TEST REPORT

Electromagnetic Compatibility

Report Reference No. ..... :	**REP016001-1** (This test report replaces the one identified with number REP0016001 issued on 2023-09-05)
Date of issue ..... :	2023-11-16
Test Report Verdict ..... :	PASS
Testing Laboratory..... :	**Nemko S.p.A.**
Address..... :	Via Del Carroccio, 4
City ..... :	20853 Biassono (MB)
Country ..... :	Italy
Testing location..... :	Described at clause 1.4
Customer name..... :	**Nextys SA**
Customer contact information .... :	Via Luserte Sud, 6 – 6572 Quartino – Switzerland
Reference standards..... :	**IEC 61000-6-2:2016 – IEC 61000-6-3:2020** **EN IEC 61000-6-2:2019 – EN IEC 61000-6-3:2021**
Standard application ..... :	Full application
Equipment under test ..... :	DIN rail power supply
Trademark(s) ..... :	TDK-Lambda
Manufacturer..... :	TDK-Lambda
Model/Type reference ..... :	Described at clause 4.1
Tests performed by ..... :	G. Tepelena
Report approved by..... :	G. Bazzi

Digitally signed by TEPELENA GENCI
Date: 2023.11.16 10:30:45 +01'00'

Firmato digitalmente da BAZZI GIUSEPPE MASSIMILIANO
Data: 2023.11.17 10:08:17 +01'00'

CONTENTS

1. GENERAL INFORMATION

1.1 Project history

Report number	Modification to the report / comments	Date
REP016001	First release	2023-09-05
REP016001-1	Second release (Modification on par. 4.7 and par. 6.12.1)	2023-11-16
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1.2 Symbol used in the report

☒ ..... :	The crossed square indicates that the listed condition, standard or equipment is applicable for this report.
☐ ..... :	The empty square indicates that the listed condition, standard or equipment is not applicable for this report.
NP (Not performed)..... :	Test case not performed according to customer request
N (Not applicable) ..... :	Test case does not apply to the test object
P (Pass) ..... :	Test object does meet the requirement
F (Fail) ..... :	Test object does not meet the requirement
☐ Comma (,) / ☒ Dot (.) ..... :	Symbol used as decimal separator throughout this report
Asterisk (*) ..... :	Symbol used to indicate a standard or a test not accredited by ACCREDIA
EUT ..... :	Equipment Under Test

The results contained in this report reflect the results for this particular model(s) and serial number(s) and apply to the sample(s) as received. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

1.3 Date of sample(s) reception and tests

Date of receipt of test sample(s) .....:	2023-09-03
Testing start date .....:	2023-09-03
Testing termination date .....:	2023-09-05

1.4 Testing location

The tests have been performed in the place indicated below:	
☒ Nemko premises location .....:	Nemko S.p.A.
	Via Del Carroccio, 4
	20853 Biassono (MB) - Italy
☐ Other location .....:	--
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1.5 Environmental conditions

The tests were carried out in the ranges of environmental conditions specified below:	
Ambient temperature .....:	18-33 °C [1]
Relative Humidity .....:	25-70 % [2]
Atmospheric pressure .....:	860-1060 hPa

Notes:
[1] For luminaire, temperature during tests was verified to be within 18 ÷ 30 °C
[2] During ESD test, humidity was verified to be within 30 ÷ 60 %

The following instruments are used to monitor the environmental conditions:

Equipment	Trademark	Model	Serial No.
Thermo-hygrometer	Testo	175-H2	20012380/305
Thermo-hygrometer	Testo	175-H2	38203337/703
Barometer	Castle	GPB 3300	072015

1.6 Measurement uncertainty and assessment of conformity

The measurement uncertainty was calculated for each test and quantity listed in this test report, according to CISPR 16-4-2 and other specific test standard and is documented in Nemko Spa working manual WML1002. The assessment of conformity for each test performed on the equipment is performed not taking into account the measurement uncertainty. The two following possible verdicts are stated in the report:

P (Pass) - The measured values of the equipment respect the specification limit at the points tested. The specific risk of false accept is up to 50% when the measured result is close to the limit.

F (Fail) - One or more measured values of the equipment do not respect the specification limit at the points tested. The specific risk of false reject is up to 50% when the measured result is close to the limit.

Hereafter Nemko's measurement uncertainties are reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Disturbance	Antenna distance 1 m, 3 m, 10 m 0.009 ÷ 200 MHz	5.0 dB	(1)
	Antenna distance 1 m, 3 m, 10 m 200 ÷ 1000 MHz	5.2 dB	(1)
	Antenna distance 1 m, 3 m, 10 m 1 ÷ 6 GHz	5.2 dB	(1)
	Antenna distance 1 m, 3 m 6 ÷ 18 GHz	5.5 dB	(1)
	Antenna distance 1 m, 3 m 18 ÷ 40 GHz	7.2 dB	(1)
Radiated Disturbance with large loop antenna system (LLAS)	0.009 ÷ 30 MHz	3.3 dB	(1)
Conducted Disturbance	0.02 ÷ 150 kHz with AMN	3.8 dB	(1)
	150 kHz ÷ 30 MHz with AMN	3.4 dB	(1)
	150 kHz ÷ 30 MHz with AAN	4.6 dB	(1)
	9 kHz ÷ 30 MHz with voltage probe	2.9 dB	(1)
	150 kHz ÷ 30 MHz with current probe	2.9 dB	(1)
Clicks	9 ÷ 150 kHz	3.8 dB	(1)
	150 kHz ÷ 30 MHz	3.4 dB	(1)
Disturbance Power	30 MHz ÷300 MHz	4.5 dB	(1)
Frequency	10 Hz ÷ 1 kHz	0.2 %	(1)
	1 kHz ÷ 40 GHz	10^{-6}	(1)
Harmonic Current Emission	50 Hz ÷ 2 kHz	3 %	(1)
Fluctuation and Flikers	Fluctuation (d%)	0.05 %	(1)
	Flikers (Pst)	5 %	(1)
Radiated Immunity Anechoic Chambers	20 MHz ÷ 6 GHz	3.4 dB	(1) (3)
Radiated Immunity TEM Cell	0.01 ÷ 200 MHz	3.0 dB	(1) (3)
Bulk Current	0.1 ÷ 400 MHz	3.0 dB	(1)
Immunity to conducted disturbances	9 kHz ÷ 230 MHz	3.0 dB	(1)
ESD Immunity	Voltage, Current, Rise time, Duration	(2)	(1)
Burst Immunity	Voltage, frequency, burst period and duration, rise time and pulse width	(2)	(1)
Surge Immunity	Voltage, Current, Rise time, Duration	(2)	(1)
DIPS, Interruption and Voltage duration Immunity	Amplitude	5 %	(1)
	Duration	5 %	
Impulse Magnetic Field Immunity	Peak Current	10 %	(1) (3)
	Rise time, Duration	20 %	
Power Frequency Magnetic Field Immunity	16.7 Hz, 50 Hz, 60 Hz	2.0 dB	(1) (3)
Damped Oscillatory Wave Immunity, Ring Wave Immunity	Voltage, front time, frequency 100 kHz, 1 MHz	(2)	(1)
Damped Magnetic Field	Amplitude: 100 kHz, 1 MHz	3 dB	(1)
	Frequency: 100 kHz, 1 MHz	10 %	
Low Frequency Immunity	15 Hz ÷ 150 kHz	2.2 dB	(1)
Automotive transients Immunity	Voltage, rise time, duration time Impulses 1, 2a, 2b, 3a, 3b and 4	(2)	(1)
Automotive transients Emission	Amplitude, Time	10 %	(1)
EMF for Lighting Equipment	-	25 %	(1)
Electromagnetic fields (EMF)	Magnetic, Electric and Electromagnetic fields: 0 Hz ÷ 40 GHz	25 %	(1)
Electrical quantities (voltage, current, resistance)	AC/DC Voltage 10 mV ÷ 1000 V 0÷100 kHz AC/DC Current 0.1 mA ÷ 400 A 0÷1 kHz Resistance 100 mΩ ÷ 10 MΩ	2.5 %	(1)

NOTES:

(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 %

(2) The instruments used for this immunity test is according to the tolerances requested by the applicable standard

(3) The reported expanded uncertainty of measurement is related to the stimulus quantity

1.7 Instruments calibration table

Instrument cited in the report and not listed in this paragraph are not subject to calibration. The calibration is valid up to the last day of the due date month.

Description	Manufacturer	Model	Identifier	Cal Date	Due Date
EMI Receiver	Rohde & Schwarz	ESW44	101620	2023-08	2024-08
EMI Receiver	Rohde & Schwarz	ESU8	100202	2023-09	2024-09
Antenna Trilog 25MHz - 8GHz	Schwarzbeck Mess-Elektronik	VULB9162	9162-025	2021-07	2024-07
Antenna Trilog 25-2000 MHz	Schwarzbeck Mess-Elektronik	VULB9168	9168-242	2021-06	2024-06
Antenna 1 - 18 GHz	Schwarzbeck Mess-Elektronik	STLP9148	STLP 9148-152	2021-09	2024-09
Antenna 1 - 18 GHz	Schwarzbeck Mess-Elektronik	STLP9148	STPL 9148-123	2021-06	2024-06
Broadband Amplifier	Schwarzbeck Mess-Elektronik	BBV9718C	00121	2023-03	2024-03
Preamplifier	Schwarzbeck Mess-Elektronik	BBV9718	BBV9718-137	2023-05	2024-05
Semi-anechoic chamber	Nemko S.p.a.	10m semi-anechoic chamber	530	2023-09	2025-09
3m Semi anechoic chamber	Comtest	SAC-3	1711-150	2022-09	2024-09
Common Mode Absorption Device	Schwarzbeck Mess-Elektronik	CMAD1614	00041	2022-05	2025-05
LISN	Rohde & Schwarz	ENV432	101714	2023-08	2024-08
LISN	Rohde & Schwarz	ESH2-Z5	872 460/041	2022-10	2023-10
V-network	Rohde & Schwarz	ESH3-Z5	840 731/004	2023-08	2024-08
Voltage probe	Rohrbacher	VP-1	2.455	2023-09	2024-09
RF Current Probe	Rohde & Schwarz	ESH2-Z1	891 923/18	2023-09	2026-09
Impedance stabilization network	Teseq	ISN T800	47263	2021-08	2024-08
Impedance Stabilisation Network	Schwarzbeck Mess-Elektronik	NTFM8131	8131-153	2023-06	2024-06
Absorbing clamp	Rohde & Schwarz	MDS-21	893 169/001	2022-12	2023-12
Absorbing clamp	Rohde & Schwarz	MDS-21	893 169/003	2022-10	2023-10
Harmonics and Flicker analyzer	Emc Partner	HARMONICS1000+HAR-EXT1000	016+103489	2023-02	2024-02
Harmonics and Flicker analyzer	EM Test	DPA500N	P1735202736	2023-03	2024-03
AC Power Source	Elettrotest	TPS/M/6000	358 04/18	2023-03	2024-03
Attenuator	Aeroflex / Weinschel	2	CC8577	2023-08	2024-08
Attenuator	Aeroflex / Weinschel	2	CC8577	2023-08	2024-08

