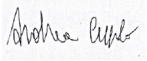
TEST REPORT

Report Number	290/20/00287/EMC	Rev. 00
Date of document	2020-08-06	
Total number of pages	Pag. 41	
OBJECT	EMC Tests	
CUSTOMER	TurnKey Technology S.r.l.s (T.K.T.)	
EQUIPMENT UNDER TEST	Nebulizing diffuser	
MODEL	Ayra mini	

SUMMARY

Tested by *(Name + Signature)*	ANDREA CROCCHI *Test engineer*		Documento firmato da: CROCCHI ANDREA 04.09.2020 06:49:22 UTC
Tested by *(Name + Signature)*	MARCO NICOLE' *Test engineer*		Documento firmato da: NICOLE' MARCO 16.09.2020 07:53:05 UTC
Tested by *(Name + Signature)*	SABINA SPINELLI *Test engineer*		Documento firmato da: SPINELLI SABINA 27.08.2020 18:39:16 UTC
Verified by *(Name + Signature)*	ANDREA CUPIDO *Lab Manager*		Documento firmato da: CUPIDO ANDREA 31.08.2020 04:40:07 UTC
Approved and issued by *(Name + Signature)*	ALESSANDRO ZUCCATO *Lab Director*		Documento firmato da: ZUCCATO ALESSANDRO 17.09.2020 13:22:35 UTC

History sheet of test Report			
Report Number	**Rev.**	**Date**	**Description of modification**
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1 OBJECT OF THE TESTS

The objective of the tests is the evaluation of the conformity of the EUT to the requirements of the standards and test methods specified on par. 4 of present Test Report.

2 IDENTIFICATION

2.1 Laboratory

Name : CREI Ven S.c.a.r.l.
CENTRO RICERCA ELETTRONICA INDUSTRIALE VENETO
Street: Corso Spagna, 12
City : 35127 Padova - ITALY
Phone : +39.049.8704036
Fax: +39.049.8707037
E-mail : info@creiven.it

2.2 Customer

Customer: TurnKey Technology S.r.l.s (T.K.T.)
Street: Sestriere Canareggio 521
City: 30121 Venezia (VE)
Refer to : Mr Tiziano Montemezzo

3 EQUIPMENT UNDER TEST (EUT)

3.1 EUT identification (declared by the customer)

EUT Description: Nebulizing diffuser
Model: Ayra mini
Code: DIF-0020-R0-M-24
Serial N°: 20 27 3900 0000 X
Software release: Fw 1.1
Size: 535 x 300 x 200 [mm]
Manufacturer: Project Vending S.r.l.
Supply voltage: 230 Vac
Frequency: 50/60 Hz
Rated Electrical Power: 80 W
Rated Electrical Current: 0.5 A

3.2 EUT additional information

Object	Descriptions
EUT Internal frequencies (Fundamental frequency of any signal used in the device)	< 108 MHz as specified by the manufacturer
Date of receipt of test item	2020-07-25
Date(s) of performance of tests	See the data specified in test results details

3.3 EUT cables

The EUT has been configured by the manufacturer with the following input / output cables:

Classification	Description	Cable		Note
		Shielded	Specified max. length	
AC power port	AC input cable	☐	none	

3.4 EUT Auxiliary Equipments (AEs)

None.

3.5 Sampling and adopted criteria

Equipment used for testing was selected by the customer. Sampling criteria adopted by the customer is unknown to CREI Ven laboratory.

4 REFERENCE STANDARDS

4.1 Reference standards

DOCUMENT	DATE	OBJECT
EN 55014-1	2017	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus. Part 1: Emission
EN 55014-2	2015	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity - Product family standard

4.1.1 Emission summary

The following table specifies the tests required by the reference standard and test performed on EUT.

EUT PORT	Requirement of reference standard	Tested	Note	Results
Enclosure	Radiated disturbance Range 30÷1000MHz	YES	---	***Complies***
Mains terminals	Disturbance voltage: continuous disturbance	YES	---	***Complies***
	Disturbance voltage: discontinuous disturbance	YES	---	***Complies***
	Voltage Fluctuation and Flicker	YES	---	***Complies***
	Harmonic	YES	---	***Complies***

4.1.2 Immunity summary

The following table specifies the tests required by the reference standard and test performed on EUT.

EUT PORT	Required by reference standard	Tested	Note	Results
Enclosure	Electrostatic discharge	YES	---	***Complies***
A.c. Input port	Radio frequency common mode	YES	---	***Complies***
	Fast Transient	YES	---	***Complies***
	Surge	YES	---	***Complies***
	Voltage dips and interruptions	YES	---	***Complies***

4.1.3 Performance criteria of immunity reference standards

The following performance criteria have been adopted:

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

5 TEST METHODS

5.1 Test methods

DOCUMENT	DATE	METHOD	ACCREDIA accreditation	Test Sequence (See Note 1)
EN 55014-1	2017	Measurement of disturbance voltage: continuous disturbance	Yes	01
EN 55014-1	2017	Measurement of disturbance voltage: discontinuous disturbance (Click)	Yes	09
EN 55016-2-3	2017	Measurement of radio disturbance characteristics	Yes	04
EN 61000-3-2	2014	Measurement of harmonic current	Yes	05
EN 61000-3-3	2013	Measurement of voltage fluctuations and flicker in low voltage supply	Yes	06
EN 61000-4-2	2009	Electrostatic discharge immunity test	Yes	08
EN 61000-4-4	2012	Electrical fast transient/burst immunity test	Yes	02
EN 61000-4-5	2014	Surge immunity test	Yes	10
EN 61000-4-5/A1	2017			
EN 61000-4-6	2014	Immunity to conducted disturbances, induced by radio-frequency fields	Yes	03
EN 61000-4-6/AC	2015			
EN 61000-4-11	2004	Voltage dips, short interruptions and voltage variations immunity tests	Yes	07
EN 61000-4-11/A1	2017			
Note : 1) The tests have been carried out in the order specified in this column				

5.2 Deviation from test methods

None.

6 EUT OPERATING CONDITIONS DURING TESTS

The EUT was set to function as indicated in Table 1, in compliance with the manufacturer's prescriptions and with that which is stated in the applied standards, test methods and procedures.

OPERATING CONDITION	DESCRIPTION OF FUNCTIONING
OC01	EUT details : during the test the EUT • was powered at 230 Va.c. – 50 Hz • was in continuous working state (3 knobs set at maximum) 

7 EUT REPRESENTATIVE PERFORMANCE PARAMETERS

To evaluate the EUT performance during immunity tests, according to the evaluation criteria indicated in par. 4.1.3 of the present report, the following parameters and manufacturer's degradation were taken into consideration:

PARAMETER	DESCRIPTION	MANUFACTURER'S SPECIFIED DEGRADATION
n°1	EUT status	None
n°2	Green led status	None

