

Prüfbericht-Nr.: <i>Test Report No.:</i>	CN20JI8N 001	Auftrags-Nr.: <i>Order No.:</i>	244268393	Seite 1 von 22 <i>Page 1 of 22</i>	
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	60051577	Auftragsdatum: <i>Order date.:</i>	23.09.2020		
Auftraggeber: <i>Client:</i>	IKEA of Sweden AB BOX 702 SE-343 81 Älmhult Sweden				
Prüfgegenstand: <i>Test item:</i>	Wall Mirror Lamp				
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	V2012 Kabomba				
Auftrags-Inhalt: <i>Order content:</i>	EMC test				
Prüfgrundlage: <i>Test specification:</i>	FCC 47 CFR Part 15, Subpart B:2019 Class B ICES-005:2018				
Wareneingangsdatum: <i>Date of receipt:</i>	10.11.2020	Refer to the EUT photos file			
Prüfmuster-Nr.: <i>Test sample No.:</i>	A002945829-003				
Prüfzeitraum: <i>Testing period:</i>	Refer to test report				
Ort der Prüfung: <i>Place of testing:</i>	EMC laboratory				
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shanghai) Co., Ltd.				
Prüfergebnis*: <i>Test result*:</i>	Pass				
geprüft von / tested by:		kontrolliert von / reviewed by:			
<i>Jessie Xu</i>		<i>Hexiong Liu</i>			
03.12.2020	Jessie Xu/Senior project engineer	03.12.2020	Hexiong Liu/Department manager		
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>
Sonstiges / Other: FCC ID: FHO-V2012 Test Firm Registration Number: 958801					
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: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor 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>					

TEST SUMMARY

4.1.1 CONDUCTED EMISSION

Result:

Passed

4.2.1 RADIATED EMISSION

Result:

Passed

Contents

1	TEST SITES	4
1.1	TEST FACILITIES.....	4
2	GENERAL PRODUCT INFORMATION	5
2.1	PRODUCT FUNCTION AND INTENDED USE.....	5
2.2	RATINGS AND SYSTEM DETAILS.....	5
2.3	INDEPENDENT OPERATION MODESS.....	5
2.4	DESCRIPTION OF INTERCONNECTING CABLES.....	5
2.5	NOISE GENERATING AND NOISE SUPPRESSING PARTS.....	5
2.6	HIGHEST FREQUENCY GENERATED OR USED IN THE DEVICE OR ON WHICH THE DEVICE OPERATES OR TUNES.....	5
2.7	SUBMITTED DOCUMENTS.....	5
3	TEST SET-UP AND OPERATION MODES	6
3.1	PRINCIPLE OF CONFIGURATION SELECTION.....	6
3.2	EQUIPMENT AND CABLE ARRANGEMENT.....	6
3.3	TEST SOFTWARE.....	7
3.4	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT.....	7
3.5	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....	7
4	TEST RESULTS EMISSION	8
4.1	EMISSION IN THE FREQUENCY RANGE UP TO 30 MHz.....	8
4.1.1	<i>Conducted emission</i>	8
4.2	EMISSION IN THE FREQUENCY RANGE ABOVE 30 MHz.....	14
4.2.1	<i>Radiated emission</i>	14
5	PHOTOGRAPHS OF THE TEST SET-UP	20
6	LIST OF TEST AND MEASUREMENT INSTRUMENTS	21
7	LIST OF FIGURES	22

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 6 for test and measurement instruments.

2 General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is an ordinary wall mirror lamp for household and similar use. For the further information, refer to the user's manual.

2.2 Ratings and System Details

System input : AC 120 V, 50-60 Hz
Rated power : 9 W
Protection class : II

2.3 Independent Operation Modess

The basic operation modes are: "ON" and "OFF" with dimming function.

2.4 Description of interconnecting cables

No.	Interface and name	Shielded or not	Specified length (mm)
1	AC power line	Unshielded	245 mm

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 65 kHz.