Description	Manufacturer	Model	Identifier	Cal Date	Due Date
ESD Simulator	Emc Partner	ESD3000+DM1	252+192	2022-10	2023-10
ESD Simulator + Coupling Network	Teseq	NSG437	767+437767+661+695+445	2023-03	2024-03
Broadband amplifier	Rohde & Schwarz	BBA100	101163	2023-09	2024-09
Broadband Amplifier	Rohde & Schwarz	BBA150	102626	2023-08	2024-08
RF Amplifier 200MHz-1000MHz	IFI	CMX100010-SMCC1000	L448A-0108	2023-02	2024-02
RF Amplifier 10kHz-225MHz	Amplifier Research	1000A225	0336745	2023-02	2024-02
RF Amplifier 0,8-4,2 GHz	Amplifier Research	50S1G4A	301049	2023-05	2024-05
RF Power Sensor	Rohde & Schwarz	NRP18AN	100990	2023-02	2024-02
RF Power Sensor	Rohde & Schwarz	NRP18AN	100987	2022-10	2023-10
RF Signal Generator	Rohde & Schwarz	SMB100A	180431	2022-10	2023-10
RF Signal Generator	Rohde & Schwarz	SMA100B	104075	2023-08	2024-08
Antenna	Amplifier Research	AT6026A	0330876	2022-11	2025-11
Antenna Biconilog	ETS Lindgren	3142E	00213197	2022-11	2025-11
Broad-Band Horn Antenna	Schwarzbeck Mess-Elektronik	BBHA9120D	01874	2021-02	2024-02
EMC Multifunction Instrument+CDN Triphase 32A+CDN for I/O	Emc Partner	IMU3000+CDN2000-06-32+CDN-UTP ED3	F5-S-D-V-1505+CDN2000-06-30-1537+CDN-UTP ED3-1526	2023-05	2024-05
EMC Multifunction Instrument+CDN Triphase Burst+CDN Surge	Emc Partner+Schaffner	Transient2000+CDN300+CDN116	849+231+149 9318	2022-10	2023-10
Coupling clamp	Schaffner	CDN125	245 9219	2023-05	2024-05
Capacitive Coupling clamp	Emc Partner	CDN	CNEFT1000-120	2023-05	2024-05
Power supply	Zenone	GVS300GL	0000000444	2023-08	2024-08
Power supply	Zenone	GVS300GL	0000000445	2023-08	2024-08
Power supply	Zenone	GVS300GL	0000000446	2023-08	2024-08
H/E Fieldmeter	Maschek	ESM-100	971909-G	2023-02	2024-02
Automotive EMC pulse generator	EM Test	UCS 200N	V1239113698	2022-10	2023-10
V-network	Rohde & Schwarz	ESH3-Z6	843 864/025	2023-09	2024-09
V-network	Rohde & Schwarz	ESH3-Z6	843 864/024	2023-09	2024-09
V-network	Rohde & Schwarz	ESH3-Z6	893 046/010	2023-09	2024-09

Description	Manufacturer	Model	Identifier	Cal Date	Due Date
V-network	Rohde & Schwarz	ESH3-Z6	843 864/026	2023-09	2024-09
Test System for Conducted and Radiated Immunity	Teseq - Ametek	NSG4070C-80	540125	2023-10	2024-10
Continuous wave simulator	EM Test	CWS 500 CS1	V0710102305	2023-02	2024-02
EM Injection Clamp	Fisher Custom Communications Inc	F-203I-23mm	121239	2022-11	2023-11
Bulk current injection probe	Fisher Custom Communications Inc	F-120-9A	447	2022-10	2023-10
Attenuator + Coaxial cable	EM Test + Huber+Shuner	ATT6+CS03+CS04+CS05	0206-18+1.662+1.663+1.664	2022-10	2023-10
Coupling/Decoupling Network	Luthi	CDN AF2	P1425135039	2022-12	2023-12
Coupling/Decoupling Network	Luthi	CDN M1	P1422134545	2022-12	2023-12
Coupling/Decoupling Network	Luthi	CDN M2/M3	P1426135614	2022-12	2023-12
Coupling/Decoupling Network	Luthi	CDN M4 N-32A	P1343125190	2022-12	2023-12
Coupling/Decoupling Network	Luthi	CDN M4 PE-32A	P1428136828	2022-12	2023-12
Coupling/Decoupling Network	Luthi	CDN M5-32A	P1430137446	2022-11	2023-11
Coupling/Decoupling Network	Luthi	CDN S1-50 BNC	P1430137436	2022-12	2023-12
Coupling/Decoupling Network	Luthi	CDN T2	P1427136163	2022-12	2023-12
Coupling/Decoupling Network	EM Test	CDN M2/M3	0307-16	2022-12	2023-12
Loop sensor	Solar Electronics	9229-1	010221	2021-04	2031-04
Magnetic Field Sensor	Schwarzbeck Mess-Elektronik	FESP 5134-1	00023	2021-04	2031-04
RF Amplifier 10kHz-220MHz	Amplifier Research	250L	8645	2023-03	2024-03
RF Vector Signal Generator	Rohde & Schwarz	SMBV100A	263254	2023-05	2024-05
Oscilloscopio	Agilent	54846A	MY40000254	2023-07	2024-07
Multimeter	Rohde & Schwarz	HMC8012	101577	2022-07	2023-07
Barometer	Castle	GBP 3300	072015	2023-05	2024-05
Data logger con diagnosi in campo	Testo	175-H2	20012380/305	2022-12	2024-12
Data logger con diagnosi in campo	Testo	175-H2	38203337/703	2022-12	2024-12

2. STANDARDS, TEST METHODS AND TECHNICAL PROCEDURES

2.1 Standard(s) or other specifications applied

The following standard(s) or specifications, accredited by ACCREDIA, were applied:

IEC 61000-6-2:2016 / EN IEC 61000-6-2:2019
Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments

IEC 61000-6-3:2020 / EN IEC 61000-6-3:2021
Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for equipment in residential environments

2.2 Test method(s) applied

The following document(s) are referred to in the standard(s) or specifications cited at clause 2.1 in such a way that some or all of their content constitutes requirements for the standard itself:

CISPR 16-2-1 / EN 55016-2-1
Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements

CISPR 16-2-3 / EN55016-2-3
Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurement of disturbances and immunity - Radiated disturbance measurements

CISPR 32 / EN 55032
Electromagnetic compatibility of multimedia equipment – Emission requirements

CISPR 22 / EN 55022
Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement

IEC 61000-3-2 / EN 61000-3-2
Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

IEC 61000-3-3 / EN 61000-3-3
Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

CISPR 14-1 / EN 55014-1
Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission

IEC / EN 61000-4-2
Electromagnetic compatibility (EMC) -- Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test

IEC / EN 61000-4-3
Electromagnetic compatibility (EMC) -- Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test

IEC / EN 61000-4-4
Electromagnetic compatibility (EMC) -- Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test

IEC / EN 61000-4-5
Electromagnetic compatibility (EMC) -- Part 4-5: Testing and measurement techniques - Surge immunity test

IEC / EN 61000-4-6
Electromagnetic compatibility (EMC) -- Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields

IEC / EN 61000-4-8
Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test

IEC / EN 61000-4-11
Electromagnetic compatibility (EMC) -- Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests

2.3 Nemko technical procedures

WM L0177: General routines for using instruments at Nemko

WM L1002: Measurement Uncertainty - Policy and Statement

WM L0077: General procedure for conducting EMC tests

3. SUMMARY OF TEST RESULTS AND VERDICTS

3.1 Measurement of electromagnetic disturbances emitted by the equipment under test

Emission Tests		
Requirement / test	**Method Standard**	**Verdict**
Radiated emissions – enclosure port	CISPR 16-2-3 EN 55016-2-3	P
Conducted emissions – low voltage AC mains port	CISPR 16-2-1 EN 55016-2-1	P
Conducted emissions – DC power port	CISPR 16-2-1 EN 55016-2-1	N
Discontinuous disturbance – low voltage AC mains port	CISPR 14-1 EN 55014-1	N
Harmonic current emissions – low voltage AC mains port	IEC 61000-3-2 EN 61000-3-2	P
Voltage changes, voltage fluctuations and flicker – low voltage AC mains port	IEC 61000-3-3 EN 61000-3-3	P
Conducted emissions – wired network port	CISPR 32 EN 55032	N
Notes:		

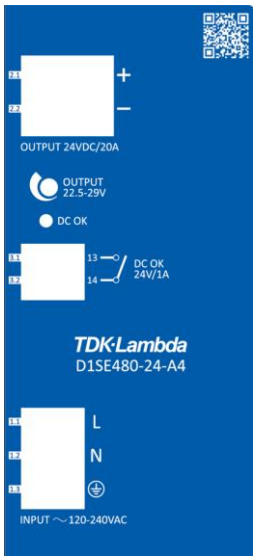
3.2 Degree of immunity of the appliance to electromagnetic disturbances present in the intended use environment

Immunity Tests		
Requirement / test	**Method Standard**	**Verdict**
Enclosure ports – Electrostatic discharges	IEC / EN 61000-4-2	P
Enclosure ports – Radio-frequency electromagnetic field (AM)	IEC / EN 61000-4-3	P
Signal/control ports – Fast transients	IEC / EN 61000-4-4	P
I/O DC power ports – Fast transients	IEC / EN 61000-4-4	N
I/O AC power ports – Fast transients	IEC / EN 61000-4-4	P
Signal/control ports – Surges	IEC / EN 61000-4-5	N
I/O DC power ports – Surges	IEC / EN 61000-4-5	N
I/O AC power ports – Surges	IEC / EN 61000-4-5	P
Signal/control ports – Radio-frequency common mode	IEC / EN 61000-4-6	P
I/O DC power ports – Radio-frequency common mode	IEC / EN 61000-4-6	N
I/O AC power ports – Radio-frequency common mode	IEC / EN 61000-4-6	P
Enclosure ports – Power-frequency magnetic field	IEC / EN 61000-4-8	P
I/O AC power ports – Voltage dips and interruptions	IEC / EN 61000-4-11	P
Notes:		

4. EQUIPMENT UNDER TEST

4.1 EUT Identification

Short description of the EUT
The EUT is a DIN rail power supply, single phase, 90-264VAC, 24V output, 480W

Copy of marking plate(s) (if present)


Sample ID ..... :	PRJ00123610004 (number assigned from Nemko spa)
Model/Type reference ..... :	D1SE480
Ratings ..... :	230 VAC
Equipment installation ..... :	Rack mounted
Accessories and detachable parts included .... :	None
Test performed..... :	All tests were performed on this sample

Sample ID ..... :	-
Model/Type reference ..... :	-
Ratings ..... :	-
Equipment installation ..... :	-
Accessories and detachable parts included .... :	-
Test performed..... :	-

Sample ID ..... :	-
Model/Type reference ..... :	-
Ratings ..... :	-
Equipment installation ..... :	-
Accessories and detachable parts included ... :	-
Test performed..... :	-
Software and/or firmware information ..... :	-
Product variants not tested:	
Opinions and interpretations - not subject to ACCREDIA accreditation:	

4.2 EUT Power Supply

Used [1]	N° [2]	Type	Supply Voltage	Phases N°	Supplementary Information
☒	1	AC	230 V / 50 Hz	L+N+PE	

Notes:
[1] The crossed square indicates that the supply voltage is used in at least one test.
[2] This number will be used all over the report to identify the supply voltage(s) used for each test.

4.3 EUT Information declared by the Customer [1]

Information	Declaration
EUT highest frequency[2] .....:	fc ≤ 108 MHz
Environment intended use.....:	Domestic / Residential
Equipment classification[3] .....:	Not applicable
Equipment category[3].....:	Not applicable

Notes:
[1] Nemko S.p.A. declines all responsibility for the information above declared by the customer that may influence the validity of the results contained in this test report.
[2] Highest frequency generated or used in the device or on which the device operates or tunes. If the clock frequency is not declared by the customer, according to the product standard(s), the worst case will be considered for each test.
[3] Equipment class and category definitions are specified in the standard used.

4.4 EUT Operation Modes

N°	Emission	Immunity	Description
1	☒	☒	The EUT has been tested connected to an adequate load to obtain maximum output power Resistive load 1.2 Ohm
2	☐	☐	
3	☐	☐	
4	☐	☐	

Notes:

4.5 EUT Configuration Modes

Emission: the EUT was configured to measure its highest possible radiation level. The test modes selected are according to EUT instruction manual.
Immunity: the EUT was configured to have its highest possible susceptibility against tested phenomena. The test modes selected are according to EUT instruction manual.

