EU-Konformitätserklärung

Der Hersteller:

Tinkerforge GmbH

Helleforthstraße 22-28

33758 Schloß Holte-Stukenbrock

erklärt hiermit, dass die Produkte:

WARP4 Charger Smart und WARP4 Charger Pro

in ihrer Konzeption und Bauart, bei korrekter Inbetriebnahme und Nutzung und in der vom Hersteller festgelegten Ausführungen den grundlegenden Anforderungen der folgenden akutell gültigen Bestimmungen entspricht:

EU-Richtlinie 2014/35/EU (Niederspannungsrichtline)

EU-Richtlinie 2014/30/EU (EMV)

EU-Richtlinie 2011/65/EU (RoHS)

EU-Richtlinie 2014/53/EU (RED)

Angewendete harmonisierte Normen:

EN 61851-1:2021

EN 61851-21-2:2021

Schloß Holte-Stukenbrock, 30. Mai 2026

Bastian Nordmeyer (Geschäftsführer)

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Test Report

Report Number:

E260381E1

Equipment under Test (EUT):

Wall box
WARP4 Charger 3-phase

Applicant:

Tinkerforge GmbH

Manufacturer:

Tinkerforge GmbH

ilac-MRA

DAkkS
Deutsche
Akkreditierungsstelle
D-PL-17186-01-00

References

Product (-family) standard(s) / Generic standard(s)

- EN IEC 61851-21-2:2021 Electric vehicle conductive charging system – Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply – EMC requirements for off board electric vehicle charging systems

The tests were requested by the customer.

Basic Standard(s):

- EN 61000-3-2:2019 Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
- EN 61000-3-3:2013 + A1:2019 + A2:2021 + A2:2021/AC:2022 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
- EN 61000-4-2:2009 Electrostatic discharge immunity test
- EN IEC 61000-4-3:2020 Radiated, radio-frequency, electromagnetic field immunity test
- EN 61000-4-4:2012 Electrical fast transient/burst immunity test
- EN 61000-4-5:2014 + A1:2017 Surge immunity test
- EN 61000-4-6:2014 Immunity to conducted disturbances, induced by radio-frequency fields
- EN 61000-4-8:2010 Power frequency magnetic field immunity test
- EN 61000-4-11:2021 + AC:2009 Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase

If the issue date of the basic standards mentioned above is newer than described in the annex ZA of the above-mentioned product standard, it is ensured, that the newer editions fulfill at least the requirements of the edition of annex ZA.

The EN standard is the european version of the IEC standard. The IEC standard is accepted by CENELEC without changes. This is documented by the endorsement notice in the EN standard.

Test result

The requirements of the standards listed under the section "product (-family) standard(s) / generic standard(s)" on page 2 of this test report were fulfilled by the EUT. Restrictions for the use of the EUT in certain environments and / or under special conditions of use are defined in chapter 3, if applicable. Details are shown in the following pages.

tested by:	Signature
tested and written by:	Signature
reviewed and approved by:	Signature

The measurement uncertainty for all measurement and test procedures of the laboratory has been determined and can be viewed if required. With regard to the emission measurement method according to CISPR 16-4-2 (EN 55016-4-2), the measurement uncertainty of the test laboratory (U_{Lab}) is less than the CISPR-defined measurement uncertainty (U_{CISPR}). This means that if the measured values for emitted interference fall below the limit value, the requirements of the relevant standard are met. For disturbance immunity, the decision rule of “simple acceptance” is applied with respect to the disturbance level.

If the customer requires an individual decision rule for conformity to the standard or the standard does not specify a decision rule, the measurement uncertainty and the decision rule are explicitly stated in the test report.

This test report is only valid in its original form.

The test results herein refer only to the tested sample. PHOENIX TESTLAB GmbH is not responsible for any generalisations or conclusions drawn from these test results concerning further samples. Any modification of the tested samples is prohibited and leads to the invalidity of this test report. Each page necessarily contains the PHOENIX TESTLAB Logo and the TEST REPORT NUMBER.

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1 Identification

1.1 Applicant

Name:	Tinkerforge GmbH
Address:	Helleforthstraße 22-28 33758 Schloß Holte-Stukenbrock
Country:	Germany
Applicant represented during the test by the following person:	Mr. Nordmeyer

1.2 Manufacturer

Name:	Tinkerforge GmbH
Address:	Helleforthstraße 22-28 33758 Schloß Holte-Stukenbrock
Country:	Germany
Manufacturer represented during the test by the following person:	Mr. Nordmeyer

1.3 Test Laboratory

The tests were carried out by: **PHOENIX TESTLAB GmbH**
Königswinkel 10
32825 Blomberg
Germany

accredited by *Deutsche Akkreditierungsstelle GmbH (DAkkS)* according to DIN EN ISO/IEC 17025:2018. The accreditation is only valid for the scope of accreditation listed in the annex of the certificate D-PL-17186-01-01.

1.4 EUT (Equipment Under Test)

Test object:	Wall box
Type:	WARP4 Charger 3-phase with Iskra WM3M4C
Order number:	001
Serial number:	2i77, EVSEID ISO: DEWRPEAAAHWXO
PCB identifier:	EVSE 4.4, WARP ESP32 Ethernet 2.3, WARP PLC 1.1
Hardware version:	4.0
Firmware version:	1.0.0+69dcfc3d build 13.04.2026

Remark: PHOENIX TESTLAB GmbH does not select the samples used for testing. The samples are provided exclusively by the applicant.

1.5 Technical Data of Equipment

Power supply:	AC Mains
Supply voltage:	400 V, 3ph; 50Hz

1.6 Dates

Date of receipt of test sample:	14.04.2026
Test period:	14.04.2026 – 17.04.2026

2 Operational States and Test Setup

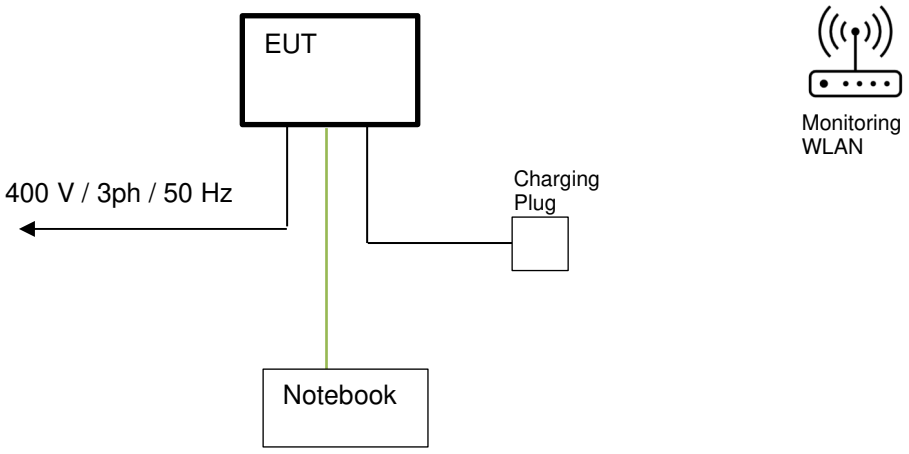
The following states were defined as the operating conditions:

- waiting mode: to simulate when the EUT is fully powered up and connected to a vehicle but not charging
- charge mode: during testing, the EUT was operated at 1000 W resistive load

Definition of the functions to be monitored and corresponding tolerance limits:

- No unintentional stop or start of charging.
- No permanent failures.

The system was setup as follows:



3 Additional Information

General information:

- none

Classification of ports:

- none

Maximum length, type and special use of cables (declared by the manufacturer):

- no maximum length declared

Climatic conditions:

- The ventilation system of the test laboratory maintains the temperature at 20°C ± 5°C and the relative humidity less than 80%.
- The recorded values for temperature and relative humidity for ESD tests are listed with the ESD results.
- All climatic conditions are recorded continuously and are available on request.

Deviation of the standard or test plan:

- The tests against surge were only carried out at L1, N and PE in charging mode to test the control hardware.

Special EMC measures, as a result of the tests:

- Firmware update during voltage dips, to prevent wrong brown out detection.

  New firmware:1.0.0+69df7f61 of 15.04.2026 14:06:57

4 Test Overview

4.1 Electromagnetic disturbances characteristics

Radiated emissions – Enclosure port				
Frequency range	Limits	Basic standard	Remark	Test result
30 to 230 MHz 230 to 1000 MHz	40 dBµV/m QP at 3 m 47 dBµV/m QP at 3 m	EN 55016-2-3, 7.3 *[OATS / SAC]*	see 1, 2, 6	pass
30 to 230 MHz 230 to 1000 MHz	42 to 35 dBµV/m QP at 3 m 42 dBµV/m QP at 3 m	EN 55016-2-3, 7.4 *[FAR]*	see 3, 6	---
1 to 3 GHz 3 to 6 GHz	70 dBµV/m PK at 3 m 50 dBµV/m AV at 3 m 74 dBµV/m PK at 3 m 54 dBµV/m AV at 3 m	EN 55016-2-3, 7.6	see 4, 5, 6	pass

1) Allowed measurement distances: 3 m, 5 m, 10 m or 30 m. For measurement distances less than 30 m, the receiving antenna height shall be varied between 1 m to 4 m, else 1 m to 6 m shall be used.
2) For equipment meeting the size criterion defined in 3.1.15 [*of the generic standard*], the measurements may be performed at the 3 m distance.
3) Restricted to table top equipment, and floor-standing equipment which can be placed on table during the test. Allowed measurement distances: 3 m, 5 m or 10 m. The limitations on EUT size in CISPR 16-2-3 apply.
4) Allowed measurement distances: 1 m, 3 m, 5 m or 10 m.
5) Highest internal frequency $f_x \leq$ 108 MHz → highest measured frequency: 1 GHz
   Highest internal frequency 108 MHz < $f_x \leq$ 500 MHz → highest measured frequency: 2 GHz
   Highest internal frequency 500 MHz < $f_x \leq$ 1 GHz → highest measured frequency: 5 GHz
   Highest internal frequency $f_x >$ 1 GHz → highest measured frequency: $5 \times f_x$ up to a maximum of 6 GHz
   Where the highest internal frequency is not known, tests are be performed up to 6 GHz.
6) For further information, see chapter 11 of the generic standard.