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.

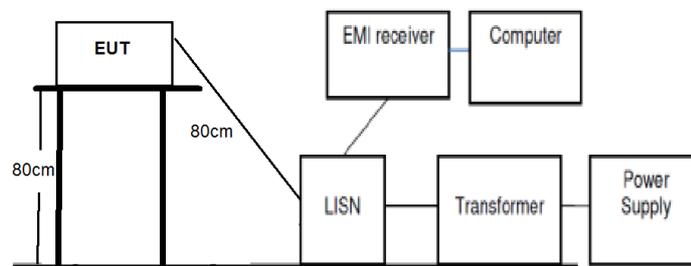
Refer to the related paragraph of this report.

The sequence of testing:

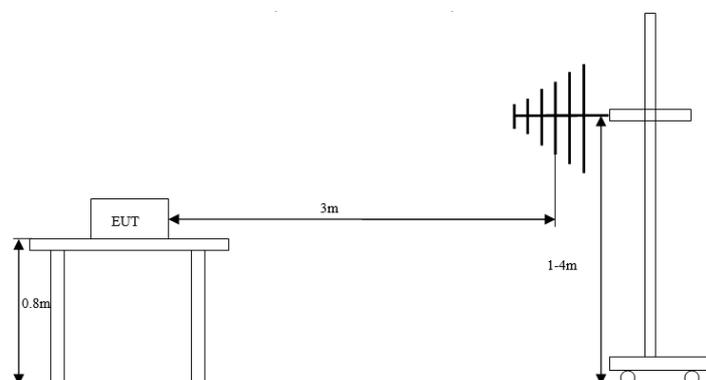
1. Radiated emission tests were performed on 16.11.2020.
2. Conducted emission tests were performed on 17.11.2020

3.2 Equipment and cable arrangement

Block diagram for both conducted emission and radiated emission tests is as follows:



(Conducted emission)



(Radiated emission)

Also refer to photographs on clause 5 for test setups for both conducted emission test and radiated emission test.

3.3 Test Software

No special test software was used during the tests.

3.4 Special Accessories and Auxiliary Equipment

None.

3.5 Countermeasures to achieve EMC Compliance

No other special measure is employed to achieve the requirement.

4 Test Results EMISSION

4.1 Emission in the Frequency Range up to 30 MHz

4.1.1 Conducted emission

Result:	Passed
Date of testing	: 16.11.2020
Test procedure	: FCC 47 CFR Part 15, Subpart B:2019, ICES-005:2018, ANSI C63.4-2014 and CISPR 16-1 series standards
Frequency range	: 0.15 – 30 MHz
Limits	: Quasi-peak limit: 0.15 - 0.5 MHz, 66 to 56 dB μ V (decrease with the logarithm of frequency); 0.5 - 5 MHz, 56 dB μ V; 5 - 30 MHz, 60 dB μ V Average limit: 0.15 - 0.5 MHz, 56 to 46 dB μ V (decrease with the logarithm of frequency); 0.5 – 5 MHz, 46 dB μ V; 5 – 30 MHz, 50 dB μ V
Bandwidth of EMI receiver for final measurement	: 9 kHz
Measurement time for final measurement	: 1 s
Kind of test site	: Shielded room
Input voltage	: AC 120 V, 60 Hz
Operational mode	: Power on with maximum light out and minimum light out respectively.
Ambient condition	: Temperature: 24.2 °C; Relative humidity: 48.6 %
Expanded measurement uncertainty ($k=2$)	: 3.39 dB

The measurement setup was made according to ANSI C63.4-2014 in a shielded room.

The measurement equipment like test receivers, quasi-peak detector and artificial mains network (AMN) are in compliance with CISPR 16-1 series standards.

The tested object was set-up on a wooden support. The EUT was set 0.8 m away from the AMN. The cord longer than necessary to be connected to the AMN was folded forth and back parallel so as to form a bundle with a length between 0.3 m and 0.4 m.