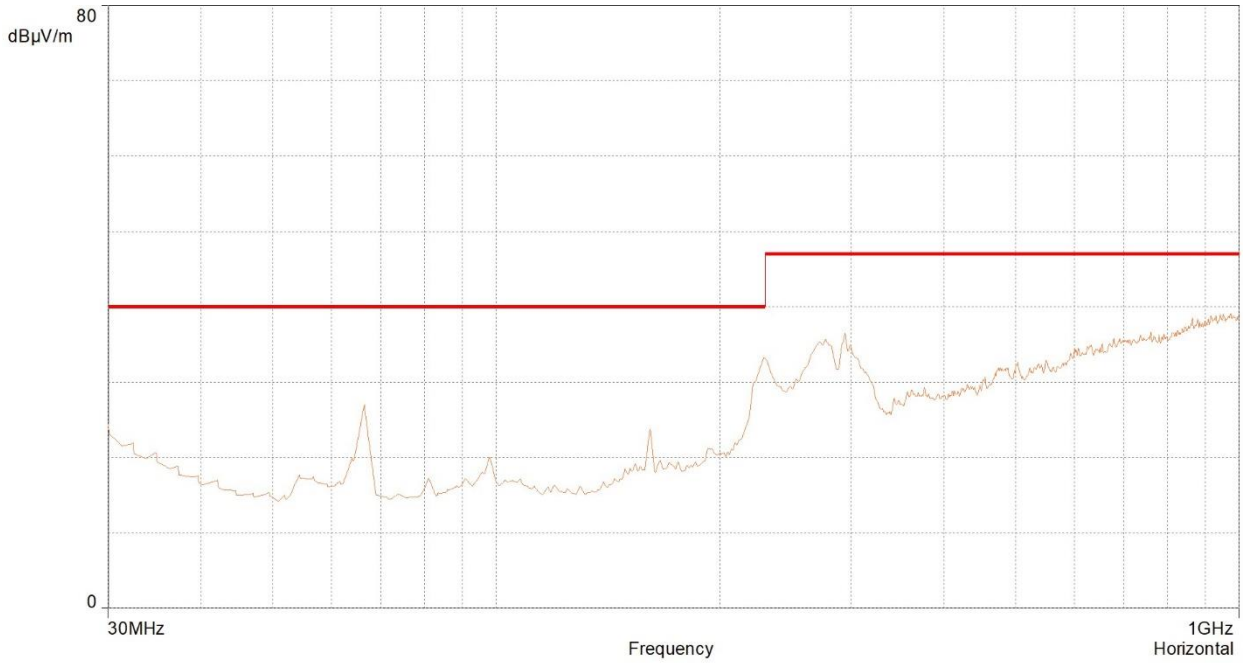
8 TEST RESULT

Test method:	**EN 55016-2-3** **Measurement of radio disturbance (30 MHz ÷ 1 GHz)** For details see par. 5 of this report	
Operator	Sabina Spinelli	
Test Date	2020-08-03	
Test Temperature	26.5°C	
Test Humidity	54%	
Test Pressure	1003hPa	
EUT Classification	Class:B (EN 55016-2-3)	
Electrical wiring	*Cable*	*Length [m]*
	Power supply cable	
Operating conditions	OC01 See par. 6 of this report	
Auxiliary equipment (AE)	See par. 3.4 of this report	
Frequency range	(30 MHz ÷ 1 GHz)	
Test set up	Floor standing set up	
Measuring distance	3 m	
Limits	The reference standard limit has been relaxed by using an inverse proportional factor of 20 dB/dec, in order to refer the measurement results to the specified distance.	
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	
EUT modification during this test	None	
Result	**COMPLIES**	
Note		

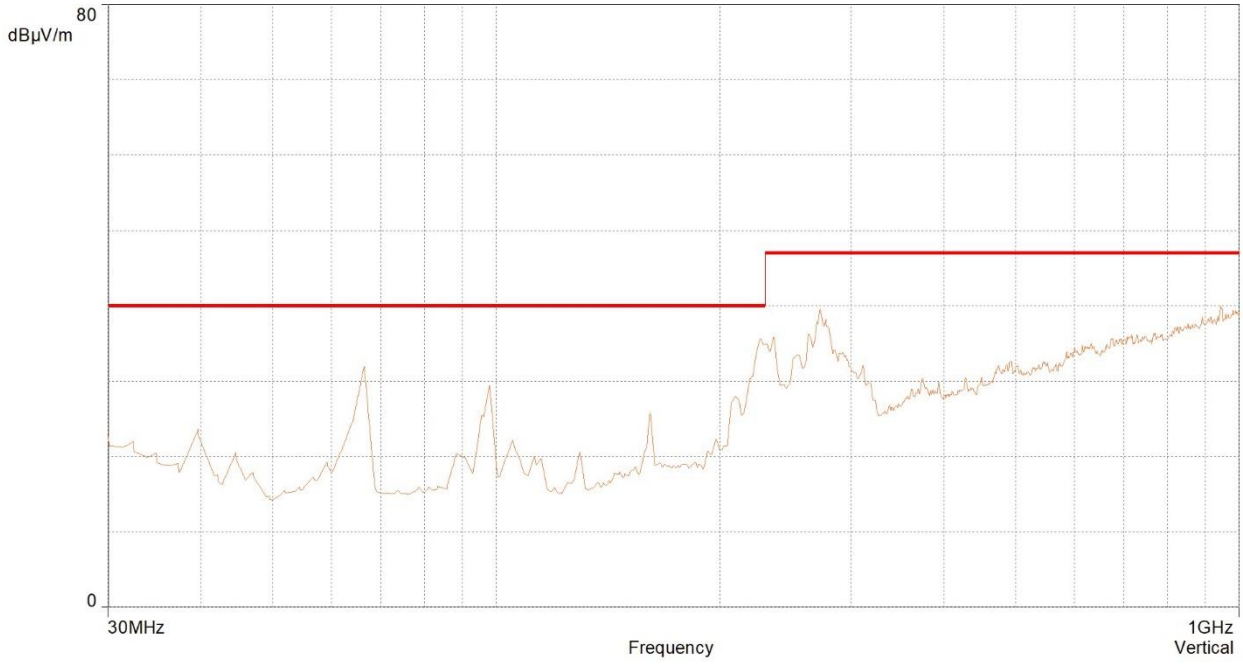
TEST GRAPHS AND MEASUREMENTS

All traces have been acquired with Peak detector in Max-Hold mode (Maximum-Hold allows to record the maximum values of the spectra)

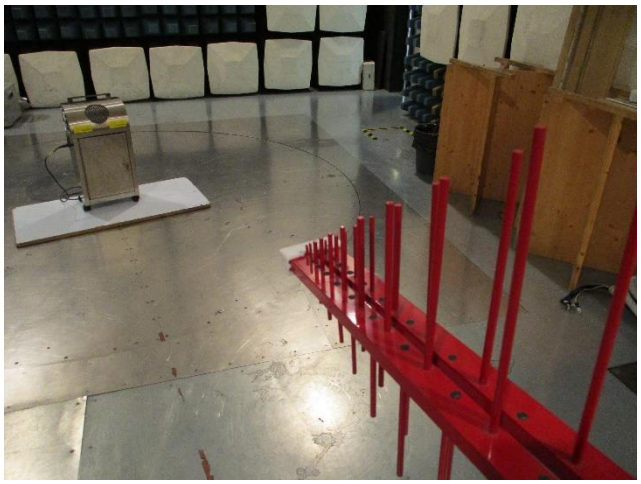
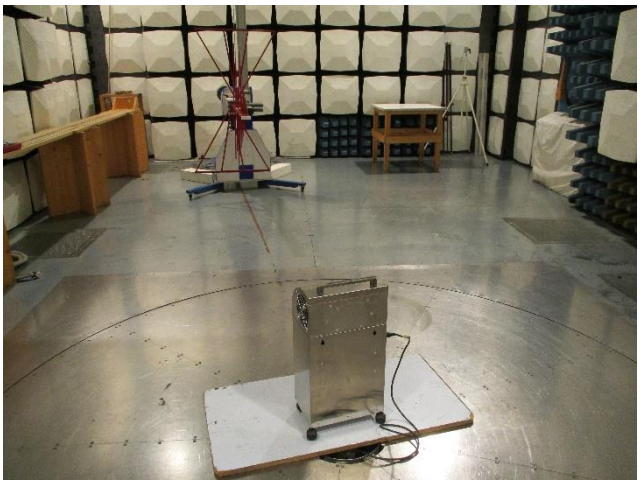
Measurement 01 Horizontal
EUT disposal: Complete rotation (360°) – **Antenna height:** 1 ÷ 4 m – **Antenna Pol.:** Horizontal
Range: 30MHz÷ 1GHz
Operating Condition: OC01