Conducted emissions – Low voltage AC mains port				
Frequency range	Limits	Basic standard	Remark	Test result
0 to 2 kHz	see basic standard	EN 61000-3-2 / -3-12	see 1	pass
		EN 61000-3-3 / -3-11		pass
0.15 to 0.5 MHz	66 to 56 dBµV QP 56 to 46 dBµV AV	EN 55016-2-1, 7 EN 55016-1-2, 4 *[V-AMN]*	see 2, 3	pass
0.5 to 5 MHz	56 dBµV QP 46 dBµV AV			
5 to 30 MHz	60 dBµV QP 50 dBµV AV			

1) Applicable to equipment covered within the scope of IEC 61000-3-2 / IEC 61000-3-12 respectively IEC 61000-3-3 / IEC 61000-3-11.
2) Impulse noise (clicks) shall be measured and assessed according to CISPR 14-1.
3) For further information, see chapter 11 of the generic standard.

Conducted emissions – other wired ports [Note]				
Frequency range	Limits	Basic standard	Remark	Test result
0.15 to 0.5 MHz	40 to 30 dBµA QP 30 to 20 dBµA AV	EN 55032	see 1 and 2	pass
0.5 to 30 MHz	30 dBµA QP 20 dBµA AV			

Note: Applicable to wired network ports (e.g. CableTV, ISDN, xDSL, LAN), optical fibre ports with metallic shield or tension members, broadcast receiver tuner ports and antenna ports.

1) The current and voltage disturbance limits are derived for use with an Asymmetric Artificial Network (AAN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the wired network port under test (conversion factor is 20 $\log_{10}$ (150) = 44 dB).
2) For further information, see chapter 11 of the generic standard.

4.2 EMC Immunity

Definition of performance criteria:

A: The EUT shall continue to operate as intended within the tolerances defined by the EUT manufacturer during and after the application of the appropriate tests. It shall not change the state in which it is operating (i.e. charging shall continue if in charge mode and shall remain idle if in waiting mode).

NOTE:
A change of state includes the control/communication lines of the CPT port and any change in charging current for DC charging (beyond the tolerance defined by the manufacturer).

B: The EUT shall continue to operate as intended within the tolerances defined by the EUT manufacturer at the completion of the applicable tests. Additionally, during the application of the appropriate tests the primary functions of the charger shall be maintained (within the tolerances defined by the EUT manufacturer). Secondary functions (for example displays, etc.) may degrade in performance during the test but shall resume to the original condition subsequent to testing.

Subsequent to the application of the applicable test, the EUT shall not have changed the state in which it is operating (i.e. charging shall continue if in charge mode and shall remain idle if in waiting mode).

NOTE:
A change of state includes the control/communication lines of the CPT port and any change in charging current for DC charging (beyond the tolerance defined by the charging equipment manufacturer).

C: During and after completion of the appropriate tests, the EUT can change to a failsafe condition. This state requires user intervention to restart the charge cycle or the automatic resumption of charging if the safety conditions have been fulfilled as defined in IEC 61851-1:2017 (simplified mode 3).

Immunity – Enclosure ports				
Environmental phenomena / Basic standard	Test specifications and units	Remark	required performance criterion	Test result
Radio-frequency electromagnetic field *(EN 61000-4-3)*	80 MHz - 2.7 GHz; 10 V/m; 80% AM (1 kHz)	see 1	A	pass
Electrostatic discharge (ESD) *(EN 61000-4-2)*	± 4 kV charge voltage (contact discharge)	see 2	B	pass
	± 8 kV charge voltage (air discharge)		B	not applicable
Power-frequency magnetic field *(EN 61000-4-8)*	50 Hz, 60 Hz: 30 A/m for Systems ≤ 32 A 100 A/m for Systems > 32 A	see 3	A	pass

1) The test level specified is the r.m.s. value of the unmodulated carrier.
2) See basic standard for applicability of contact and / or air discharge test.
3) 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.

Immunity – Input and output AC power ports				
Environmental phenomena / Basic standard	Test specifications and units	Remark	required performance criterion	Test result
Radio-frequency common mode *(EN 61000-4-6)*	150 kHz - 80 MHz, 10 V; 80% AM (1 kHz)	see 1	A	pass
Fast transients (Burst) *(EN 61000-4-4)*	± 4.0 kV 5 kHz rep. frequency	see 2	B	pass
Surges *(EN 61000-4-5)*	1.2/50 (8/20) µs (t_r/t_h) ± 1.0 kV line to line ± 2.0 kV line to earth	see 3	B	pass
	1.2/50 (8/20) µs (t_r/t_h) ± 2.0 kV line to line ± 4.0 kV line to earth		B	pass
Voltage dips *(EN 61000-4-11)*	0 % for 0.5 cycle	see 4	B	pass
	0% for 1 cycle		B	pass
	40% for 10 / 12 cycles		B	pass
	70% for 25 / 30 cycles		B	pass
Voltage interruptions *(EN 61000-4-11)*	0% for 250 / 300 cycles		C	pass

1) The test level specified is the r.m.s. value of the unmodulated carrier. The test level can also be defined as the equivalent current into a 150 Ω load.
2) 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.
3) In cases where a manufacturer's specification requires external protection devices or measures which are clearly specified in the user's manual, the test requirements of this standard shall be applied with the external protection devices or measures in place. For supply voltages where no test equipment is commercially available (e.g. CDNs), this test is not required.
4) Voltage shift at zero crossings. Applicable only to input ports.

Immunity – Signal / control ports				
Environmental phenomena / Basic standard	Test specifications and units	Remark	required performance criterion	Test result
Radio-frequency common mode *(EN 61000-4-6)*	150 kHz - 80 MHz, 10 V; 80% AM (1 kHz)	see 1, 2	A	pass
Fast transients (Burst) *(EN 61000-4-4)*	± 2.0 kV 5 kHz rep. frequency	see 2, 3	B	pass
Surges *(EN 61000-4-5)*	1.2/50 (8/20) µs (t_r/t_h) ± 2.0 kV line to earth	see 4, 5, 6	B	pass

1) The test level specified is the r.m.s. value of the unmodulated carrier. The test level can also be defined as the equivalent current into a 150 Ω load.
2) Applicable only to ports interfacing with cables whose total length according to the manufacturer's functional specification may exceed 3 m.
3) Capacitive clamp used. 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.
4) Applicable only to ports interfacing with long distance lines (line connected to a signal / control port and which inside a building is longer than 30 m, or which leaves the building (including a line installed outdoors).
5) Where normal functioning cannot be achieved because of the impact of the coupling/decoupling network (CDN) on the EUT, the test shall be done with the reduced functionality. A rationale shall be given in the test report for doing so. After the test and the removal of the CDN, the normal function shall not be affected.
6) Signal ports directly connected to AC power network shall be treated as AC power ports.

5 Results

5.1 Radiated radio disturbance according to EN 55011

Measuring setup:
- Table setup
- The photo below shows the test set-up

Measuring procedure SAC (Semi Anechoic Chamber):

The interfering field strength is measured in a semi anechoic chamber. Here the equipment under test is measured from various sides in normal fitted position. The antenna is adjusting in height whether the test object is emitting interference at certain frequencies. This procedure makes it possible to ascertain without the effect of external interference sources. If measuring above 1 GHz, the ground of the SAC shall be covered with ground absorber. The measuring procedure above 1 GHz is performed according to the above mentioned standard.

Measuring equipment:
Semi anechoic chamber M153 (PM-No. 482784)
Switch unit OSP220 (PM-No. 483141)
Switch unit OSP220 Master (PM-No. 483142)
Switch unit OSP220 Satellite (PM-No. 483143)
Antenna mast Borsight BAM 4.0-P (PM-No. 483222)
Software EMC 32 (PM-No. 483150)
Measuring receiver ESW44 (PM-No. 483149)
Ultralog antenna HL562E (PM-No. 483152)

Measuring record: The measuring records are presented on the following pages.

Measuring result: The requirements made in the test documents were fulfilled.

EUT Information

Test description:	Radiated emission measurement
Test site:	Phoenix TESTLAB GmbH, Semi Anechoic Chamber M153
Setup:	Table setup
Operator:	T .Brähler
EUT:	WARP 4 Wallbox
Manufacturer:	Tinkerforge
Operating conditions:	AC charging
Comment:	1kW load

EMI Auto Test Template: 30 MHz - 1 GHz

Hardware Setup:	30MHz-6GHz_HL562E
Measurement Type:	Open-Area-Test-Site (SAC/FAR)
Frequency Range:	30 MHz - 1 GHz
Graphics Level Range:	0 dBµV/m - 80 dBµV/m

Preview Measurements:

Scan Test Template:	30 MHz - 6 GHz, HL562E, FFT, PRE

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESW 44]					
30 MHz - 1 GHz	30 kHz	PK+ ; AVG	120 kHz	0,05 s	20 dB
1 GHz - 6 GHz	250 kHz	PK+ ; AVG	1 MHz	0,15 s	20 dB

Frequency Zoom:

Zoom Scan Template:	30 MHz - 6 GHz, HL562E, ZOOM

Adjustment:

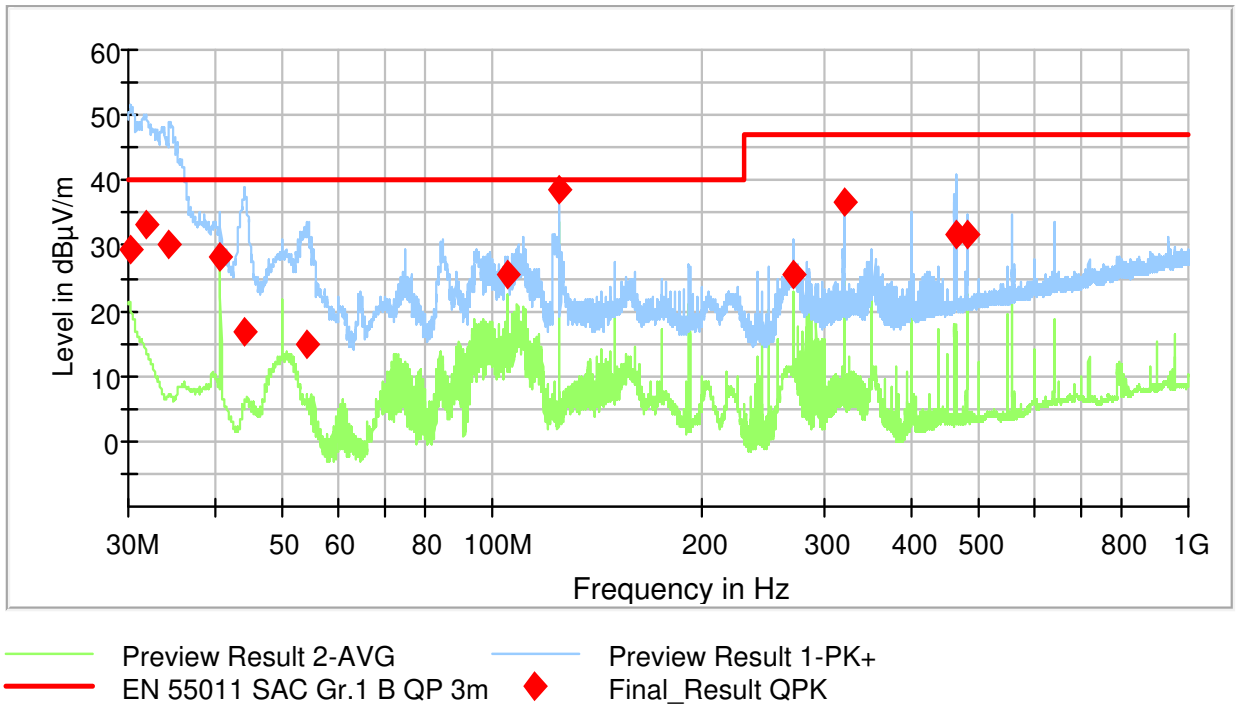
Template for Single Meas.:	30 MHz - 6 GHz, HL562E, PSC