The disturbance voltage test was performed on the neutral line and phase line of the power supply of the EUT respectively.

The following figures and tables were those measured by an automatic measuring system. Both quasi-peak and average measurements were performed. In the following spectral

Prüfbericht - Nr.: CN20JI8N 001

Seite 9 von 22

Test Report No.:

Page 9 of 22

diagram, Blue “◆” means Quasi-Peak Value and green “◆” means Average Value results.

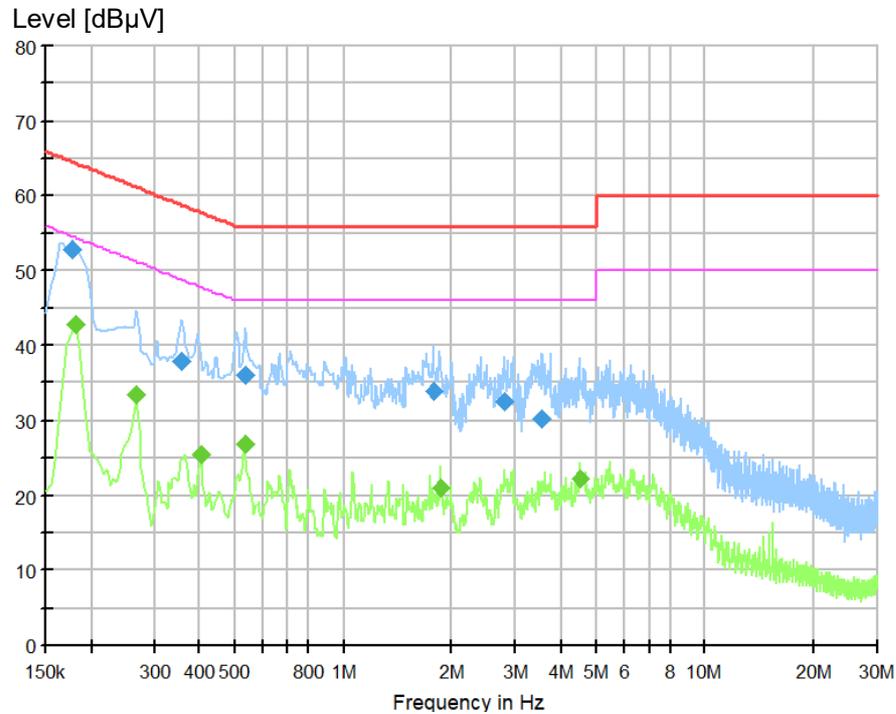
Notes on following tables of conducted emission results and conversions:

Level (dB μ V): final measurement results by using quasi-peak detector and average detector

Transd (dB): transducer factor including cable loss, insertion loss of artificial mains network and gain of pre-amplifier (if used)

Margin: Limit (dB μ V) - Level (dB μ V)

Figure 1: Spectral Diagrams, Conducted Emission, 150 kHz-30 MHz, L for maximum light output



