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**TEST REPORT REF.** EMCKP3700B  
**PROJECT NO.** EMCK3700  
**DATE OF ISSUE** 2019-07-09

**MANUFACTURER** Aafag AG  
**TRADE MARK** Schoch Werkhaus  
**EQUIPMENT UNDER TEST (E.U.T.)** LED Stehleuchte JSL-PURE, 1 Kopf

**STANDARD** EN 55015:2013+A1:2015  
CISPR 15:2018  
IEC 61547:2009  
ETSI EN 300 328 V2.1.1 (2016-11)  
ETSI EN 301 489-1 V2.2.0:2017-03  
ETSI EN 301 489-17 V3.2.0:2017-03

**TEST RESULT** Complied according to test table on pages 2 to 5

**CLIENT** Aafag AG  
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SWITZERLAND

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**TEST SUMMARY Emission limits according to EN 55015 / CISPR 15**

| Sub-CI. | Test description                  | Level, Remarks | Result           | Test No. | Page    |
|---------|-----------------------------------|----------------|------------------|----------|---------|
| ---     | Conducted Emission 9 kHz - 30 MHz | Table 2a       | C                | 1        | 13 - 14 |
| ---     | Radiated Magnetic Field emission  | Table 3a       | NA <sup>1)</sup> | -        | -       |
| ---     | Radiated disturbance              | Table 3b       | C                | 2        | 15 - 17 |

**TEST SUMMARY Emission limits according to EN 61000-3-2 / -3-3**

| Sub-CI. | Test description                             | Level, Remarks                     | Result           | Test No. | Page    |
|---------|--|------------------------------------|------------------|----------|---------|
| ---     | Harmonic current emission                    | Class A                            | C                | 3        | 18 - 33 |
| ---     | Limitation of voltage fluctuations (flicker) | $P_{st} < 1.00$<br>$P_{lt} < 0.65$ | NA <sup>2)</sup> | -        | -       |

**Remarks:** 1) EUT is a luminary, see EN 55015, chapter 5.11  
2)  $P < 75$  W

**Results:** C Complied  
NC Did not comply  
NA Not applicable  
NP Not performed



**TEST SUMMARY EN 300 328 - Requirements for non-Frequency Hopping equipment**

| Standard   | Test description   | Level, Remarks | Result          | Test No. Sub-Clause | Page    |
|------------|--|----------------|-----------------|---------------------|---------|
| EN 300 328 | RF output power  | --             | NP <sup>2</sup> | 4.3.2.2             | -       |
| EN 300 328 | Power spectral density                                   | --             | NP <sup>2</sup> | 4.3.2.3             | -       |
| EN 300 328 | Duty Cycle, Tx-sequence, Tx-gap                          | --             | NA <sup>1</sup> | 4.3.2.4             | --      |
| EN 300 328 | Medium Utilization (MU) factor                           | --             | NP <sup>2</sup> | 4.3.2.5             | --      |
| EN 300 328 | Adaptivity (Adaptive Frequency Hopping)                  | --             | NA <sup>1</sup> | 4.3.2.6             | --      |
| EN 300 328 | Occupied Channel Bandwidth                               | --             | NP <sup>2</sup> | 4.3.2.7             | -       |
| EN 300 328 | Transmitter unwanted emissions in the out-of-band domain | --             | NP <sup>2</sup> | 4.3.2.8             | -       |
| EN 300 328 | Transmitter unwanted emissions in the spurious domain    | --             | C               | 4.3.2.9             | 34 - 36 |
| EN 300 328 | Receiver spurious emissions                              | --             | NP <sup>2</sup> | 4.3.2.10            | --      |
| EN 300 328 | Receiver Blocking  | --             | NP <sup>2</sup> | 4.3.2.11            | --      |
| EN 300 328 | Geo-location capability                                  | --             | NA <sup>3</sup> | 4.3.2.12            | --      |

- Remarks:**
- <sup>1</sup> Maximum RF output power < 10 dBm e.i.r.p.
  - <sup>2</sup> Certified module Microchip RN4871  
(see test report 10053433 001 and 50067509 002 by TÜVRheinland)
  - <sup>3</sup> Equipment without this capability

**Results:**

|    |                |
|----|----------------|
| C  | Complied       |
| NC | Did not comply |
| NA | Not applicable |
| NP | Not performed  |



**TEST SUMMARY Immunity Requirements according to IEC 61547**

| Sub-Cl. | Test description                           | Level, Remarks   | Result  | Test No. | Page |
|---------|--|--|---|----------|------|
| 5.2     | Electrostatic Discharges (ESD)             | 4 kV CD<br>8 kV AD   | C<br>C  | 5        | 37   |
| 5.3     | Radiated EM Field                          | 80 – 1000 MHz: 3 V/m   | C   | 6        | 38   |
| 5.4     | Power frequency magnetic fields            | ---  | NA <sup>1)</sup>  | --       | --   |
| 5.5     | Electrical fast transient (EFT)            | 1.0 kV   | C   | 7        | 39   |
| 5.6     | Conducted RF disturbances                  | 0.15 – 80 MHz: 3 Vrms  | C   | 8        | 40   |
| 5.7     | Surge transient                            | 1.0 kV, 2.0 kV   | C   | 9        | 41   |
| 5.8     | Voltage variations, dips and interruptions | 0% U <sub>T</sub> 0.5 Cycle<br>0% U <sub>T</sub> 1 Cycle<br>70% U <sub>T</sub> 10 Cycles<br>70% U <sub>T</sub> 25 Cycles<br>0% U <sub>T</sub> 250 Cycles | C<br>C <sup>2)</sup><br>C<br>C <sup>2)</sup><br>C <sup>2)</sup> | 10       | 42   |

**Remarks:** 1) No magnetic susceptible device  
2) Informative

**Results:** C    Complied  
NC   Did not comply  
NA   Not applicable  
NP   Not performed



Test Report Approval

Tests performed by: Max Hunziker, Head EMC-Testcenter 2018-10-17
Name / Function Signature Date

Tests performed by: Christoph Hauser, Deputy Head EMC-Testcenter 2018-10-18
Name / Function Signature Date

Test report reviewed by: Max Hunziker, Head EMC-Testcenter 2019-07-09
Name / Function Signature Date

Test report approved by: Marcel Fehr, EMC Test Engineer 2019-07-09
Name / Function Signature Date

Test period

Equipment to be tested received on 2018-10-17

Witnessing:

Mr. Christian Bach, Aafag AG

REVISION INDEX

Table with 4 columns: Document Number, Issue date, Replaces, No. of revised pages / deleted pages\*. Rows include EMCKP3700A and EMCKP3700B.



## SECTION 1 EQUIPMENT UNDER TEST (E. U. T.)

### 1.1 Identification of E. U. T.

Trade mark : Schoch Werkhaus  
Type Identification: LED Stehleuchte JSL-PURE, 1 Kopf  
Serial no: Prototype  
  
Country of manufacture: Switzerland  
Technical data sheet : According to Schoch Werkhaus AG

#### Classification according to ETSI EN 300 328

Nominal output power: +0.0 dBm  
Type of modulation: Non FHSS  
Modulation scheme: ---  
Adaptivity: Non-adaptive  
Frequency band: 2'402 MHz to 2'480 MHz (ISM)  
Number of channels: 3 (device is advertising only)  
Nominal channel bandwidth: 2 MHz  
Type of equipment: Combined equipment  
Antenna type: Integral antenna  
Equipment type: Bluetooth low energy

#### Classification according to IEC / EN 61547

Type of equipment: Luminaire

### 1.2 Operation modes of E.U.T.

Emission: Normal operation  
Normal operation with i-Phone charging  
Immunity: Normal operation

### 1.3 Power specification

Voltage: 230 VAC / 50 Hz  
Power: 70 W

### 1.4 Description of E. U. T.

The E.U.T. is a LED luminaire for office appliance.

### 1.5 Modifications Incorporated in E. U. T.

None

### 1.6 Support Equipment

None

### 1.7 Configuration and Peripherals

According to requirements of the standards, for details see appendix 2.  
Periphery cables: AC mains, 3 x 1.0 mm<sup>2</sup>, 2.0 m length, unshielded

#### NOTE:

The client shall be responsible for the declaration of the interfaces and operation modes of the E.U.T. during and after the tests.



## SECTION 2 TEST SPECIFICATION, METHODS & PROCEDURES

### 2.1 Emission Test Specification

- Test Specification : EN 55015:2013/A1:2015  
CISPR 15:2018
- Title : Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
- Test Specification : ETSI EN 300 328 V2.1.1:2016-11
- Title : Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
- Test Specification : ETSI EN 301 489-1 V2.2.0:2017-03
- Title : ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Harmonised Standard covering the essential requirements of article 3.1(b) of the Directive 2014/53/EU and the essential requirements of article 6 of the Directive 2014/30/EU;  
Part 1: Common technical requirements
- Test Specification : ETSI EN 301 489-17 V3.2.0:2017-03
- Title : ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU
- Purpose of test : The test is part of a certification program.



## SECTION 2 TEST SPECIFICATION, METHODS & PROCEDURES

### 2.1.1 Emission Test : Methods & Procedures

| Basic standard                  | Date           | Title   |
|---------------------------------|----------------|---|
| CISPR 16-2-1                    | 2014           | 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                    | 2010 / A2:2014 | Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-3: Methods of measurement of disturbances and immunity – Radiated disturbance measurements  |
| EN 61000-3-2<br>(IEC 61000-3-2) | 2014           | Electromagnetic compatibility (EMC) - Part 2: Limits Section 2: Limits for harmonic current emissions (equipment input current $\leq 16$ A per phase).  |
| EN 61000-3-3<br>(IEC 61000-3-3) | 2013           | 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 $\leq 16$ A per phase and not subject to conditional connection |





## 2.2 Immunity Test Specification

- Test Specification : IEC 61547:2009  
Title : Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
- Test Specification : ETSI EN 301 489-1 V2.2.0:2017-03  
Title : ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Harmonised Standard covering the essential requirements of article 3.1(b) of the Directive 2014/53/EU and the essential requirements of article 6 of the Directive 2014/30/EU; Part 1: Common technical requirements
- Test Specification : ETSI EN 301 489-17 V3.2.0:2017-03  
Title : ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU
- Purpose of test : The test is part of a certification program.



2.2.1 Immunity Test : Methods & Procedures

| Basic standard                    | Date                             | Title  |
|-----------------------------------|----------------------------------|--|
| EN 61000-4-2<br>(IEC 61000-4-2)   | 2009                             | Electromagnetic compatibility (EMC) Part 4: Testing measurement techniques - Section 2: Electrostatic discharge immunity test.                                       |
| EN 61000-4-3<br>(IEC 61000-4-3)   | 2006 /<br>A1: 2008 /<br>A2: 2010 | Electromagnetic Compatibility (EMC) - Part 4: Testing and measurement techniques - Section 3: Radiated radio-frequency electromagnetic field immunity test.          |
| EN 61000-4-4<br>(IEC 61000-4-4)   | 2012                             | Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques - Section 4: Electrical fast transient / burst immunity test.                         |
| EN 61000-4-5<br>(IEC 61000-4-5)   | 2014                             | Electromagnetic Compatibility (EMC) - Part 4: Testing and measurement techniques - Section 5: Surge immunity test.   |
| EN 61000-4-6<br>(IEC 61000-4-6)   | 2014                             | Electromagnetic Compatibility (EMC) - Part 4: Testing and measurement techniques - Section 6: Immunity to conducted disturbances, induced by radio frequency fields. |
| EN 61000-4-8<br>(IEC 61000-4-8)   | 2010                             | Electromagnetic Compatibility (EMC) - Part 4: Testing and measurement techniques - Section 8: Immunity to power frequency magnetic field.                            |
| EN 61000-4-11<br>(IEC 61000-4-11) | 2004                             | Electromagnetic Compatibility (EMC) - Part 4: Testing and measurement techniques - Section 11: Immunity to voltage variations, dips, interruptions.                  |



SECTION 3 OPERATION OF E. U. T. DURING TESTING

3.1 Operating Environment

|   | (Inner dimensions)      |
|---|-------------------------|
| Test facility : <input type="checkbox"/> Semi Anechoic Chamber SAC10<br>Turntable, Maturo, d = 5 m, 10 t<br>Antenna Mast, Maturo, 1.0 m ... 4.0 m | 18.2 m x 10.1 m x 7.0 m |
| <input checked="" type="checkbox"/> Semi Anechoic Chamber SAC3<br>Turntable, Maturo, d = 1.2 m, 0.5 t<br>Antenna Mast, EMCO, 1.0 m ... 4.0 m      | 7.4 m x 3.7 m x 4.7 m   |
| <input type="checkbox"/> Faraday Room CR (SAC10)  | 4.9 m x 4.9 m x 2.4 m   |
| <input type="checkbox"/> Faraday room AR  | 4.9 m x 3.0 m x 2.4 m   |
| <input checked="" type="checkbox"/> Faraday room CR (SAC3)  | 4.9 m x 4.0 m x 2.4 m   |
| <input checked="" type="checkbox"/> Conducted test site   | 7.0 m x 4.8 m x 6.1 m   |

3.2 Performance Criteria (only for Immunity Tests)

For this E. U. T., the performance criteria were applied as follows:

- Criterion A** : During and after the EMC-test, no degradation of performance or loss of function is allowed below a performance level specified by the manufacturer.  
Additional for E. U. T. : NA
- Criterion B** : During the EMC-test, degradation of performance is allowed, no change of actual operating state or stored data is allowed. After the EMC-test, E.U.T. shall continue to operate as intended.  
Additional for E. U. T. : NA
- Criterion C** : During the EMC-test, temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.  
Additional for E. U. T. : NA

3.3 Monitoring of the E. U. T. (Only for Immunity Tests)

The performance of the E. U. T. during testing was monitored in the following manner :

- Visual monitoring of displays by digital camera
- Through E. U. T. - auxiliary / control equipment



SECTION 4 MEASUREMENTS, EXAMINATIONS AND DERIVED RESULTS : NORMATIVE

4.1 General comments

This section contains the test results only. Details of the test methods used, etc., can be found in the requirements and Appendix 2 of this report.

4.1.1 Measurement Uncertainty

Immunity Tests

The measurement uncertainties of the test equipment are within the requirements of the applicable test standards

Conducted Emission

The measurement uncertainty (with a 95 % confidence level) for this test according to CISPR 16-4-2 was U\_Lab = 2.47 dB for 2 Lines and 3.35 dB for 4 Lines (Requirements according to CISPR 16-4-2: 3.6 dB). The measurement values shall not exceed the limits for Quasi-Peak and Average Detector and shall be 2.47 dB below the limit in order not to be within the measurement uncertainty.

Radiated Emission

The measurement uncertainty (with a 95 % confidence level) for this test according to CISPR 16-4-1 / CISPR 16-4-2 was as follows:

Test facility SAC3, Test distance 3 m:

30MHz to 1GHz, Test volume d = 1.0 m
1GHz to 6GHz, Test volume d = 1.0 m
6GHz to 18GHz, Test volume d = 1.0 m

U\_LAB ≤ 5.18 dB (Requirement U\_CISPR ≤ 5.2 dB)
U\_LAB ≤ 5.88 dB (Requirement U\_CISPR pending)
U\_LAB ≤ 6.19 dB (Requirement U\_CISPR pending)

Test facility SAC10, Test distance 10 m:

30MHz to 1GHz, Test volume d = 5.0 m
(U\_LAB is < 3.08 dB for smaller Test volumes)

U\_LAB ≤ 3.08 dB (Requirement U\_CISPR ≤ 5.2 dB)

Test facility SAC10, Test distance 3 m:

1GHz to 15GHz, Test volume d = 5.0 m
15GHz to 18GHz, Test volume d = 5.0 m
(U\_LAB is < 4.04 / 5.88 dB for smaller Test volumes)

U\_LAB ≤ 4.04 dB (Requirement U\_CISPR pending)
U\_LAB ≤ 5.88 dB (Requirement U\_CISPR pending)

The measurement values shall not exceed the limits for Quasi-Peak Detector and shall be the values of U\_LAB dB below the limit in order not to be within the measurement uncertainty.

Frequency: ± 7.04 x 10^-8 GHz



## 4.2 Test results

### 4.2.1 Emission Test

#### Test No. 1 Conducted Emission

EUT : LED Stehleuchte JSL-PURE, 1 Kopf  
Port : Input AC power port  
Standard Limits : EN 55015 table 2a, EN 55032 Class B  
Basic Standard : EN 55015 / CISPR 15, EN 55032 / CISPR 32  
Temperature : 19 to 23 °C  
Relative Humidity : 30 to 50 %  
Atmospheric Pressure : 950 to 1030 hPa

| Frequency range<br>[ MHz ] | Quasi peak Limits<br>[ dB $\mu$ V ] | Average Limits<br>[ dB $\mu$ V ] | Result   |
|----------------------------|-------------------------------------|----------------------------------|----------|
| 0.009 – 0.05               | 110                                 | --                               | Complied |
| 0.05 – 0.15                | 90 – 80                             | --                               | Complied |
| 0.15 – 0.5                 | 66 – 56                             | 56 – 46                          | Complied |
| 0.5 – 5                    | 56                                  | 46                               | Complied |
| 5 – 30                     | 60                                  | 50                               | Complied |

#### Measurement Uncertainty

See page 12, §4.1.1

#### Test equipment used

No. 01.1, 02, 08, 09, 117, see Appendix 1 for full details of test equipment.

#### Comments, Test methods

A detailed description of the test methods used can be found in Appendix 2 of this report.

#### Result

See measurement diagrams on the next pages.

The EUT complied with the specification limit.

