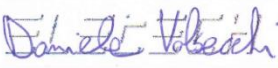


EMC TEST REPORT		
61000-6-1:2019		
Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for equipment in residential, environments.		
61000-6-3:2021		
Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Emission standard for equipment in residential, environments.		
Report Reference No.:	003532 EMC_00_01	
Date of issue	26/01/2024	
Total number pages	30	
Trademark :		
Applicant's name / Manufacturer	GTE Elettromeccanica S.r.l.	
Address	Via del Commercio, 62/64 - 20882 Bellusco (MB) – Italy	
Witness to the test	—	
Test item description	Hall effect transducer	
Model / Type	T – TT – TM	
Rating(s)	5V _{DC}	
Result	COMPLIANT	
Name of Testing Laboratory	Eletech S.r.l.	
Address	via Garcia Lorca, 29 - 23871 Lomagna (LC) - Italy	
Tested by (name, function, signature) :	Verified by (name, function, signature) :	Approved by (name, function, signature) :
Galbusera Matteo Testing engineer	Valsecchi Daniele Testing engineer	Ferrari Marco General Manager
 (Galbusera Matteo)  (Valsecchi Daniele)		

Test report form	TRF_EMC_2023_10_30
Testing:	
Date of receipt of test item	10/01/2024
Date(s) of performance of tests	10/01/2024 ÷ 11/01/2024
Laboratory sample identification	003532_SAM_00_00
Possible test case verdicts:	
- test case does not apply to test object ..	N/A
- test object does meet requirement	P (Pass)
- test object does not meet requirement ..	F (Fail)
- test case does not tested.....	N/T
- test case does not required by manufacturer.....	N/M
General disclaimer:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Eletech laboratory. The E.U.T. was configured for the testing according to the instructions for installation given by the manufacturer. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report. It is the responsibility of the manufacturer choose the sample to be tested. This laboratory is accredited in accordance with the International Standard ISO / IEC 17025:2017. This accreditation demonstrates technical competence for the defined purpose of EMC testing, according to PJLA Accreditation n.101188.	

Revision history			
Report	Date	Compiled by	Note
003532_EMC_00_00	12/01/2024	Galbusera Matteo	First release.
003532_EMC_00_01	26/01/2024	Valsecchi Daniele	Improvements and corrections. Changed: - model / type (pag. 1). <i>This test report cancels and replaces the previous test report "003532_EMC_00_00" which is not valid anymore.</i>

Production variant		
Variant model	Difference against main model	Additional test performed
—	—	—

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1 Reference standards and documents

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref.	Standard or document (european version)	Year	Title	Standard (international version)	Year
[12]	EN IEC 55016-1-1	2019	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus.	CISPR 16-1-1	2019
[13]	EN 55016-1-2 + A1	2014 2018	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-2: Radio disturbance and immunity measuring apparatus - Coupling devices for conducted disturbance measurements.	CISPR 16-1-2 A1	2014 2017
[16]	EN 55016-2-1 + A1	2014 2017	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-1: Methods of measurement of disturbances and immunity. Conducted disturbance measurements.	CISPR 16-2-1 A1	2014 2017
[26]	EN IEC 61000-3-2 + A1	2019 2021	Electromagnetic compatibility (EMC). Part 3-2: Limits. Limits for harmonic current emissions (equipment input current ≤16 A per phase).	IEC 61000-3-2 + A1	2019 2020
[27]	EN 61000-3-3 + A1 + A2 + AC	2013 2019 2021 2022	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.	IEC 61000-3-3 A1 A2	2013 2017 2021
[30]	EN 61000-4-2	2009	Electromagnetic compatibility (EMC). Part 4: Testing and measuring techniques. Section 2: Electrostatic discharge immunity test.	IEC 61000-4-2	2008
[31]	EN 61000-4-3 + A1 + IS1 + A2	2006 2008 2009 2010	Electromagnetic compatibility (EMC). Part 4: Testing and measuring techniques. Section 3: Radiated, radio frequency, electromagnetic field. Immunity test.	IEC 61000-4-3 A1 A2	2006 2007 2010
[32]	EN 61000-4-4	2012	Electromagnetic compatibility (EMC). Part 4-4: Testing and measurement techniques. Electrical fast transient/burst immunity test.	IEC 61000-4-4	2012
[33]	EN 61000-4-5 + A1	2014 2017	Electromagnetic compatibility (EMC). Part 4-5: Testing and measurement techniques. Surge immunity test.	IEC 61000-4-5 A1	2014 2017

Ref.	Standard or document (european version)	Year	Title	Standard (international version)	Year
[34]	EN 61000-4-6 + AC	2014 2015	Electromagnetic compatibility (EMC). Part 4: Testing and measuring techniques. Section 6: Immunity to conducted disturbance, induced by radio-frequency fields.	IEC 61000-4-6 COR1	2013 2015
[35]	EN 61000-4-7 + A1	2002 2009	Electromagnetic compatibility (EMC). Part 4-7: Testing and measurement techniques - General guide on harmonics and inter-harmonics measurements and instrumentation, for power supply systems and equipment connected thereto.	IEC 61000-4-7 A1	2002 2008
[36]	EN 61000-4-8	2010	Electromagnetic compatibility (EMC). Part 4-8: Testing and measurement techniques Power frequency magnetic field immunity test.	IEC 61000-4-8	2009
[38]	EN IEC 61000-4-11 + AC + AC	2020 2020 2022	Electromagnetic compatibility (EMC). Part 4-11: Testing and measurement techniques. Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16A per phase.	IEC 61000-4-11	2020
[39]	EN 61000-4-13 + A1 + A2	2002 2009 2016	Electromagnetic compatibility (EMC). Part 4-13: Testing and measurement techniques - Harmonics and inter-harmonics including mains signalling at AC power port, low frequency immunity tests.	IEC 61000-4-13 A1 A2	2002 2009 2015
[40]	EN 61000-4-15	2011	Electromagnetic compatibility (EMC). Part 4-15: Testing and measurement techniques. Flickermeter - Functional and design specifications.	IEC 61000-4-15	2010
[44]	EN IEC 61000-6-1	2019	Electromagnetic compatibility (EMC). Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments.	IEC 61000-6-1	2016
[46]	EN IEC 61000-6-3	2021	Electromagnetic compatibility (EMC). Part 6-3: Generic standards. Emission standard for equipment in residential environments.	IEC 61000-6-3	2020