N°	Emission	Immunity	Description
1	☒	☒	The EUT has been tested connected to the mains, the DC output is connected to a resistive load
2	☐	☐	
3	☐	☐	
4	☐	☐	
Notes:			

4.6 EUT Input/Output Ports

Port	Name	Type [1]	Cable Max. >3m	Cable Shielded	Description
0	Enclosure	N/E	—	—	Connected to PE
1	Input ~120-240VAC	AC	☐	☐	3 wires L, N, PE
2	Output 24VDC/20A	DC	☐	☐	2 wires
3	Signal DC-OK 24 VDC/1A	I/O	☐	☐	2 wires

Notes:
[1] Port type:
AC = I/O AC Power Port DC = I/O DC Power Port WN = wired network port I/O = Signal/control ports
N/E = Non-Electrical

4.7 EUT and Equipment Used During Test

Use [1]	Product Type	Manufacturer	Model	Comments
AE	Load	Nextys	//	Supplied by customer
AE	Multimeter	Fluke	--	Supplied by Nemko

Notes:
[1] Use
EUT - Equipment Under Test SIM - Simulator (Not Subjected to Test)
AE - Auxiliary/Associated Equipment (Not Subjected to Test)

5 PERFORMANCE LEVELS

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test (criterion), relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

Performance level definition	
☐	based on the used product standard
☒	based on the declaration of the manufacturer, requestor or purchaser

The following performance criteria are defined by the product standard:

Criterion	Description from standard
A	The EUT 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 EUT is used as intended. If the performance level is not specified by the manufacturer, this may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.
B	The EUT 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 EUT is used as intended. The performance level may be replaced by a permissible loss of performance. However, during the test degradation of performance is allowed but 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 equipment if used as intended.
C	Temporary loss of function is allowed during the test, provided the function is self-recoverable or can be restored by the operation of the controls.

For each criterion, the following representative parameters and performance level were checked during immunity tests:

Criterion	Immunity Test	Representative parameter	Performance level
A	All applicable	Output current	± 10 % of nominal value
		Output Voltage	± 10 % of nominal value
B	All applicable	Output current	± 10 % of nominal value
		Output Voltage	± 10 % of nominal value
C	All applicable	--	--

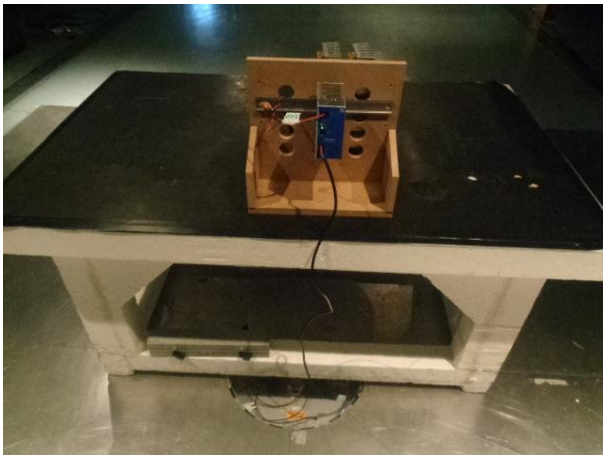
6 TEST RESULTS

6.1 Radiated emissions

6.1.1 Test result

Verdict:	☒ P ☐ F ☐ N[1] ☐ NP
Frequency range:	30 MHz – 1 000 MHz
Test site:	Semi anechoic chamber
Measurement distance:	10 m
Notes: [1] If marked, the test is not applicable for the EUT	

6.1.2 Photo documentation of the test set-up



6.1.3 Test method

Method standard is reported at par. 3.1. Measurements were made on a semi anechoic chamber. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10 meters with the receiving antenna located at a fixed height (from 1 to 4 meter) in both horizontal and vertical polarities. Final measurements (quasi-peak) were then performed by rotating the EUT 360° and adjusting the receiving antenna height from 1 to 4 meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.

6.1.4 Limits for enclosure

Radiated emissions – enclosure port			
Frequency (MHz)	**Quasi-Peak limit (dBµV/m)**	**Average limit (dBµV/m)**	**Peak limit (dBµV/m)**
30 to 230	30	-	-
230 to 1000	37	-	-
1000 to 3000	-	50	70
3000 to 6000	-	54	74

Notes:
[1] The limit decreases linearly with the logarithm of the frequency
[2] The limit decreases linearly with the frequency

6.1.5 Test equipment used[1]

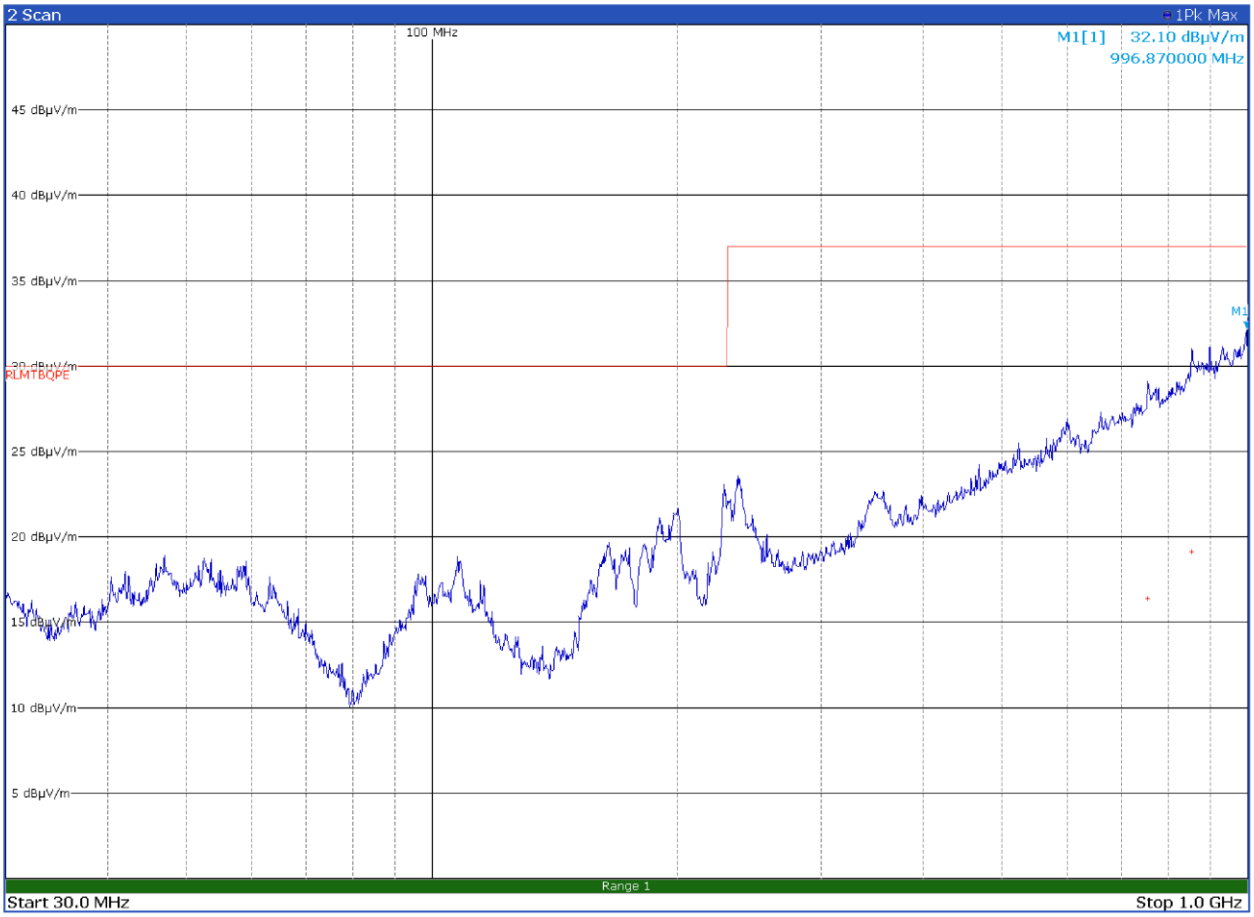
Used [2]	Description	Manufacturer	Model	Identifier
☒	SAC	Nemko Spa	10m SAC	530
☒	SAC	Comtest	3m SAC	1711-150
☒	EMI receiver	Rohde & Schwarz	ESW44	101620
☐	EMI receiver	R&S	ESU8	100202
☒	Common mode absorption device	Schwarzbeck	CMAD1614	00041
☒	Antenna	Schwarzbeck	VULB9162	VULB9162-025
☐	Antenna	Schwarzbeck	VULB9168	VULB9168-242
☒	Antenna	Schwarzbeck	STLP9148	STLP9148-123
☐	Antenna	Schwarzbeck	STLP9148	STLP9148-152
☐	Preamplifier	Schwarzbeck	BBV9718	BBV9718-137
☒	Preamplifier	Schwarzbeck	BBV9718C	00121
☒	Controller for turntable and antenna mast	Maturo	FCU3.0	10041
☒	Tilt antenna mast	Maturo	TAM4.0-E	10042
☒	Turntable 4.5 t	Maturo	TT4.0-5T	2.527

Notes:
[1] See clause 1.7 for calibration information.
[2] If crossed, the instrument was used during tests.

6.1.6 Test protocol

Antenna Polarization	Supply Voltage[1]	Test Mode		Remarks	Verdict
		Operation[2]	Configuration[3]		
Horizontal	1	1	1	30 MHz – 1 GHz	P

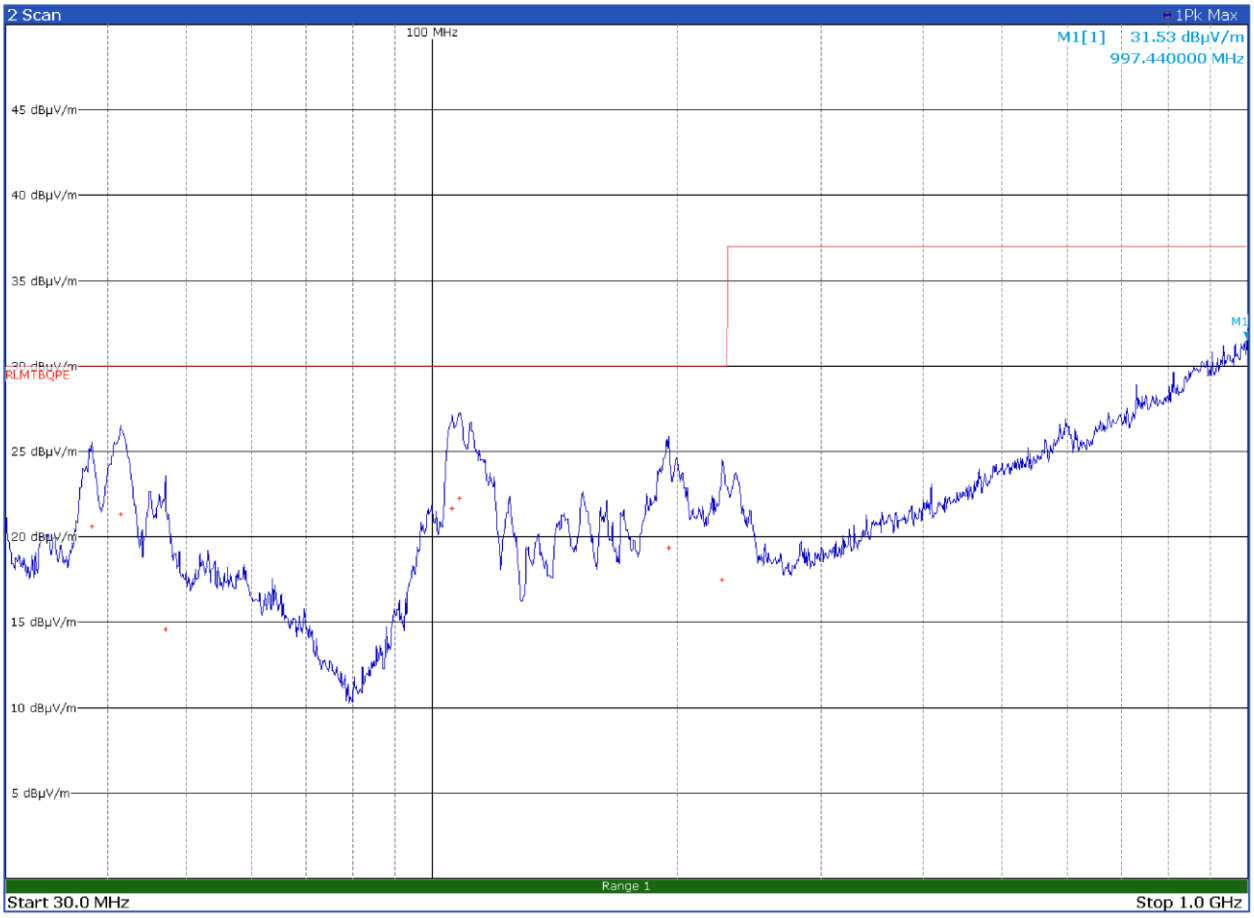
Notes:
[1] See clause 4.2 EUT Power Supply
[2] See clause 4.4 EUT Operation Modes
[3] See clause 4.5 EUT Configuration Modes



Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
753.8400	16.4	37.0	-20.6	QP
854.3400	19.2	37.0	-17.8	QP

Antenna Polarization	Supply Voltage[1]	Test Mode		Remarks	Verdict
		Operation[2]	Configuration[3]		
Vertical	1	1	1	30 MHz – 1 GHz	P

Notes:
[1] See clause 4.2 EUT Power Supply
[2] See clause 4.4 EUT Operation Modes
[3] See clause 4.5 EUT Configuration Modes



Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Detector
38.2500	20.7	30.0	-9.3	QP
41.4900	21.4	30.0	-8.6	QP
47.1000	14.7	30.0	-15.3	QP
105.7800	21.7	30.0	-8.3	QP
107.9100	22.3	30.0	-7.7	QP
194.9700	19.4	30.0	-10.6	QP
226.8600	17.6	30.0	-12.4	QP

6.2 Conducted emissions

6.2.1 Test result

Verdict for low voltage AC mains port:	☐ P	☐ F	☒ N[1]	☐ NP
Verdict for DC power port:	☒ P	☐ F	☐ N[1]	☐ NP
Verdict for wired network port:	☐ P	☐ F	☒ N[1]	☐ NP
Frequency range:	0.15 MHz – 30 MHz			
Kind of test site:	Shielded room			
Notes: [1] If marked, the test is not applicable for the EUT				

6.2.2 Photo documentation of the test set-up

6.2.3 Test method

Method standard is reported at par. 3.1. Measurements were made on a ground plane that extends one meter minimum beyond all sides of the system under test. All power was connected to the system through Line Impedance Stabilization Networks (LISN). Conducted voltage measurements on mains lines were made at the output of the LISN. All tested telecommunications lines were connected to an Impedance Stabilization Network (ISN) and conducted voltage measurements on telecommunications lines were made at the output of the ISN. Where an ISN was not appropriate or available measurements were made using a Capacitive Voltage Probe and Current probe.

6.2.4 Limits

Conducted emissions – low voltage AC mains port		
Frequency (MHz)	**Quasi-Peak limit (dBµV)**	**Average limit (dBµV)**
0.15 to 0.50	66 to 56 [1]	56 to 46 [1]
0.50 to 5	56	46
5 to 30	60	50
Notes: [1] The limits decrease linearly with the logarithm of the frequency		

Conducted emissions – DC power port		
Frequency (MHz)	**Quasi-Peak limit (dBµV)**	**Average limit (dBµV)**
0.15 to 0.50	79	66
0.50 to 30	73	60
Notes:		

Conducted emissions – wired network port[1]				
Frequency (MHz)	**Quasi-Peak limit**		**Average limit**	
	dB(µV)	**dB(µA)**	**dB(µV)**	**dB(µA)**
0.15 to 0.50	84 to 74 [2]	40 to 30 [2]	74 to 64 [2]	30 to 20 [2]
0.50 to 30	74	30	64	20
Notes: [1] Applicable to wired network, optical fiber (with metallic shield or tension member) and antenna ports [2] The limits decrease linearly with the logarithm of the frequency				

6.2.5 Test equipment used[1]

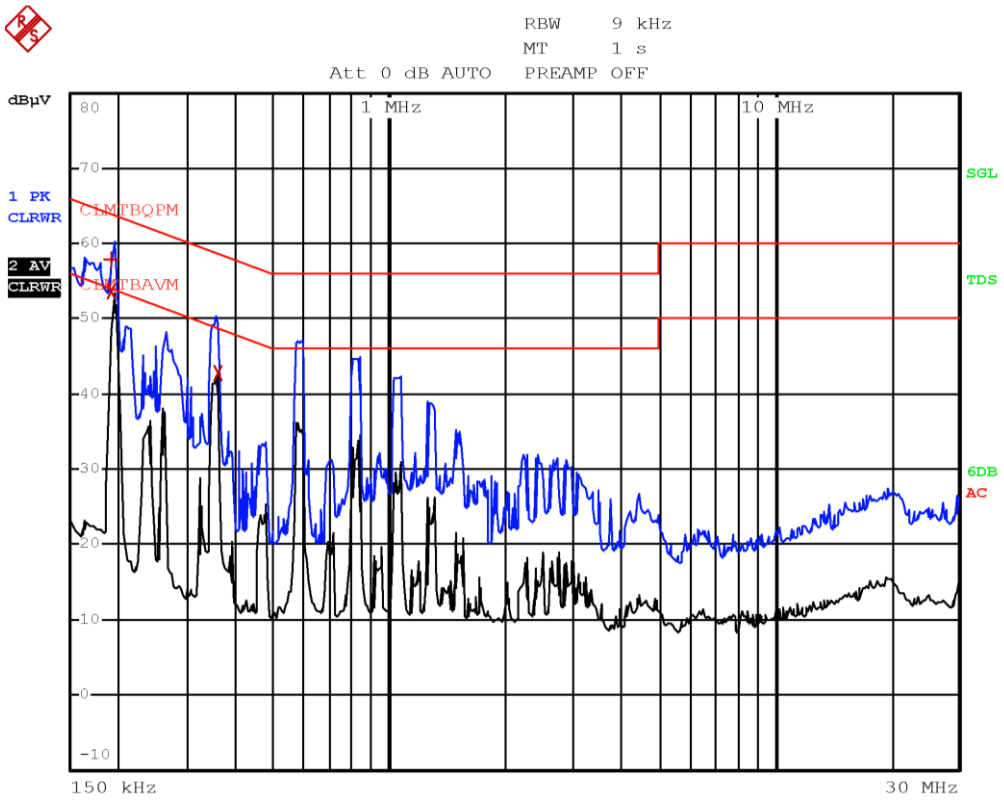
Used [2]	Description	Manufacturer	Model	Identifier
☒	EMI receiver	R&S	ESU8	100202
☐	EMI receiver	Rohde & Schwarz	ESW44	101620
☒	Attenuator	Aeroflex / Weinschel	2	CC8577
☐	LISN 9 kHz ÷ 30 MHz	R&S	ESH2-Z5	872 460/041
☒	LISN 9 kHz ÷ 30 MHz	R&S	ENV432	101714
☐	LISN 9 kHz ÷ 30 MHz	R&S	ESH3-Z5	840 731/004
☒	Current clamp probe	R&S	ESH2-Z1	891 923/18
☒	Voltage Probe	Rorhbacher	VP-1	2.455
☐	ISN	Schwarzbeck	NTFM8131	8131-153
☐	ISN	Teseq	ISN T800	47263
☒	Shielded room	Siemens	Conducted emission test room	1862

Notes:
[1] See clause 1.7 for calibration information.
[2] If crossed, the instrument was used during tests.

6.2.6 Test protocol

Test Port		Supply Voltage[2]	Test Mode		Remarks	Verdict
EUT[1]	Line		Operation[3]	Configuration[4]		
1	L	1	1	1		P

Notes:
[1] See clause 4.6 EUT Input/Output Ports
[2] See clause 4.2 EUT Power Supply
[3] See clause 4.4 EUT Operation Modes
[4] See clause 4.5 EUT Configuration Modes



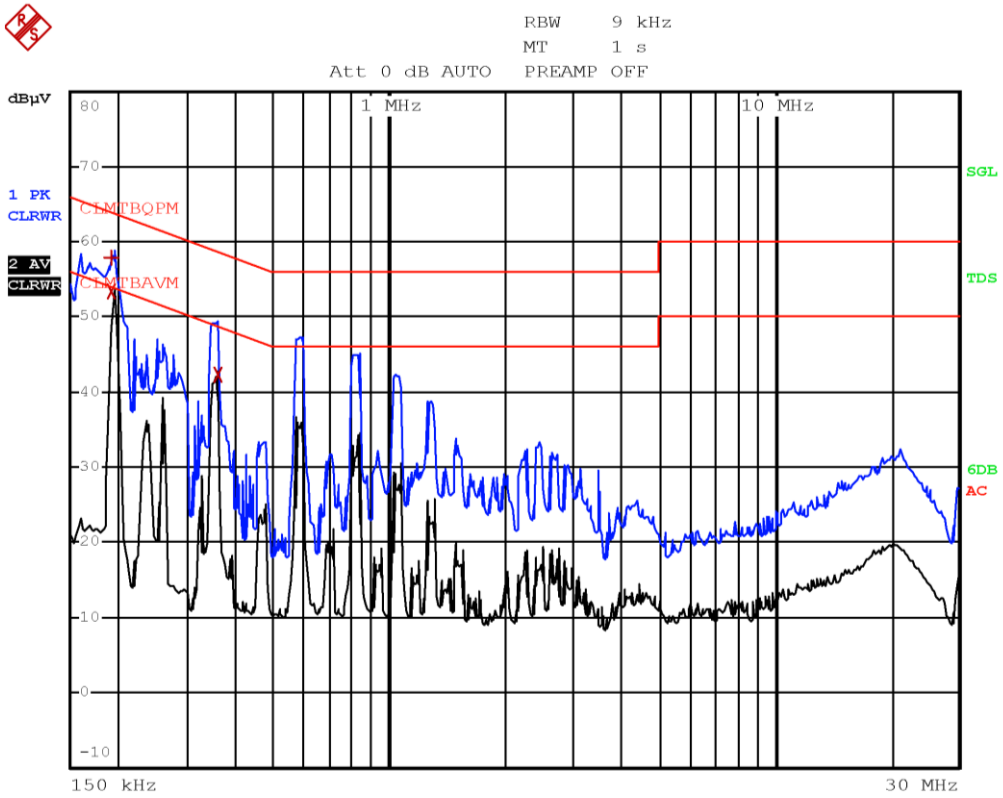
EDIT PEAK LIST (Final Measurement Results)

Trace1:	CLMTBQPM
Trace2:	CLMTBAVM
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Quasi Peak	194 kHz	57.98	-5.88
2 Average	194 kHz	53.71	-0.14
2 Average	358 kHz	42.68	-6.09

Test Port		Supply Voltage[2]	Test Mode		Remarks	Verdict
EUT[1]	Line		Operation[3]	Configuration[4]		
1	N	1	1	1		P