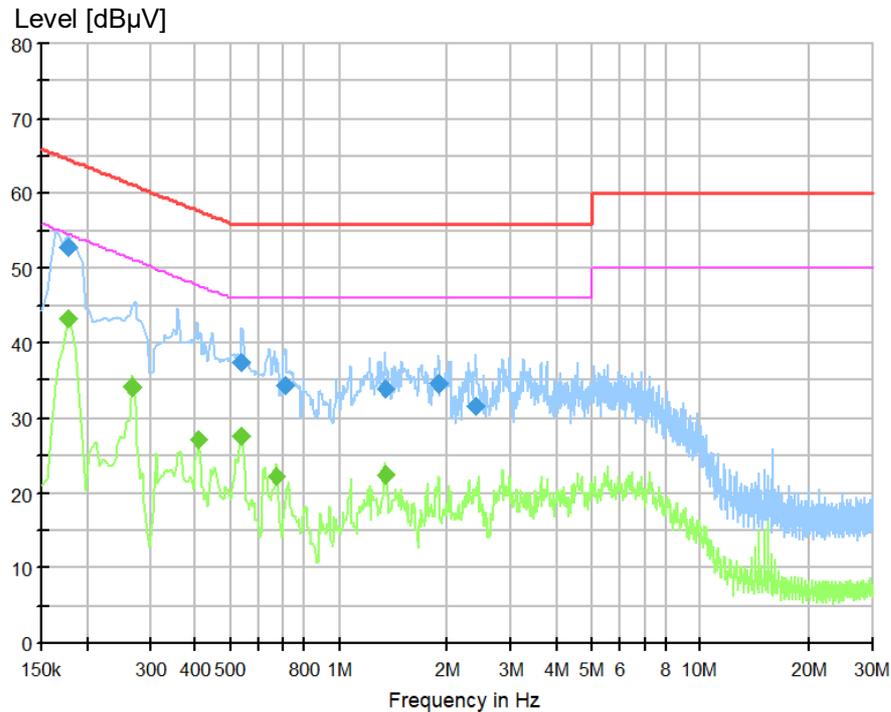
Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.177000	52.91	64.63	11.71	1000.0	9.000	L1	10.4
0.357000	37.82	58.80	20.98	1000.0	9.000	L1	10.4
0.532500	35.92	56.00	20.08	1000.0	9.000	L1	10.4
1.779000	33.80	56.00	22.20	1000.0	9.000	L1	10.5
2.800500	32.51	56.00	23.49	1000.0	9.000	L1	10.5
3.556500	30.26	56.00	25.74	1000.0	9.000	L1	10.6

Final Average measurement result:

Frequency (MHz)	CAverage (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.181500	42.88	54.42	11.54	1000.0	9.000	L1	10.4
0.267000	33.40	51.21	17.81	1000.0	9.000	L1	10.4
0.402000	25.49	47.81	22.32	1000.0	9.000	L1	10.4
0.532500	26.83	46.00	19.17	1000.0	9.000	L1	10.4
1.869000	20.95	46.00	25.05	1000.0	9.000	L1	10.5
4.537500	22.12	46.00	23.88	1000.0	9.000	L1	10.6

Figure 2: Spectral Diagrams, Conducted Emission, 150 kHz-30 MHz, N for maximum light output



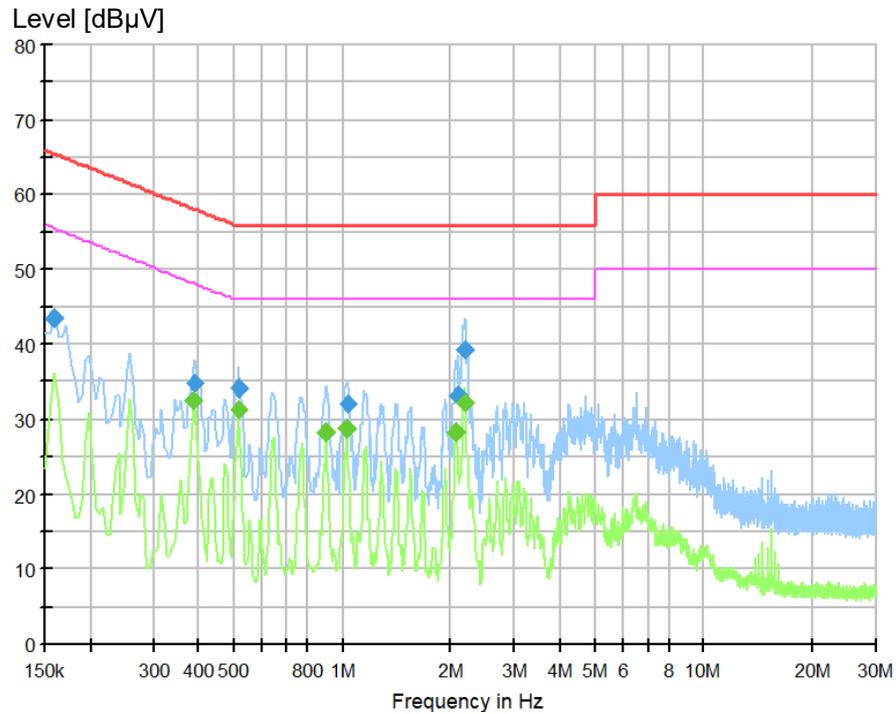
Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.177000	52.96	64.63	11.66	1000.0	9.000	N	10.4
0.537000	37.35	56.00	18.65	1000.0	9.000	N	10.4
0.708000	34.39	56.00	21.61	1000.0	9.000	N	10.5
1.347000	33.89	56.00	22.11	1000.0	9.000	N	10.5
1.887000	34.66	56.00	21.34	1000.0	9.000	N	10.5
2.395500	31.64	56.00	24.36	1000.0	9.000	N	10.5