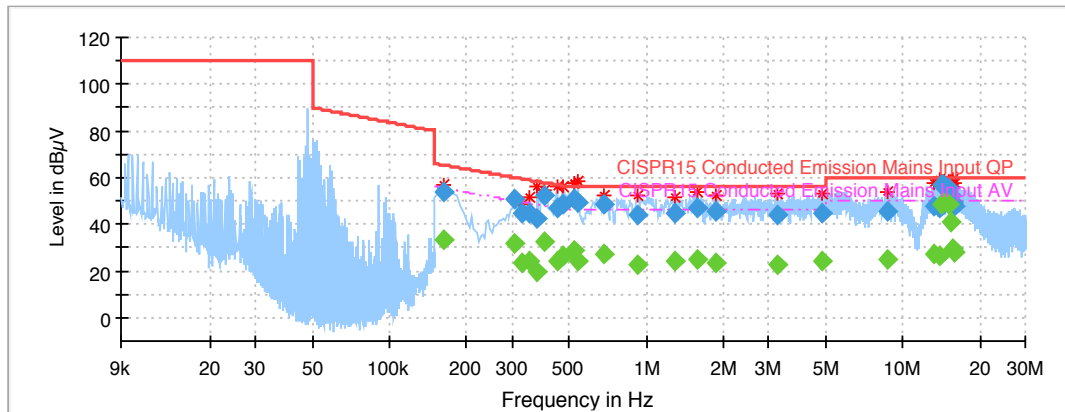


Conducted Emission, 9 kHz - 30 MHz



Common Information

Customer: Aafag AG, 8451 Kleinandelfingen / Switzerland  
 E.U.T.: LED Stehleuchte JSL-PURE, 1 Kopf  
 Operating Conditions: Normal operation  
 Comment: BLE Radio active  
 Standard: CISPR 11 Conducted Emission, Table 2a  
 Port: 230 V / 50Hz mains  
 LISN: R&S, ENV216  
 Test facility: SAC3  
 Engineer: Max Hunziker  
 Project ID: EMCK3700



— Preview Result 1-PK+      \* Critical\_Freqs PK+  
— CISPR15 Conducted Emission Mains Input QP      - - - CISPR15 Conducted Emission Mains Input AV  
◆ Final\_Result QPK      ◆ Final\_Result CAV

Final Result

| Frequency (MHz) | QuasiPeak (dBµV) | CAverage (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|--------|------------|
| 0.162000        | ---              | 33.04           | 55.36        | 22.32       | 2000.0          | 9.000           | L1   | OFF    | 9.7        |
| 0.162000        | 53.69            | ---             | 65.36        | 11.67       | 2000.0          | 9.000           | L1   | OFF    | 9.7        |
| 0.306000        | ---              | 31.67           | 50.08        | 18.41       | 2000.0          | 9.000           | N    | OFF    | 9.7        |
| 0.306000        | 50.67            | ---             | 60.08        | 9.41        | 2000.0          | 9.000           | N    | OFF    | 9.7        |
| 0.326000        | ---              | 23.53           | 49.55        | 26.03       | 2000.0          | 9.000           | L1   | OFF    | 9.7        |
| 0.326000        | 44.72            | ---             | 59.55        | 14.83       | 2000.0          | 9.000           | L1   | OFF    | 9.7        |
| 0.350000        | ---              | 24.18           | 48.96        | 24.78       | 2000.0          | 9.000           | L1   | OFF    | 9.7        |
| 0.350000        | 44.86            | ---             | 58.96        | 14.10       | 2000.0          | 9.000           | L1   | OFF    | 9.7        |
| 0.378000        | ---              | 19.68           | 48.32        | 28.65       | 2000.0          | 9.000           | N    | OFF    | 9.7        |
| 0.378000        | 42.57            | ---             | 58.32        | 15.75       | 2000.0          | 9.000           | N    | OFF    | 9.7        |
| 0.402000        | ---              | 32.21           | 47.81        | 15.60       | 2000.0          | 9.000           | N    | OFF    | 9.7        |
| 0.402000        | 52.26            | ---             | 57.81        | 5.55        | 2000.0          | 9.000           | N    | OFF    | 9.7        |
| 0.450000        | ---              | 24.04           | 46.88        | 22.83       | 2000.0          | 9.000           | N    | OFF    | 9.7        |
| 0.450000        | 46.78            | ---             | 56.88        | 10.09       | 2000.0          | 9.000           | N    | OFF    | 9.7        |
| 0.474000        | ---              | 26.69           | 46.44        | 19.75       | 2000.0          | 9.000           | L1   | OFF    | 9.7        |
| 0.474000        | 48.40            | ---             | 56.44        | 8.04        | 2000.0          | 9.000           | L1   | OFF    | 9.7        |
| 0.526000        | ---              | 28.48           | 46.00        | 17.52       | 2000.0          | 9.000           | N    | OFF    | 9.7        |
| 0.526000        | 50.84            | ---             | 56.00        | 5.16        | 2000.0          | 9.000           | N    | OFF    | 9.7        |
| 0.542000        | ---              | 24.32           | 46.00        | 21.68       | 2000.0          | 9.000           | L1   | OFF    | 9.7        |



**Test No. 2 Radiated Emission**

EUT : LED Stehleuchte JSL-PURE, 1 Kopf  
Port : Enclosure  
Standard Limits : EN 55015 table 3b, EN 55032 Class B  
Basic Standard : EN 55015 / CISPR 15, EN 55032 / CISPR 32  
Temperature : 19 to 23 °C  
Relative Humidity : 30 to 50 %  
Atmospheric Pressure : 950 to 1030 hPa

| Frequency [MHz] | Limits at 3 m [dB $\mu$ V / m] | Comment                        | Result   |
|-----------------|--------------------------------|--------------------------------|----------|
| 30 - 230        | 40                             | QuasiPeak Detector<br>EN 55015 | Complied |
| 230 - 300       | 47                             | QuasiPeak Detector<br>EN 55015 | Complied |
| 30 - 230        | 40                             | QuasiPeak Detector<br>EN 55032 | Complied |
| 30 - 1000       | 47                             | QuasiPeak Detector<br>EN 55032 | Complied |

**Measurement Uncertainty**

See page 12, §4.1.1

**Test equipment used**

No. 01.1, 02, 08, 09, 16.1, 152, 153, 154, 154.1, see Appendix 1 for full details of test equipment.

**Comments, Test methods**

A detailed description of the test methods used can be found in Appendix 2 of this report.

**Result**

See measurement diagrams on the next pages.

The EUT complied with the specification limit.

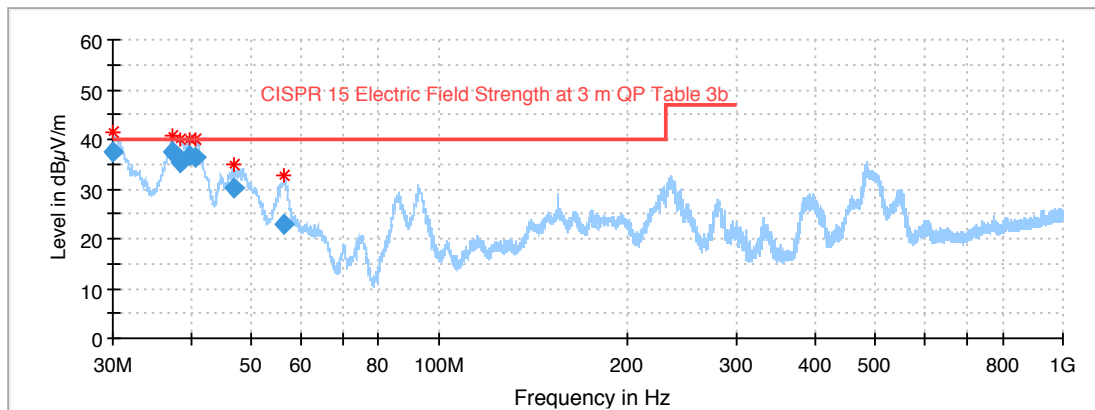


Radiated Emission, 30 MHz – 1000 MHz



**Common Information**

Customer: Aafag AG, 8451 Kleinandelfingen / Switzerland  
 E.U.T.: LED Stehleuchte JSL-PURE, 1 Kopf  
 Operating Conditions: Normal operation  
 Comment: BLE Radio active  
 Standard: CISPR 32 Radiated Emission, Limit CISPR 15 Table 3b  
 Antenna location: Distance 3 m  
 Test facility: SAC3  
 Engineer: Max Hunziker  
 Project ID: EMCK3700



**Final Result**

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 30.060000       | 37.30              | 40.00          | 2.70        | 2000.0          | 120.000         | 100.0       | V   | 120.0         | 19.0       |
| 37.440000       | 37.36              | 40.00          | 2.64        | 2000.0          | 120.000         | 100.0       | V   | 120.0         | 15.5       |
| 38.520000       | 35.29              | 40.00          | 4.71        | 2000.0          | 120.000         | 100.0       | V   | 0.0           | 15.0       |
| 39.840000       | 36.82              | 40.00          | 3.18        | 2000.0          | 120.000         | 100.0       | V   | 120.0         | 14.4       |
| 40.620000       | 36.34              | 40.00          | 3.66        | 2000.0          | 120.000         | 100.0       | V   | 180.0         | 14.0       |
| 46.890000       | 30.24              | 40.00          | 9.76        | 2000.0          | 120.000         | 100.0       | V   | 120.0         | 11.0       |
| 56.250000       | 23.08              | 40.00          | 16.92       | 2000.0          | 120.000         | 100.0       | V   | 0.0           | 7.8        |



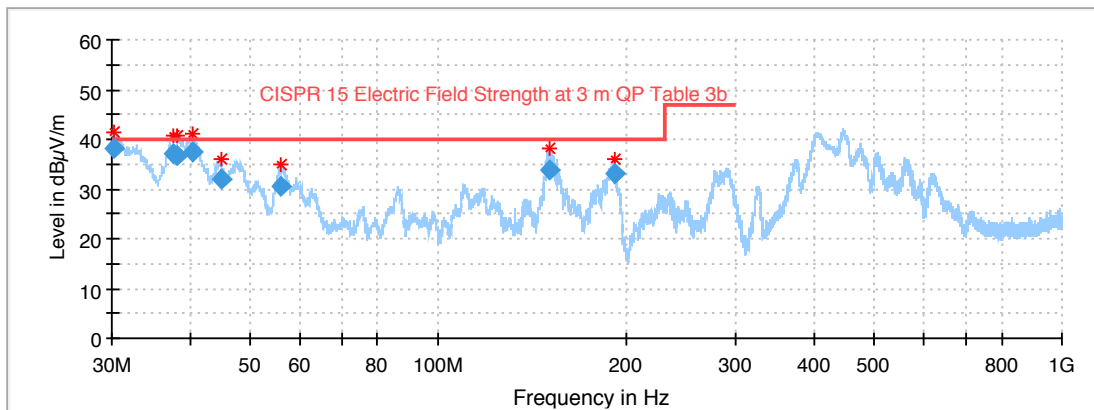


Radiated Emission, 30 MHz – 1000 MHz



**Common Information**

Customer: Aafag AG, 8451 Kleinandelfingen / Switzerland  
 E.U.T.: LED Stehleuchte JSL-PURE, 1 Kopf  
 Operating Conditions: Normal operation, charging cable with Iphone 6  
 Comment: BLE Radio active  
 Standard: CISPR 32 Radiated Emission, Limit CISPR 15 Table 3b  
 Antenna location: Distance 3 m  
 Test facility: SAC3  
 Engineer: Max Hunziker  
 Project ID: EMCK3700



- Preview Result 1-PK+
- \* Critical\_Freqs PK+
- CISPR 15 Electric Field Strength at 3 m QP Table 3b
- ◆ 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) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 30.150000       | 38.11              | 40.00          | 1.89        | 2000.0          | 120.000         | 100.0       | V   | 0.0           | 18.9       |
| 37.590000       | 37.17              | 40.00          | 2.83        | 2000.0          | 120.000         | 100.0       | V   | 0.0           | 15.5       |
| 38.070000       | 36.75              | 40.00          | 3.25        | 2000.0          | 120.000         | 100.0       | V   | 0.0           | 15.2       |
| 40.350000       | 37.29              | 40.00          | 2.71        | 2000.0          | 120.000         | 100.0       | V   | 0.0           | 14.1       |
| 44.850000       | 32.06              | 40.00          | 7.94        | 2000.0          | 120.000         | 100.0       | V   | 0.0           | 11.9       |
| 55.950000       | 30.66              | 40.00          | 9.34        | 2000.0          | 120.000         | 100.0       | V   | 0.0           | 7.9        |
| 150.540000      | 33.77              | 40.00          | 6.23        | 2000.0          | 120.000         | 100.0       | V   | 0.0           | 20.1       |
| 191.910000      | 33.12              | 40.00          | 6.88        | 2000.0          | 120.000         | 100.0       | V   | 0.0           | 13.3       |



**Test No. 3 Harmonic Current Emission**

EUT : LED Stehleuchte JSL-PURE, 1 Kopf  
Port : Input AC power port  
Basic Standard : IEC 61000-3-2:2014  
Standard Limits : IEC 61000-3-2 Class C  
Temperature : 19 to 23 °C  
Relative Humidity : 30 to 50 %  
Atmospheric Pressure : 950 to 1030 hPa

| Harmonic order (n)                       | Limits for harmonics current averaged over the observation time [% of input current at fundamental frequency] | Comment | Result   |
|--|---|---------|----------|
| Harmonics                                |   |         |          |
| 2  | 2   | --      | Complied |
| 3  | 30 * $\lambda$ *)   | --      | Complied |
| 5  | 10  | --      | Complied |
| 7  | 7   | --      | Complied |
| 9  | 5   | --      | Complied |
| 11 ≤ h ≤ 39                              | 3   | --      | Complied |
| *) $\lambda$ is the circuit power factor |   |         |          |

**Measurement Uncertainty**

See page 12, § 4.1.1

**Test equipment used**

No. 104.1, 104.2, 106, 107, 107.1, see Appendix 1 for full details of test equipment.

**Comments, Test methods**

A detailed description of the test methods used can be found in Appendix 2 of this report.

**Result**

See measurement diagrams on the next pages.  
The EUT complied with the specification limit.



**Harmonic Current Emission**

**Test Report**

Report Number : EMCK3700  
Test Object : LED Stehleuchte JSL-PURE, 1 Kopf  
Customer : Aafag AG  
Test Standard : IEC 61000-3-2 (Edition 4)  
Limits for harmonic current emissions (equipment input current < 16 A per phase)  
Tester : Christoph Hauser  
Company : EMC Testcenter AG  
Test Date : 10/18/2018 1:14:45 PM

**Result**

E.U.T. : Passed Source : Passed

**Customer**

Name : Aafag AG Contact Person : Thomas Bühler  
Phone : eMail :  
Address :

**Test Object / Product**

Name : LED Stehleuchte JSL-PURE, 1 Kopf Operation Mode : Continuous operation (100 % dimmed)  
Serial Number : Connection :  
Description : Ein Kopf

**Climatic Conditions**

Temperature : 25 °C Pressure : 97 kPa Humidity : 41 %

**Software**

Name : net.control Version : 1.2.9.0



### Harmonic Current Emission

| Measures & Analysis |   |
|---------------------|---|
| Measure Window :    | 10 periods  |
| Refresh Interval :  | 2 s   |
| Sampling Rate :     | 6.4 kS/s  |
| Scaled Window :     | Rectangular   |
| Accordinging :      | IEC 61000-3-2 (Edition 4)<br>Limits for harmonic current emissions (equipment input current < 16 A per phase) |
| Voltage Range :     | 500 V   |
| Current Range :     | 200 A   |

| Measure Results  |   |
|--|---|
| Standard Specific Results for IEC 61000-3-2 (Edition 4)            |   |
| Standard Group:  | Industry  |
| Standard Name:   | IEC 61000-3-2 (Edition 4)<br>Limits for harmonic current emissions (equipment input current < 16 A per phase) |
| Device Under Test:   | PASS  |
| Power Source:  | PASS  |
| Class C (Active input power > 25 W)                                |   |
| Check Harmonics 2..40 [exception odd 21..39]                       |   |
| <i>First detected harmonic order &gt; 150 %</i>                    |   |
| Line 1:  | None  |
| <i>Harmonics orders &gt; 150 %</i>                                 |   |
| Line 1:  | None  |
| <i>Harmonics orders with average &gt; 100 %</i>                    |   |
| Line 1:  | None  |
| Check Odd Harmonics 21..39   |   |
| <i>First detected time window with partial &gt; partial limits</i> |   |
|  | <i>time window (time)      measured value      limit</i>  |
| Line 1:  | None      9.49 %  |
| <i>Maximal time window with partial &gt; partial limits</i>        |   |
|  | <i>time window (time)      measured value      limit</i>  |
| Line 1:  | None      9.49 %  |
| <i>First detected harmonic order &gt; 150 %</i>                    |   |
| Line 1:  | None  |
| <i>Harmonics orders &gt; 150 %</i>                                 |   |
| Line 1:  | None  |
| <i>Harmonics orders with average &gt; 150 %</i>                    |   |
| Line 1:  | None  |
| Measured values  |   |



**Harmonic Current Emission**

|                             |            |
|-----------------------------|------------|
| <i>Fundamental Current</i>  |            |
| Line 1:                     | 0.273 A    |
| <i>Active input Power</i>   |            |
| Line 1:                     | 60.789 W * |
| <i>Circuit power factor</i> |            |
| Line 1:                     | 0.957 *    |

\* Absolute value.