2 General description of test item(s)

The equipment under test (E.U.T.) is used in	☒ domestic environment ☐ professional environment
Mounting position	☐ table-top equipment ☐ wall or ceiling mounted equipment ☐ floor standing equipment ☐ hand-held equipment ☐ DIN rail equipment ☒ Equipment for Building-in / inside of apparatus: <i>heating elements, air conditioning, boiler systems, industrial application.</i>

Code	—		
Serial number	—		
Manufacture date	—		
Firmware version	—		
Hardware version	—		
Schematic	—		
Bill of material (BOM)	—		
Dimensions (width x depth x height) ..	—		
Weight	—		
Maximum power absorption	$I_{MAX} = 9mA$	$P = \text{—}W$	$S = \text{—}VA$
Protection class	☐ Class 0	☐ Class I	☐ Class II ☒ Class III
Clock frequencies	☐ <15MHz	☐ >15MHz	☐ >30MHz ☒ <108MHz ☐ >108MHz
Other parameters	—		

2.1 Equipment modules / parts

Module / parts of test item	Type	Manufacturer
Hall effect transducer	T – TT – TM	GTE Elettromeccanica S.r.l.

2.2 Auxiliary equipment (A.E.) and accessories (not part of the test item)

Accessory	Type	Manufacturer
DC Power Supply	GPS - 2303	GW Instek
MUL013	187	Fluke

2.3 Configuration block diagram

—

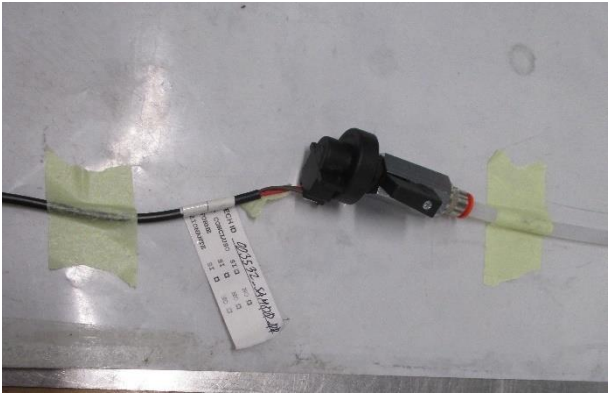
2.4 Port name and description

Port name	Cable			Note
	Specified length [m]	Attached during test	Shielded	
0 - Enclosure	—	—	—	Plastic enclosure.
1 - DC mains	< 3	DC	NO	5V _{DC} 2 wire connected to power supply (IN – GND)
2 - Output signal	< 3	I/O	NO	2 wire connected to voltmeter (OUT – GND)

2.5 Operation mode

No.	Description
1	Continuous operation of the E.U.T. connected to air compressor, at 5V _{DC} . The value of voltage output is 2,77V_{DC}

2.6 Photos of the test item

Photo of marking plate	—
Photo of test item	
	

3 Summary results

3.1 EN IEC 61000-6-3 standard

Clause	Requirement – Test case	Basic standard (see §1 - Reference standard - Ref. #)	Verdict
Table 3 – Radiated emission - Enclosure port			
3.1	Radiated disturbance emissions (30MHz to 1000MHz)	[47], [12], [15], [17]	P
3.4	Radiated disturbance emissions (1GHz to 6GHz)	[47], [12], [15], [17]	N/A ⁽¹⁾
Table 4 – Conducted emission – Low voltage AC mains port			
4.1	Low voltage AC mains port (0 ÷ 2kHz)	[26], [29]	N/A ⁽³⁾
4.2	Flicker emission and voltage fluctuation	[27], [28]	N/A ⁽³⁾
4.3	Conducted disturbance emissions, continuous disturbance (150kHz to 30MHz)	[47], [12], [13], [16]	N/A ⁽³⁾
4.4	Low voltage AC mains (0,15 MHz to 30 MHz) Discontinuous interference	[9]	N/A ⁽³⁾
Table 5 – Conducted emission - Emission – DC power port			
5.1	DC power (0,15 MHz to 30 MHz)	[12], [13], [16]	P
Table 6 – Emission – Other wired ports			
6.1	Telecommunications / network port (0,15 MHz to 30 MHz)	[19]	N/A
Supplemental Information: ⁽¹⁾ The highest internal frequency of the E.U.T. is less than 108MHz, the measurement shall only be made up to 1GHz. ⁽²⁾ This test is required by the customer. ⁽³⁾ Applicable only to the AC mains port.			

3.2 EN IEC 61000-6-1 standard

Clause	Requirement – Test case	Basic standard (see §1 - Reference standard - Ref. #)	Verdict
Table 1 <i>Immunity requirements – Enclosure ports</i>			
1.1	Power frequency magnetic field 50Hz and 60Hz	[36]	P ⁽¹⁾
1.2 1.3	Radiated, radio-frequency, electromagnetic field immunity test (80MHz to 1000MHz; 1,4GHz to 6GHz)	[31]	P
1.4	Electrostatic discharge immunity test	[30]	P
Table 2 <i>Immunity requirements – Signal / control ports</i>			
2.1	Immunity to conducted disturbances, induced by radio-frequency fields (150kHz to 80MHz)	[34]	N/A ⁽²⁾
2.2	Surge immunity test	[33]	N/A ^{(3), (7)}
2.3	Electrical fast transient / burst immunity test	[32]	N/A ⁽²⁾
Table 3 <i>Immunity requirements – Input and output DC power ports</i>			
3.1	Immunity to conducted disturbances, induced by radio-frequency fields (150kHz to 80MHz)	[34]	N/A ⁽²⁾
3.2	Surge immunity test	[33]	N/A ^{(3), (4), (6)}
3.3	Electrical fast transient / burst immunity test	[32]	P ⁽⁵⁾
Table 4 <i>Immunity requirements – Input and output AC power port</i>			
4.1	Immunity to conducted disturbances, induced by radio-frequency fields (150kHz to 80MHz)	[34]	N/A ⁽⁸⁾
4.2 4.3	Voltage dips, short interruptions and voltage variations immunity tests	[38]	N/A ⁽⁸⁾
4.4	Surge immunity test	[33]	N/A ⁽⁸⁾
4.5	Electrical fast transient / burst immunity test	[32]	N/A ⁽⁸⁾