Final Measurements:

Template for Single Meas.:	30 MHz - 1 GHz, HL562E, FIN

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESW 44]					
30 MHz - 1 GHz	40 kHz	QPK	120 kHz	1 s	20 dB

The interfering field strength of the EUT is measured from various sides and different antenna heights. The curves in the diagram represent the maximum measured value for each frequency. The top measured curve represents the peak measurement, the bottom measured curve represents average values, which are only required for control purposes. The measured points marked with "◆" are frequency points which were carried out with a quasi-peak detector. The results of the standard subsequent are indicated in the table below. The limits as well as the measured results refer to the above-mentioned standard while taking account of the specified requirements for a 3 m measuring distance.



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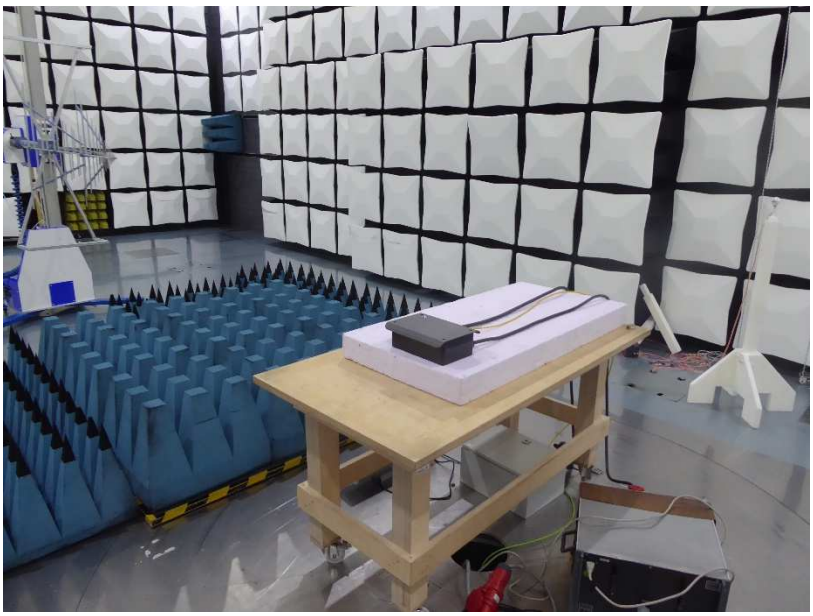
Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.300000	29.55	40.00	10.45	1000.0	120.000	117.0	V	103.0	19.5
31.770000	33.38	40.00	6.62	1000.0	120.000	102.0	V	68.0	18.6
34.295000	30.05	40.00	9.95	1000.0	120.000	103.0	V	85.0	17.0
40.690000	28.13	40.00	11.87	1000.0	120.000	100.0	V	22.0	13.3
44.045000	16.88	40.00	23.12	1000.0	120.000	141.0	V	112.0	11.2
54.135000	15.03	40.00	24.97	1000.0	120.000	131.0	V	-2.0	6.1
105.485000	25.45	40.00	14.55	1000.0	120.000	124.0	V	337.0	11.2
124.995000	38.46	40.00	1.54	1000.0	120.000	100.0	V	246.0	11.0
271.220000	25.55	47.00	21.45	1000.0	120.000	120.0	H	226.0	11.9
319.995000	36.57	47.00	10.43	1000.0	120.000	110.0	H	315.0	13.4
463.400000	31.72	47.00	15.28	1000.0	120.000	132.0	V	-2.0	17.4
479.995000	31.60	47.00	15.40	1000.0	120.000	196.0	H	136.0	17.6

5.2 Radiated radio disturbance according to EN 55032

Measuring setup:
- Table setup
- The photo below shows the test set-up.



Measuring procedure SAC (Semi Anechoic Chamber):

The interfering field strength is measured in a semi anechoic chamber. Here the equipment under test is measured from various sides in normal fitted position. The antenna is adjusting in height whether the test object is emitting interference at certain frequencies. This procedure makes it possible to ascertain without the effect of external interference sources. If measuring above 1 GHz, the ground of the SAC shall be covered with ground absorber. The measuring procedure above 1 GHz is performed according to the above mentioned standard.

Measuring equipment:
Semi anechoic chamber M153 (PM-No. 482784)
Switch unit OSP220 (PM-No. 483141)
Switch unit OSP220 Master (PM-No. 483142)
Switch unit OSP220 Satellite (PM-No. 483143)
Antenna mast Borsight BAM 4.0-P (PM-No. 483222)
Software EMC 32 (PM-No. 483150)
Measuring receiver ESW44 (PM-No. 483149)
Ultralog antenna HL562E (PM-No. 483152)

Measuring record: The measuring records are presented on the following pages.

Measuring result: The requirements made in the test documents were fulfilled.

EUT Information

Test description:	Radiated emission measurement
Test site:	Phoenix TESTLAB GmbH, Semi Anechoic Chamber M153
Setup:	Table setup
Operator:	T. Brähler
EUT:	WARP 4 Wallbox
Manufacturer:	Tinkerforge
Operating conditions:	AC charging
Comment:	1kW load

EMI Auto Test Template: 1 GHz - 6 GHz

Hardware Setup:	30MHz-6GHz_HL562E
Measurement Type:	Open-Area-Test-Site (SAC/FAR)
Frequency Range:	1 GHz - 6 GHz
Graphics Level Range:	0 dBµV/m - 80 dBµV/m

Preview Measurements:

Scan Test Template: 30 MHz - 6 GHz, HL562E, FFT, PRE

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESW 44]					
30 MHz - 1 GHz	30 kHz	PK+ ; AVG	120 kHz	0,05 s	20 dB
1 GHz - 6 GHz	250 kHz	PK+ ; AVG	1 MHz	0,15 s	20 dB

Adjustment:

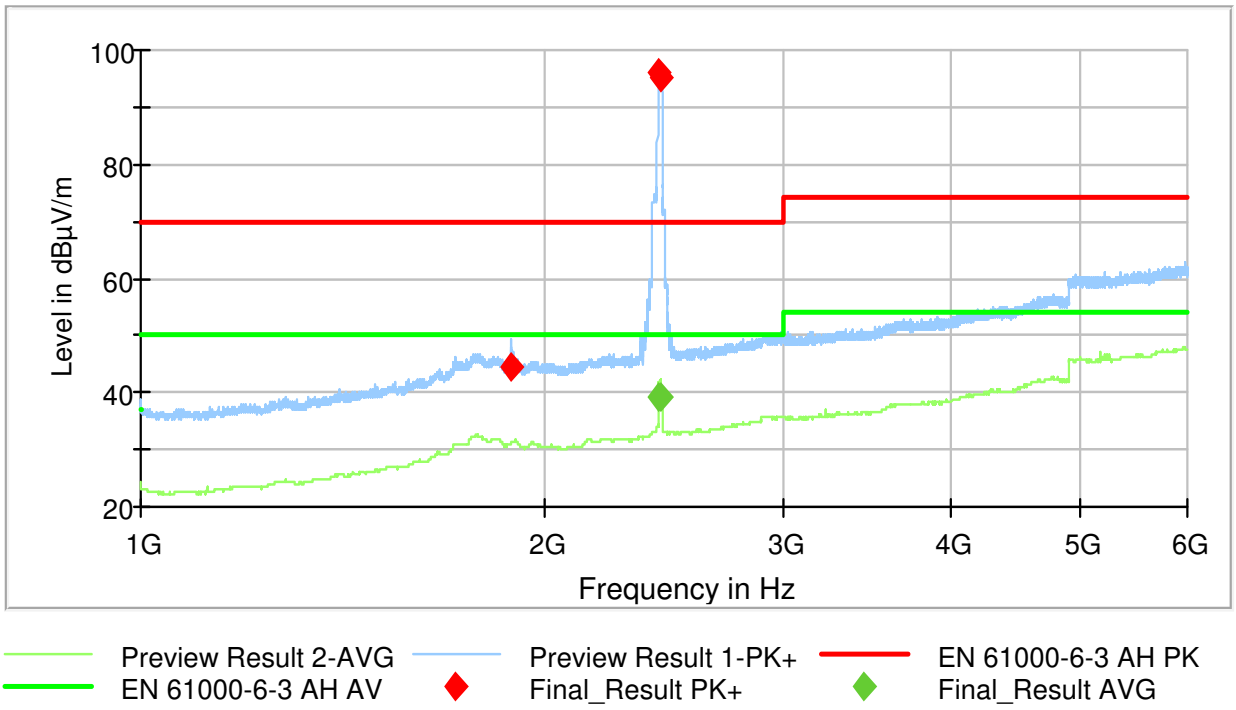
Template for Single Meas.: 30 MHz - 6 GHz, HL562E, PSC

Final Measurements:

Template for Single Meas.: 1 GHz - 6 GHz, HL562E, FIN

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESW 44]					
1 GHz - 6 GHz	500 kHz	PK+ ; AVG	1 MHz	1 s	20 dB

The interfering field strength of the EUT is measured from various sides and an antenna height of 150 cm above ground. The curves in the diagram represent the maximum measured value for each frequency. The top measured curve represents the peak measurement, the bottom measured curve represents average values. The measured points marked with "◆" are frequency points which were carried out with a peak detector and a measurement duration of 1 s. Corresponding, measured points marked with "◆" are frequency points which were carried out with an average detector and a measurement duration of 1 s as well. The results of the standard subsequent are indicated in the table below. The limits as well as the measured results refer to the above-mentioned standard while taking account of the specified requirements for a 3 m measuring distance.