Measurement 02 Vertical
EUT disposal: Complete rotation (360°) – **Antenna height:** 1 ÷ 4 m – **Antenna Pol.:** Vertical
Range: 30MHz÷ 1GHz
Operating Condition: OC01



TEST PHOTOGRAPHS

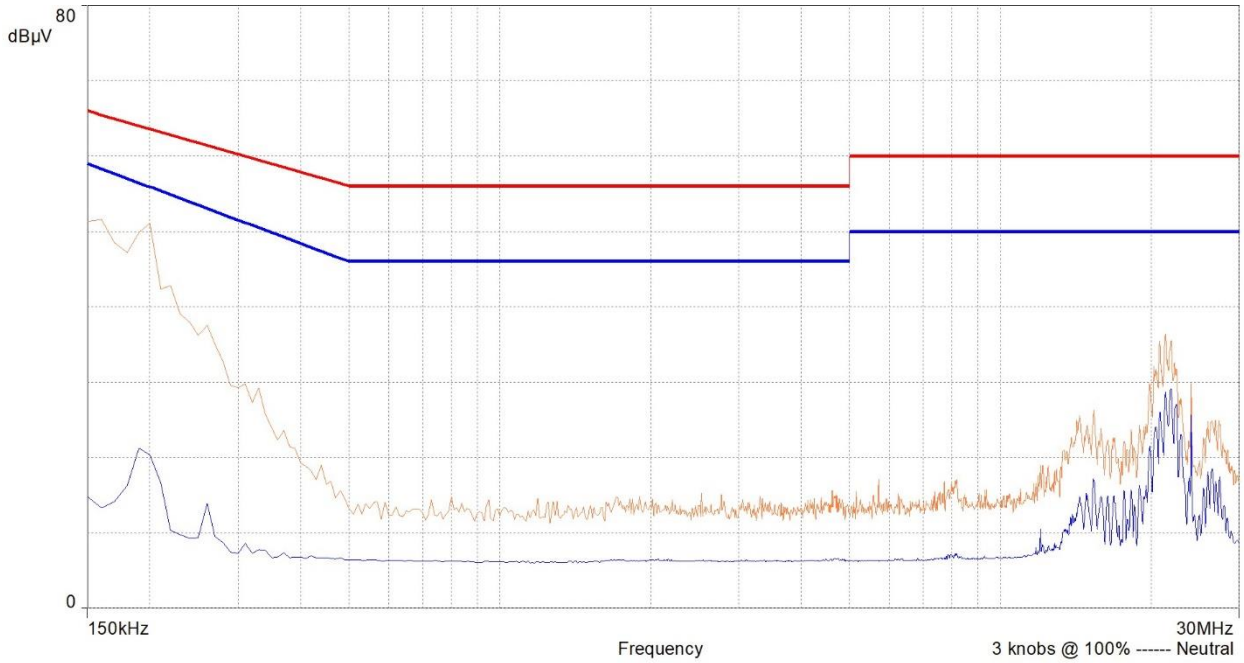
Measurement of radio disturbance characteristics: Table position = 0 deg. Range: 30MHz÷1GHz	Measurement of radio disturbance characteristics: Table position = 0 deg. Range: 30MHz÷1GHz
	

Test method:	**EN 55014-1** **Measurement of disturbance voltage** For details see par. 5 of this report	
Operator	Sabina Spinelli	
Test Date	2020-07-31	
Test Temperature	29°C	
Test Humidity	52%	
Test Pressure	1010hPa	
EUT Classification	Class:Mains port (EN 55014-1)	
Electrical wiring	*Cable*	*Length [m]*
	Power supply cable	1
Operating conditions	OC01 See par. 6 of this report	
Additional information	None	
Auxiliary equipment (AE)	See par. 3.4 of this report	
Frequency range	(0.15 ÷ 30) MHz	
Test set up	Floor standing set up	
Limits	In compliance with reference standard	
Port	A.C. Input - LISN measurements	
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	
EUT modification during this test	None	
Result	**COMPLIES**	
Note		

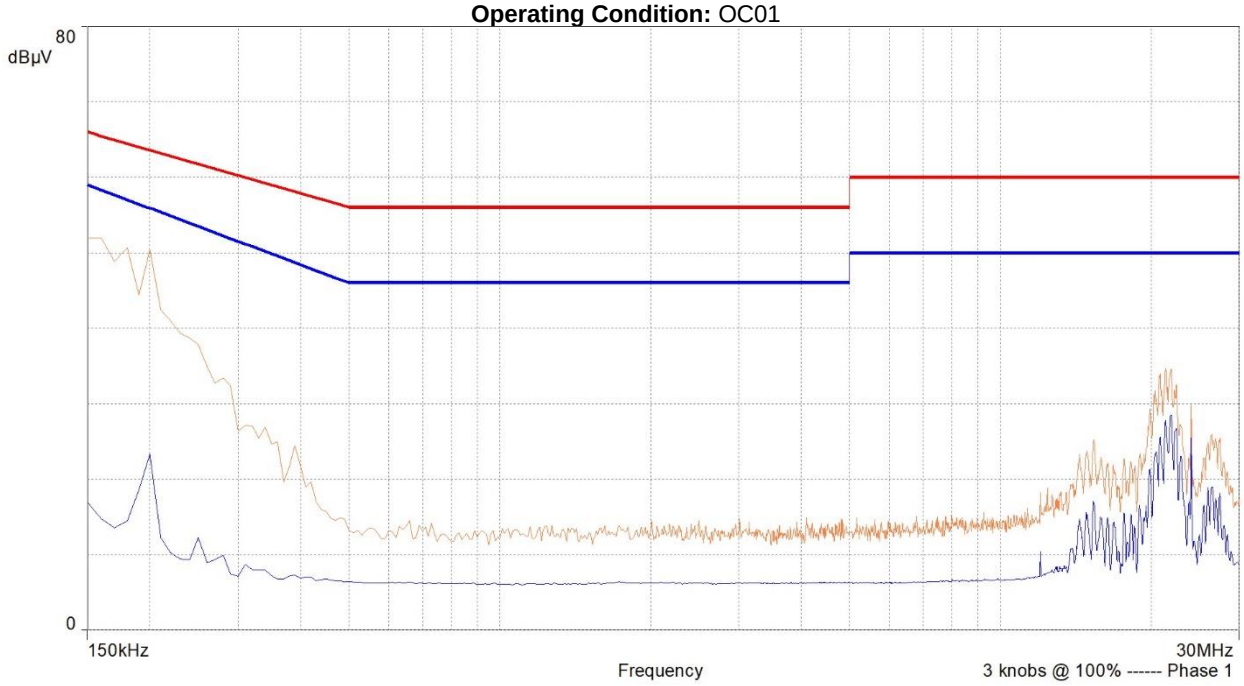
TEST GRAPHS AND MEASUREMENTS

All traces have been acquired with PK Peak detector (orange trace) and AVG Average detector (blue trace)
If PK trace exceeds QP Quasi-Peak limit, QP measurements are performed at discrete frequencies where the limit is exceeded. Measurement time for QP measurements is 15 s.
If the general level of the disturbance is not steady, also the AVG disturbance voltage level is observed for 15 s per frequency; results are reported in a specific table below the graph.