**Current Test Result**

| Average and Maximum harmonic current results |          |          |           |           |          |          |           |           |                 |
|--|----------|----------|-----------|-----------|----------|----------|-----------|-----------|-----------------|
| Hn   | Average  |          |           |           | Maximum  |          |           |           | Harmonic Result |
|  | Ieff [A] | Ieff [%] | Limit [%] | Result    | Ieff [A] | Ieff [%] | Limit [%] | Result    |                 |
| 1  | 0.273    | 100.000  |           |           | 0.273    | 100.000  |           |           |                 |
| 2  | 0.000    | 0.135    | 2.000     | Disregard | 0.001    | 0.185    | 3.000     | Disregard | Disregard       |
| 3  | 0.041    | 15.148   | 28.698    | PASS      | 0.042    | 15.277   | 43.048    | PASS      | PASS            |
| 4  | 0.000    | 0.170    |           |           | 0.001    | 0.239    |           |           |                 |
| 5  | 0.013    | 4.922    | 10.000    | PASS      | 0.014    | 5.118    | 15.000    | PASS      | PASS            |
| 6  | 0.000    | 0.167    |           |           | 0.001    | 0.244    |           |           |                 |
| 7  | 0.009    | 3.243    | 7.000     | PASS      | 0.009    | 3.422    | 10.500    | PASS      | PASS            |
| 8  | 0.000    | 0.165    |           |           | 0.001    | 0.230    |           |           |                 |
| 9  | 0.007    | 2.495    | 5.000     | PASS      | 0.007    | 2.645    | 7.500     | PASS      | PASS            |
| 10   | 0.000    | 0.166    |           |           | 0.001    | 0.200    |           |           |                 |
| 11   | 0.004    | 1.454    | 3.000     | Disregard | 0.004    | 1.608    | 4.500     | Disregard | Disregard       |
| 12   | 0.000    | 0.166    |           |           | 0.001    | 0.234    |           |           |                 |
| 13   | 0.003    | 1.087    | 3.000     | Disregard | 0.003    | 1.232    | 4.500     | Disregard | Disregard       |
| 14   | 0.000    | 0.168    |           |           | 0.001    | 0.235    |           |           |                 |
| 15   | 0.004    | 1.316    | 3.000     | Disregard | 0.004    | 1.426    | 4.500     | Disregard | Disregard       |
| 16   | 0.000    | 0.162    |           |           | 0.001    | 0.192    |           |           |                 |
| 17   | 0.003    | 1.162    | 3.000     | Disregard | 0.004    | 1.323    | 4.500     | Disregard | Disregard       |
| 18   | 0.000    | 0.158    |           |           | 0.001    | 0.192    |           |           |                 |
| 19   | 0.003    | 1.224    | 3.000     | Disregard | 0.004    | 1.330    | 4.500     | Disregard | Disregard       |
| 20   | 0.000    | 0.165    |           |           | 0.001    | 0.229    |           |           |                 |
| 21   | 0.002    | 0.551    | 4.500     | Disregard | 0.002    | 0.742    | 4.500     | Disregard | Disregard       |
| 22   | 0.000    | 0.163    |           |           | 0.001    | 0.223    |           |           |                 |
| 23   | 0.001    | 0.225    | 4.500     | Disregard | 0.001    | 0.320    | 4.500     | Disregard | Disregard       |
| 24   | 0.000    | 0.160    |           |           | 0.001    | 0.195    |           |           |                 |
| 25   | 0.003    | 0.952    | 4.500     | Disregard | 0.003    | 1.120    | 4.500     | Disregard | Disregard       |
| 26   | 0.000    | 0.159    |           |           | 0.001    | 0.204    |           |           |                 |
| 27   | 0.001    | 0.497    | 4.500     | Disregard | 0.002    | 0.567    | 4.500     | Disregard | Disregard       |



**Harmonic Current Emission**

|    |       |       |       |           |       |       |       |           |           |
|----|-------|-------|-------|-----------|-------|-------|-------|-----------|-----------|
| 28 | 0.000 | 0.166 |       |           | 0.001 | 0.228 |       |           |           |
| 29 | 0.003 | 0.977 | 4.500 | Disregard | 0.003 | 1.071 | 4.500 | Disregard | Disregard |
| 30 | 0.000 | 0.161 |       |           | 0.001 | 0.197 |       |           |           |
| 31 | 0.001 | 0.541 | 4.500 | Disregard | 0.002 | 0.687 | 4.500 | Disregard | Disregard |
| 32 | 0.000 | 0.163 |       |           | 0.001 | 0.213 |       |           |           |
| 33 | 0.001 | 0.430 | 4.500 | Disregard | 0.002 | 0.590 | 4.500 | Disregard | Disregard |
| 34 | 0.000 | 0.171 |       |           | 0.001 | 0.229 |       |           |           |
| 35 | 0.001 | 0.197 | 4.500 | Disregard | 0.001 | 0.273 | 4.500 | Disregard | Disregard |
| 36 | 0.000 | 0.162 |       |           | 0.001 | 0.203 |       |           |           |
| 37 | 0.001 | 0.384 | 4.500 | Disregard | 0.001 | 0.535 | 4.500 | Disregard | Disregard |
| 38 | 0.000 | 0.160 |       |           | 0.001 | 0.192 |       |           |           |
| 39 | 0.002 | 0.732 | 4.500 | Disregard | 0.002 | 0.802 | 4.500 | Disregard | Disregard |
| 40 | 0.000 | 0.164 |       |           | 0.001 | 0.227 |       |           |           |

*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.*

**Voltage Source Verification**

| Harmonic voltage results |          |          |           |        |
|--------------------------|----------|----------|-----------|--------|
| Hn                       | Ueff [V] | Ueff [%] | Limit [%] | Result |
| 1                        | 229.562  | 99.810   |           |        |
| 2                        | 0.021    | 0.009    | 0.200     | PASS   |
| 3                        | 0.119    | 0.052    | 0.900     | PASS   |
| 4                        | 0.017    | 0.007    | 0.200     | PASS   |
| 5                        | 0.026    | 0.011    | 0.400     | PASS   |
| 6                        | 0.011    | 0.005    | 0.200     | PASS   |
| 7                        | 0.028    | 0.012    | 0.300     | PASS   |
| 8                        | 0.008    | 0.004    | 0.200     | PASS   |
| 9                        | 0.017    | 0.007    | 0.200     | PASS   |
| 10                       | 0.007    | 0.003    | 0.200     | PASS   |
| 11                       | 0.016    | 0.007    | 0.100     | PASS   |
| 12                       | 0.005    | 0.002    | 0.100     | PASS   |
| 13                       | 0.017    | 0.008    | 0.100     | PASS   |
| 14                       | 0.006    | 0.003    | 0.100     | PASS   |
| 15                       | 0.007    | 0.003    | 0.100     | PASS   |
| 16                       | 0.009    | 0.004    | 0.100     | PASS   |
| 17                       | 0.015    | 0.006    | 0.100     | PASS   |
| 18                       | 0.011    | 0.005    | 0.100     | PASS   |
| 19                       | 0.013    | 0.006    | 0.100     | PASS   |



**Harmonic Current Emission**

|    |       |       |       |      |
|----|-------|-------|-------|------|
| 20 | 0.011 | 0.005 | 0.100 | PASS |
| 21 | 0.010 | 0.004 | 0.100 | PASS |
| 22 | 0.007 | 0.003 | 0.100 | PASS |
| 23 | 0.009 | 0.004 | 0.100 | PASS |
| 24 | 0.009 | 0.004 | 0.100 | PASS |
| 25 | 0.008 | 0.003 | 0.100 | PASS |
| 26 | 0.006 | 0.003 | 0.100 | PASS |
| 27 | 0.007 | 0.003 | 0.100 | PASS |
| 28 | 0.008 | 0.004 | 0.100 | PASS |
| 29 | 0.006 | 0.003 | 0.100 | PASS |
| 30 | 0.011 | 0.005 | 0.100 | PASS |
| 31 | 0.005 | 0.002 | 0.100 | PASS |
| 32 | 0.008 | 0.004 | 0.100 | PASS |
| 33 | 0.006 | 0.003 | 0.100 | PASS |
| 34 | 0.006 | 0.002 | 0.100 | PASS |
| 35 | 0.008 | 0.003 | 0.100 | PASS |
| 36 | 0.007 | 0.003 | 0.100 | PASS |
| 37 | 0.006 | 0.003 | 0.100 | PASS |
| 38 | 0.005 | 0.002 | 0.100 | PASS |
| 39 | 0.009 | 0.004 | 0.100 | PASS |
| 40 | 0.010 | 0.004 | 0.100 | PASS |



Harmonic Current Emission, dimmed, 1 LED

**Test Report**

Report Number : EMCK3700  
Test Object : LED Stehleuchte JSL-PURE, 1 Kopf  
Customer : Aafag AG  
Test Standard : IEC 61000-3-2 (Edition 4)  
Limits for harmonic current emissions (equipment input current < 16 A per phase)  
Tester : Christoph Hauser  
Company : EMC Testcenter AG  
Test Date : 10/18/2018 1:31:17 PM

**Result**

E.U.T. : Passed Source : Passed

**Customer**

Name : Aafag AG Contact Person : Thomas Bühler  
Phone : eMail :  
Address :

**Test Object / Product**

Name : LED Stehleuchte JSL-PURE, 1 Kopf Operation Mode : Dimmed to minimum setting (lower LED)  
Serial Number : Connection :  
Description : Ein Kopf

**Climatic Conditions**

Temperature : 25 °C Pressure : 97 kPa Humidity : 41 %

**Software**

Name : net.control Version : 1.2.9.0





**Harmonic Current Emission, dimmed, 1 LED**

| Measures & Analysis |   |
|---------------------|---|
| Measure Window :    | 10 periods  |
| Refresh Interval :  | 2 s   |
| Sampling Rate :     | 6.4 kS/s  |
| Scaled Window :     | Rectangular   |
| Accordinging :      | IEC 61000-3-2 (Edition 4)<br>Limits for harmonic current emissions (equipment input current < 16 A per phase) |
| Voltage Range :     | 500 V   |
| Current Range :     | 200 A   |

| Measure Results  |   |
|--|---|
| Standard Specific Results for IEC 61000-3-2 (Edition 4)            |   |
| Standard Group:  | Industry  |
| Standard Name:   | IEC 61000-3-2 (Edition 4)<br>Limits for harmonic current emissions (equipment input current < 16 A per phase) |
| Device Under Test:   | PASS  |
| Power Source:  | PASS  |
| Class C (Active input power ≤ 25 W, Power-related limits)          |   |
| Check Harmonics 2..40 [exception odd 21..39]                       |   |
| <i>First detected harmonic order &gt; 150 %</i>                    |   |
| Line 1:  | None  |
| <i>Harmonics orders &gt; 150 %</i>                                 |   |
| Line 1:  | None  |
| <i>Harmonics orders with average &gt; 100 %</i>                    |   |
| Line 1:  | None  |
| Check Odd Harmonics 21..39   |   |
| <i>First detected time window with partial &gt; partial limits</i> |   |
|  | <i>time window (time)      measured value      limit</i>  |
| Line 1:  | None -  |
| <i>Maximal time window with partial &gt; partial limits</i>        |   |
|  | <i>time window (time)      measured value      limit</i>  |
| Line 1:  | None -  |
| <i>First detected harmonic order &gt; 150 %</i>                    |   |
| Line 1:  | None  |
| <i>Harmonics orders &gt; 150 %</i>                                 |   |
| Line 1:  | None  |
| <i>Harmonics orders with average &gt; 150 %</i>                    |   |
| Line 1:  | None  |
| Measured values  |   |



**Harmonic Current Emission, dimmed, 1 LED**

|                             |           |
|-----------------------------|-----------|
| <i>Fundamental Current</i>  |           |
| Line 1:                     | 0.03 A    |
| <i>Active input Power</i>   |           |
| Line 1:                     | 4.603 W * |
| <i>Circuit power factor</i> |           |
| Line 1:                     | 0.67 *    |

\* Absolute value.

**Current Test Result**

| Average and Maximum harmonic current results |          |          |           |           |          |          |           |           |                 |
|--|----------|----------|-----------|-----------|----------|----------|-----------|-----------|-----------------|
| Hn   | Average  |          |           |           | Maximum  |          |           |           | Harmonic Result |
|  | Ieff [A] | Ieff [%] | Limit [A] | Result    | Ieff [A] | Ieff [%] | Limit [A] | Result    |                 |
| 1  | 0.027    | 100.000  |           |           | 0.030    | 100.000  |           |           |                 |
| 2  | 0.004    | 15.019   |           |           | 0.004    | 14.879   |           |           |                 |
| 3  | 0.006    | 22.842   | 0.016     | PASS      | 0.007    | 22.771   | 0.023     | PASS      | PASS            |
| 4  | 0.004    | 15.388   |           |           | 0.005    | 16.837   |           |           |                 |
| 5  | 0.005    | 17.273   | 0.009     | Disregard | 0.005    | 16.872   | 0.013     | PASS      | PASS            |
| 6  | 0.002    | 8.866    |           |           | 0.003    | 9.149    |           |           |                 |
| 7  | 0.002    | 9.212    | 0.005     | Disregard | 0.004    | 12.147   | 0.007     | Disregard | Disregard       |
| 8  | 0.002    | 6.796    |           |           | 0.002    | 7.439    |           |           |                 |
| 9  | 0.002    | 5.932    | 0.002     | Disregard | 0.002    | 5.862    | 0.003     | Disregard | Disregard       |
| 10   | 0.001    | 5.241    |           |           | 0.002    | 5.300    |           |           |                 |
| 11   | 0.002    | 6.023    | 0.002     | Disregard | 0.002    | 6.174    | 0.002     | Disregard | Disregard       |
| 12   | 0.001    | 4.586    |           |           | 0.001    | 4.727    |           |           |                 |
| 13   | 0.001    | 5.434    | 0.001     | Disregard | 0.002    | 5.815    | 0.002     | Disregard | Disregard       |
| 14   | 0.001    | 4.113    |           |           | 0.001    | 4.223    |           |           |                 |
| 15   | 0.001    | 4.289    | 0.001     | Disregard | 0.001    | 4.315    | 0.002     | Disregard | Disregard       |
| 16   | 0.001    | 3.832    |           |           | 0.001    | 3.897    |           |           |                 |
| 17   | 0.001    | 4.142    | 0.001     | Disregard | 0.001    | 4.301    | 0.002     | Disregard | Disregard       |
| 18   | 0.001    | 4.199    |           |           | 0.001    | 4.208    |           |           |                 |
| 19   | 0.001    | 3.908    | 0.001     | Disregard | 0.001    | 3.891    | 0.001     | Disregard | Disregard       |
| 20   | 0.001    | 3.440    |           |           | 0.001    | 3.461    |           |           |                 |
| 21   | 0.001    | 3.370    | 0.001     | Disregard | 0.001    | 3.401    | 0.001     | Disregard | Disregard       |
| 22   | 0.001    | 3.271    |           |           | 0.001    | 3.480    |           |           |                 |
| 23   | 0.001    | 3.373    | 0.001     | Disregard | 0.001    | 3.369    | 0.001     | Disregard | Disregard       |
| 24   | 0.001    | 3.329    |           |           | 0.001    | 3.291    |           |           |                 |
| 25   | 0.001    | 3.301    | 0.001     | Disregard | 0.001    | 3.429    | 0.001     | Disregard | Disregard       |
| 26   | 0.001    | 3.117    |           |           | 0.001    | 3.033    |           |           |                 |
| 27   | 0.001    | 3.238    | 0.001     | Disregard | 0.001    | 3.216    | 0.001     | Disregard | Disregard       |



**Harmonic Current Emission, dimmed, 1 LED**

|    |       |       |       |           |       |       |       |           |           |
|----|-------|-------|-------|-----------|-------|-------|-------|-----------|-----------|
| 28 | 0.001 | 3.224 |       |           | 0.001 | 3.154 |       |           |           |
| 29 | 0.001 | 3.164 | 0.001 | Disregard | 0.001 | 3.206 | 0.001 | Disregard | Disregard |
| 30 | 0.001 | 3.048 |       |           | 0.001 | 2.968 |       |           |           |
| 31 | 0.001 | 3.031 | 0.001 | Disregard | 0.001 | 3.001 | 0.001 | Disregard | Disregard |
| 32 | 0.001 | 3.038 |       |           | 0.001 | 3.165 |       |           |           |
| 33 | 0.001 | 3.136 | 0.001 | Disregard | 0.001 | 3.052 | 0.001 | Disregard | Disregard |
| 34 | 0.001 | 3.132 |       |           | 0.001 | 3.035 |       |           |           |
| 35 | 0.001 | 3.314 | 0.001 | Disregard | 0.001 | 3.181 | 0.001 | Disregard | Disregard |
| 36 | 0.001 | 3.187 |       |           | 0.001 | 3.148 |       |           |           |
| 37 | 0.001 | 3.354 | 0.001 | Disregard | 0.001 | 3.373 | 0.001 | Disregard | Disregard |
| 38 | 0.001 | 3.179 |       |           | 0.001 | 3.163 |       |           |           |
| 39 | 0.001 | 3.292 | 0.001 | Disregard | 0.001 | 3.277 | 0.001 | Disregard | Disregard |
| 40 | 0.001 | 3.333 |       |           | 0.001 | 3.335 |       |           |           |

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.

| Power and THD results |                    |                    |              |
|-----------------------|--------------------|--------------------|--------------|
| Active Power (P)      | Reactive Power (Q) | Apparent Power (S) | Power Factor |
| 4.270 W               | -5.258 var         | 6.780 VA           | 0.6304       |
| Vrms                  | Crest Factor (U)   | THD (U)            |              |
| 229.7 V               | 1.414              | 473.9e-6           |              |
| Irms                  | Crest Factor (I)   | THD (I)            |              |
| 31.84 mA              | 1.965              | 0.3946             |              |