Notes:
[1] See clause 4.6 EUT Input/Output Ports
[2] See clause 4.2 EUT Power Supply
[3] See clause 4.4 EUT Operation Modes
[4] See clause 4.5 EUT Configuration Modes



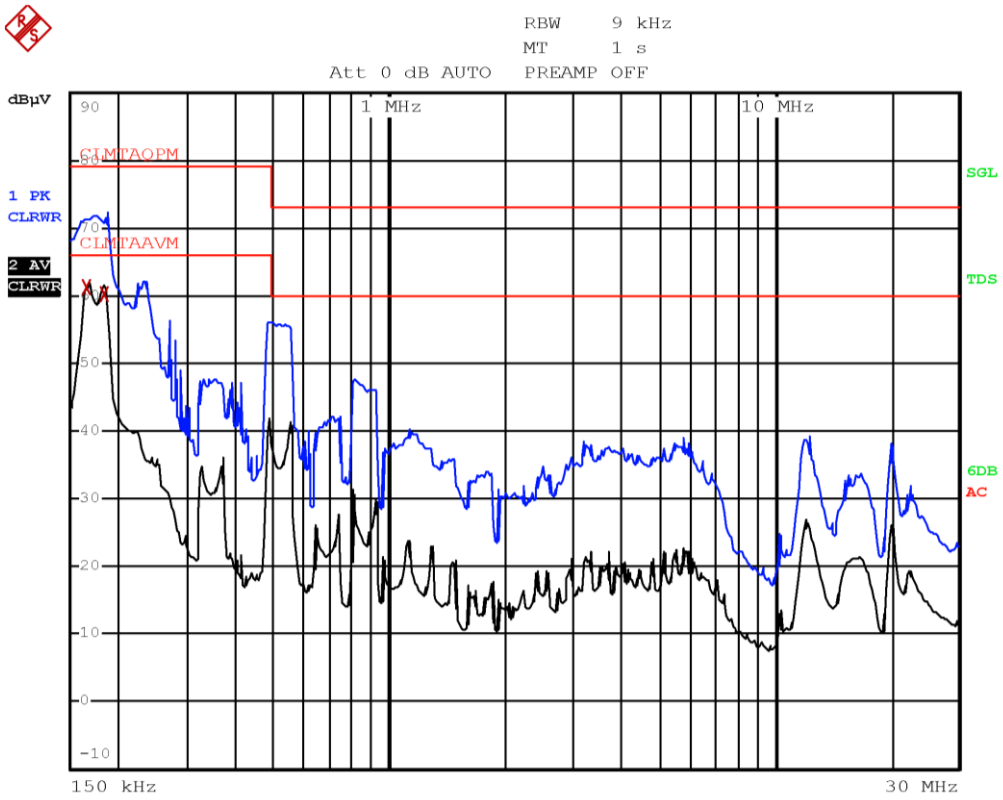
EDIT PEAK LIST (Final Measurement Results)

Trace1:	CLMTBQPM
Trace2:	CLMTBAVM
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Quasi Peak	194 kHz	57.97	-5.88
2 Average	194 kHz	53.52	-0.34
2 Average	358 kHz	42.28	-6.48

Test Port		Supply Voltage[2]	Test Mode		Remarks	Verdict
EUT[1]	Line		Operation[3]	Configuration[4]		
1	+24 Out	1	1	1		P

Notes:
[1] See clause 4.6 EUT Input/Output Ports
[2] See clause 4.2 EUT Power Supply
[3] See clause 4.4 EUT Operation Modes
[4] See clause 4.5 EUT Configuration Modes

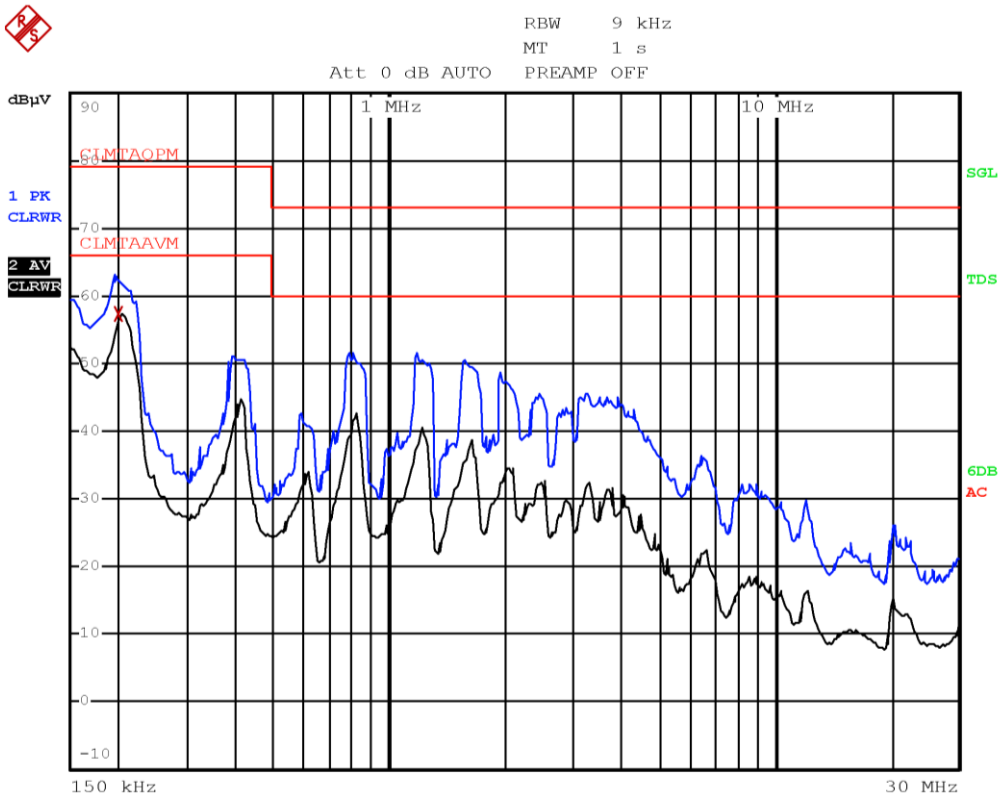


EDIT PEAK LIST (Final Measurement Results)

Trace1:	CLMTAQPM		
Trace2:	CLMTAAVM		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
2 Average	166 kHz	61.39	-4.61
2 Average	186 kHz	60.32	-5.67

Test Port		Supply Voltage[2]	Test Mode		Remarks	Verdict
EUT[1]	Line		Operation[3]	Configuration[4]		
1	-24 Out	1	1	1		P

Notes:
[1] See clause 4.6 EUT Input/Output Ports
[2] See clause 4.2 EUT Power Supply
[3] See clause 4.4 EUT Operation Modes
[4] See clause 4.5 EUT Configuration Modes



EDIT PEAK LIST (Final Measurement Results)

Trace1:	CLMTAQPM		
Trace2:	CLMTAAVM		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
2 Average	202 kHz	57.32	-8.67

6.3 Discontinuous disturbance

6.3.1 Test result

Verdict:	☐ P ☐ F ☒ N[1] ☐ NP
Frequency range:	0.15 MHz – 30 MHz
Kind of test site:	Shielded room
Notes: [1] If marked, the test is not applicable for the EUT	

6.3.2 Photo documentation of the test set-up

6.3.3 Test method

Method standard is reported at par. 3.1. Measurement of a disturbance, the amplitude of which exceeds the quasi-peak limit of continuous disturbance, the duration of which is not longer than 200 ms which is separated from a subsequent disturbance by at least 200 ms.

6.3.4 Limits

The limits for discontinuous disturbance depend mainly on the character of the disturbance and on the click rate N. For the first measurement with the limit L and a time of measurement equal to T or 120 minutes, the click rate is obtained with N = (Number of clicks or switching operation / Time of measurement).

Appliance which has a click rate N less than 5 clicks per minute, and which has instantaneous switching (90% clicks shorter than 10 ms and none longer than 20ms) shall be deemed to comply with the limits, regardless of the click's amplitude. Otherwise a second measurement is needed.

For the second measurement, the click limit Lq is obtained by increasing the relevant limit L with 44 dB for $N < 0.2$, or $20\log(30 / N)$ for $0.2 \leq N < 30$. With the limit Lq during the same time T or 120 minutes, the number of authorized clicks is equal to N2 ≤N1/4

6.3.5 Test equipment used[1]

Used [2]	Description	Manufacturer	Model	Identifier
☐	EMI receiver	R&S	ESU8	100202
☐	EMI receiver	Rohde & Schwarz	ESW44	101620
☐	Attenuator	Aeroflex / Weinschel	2	CC8577
☐	LISN 9 kHz ÷ 30 MHz	R&S	ESH2-Z5	872 460/041
☐	LISN 9 kHz ÷ 30 MHz	R&S	ENV432	101714
☐	LISN 9 kHz ÷ 30 MHz	R&S	ESH3-Z5	840 731/004
☐	Shielded room	Siemens	Conducted emission test room	1862

Notes:
[1] See clause 1.7 for calibration information.
[2] If crossed, the instrument was used during tests.

6.3.6 Test protocol

Test Port		Supply Voltage[2]	Test Mode		Remarks	Verdict
EUT[1]	Line		Operation[3]	Configuration[4]		
						N

Notes:
[1] See clause 4.6 EUT Input/Output Ports
[2] See clause 4.2 EUT Power Supply
[3] See clause 4.4 EUT Operation Modes
[4] See clause 4.5 EUT Configuration Modes

FIRST RUN							
Frequency (MHz)	Limit (dBµV)	Number of clicks			Switching operations	Time (min)	Click rate N
		< 10 ms	10ms to 20ms	> 20 ms			
0.15	66						
0.5	56						
1.4	56						
30	60						

SECOND RUN						
Frequency (MHz)	Limit (dBµV)	Number of clicks			Time (min)	Limit N
		< 10 ms	10ms to 20ms	> 20 ms		
0.15						
0.5						
1.4						
30						

6.4 Harmonics of current

6.4.1 Test result

Verdict:	☒ P ☐ F ☐ N[1] ☐ NP
Frequency range:	0 kHz – 2 kHz
Class:	☒ A
Notes: [1] If marked, the test is not applicable for the EUT	

6.4.2 Photo documentation of the test set-up

6.4.3 Test method

Method standard is reported at par. 3.1. This test consists on the measurement of harmonics components of the input current which may be produced by equipment having an input current up to and including 16 A per phase, and intended to be connected to public low-voltage distribution systems. The equipment is tested under specified conditions of operation.

6.4.4 Limits

Harmonic type	Harmonic order	Maximum permissible harmonic current (A)	
		Class A Equipment	Class B Equipment
Odd	3	2.30	3.45
	5	1.14	1.71
	7	0.77	1.155
	9	0.40	0.60
	11	0.33	0.495
	13	0.21	0.315
	15 ≤ n ≤ 40	0.15 x 15/n	0.225 x 15/n
Even	2	1.08	1.62
	4	0.43	0.645
	6	0.30	0.45
	8 ≤ n ≤ 40	0.23 x 8/n	0.345 x 8/n
Notes:			

6.4.5 Test equipment used[1]

Used [2]	Description	Manufacturer	Model	Identifier
☐	Harmonics and Flicker analyser	Emc Partner	Harmonics 1000	016+103489
☒	Harmonics and Flicker analyser	EM Test	DPA500N	P1735202736
☒	Power source	Elettrotest	TPS/M/6000	358 04/18

Notes:
[1] See clause 1.7 for calibration information.
[2] If crossed, the instrument was used during tests.