Measurement 01
A.C. Input - LISN measurements
Line: Neutral
Operating Condition: OC01



Measurement 02
A.C. Input - LISN measurements
Line: Phase 1
Operating Condition: OC01



TEST PHOTOGRAPHS

Measurement of disturbance voltage	Measurement of disturbance voltage: cable's layout
	

Test method:	**EN 55014-1** **Measurement of disturbance voltage: discontinuous disturbance (click)** For details see par. 5 of this report	
Operator	Sabina Spinelli	
Test Date	2020-08-05	
Test Temperature	27 °C	
Test Humidity	56 %	
Test Pressure	1010 hPa	
EUT Classification	None	
Electrical wiring	*Cable*	*Length [m]*
	Power supply cable	1.0
Operating conditions	OC01 See par. 6 of this report	
Additional information	None	
Auxiliary equipment (AE)	See par. 3.4 of this report	
Frequency range	0.15 MHz, 0.5 MHz, 1.4 MHz, 30 MHz	
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	
EUT modification during this test	None	
Result	**COMPLIES**	
Note		

LINE	**N**				**L1**											
Frequency [MHz]	**0,15**	**0,5**	**1,4**	**30**	**0,15**	**0,5**	**1,4**	**30**								
Lim. cont. Lq[dBµV]	**66**	**56**	**56**	**60**	**66**	**56**	**56**	**60**								
N° Click ≤ 10ms	0	0	0	0	0	0	0	0								
N° 10<Ck≤20ms	0	0	0	0	0	0	0	0								
N° 20<Ck≤200ms	0	0	0	0	0	0	0	0								
Click > 200 [ms]	0	0	0	0	0	0	0	0								
N° Click Total	0	0	0	0	0	0	0	0								
Time [min]	120	120	120	120	120	120	120	120								
Click rate N	0	0	0	0	0	0	0	0								
Result [OK; NC]	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**	**OK**								

Test method:	**EN 61000-3-2** **Measurement of harmonic current** For details see par. 5 of this report
Operator	Marco Nicolè
Test Date	2020-08-03
Test Temperature	24 °C
Test Humidity	44 %
Test Pressure	998 hPa
EN 61000-3-2 Classification	☒ Class A (balanced three-phase equipment, household appliances, excluding equipment identified as class D, tools, excluding portable tools, dimmers for incandescent lamps, audio equipment and equipment not specified in one of the three other classes) ☐ Class B (portable tools, arc welding equipment which is not professional equipment) ☐ Class C (lighting equipment) ☐ Class D (Equipment having a specified power according to 6.2.2 less than or equal to 600 W, similar to personal computers and personal computer monitors and television receivers.)
EN 61000-3-2 details	
Test observation period	150 s
Active Power	36.14 W
Power Factor	0.467
Fundamental component	0.176 A
Operating conditions	OC01 See par. 6 of this report
Auxiliary equipment (AE)	See par. 3.4 of this report
Test instrumentations	See Annex B Measuring instrumentation according to IEC 61000-4-7:2002 and IEC 61000-4-7/A1:2008
Measurement Uncertainty (k=2)	See Annex F
EUT modification during this test	None
Result	**COMPLIES**
Note	

TEST GRAPHS AND MEASUREMENTS

Table 01
Line: L1 – **Operating Condition:** OC01
Modality: Average and Maximum value for the individual harmonic currents, calculated in the observation period of test

Average and Maximum harmonic current results									
Hn	Average (100% / 150% *)				Maximum (150%)				Harmonic Result
	Ieff [A]	of Limit [%]	Limit [A]	Result	Ieff [A]	of Limit [%]	Limit [A]	Result	
1	0,156				0,176				
2	0,013				0,019				
3	0,132				0,154				
4	0,012				0,018				
5	0,121				0,141				
6	0,011				0,016				
7	0,107				0,125				
8	0,010				0,014				
9	0,090				0,104				
10	0,008				0,012				
11	0,072				0,083				
12	0,006				0,009				
13	0,053				0,061				
14	0,005				0,007				
15	0,037				0,042				
16	0,004				0,005				
17	0,022				0,024				
18	0,003				0,004				
19	0,011				0,016				
20	0,003				0,004				
21	0,005				0,014				
22	0,002				0,003				
23	0,008				0,011				
24	0,002				0,003				
25	0,009				0,010				
26	0,002				0,003				
27	0,009				0,010				
28	0,002				0,002				
29	0,007				0,008				
30	0,001				0,002				
31	0,004				0,005				
32	0,001				0,002				
33	0,002				0,003				

34	0,001				0,002				
35	0,002				0,002				
36	0,001				0,002				
37	0,003				0,003				
38	0,001				0,001				
39	0,003				0,004				
40	0,001				0,001				

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.
** Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.*

TEST PHOTOGRAPHS

Measurement of harmonic current

Test method:	**EN 61000-3-3** **Measurement of voltage fluctuations and flicker in low voltage supply** For details see par. 5 of this report
Operator	Marco Nicolè
Test Date	2020-08-03
Test Temperature	24 °C
Test Humidity	44 %
Test Pressure	998 hPa
Operating conditions	OC01 See par. 6 of this report
Auxiliary equipment (AE)	See par. 3.4 of this report
Test instrumentations	See Annex B
Measurement Uncertainty (k=2)	See Annex F
EUT modification during this test	None
Note	

MEASUREMENTS

Parameter	**Line L1**	**Limits**	**Result**
P_{st}	0.028	1.00	**COMPLIES**
P_{lt}	0.028	0.65	**COMPLIES**
d_c [%]	0.029	3.3%	**COMPLIES**
d_{max} [%]	<0.2	☒ 4% ☐ 6% ☐ 7%	**COMPLIES**
T_{max} [ms]	0	500 ms	**COMPLIES**

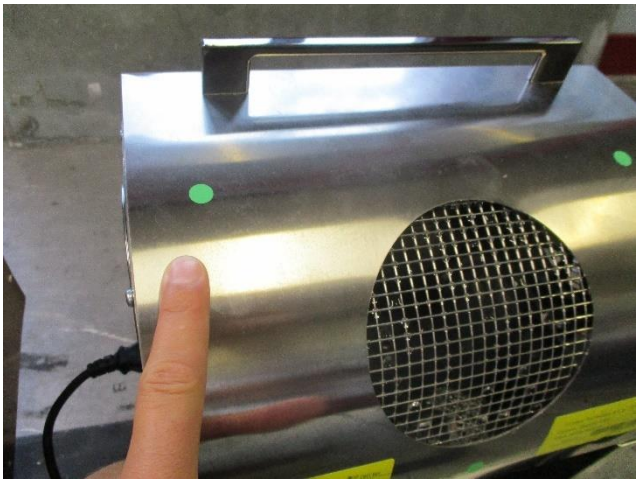
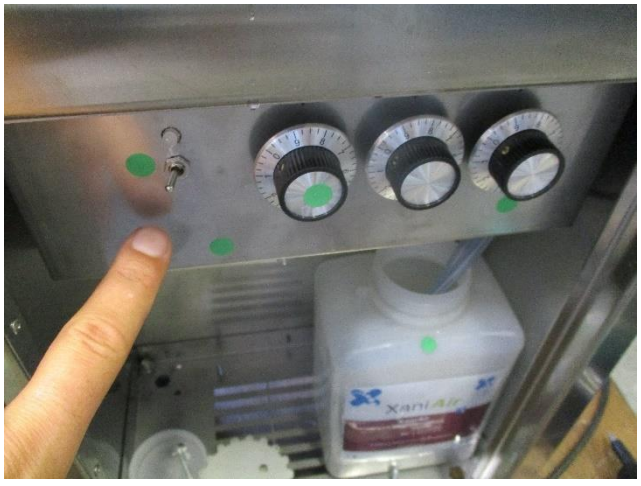
TEST PHOTOGRAPHS