Final Average measurement result:

Frequency (MHz)	CAverage (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.177000	43.34	54.63	11.29	1000.0	9.000	N	10.4
0.267000	34.16	51.21	17.05	1000.0	9.000	N	10.4
0.406500	27.06	47.72	20.66	1000.0	9.000	N	10.4
0.537000	27.55	46.00	18.45	1000.0	9.000	N	10.4
0.672000	22.33	46.00	23.67	1000.0	9.000	N	10.5
1.347000	22.49	46.00	23.51	1000.0	9.000	N	10.5

Figure 3: Spectral Diagrams, Conducted Emission, 150 kHz-30 MHz, L for minimum light output



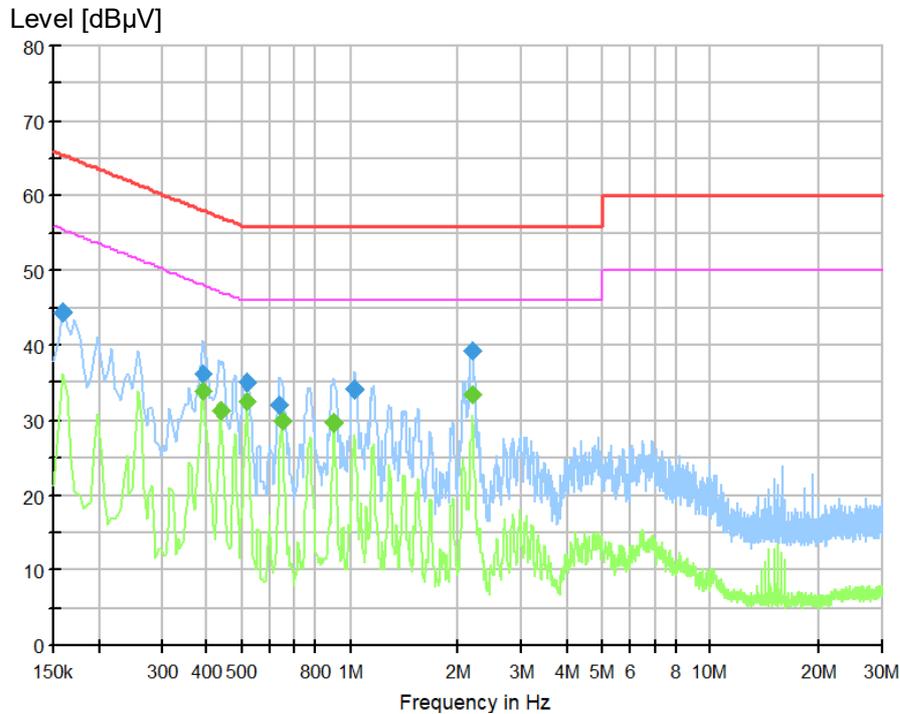
Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.159000	43.50	65.52	22.02	1000.0	9.000	L1	10.4
0.388500	34.78	58.10	23.31	1000.0	9.000	L1	10.4
0.514500	34.21	56.00	21.79	1000.0	9.000	L1	10.4
1.036500	32.10	56.00	23.90	1000.0	9.000	L1	10.5
2.080500	33.26	56.00	22.74	1000.0	9.000	L1	10.5
2.170500	39.23	56.00	16.77	1000.0	9.000	L1	10.5