**Voltage Source Verification**

| Harmonic voltage results |          |          |           |        |
|--------------------------|----------|----------|-----------|--------|
| Hn                       | Ueff [V] | Ueff [%] | Limit [%] | Result |
| 1                        | 229.698  | 99.869   |           |        |
| 2                        | 0.038    | 0.016    | 0.200     | PASS   |
| 3                        | 0.100    | 0.044    | 0.900     | PASS   |
| 4                        | 0.017    | 0.007    | 0.200     | PASS   |
| 5                        | 0.018    | 0.008    | 0.400     | PASS   |
| 6                        | 0.010    | 0.004    | 0.200     | PASS   |
| 7                        | 0.019    | 0.008    | 0.300     | PASS   |
| 8                        | 0.006    | 0.003    | 0.200     | PASS   |
| 9                        | 0.016    | 0.007    | 0.200     | PASS   |
| 10                       | 0.007    | 0.003    | 0.200     | PASS   |
| 11                       | 0.014    | 0.006    | 0.100     | PASS   |
| 12                       | 0.011    | 0.005    | 0.100     | PASS   |



**Harmonic Current Emission, dimmed, 1 LED**

|    |       |       |       |      |
|----|-------|-------|-------|------|
| 13 | 0.014 | 0.006 | 0.100 | PASS |
| 14 | 0.007 | 0.003 | 0.100 | PASS |
| 15 | 0.011 | 0.005 | 0.100 | PASS |
| 16 | 0.010 | 0.004 | 0.100 | PASS |
| 17 | 0.006 | 0.002 | 0.100 | PASS |
| 18 | 0.007 | 0.003 | 0.100 | PASS |
| 19 | 0.012 | 0.005 | 0.100 | PASS |
| 20 | 0.012 | 0.005 | 0.100 | PASS |
| 21 | 0.010 | 0.004 | 0.100 | PASS |
| 22 | 0.008 | 0.003 | 0.100 | PASS |
| 23 | 0.006 | 0.003 | 0.100 | PASS |
| 24 | 0.007 | 0.003 | 0.100 | PASS |
| 25 | 0.010 | 0.004 | 0.100 | PASS |
| 26 | 0.013 | 0.006 | 0.100 | PASS |
| 27 | 0.009 | 0.004 | 0.100 | PASS |
| 28 | 0.010 | 0.004 | 0.100 | PASS |
| 29 | 0.008 | 0.003 | 0.100 | PASS |
| 30 | 0.006 | 0.003 | 0.100 | PASS |
| 31 | 0.008 | 0.003 | 0.100 | PASS |
| 32 | 0.008 | 0.004 | 0.100 | PASS |
| 33 | 0.007 | 0.003 | 0.100 | PASS |
| 34 | 0.006 | 0.003 | 0.100 | PASS |
| 35 | 0.007 | 0.003 | 0.100 | PASS |
| 36 | 0.005 | 0.002 | 0.100 | PASS |
| 37 | 0.006 | 0.003 | 0.100 | PASS |
| 38 | 0.004 | 0.002 | 0.100 | PASS |
| 39 | 0.007 | 0.003 | 0.100 | PASS |
| 40 | 0.007 | 0.003 | 0.100 | PASS |



Harmonic Current Emission, dimmed, 2 LEDs

**Test Report**

Report Number : EMCK3700  
Test Object : LED Stehleuchte JSL-PURE, 1 Kopf  
Customer : Aafag AG  
Test Standard : IEC 61000-3-2 (Edition 4)  
Limits for harmonic current emissions (equipment input current < 16 A per phase)  
Tester : Christoph Hauser  
Company : EMC Testcenter AG  
Test Date : 10/18/2018 1:28:18 PM

**Result**

E.U.T. : Passed Source : Passed

**Customer**

Name : Aafag AG Contact Person : Thomas Bühler  
Phone : eMail :  
Address :

**Test Object / Product**

Name : LED Stehleuchte JSL-PURE, 1 Kopf Operation Mode : Dimmed to minimum setting  
Serial Number : Connection :  
Description : Ein Kopf

**Climatic Conditions**

Temperature : 25 °C Pressure : 97 kPa Humidity : 41 %

**Software**

Name : net.control Version : 1.2.9.0



**Harmonic Current Emission, dimmed, 2 LEDs**

| Measures & Analysis |   |
|---------------------|---|
| Measure Window :    | 10 periods  |
| Refresh Interval :  | 2 s   |
| Sampling Rate :     | 6.4 kS/s  |
| Scaled Window :     | Rectangular   |
| According :         | IEC 61000-3-2 (Edition 4)<br>Limits for harmonic current emissions (equipment input current < 16 A per phase) |
| Voltage Range :     | 500 V   |
| Current Range :     | 200 A   |

| Measure Results  |   |
|--|---|
| Standard Specific Results for IEC 61000-3-2 (Edition 4)            |   |
| Standard Group:  | Industry  |
| Standard Name:   | IEC 61000-3-2 (Edition 4)<br>Limits for harmonic current emissions (equipment input current < 16 A per phase) |
| Device Under Test:   | PASS  |
| Power Source:  | PASS  |
| Class C (Active input power ≤ 25 W, Power-related limits)          |   |
| Check Harmonics 2..40 [exception odd 21..39]                       |   |
| <i>First detected harmonic order &gt; 150 %</i>                    |   |
| Line 1:  | None  |
| <i>Harmonics orders &gt; 150 %</i>                                 |   |
| Line 1:  | None  |
| <i>Harmonics orders with average &gt; 100 %</i>                    |   |
| Line 1:  | None  |
| Check Odd Harmonics 21..39   |   |
| <i>First detected time window with partial &gt; partial limits</i> |   |
|  | <i>time window (time)      measured value      limit</i>  |
| Line 1:  | None -  |
| <i>Maximal time window with partial &gt; partial limits</i>        |   |
|  | <i>time window (time)      measured value      limit</i>  |
| Line 1:  | None -  |
| <i>First detected harmonic order &gt; 150 %</i>                    |   |
| Line 1:  | None  |
| <i>Harmonics orders &gt; 150 %</i>                                 |   |
| Line 1:  | None  |
| <i>Harmonics orders with average &gt; 150 %</i>                    |   |
| Line 1:  | None  |
| Measured values  |   |



**Harmonic Current Emission, dimmed, 2 LEDs**

|                             |           |
|-----------------------------|-----------|
| <i>Fundamental Current</i>  |           |
| Line 1:                     | 0.042 A   |
| <i>Active input Power</i>   |           |
| Line 1:                     | 7.076 W * |
| <i>Circuit power factor</i> |           |
| Line 1:                     | 0.71 *    |

\* Absolute value.

**Current Test Result**

| Average and Maximum harmonic current results |          |          |           |           |          |          |           |           |                 |
|--|----------|----------|-----------|-----------|----------|----------|-----------|-----------|-----------------|
| Hn   | Average  |          |           |           | Maximum  |          |           |           | Harmonic Result |
|  | Ieff [A] | Ieff [%] | Limit [A] | Result    | Ieff [A] | Ieff [%] | Limit [A] | Result    |                 |
| 1  | 0.041    | 100.000  |           |           | 0.042    | 100.000  |           |           |                 |
| 2  | 0.004    | 11.006   |           |           | 0.005    | 11.605   |           |           |                 |
| 3  | 0.010    | 24.821   | 0.024     | PASS      | 0.011    | 26.249   | 0.036     | PASS      | PASS            |
| 4  | 0.006    | 13.863   |           |           | 0.006    | 14.946   |           |           |                 |
| 5  | 0.005    | 12.977   | 0.013     | PASS      | 0.006    | 14.801   | 0.020     | PASS      | PASS            |
| 6  | 0.003    | 6.614    |           |           | 0.003    | 7.619    |           |           |                 |
| 7  | 0.004    | 8.682    | 0.007     | Disregard | 0.004    | 9.943    | 0.011     | Disregard | Disregard       |
| 8  | 0.003    | 7.837    |           |           | 0.003    | 8.237    |           |           |                 |
| 9  | 0.003    | 6.265    | 0.004     | Disregard | 0.003    | 6.644    | 0.005     | Disregard | Disregard       |
| 10   | 0.002    | 3.949    |           |           | 0.002    | 4.192    |           |           |                 |
| 11   | 0.002    | 4.469    | 0.002     | Disregard | 0.002    | 4.992    | 0.004     | Disregard | Disregard       |
| 12   | 0.001    | 3.526    |           |           | 0.002    | 3.882    |           |           |                 |
| 13   | 0.001    | 3.638    | 0.002     | Disregard | 0.002    | 3.998    | 0.003     | Disregard | Disregard       |
| 14   | 0.002    | 3.697    |           |           | 0.002    | 4.111    |           |           |                 |
| 15   | 0.001    | 3.445    | 0.002     | Disregard | 0.002    | 4.086    | 0.003     | Disregard | Disregard       |
| 16   | 0.001    | 3.141    |           |           | 0.001    | 3.390    |           |           |                 |
| 17   | 0.002    | 3.812    | 0.002     | Disregard | 0.002    | 4.095    | 0.002     | Disregard | Disregard       |
| 18   | 0.001    | 3.101    |           |           | 0.001    | 3.507    |           |           |                 |
| 19   | 0.001    | 2.925    | 0.001     | Disregard | 0.001    | 3.180    | 0.002     | Disregard | Disregard       |
| 20   | 0.001    | 2.811    |           |           | 0.001    | 2.995    |           |           |                 |
| 21   | 0.001    | 2.621    | 0.002     | Disregard | 0.001    | 2.900    | 0.002     | Disregard | Disregard       |
| 22   | 0.001    | 2.387    |           |           | 0.001    | 2.605    |           |           |                 |
| 23   | 0.001    | 2.905    | 0.002     | Disregard | 0.001    | 3.099    | 0.002     | Disregard | Disregard       |
| 24   | 0.001    | 2.471    |           |           | 0.001    | 2.741    |           |           |                 |
| 25   | 0.001    | 2.565    | 0.002     | Disregard | 0.001    | 2.862    | 0.002     | Disregard | Disregard       |
| 26   | 0.001    | 2.257    |           |           | 0.001    | 2.426    |           |           |                 |
| 27   | 0.001    | 2.330    | 0.002     | Disregard | 0.001    | 2.453    | 0.002     | Disregard | Disregard       |



**Harmonic Current Emission, dimmed, 2 LEDs**

|    |       |       |       |           |       |       |       |           |           |
|----|-------|-------|-------|-----------|-------|-------|-------|-----------|-----------|
| 28 | 0.001 | 2.184 |       |           | 0.001 | 2.424 |       |           |           |
| 29 | 0.001 | 2.507 | 0.001 | Disregard | 0.001 | 2.634 | 0.001 | Disregard | Disregard |
| 30 | 0.001 | 2.097 |       |           | 0.001 | 2.254 |       |           |           |
| 31 | 0.001 | 2.078 | 0.001 | Disregard | 0.001 | 2.246 | 0.001 | Disregard | Disregard |
| 32 | 0.001 | 2.024 |       |           | 0.001 | 2.317 |       |           |           |
| 33 | 0.001 | 2.212 | 0.001 | Disregard | 0.001 | 2.342 | 0.001 | Disregard | Disregard |
| 34 | 0.001 | 2.073 |       |           | 0.001 | 2.195 |       |           |           |
| 35 | 0.001 | 2.417 | 0.001 | Disregard | 0.001 | 2.579 | 0.001 | Disregard | Disregard |
| 36 | 0.001 | 2.160 |       |           | 0.001 | 2.266 |       |           |           |
| 37 | 0.001 | 2.187 | 0.001 | Disregard | 0.001 | 2.347 | 0.001 | Disregard | Disregard |
| 38 | 0.001 | 2.098 |       |           | 0.001 | 2.309 |       |           |           |
| 39 | 0.001 | 2.413 | 0.001 | Disregard | 0.001 | 2.553 | 0.001 | Disregard | Disregard |
| 40 | 0.001 | 2.207 |       |           | 0.001 | 2.369 |       |           |           |

*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.*

| Power and THD results |                    |                    |              |
|-----------------------|--------------------|--------------------|--------------|
| Active Power (P)      | Reactive Power (Q) | Apparent Power (S) | Power Factor |
| 6.792 W               | -7.490 var         | 10.11 VA           | 0.6717       |
| Vrms                  | Crest Factor (U)   | THD (U)            |              |
| 229.7 V               | 1.414              | 473.8e-6           |              |
| Irms                  | Crest Factor (I)   | THD (I)            |              |
| 47.61 mA              | 1.844              | 0.3857             |              |

**Voltage Source Verification**

| Harmonic voltage results |          |          |           |        |
|--------------------------|----------|----------|-----------|--------|
| Hn                       | Ueff [V] | Ueff [%] | Limit [%] | Result |
| 1                        | 229.692  | 99.866   |           |        |
| 2                        | 0.036    | 0.016    | 0.200     | PASS   |
| 3                        | 0.102    | 0.044    | 0.900     | PASS   |
| 4                        | 0.017    | 0.007    | 0.200     | PASS   |
| 5                        | 0.018    | 0.008    | 0.400     | PASS   |
| 6                        | 0.010    | 0.004    | 0.200     | PASS   |
| 7                        | 0.020    | 0.009    | 0.300     | PASS   |
| 8                        | 0.006    | 0.003    | 0.200     | PASS   |
| 9                        | 0.016    | 0.007    | 0.200     | PASS   |
| 10                       | 0.006    | 0.003    | 0.200     | PASS   |
| 11                       | 0.014    | 0.006    | 0.100     | PASS   |
| 12                       | 0.010    | 0.004    | 0.100     | PASS   |





**Harmonic Current Emission, dimmed, 2 LEDs**

|    |       |       |       |      |
|----|-------|-------|-------|------|
| 13 | 0.014 | 0.006 | 0.100 | PASS |
| 14 | 0.008 | 0.003 | 0.100 | PASS |
| 15 | 0.010 | 0.005 | 0.100 | PASS |
| 16 | 0.009 | 0.004 | 0.100 | PASS |
| 17 | 0.006 | 0.003 | 0.100 | PASS |
| 18 | 0.007 | 0.003 | 0.100 | PASS |
| 19 | 0.011 | 0.005 | 0.100 | PASS |
| 20 | 0.011 | 0.005 | 0.100 | PASS |
| 21 | 0.010 | 0.004 | 0.100 | PASS |
| 22 | 0.008 | 0.003 | 0.100 | PASS |
| 23 | 0.006 | 0.003 | 0.100 | PASS |
| 24 | 0.006 | 0.003 | 0.100 | PASS |
| 25 | 0.008 | 0.004 | 0.100 | PASS |
| 26 | 0.012 | 0.005 | 0.100 | PASS |
| 27 | 0.008 | 0.003 | 0.100 | PASS |
| 28 | 0.009 | 0.004 | 0.100 | PASS |
| 29 | 0.007 | 0.003 | 0.100 | PASS |
| 30 | 0.006 | 0.003 | 0.100 | PASS |
| 31 | 0.007 | 0.003 | 0.100 | PASS |
| 32 | 0.007 | 0.003 | 0.100 | PASS |
| 33 | 0.006 | 0.003 | 0.100 | PASS |
| 34 | 0.007 | 0.003 | 0.100 | PASS |
| 35 | 0.007 | 0.003 | 0.100 | PASS |
| 36 | 0.005 | 0.002 | 0.100 | PASS |
| 37 | 0.007 | 0.003 | 0.100 | PASS |
| 38 | 0.005 | 0.002 | 0.100 | PASS |
| 39 | 0.006 | 0.002 | 0.100 | PASS |
| 40 | 0.006 | 0.003 | 0.100 | PASS |



**Test No. 4 Transmitter unwanted emissions in the spurious domain – Sub Cl. 4.3.2.9**

EUT : LED Stehleuchte JSL-PURE, 1 Kopf  
Port : Enclosure  
Basic Standard : ETSI EN 300 328  
Standard Limits : In accordance with standard  
Temperature : 19 to 23 °C  
Relative Humidity : 30 to 50 %  
Atmospheric Pressure : 950 to 1030 hPa  
Operating mode : Unmodulated carrier  
Antenna polarisation : Vertical / Horizontal

**SUB-CLAUSE 4.3.2.9.3 LIMITS (Table 12)**

|             | 47.0 to 74 MHz<br>87.5 to 118 MHz<br>174.0 to 230 MHz<br>470.0 to 862 MHz | Other Frequen-<br>cies between<br>30 to 1000 MHz | Above<br>1000 MHz | <b>Result</b> |
|-------------|---|--|-------------------|---------------|
| Limit (dBm) | -54.0   | -36.0  | -30.0             | Complied      |

**Measurement Uncertainty**

See page 12, § 4.1.1

**Test equipment used**

No. 01.1, 02, 05, 08, 09, 16.1, 26.1, 152, 153, 154, 154.1, see Appendix 1 for full details of test equipment.

**Comments, Test methods**

A detailed description of the test methods used can be found in Appendix 2 of this report.

**Result**

See measurement diagrams on the next pages.

The EUT complied with the specification limit.