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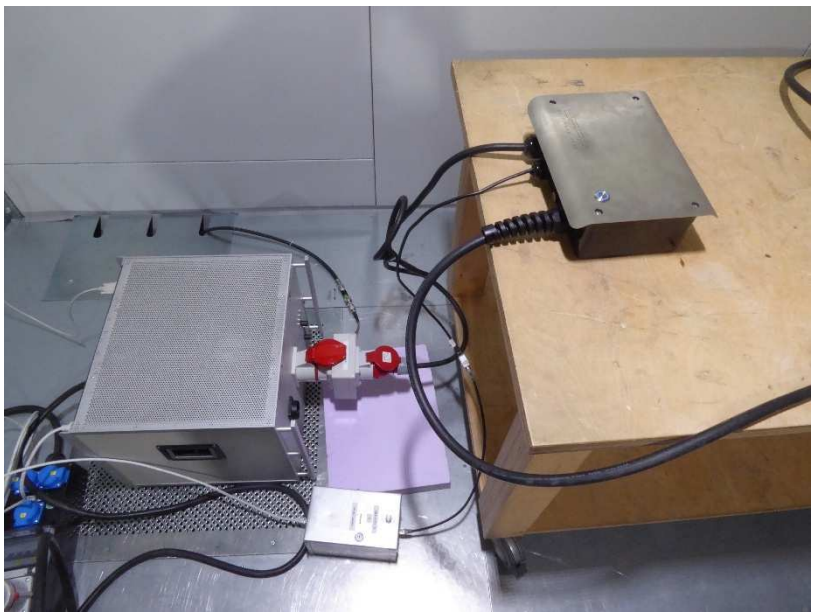
Note. The limit violation at 2.4GHz is caused by the intended radiation of WLAN.

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (s)	Bandwidth (MHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1883.250000	44.30	---	70.00	25.70	1.0	1.0	150.0	V	-13.0	31.1
2424.500000	---	39.05	50.00	10.95	1.0	1.0	150.0	H	345.0	32.4
2427.500000	95.89	---	70.00	-25.89	1.0	1.0	150.0	V	103.0	32.3
2435.250000	---	39.18	50.00	10.82	1.0	1.0	150.0	H	346.0	32.3
2437.750000	95.07	---	70.00	-25.07	1.0	1.0	150.0	V	107.0	32.3

5.3 Conducted disturbance voltage measurements according to EN 55011

Measuring setup:
- Table setup
- The photo below shows the test set-up.



Measuring equipment:
Shielded chamber M155 (PM-No. 482786)
Measuring receiver ESR7 (PM-No. 482558)
Software EMC32 (PM-No. 483182)
LISN NSLK 8128 RC (PM-No. 483186)
CDN ETH S B (PM-No. 480449)

Measuring record: The measuring records are presented on the following pages.

Measuring result: The requirements made in the test documents were fulfilled.

EUT Information

Test description:	Conducted voltage measurement
Test site:	shielded room M155
Setup:	table setup
Operator:	J. Hanselle
EUT:	WARP 4 Wallbox
Manufacturer:	Tinkerforge
Operating conditions:	AC charging
Comment:	1 kW load
	CPT Leitung als acht, Sendeleistung -3 reduziert

EMI Auto Test Template: LISN1 150kHz -30MHz

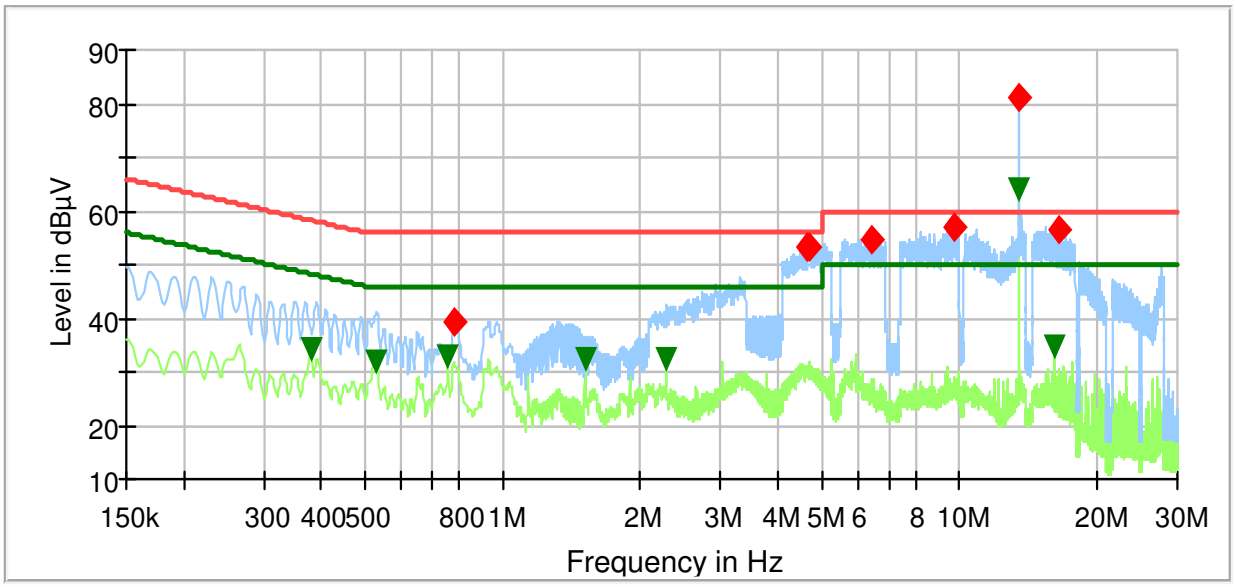
Hardware Setup:	LISN1_NSLK8128RC_Path1_C120_C121
Measurement Type:	4 Line LISN
Frequency Range:	150 kHz - 30 MHz
Graphics Level Range:	0 dBµV - 80 dBµV

Preview Measurements:

Scan Test Template: LISN1 150kHz -30MHz PRE

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESR 7]					
150 kHz - 30 MHz	2,25 kHz	QPK ; AVG	9 kHz	15 s	0 dB

The curves in the diagram represent the maximum measured values for each frequency point of all measurements which were made for each power supply line. The top measured curve represents the quasi-peak measurement and the bottom measured curve the average measurement. The points, marked with "◆" for quasi-peak and "▼" for average results, are frequency points which were chosen afterwards for better readability and can be found in the table below.



Preview Result 2-AVG
EN 61851-21-2 Class B AC_Mains_QP
Final_Result QPK
Preview Result 1-QPK
EN 61851-21-2 Class B AC_Mains_AV
Final_Result AVG

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Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.379500	---	34.26	48.29	14.03	15000.0	9.000	L2	GND	19.7
0.530250	---	32.03	46.00	13.97	15000.0	9.000	L1	GND	19.7
0.759750	---	32.58	46.00	13.42	15000.0	9.000	L2	FLO	19.7
0.780000	39.46	---	56.00	16.54	15000.0	9.000	N	FLO	19.7
1.518000	---	32.13	46.00	13.87	15000.0	9.000	L2	FLO	19.8
2.278500	---	32.18	46.00	13.82	15000.0	9.000	L2	FLO	20.0
4.636500	53.09	---	56.00	2.91	15000.0	9.000	N	GND	20.0
4.710750	53.47	---	56.00	2.53	15000.0	9.000	N	GND	20.0
6.398250	54.57	---	60.00	5.43	15000.0	9.000	N	GND	20.2
9.762000	56.98	---	60.00	3.02	15000.0	9.000	L1	FLO	20.2
13.560000	81.38	---	60.00	-21.38	15000.0	9.000	N	GND	20.3
13.560000	---	63.79	50.00	-13.79	15000.0	9.000	N	GND	20.3
16.228500	---	34.71	50.00	15.29	15000.0	9.000	N	GND	20.3
16.602000	56.57	---	60.00	3.43	15000.0	9.000	L1	GND	20.3

Note: The violation of the limit lines at 13.56MHz is caused by the intended NFC-Communication.

EUT Information

Test description:	Conducted voltage measurement
Test site:	shielded room M155
Setup:	table setup
Operator:	J. Hanselle
EUT:	WARP 4 Wallbox
Manufacturer:	Tinkerforge
Operating conditions:	AC charging
Comment:	1 kW load CPT Line meandering pattern EVCC von Tinkerforge, EVSE modified PIB file

EMI Auto Test Template: LISN1 150kHz -30MHz

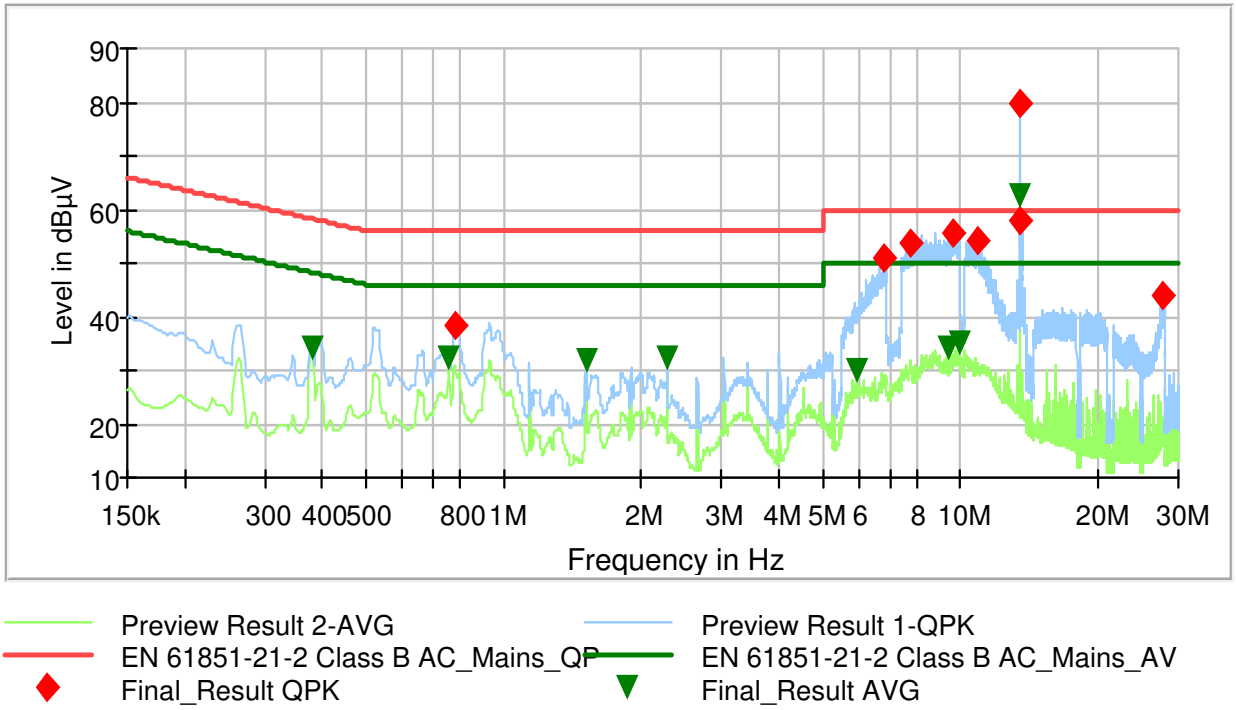
Hardware Setup:	LISN1_NSLK8128RC_Path1_C120_C121
Measurement Type:	4 Line LISN
Frequency Range:	150 kHz - 30 MHz
Graphics Level Range:	0 dBµV - 80 dBµV