Final Average measurement result:

Frequency (MHz)	CAverage (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.384000	32.53	48.19	15.66	1000.0	9.000	L1	10.4
0.514500	31.41	46.00	14.59	1000.0	9.000	L1	10.4
0.901500	28.39	46.00	17.61	1000.0	9.000	L1	10.5
1.027500	28.83	46.00	17.17	1000.0	9.000	L1	10.5
2.062500	28.33	46.00	17.67	1000.0	9.000	L1	10.5
2.188500	32.33	46.00	13.67	1000.0	9.000	L1	10.5

Figure 4: Spectral Diagrams, Conducted Emission, 150 kHz-30 MHz, N for minimum light output



Final Quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.159000	44.51	65.52	21.01	1000.0	9.000	N	10.4
0.388500	36.24	58.10	21.86	1000.0	9.000	N	10.4
0.514500	35.19	56.00	20.81	1000.0	9.000	N	10.4
0.636000	31.95	56.00	24.05	1000.0	9.000	N	10.5
1.032000	34.06	56.00	21.94	1000.0	9.000	N	10.5
2.188500	39.41	56.00	16.59	1000.0	9.000	N	10.5

Final Average measurement result

Frequency (MHz)	CAverage (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.388500	33.98	48.10	14.12	1000.0	9.000	N	10.4
0.438000	31.43	47.10	15.67	1000.0	9.000	N	10.4
0.514500	32.60	46.00	13.40	1000.0	9.000	N	10.4
0.645000	30.00	46.00	16.00	1000.0	9.000	N	10.5
0.901500	29.70	46.00	16.30	1000.0	9.000	N	10.5
2.188500	33.52	46.00	12.48	1000.0	9.000	N	10.5

4.2 Emission in the Frequency Range above 30 MHz

4.2.1 Radiated emission

Result:	Passed
----------------	---------------

Date of testing	: 17.11.2020
Test procedure	: FCC 47 CFR Part 15, Subpart B:2019, ICES-005:2018, ANSI C63.4-2014 and CISPR 16-1 series standards
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	: Power on with maximum light out and minimum light out respectively.
Ambient condition	: Temperature: 25.3 °C; Relative humidity: 48.6 %
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 a 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 65 kHz. According to FCC Part 15 subpart B §15.33 (b) (1), the upper frequency for radiated emission measurement is 1000 MHz.

Note 2: The class B limits of ICES-005:2018 Table 4 is stricter than those FCC 47 CFR Part 15, Subpart B:2019 for 3 m test distance. Therefore, the former limits are used in following figures and tables.

Prüfbericht - Nr.: CN20JI8N 001

Seite 15 von 22

Test Report No.:

Page 15 of 22

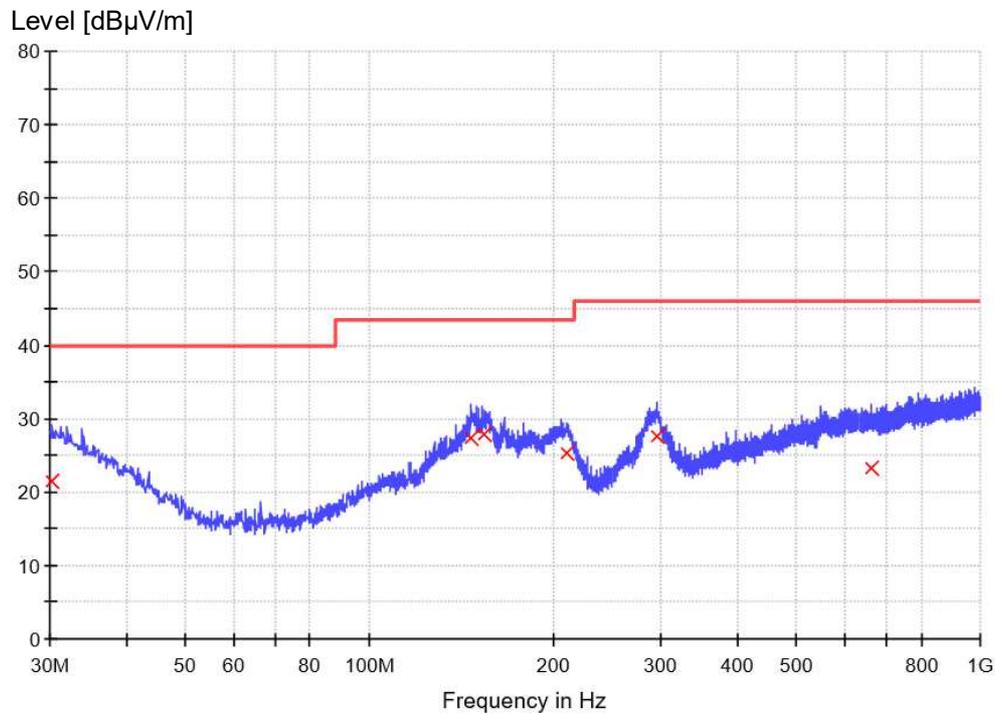
Notes on following tables of radiated emission results and conversions:

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)

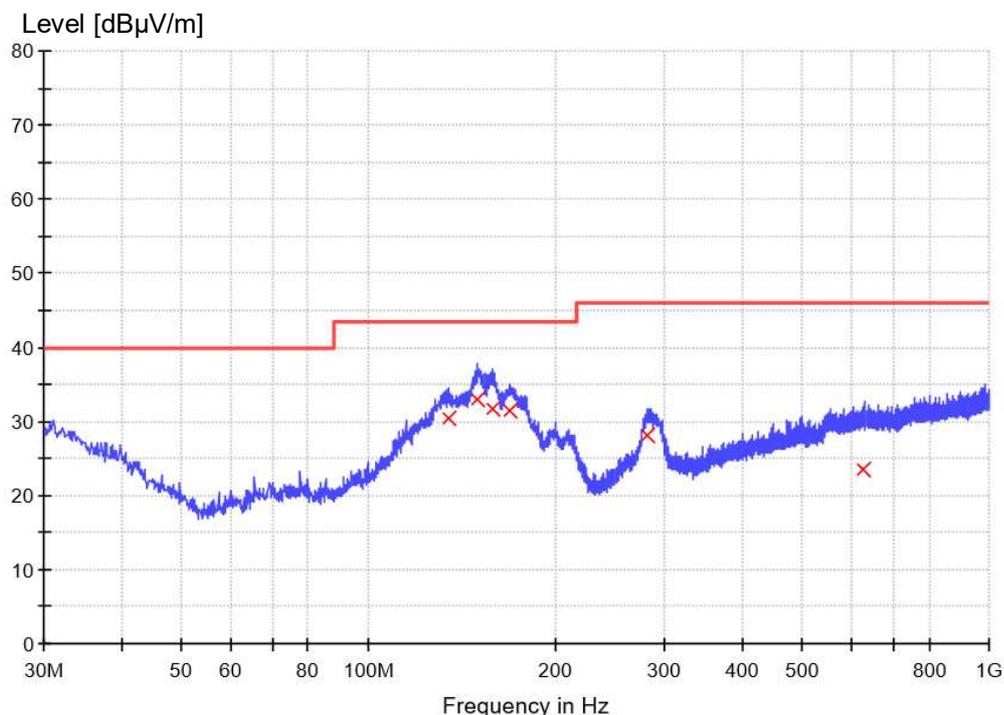
Figure 5: Spectral Diagrams, Radiated Emission, 30 MHz-1000 MHz, Horizontal polarization for maximum light output