Supplemental Information:

- (1) This test is applicable only to apparatus containing devices susceptible to magnetic field.
- (2) Applicable only to ports interfacing with cables whose total length according to the manufacturer's functional specification may exceed 3 meters.
- (3) Applicable only to ports interfacing with long distance lines (inside a building is longer than 30 meters, or which leaves the building).
- (4) This test is 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.
- (5) Equipment with a DC power input port intended for use with a dedicated AC–DC power adaptor shall be tested on the AC power input of the AC–DC power adaptor specified by the manufacturer.
Where no adaptor is specified, the test shall be done on the DC power port using the test level of the AC power port.
Where an adaptor is specified, the test is applicable to DC power input ports only when intended to be connected permanently to cables longer than 3 meters.
→ *in this case: no adaptor is specified.*
- (6) Equipment with a DC power input port intended for use with an AC–DC power adaptor shall be tested on the AC power input of the AC–DC power adaptor specified by the manufacturer or, where no adaptor is specified, the test shall be done on the DC power port using the test levels of the DC power port.
→ *in this case: no adaptor is specified.*
- (7) Applicable only to the “line - earth” coupling.
- (8) Applicable only to the AC mains port.

4 Test conditions

The test conditions are responsibility of the constructor:

- the choice of the sample to be tested;
- requested performance;
- control method during test.

4.1 General

Environmental reference conditions	The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the E.U.T. and the test equipment. The climatic conditions during the tests were within the following limits:		
	Temperature	Humidity	Atmospheric pressure
	15°C ÷ 35°C	30% ÷ 60%	800hPa ÷ 1060hPa
	<i>If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.</i>		
Measurement uncertainties	For all measurements where guidance for the calculation of the instrumentation uncertainty of a measurement is specified in CISPR 16-4-2, IEC 61000-4 series or a product standard, the measurement instrumentation uncertainty has been calculated and applied in accordance with these standards. In all cases if the test laboratory uncertainty is larger than the value for U_{CISPR} given in CISPR 16-4-2 the uncertainty are included in the test report annex. In case the standards in the IEC 61000-4 series or the product standard requires the indication of the uncertainty in the report these uncertainty values are included in the annex.		

4.2 Specific information as defined by the standard

5 Emission

5.1 Conducted disturbance emissions, continuous disturbance (150kHz to 30MHz)

Reference standard	[46] standard - Table 5	
Port	1 - DC mains	
Test set-up description	☐	Table: 80cm over horizontal ground plane; 40cm distance to vertical ground plane.
	☒	Floor standing equipment: 10cm over ground plane; 40cm distance to vertical ground plane.
	☐	Artificial hand applied
Test method applied	☒	Artificial mains network
	☐	Voltage probe
	☐	CDN according to [34] standard
Supplementary information	—	

5.1.1 Instruments

Inventory number	Description	Manufacturer	Type	Serial number	Calibration due date
CAM001	Shielded chamber	SIEMENS	—	B83117-A1011-T131	—
CAV038	RF cable	Huber + Suhner	RG58	—	23/05/2024
PAS010	LISN	Rohde & Schwarz	ESH2-Z5	830364/008	07/08/2024
PAS058	Attenuator	Huber+Suhner	6806.17A 1001266785 6dB 12,4GHz 2W	—	23/05/2024
TES028	EMI Test Receiver	Rohde & Schwarz	ESR26	101614	15/08/2024

5.1.2 Measurement uncertainty

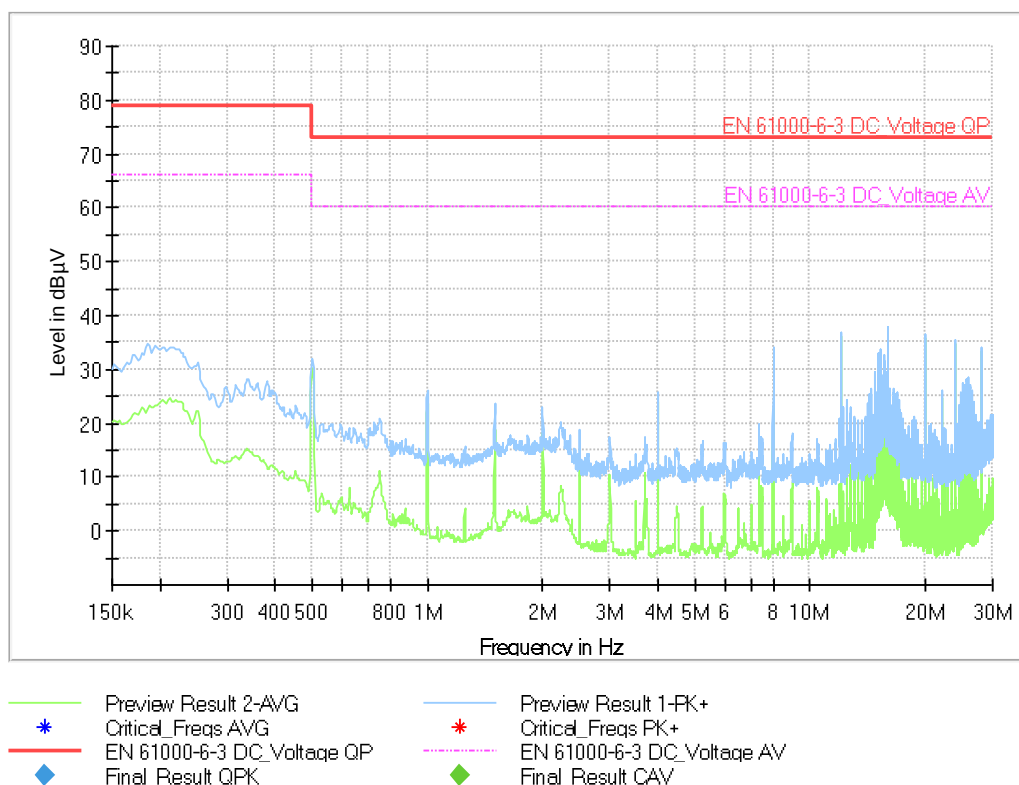
Reference standard	Parameter	Uncertainty
	Measurement at mains port using AMN (150kHz ÷ 30MHz)	2,52 dB