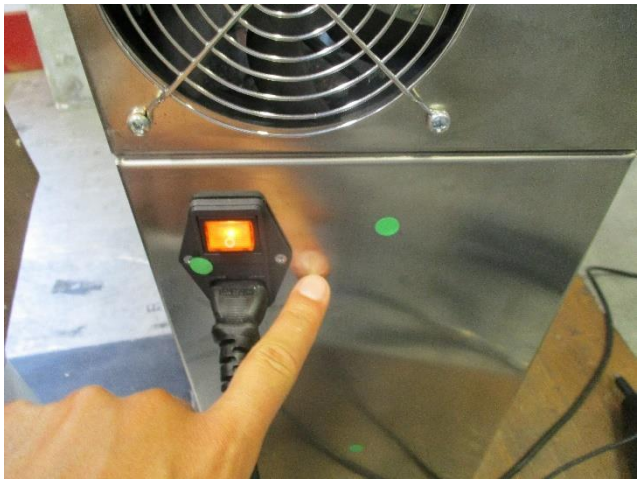
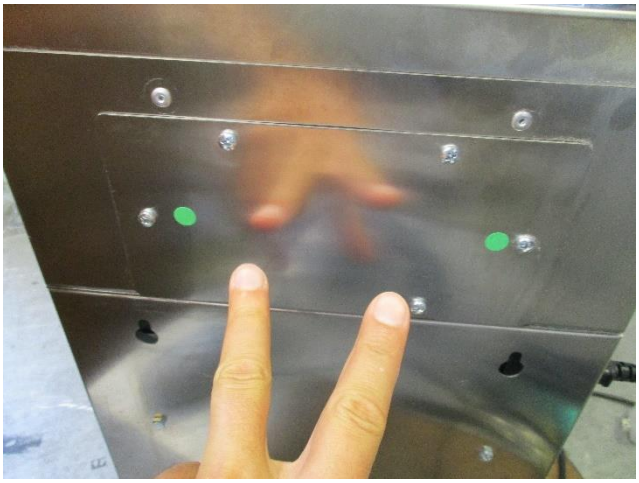
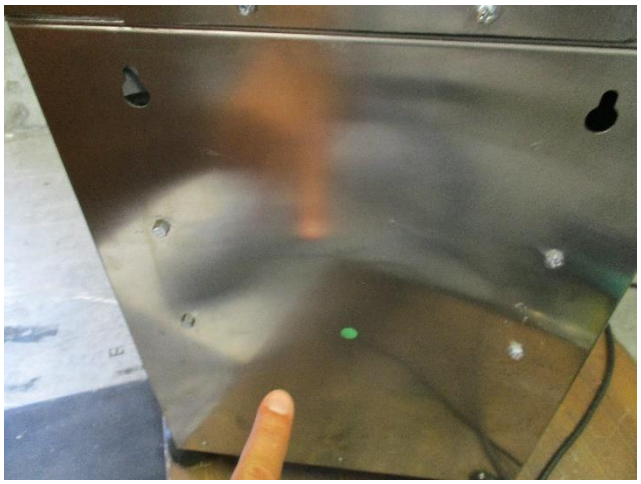
Measurement of voltage fluctuating and flicker

Test method:	**EN 61000-4-2** **Electrostatic discharge immunity test** For details see par. 5 of this report	
Operator	Marco Nicolè	
Test Date	2020-08-03	
Test Temperature	29 °C	
Test Humidity	44 %	
Test Pressure	999 hPa	
EUT Classification	Category II	
Electrical wiring	*Cable*	*Length [m]*
	Power supply cable	1.5
Operating conditions	OC01 See par. 6 of this report	
Test set up	Floor standing set up	
Auxiliary equipment (AE)	See par. 3.4 of this report	
Test procedure	Contact, direct and indirect discharge: - 10 discharges at each point of application - 1 s between successive discharges - Polarity: + / - Air discharge: - 10 discharges at each point of application - Polarity: + / - - the test is applied at all test levels specified in Table 1 of EN 61000-4-2 standard up to and including the maximum level	
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	

EUT disposal and points of application	**Application**	**Test level [kV]**	**Performance criteria (par. 4.1.3)**	**Remarks**	**Result**
See test photographs	Contact direct discharge	± 4	B	A1	**COMPLIES**
	Contact indirect discharge (Vertical plane)	± 4	B	A1	**COMPLIES**
	Air discharge	± 8	B	A1	**COMPLIES**
Remarks	A1: No loss of performance or function For EUT Representative performance parameters see par. 7 of this test report				
EUT modification during this test	None				
Note					

TEST PHOTOGRAPHS

Electrostatic discharge immunity test 	**Electrostatic discharge immunity test: cable's layout** 
Electrostatic discharge immunity test: Points of application 	**Electrostatic discharge immunity test: Points of application** 
Electrostatic discharge immunity test: Points of application 	**Electrostatic discharge immunity test: Points of application** 

Electrostatic discharge immunity test: Points of application	**Electrostatic discharge immunity test: Points of application**
	
Electrostatic discharge immunity test: Points of application	**Electrostatic discharge immunity test: Points of application**
	

Test method:	**EN 61000-4-4** **Electrical fast transient/burst immunity test** For details see par. 5 of this report	
Operator	Sabina Spinelli	
Test Date	2020-07-31	
Test Temperature	29 °C	
Test Humidity	45 %	
Test Pressure	1008 hPa	
EUT Classification	Category II	
Electrical wiring	*Cable*	*Length [m]*
	Power supply cable	1
Operating conditions	OC01 See par. 6 of this report	
Auxiliary equipment (AE)	See par. 3.4 of this report	
Test procedure	- Burst duration: 15 ms - Burst period 300 ms - Spike frequency 5 kHz - Burst polarity: + / - - Duration of burst sequence per polarity: 120 s - Interval between successive applications : 10 s	
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	

Port	**Description**	**Injection**	**Test Level [kV]**	**Perform. criteria (par. 4.1.3)**	**Remarks**	**Result**
AC power port	A.C. input	Direct (CDN) Note 1	± 1	B	A1	**COMPLIES**

Remarks	A1: No loss of performance or function For EUT Representative performance parameters see par. 7 of this test report
EUT modification during this test	None
Note	1) L1, N and P.E terminals have been stimulated simultaneously

TEST PHOTOGRAPHS

Electrical fast transient/burst immunity test	Electrical fast transient immunity test: cable's layout
	