Preview Measurements:

Scan Test Template: LISN1 150kHz -30MHz PRE

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESR 7]					
150 kHz - 30 MHz	2,25 kHz	QPK ; AVG	9 kHz	15 s	0 dB

The curves in the diagram represent the maximum measured values for each frequency point of all measurements which were made for each power supply line. The top measured curve represents the quasi-peak measurement and the bottom measured curve the average measurement. The points, marked with "◆" for quasi-peak and "▼" for average results, are frequency points which were chosen afterwards for better readability and can be found in the table below.



260381v08_waiting 16.04.2026

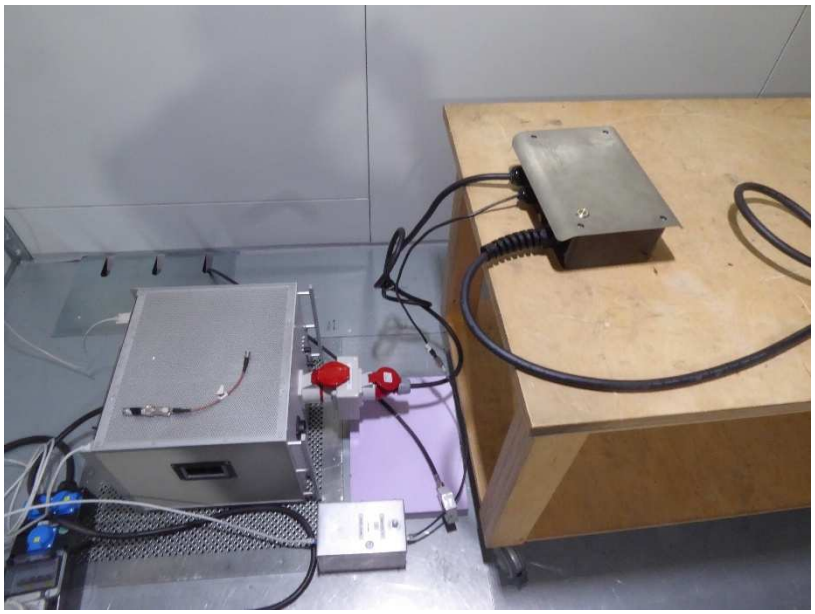
Note: The violation of the limit lines at 13.56MHz is caused by the intended NFC-Communication.

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.379500	---	34.19	48.29	14.10	15000.0	9.000	L2	GND	19.7
0.759750	---	32.49	46.00	13.51	15000.0	9.000	L2	GND	19.7
0.780000	38.24	---	56.00	17.76	15000.0	9.000	N	FLO	19.7
1.518000	---	32.03	46.00	13.97	15000.0	9.000	L2	FLO	19.8
2.276250	---	32.38	46.00	13.62	15000.0	9.000	L2	FLO	20.0
5.907750	---	30.02	50.00	19.98	15000.0	9.000	N	GND	20.1
6.832500	50.93	---	60.00	9.07	15000.0	9.000	N	GND	20.1
7.820250	53.57	---	60.00	6.43	15000.0	9.000	N	GND	20.2
9.388500	---	34.27	50.00	15.73	15000.0	9.000	N	GND	20.2
9.577500	55.72	---	60.00	4.28	15000.0	9.000	N	GND	20.2
9.937500	---	35.25	50.00	14.75	15000.0	9.000	N	GND	20.3
10.914000	54.12	---	60.00	5.88	15000.0	9.000	N	GND	20.3
13.546500	57.70	---	60.00	2.30	15000.0	9.000	N	GND	20.3
13.560000	---	62.63	50.00	-12.63	15000.0	9.000	N	GND	20.3
13.560000	79.79	---	60.00	-19.79	15000.0	9.000	N	GND	20.3
27.735000	44.13	---	60.00	15.87	15000.0	9.000	L3	GND	20.4

5.4 Conducted disturbance current measurements according to EN 55032

Measuring setup:
- Table setup
- The photo below shows the test set-up



Measuring equipment:
Shielded chamber M155 (PM-No. 482786)
Measuring receiver ESR7 (PM-No. 482558)
Software EMC32 (PM-No. 483182)
LISN NSLK 8128 RC (PM-No. 483186)
Current clamp R&S EZ-17 (PM-No. 480238)
CDN ETH S A (PM-No. 480448)

Measuring records: The measuring records are presented on the following pages.

Measuring results: The requirements made in the test documents were fulfilled.

EUT Information

Test description:	Conducted current measurement
Test site:	shielded room M155
Setup:	table setup
Operator:	J.Hanselle
EUT:	WARP 4 Wallbox
Manufacturer:	Tinkerforge
Operating conditions:	AC waiting
Comment:	1 kW load Ethernet EVCC von Tinkerforge, EVSE modified PIB file

EMI Auto Test Template: EZ17µA 150kHz -30MHz

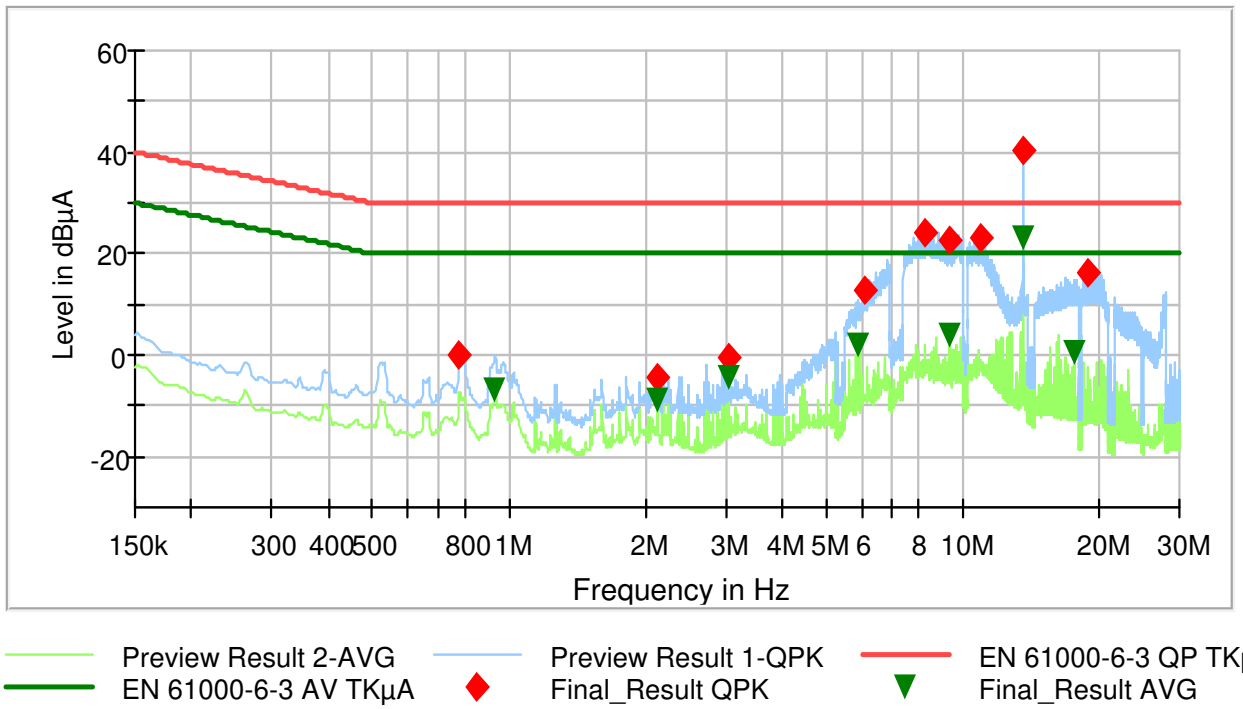
Hardware Setup:	EZ17dBµA_Path1_C120_C121
Measurement Type:	Current Clamp
Frequency Range:	150 kHz - 30 MHz
Graphics Level Range:	-30 dBµA - 60 dBµA

Preview Measurements:

Scan Test Template: EZ17_dBµA 150kHz -30MHz PRE

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESR 7]					
150 kHz - 30 MHz	2,25 kHz	QPK ; AVG	9 kHz	15 s	0 dB

The curves in the diagram represent the maximum measured values for each frequency point of all measurements which were made for each power supply line. The top measured curve represents the quasi-peak measurement and the bottom measured curve the average measurement. The points, marked with "◆" for quasi-peak and "▼" for average results, are frequency points which were chosen afterwards for better readability and can be found in the table below.



260381v09_ETH_waiting 16.04.2026

Note: The violation of the limit lines at 13.56MHz is caused by the intended NFC-Communication.