5.1.3 Operation mode: 1

Diagram of the disturbance:

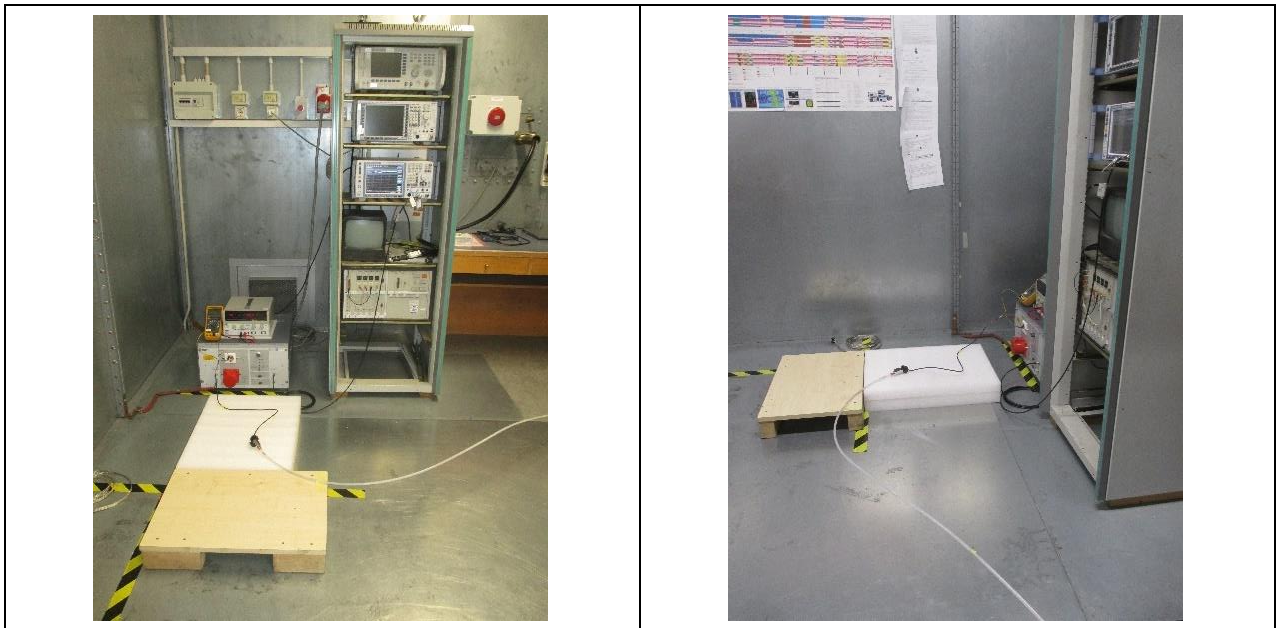
Subrange
150 kHz - 30 MHzStep Size
2,25 kHzDetectors
QPK ; CAVIF BW
9 kHzMeas. Time
1 sPreamp
20 dB

Full Spectrum



Minimum margin to the limit.....:	> 10 [dB]
Verdict (Pass/Fail).....:	PASS

5.1.4 Photo



5.2 Radiated disturbance emissions (9kHz to 6000MHz)

Reference standard	[46] standard - Table 3 – 3.1	
Port	0 - Enclosure	
Test set-up description	☒	Table: 80cm over horizontal ground plane.
	☐	Floor standing equipment: 10cm over ground plane.
Test method applied	☒	SAC with measurement distance: 3 meters
Supplementary information	—	

5.2.1 Instruments

Inventory number	Description	Manufacturer	Type	Serial number	Calibration due date
AMP007	Broadband pre-amplifier	Schwarzbeck Mess - Elektronik	BBV 9718 B	00004 P/n: 01961	21/03/2024
CAM006	Semi-anechoic chamber	ALBATROSS PROJECTS	3mSAC	B83117-S20-X435	22/05/2025
CAM008	Shielded chamber	Eletech	For auxiliary equipment	—	—
CAV047	RF cable	Huber + Suhner	Sucoflex 126/16N/16N/7000 (cavo tra ricevitore e camera anecoica)	271919/4	28/08/2024
CAV048	RF cable	Huber + Suhner	Sucoflex 126/11N/16N/10000 (cavo tra camera anecoica e antenna)	—	28/08/2024
PAS009	Antenna	EMCO	Horn 3115	9005-3475	11/05/2025
PAS028	Antenna	Schwarzbeck Mess - Elektronik	Trilog Super VULB 9161SE (25MHz - 2GHz)	9161-4084	11/05/2025
PAS046	Attenuator	Huber+Suhner	6803.17.B 3dB 18GHz / 50Ohm	—	28/08/2024
TES028	EMI Test Receiver	Rohde & Schwarz	ESR26	101614	15/08/2024