Test method:	**EN 61000-4-5** **Surge immunity test** For details see par. 5 of this report	
Operator	Sabina Spinelli	
Test Date	2020-08-06	
Test Temperature	25 °C	
Test Humidity	48 %	
Test Pressure	1012 hPa	
EUT Classification	Category II	
Electrical wiring	*Cable*	*Length [m]*
	Power supply cable	1
Operating conditions	OC01 See par. 6 of this report	
Auxiliary equipment (AE)	See par. 3.4 of this report	
Test procedure	- Surge polarity: + / - randomly applied - Surge polarity: + / - at 0, 90, 180, 270 voltage phase - N of impulses per polarity: 5 - Interval between successive applications : 60 s	
Coupling	CM = Common Mode DM = Differential mode	
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	

Port	**Description**	**Injection**	**Coupling**	**Test Level [kV]**	**Perform. criteria (par. 4.1.3)**	**Remarks**	**Result**
AC power port	A.C. input	Direct (CDN) Add. R = 10 Ω	CM	± 2	B	A1	**COMPLIES**
AC power port	A.C. input	Direct (CDN)	DM	± 1	B	A1	**COMPLIES**

Remarks	A1: No loss of performance or function B1: Temporary loss of function or performance which is self-recoverable For EUT Representative performance parameters see par. 7 of this test report
EUT modification during this test	None
Note	

TEST PHOTOGRAPHS

Surge immunity test

Test method:	**EN 61000-4-6** **Immunity to conducted disturbance, induced by radio frequency fields** For details see par. 5 of this report	
Operator	Andrea Crocchi/Andrea Cupido	
Test Date	2020-08-03	
Test Temperature	26°C	
Test Humidity	67%	
Test Pressure	1010hPa	
EUT Classification	Category II (EN 55014-2)	
Electrical wiring	*Cable*	*Length [m]*
	Power supply cable	1.0
Operating conditions	OC01 See par. 6 of this report	
Auxiliary equipment (AE)	See par. 3.4 of this report	
Test procedure	- Frequency sweep mode = Logarithmic - Step = 1 % - Application time = 2 s - Modulation = AM - Modulating Signal = sinusoidal 1 kHz - Amplitude modulation = 80 %	
Test instrumentations	See Annex B	
Measurement Uncertainty (k=2)	See Annex F	

Port	**Description**	**Coupling device**	**CDN with 50Ω termination**	**Range [MHz]**	**Test level unmod. Rms [V]**	**Perform. criteria (par. 4.1.3)**	**Remarks**	**Result**
AC power port	AC input cable	CDN M3	CDM M1 Connected to : Eut Enclosure	150kHz÷ 230MHz	3	A	A1	**COMPLIES**

Remarks	A1: No loss of performance or function For EUT Representative performance parameters see par. 7 of this test report
EUT modification during this test	None
Note	

TEST PHOTOGRAPHS

Immunity to conducted disturbance, induced by RF	Immunity to conducted disturbance, induced by RF:
	

Test method:	**EN 61000-4-11** **Voltage dips, short interruptions and voltage variations immunity tests** For details see par. 5 of this report
Operator	Marco Nicolè
Test Date	2020-08-03
Test Temperature	24 °C
Test Humidity	44 %
Test Pressure	998 hPa
EUT Classification	Category II (EN 55014-2)
EUT rated voltage See 3.1	230 Va.c. (U_T) Equipment having a rated voltage range: ☒ If the voltage range does not exceed 20 % of the lower voltage specified for the rated voltage range, a single voltage within that range may be specified as a basis for test level specification (U_T) ☐ If the voltage range exceed 20 % of the lower voltage specified for the rated voltage range, the test procedure shall be applied for both the lowest and highest voltages declared in the voltage range
Operating conditions	OC01 See par. 6 of this report
Auxiliary equipment (AE)	See par. 3.4 of this report
Test instrumentations	See Annex B
Measurement Uncertainty (k=2)	See Annex F

Phenomena	**Voltage dips**	**Test level**	**Duration**	**Number sequence**	**Perform. criteria (par. 4.1.3)**	**Remarks**	**Result**
Voltage dips	100 % U_T	0 % U_T	0.5 $T_{fond.}$	3 with interval of 10s	C	A1	**COMPLIES**
Voltage dips	60 % U_T	40 % U_T	10 $T_{fond.}$	3 with interval of 10s	C	A1	**COMPLIES**
Voltage dips	30 % U_T	70 % U_T	25 $T_{fond.}$	3 with interval of 10s	C	A1	**COMPLIES**
Note	Voltage dips and interruptions are applied at zero crossing of the supply voltage						

Remarks	A1: No loss of performance or function For EUT Representative performance parameters see par. 7 of this test report
EUT modification during this test	None
Note	

TEST PHOTOGRAPHS

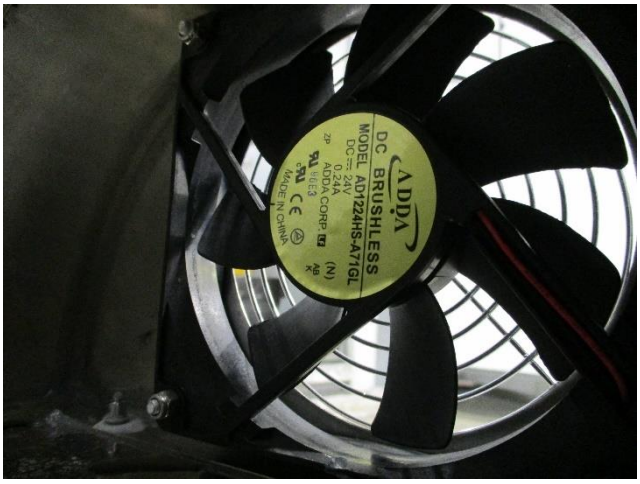
Voltage dips, short interruptions and voltage variations immunity tests

9 PHOTOGRAPHS

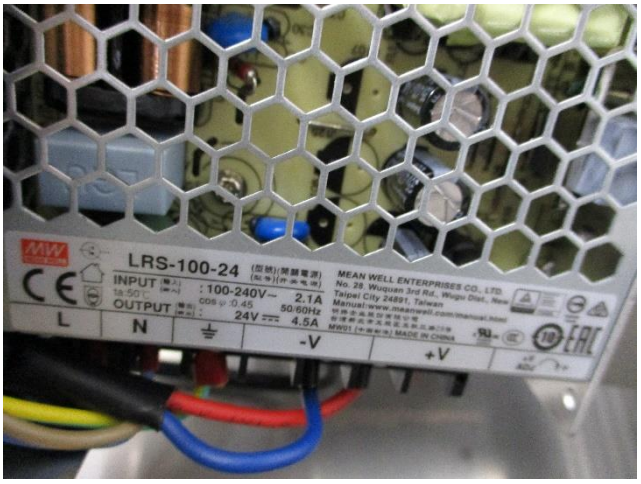
9.1 EUT's Photographs

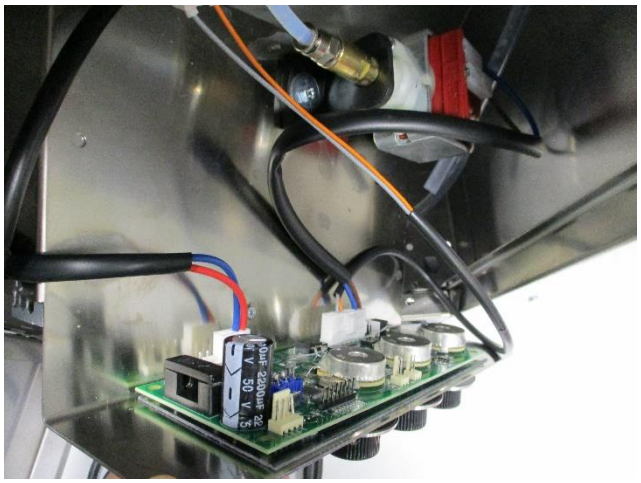
Side right

Side left




HB98017895


LRS-100-24
INPUT
: 100-240V~ 2.1A
OUTPUT
24V 4.5A
L
N
-V
+V
MEAN WELL ENTERPRISES CO., LTD.



