

Prüfbericht-Nr.: <i>Test Report No.:</i>	CN2180AQ 002	Auftrags-Nr.: <i>Order No.:</i>	244374761	Seite 1 von 15 <i>Page 1 of 15</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	1774198	Auftragsdatum: <i>Order date.:</i>	2021-11-16	
Auftraggeber: <i>Client:</i>	IKEA of Sweden AB BOX 702, SE-343 81 Älmhult, Sweden			
Prüfgegenstand: <i>Test item:</i>	LED fixed lighting			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	L2101 ROLFSTORP			
Auftrags-Inhalt: <i>Order content:</i>	TÜV Rheinland EMC service			
Prüfgrundlage: <i>Test specification:</i>	FCC 47 CFR Part 15, Subpart B:2020 Class B ICES-005:2018			
Wareneingangsdatum: <i>Date of receipt:</i>	2021-11-28	Refer to the EUT photos file		
Prüfmuster-Nr.: <i>Test sample No.:</i>	A003172835-001			
Prüfzeitraum: <i>Testing period:</i>	Refer to test report			
Ort der Prüfung: <i>Place of testing:</i>	Refer to clause 1.1			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: / tested by: Jessie Xu		genehmigt von: / authorized by: Jiayi Zhou		
Datum: / Date: 2022-01-10		Datum: / Date: 2022-01-10		
Stellung: / Position: Project manager		Stellung: / Position: Senior manager		
Sonstiges / Other:	FCC ID: FHO-L2101 Test Firm Registration Number: 958801 Refer to clause 2.2 for further information.			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

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TEST SUMMARY

5.2.1 RADIATED EMISSION

Result:

Passed

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1 Test Sites

1.1 Test Facilities

Laboratory: TÜV Rheinland (Shanghai) Co., Ltd.

Address: No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China

The used test equipment is in accordance with CISPR 16-1 series standards for measurement of radio interference.

Refer to Clause 7 for test and measurement instruments.

2 General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is the ordinary LED fixed lighting for lighting and similar use. For the further information, refer to the user's manual.

2.2 Ratings and System Details

System input : 5 VDC
3 x 1.2 VDC supplied by rechargeable AA battery

Rated power : 3.8 W

Protection class : III

Identities and differences: the model L2101 ROLFSTORP was already EMC tested as described in the report CN2180AQ 001. The report is for making a small update of the PCB layout, and the circuit diagram does not changed. Therefore, the radiated emission test was performed on above model.

2.3 Independent Operation Modes

The basic operation modes are: "ON" and "OFF".

2.4 Description of interconnecting cables

No.	Interface and name	Shielded or not	Specified length (mm)
1	Power supply line	Unshielded	1500

2.5 Noise Generating and Noise Suppressing Parts

Refer to the circuit diagram for further information.

2.6 Highest frequency generated or used in the device or on which the device operates or tunes

The highest frequency used in the EUT is less than 108 MHz.

2.7 Submitted Documents

Circuit diagram, user's manual and rating label.

3 Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible emission level. The test conditions were adapted accordingly in reference to the instructions for use.

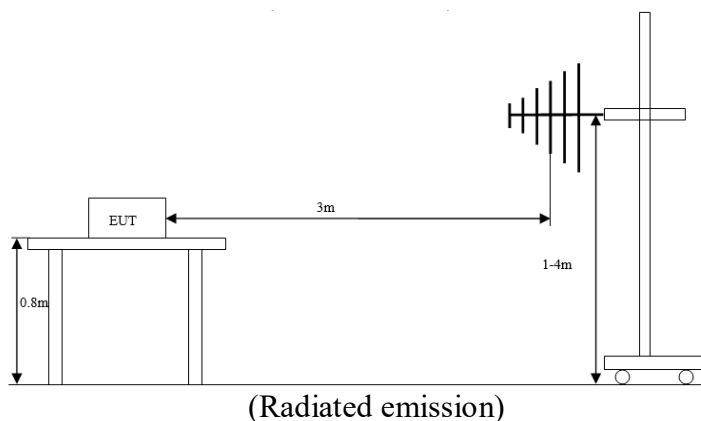
Refer to the related paragraph of this report.

The sequence of testing:

Radiated emission tests were performed on 2021-12-07.

3.2 Equipment and cable arrangement

Block diagram for radiated emission test is as follows:



Also refer to photographs on clause 6 for test setup for radiated emission test.

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3.3 Test Software

No special test software was used during the tests.

3.4 Special Accessories and Auxiliary Equipment

During the tests, the power supply (model: ICPSW5-17NA-1, brand:IKEA) was used.

Model name	Rating
ICPSW5-17NA-1	Input: 100-240 V~, 50/60 Hz, Max. 0.5 A; Output: 5 VDC, Max. 2.4 A per USB-outlet, ta: 45°C

3.5 Countermeasures to achieve EMC Compliance

No other special measure is employed to achieve the requirement.