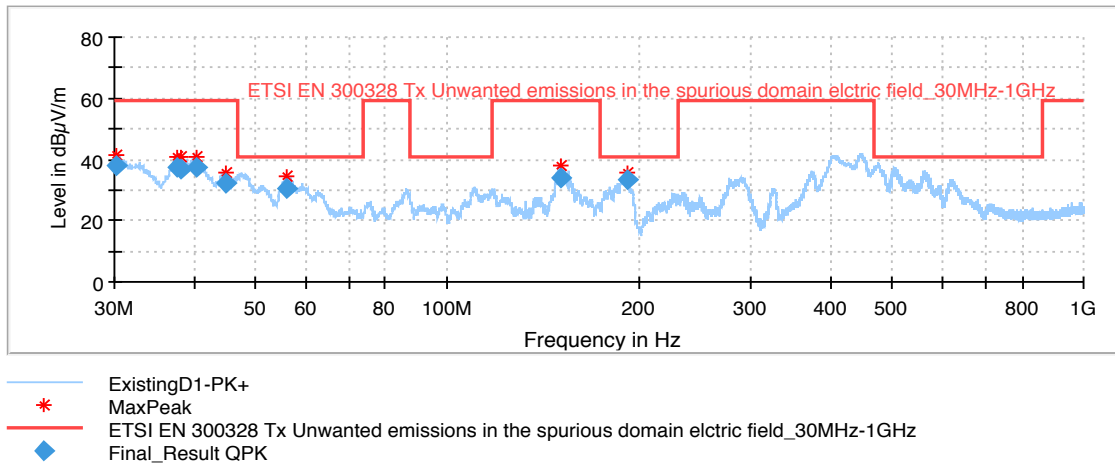


**Transmitter Unwanted Emissions in the Spurious Domain below 1 GHz**



**Common Information**

Customer: Aafag AG, 8451 Kleinandelfingen / Switzerland  
 E.U.T.: LED Stehleuchte JSL-PURE, 1 Kopf  
 Operating Conditions: Normal operation, charging cable with Iphone 6  
 Comment: BLE Radio active  
 Standard: ETSI EN 300328 Tx Unwanted emission in the spurious domain  
 Antenna location: Distance 3 m  
 Test facility: SAC3  
 Engineer: Max Hunziker  
 Project ID: EMCK3700



**Final Result**

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|--------------------|----------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 30.150000       | 38.11              | 59.00          | 20.89       | 1000.0          | 120.000         | 100.0       | V   | 0.0           | 18.9       |
| 37.590000       | 37.17              | 59.00          | 21.83       | 1000.0          | 120.000         | 100.0       | V   | 0.0           | 15.4       |
| 38.100000       | 36.75              | 59.00          | 22.25       | 1000.0          | 120.000         | 100.0       | V   | 0.0           | 15.2       |
| 40.350000       | 37.30              | 59.00          | 21.70       | 1000.0          | 120.000         | 100.0       | V   | 0.0           | 14.1       |
| 44.820000       | 32.06              | 59.00          | 26.94       | 1000.0          | 120.000         | 100.0       | V   | 0.0           | 11.9       |
| 55.950000       | 30.66              | 41.00          | 10.34       | 1000.0          | 120.000         | 100.0       | V   | 0.0           | 7.9        |
| 150.540000      | 33.77              | 59.00          | 25.23       | 1000.0          | 120.000         | 100.0       | V   | 0.0           | 20.0       |
| 191.520000      | 33.12              | 41.00          | 7.88        | 1000.0          | 120.000         | 100.0       | V   | 0.0           | 13.3       |

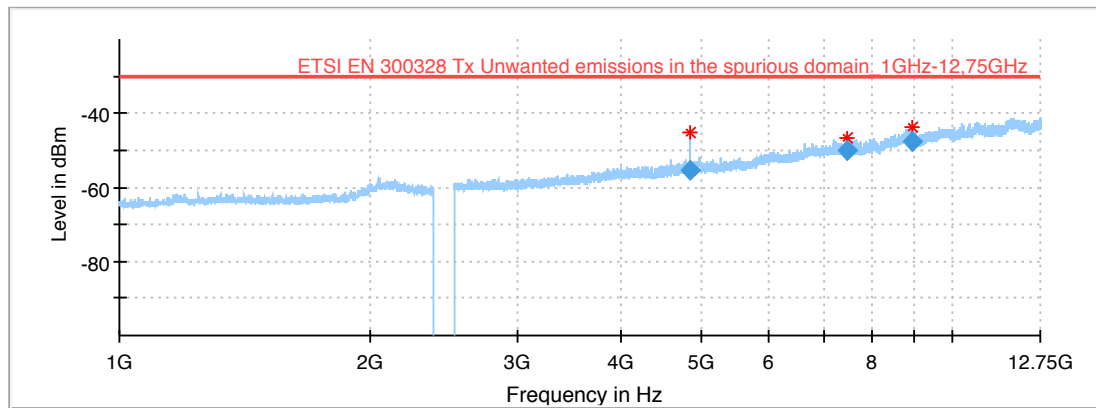


**Transmitter Unwanted Emissions in the Spurious Domain 1.0 to 12.75 GHz**



**Common Information**

Customer: Aafag AG, 8451 Kleinandelfingen / Switzerland  
 E.U.T.: LED Stehleuchte JSL-PURE, 1 Kopf  
 Operating Conditions: Normal operation, charging cable with Iphone 6  
 Comment: BLE Radio active  
 Standard: ETSI EN 300328 Tx Unwanted emission in the spurious domain  
 Antenna location: Distance 3 m  
 Test facility: SAC3  
 Engineer: Max Hunziker  
 Project ID: EMCK3700



— Preview Result 1-PK+  
 — ETSI EN 300328 Tx Unwanted emissions in the spurious domain\_1GHz-12,75GHz  
 \* MaxPeak-PK+  
 ◆ Final\_Result PK+

**Final Result**

| Frequency (MHz) | MaxPeak (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|---------------|-------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 4851.750000     | -55.54        | -30.00      | 25.54       | 15.0            | 1000.000        | 200.0       | V   | 90.0          | -80.2      |
| 7465.250000     | -50.24        | -30.00      | 20.24       | 15.0            | 1000.000        | 200.0       | V   | 90.0          | -74.7      |
| 8939.250000     | -47.63        | -30.00      | 17.63       | 15.0            | 1000.000        | 200.0       | V   | 90.0          | -72.7      |



## 4.2 Immunity Test

### Test No. 5 Electrostatic Discharge

EUT : LED Stehleuchte JSL-PURE, 1 Kopf  
Port : Enclosure  
Standard Test Level : IEC 61547  
ETSI 301 489-01 / -17  
Basic Standard : EN 61000-4-2  
Required Performance Crit. : B  
Standard Levels : 4 kV Contact discharge / 8 kV Air discharge  
Test execution : 10 discharges with each polarity, 1 s intervals  
Temperature : 19 to 23 °C  
Relative Humidity : 30 to 50 %  
Atmospheric Pressure : 950 to 1030 hPa

| Type of discharge        | Test Voltage [kV] | E.U.T. performance criterion | Result   |
|--------------------------|-------------------|------------------------------|----------|
| Direct contact discharge | ±2, ±4, ±6, ±8    | A                            | Complied |
| Indirect contact H/V CP  | ±2, ±4, ±6, ±8    | A                            | Complied |
| Air discharge            | ±2, ±4, ±8        | A                            | Complied |

### Measurement Uncertainty

See page 12, § 4.1.1

### Test equipment used

No. 100, 100.1, see Appendix 1 for full details of test equipment

### Comments, Test methods

A detailed description of the test methods used can be found in Appendix 2 of this report.

### Result

The EUT complied with the specification levels.



**Test No. 6 Radio Frequency Electromagnetic Field**

EUT : LED Stehleuchte JSL-PURE, 1 Kopf  
Port : Enclosure  
Standard Test Level : IEC 61547  
ETSI 301 489-01 / -17  
Basic Standard : EN 61000-4-3  
Required Performance Crit. : A  
Standard Levels : 80 MHz - 6 GHz: 3 V/m (unmodulated level), Modulation: AM 80 %, 1 kHz  
Sweep rate : 1.01 f<sub>0</sub> / second, step duration 1000 ms  
Temperature : 19 to 23 °C  
Relative Humidity : 30 to 50 %  
Atmospheric Pressure : 950 to 1030 hPa

| Frequency [MHz] | Pol. [V / H] | Level [V / m]   | Comment             | EUT performance criterion | Result   |
|-----------------|--------------|-----------------|---------------------|---------------------------|----------|
| 80 - 6000       | V / H        | 10 <sup>1</sup> | Mod. AM 80 %, 1 kHz | A                         | Complied |

**Remark:** <sup>1</sup>Customer requirement: Higher level

**Measurement Uncertainty**

See page 12, §4.1.1

**Test equipment used**

No. 08, 16.1, 26.1, 41, 45.1, 54, 55.1, 56, 77, 78, 134, 134.3, 147.3, 152, 153, 154, 154.1, see Appendix 1 for full details of test equipment

**Comments, Test methods**

A detailed description of the test methods used can be found in Appendix 2 of this report.

**Result**

The EUT complied with the specification level.



**Test No. 7 Burst / Fast transients**

EUT : LED Stehleuchte JSL-PURE, 1 Kopf  
Port : Input AC power port  
Standard Test Level : IEC 61547  
ETSI 301 489-01 / -17  
Basic Standard : EN 61000-4-4  
Required Performance Crit. : B  
Standard Levels : 1.0 kV at 5 kHz  
Test execution : Common mode coupling, 1 minute each polarity  
Temperature : 19 to 23 °C  
Relative Humidity : 30 to 50 %  
Atmospheric Pressure : 950 to 1030 hPa

| Port                | Severity Level [kV] | Decoupling arrangement | Frequency [kHz] | E.U.T. performance criterion | Result      |
|---------------------|---------------------|------------------------|-----------------|------------------------------|-------------|
| Input AC power port | ±3.0 <sup>1</sup>   | CDN NX5                | 5               | A <sup>2</sup>               | Complied    |
| Input AC power port | ±2.0                | CDN NX5                | 100             | B                            | Informative |

**Remark:** <sup>1</sup>Customer requirement: Higher level

<sup>2</sup>New firmware on EUT

**Measurement Uncertainty**

See page 12, §4.1.1

**Test equipment used**

No. 74, see Appendix 1 for full details of test equipment

**Comments, Test methods**

A detailed description of the test methods used can be found in Appendix 2 of this report.

**Result**

The EUT complied with the specification level.



**Test No. 8 Surge**

EUT : LED Stehleuchte JSL-PURE, 1 Kopf  
Port : Input AC power port  
Standard Test Level : IEC 61547  
ETSI 301 489-01 / -17  
Basic Standard : EN 61000-4-5  
Required Performance Crit. : C  
Standard Limit : 2 kV, 1 kV  
Test execution : 5 positive and 5 negative pulses  
Temperature : 19 to 23 °C  
Relative Humidity : 30 to 50 %  
Atmospheric Pressure : 950 to 1030 hPa

| Port                | Severity Level [kV] | Line       | Internal imp. [ $\Omega$ ] | E.U.T. performance criterion | Result   |
|---------------------|---------------------|------------|----------------------------|------------------------------|----------|
| Input AC power port | $\pm 1.0, \pm 2.0$  | L, N to PE | 12                         | A                            | Complied |
| Input AC power port | $\pm 0.5, \pm 1.0$  | L to N     | 2                          | A                            | Complied |

**Measurement Uncertainty**

See page 12, §4.1.1

**Test equipment used**

No. 74, see Appendix 1 for full details of test equipment

**Comments, Test methods**

A detailed description of the test methods used can be found in Appendix 2 of this report.

**Result**

The EUT complied with the specification levels.





**Test No. 9 Conducted disturbances, induced by radio frequency fields**

EUT : LED Stehleuchte JSL-PURE, 1 Kopf  
Port : Input AC power port  
Standard Test Level : IEC 61547  
ETSI 301 489-01 / -17  
Basic Standard : EN 61000-4-6  
Required Performance Crit. : A  
Standard Limit :  $3 V_{rms}$  (unmodulated), Modulation: AM 80 %, 1 kHz  
Sweep rate :  $1.01 f_0$ , step duration 1000 ms  
Temperature : 19 to 23 °C  
Relative Humidity : 30 to 50 %  
Atmospheric Pressure : 950 to 1030 hPa

| Port                | Frequency [MHz] | Level [ $V_{rms}$ ] | Coupling arrangement | Decoupling arrangement | E.U.T. performance criterion | Result   |
|---------------------|-----------------|---------------------|----------------------|------------------------|------------------------------|----------|
| Input AC power port | 0.150 - 80      | $10^1$              | CDN-M3               | ---                    | A                            | Complied |

**Remark:** <sup>1</sup>Customer requirement: Higher level

**Measurement Uncertainty**

See page 12, §4.1.1

**Test equipment used**

No. 04, 41, 43, 50, 110, 132, 135, 147, 147.1, 147.2, see Appendix 1 for full details of test equipment

**Comments, Test methods**

A detailed description of the test methods used can be found in Appendix 2 of this report.

**Result**

The EUT complied with the specification level.



### Test No. 10 Voltage Variations, Dips and Interruptions

EUT : LED Stehleuchte JSL-PURE, 1 Kopf  
Port : Input AC power port  
Standard Test Level : IEC 61547  
ETSI 301 489-01 / -17  
Basic Standard : EN 61000-4-11  
Required Performance Crit. : B  
Standard Limit : See table below  
Test execution : 3 events with 10 s interval at 0° angle  
Temperature : 19 to 23 °C  
Relative Humidity : 30 to 50 %  
Atmospheric Pressure : 950 to 1030 hPa

| Voltage variation    | Cycles | E.U.T. performance criterion | Result      |
|----------------------|--------|------------------------------|-------------|
| Residual voltage 0%  | 0.5    | A                            | Complied    |
| Residual voltage 0%  | 1      | A                            | Informative |
| Residual voltage 70% | 10     | A                            | Complied    |
| Residual voltage 70% | 25     | A                            | Informative |
| Residual voltage 0%  | 250    | C <sup>1</sup>               | Informative |

**Remark:** <sup>1</sup>EUT switches off and remains in standby after restart.

#### Measurement Uncertainty

See page 12, §4.1.1

#### Test equipment used

No. 104.1, 104.2, see Appendix 1 for full details of test equipment

#### Comments, Test methods

A detailed description of the test methods used can be found in Appendix 2 of this report.

#### Result

The EUT complied with the specification levels.



**APPENDIX 1 TEST EQUIPMENT USED, INSTRUMENTATION**

| No.  | Equipment                              | Manufacturer                | Type:                     | Serial No.      |
|------|--|-----------------------------|---------------------------|-----------------|
| 01   | Emission Software (SAC10)              | R&S                         | EMC32-EB                  | 100697          |
| 01.1 | Emission Software (SAC3)               | R&S                         | EMC32-MEB                 | 100319          |
| 02   | EMI Test Receiver                      | R&S                         | ESIB40                    | 831564/004      |
| 03   | EMI Test Receiver                      | R&S                         | ESIB7                     | 100206          |
| 03.1 | EMI Test Receiver                      | R&S                         | ESR                       | 101145          |
| 03.2 | Vector Network Analyzer                | R&S                         | ZVRE                      | 846572/005      |
| 03.3 | EMI Test Receiver                      | R&S                         | ESW8                      | 100940          |
| 04   | Notebook with GPIB - Interface         | HP                          | 6730b                     | ---             |
| 05   | Preamplifier                           | Teseq                       | LNA 6018                  | 71746           |
| 08   | PC with GPIB - Interface               | HP Compaq                   | dx5150ut                  | SCZC6172DMC     |
| 09   | Isolation Transformer                  | Electro-Metrics             | ISF - 18                  | 130             |
| 10   | Impulse Generator                      | Electro-Metrics             | CIG - 25,90dB $\mu$ V/MHz | 356             |
| 11   | Loop Antenna                           | Electro-Metrics             | ALP - 10                  | 184             |
| 13   | Loop Antenna                           | Electro-Metrics             | ALR - 30                  | 114             |
| 14   | Loop Antenna                           | R&S                         | HFH2-Z2                   | 301421/098      |
| 16   | Biconical Antenna                      | ETS-Lindgren                | 3109                      | 00118159        |
| 16.1 | Bilogical Antenna                      | A.H. Systems, inc.          | SAS-521-7                 | 164             |
| 17   | Rod Antenna                            | ISE-MICRO                   | R 1040                    | 11              |
| 18   | BiconiLog™ Antenna                     | EMCO                        | 3141                      | 1151            |
| 19   | Bilog Antenna                          | Schaffner                   | CBL6141A                  | 4261            |
| 20   | High Gain Log-Periodic Antenna         | R&S                         | HL046                     | 359952          |
| 21   | Broadband Doubled Ridged Guide Antenna | Schwarzbeck                 | BBHA 9120 E               | BBHA 9120 E 649 |
| 26   | Double Ridged Guide Antenna            | ETS-Lindgren                | 3115                      | 00102801        |
| 26.1 | Horn Antenna                           | Antenna Research Associates | MWH-1826B                 | 1037            |
| 27   | Pick up Coil                           | Tensor                      | 8604                      | 2006            |
| 28   | Loop Sensor Antenna                    | Electro-Metrics             | ELS-10                    | 165             |
| 29   | Clamp on Current Probe                 | Electro-Metrics             | PCL-10/11                 | 1004            |
| 30   | Clamp on Current Probe                 | Electro-Metrics             | PCL- 25/30                | 1020            |
| 32   | T2 - LISNTelecom                       | R&S                         | ESH3-Z4                   | 837166/011      |
| 33   | T4 - LISNTelecom                       | R&S                         | EZ-10                     | 843074/013      |
| 34   | Absorbing Clamp                        | Lüthi                       | MDS - 21                  | 890683/012      |
| 35   | Loop Antenna, 2 m EN 55015             | EMCT                        | ALR01                     | 001             |
| 37   | Nexus amplifier                        | B&K                         | 2690                      | 2069840         |
| 38   | Microphone                             | B&K                         | 2669                      | 2082393         |
| 39   | Calibrator                             | B&K                         | 4321                      | 2415884         |
| 40   | Arbitrary Waveform Generator           | Pragmatic                   | 2416A                     | 820013          |
| 41   | Susceptibility Software (SAC3)         | R&S                         | EMC32-S                   | 100338          |
| 41.1 | Susceptibility Software (SAC10)        | R&S                         | EMC32-S                   | 100337          |
| 42   | Signal Generator                       | R&S                         | SME 03                    | 837175/002      |
| 42.1 | Signal Generator                       | R&S                         | SMG                       | 883318/039      |
| 43   | Signal Generator                       | R&S                         | SMB100A                   | 107543          |
| 44   | Audio-Signal Generator                 | R&S                         | APN06                     | 832373/009      |
| 45   | Broadband Power Amplifier              | PRANA                       | DP1300DC                  | 2034            |
| 45.1 | Broadband Power Amplifier              | PRANA                       | MT1200DC                  | 1511-1769       |
| 46   | Wideband Amplifier                     | Bonn                        | BLWA 0810-200/100         | 1419524         |
| 48   | Broadband Amplifier                    | AR                          | 100 W1000M1               | 17318           |
| 48.1 | Broadband Amplifier                    | AR                          | 250A250A                  | 0326423         |
| 50   | Broadband Amplifier                    | AR                          | 75A400                    | 322235          |
| 51   | Audio Amplifier                        | AR                          | 350AH1                    | 033159          |
| 54   | Microwave Synthesizer                  | Anritsu                     | MG3694A                   | 033201          |
| 55   | Microwave Power Amplifier              | AR                          | 15S1G3                    | 300038          |
| 55.1 | RF Power Amplifier                     | OPHIR                       | 5038                      | 1007            |
| 56   | Microwave TWT Amplifier                | AR                          | 300T2G8M13                | 334602          |
| 58   | Microwave TWT Amplifier                | CPI                         | VZM-6991K3                | 7618            |
| 59   | Microwave Amplifier                    | HP                          | 8349A                     | 2512A00774      |
| 60   | E-Field Antenna                        | EMC-Testcenter AG           | EFG_IC100M                | 2017-001        |
| 61   | Tenuline Coaxial Attenuator            | Bird                        | 8327-300                  | 418             |
| 63   | Double Ridged Guide Antenna            | EMCO                        | 3106                      | 2315            |
| 64   | Audio Isolation Transformer            | Solar                       | 6220-4                    | Inv. No. 141    |
| 65   | Audio Isolation Transformer            | Solar                       | 6220-1A                   | CZ4915001       |
| 66   | Audio Isolation Transformer            | Solar                       | 6220-1A                   | Inv. No. 451    |
| 68   | Magnetic Field Generating Coil         | Tensor                      | 7404                      | 2000            |
| 69   | Strip Line Antenna 50 $\Omega$         | Schaffner                   | SL 50                     | 21610           |
| 70   | Magnetic Field Generating Coil         | Contraves                   | CZ                        | 1               |
| 71   | Magnetic Coil, Helmholtz, 49 turns     | ETC                         | 1x1                       | 0001            |