10 EUT MODIFICATIONS

None.

Annex B Test instrumentations

61000-4-11 - Immunity to voltage dips, short interruption and voltage variation

Description	Manufacturer	Model	Identifier	Cal data	Cal due
Power fail simulator - Generator	EM/TEST	PFS 500	065/LAB	2020-02-11	2021-02-10
SOURCE/SORGENTE AC Grid Simulator	ELETTROTEST S.p.A.	TPS 20 kW	053/LAB	2020-02-06	2021-02-05

61000-4-2 - Immunity to electrostatic discharge

Description	Manufacturer	Model	Identifier	Cal data	Cal due
ESD generator	Haefely	ONYX 30	1061/LAB	2020-02-13	2021-02-12
ESD Vertical Coupling Plane - for floor set up	CREI Ven		1204/LAB	--	--

61000-4-4 - Immunity to electrical fast transient - BURST

Description	Manufacturer	Model	Identifier	Cal data	Cal due
Burst Generator	EM Test	EFT 500	1134/LAB	2020-01-08	2021-01-07
EFT Capacitive Clamp (for 1134/LAB Burst Generator	Schloder GmbH	SFT 415	1135/LAB	--	--

61000-4-5 - Immunity to SURGE

Description	Manufacturer	Model	Identifier	Cal data	Cal due
Surge Generator	KEYTEK	SERIES 100	003L/LT	2020-05-08	2021-05-08

61000-4-6 - Immunity to conducted disturbance, induced to radio frequency fields

Description	Manufacturer	Model	Identifier	Cal data	Cal due

Annex B Test instrumentations

CDN M3	Schloeder	801-M3-16	1127/LAB	2019-07-05	2020-07-04
Attenuator - 6 dB	Spin	SPIN SACB06-50SN	1206/LAB	2019-09-30	2020-09-29
RF Cable - BNC-BNC 4,5 m	CREI Ven		1208/LAB	2019-08-29	2020-08-28
Signal Generator	HEWLETT PACKARD	HP 8656B	170/LAB	2020-02-04	2021-02-03
RF Cable - BNC-BNC 10m			226/LAB	2019-08-29	2020-08-28
RF Cable - BNC-BNC 2m	CREI Ven		359/LAB	2019-08-29	2020-08-28
Test Bench EN 61000-4-6 - Calibration			941/LAB	2020-02-07	2021-02-06
Amplifier	AMPLIFIER RESEARCH	75A220	011L/LAB	2020-01-24	2022-01-23
RF Cable - BNC-BNC 0,2m	CREI Ven		361/LAB	2019-08-29	2020-08-28

Emission: 61000-3-2 / 61000-3-12 Harmonic current emission measurement

Description	Manufacturer	Model	Identifier	Cal data	Cal due
SOURCE/SORGENTE AC Grid Simulator	ELETTROTEST S.p.A.	TPS 20 kW	053/LAB	2020-02-06	2021-02-05
POWER ANALYZER - Harmonic and Flicker analyzer	EM TEST	DPA 503	642/LAB	2019-08-27	2020-08-26
POWER ANALYZER - Harmonic and Flicker analyzer	EM TEST	DPA 503	642/LAB	2019-08-27	2020-08-26
Current clamp - Power analyzer DPA503	Universal Technic S.A.S.	M1 U 200A/2V	643/LAB	--	--

Annex B Test instrumentations

Current clamp - Power analyzer DPA503	Universal Technic S.A.S.	M1 U 200A/2V	644/LAB	--	--
Current clamp - Power analyzer DPA503	Universal Technic S.A.S.	M1 U 200A/2V	645/LAB	--	--

Emission: 61000-3-3 / 61000-3-11 Voltage fluctuation and flicker measurement

Description	Manufacturer	Model	Identifier	Cal data	Cal due
Standard Impedance	CREI Ven	Zref	856/LAB	2020-03-12	2021-03-12
SOURCE/SORGENTE AC Grid Simulator	ELETTROTEST S.p.A.	TPS 20 kW	053/LAB	2020-02-06	2021-02-05
POWER ANALYZER - Harmonic and Flicker analyzer	EM TEST	DPA 503	642/LAB	2019-08-27	2020-08-26
POWER ANALYZER - Harmonic and Flicker analyzer	EM TEST	DPA 503	642/LAB	2019-08-27	2020-08-26

Emission: Discontinuous terminal disturbance voltage measurement

Description	Manufacturer	Model	Identifier	Cal data	Cal due
EMI Receiver - MXE	Keysight Technologies	N9038A	1444/LAB	2019-10-24	2020-10-23
RF Cable - N-N 1,8m	Siva Cables Italy	RG 58A/U	243/LAB	2020-06-30	2021-06-30
RF Cable - N-N 5m	INTERCOND	M17/74 RG 213	225/LAB	2020-06-30	2021-06-30

Emission: Radiated disturbance measurements (30 MHz ÷ 1 GHz)

Description	Manufacturer	Model	Identifier	Cal data	Cal due
Antenna - BiConiLog Antenna 30MHz÷ 6 GHz	ETS-LINDGREN	3142E	1508/LAB	2018-06-18	2021-06-17

Annex B Test instrumentations

EMI Receiver	HEWLETT PACKARD	8542E	031L/LAB	2019-11-25	2020-12-24
RF cable - set of RF cables (771/LAB + 791/LAB + 9			802/LAB	2020-01-28	2021-01-27
Semianechoic Chamber	Albatross Projects GmbH		739/CA	2019-02-04	2021-02-03

Emission: Terminal disturbance voltage measurements

Description	Manufacturer	Model	Identifier	Cal data	Cal due
Pulse Limiter ESH3-Z2	ROHDE&SCHWARZ Gmbh	ESH3-Z2	528/LAB	2020-06-30	2021-06-30
Filter PB	G. De PAOLI	BPF.0.15-30MHz	268/LAB	2020-06-30	2021-06-30
RF Cable - N-N 1,8m	Siva Cables Italy	RG 58A/U	243/LAB	2020-06-30	2021-06-30
RF Cable - N-N 5m	INTERCOND	M17/74 RG 213	225/LAB	2020-06-30	2021-06-30
EMI Receiver	ROHDE&SCHWARZ	ESHS10 9kHz...30MHz	030L/CS	2020-05-06	2021-05-06