Final_Result

Frequency (MHz)	QuasiPeak (dBµA)	Average (dBµA)	Limit (dBµA)	Margin (dB)	Bandwidth (kHz)	Corr. (dB)
0.777750	0.06	---	30.00	29.94	---	-6.9
0.930750	---	-6.71	20.00	26.71	---	-7.8
2.121000	---	-8.79	20.00	28.79	---	-9.3
2.121000	-4.30	---	30.00	34.30	---	-9.3
3.039000	-0.70	---	30.00	30.70	---	-9.4
3.039000	---	-4.23	20.00	24.23	---	-9.4
5.907750	---	2.13	20.00	17.87	---	-9.5
6.072000	12.87	---	30.00	17.13	---	-9.5
8.227500	24.31	---	30.00	5.69	---	-9.4
9.386250	22.43	---	30.00	7.57	---	-9.4
9.388500	---	4.08	20.00	15.92	---	-9.4
10.914000	22.97	---	30.00	7.03	---	-9.3
13.560000	---	22.98	20.00	-2.98	---	-9.4
13.560000	40.23	---	30.00	-10.23	---	-9.4
17.693250	---	0.70	20.00	19.30	---	-9.4
18.944250	16.11	---	30.00	13.89	---	-9.3

EUT Information

Test description:	Conducted voltage measurement
Test site:	shielded room M155
Setup:	table setup
Operator:	J.Hanselle
EUT:	WARP 4 Wallbox
Manufacturer:	Tinkerforge
Operating conditions:	AC charging
Comment:	1 kW load
	Ethernet

EMI Auto Test Template: EZ17µA 150kHz -30MHz

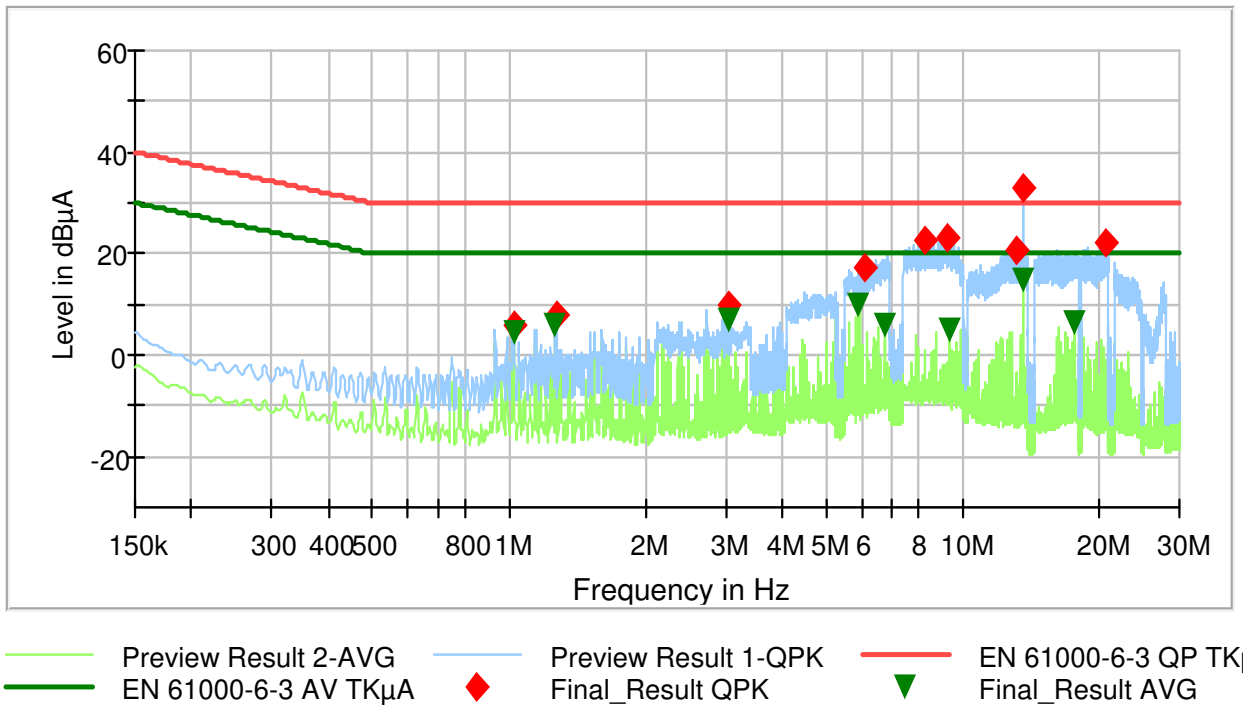
Hardware Setup:	EZ17dBµA_Path1_C120_C121
Measurement Type:	Current Clamp
Frequency Range:	150 kHz - 30 MHz
Graphics Level Range:	-30 dBµA - 60 dBµA

Preview Measurements:

Scan Test Template: EZ17_dBµA 150kHz -30MHz PRE

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESR 7]					
150 kHz - 30 MHz	2,25 kHz	QPK ; AVG	9 kHz	15 s	0 dB

The curves in the diagram represent the maximum measured values for each frequency point of all measurements which were made for each power supply line. The top measured curve represents the quasi-peak measurement and the bottom measured curve the average measurement. The points, marked with "◆" for quasi-peak and "▼" for average results, are frequency points which were chosen afterwards for better readability and can be found in the table below.



260381v05_ETH_charging 16.04.2026

Final_Result

Frequency (MHz)	QuasiPeak (dBµA)	Average (dBµA)	Limit (dBµA)	Margin (dB)	Bandwidth (kHz)	Corr. (dB)
1.023000	---	4.57	20.00	15.43	9.000	-8.3
1.023000	6.12	---	30.00	23.88	9.000	-8.3
1.266000	---	5.76	20.00	14.24	9.000	-8.5
1.268250	7.88	---	30.00	22.12	9.000	-8.5
3.039000	---	6.96	20.00	13.04	9.000	-9.4
3.039000	10.00	---	30.00	20.00	9.000	-9.4
5.907750	---	9.69	20.00	10.31	9.000	-9.5
6.072000	17.02	---	30.00	12.98	9.000	-9.5
6.702000	---	5.70	20.00	14.30	9.000	-9.5
8.227500	22.54	---	30.00	7.46	9.000	-9.4
9.226500	22.93	---	30.00	7.07	9.000	-9.4
9.388500	---	5.06	20.00	14.94	9.000	-9.4
13.085250	20.46	---	30.00	9.54	9.000	-9.4
13.560000	---	14.88	20.00	5.12	9.000	-9.4
13.560000	32.72	---	30.00	-2.72	9.000	-9.4
17.693250	---	6.62	20.00	13.38	9.000	-9.4
20.706000	22.16	---	30.00	7.84	9.000	-9.4

5.5 Measurement of harmonics according to EN 61000-3-2

Measuring setup: - The photo below shows the test set-up.

Note: The measurement was carried out according to **table 2** requirements.

Measuring equipment: EMC test system EMC D 30000 / PAS (PM-No. 481301)
Control unit SyCore (PM-No. 481302)
Analyzer Reference System ARS 16/3 (PM-No. 481303)
EMC test software SPS EMC (PM-Nr. 480114)

Measuring record: The measuring records are presented on the next pages.

Measuring result: The requirements made in the test documents were fulfilled.

Name:	T. Brähler	Serial no:	
Department:	EMC	Operating modes:	charging
Company:	Phoenix Testlab	Comment1:	
Test report no:	E260381	Comment2:	
Device:	Wallbox	Comment3:	
Specimen:		Comment4:	
Manufacturer:	Tinkerforge	Date:	15.04.2026
Type:	Warp 4	Test date:	15.04.2026

Maximum RMS current and corresponding values in timewindow 463:

Voltage:	230.48 Vrms		THD=0.01 %	THV=0.019 V	POHV=0.011 V	PWHD=0.03 %
Current:	5.067 Arms		THD=0.43 %	THC=0.022 A	POHC=0.005 A	PWHD=0.76 %
Power:	1167.9 W	P1=1167.9 W	1167.9 VA			
Power factor:	1.000	CosPhi1: 1.000				

Test conditions: EN IEC 61000-3-2:2019 + A2:2024, f=50 Hz, Phase=L1, Range=20.00 A
Time window=16, Grouping (>2nd harm.)=off
No Ztest selected
harmonic currents < 0.6 % of I or < 5 mA are NOT DISREGARD for calc. of THD, THC, POHC, PWHD
Calc. avg. POHC, THD, THC, POHC, PWHD=Annex C.3 as from EN IEC 61000-3-2:2019 + A1:2021

HARMONIC ANALYSIS: Test PASS
Tobs = entire measurement; POHC (C.3): avg=0.005 A, limit=0.251 A
Iavg=5.066 Arms