**APPENDIX 1 TEST EQUIPMENT USED, INSTRUMENTATION**

|       |  |                               |                          |              |
|-------|--|-------------------------------|--------------------------|--------------|
| 72    | Magnetic Coil, Helmholtz, 1 turn           | ETC                           | 1x1                      | 0001         |
| 74    | Compact NX Generator                       | EM TEST (Switzerland) GmbH    | NX5-bsp-1-300-32         | P1728201326  |
| 75    | Surge / Burst 3-Phase CDN, 32 A            | EM TEST (Switzerland) GmbH    | Coupling NX5 BS-3-480-32 | P1737203101  |
| 77    | E-Field Probe 2 MHz - 18 GHz               | AR                            | FL7218                   | 0348537      |
| 78    | Laser Probe Interface                      | AR                            | FI7000                   | 0349644      |
| 79    | EM Radiation Meter                         | W&G                           | EMR-200                  | M-0094       |
| 80    | 3D E-Field Analyzer                        | LUMILOOP GmbH                 | CI-250 1v2 / LSProbe 1.2 | 12 / 57      |
| 81.1  | E-Field Sensor, isotropic                  | Narda                         | TYP-8.2                  | L-0004       |
| 82    | E-Field Sensor, isotropic                  | Narda                         | TYP-11.2                 | D-0014       |
| 83    | Coupling / Decoupling Network              | Schaffner                     | CDN 133-153              | 34367        |
| 84    | Coupling Capacitor 33 nF                   | Contraves                     | CC33                     | 0001         |
| 85    | Signal/data line coupling network 40 Ω     | Schaffner                     | INA 110-40               | 9120         |
| 86    | Control Software                           | Schaffner                     | WIN 2050 V 6.0           | ---          |
| 87    | Signal line coupling network               | Schaffner                     | CDN 117                  | 20203        |
| 88    | Signal/data line coupling network 4x 100 Ω | Schaffner                     | INA 172                  | 485          |
| 89    | High Energy Pulse Generator                | Schaffner                     | NSG 2050                 | 112          |
| 90    | Pulse Network                              | Schaffner                     | PNW 2055                 | 106          |
| 91    | Pulse Network                              | Schaffner                     | PNW 2050                 | 284          |
| 92    | Pulse Network                              | Schaffner                     | PNW 2051                 | 105          |
| 93    | Signal/data line coupling network          | Schaffner                     | CDN 118                  | 124          |
| 94    | Pulse Network                              | Schaffner                     | PNW 2225                 | 200212-0075C |
| 95    | Decoupling Clamps 7x                       | EMCT                          | DC1                      | 001 ... 006  |
| 96    | Decoupling Clamp                           | R&S                           | MDS 21                   | 800 683/812  |
| 96.1  | Absorbing Clamp                            | LÜTHI                         | MDS 21                   | ---          |
| 97    | Electromagnetic Clamp                      | TESEQ                         | KEMZ 801                 | 31488        |
| 97.1  | Electromagnetic Clamp                      | LÜTHI                         | EM100                    | ---          |
| 98    | Decoupling Clamp CMAD LÜTHI                | EM Test Switzerland GmbH      | FTC 40X15E               | P1549168460  |
| 99    | Decoupling Clamp CMAD LÜTHI                | EM Test Switzerland GmbH      | FTC 40X15E               | P1549168461  |
| 100   | ESD - Simulator                            | Schaffner                     | NSG 438                  | 328          |
| 100.1 | Discharge Network                          | Schaffner                     | INA 4380                 | 0412         |
| 100.2 | Discharge Network                          | Schaffner                     | INA 4381                 | 0416         |
| 100.3 | Discharge Network                          | Schaffner                     | INA 4382                 | 0418         |
| 102   | Capacitive Coupling Clamp                  | Contraves                     | CZ                       | 0001         |
| 103   | Transient Pulse Generator                  | Solar                         | Model 8282-1             | 839979       |
| 103.1 | H. V. Transient Pulse Transformer 15kV     | Solar                         | 7115-2                   | Inv. No. 371 |
| 104.1 | 3 Phase AC Power Source                    | Pacific Power Source.         | 3120AMXT-UPC32           | 0221 / 0225  |
| 104.2 | Control Software                           | Pacific Power Source          | UPCSUITE                 | Version 1.01 |
| 106   | Ref. Impedance Network                     | Voltech                       | PM3000A                  | AH11/9669    |
| 107   | 3 Line Power Analyzer                      | EM Test                       | DPA 503                  | V0540100764  |
| 107.1 | Control Software                           | EM Test                       | ISMDPA, V 5.2.0.0        | ---          |
| 108   | Audio Isolation Transformer (2x)           | Solar                         | 6220-1A                  | CZ4915001    |
| 110   | Current Probe                              | Solar                         | 9123-1N                  | 021540       |
| 111   | CDN-D-Sub D-25                             | Fischer Custom Communications | FCC-801-S25              | 81           |
| 112   | Auto Transformer Variac                    | PD                            | 242252900007             | ---          |
| 113   | CDN-USB 4 shielded lines                   | EM Test Switzerland           | CDN S4 USB               | P1315117415  |
| 114   | CDN-RJ45 8 shielded lines                  | EM Test Switzerland           | CDN S8 RJ45              | P1345125803  |
| 114.1 | CDN-RJ45 8 unshielded lines                | TESEQ                         | ISN T8-Cat6              | 27256        |
| 115   | LISN (5 μH / 100 A), 1 Line                | R&S                           | ESH3-Z6                  | 837166/009   |
| 115.1 | LISN (5 μH / 100 A), 1 Line                | R&S                           | ESH3-Z6                  | 100495       |
| 116   | LISN (5 μH / 100 A), 1 Line                | R&S                           | ESH3-Z6                  | 837166/011   |
| 116.1 | LISN (5 μH / 100 A), 1 Line                | R&S                           | ESH3-Z6                  | 100507       |
| 117   | LISN (50 μH / 1 6 A), 2 Lines              | R&S                           | ENV216                   | 101649       |
| 117.1 | LISN (50 μH / 16 A), 2 Lines               | R&S                           | ENV216                   | 101650       |
| 118   | LISN (50 μH), 4 Lines                      | R&S                           | ESH2-Z5                  | 100420       |
| 118.1 | Attenuator with Pulse Limiter (10 dB)      | R&S                           | 0357.8810.54             | 101670-Zh    |
| 119   | LISN (4 x 200 A)                           | R. Heine HFT                  | NNB-4/200                | 96-001       |
| 119.1 | AAN (150 A DC)                             | BFH-TI Burgdorf               | 150A-5                   | ---          |
| 120   | T2 - LISN                                  | R&S                           | ESH3-Z4                  | 837166/011   |
| 121   | T4 - LISN                                  | R&S                           | EZ-10                    | 843074/013   |
| 122   | Coupling / Decoupling Network              | EMCT                          | CDN-M1 / -M2 / -M3       | 001 ... 003  |
| 122.1 | Coupling / Decoupling Network              | EMCT                          | CDN-M5                   | 001          |
| 123   | Current Injection Probe                    | Solar                         | 9108-1N                  | 943035       |
| 124   | Bulk Current Injection Probe               | Schaffner                     | CIP9136                  | 1093         |
| 125   | Detector, Fig. 4, EN 55011                 | CZ                            | PS01                     | 001          |
| 126   | High Voltage Transformer, 9 V / 2 kV       | Huber                         | T1X                      | 9900561      |
| 127   | Transient pulse generator                  | Solar                         | 9354-1                   | 019719       |



**APPENDIX 1 TEST EQUIPMENT USED, INSTRUMENTATION**

|       |                                      |                    |                    |                      |
|-------|--------------------------------------|--------------------|--------------------|----------------------|
| 129   | Terminator 50 Ω, 20 W                | NARDA              | 374BNM             | 7911                 |
| 130   | Attenuator 10 dB, 2W, DC - 40 GHz    | Anritsu            | 43KC-10            | 0505050              |
| 130.1 | Attenuator 20 dB, 2 W                | HP                 | 8491C              | 01133                |
| 130.2 | Attenuator 10 dB, 2 W                | HP                 | 8491C              | 01238                |
| 131   | Dual Directional Coupler, 2 kW       | Werlatone          | C1460              | 5194                 |
| 132   | Directional Coupler, 100 W           | Werlatone          | C1634              | 2379                 |
| 133   | Dual Directional Coupler, 100 W      | Werlatone          | C3945              | 5150                 |
| 134   | Directional Coupler, 300 W           | Narda              | 27000-30           | 0072                 |
| 134.1 | Directional Coupler, 25 W            | MAC Technology     | C4248-20           | 397001               |
| 134.2 | Dual Directional Coupler, 500 W      | Narda              | 3020A              | 39716                |
| 134.3 | Dual Directional Coupler, 1500 W     | AR                 | DC628AM1           | 0334883              |
| 135   | Attenuator 3 dB, 150 W               | Weinschel          | 40-3-34            | AA4781               |
| 136   | Attenuator 30 dB, 30 W               | HP                 | 8498A              | 1801A02707           |
| 137   | Attenuator 3 dB, 1000 W              | Weinschel          | SP-3-1             | 02                   |
| 138   | Attenuator 20 dB, 100 W              | Bird               | 8343-200           | 1003                 |
| 139.1 | Attenuator 10 dB, 30 W, BNC          | JFW                | 50FH-010-30        | ---                  |
| 139.2 | Attenuator 10 dB, 30 W, N            | JFW                | 50FH-010-30        | ---                  |
| 139.3 | Terminator, 30 W, BNC connector      | JFW                | 50T-056            | ---                  |
| 140   | Terminator 50 Ω, 3x                  | MTS                | AW-51-01           | ---                  |
| 141   | Digital Oscilloscope                 | Teledyne LeCroy    | WR610ZI            | 63045                |
| 142   | Differential Probe                   | LeCroy             | AP031              | 005780               |
| 143   | Current Probe                        | LeCroy             | AP015              | 0486                 |
| 143.1 | Arbitrary Waveform Generator         | LeCroy             | LW420A             | U3225                |
| 144   | Dual Channel Power Meter             | R&S                | NRVD               | 826558/007           |
| 145   | Thermal Power Sensor                 | R&S                | NRV-Z51            | 830801/018           |
| 146   | Thermal Power Sensor                 | R&S                | NRV-Z55            | 827282/006           |
| 147   | Dual Channel Power Meter             | R&S                | NRVD               | 833697/028           |
| 147.1 | Power Sensor                         | R&S                | NRV-Z4             | 832475/007           |
| 147.2 | Power Sensor                         | R&S                | URV5-Z4            | 835663/042           |
| 147.3 | Power Sensor                         | R&S                | NRP-Z91            | 102230               |
| 147.4 | Power Sensor                         | R&S                | NRP-Z91            | 102231               |
| 147.5 | Thermal Power Sensor                 | R&S                | NRP-Z51            | 104030               |
| 147.6 | Power Sensor                         | R&S                | NRP-Z91            | 100417               |
| 148   | Power Sensor                         | R&S                | NRV-Z2             | 8366312/013          |
| 149   | Multimeter/10-CH. Scanner            | Keithley           | 2000/2000-SCAN     | 62580                |
| 150   | Digital Multimeter                   | Keithley           | 195                | 197280               |
| 151   | Exposure Level Tester                | Narda              | ELT-400            | N-0479               |
| 151.1 | B-Field Probe                        | Narda              | 100 cm2            | M-0928               |
| 151.2 | Teslameter                           | Projekt Elektronik | FM 205             | 0910779022           |
| 152   | Antenna MiniMast (SAC3)              | EMCO               | 2075               | ---                  |
| 153   | Turntable (SAC3)                     | Maturo             | TT 1.2 SI          | TT1.2SI/353/10731112 |
| 154   | Multi-Device Controller, Mast (SAC3) | EMCO               | 2090               | ---                  |
| 154.1 | Controller, Turn Table (SAC3)        | Maturo             | MCU                | MCU/329/10731112     |
| 155   | H.V. Probe                           | PeakTech           | 40kV               | 69020743             |
| 156   | Digital Oscilloscope                 | LeCroy             | LT584 Waverunner   | 556                  |
| 157   | Digital Multimeter                   | Fluke              | 89 IV              | 75630550             |
| 158   | Digital Multimeter                   | Fluke              | 89 IV              | 76280661             |
| 159   | UCS (Pulse 1 ... 3)                  | EM TEST            | 200-M              | V0606 100108         |
| 160   | VDS (Pulse 4)                        | EM TEST            | 200B               | V0606 100109         |
| 161   | LD (Pulse 5)                         | EM TEST            | 200B               | V0606 100107         |
| 162   | Software ISMISO for Windows          | EM TEST            | Version 4.05       | ---                  |
| 163   | Automotive Clamp                     | Schaffner          | CDN 500            | 001                  |
| 164   | Safety tester                        | Q+S                | 3021LY             | 963794               |
| 165   | Climate chamber                      | HERARUS VÖTSCHE    | VUK 04/500         | 40 202               |
| 166   | HYGROLOG, Temp. and Humidity         | Rotronic AG        | NT3-D-CL           | 60216322             |
| 167   | Software HYGROLOG NT3-D-CL           | Rotronic AG        | HW4-E              | Edition V2.0.0       |
| 169   | Antenna Mast (SAC10)                 | Maturo             | AM 4.0             | AM4.0/167/10731112   |
| 170   | Turntable (SAC10)                    | Maturo             | TT 5.0-5t_d/30t_st | 352/10731112         |
| 171   | Controller (SAC10)                   | Maturo             | MCU                | MCU/328/10731112     |
| 172   | DC Power Source                      | ARGANTIX           | KDC80-62-FT-400-IF | 12533                |
| 173   | Control Software                     | ARGANTIX           | KDCGui-KDC80-187   | Rev. 1.0             |
| 174   | Preamplifier 18 GHz - 40 GHz         | A.H. Systems, inc. | PAM-1840VH         | 146                  |
| 175   | High Voltage Probe                   | Schwarzbeck        | TK 9421            | 288                  |



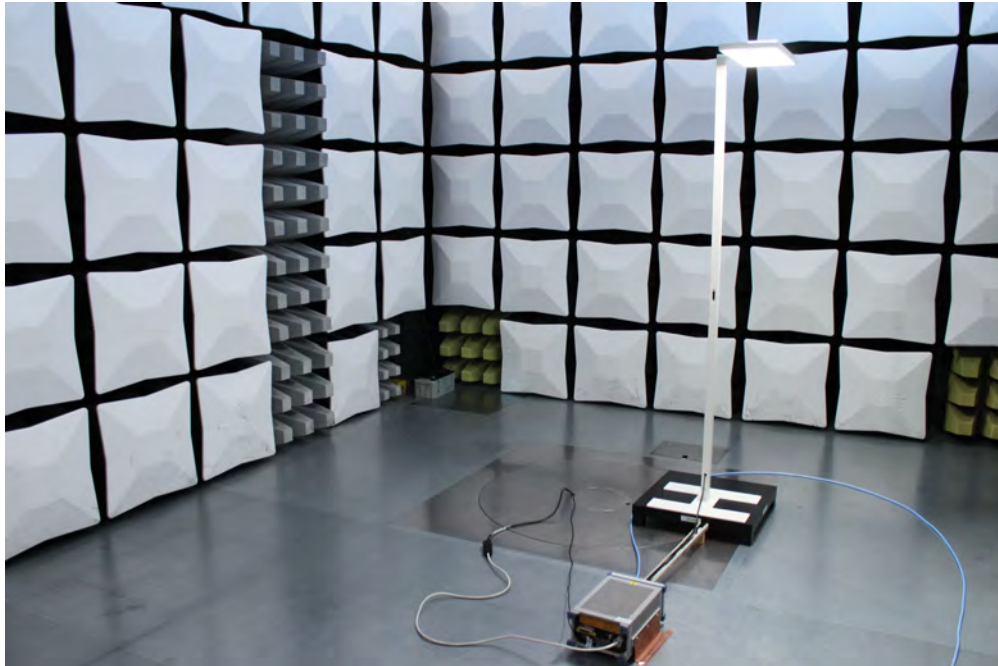


APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS

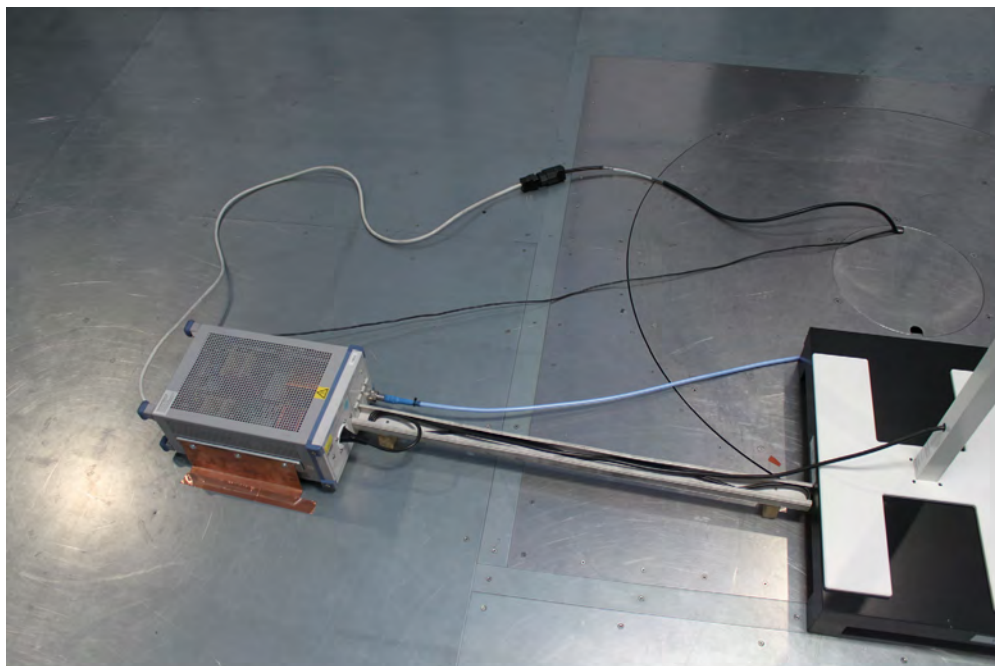
Test No. 1

Test configuration for measurement the conducted emission in accordance with CISPR 15 CISPR 32.