5.2.2 Measurement uncertainty

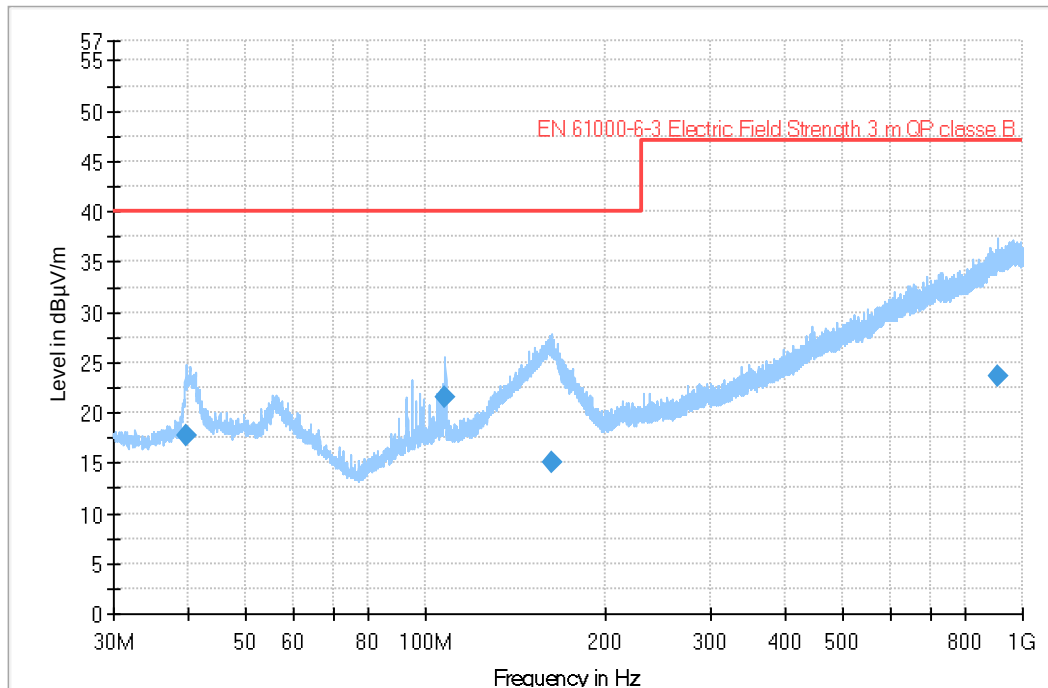
Reference standard	Parameter	Uncertainty
EN 55016-4-2 + A1 + A2 + AC	Horizontal polarization (30MHz ÷ 1GHz)	5,90 dB
	Vertical polarization (30MHz ÷ 1GHz).....	6,85 dB

5.2.3 Operation mode: 1 (30MHz to 1000MHz)

Diagram of the disturbance:

Subrange 30 MHz - 1 GHz Step Size 30 kHz Detectors QPK IF BW 120 kHz Meas. Time 1 s Preamp 20 dB

Full Spectrum



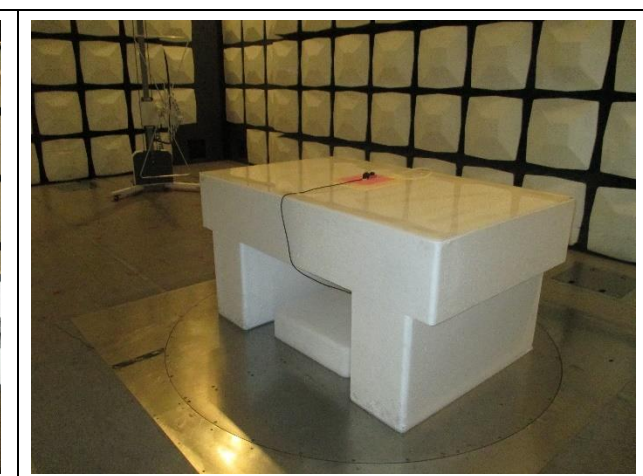
Preview Result 1-FK+
EN 61000-6-3 Electric Field Strength 3 m QP classe B
Final_Result QPK

Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
39.600000	17.76	40.00	22.24	1000.0	120.000	107.0	V	150.0	16.2
107.940000	21.57	40.00	18.43	1000.0	120.000	111.0	V	210.0	15.7
162.750000	15.07	40.00	24.93	1000.0	120.000	193.0	V	176.0	24.1
906.870000	23.71	47.00	23.29	1000.0	120.000	301.0	V	137.0	30.9

Minimum margin to the limit.....:	> 10 [dB]
Verdict (Pass/Fail).....:	PASS

5.2.4 Photo

	
30MHz to 1000MHz	30MHz to 1000MHz
	
E.U.T.	Auxiliary equipment (A.E.) and accessories

6 Immunity

6.2 General information

6.3 Performance criteria as defined by the standard

Criterion	Description
A	The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from 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 (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however no change of actual operating state or stored data is allowed to persist after the test. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from 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, or by any operation specified in the instructions for use.

6.4 Performance criteria as defined by the manufacturer

Before, during and after each immunity test performed, the equipment under test (E.U.T.) must continue to operate as intended without: - damage or reset; - status variation of the E.U.T. (normal operation); - status variation of the parameters (voltage, pressure). Check and verify the correct functionality of the E.U.T. through: - visual inspection, that any part of the E.U.T. hasn't been damaged, and that no hazardous condition has occurred; - voltage output's values with a multimeter.	
for A criterion	the maximum variation of the value of output voltage is equal to $\pm 20\text{mV}$.
for B criterion	the maximum variation of the value of output voltage is equal to $\pm 100\text{mV}$.

6.5 Electrostatic discharge immunity test

Reference standard	[30] standard	
Port	0 - Enclosure	
Temperature	21°C	
Humidity	33%	
Test set-up	☒	Table equipment (0,8m above ground plane)
	☐	Floor standing equipment (0,1m above ground plane)
Size of horizontal coupling plate ..	1,6m x 0,8m	
Size of vertical coupling plate	0,5m x 0,5m	
Number of discharges for each test point	10	
Repetition rate	1 discharge every 2 seconds	
Performance criterion required ...:	B see §6.3 - Performance criteria as defined by the standard	
Supplementary information.....:	—	

6.5.1 Instruments

Inventory number	Description	Manufacturer	Type	Serial number	Calibration due date
CAV030	ESD cable	—	HCP	—	01/02/2024
CAV031	ESD cable	—	VCP	—	01/02/2024
GEN013	ESD generator	EM TEST	Generator: ESD NX 30.1 (item 1002487) Network: RCN30 150-330	Generator: 11825 Network: 50197	04/06/2024