Annex D Auxiliary instrumentations

Application	*Description*	*Manufacturer*	*Model*	*Identifier*	*Cal. data*	*Cal. due*
Monitoring of environmental conditions	Climatic Sensor (pri site) - 739/LAB Emission Anec	HW group	HWg-STE	1299/LAB	2019-07-22	2020-07-21
Monitoring of environmental conditions	Climatic Sensor (pri site) - 051L/CS Shielded Cham	HW group	HWg-STE	1300/LAB	2019-07-22	2020-07-21
Monitoring of environmental conditions	Climatic Sensor (pri site) - EMC Laboratory - ECAT	HW group	HWg-STE	1301/LAB	2019-07-22	2020-07-21
Monitoring of environmental conditions	Climatic Sensor (pri site) - IP test area / Low Fr	HW group	HWg-STE	1326/LAB	2019-07-22	2020-07-21
Monitoring of environmental conditions	Pressure Transducer	COMET	T7410	1530/LAB	2019-10-28	2020-10-27
Distance monitoring	Metro Laser	Leica	DISTO A2	1094/LAB	2019-11-11	2020-11-10

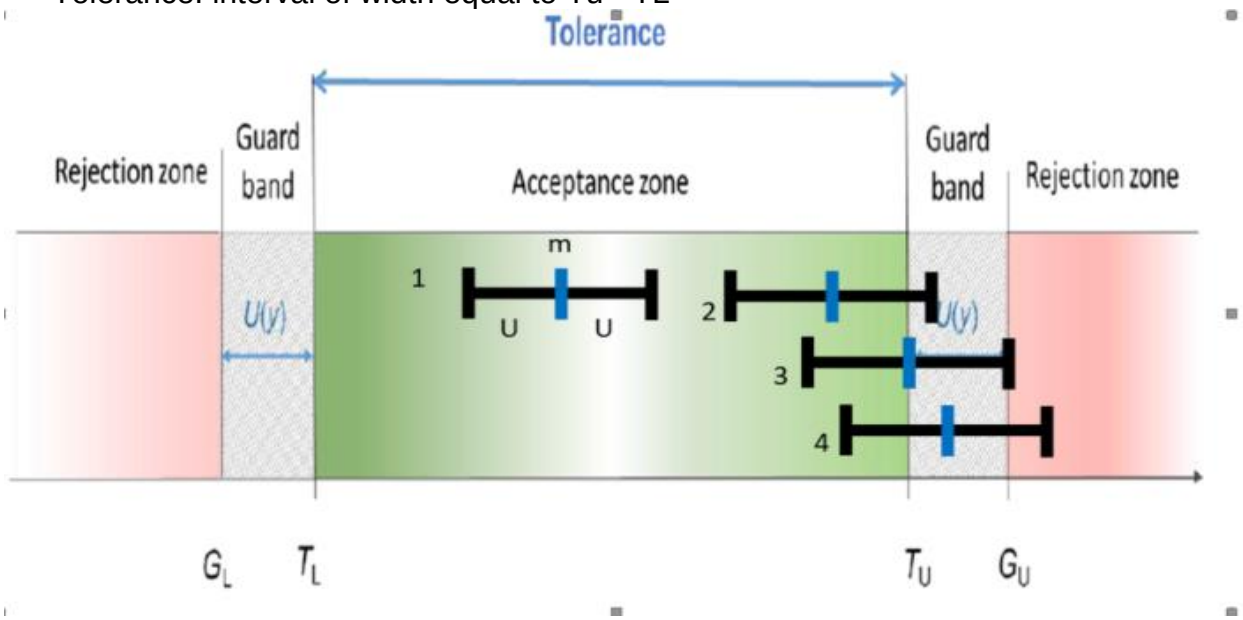
Annex F Compliance Decision Rule and measurements uncertainty

F1: Decision Rule

- A decision rule defines the role of uncertainty in assessing the conformity of measured values with respect to specification limits.
- The CREIVen decision rule uses the “guard band” method minimizing the “supplier risk” (type 1 risk or alpha risk), that is the risk of refusing a compliant product.
- The "guard band" is established equal to the extended uncertainty U beyond the tolerance limit; Gu = Tu + U
- The probability distribution of the measurement uncertainty is assumed to be Gaussian,

Nomenclature

- Gu: (G_L) width of the Upper (lower) guard band
- m: measured value
- P: probability of correct acceptation, (1-P: probability of refusing a compliant product)
- Tu: upper tolerance limit
- TL: lower tolerance limit
- Tolerance: interval of width equal to Tu - TL



Case	Decision Rule	Note
Case 1, 2, 3	Measurement complies with specifications	• **$T_L \leq m \leq Tu$**; the probability **P** of correct acceptation is: 100 **≤ P ≤** 50% • **m+U (m-U)** always falls into the Gu (G_L)
Case 4	Measurement NOT complies with specifications	• **m > Tu (T_L):** the probability **P** of correct acceptation is lower than 50% • **m+U (m-U)** falls into the uopper (lower) rejection zone

In accordance with :

Annex F Compliance Decision Rule and measurements uncertainty

- IEC Guide 115 Application of uncertainty of measurement to conformity assessment activities in the electrotechnical sector
- ILAC-G8:03/2009 Guidelines on the Reporting of Compliance with Specification
- EUROLAB Technical report nr 01/2017
- JGCM guide 106:2012

Annex F Compliance Decision Rule and measurements uncertainty

F.2 Measurements uncertainty

Set Up N.	*Expanded Uncertainty (k=2 - coverage factor: 95%)*
4	**Power disturbance measurement**
Test Uncertainty [dB]	4.5
5	**Discontinuous terminal disturbance voltage measurement**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty [dB]	3.4
7	**Harmonic current emission measurement**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty [%]	7.5
8	**Voltage fluctuation and Flicker measurement up to 16A**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Uncertainty Dmax [%]	8.0
Uncertainty Dc [%]	8.0
Uncertainty Pst [%]	8.0
8	**Voltage fluctuation and Flicker measurement up to 75A**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Uncertainty Dmax< 3% [%]	8.0
Uncertainty Dmax 3% -> 7% [%]	8.0
Uncertainty Dmax > 7% [%]	8.0
34 - LISN DC PMM	**Conducted emissions from components/modules - Voltage measurements**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty [dB]	3.2
35 – Current Probe	**Conducted emissions from components/modules – Current measurements**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty [dB]	2.9
36 – Radiated emission	**36 – Radiated emission from components/modules**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty [dB]	7.6
47 - LISN 32A – 200A	**Terminal disturbance voltage measurements (LISN 32A – 200A)**

Annex F Compliance Decision Rule and measurements uncertainty

	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty [dB]	3.4
47 – VP	**Terminal disturbance voltage measurements (Passive Voltage Probe)**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty [dB]	2.9
47 - ISN T2	**Terminal disturbance voltage measurements (ISN T2)**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty [dB]	4.2
47 - ISN T4	**Terminal disturbance voltage measurements (ISN T4)**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty [dB]	4.6
47 - ISN T8	**Terminal disturbance voltage measurements (ISN T8)**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty [dB]	5.0
47 - CVP	**Terminal disturbance voltage measurements (CVP)**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty [dB]	3.9
51	**Emission: Radiated disturbance measurements 30-1000MHz**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty 30 MHz - 200 MHz [dB]	5.1
Test Uncertainty 200 MHz - 1 GHz [dB]	6.3
52	**Emission: Radiated disturbance measurements 18-40 GHz**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty [dB]	6.5

Annex F Compliance Decision Rule and measurements uncertainty

61	**Emission: Radiated disturbance measurements 1-18 GHz**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty 1 – 6 GHz [dB]	5.2
Test Uncertainty 6 - 18 GHz [dB]	5.5
64	**Emission: Radiated Large Loop Antenna**
	Expanded Uncertainty (k=2 - coverage factor: 95%)
Test Uncertainty [dB]	3.6