Test setup



Test setup



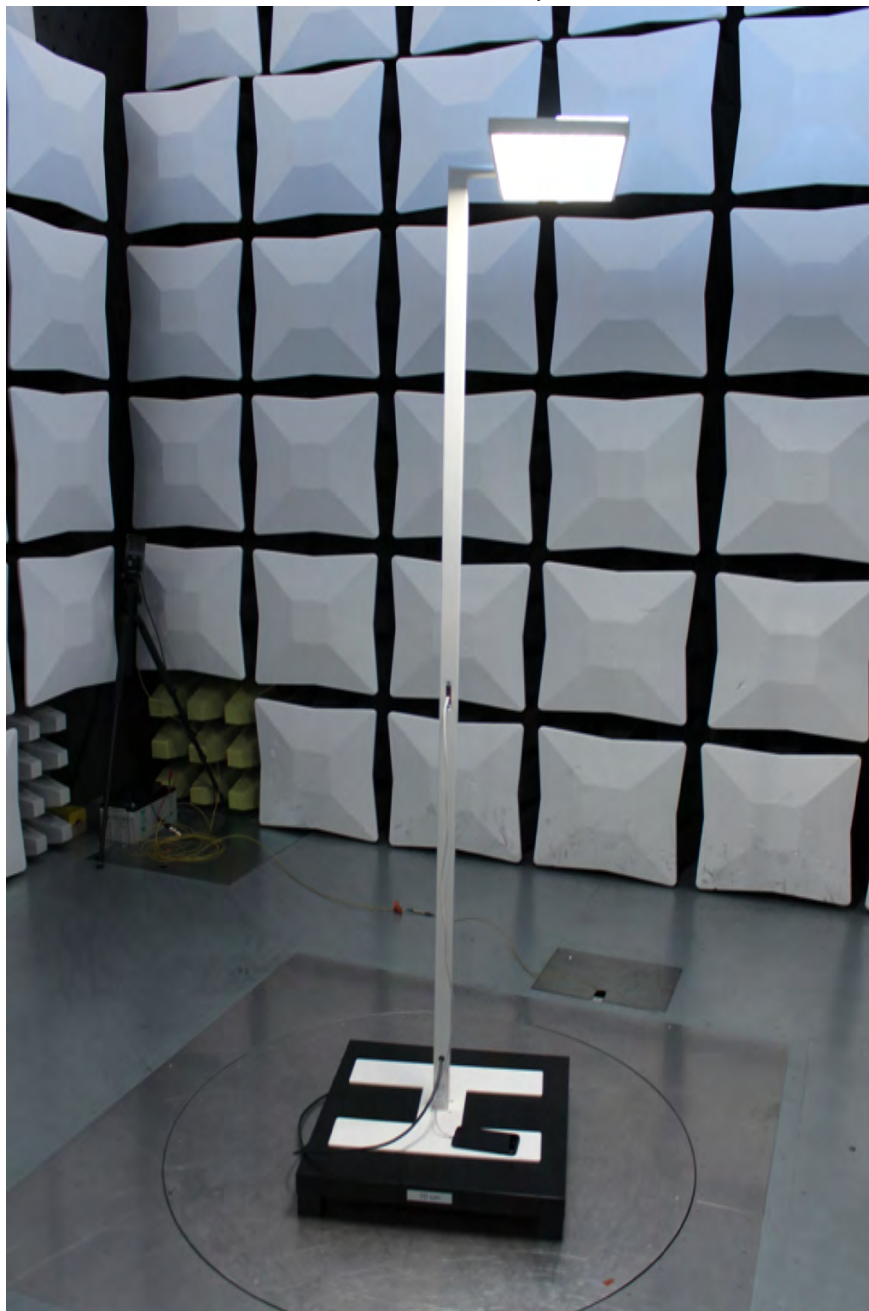


**APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS**

**Test No. 2 and 4**

Test configuration for the measurement of the radiated disturbance in accordance with CISPR 15 / CISPR 32 and of the Tx unwanted emission in the spurious domain below 1 GHz in accordance with ETSI EN 300 328.

Test setup





## APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS

### Test No. 2 and 4

Test configuration for the measurement of the radiated disturbance in accordance with CISPR 15 / CISPR 32 and of the Tx unwanted emission in the spurious domain below 1 GHz in accordance with ETSI EN 300 328.

Frequency range 80 to 1000 MHz, vertical polarisation



Frequency range 80 to 1000 MHz, horizontal polarisation







**APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS**

**Test No. 3**

Test configuration for measurement the harmonic current emission in accordance with EN 61000-3-2.

Test setup



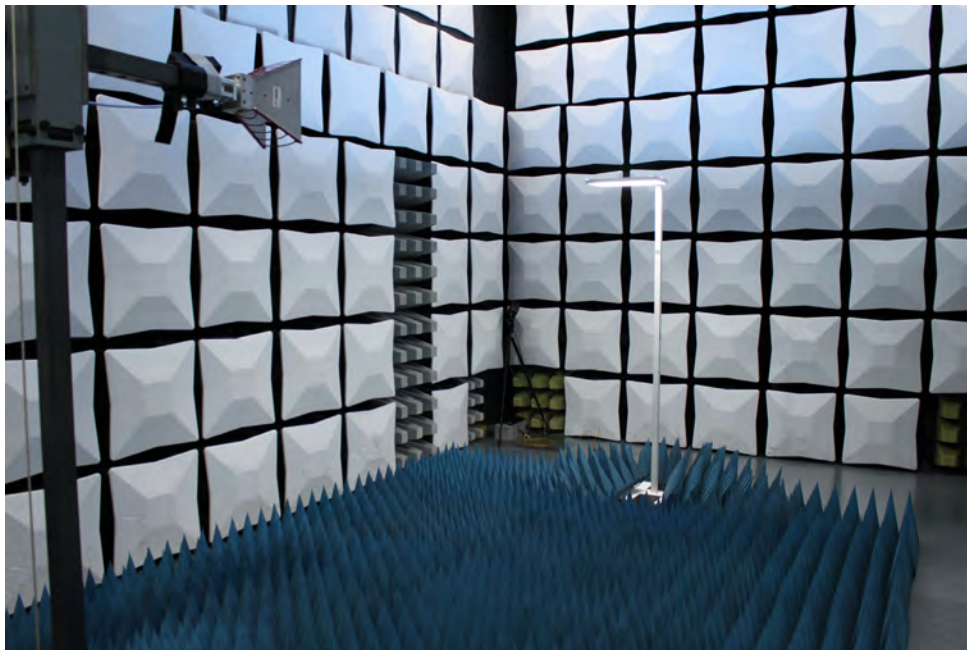


APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS

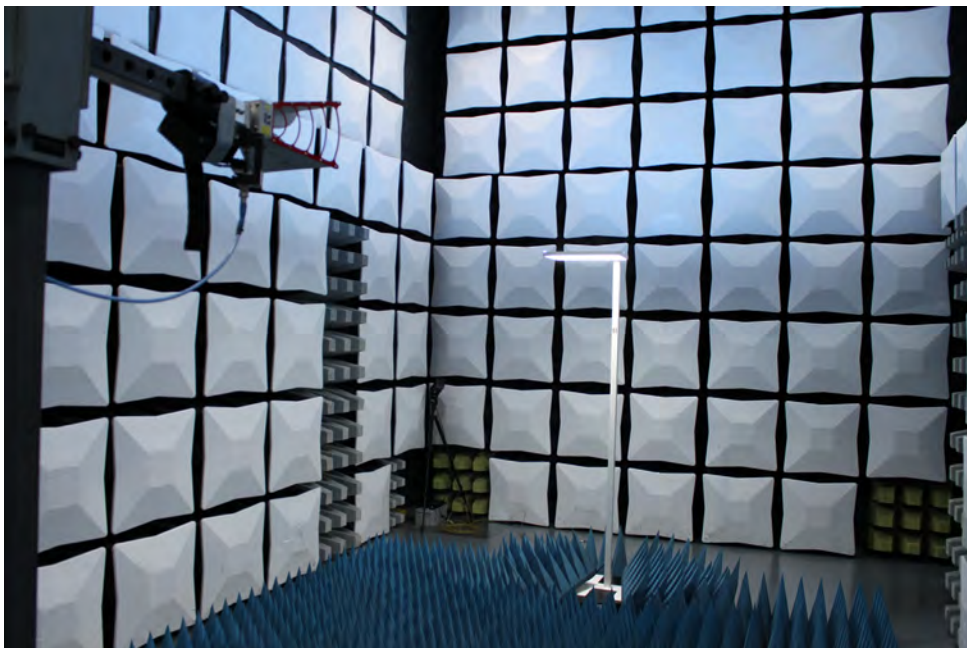
**Test No. 4**

Test configuration for the measurement of the Tx unwanted emission in the spurious domain above 1 GHz up to 12.75 GHz in accordance with ETSI EN 300 328.

Horizontal polarisation



Vertical polarisation





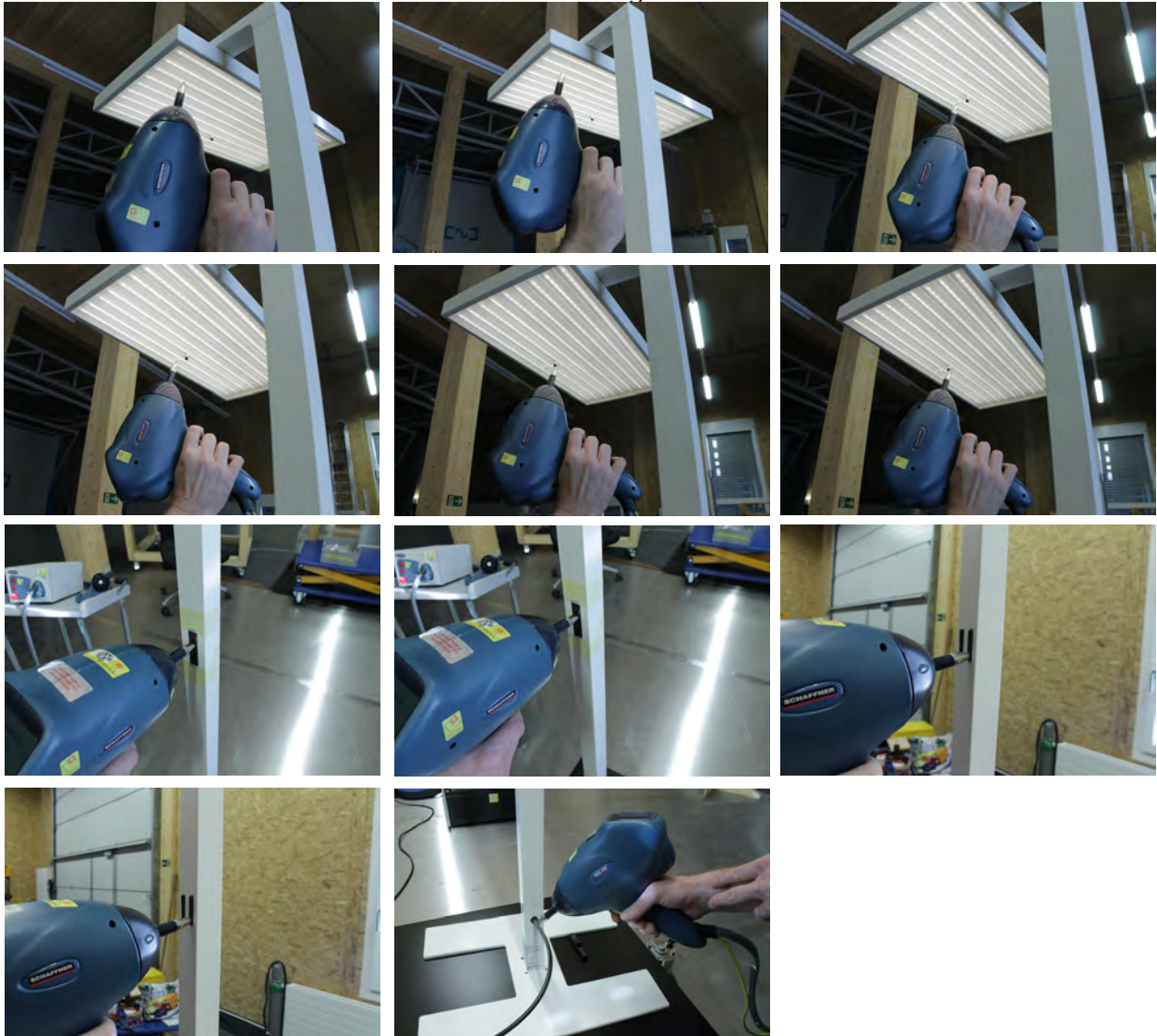
APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS

Test No. 5

Test configuration to verify the EUT's immunity to ESD in accordance with EN 61000-4-2 (IEC 61000-4-2) for floor standing equipment.

- All parts of E.U.T. which could be touched

Air discharge





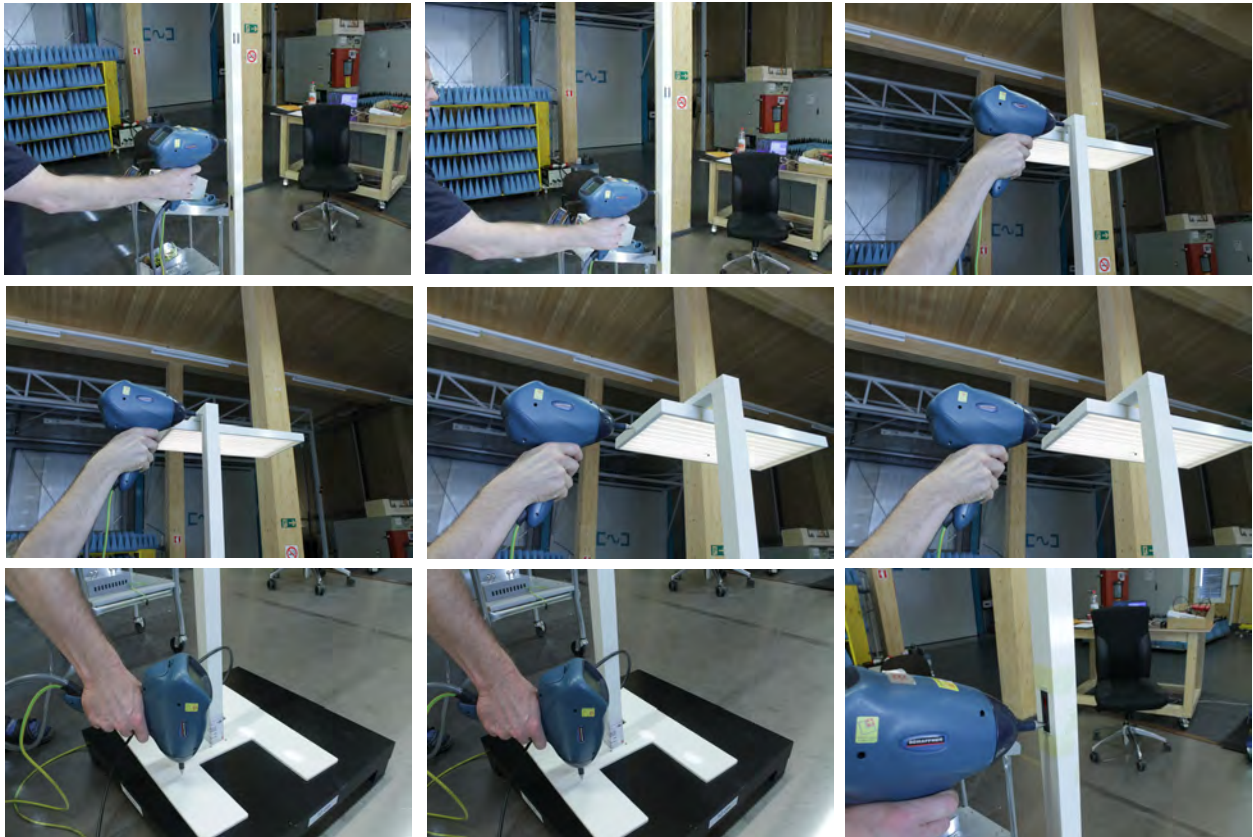


APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS

Test No. 5

Test configuration to verify the EUT's immunity to ESD in accordance with EN 61000-4-2 (IEC 61000-4-2) for floor standing equipment.