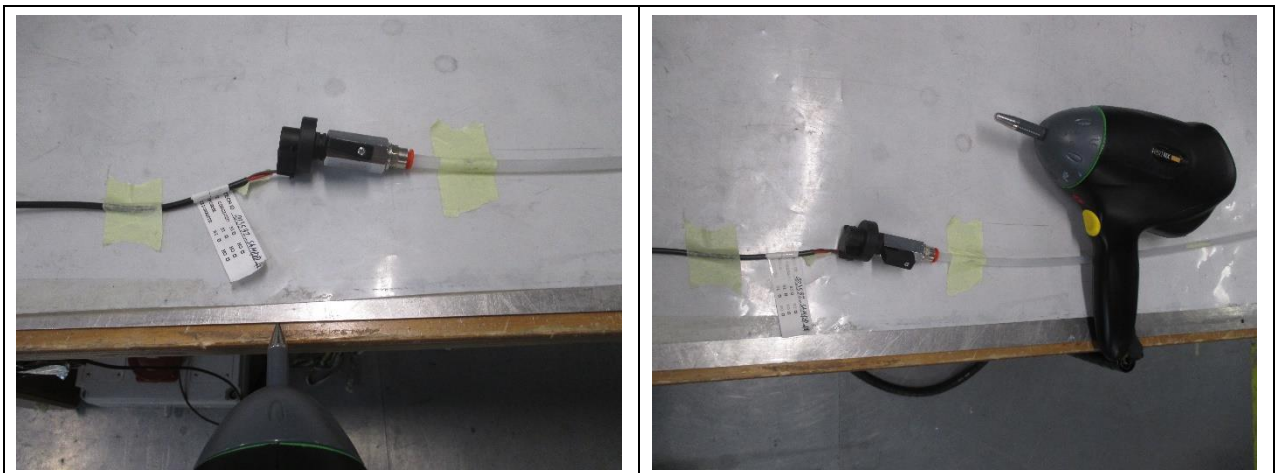
6.5.2 Measurement uncertainty

Reference standard	Parameter	Uncertainty
[30] standard	Voltage	3,42 %
	Rise time.....	24,63 %
	Peak current	14,83 %
	Current (at 30ns).....	14,03 %
	Current (at 60ns).....	12,22 %

6.5.3 Operation mode: 1

Location of discharge	Discharge	Polarity	Test level [kV]	Number of discharges	Results and observations
Points on non-conductive surface	A	P	8	10	A criterion ^{(1), (2)}
	A	N	8	10	A criterion ^{(1), (2)}
0 - Enclosure	HCP	P	4	10	A criterion ^{(1), (2)}
	HCP	N	4	10	A criterion ^{(1), (2)}
C = Contact discharge HCP = Horizontal coupling plate P = Positive A = Air discharge VCP = Vertical coupling plate N = Negative					
Supplementary information: ⁽¹⁾ The apparatus continues to operate during and after the test. No performance degradation is observed. ⁽²⁾ The maximum variation of the value of output voltage is equal to $\pm 20\text{mV}$.					
Verdict (Pass/Fail)			PASS		

6.5.4 Photo



6.6 Radiated, radio-frequency, electromagnetic field immunity test (80MHz to 6GHz) and proximity wireless fields

Reference standard	[31] standard
Port	0 - Enclosure
Test set-up	☒ Table equipment (0,8m above ground plane)
	☐ Floor standing equipment (0,1m above ground plane)
Modulation	☒ Amplitude modulation 80% 1kHz sinusoidal
	☐ Pulse modulation 1Hz with duty cycle = 50% (0,5s ON and 0,5s OFF)
Step size	1%
Antenna to E.U.T. distance.....	80MHz ÷ 1000MHz: 2,4m 1GHz ÷ 3GHz - Level ≤ 18V/m without modulation: 3m 1GHz ÷ 3GHz - Level > 18V/m without modulation: 1m 3GHz ÷ 6GHz: 1m
Performance criterion required ...	A see §6.3 - Performance criteria as defined by the standard
Supplementary information.....	—

6.6.1 Instruments

Inventory number	Description	Manufacturer	Type	Serial number	Calibration due date
AMP005	Power amplifier	Prana	MT400DC	1510-1758	06/04/2024
AMP006	Power amplifier	Rohde & Schwarz	BBA150 D60E30	102858	26/03/2024
CAM006	Semi-anechoic chamber	ALBATROSS PROJECTS	3mSAC	B83117-S20-X435	22/05/2025
CAV018	RF cable	Suhner	Sucoflex 104	269736/4	01/05/2024
CAV023	RF cable	Suhner	Sucoflex 104	269737/4	01/05/2024
CAV037	RF cable	Huber + Suhner	Sucoflex 104	—	01/05/2024
GEN009	Signal generator	Rohde & Schwarz	SMB100A	1406.6000K02 110669	10/08/2024
MDC001	Power meter	Amplifier Research	PM2002	26698	25/05/2024
MDC002	Laser Probe Interface	Amplifier Research	FI7000	0332975 S/N Kit: 0333300	27/02/2025
MDC003	Laser powered field probe	Amplifier Research	FL7006 Start Probe 2 100kHz - 6GHz	0332632 S/N Kit: 0333300	27/02/2025
PAS056	Antenna	Schwarzbeck Mess - Elektronik	STLP 9128 E Stacked Double Logarithmic- Periodic Antenna	9128 E 1131	05/05/2025
PAS067	Antenna	Schwarzbeck Mess - Elektronik	Broadband high gain Horn antenna BBHA 9120J	00089 P/n: 00592	31/01/2024

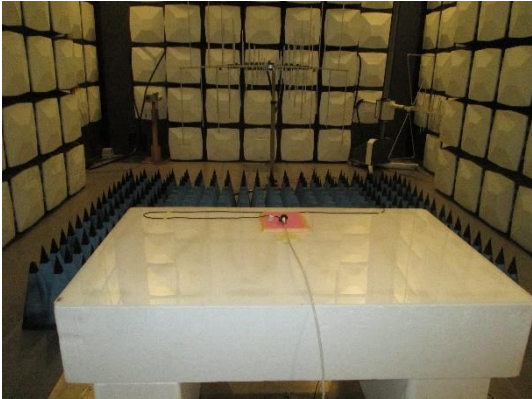
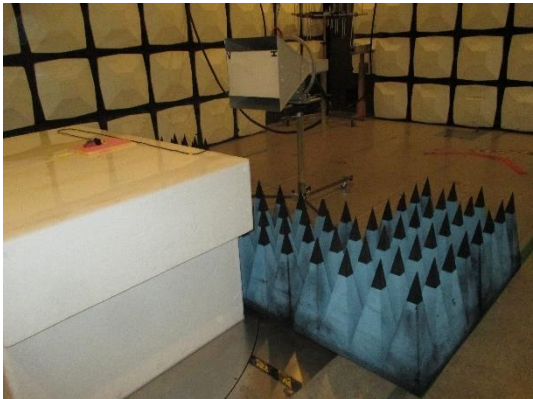
6.6.2 Measurement uncertainty