6.4.6 Test protocol

Test Port		Supply Voltage[2]	Test Mode		Remarks	Verdict
EUT[1]	Line		Operation[3]	Configuration[4]		
1	L, N	1	1	1		P

Notes:
[1] See clause 4.6 EUT Input/Output Ports
[2] See clause 4.2 EUT Power Supply
[3] See clause 4.4 EUT Operation Modes
[4] See clause 4.5 EUT Configuration Modes

Measured values	
Fundamental Current	
Line 1:	2.08 A
Active input Power	
Line 1:	467.079 W *
Circuit power factor	
Line 1:	0.961 *

** Absolute value.*

Current Test Result

Average and Maximum harmonic current results									
Hn	Average				Maximum				Harmonic Result
	Ieff [A]	of Limit [%]	Limit [A]	Result	Ieff [A]	of Limit [%]	Limit [A]	Result	
1	2.080				2.080				
2	0.001	0.127	1.080	n/a	0.002	0.099	1.620	n/a	PASS
3	0.314	13.635	2.300	PASS	0.314	9.103	3.450	PASS	PASS
4	0.001	0.250	0.430	n/a	0.001	0.194	0.645	n/a	PASS
5	0.070	6.130	1.140	PASS	0.070	4.109	1.710	PASS	PASS
6	0.001	0.308	0.300	n/a	0.001	0.238	0.450	n/a	PASS
7	0.038	4.980	0.770	PASS	0.039	3.340	1.155	PASS	PASS
8	0.001	0.330	0.230	n/a	0.001	0.259	0.345	n/a	PASS
9	0.042	10.555	0.400	PASS	0.042	7.082	0.600	PASS	PASS
10	0.001	0.387	0.184	n/a	0.001	0.288	0.276	n/a	PASS
11	0.032	9.672	0.330	PASS	0.032	6.504	0.495	PASS	PASS
12	0.001	0.454	0.153	n/a	0.001	0.338	0.230	n/a	PASS
13	0.017	7.890	0.210	PASS	0.017	5.356	0.315	PASS	PASS
14	0.001	0.622	0.131	n/a	0.001	0.506	0.197	n/a	PASS
15	0.022	14.601	0.150	PASS	0.022	9.876	0.225	PASS	PASS
16	0.001	0.735	0.115	n/a	0.001	0.609	0.173	n/a	PASS
17	0.021	15.740	0.132	PASS	0.021	10.591	0.199	PASS	PASS
18	0.001	0.711	0.102	n/a	0.001	0.537	0.153	n/a	PASS
19	0.023	19.394	0.118	PASS	0.023	13.043	0.178	PASS	PASS
20	0.001	1.110	0.092	n/a	0.001	0.865	0.138	n/a	PASS
21	0.027	25.115	0.107	PASS	0.027	16.786	0.161	PASS	PASS

22	0.001	1.098	0.084	n/a	0.001	0.866	0.125	n/a	PASS
23	0.031	31.713	0.098	PASS	0.031	21.311	0.147	PASS	PASS
24	0.001	1.107	0.077	n/a	0.001	0.865	0.115	n/a	PASS
25	0.021	23.530	0.090	PASS	0.022	16.020	0.135	PASS	PASS
26	0.001	1.066	0.071	n/a	0.001	0.837	0.106	n/a	PASS
27	0.015	18.010	0.083	PASS	0.015	12.184	0.125	PASS	PASS
28	0.001	1.108	0.066	n/a	0.001	0.850	0.099	n/a	PASS
29	0.014	18.608	0.078	PASS	0.015	12.564	0.116	PASS	PASS
30	0.001	1.233	0.061	n/a	0.001	1.000	0.092	n/a	PASS
31	0.009	12.349	0.073	n/a	0.009	8.398	0.109	n/a	PASS
32	0.001	1.246	0.058	n/a	0.001	0.896	0.086	n/a	PASS
33	0.006	8.998	0.068	n/a	0.006	6.120	0.102	n/a	PASS
34	0.001	1.637	0.054	n/a	0.001	1.210	0.081	n/a	PASS
35	0.003	3.913	0.064	n/a	0.003	3.022	0.096	n/a	PASS
36	0.001	1.660	0.051	n/a	0.001	1.295	0.077	n/a	PASS
37	0.002	2.956	0.061	n/a	0.002	2.203	0.091	n/a	PASS
38	0.001	1.610	0.048	n/a	0.001	1.191	0.073	n/a	PASS
39	0.007	11.311	0.058	n/a	0.007	7.682	0.087	n/a	PASS
40	0.001	1.572	0.046	n/a	0.001	1.368	0.069	n/a	PASS

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.

6.5 Voltage changes, voltage fluctuations and flicker

6.5.1 Test result

Verdict:	☒ P ☐ F ☐ N[1] ☐ NP
Notes: [1] If marked, the test is not applicable for the EUT	

6.5.2 Photo documentation of the test set-up

6.5.3 Test method

Method standard is reported at par. 3.1. This test consists in the measurement of voltage changes, voltage fluctuations and flicker which may be produced by equipment having an input current ≤ 16 A per phase, and intended to be connected to public low-voltage distribution systems. The equipment is tested under specified conditions of operation.

6.5.4 Limits

The value of Pst shall be not greater than 1.0.
The value of Plt shall be not greater than 0.65.
The value of d(t) during a voltage change shall not exceed 3.3 % for more than 500 ms.
The relative steady-state voltage change, dc shall not exceed 3.3 %.
The maximum relative voltage change dmax shall not exceed:

a) 4 % without additional conditions
b) 6 % for equipment which is switched manually, or switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption
c) 7 % for equipment which is attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as mowers, portable tools such as electric drills), or switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

6.5.5 Test equipment used[1]

Used [2]	Description	Manufacturer	Model	Identifier
☐	Harmonics and Flicker analyser	Emc Partner	Harmonics 1000	016+103489
☒	Harmonics and Flicker analyser	EM Test	DPA500N	P1735202736
☒	Power source	Elettrotest	TPS/M/6000	358 04/18

Notes:
[1] See clause 1.7 for calibration information.
[2] If crossed, the instrument was used during tests.

6.5.6 Test protocol

Test Port		Supply Voltage[2]	Test Mode		Remarks	Verdict
EUT[1]	Line		Operation[3]	Configuration[4]		
1	L,N	1	1	1		P

Notes:
[1] See clause 4.6 EUT Input/Output Ports
[2] See clause 4.2 EUT Power Supply
[3] See clause 4.4 EUT Operation Modes
[4] See clause 4.5 EUT Configuration Modes

Analysis Status: PASS

Flicker Measurements Settings	
Main Line:	230V, 50Hz
Flicker Meter:	230V / 50Hz
Flicker Impedance:	Zref
Observation Time:	1 × 10 min
Measurements:	1

Flicker Measurements					
	P_{lt}	Max P_{st}	Max d_c	Max d_{max}	Max T_{max}
Line 1:	0.012	0.028	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

Flicker Individual Measurements												
Measurement	P_{st} [ ]			d_c [%]			d_{max} [%]			T_{max} [s]		
	Value	Limit	Result	Value	Limit	Result	Value	Limit	Result	Value	Limit	Result
#1	0.03	1.00	PASS	0.00	3.30	PASS	< 0.2	4.00	PASS	0.00	0.50	PASS

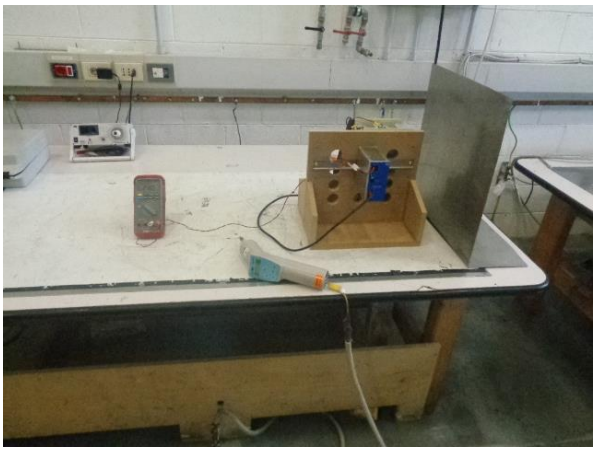
6.6 Electrostatic discharges

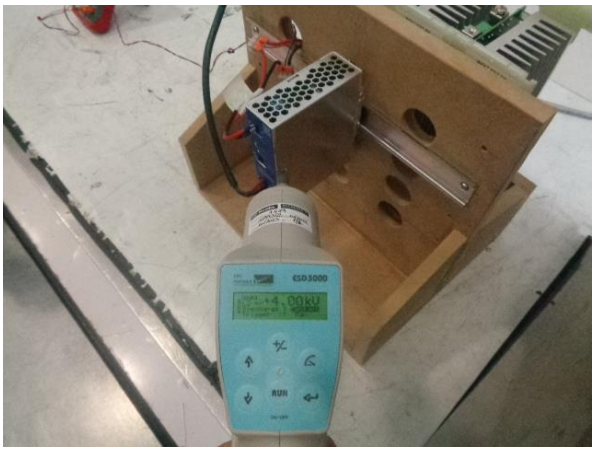
6.6.1 Test result

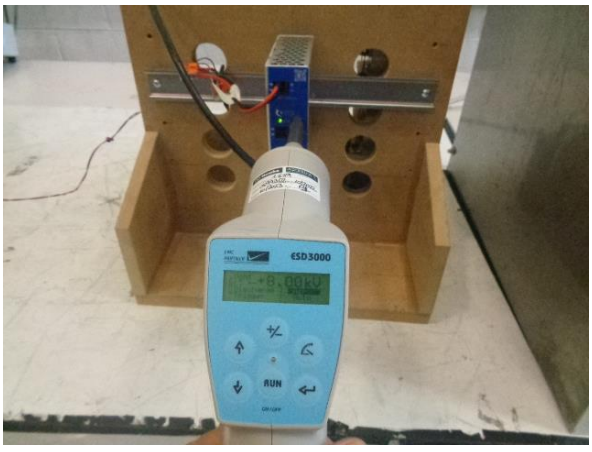
EUT port[1]	Test n° [2]	Supply Voltage[3]	Criterion[4]		Mode		Verdict
			Required	Achieved	Operation	Configuration	
0	1	1	A	A	1	1	P
0	2	1	A	A	1	1	P

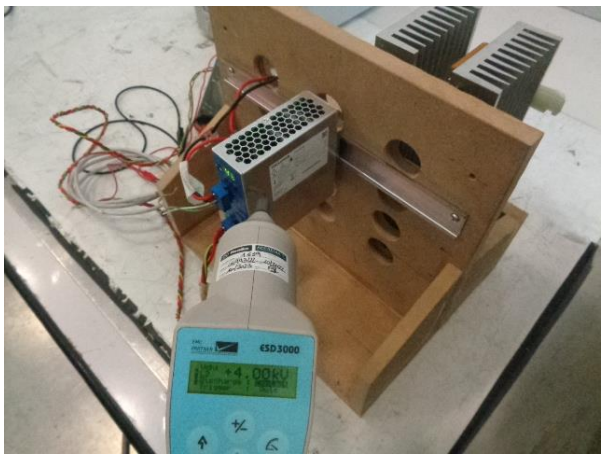
Notes:
[1] See clause 4.6 EUT Input/Output Ports
[2] See test specification clause reported below for this test
[3] See clause 4.2 EUT Power Supply
[4] For criterion definition and requirement see clause 5 Performance Levels

6.6.2 Photo documentation of the test set-up









6.6.3 Test method

Method standard is reported at par. 3.2. The test is intended to demonstrate the immunity of equipment subjected to static electricity discharges from operators directly and to adjacent objects. The table-top equipment under test is placed on a wooden table, 0.8 m high, standing on the ground reference plane. A horizontal coupling plane (HCP) is placed on the table. The EUT and the cables are isolated from the coupling plane by an insulating support 0.5 mm thick. The floor standing equipment is isolated from the ground reference plane by an insulating support about 0.1 m thick. The vertical coupling plane (VCP) of dimensions 0.5 m x 0.5 m is placed parallel to, and positioned at a distance of 0.1 m from, the EUT. Air discharges are applied to non-metallic parts of the system. Contact discharges are applied to all accessible metallic parts. Discharges are also applied to the Horizontal and Vertical Coupling Planes.