Direct contact discharge



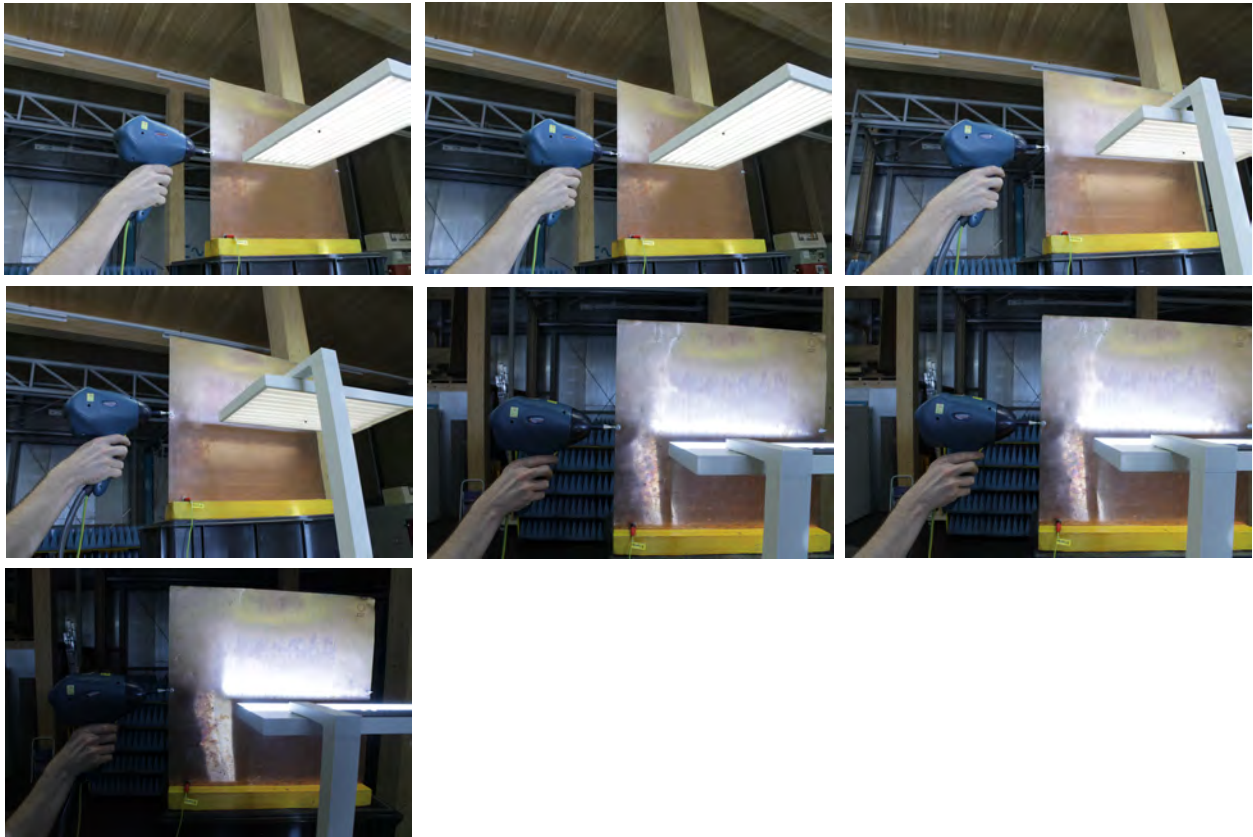


**APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS**

**Test No. 5**

Test configuration to verify the EUT's immunity to ESD in accordance with EN 61000-4-2 (IEC 61000-4-2) for floor standing equipment.

Vertical contact plane





**APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS**

**Test No. 6**

Test configuration to verify the EUT's immunity to radiated rf electromagnetic field in accordance with EN 61000-4-3 (IEC 61000-4-3).- Prior calibration of the field level according to the standard  
- Antenna distance 3.0 m, height 1.55 m

General test setup







**APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS**

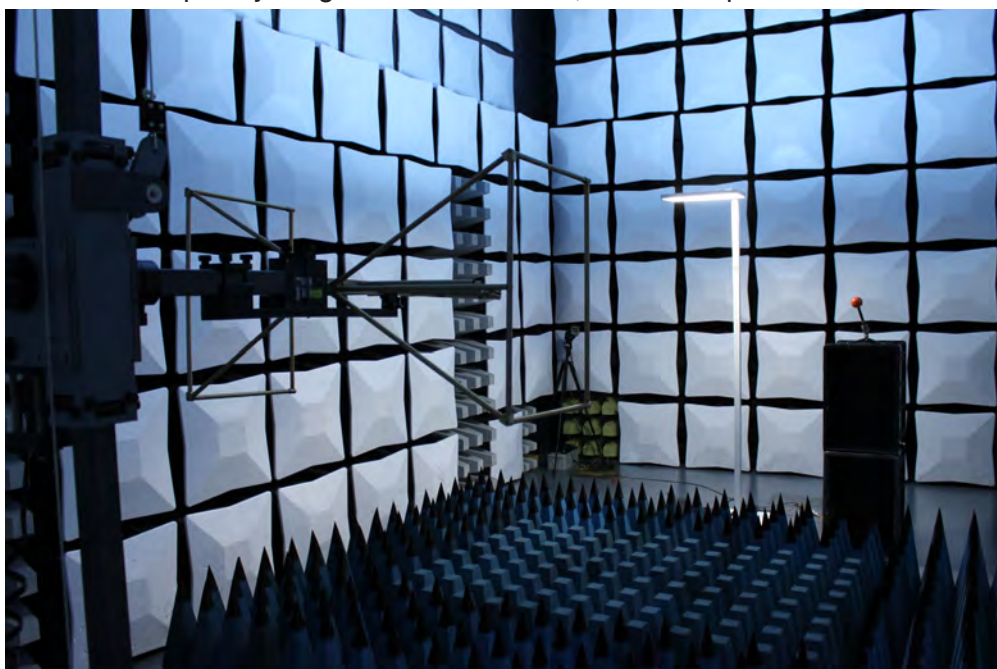
**Test No. 6**

Test configuration to verify the EUT's immunity to radiated rf electromagnetic field in accordance with EN 61000-4-3 (IEC 61000-4-3).- Prior calibration of the field level according to the standard  
- Antenna distance 3.0 m, height 1.55 m

Frequency range 80 to 1000 MHz, vertical polarisation



Frequency range 80 to 1000 MHz, horizontal polarisation



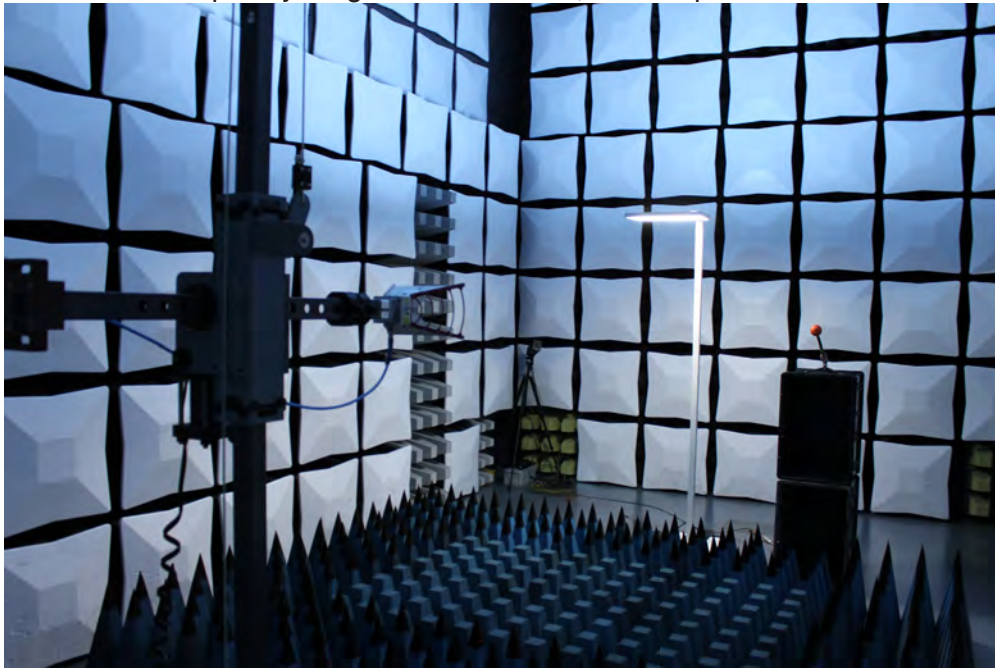


APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS

**Test No. 6**

Test configuration to verify the EUT's immunity to radiated rf electromagnetic field in accordance with EN 61000-4-3 (IEC 61000-4-3).- Prior calibration of the field level according to the standard  
- Antenna distance 3.0 m, height 1.55 m

Frequency range 1.0 to 6.0 GHz, vertical polarisation



Frequency range 1.0 to 6.0 GHz, horizontal polarisation







**APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS**

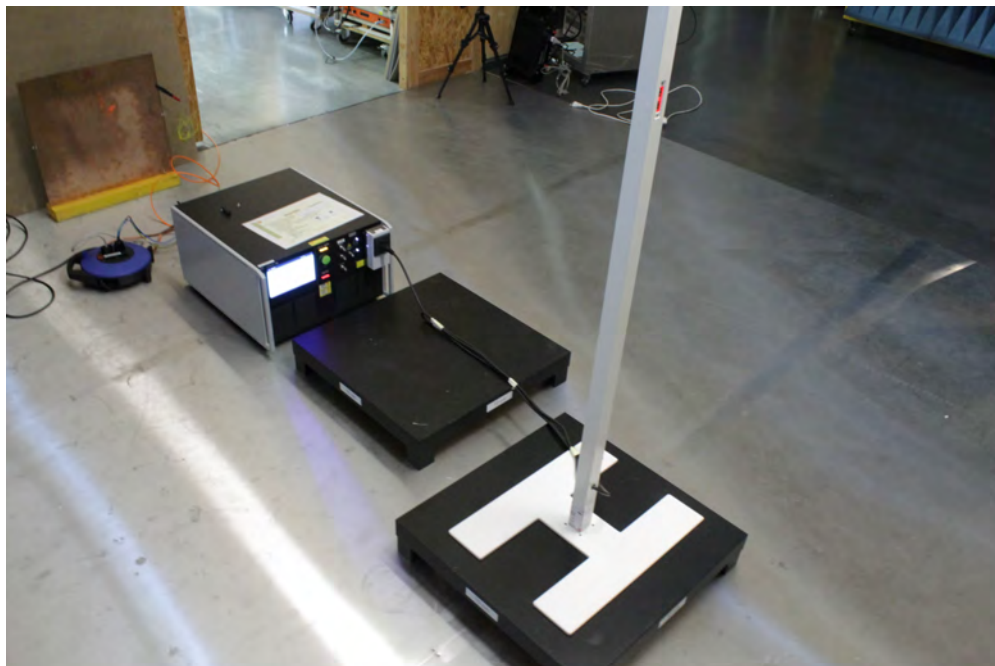
**Test No. 7**

Test configuration for immunity to electrical fast transients in accordance with EN 61000-4-4 (IEC 61000-4-4).

Test setup



Test setup





APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS

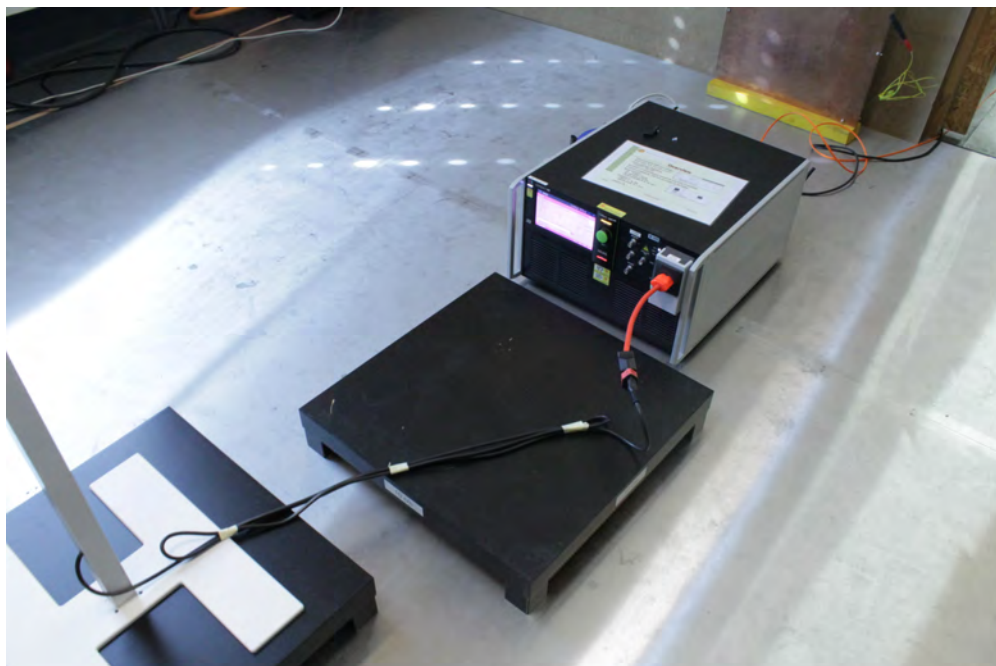
**Test No. 8**

Test configuration for immunity to surges in accordance with EN 61000-4-5 (IEC 61000-4-5).

Test setup



Test setup, phase reverse





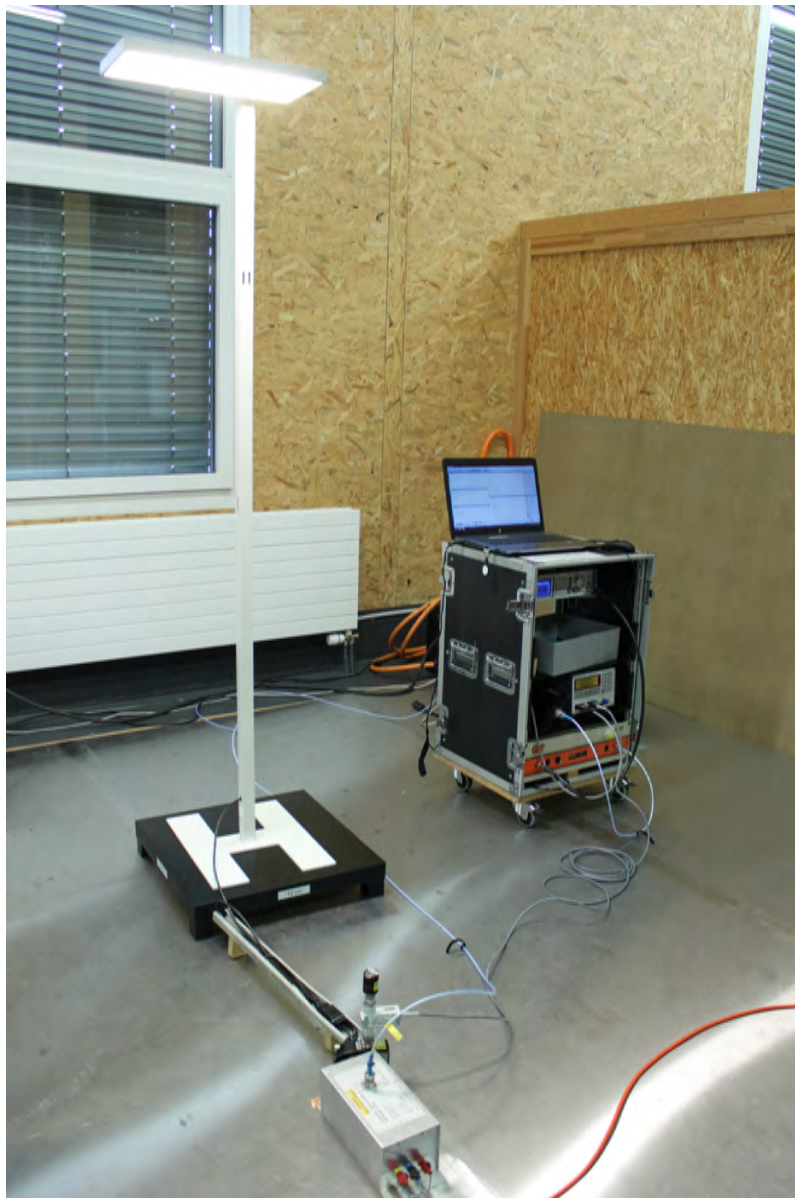
## APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS

### Test No. 9

Test configuration for immunity to conducted disturbances, induced by radio frequency fields above 150 kHz in accordance with EN 61000-4-6 (IEC 61000-4-6).

-Prior calibration of electromagnetic energy into 150  $\Omega$  load according to standard

Test setup







**APPENDIX 2 TEST CONFIGURATION PHOTOGRAPHS**

**Test No. 10**

Test configuration for immunity to voltage dips and interruptions in accordance with EN 61000-4-11.

Test setup