Ha	Entire measurement (2.5 min = 469 time windows)							Worst 2.5 min		Average		PASS	FAIL
	Maximum	Window	EN61000-3-2 Class A / Tab1	Margin in MaxWin	100 to 150%	150 to 200%	Exceeded	100 to 150%	Exceeded	Value	Exceeded		
DC	0.0126 A	3	-.----	---.-	0	0	0	n.e.	n.e.	0.0110 A	0	X	
1	5.0674 A	463	-.----	---.-	0	0	0	n.e.	n.e.	5.0662 A	0	X	
2	0.0009 A	86	1.0800 A	-99.9 %	0	0	0	n.e.	n.e.	0.0006 A	0	X	
3	0.0101 A	288	2.3000 A	-99.6 %	0	0	0	n.e.	n.e.	0.0099 A	0	X	
4	0.0009 A	259	0.4300 A	-99.8 %	0	0	0	n.e.	n.e.	0.0006 A	0	X	
5	0.0093 A	1	1.1400 A	-99.2 %	0	0	0	n.e.	n.e.	0.0090 A	0	X	
6	0.0005 A	1	0.3000 A	-99.8 %	0	0	0	n.e.	n.e.	0.0003 A	0	X	
7	0.0086 A	64	0.7700 A	-98.9 %	0	0	0	n.e.	n.e.	0.0084 A	0	X	
8	0.0004 A	110	0.2300 A	-99.8 %	0	0	0	n.e.	n.e.	0.0003 A	0	X	
9	0.0077 A	222	0.4000 A	-98.1 %	0	0	0	n.e.	n.e.	0.0075 A	0	X	
10	0.0005 A	269	0.1840 A	-99.7 %	0	0	0	n.e.	n.e.	0.0004 A	0	X	
11	0.0067 A	81	0.3300 A	-98.0 %	0	0	0	n.e.	n.e.	0.0066 A	0	X	
12	0.0003 A	423	0.1533 A	-99.8 %	0	0	0	n.e.	n.e.	0.0002 A	0	X	
13	0.0060 A	1	0.2100 A	-97.2 %	0	0	0	n.e.	n.e.	0.0058 A	0	X	
14	0.0003 A	1	0.1314 A	-99.8 %	0	0	0	n.e.	n.e.	0.0001 A	0	X	
15	0.0051 A	127	0.1500 A	-96.6 %	0	0	0	n.e.	n.e.	0.0050 A	0	X	
16	0.0003 A	3	0.1150 A	-99.7 %	0	0	0	n.e.	n.e.	0.0003 A	0	X	
17	0.0043 A	331	0.1324 A	-96.7 %	0	0	0	n.e.	n.e.	0.0042 A	0	X	
18	0.0002 A	39	0.1022 A	-99.8 %	0	0	0	n.e.	n.e.	0.0002 A	0	X	
19	0.0033 A	365	0.1184 A	-97.2 %	0	0	0	n.e.	n.e.	0.0033 A	0	X	
20	0.0002 A	86	0.0920 A	-99.8 %	0	0	0	n.e.	n.e.	0.0001 A	0	X	
21	0.0026 A	1	0.1071 A	-97.6 %	0	0	0	n.e.	n.e.	0.0025 A	0	X	
22	0.0002 A	75	0.0836 A	-99.7 %	0	0	0	n.e.	n.e.	0.0002 A	0	X	
23	0.0019 A	115	0.0978 A	-98.0 %	0	0	0	n.e.	n.e.	0.0019 A	0	X	
24	0.0002 A	1	0.0767 A	-99.7 %	0	0	0	n.e.	n.e.	0.0001 A	0	X	
25	0.0014 A	462	0.0900 A	-98.5 %	0	0	0	n.e.	n.e.	0.0013 A	0	X	
26	0.0002 A	1	0.0708 A	-99.8 %	0	0	0	n.e.	n.e.	0.0001 A	0	X	
27	0.0013 A	1	0.0833 A	-98.4 %	0	0	0	n.e.	n.e.	0.0013 A	0	X	
28	0.0002 A	20	0.0657 A	-99.7 %	0	0	0	n.e.	n.e.	0.0001 A	0	X	
29	0.0015 A	446	0.0776 A	-98.0 %	0	0	0	n.e.	n.e.	0.0014 A	0	X	
30	0.0002 A	1	0.0613 A	-99.7 %	0	0	0	n.e.	n.e.	0.0001 A	0	X	
31	0.0014 A	1	0.0726 A	-98.0 %	0	0	0	n.e.	n.e.	0.0014 A	0	X	
32	0.0002 A	290	0.0575 A	-99.7 %	0	0	0	n.e.	n.e.	0.0001 A	0	X	
33	0.0013 A	421	0.0682 A	-98.1 %	0	0	0	n.e.	n.e.	0.0013 A	0	X	
34	0.0002 A	48	0.0541 A	-99.7 %	0	0	0	n.e.	n.e.	0.0001 A	0	X	
35	0.0013 A	43	0.0643 A	-97.9 %	0	0	0	n.e.	n.e.	0.0013 A	0	X	
36	0.0001 A	1	0.0511 A	-99.7 %	0	0	0	n.e.	n.e.	0.0001 A	0	X	
37	0.0011 A	459	0.0608 A	-98.2 %	0	0	0	n.e.	n.e.	0.0010 A	0	X	
38	0.0001 A	162	0.0484 A	-99.7 %	0	0	0	n.e.	n.e.	0.0001 A	0	X	
39	0.0009 A	256	0.0577 A	-98.4 %	0	0	0	n.e.	n.e.	0.0009 A	0	X	
40	0.0001 A	384	0.0460 A	-99.7 %	0	0	0	n.e.	n.e.	0.0001 A	0	X	

|||| average value < 0.6 % of Iavg or < 5 mA n.e. = not evaluated

5.6 Measurement of voltage fluctuation (Flicker) according to EN 61000-3-3

Measuring setup: - The photo below shows the test set-up.

Measuring equipment: EMC test system EMC D 30000 / PAS (PM-No. 481301)
Control unit SyCore (PM-No. 481302)
Analyzer Reference System ARS 16/3 (PM-No. 481303)
EMC test software SPS EMC (PM-Nr. 480114)

Measuring record:

Name:	T. Brähler	Serial no:	
Department:	EMC	Operating modes:	charging
Company:	Phoenix Testlab	Comment1:	
Test report no:	E260381	Comment2:	
Device:	Wallbox	Comment3:	
Specimen:		Comment4:	
Manufacturer:	Tinkerforge	Date:	15.04.2026
Type:	Warp 4	Test date:	15.04.2026

Test conditions: EN 61000-3-3:2013 + A1:2019 + A2:2021 + A2:2021/AC:2022 / 230 V / 50 Hz / F
EN 61000-4-15:2011 / d(t) = 3.3 %/ Obs 3 x 10 min / Ztest (0.400+j0.250) Ohm
Ra+jXa (0.2400+j0.1500) Ohm / Rn+jXn (0.1600+j0.1000) Ohm

FLICKER: Test PASS!

Time	Pmax	Pst	Sliding Plt	Tmax [s]	dmax [%]	dc [%]	PASS	FAIL
12:59:10	0.000	0.0050	- . - - - -	0.000	+0.000	- . - - -	X	
13:09:10	4.471	0.2570	0.2040	0.000	-1.110	-1.100	X	
13:19:10	4.618	0.2950	0.2773	0.000	+1.130	+1.130	X	
Limits:		1.000	0.650	0.500	4.000	3.300		
Plt: 0.242246							X	
Evaluated: PST, PLT, Sliding PLT, dc, Tmax, dmax								

FLICKER: Source test PASS!

Time	Pmax	Pst	Sliding Plt	Tmax [s]	dmax [%]	dc [%]	PASS	FAIL
12:59:10	0.000	0.0030	- . - - - -	0.000	+0.000	- . - - -	X	
13:09:10	0.187	0.1590	- . - - - -	0.000	-0.230	-0.230	X	
13:19:10	0.204	0.1620	- . - - - -	0.000	+0.240	+0.240	X	
Plt: 0.140222								
Evaluated: PST <= 0.4 dmax < 20 % dmax1								

Tested with SPS EMC 4.8.1 / PAS10000 by Spitzenberger & Spies GmbH & Co. KG, Schmidstr. 32-34, 94234 Viechtach, Germany, 15.04.2026

Remark: According to EN 61000-3-3:2013, chapter 6.1 the measurement was done only at one phase.

Measuring result: The requirements made in the test documents were fulfilled.

5.7 Immunity test to radiated, radio-frequency, electromagnetic fields according to EN 61000-4-3

Test setup:

- Table setup
- The transmitting antenna is set at 1.5 m above the floor.
- The photo below shows the test set-up.

Monitoring of EUT:

visually:

With the camera system of the anechoic chamber

electrically:

The output signals were checked by the monitoring system outside the anechoic chamber.

Test equipment:

Fully anechoic chamber M154 (PM-No. 482785)
Switch unit OSP220 (PM-No. 483164)
Switch unit OSP220 Master (PM-No. 483165)
Switch unit OSP220 Satellite (PM-No. 483166)
Signal generator SMA100B (PM-No. 483167)
Power amplifier BBA150-BC1000 (PM-No. 483162)
Power amplifier BBA150-D200 (PM-No. 483163)
Power amplifier BBA150-E200 (PM-No. 483177)
Power sensor NRP8SN (PM-No. 483168)
Power sensor NRP8SN (PM-No. 483169)
Power sensor NRP18SN (PM-No. 483170)
Power sensor NRP18SN (PM-No. 483171)
Software EMC 32 (PM-No. 483173)
Antenna mast Borsight BAM 4.0-P (PM-No. 483223)
Ultralog antenna HL562E (PM-No. 483175)

Test record:

Wating mode

Date of test ..... : 15.04.2026			
Test level ..... : 80 MHz - 1 GHz .....log 1% ..... 2 s ....10 V/m ..... 80% AM (1 kHz) 1.0 GHz - 6 GHz .....log 1% ..... 2 s ....10 V/m ..... 80% AM (1 kHz)			
Polarisation	Radiation direction	EUT reaction	Result
vertical	0°	none detected	A
	90°	none detected	A
	180°	none detected	A
	270°	none detected	A
horizontal	0°	none detected	A
	90°	none detected	A
	180°	none detected	A
	270°	none detected	A

Charging mode

Date of test ..... : 15.04.2026 Test level ..... : 80 MHz - 1 GHz.....log 1% .....2 s ....10 V/m ..... 80% AM (1 kHz) 1.0 GHz - 6 GHz.....log 1% .....2 s ....10 V/m ..... 80% AM (1 kHz)			
Polarisation	Radiation direction	EUT reaction	Result
vertical	0°	none detected	A
	90°	none detected	A
	180°	none detected	A
	270°	none detected	A
horizontal	0°	none detected	A
	90°	none detected	A
	180°	none detected	A
	270°	none detected	A

Test result: The requirements made in the test documents were fulfilled.

5.8 Immunity test to conducted disturbances, induced by radio-frequency fields according to EN 61000-4-6

Test setup:

- Table setup
- The EUT is placed 10 cm above the ground plane.
- The photo below shows the test set-up.

Monitoring of EUT:

electrically:

The output signals were checked by the monitoring system outside the shielded room.

Test equipment:

Shielded chamber M155 (PM-No. 482786)
Software EMC32 (PM-No. 483182)
Signal generator SMC100A (PM-No. 483183)
Power amplifier BBA150-AB125 (PM-No. 483184)
Power sensor NRP6AN (PM-No. 483185)
Attenuator 6 dB, 300 W (PM-No. 483187)
CDN M016 (PM-No. 580005)
CDN M5 E (PM-No. 483236)
CDN ETH S B (PM-No. 480449)
Coupling clamp Lüthi EM 101 (PM-No. 480065)

Test record:

Wating mode

Date of test ..... : 16.04.2026 Test level ..... : 150 kHz - 80 MHz.....log 1% .....2 s .....10 V..... 80% AM (1 kHz)				
CDN for coupling	CDN for 50 Ω termination	Coupling to connection	EUT reaction	Result
M016	---	Decoupling auxiliary devices	CDN was only used for decoupling.	---
M5 E	ETH S B	400 V AC	none detected	A
ETH S B	M5 E	Ethernet	none detected	A
Coupling clamp Lüthi EM 101	M5 E	CPT-Port	none detected	A

Charging mode

Date of test ..... : 16.04.2026 Test level ..... : 150 kHz - 80 MHz.....log 1% .....2 s .....10 V..... 80% AM (1 kHz)				
CDN for coupling	CDN for 50 Ω termination	Coupling to connection	EUT reaction	Result
M016	---	Decoupling auxiliary devices	CDN was only used for decoupling.	---
M5 E	ETH S B	400 V AC	none detected	A
ETH S B	M5 E	Ethernet	none detected	A
Coupling clamp Lüthi EM 101	M5 E	CPT-Port	none detected	A

Test result: The requirements made in the test documents were fulfilled.