6.6.4 Test specification

Test n°	Discharge type	Discharge impedance	Discharge repetition	Discharge polarity	Test level
1	contact	330 Ω / 150 pF	10 discharges, one per second	positive and negative	4 kV
2	air	330 Ω / 150 pF	10 discharges, one per second	positive and negative	8 kV
Notes:					

6.6.5 Test equipment used[1]

Used [2]	Description	Manufacturer	Model	Identifier
☒	ESD Test system	EMC Partner	ESD3000	252 + 192
☐	ESD Test system	Teseq	NSG437	767+437767

Notes:
[1] See clause 1.7 for calibration information.
[2] If crossed, the instrument was used during tests.

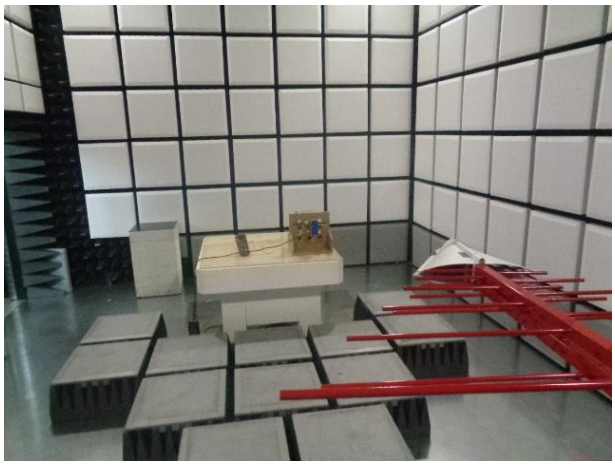
6.7 Radio-frequency electromagnetic field. Amplitude modulated

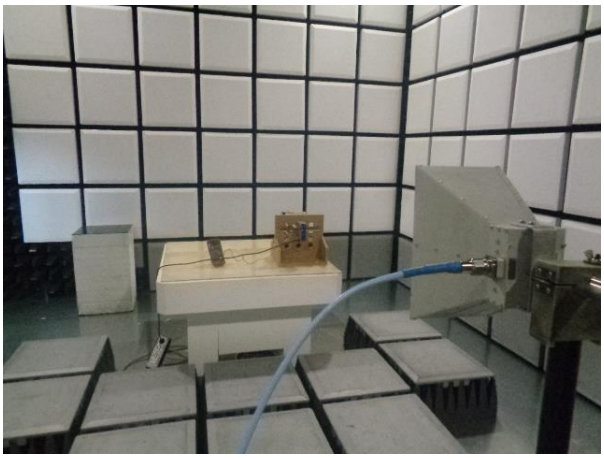
6.7.1 Test result

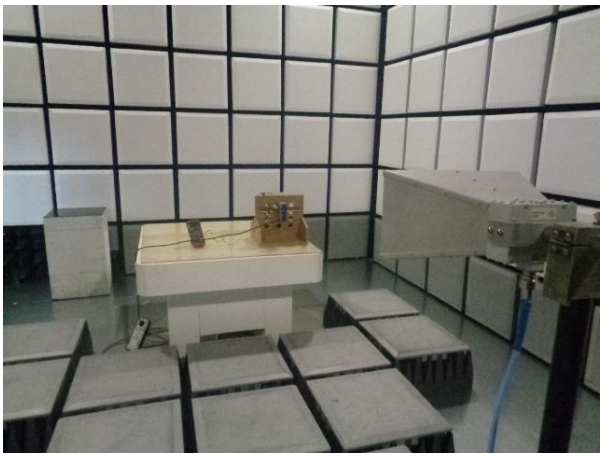
EUT port[1]	Test n° [2]	Supply voltage[3]	Criterion[4]		Mode		Verdict
			Required	Achieved	Operation	Configuration	
0	1	1	A	A	1	1	P
0	2	1	A	A	1	1	P
-	-	-	-	-	-	-	

Notes:
[1] See clause 4.6 EUT Input/Output Ports
[2] See test specification clause reported below for this test
[3] See clause 4.2 EUT Power Supply
[4] For criterion definition and requirement see clause 5 Performance Levels

6.7.2 Photo documentation of the test set-up







6.7.3 Test method

Method standard is reported at par. 3.2. The test allows estimating of the radiated immunity of electrical and electronic equipment to electromagnetic disturbances coming from intended radio-frequency (RF) transmitters in the frequency range indicated in the product standard. The interference is applied on the enclosure of the equipment by using transmitting antennas. Measurements are made in a fully anechoic chamber and the indicated field strength is pre-calibrated prior to placement of the system under test.

6.7.4 Test specification

Test n°	EUT - Antenna separation	Frequency step	Modulation	Frequency range	Test level
1[1]	2.5 m ± 0.3 m	1 % with 3 s dwell time	80 % AM modulated with a 1 kHz sine wave	80 MHz to 1000 MHz	10 V/m
2[1]	2.5 m ± 0.3 m	1 % with 3 s dwell time	80 % AM modulated with a 1 kHz sine wave	1.4 GHz to 6 GHz	3 V/m

Notes:

[1] Test was performed with antenna in both horizontal and vertical polarization, positioning each EUT face in front of generating antenna. Top and bottom faces are not exposed to EM field for table-top and floor standing equipment.

6.7.5 Test equipment used[1]

Used [2]	Description	Manufacturer	Model	Identifier
	RF Amplifier	Amplifier Research	1000A225	336745
	RF amplifier	Amplifier Research	50S1G4A	301049
	Log periodic antenna	Amplifier Research	AT6026A	330878
	Bidirectional coaxial coupler	Amplifier Research	DC7144	301249
☒	RF Amplifier	IFI	CMX100010-SMCC1000	L448A-0108
	SAC	Nemko Spa	10m SAC	530
	Power sensor	Rohde & Schwarz	NRP18AN	100987
	RF generator	Rohde & Schwarz	SMB100A	180431
	Shielded room	Siemens	10m control room	1947
	Biconilog antenna	ETS Lindgren	3142E	00213197
	Turntable	Inn.co	CT1000-150kg	CT1000/115/40 530517/P
	SAC	Comtest	3m SAC	1711-150
☐	RF amplifier	Rohde & Schwarz	BBA100	101163
	RF amplifier	Rohde & Schwarz	BBA150	102626
	Power sensor	Rohde & Schwarz	NRP18AN	100987
	RF generator	Rohde & Schwarz	SMA100B	104075
	Shielded room	Siemens	3 m control room	3
☒	Broad-Band Horn Antenna	Schwarzbeck Mess-Elektronik	BBHA9120D	01874

Notes:
[1] See clause 1.7 for calibration information.
[2] If crossed, the instrument was used during tests.

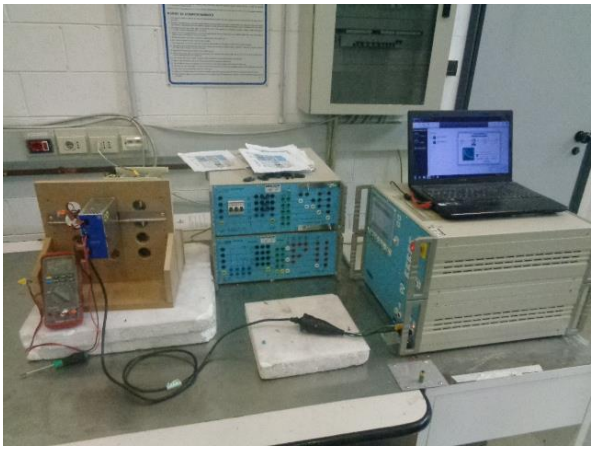
6.8 Fast transients

6.8.1 Test result

EUT port[1]	Test n° [2]	Supply voltage[3]	Criterion[4]		Mode		Verdict
			Required	Achieved	Operation	Configuration	
1	1	1	B	A	1	1	P
2	3	1	B	A	1	1	P
3	3	1	B	A	1	1	P

Notes:
[1] See clause 4.6 EUT Input/Output Ports
[2] See test specification clause reported below for this test
[3] See clause 4.2 EUT Power Supply
[4] For criterion definition and requirement see clause 5 Performance Levels

6.8.2 Photo documentation of the test set-up



6.8.3 Test method

Method standard is reported at par. 3.2. The test is intended to demonstrate the immunity of equipment subjected to types of transient disturbances such as those originating from switching transients (interruption of inductive loads, relay contact bounce….). The bursts are applied on the mains supply port by using a coupling decoupling network and on signal and control lines ports by using a capacitive clamp. Measurements are made on a ground plane.

6.8.4 Test specification

Test n°	Port type	Coupling device	Burst repetition frequency	Burst polarity	Test duration	Test level
1	I/O AC power ports	network	5 kHz or 100 kHz [1]	positive and negative	60 s	2 kV
2[2]	I/O DC power ports	network	5 kHz or 100 kHz [1]	positive and negative	60 s	1 kV
3[2]	Signal/control ports	clamp	5 kHz or 100 kHz [1]	positive and negative	60 s	1 kV

Notes:

[1] The test may be performed at one or at both repetition frequencies. The use of 5 kHz repetition frequency is traditional; however, 100 kHz is closer to reality.

[2] Applicable only to ports interfacing with cables whose total length according to the manufacturer's functional specification may exceed 3 m. Not applicable to input ports intended for connection to a battery or a rechargeable battery which shall be removed or disconnected from the equipment for recharging.

6.8.5 Test equipment used[1]

Used [2]	Description	Manufacturer	Model	Identifier
☒	Pulse generator	EMC partner	IMU3000	F5-S-D-V-1505
	Coupling network	EMC partner	CDN2000-06-32	1537
☐	Pulse generator	EMC partner	Transient 2000	849
	Coupling network	Schaffner	CDN 300	231
☒	Coupling clamp	EMC partner	CN-EFT1000	120
☐	Coupling clamp	Schaffner	CDN 125	245 9219

Notes:

[1] See clause 1.7 for calibration information.

[2] If crossed, the instrument was used during tests.

6.9 Surges

6.9.1 Test result

EUT port[1]	Test n° [2]	Supply voltage[3]	Criterion[4]		Mode		Verdict
			Required	Achieved	Operation	Configuration	
1	1	1	B	A	1	1	P
1	2	1	B	A	1	1	P

Notes:
[1] See clause 4.6 EUT Input/Output Ports
[2] See test specification clause reported below for this test
[3] See clause 4.2 EUT Power Supply
[4] For criterion definition and requirement see clause 5 Performance Levels

6.9.2 Photo documentation of the test set-up

6.9.3 Test method

Method standard is reported at par. 3.2. The test allows estimating of the conducted immunity of electrical and electronic equipment to unidirectional surges caused by over voltages from switching and lighting transients. The interference is applied on symmetrical and unsymmetrical modes on mains supply port by using coupling decoupling network. Five positive surges and five negative surges are applied at each of phases of the a.c. waveform: 0°, 90°, 180° and 270°. Each surge was applied 60 seconds after the previous surge. Signal and Telecommunications ports were subject to five positive and five negative surges applied through the appropriate Coupling/Decoupling Network (CDN).