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4 Conformity Decision Rule

For all EMI tests included in this report, as measurement uncertainties are less than the values U_{CISPR} given in CISPR 16-4-2, compliance with the limits is determined by comparing measurement results directly with corresponding limits without taking into consideration of measurement uncertainties.

5 Test Results EMISSION

5.1 Emission in the Frequency Range above 30 MHz

5.1.1 Radiated emission

Result:	Passed
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Date of testing	: 2021-12-16
Test procedure	: FCC 47 CFR Part 15, Subpart B:2020, ICES-005:2018, ANSI C63.4-2014 and CISPR 16-2-3
Product classification	: Class B
Frequency range	: 30 – 1000 MHz (see Note 1)
Limits	: Quasi-peak limits (3 m distance): 30 – 88 MHz, 40 dB μ V/m; 88 – 216 MHz, 43.5 dB μ V/m; 216 – 1000 MHz, 46 dB μ V/m (see Note 2)
Bandwidth of EMI receiver for final measurement	: 120 kHz
Measurement time for final measurement	: 1 s
Kind of test site	: Semi-anechoic chamber
Input voltage	: AC 120 V, 60 Hz
Operational mode	: Charging and lighting on by adapter
Ambient condition	: Temperature: 21.0 °C; Relative humidity: 46.7 %
Expanded measurement uncertainty ($k=2$)	: 5.49 dB

The radiated disturbance test was carried out in a semi-anechoic chamber. The test distance from the receiving antenna to the EUT is 3 m. The normalized site attenuation of the semi-anechoic chamber is regularly calibrated to ensure the radiated disturbance test results are valid. During the test, the EUT was placed on an 80 cm wooden support above the reference ground plane. The wooden support was rotated 360° around and the height of the antenna was varied from 1 m to 4 m to find the maximum disturbance. The test was performed with the antenna both in its horizontal and vertical polarizations.

The following figures and tables were those measured by an automatic measurement system. A preview test was firstly performed with peak detector. The final test was performed with quasi-peak at those critical frequencies during the preview test. In the following spectral diagram, “x” means quasi-peak test results.

Note 1: The highest frequency in the EUT is less than 108 MHz. According to FCC Part 15 subpart B §15.33 (b) (1), the upper frequency for radiated emission measurement is 1000 MHz.

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Note 2: The class B limits of ICES-005:2018 is stricter than those FCC 47 CFR Part 15, Subpart B:2020 for 3 m test distance. Therefore, the former limits are used in following figures and tables.

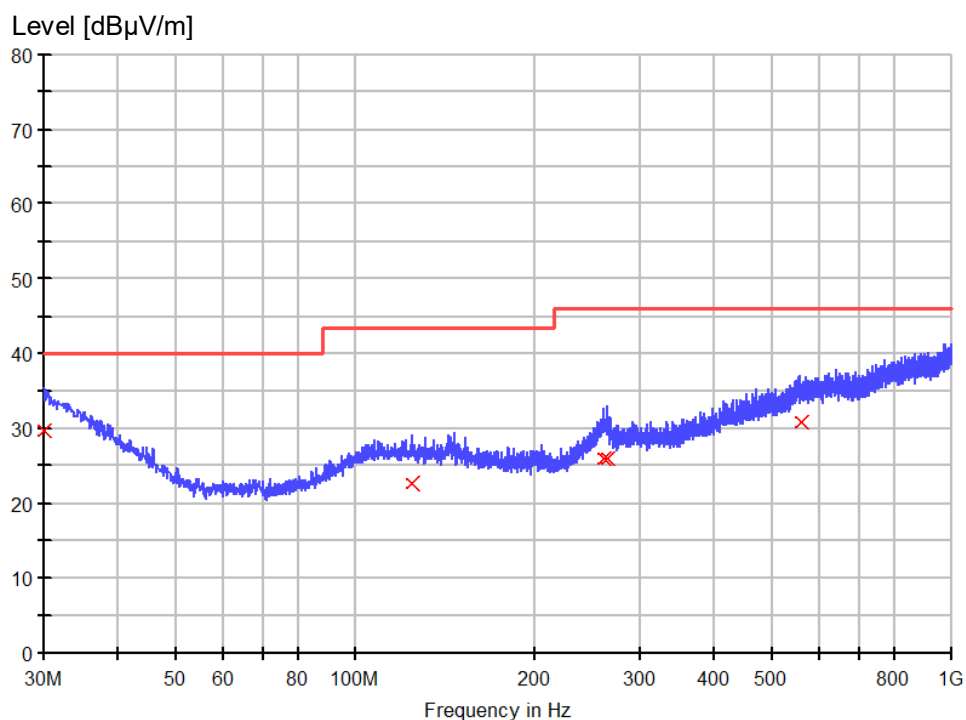
Notes on following tables of radiated emission results and conversions:

QuasiPeak (dB μ V/m): final measurement results by using quasi-peak detector

Corr. (dB): correction factor including: antenna factor, cable loss, and gain of pre-amplifier (if used)

Margin: Limit (dB μ V/m) - QuasiPeak (dB μ V/m)

Figure 1: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Horizontal polarization



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
30.000000	29.8	1000.0	120.000	105.0	H	-108.0	25.4	10.2	40.0
124.817500	22.8	1000.0	120.000	135.0	H	0.0	18.7	20.7	43.5
260.496250	26.0	1000.0	120.000	150.0	H	180.0	20.7	20.0	46.0
265.103750	26.0	1000.0	120.000	188.0	H	36.0	20.7	20.0	46.0
556.831250	30.9	1000.0	120.000	231.0	H	-96.0	26.4	15.1	46.0

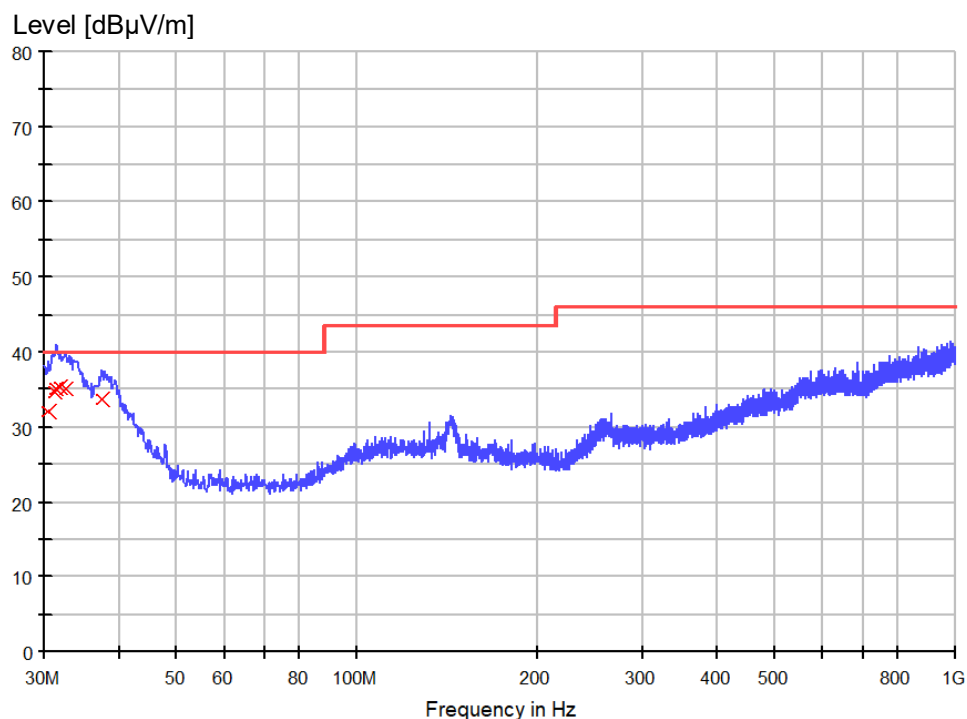
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Figure 2: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
30.363750	32.0	1000.0	120.000	150.0	V	-56.0	25.2	8.1	40.0
31.091250	34.7	1000.0	120.000	102.0	V	85.0	24.9	5.4	40.0
31.455000	35.1	1000.0	120.000	112.0	V	-103.0	24.7	4.9	40.0
31.940000	35.3	1000.0	120.000	100.0	V	-146.0	24.5	4.8	40.0
32.546250	35.2	1000.0	120.000	160.0	V	155.0	24.1	4.8	40.0
37.517500	33.6	1000.0	120.000	124.0	V	-180.0	21.3	6.4	40.0

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6 Photographs of the Test Set-Up

Refer to the test setup file.

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7 List of Test and Measurement Instruments

Equip.	Description	Model	Manufacturer	Last Date	Due Date
				DD.MM.YYYY	DD.MM.YYYY
G1824845	EMC measurement software	EMC32 (Ver 10.20.01)	Rohde&Schwarz	N/A	N/A
G1811378	3m modified semi-anechoic chamber	SAC3	Frankonia	27.06.2019	27.06.2022
G1811402	EMI test receiver	ESCI	Rohde&Schwarz	01.09.2021	01.09.2022
G1811425	Bilog antenna	CBL 6112D	Teseq	10.03.2020	10.03.2023

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Figure 2: Spectral Diagrams, Radiated Emission, 30 MHz – 1000 MHz, Vertical polarization..... 12

End of test report