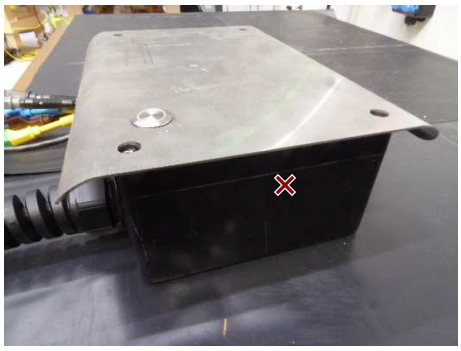
5.9 Immunity test to electrostatic discharge according to EN 61000-4-2

Test setup:

- Table setup
- The photo below shows the test set-up.

Test plan:

- Indirect discharge (ID) is carried out on the horizontal (HCP) and vertical (VCP) coupling plane, in case the housing of the EUT is made of insulating materials.
- Contact discharge (CD) (X) is carried out on the conductive parts of the EUT.
- The discharge locations can be seen on the following figure(s).
  The plastic housing of the EUT consists of conductive material, therefore it is tested with contact discharge.



Test equipment: ESD simulator Haefely ONYX 30 (PM-No. 482602)

Test record:

Waiting mode

Date of test ..... : 17.04.2026 Climatic conditions ..... : 22°C, 38% F_{rel}; Air pressure conforms to the requirements of the standard Pulse repetition..... : 1 s for contact and indirect discharge (if performed) Number of impulses ... : 10 per polarity, test voltage and discharge location		
Method of discharge	EUT reaction	Result
indirect coupling ± 4 kV	none detected	A
contact discharge ± 4 kV	none detected	A

Charging mode

Date of test ..... : 17.04.2026 Climatic conditions ..... : 22°C, 38% F_{rel}; Air pressure conforms to the requirements of the standard Pulse repetition..... : 1 s for contact and indirect discharge (if performed) Number of impulses ... : 10 per polarity, test voltage and discharge location		
Method of discharge	EUT reaction	Result
indirect coupling ± 4 kV	none detected	A
contact discharge ± 4 kV	none detected	A

Test result: The requirements made in the test documents were fulfilled.

5.10 Immunity test to electrical fast transients (Burst) according to EN 61000-4-4

Test setup:

- Table setup
- The EUT is placed 10 cm above the ground plane.
- The photo below shows the test set-up

Test equipment:

Generator EFT 500N5.8 (PM-No. 480994)
Capacitive clamp em test (PM-No. 481727)

Test record:

Waiting mode

Date of test ..... : 16.04.2026 Test duration..... : 60 s per polarity, test voltage and line Burst frequency ..... : 5 kHz				
Method of coupling	Coupling to	Test level	EUT reaction	Result
CDN	400 V AC	± 4.0 kV	none detected	A
capacitive clamp	Ethernet	± 2.0 kV	none detected	A

Charging mode

Date of test ..... : 16.04.2026 Test duration..... : 60 s per polarity, test voltage and line Burst frequency ..... : 5 kHz				
Method of coupling	Coupling to	Test level	EUT reaction	Result
CDN	400 V AC	± 4.0 kV	none detected	A
capacitive clamp	Ethernet	± 2.0 kV	none detected	A

Test result: The requirements made in the test documents were fulfilled.

5.11 Immunity test to surges according to EN 61000-4-5

Test setup:

- Table setup
- The EUT is placed 10 cm above the ground plane.
- The photo below shows the test set-up.

Test equipment:

Test system IMU MGE (PM-No. 483739)
CDN-A-06-63 (PM-No. 483498)

Test record:

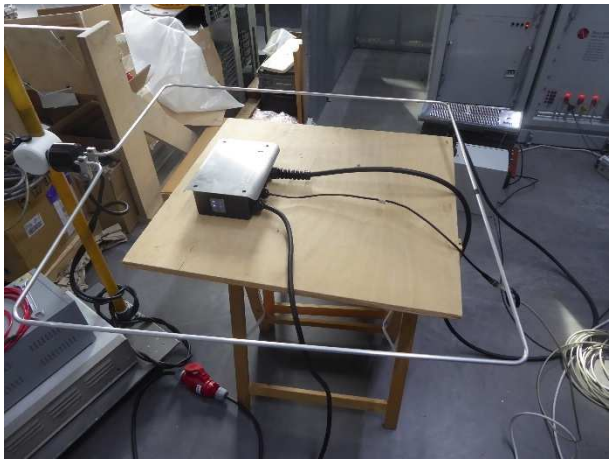
Charging mode, only

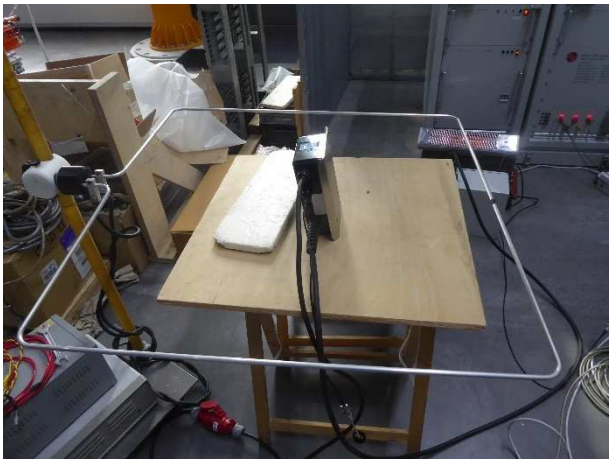
Date of test ..... : 17.04.2024 Number of pulses ..... : 5 impulses per polarity, test voltage and line Pulse repetition..... : 60 s				
Method of coupling	Coupling to	Test level	EUT reaction	Result
CDN (2 Ω, 18 µF line to line; 12 Ω, 9 µF, line to earth)	400 V AC	± 0.5 kV line to line and line to earth	none detected	A
		± 1.0 kV line to line and line to earth	none detected	A
		± 2.0 kV line to line and line to earth	none detected	A
		± 4.0 kV line to earth	none detected	A
CDN (2 Ω, 18 µF direct)	Ethernet	± 0.5 kV line to earth ± 1.0 kV line to earth	none detected none detected	A A

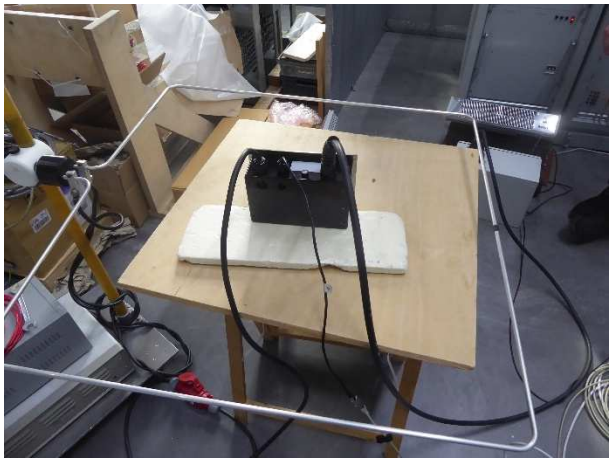
Test result: The requirements made in the test documents were fulfilled.

5.12 Immunity test to power frequency magnetic field according to EN 61000-4-8

Test setup:
- Table setup
- The photos below show the test set-up.







Test equipment:
Induction coil 1 m x 1 m (PM-No. 482245)
Haefely magnetic field tester MAG 100.1 (PM-No. 482244)
EMC test system EMC D 30000 / PAS (PM-No. 481301)
Control unit SyCore (PM-No. 481302)
Current clamp meter Testfox CC-1 (PM-No. 482787)

Test record:

Charging mode:

Date of test ..... : 15.04.2026 Test level ..... : 50, 60 Hz: 30 A/m; 60 s		
Orientation	EUT reaction	Result
X axis	none detected	A
Y axis	none detected	A
Z axis	none detected	A

Test result: The requirements made in the test documents were fulfilled.

5.13 Immunity test to voltage dips, short interruptions and voltage variations according to EN 61000-4-11

Test setup: - The photo below shows the test set-up.

Test equipment: EMC test system EMC D 30000 / PAS (PM-No. 481301)
control unit SyCore (PM-No. 481302)
EMC test software SPS EMC (PM-Nr. 480114)

Test record:

Waiting mode

Date of test ..... :	15.04.2026
Test method for voltage dips ..... :	variation of one phase each (type “A” acc. to EN 61000-4-11)
Test method for voltage interuptions ..... :	coupling to all phases at same time.
Repetition ..... :	3 times with 10 s pause
Coupling phases ..... :	0° (all tests) and 180° (voltage dips only)
Reference voltage(s) ..... :	3~ 400 V, 50 Hz

Variation	Test level	EUT reaction	Result
Voltage dips	0% for 0.5 cycle	none detected	A
	0% for 1 cycle	none detected	A
	40% for 10 / 12 cycles	none detected	A
	70% for 25 / 30 cycles	none detected	A
Voltage interruptions	0% for 250 / 300 cycles	EUT switches off and restarts automatically	B

Charging mode

Date of test ..... :	15.04.2026
Test method for voltage dips ..... :	variation of one phase each (type “A” acc. to EN 61000-4-11)
Test method for voltage interuptions ..... :	coupling to all phases at same time.
Repetition ..... :	3 times with 10 s pause
Coupling phases ..... :	0° (all tests) and 180° (voltage dips only)
Reference voltage(s) ..... :	3~ 400 V, 50 Hz

Variation	Test level	EUT reaction	Result
Voltage dips	0% for 0.5 cycle	none detected	A
	0% for 1 cycle	none detected	A
	40% for 10 / 12 cycles	Contactors chattering at test L1 to N	B
	70% for 25 / 30 cycles	none detected	A
Voltage interruptions	0% for 250 / 300 cycles	EUT reboot, after Test normal charge possible	C

Test result: The requirements made in the test documents were fulfilled.

6 Report History

Report Number	Date of issue	Comment
E260381E1	07.05.2026	initial test report