6.9.4 Test specification

Test N°	Port type	Coupling type	Coupling network	Pulse type	Pulse polarity	Pulse repetition	Test level
1[1]	I/O AC power ports	line to line	2 Ω + 18 µF	1.2 / 50 µs	positive and negative	5 surges, one per minute	2 kV
2[1]	I/O AC power ports	line to earth	12 Ω + 9 µF	1.2 / 50 µs	positive and negative	5 surges, one per minute	4 kV
3[2]	I/O DC power ports	line to line	2 Ω + 18 µF	1.2 /50 µs	positive and negative	5 surges, one per minute	0.5 kV
4[2]	I/O DC power ports	line to earth	12 Ω + 9 µF	1.2 /50 µs	positive and negative	5 surges, one per minute	1 kV
5[2]	Signal/control ports	line to earth	42 Ω + 0.5 µF	1.2 /50 µs	positive and negative	5 surges, one per minute	1 kV

Notes:
[1] Test repeated at phase angle 0°, 90°, 180° and 270°. Level 2kV, 4kV required by manufactured.
[2] Applicable only to ports interfacing with long distance lines; not applicable to input ports intended for connection to a battery or a rechargeable battery which shall be removed or disconnected from the equipment for recharging.

6.9.5 Test equipment used[1]

Used [2]	Description	Manufacturer	Model	Identifier
☒	Pulse generator	EMC partner	IMU3000	F5-S-D-V-1505
	Coupling network	EMC partner	CDN2000-06-32	1537
	Coupling network	EMC partner	CDN-UTP ED3	1526
☐	Pulse generator	EMC partner	Transient 2000	849
	Coupling network	Schaffner	CDN 116	149 9318

Notes:
[1] See clause 1.7 for calibration information.
[2] If crossed, the instrument was used during tests.

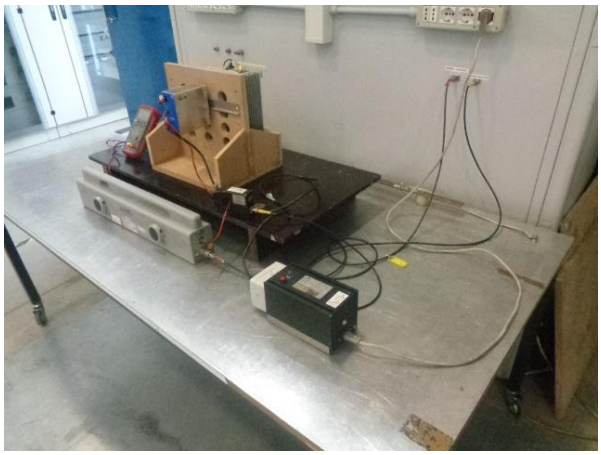
6.10 Radio-frequency common mode

6.10.1 Test result

EUT port[1]	Test n° [2]	Supply voltage[3]	Criterion[4]		Mode		Verdict
			Required	Achieved	Operation	Configuration	
1	1	1	A	A	1	1	P
2	5	1	A	A	1	1	P
3	7	1	A	A	1	1	P

Notes:
[1] See clause 4.6 EUT Input/Output Ports
[2] See test specification clause reported below for this test
[3] See clause 4.2 EUT Power Supply
[4] For criterion definition and requirement see clause 5 Performance Levels

6.10.2 Photo documentation of the test set-up



6.10.3 Test method

Method standard is reported at par. 3.2. The test allows estimating of the conducted immunity of electrical and electronic equipment to electromagnetic disturbances coming from intended radio-frequency (RF) transmitters in the frequency range 150 kHz to 80 MHz. The interference is applied on mains supply, signal line and earth connection ports by using coupling decoupling networks or a clamp. Measurements are made on a ground plane. The EUT was located 10cm above the reference ground plane and any associated I/O cables attached to the EUT are located between 30mm and 50mm above the ground plane. The indicated field is pre-calibrated prior to placement of the system under test.

6.10.4 Test specification

Test n°	Port type	Coupling Device	Frequency step	Modulation	Frequency range	Test level
1	I/O AC power ports	CDN M2	1 % with 3 s dwell time	80 % AM modulated with a 1 kHz sine wave	0.15 to 80 MHz	10 V
2	I/O AC power ports	CDN M3	1 % with 3 s dwell time	80 % AM modulated with a 1 kHz sine wave	0.15 to 80 MHz	10 V
3	I/O AC power ports	CDN M4	1 % with 3 s dwell time	80 % AM modulated with a 1 kHz sine wave	0.15 to 80 MHz	10 V
4	I/O AC power ports	CDN M5	1 % with 3 s dwell time	80 % AM modulated with a 1 kHz sine wave	0.15 to 80 MHz	10 V
5[1]	I/O DC power ports	CDN M2	1 % with 3 s dwell time	80 % AM modulated with a 1 kHz sine wave	0.15 to 80 MHz	10 V
6[1]	I/O DC power ports	CDN M3	1 % with 3 s dwell time	80 % AM modulated with a 1 kHz sine wave	0.15 to 80 MHz	10 V
7[1]	Signal/control ports	CLAMP	1 % with 3 s dwell time	80 % AM modulated with a 1 kHz sine wave	0.15 to 80 MHz	10 V
8[1]	Signal/control ports	AF2	1 % with 3 s dwell time	80 % AM modulated with a 1 kHz sine wave	0.15 to 80 MHz	10 V
9[1]	Signal/control ports	T2	1 % with 3 s dwell time	80 % AM modulated with a 1 kHz sine wave	0.15 to 80 MHz	10 V
10[1]	Signal/control ports	S1	1 % with 3 s dwell time	80 % AM modulated with a 1 kHz sine wave	0.15 to 80 MHz	10 V

Notes:

[1] Applicable only to ports interfacing with cables whose total length according to the manufacturer's functional specification may exceed 3 m.

6.10.5 Test equipment used[1]

Used [2]	Description	Manufacturer	Model	Identifier
☒	RF Conducted immunity test equipment	Teseq-Ametek	NSG4070C-80	540125
☐	RF Conducted immunity test equipment	EM Test	CWS500 CSI	V0710102305
☒	Attenuator 6dB	EM Test	ATT6/75	0206-18
☒	EM injection clamp	FCC	F-203I-23mm	121239
☐	Bulk current injection probe	FCC	F-120-9A	447
☒	CDN	EM Test	CDN M2 / M3	0307-16
☐	CDN	Luthi	CDN M2/M3	P1426135614
☐	CDN	Luthi	CDN M4 N-32A	P1343125190
☐	CDN	Luthi	CDN M4 PE-32A	P1428136828
☐	CDN	Luthi	CDN M5-32A	P1430137446
☐	CDN	Luthi	CDN S1-50 BNC	P1430137436
☐	CDN	Luthi	CDN T2	P1427136163
☐	CDN	Luthi	CDN AF2	P1425135039

Notes:
[1] See clause 1.7 for calibration information.
[2] If crossed, the instrument was used during tests.

6.11 Power frequency magnetic field

6.11.1 Test result

EUT port[1]	Test n° [2]	Supply voltage[3]	Criterion[4]		Mode		Verdict
			Required	Achieved	Operation	Configuration	
0	1	1	A	A	1	1	P
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	

Notes:
[1] See clause 4.6 EUT Input/Output Ports
[2] See test specification clause reported below for this test
[3] See clause 4.2 EUT Power Supply
[4] For criterion definition and requirement see clause 5 Performance Levels

6.11.2 Photo documentation of the test set-up

6.11.3 Test method

Method standard is reported at par. 3.2. This test is intended to demonstrate the immunity of equipment when subjected to power frequency magnetic fields. The test magnetic field is obtained by a current flowing in an induction coil; the application of the test field to the EUT is by the immersion method.

6.11.4 Test specification

Test n°	Magnetic field type	Magnetic field orientation[1]	Test duration	Test frequency	Test level
1[2]	sinusoidal continuous field	x-axis, y-axis, z-axis	60 s	50 Hz	30 A/m
2[2]	sinusoidal continuous field	x-axis, y-axis, z-axis	60 s	60 Hz	30 A/m

Notes:
[1] Respect to EUT
[2] Applicable only to equipment containing devices susceptible to magnetic fields. The test shall be carried out at the frequencies appropriate to the power supply frequency. Equipment intended for use in areas supplied only at one of these frequencies need only be tested at that frequency.

6.11.5 Test equipment used[1]

Used [2]	Description	Manufacturer	Model	Identifier
☒	Magnetic field meter	Maschek	ESM-100	971909-G
☒	Helmotz induction coil	G.I.E.	IEC1000-4-8	111962

Notes:
[1] See clause 1.7 for calibration information.
[2] If crossed, the instrument was used during tests.

6.12 Voltage dips and interruptions

6.12.1 Test result

EUT port[1]	Test n° [2]	Supply voltage[3]	Criterion[4]		Mode		Verdict
			Required	Achieved	Operation	Configuration	
1	1	1	B	A	1	1	P
1	3	1	B	A	1	1	P
1	5	1	B	A	1	1	P
1	7	1	C	C	1	1	P

Notes:

[1] See clause 4.6 EUT Input/Output Ports

[2] See test specification clause reported below for this test

[3] See clause 4.2 EUT Power Supply

[4] For criterion definition and requirement see clause 5 Performance Levels

[5] If this note is present near the verdict P, it means that he EUT does not demonstrate compliance when tested with 0 degree switching; the test was repeated with the switching occurring at both 90 degrees and 270 degrees and EUT fulfilled the requirements.

6.12.2 Photo documentation of the test set-up

6.12.3 Test method

Method standard is reported at par. 3.2. The test allows estimating of the conducted immunity of electrical and electronic equipment connected to low-voltage power supply networks for voltage dips and short interruptions. Testing is performed with the product connected directly to a generator capable of simulating the voltage drops and interrupts as described.

6.12.4 Test specification

Test n°	Change type	Frequency	Cycles	Test level[3]
1	Voltage dips	50 Hz	1	0 %
2	Voltage dips	60 Hz	1	0 %
3	Voltage dips	50 Hz	10	40 %
4	Voltage dips	60 Hz	12	40 %
5	Voltage dips	50 Hz	25	70 %
6	Voltage dips	60 Hz	30	70 %
7	Voltage interruptions	50 Hz	250	0 %
8	Voltage interruptions	60 Hz	300	0 %

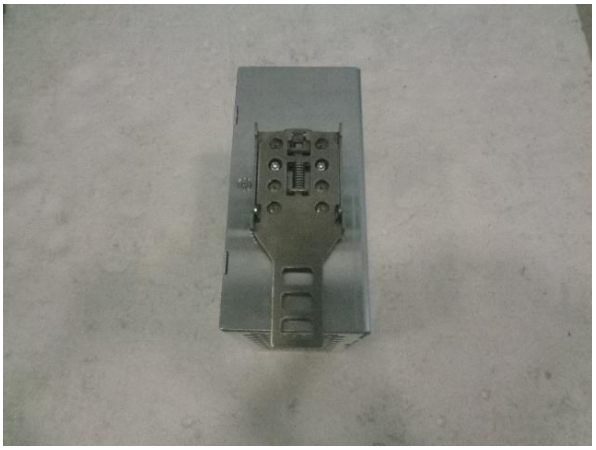
Notes:
[1] Changes to occur at 0 degree crossover point of the voltage waveform.
[2] The test shall be carried out at the frequencies appropriate to the power supply frequency. Equipment intended to be used in regions where only one of these frequencies is applied needs to be tested at this specific frequency only.
[3] % residual voltage

6.12.5 Test equipment used[1]

Used [2]	Description	Manufacturer	Model	Identifier
☒	Pulse generator	EMC partner	IMU3000	F5-S-D-V-1505
☐	Pulse generator	EMC partner	Transient 2000	849
☐	Power supply	Zenone	GVS300GL	0000000446
☐	Power supply	Zenone	GVS300GL	0000000445
☐	Power supply	Zenone	GVS300GL	0000000444

Notes:
[1] See clause 1.7 for calibration information.
[2] If crossed, the instrument was used during tests.

7 EUT PHOTOS



End of report