Reference standard	Parameter	Uncertainty
[31] standard	RF field level (80MHz ÷ 1GHz)..... :	6,00 dB
	RF field level (1GHz ÷ 6GHz)..... :	6,00 dB
	Frequency..... :	1,15 dB

6.6.3 Operation mode: 1

Frequency range	Test level [V/m]	Polarization	Modulation	Dwell time [s]	Results and observations
- Front side:					
80MHz ÷ 1000MHz	3	V	Amplitude modulation 80% 1kHz sinusoidal	2	A criterion ^{(1), (2)}
	3	H		2	A criterion ^{(1), (2)}
1GHz ÷ 3GHz	3	V		2	A criterion ^{(1), (2)}
	3	H		2	A criterion ^{(1), (2)}
3GHz ÷ 6GHz	3	V		2	A criterion ^{(1), (2)}
	3	H		2	A criterion ^{(1), (2)}
V = Vertical H = Horizontal					
Supplementary information:					
⁽¹⁾ The apparatus continues to operate during and after the test. No performance degradation is observed.					
⁽²⁾ The maximum variation of the value of output voltage is equal to ± 20mV.					
Verdict (Pass/Fail)		PASS			

6.6.4 Photo

	
80MHz ÷ 1000MHz	80MHz ÷ 1000MHz
	
1GHz ÷ 3GHz	1GHz ÷ 3GHz
	
3GHz ÷ 6GHz	Auxiliary equipment (A.E.) and accessories

6.7 Electrical fast transient / burst immunity test

Reference standard	[32] standard
Port	1 - DC mains
Test set-up	0,1m above ground plane
Performance criterion required ...:	B see §6.3 - Performance criteria as defined by the standard
Supplementary information.....:	—

6.7.1 Instruments

Inventory number	Description	Manufacturer	Type	Serial number	Calibration due date
CAV028	BURST cable	—	MIL-C-17F-RG 058 CU	—	14/06/2024
GEN014	Burst generator	Ametek CTS (EM TEST)	COMPACT NX5 B 16A	P2138256667	30/05/2024
PAS015	Burst clamp	EM TEST	1 METRO	00438	14/06/2024

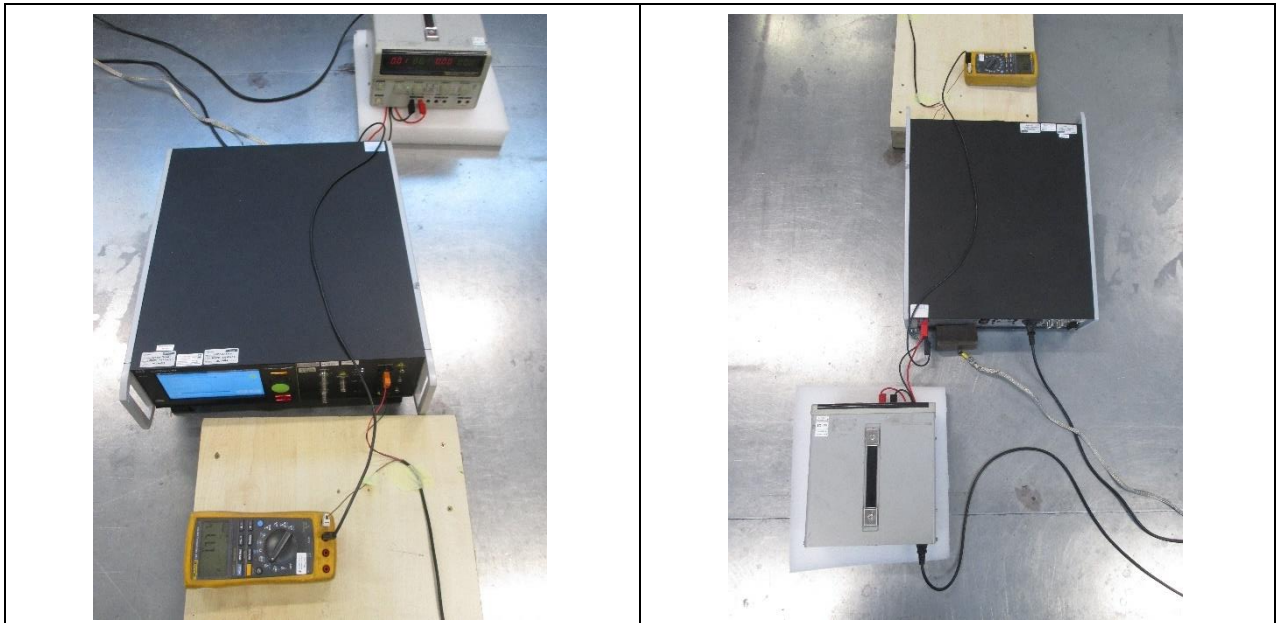
6.7.2 Measurement uncertainty

Reference standard	Parameter	Uncertainty
[32] standard	❖ with internal coupling (L / N / PE output):	
	Output voltage.....:	8,81 %
	Repetition frequency	0,0040 %
	Rise time.....:	12,56 %
	Pulse duration.....:	13,77 %
	Burst duration.....:	0,0002 %
	Burst period.....:	0,04 %

6.7.3 Operation mode: 1

Port	Coupling	Polarity	Test level [kV]	Repetition frequency [kHz]	Test time [min.]	Results and observations
1 - DC mains Positive, Negative	Positive	P	2	5	2	B criterion ^{(1), (3)}
		N	2	5	2	B criterion ^{(1), (3)}
	Negative	P	2	5	2	B criterion ^{(1), (3)}
		N	2	5	2	B criterion ^{(1), (3)}
	Positive + Negative	P	2	5	2	B criterion ^{(1), (3)}
		N	2	5	2	B criterion ^{(1), (3)}
P = Positive N = Negative						
Supplementary information: ⁽¹⁾ The apparatus continues to operate during and after the test. No performance degradation is observed. ⁽²⁾ The maximum variation of the value of output voltage is equal to ± 20mV. ⁽³⁾ The maximum variation of the value of output voltage is equal to ± 100mV.						
Verdict (Pass/Fail)		PASS				

6.7.4 Photo



6.8 Power frequency magnetic field immunity test

Reference standard	[36] standard
Port	0 - Enclosure
Performance criterion required ...:	A see §6.3 - Performance criteria as defined by the standard
Supplementary information.....:	—

6.8.1 Instruments

Inventory number	Description	Manufacturer	Type	Serial number	Calibration due date
ALI031	Three phase generator	EM TEST	NetWave 20-400	P1412132652	26/06/2024
MUL026	Digital multimeter with current clamp	BEHA-AMPROBE	AMP-330-EUR	170101433	12/07/2024
PAS020	Induction coil 50/60Hz	ELESYSTEMS	1 METRO	—	22/08/2024
PAS061	Transformer for induction coil 50/60Hz	—	—	—	22/08/2024

6.8.2 Measurement uncertainty

Reference standard	Parameter	Uncertainty
[36] standard	Output current.....:	2,22 %
	Frequency.....:	0,45 %

6.8.3 Operation mode: 1

Point of application	Test level [A/m]	Frequency [Hz]	Dwell time [s]	Results and observations
X-Axis	3	50	120	A criterion ^{(1), (2)}
	3	60	120	A criterion ^{(1), (2)}
Y-Axis	3	50	120	A criterion ^{(1), (2)}
	3	60	120	A criterion ^{(1), (2)}
Z-Axis	3	50	120	A criterion ^{(1), (2)}
	3	60	120	A criterion ^{(1), (2)}

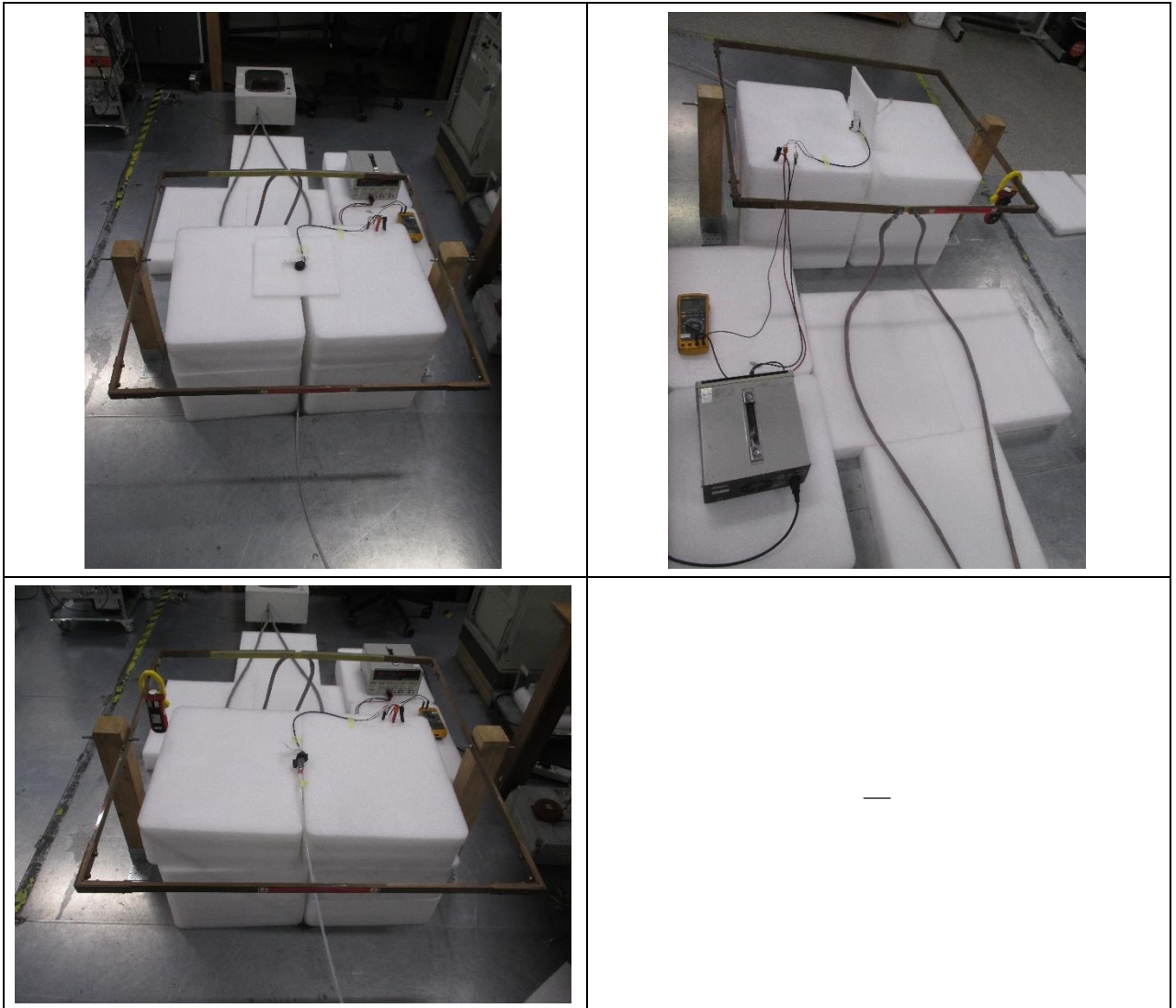
Supplementary information:

⁽¹⁾ The apparatus continues to operate during and after the test. No performance degradation is observed.

⁽²⁾ The maximum variation of the value of output voltage is equal to $\pm 20\text{mV}$.

Verdict (Pass/Fail)	PASS
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6.8.4 Photo



7 Instruments and measurement uncertainty

7.2 Instruments

Inventory number	Description	Manufacturer	Type	Serial number	Calibration due date
TER009	Ambient thermo-hygrometer	PCE	THB 40	S081865	29/03/2024

For all other instruments see each paragraph test performed.

7.3 Measurement uncertainty

"Binary statement for simple acceptance" decision rule has been applied, according to the document ILAC-G8 which includes the level of risk to false accept and false reject items.

The measurement uncertainties stated in these documents are estimated as extended uncertainty obtained multiplying the standard uncertainty by the coverage factor $k = 2$ corresponding to a confidence level of about 95,45%.

8 Annex

8.2 Device modifications required for compliance

Requirement – Test	Result / Comments
—	—

8.3 Critical components table

Object	Type/Model	Manufacturer
—	—	—

--- End of Test Report ---