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
30.242500	21.6	1000.0	120.000	120.0	H	12.0	25.3	18.4	40.0
147.006250	27.2	1000.0	120.000	126.0	H	4.0	17.5	16.3	43.5
153.917500	27.9	1000.0	120.000	140.0	H	3.0	17.0	15.6	43.5
211.147500	25.3	1000.0	120.000	150.0	H	15.0	16.0	18.2	43.5
294.931250	27.7	1000.0	120.000	142.0	H	0.0	19.8	18.3	46.0
662.318750	23.3	1000.0	120.000	130.0	H	0.0	26.3	22.7	46.0

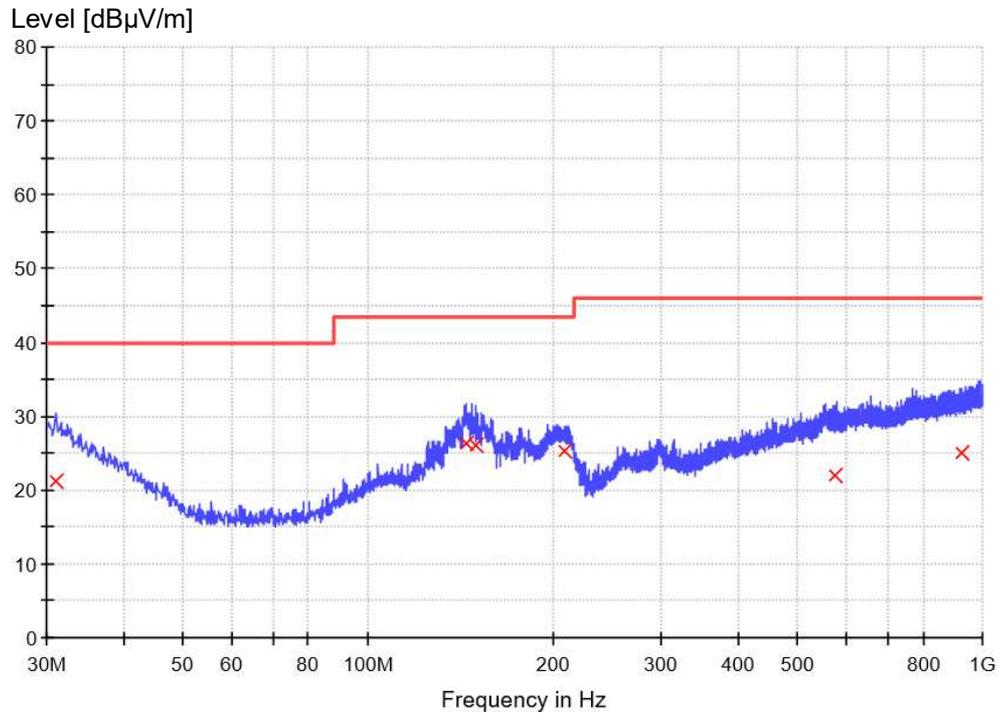
Figure 6: Spectral Diagrams, Radiated Emission, 30 MHz-1000 MHz, Vertical polarization for maximum light output



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
134.638750	30.5	1000.0	120.000	100.0	V	12.0	18.4	13.0	43.5
149.916250	32.9	1000.0	120.000	100.0	V	1.0	17.2	10.6	43.5
158.403750	31.8	1000.0	120.000	100.0	V	4.0	16.8	11.7	43.5
169.558750	31.5	1000.0	120.000	100.0	V	33.0	16.3	12.0	43.5
282.321250	28.1	1000.0	120.000	102.0	V	15.0	19.6	17.9	46.0
628.005000	23.5	1000.0	120.000	110.0	V	2.0	26.4	22.5	46.0

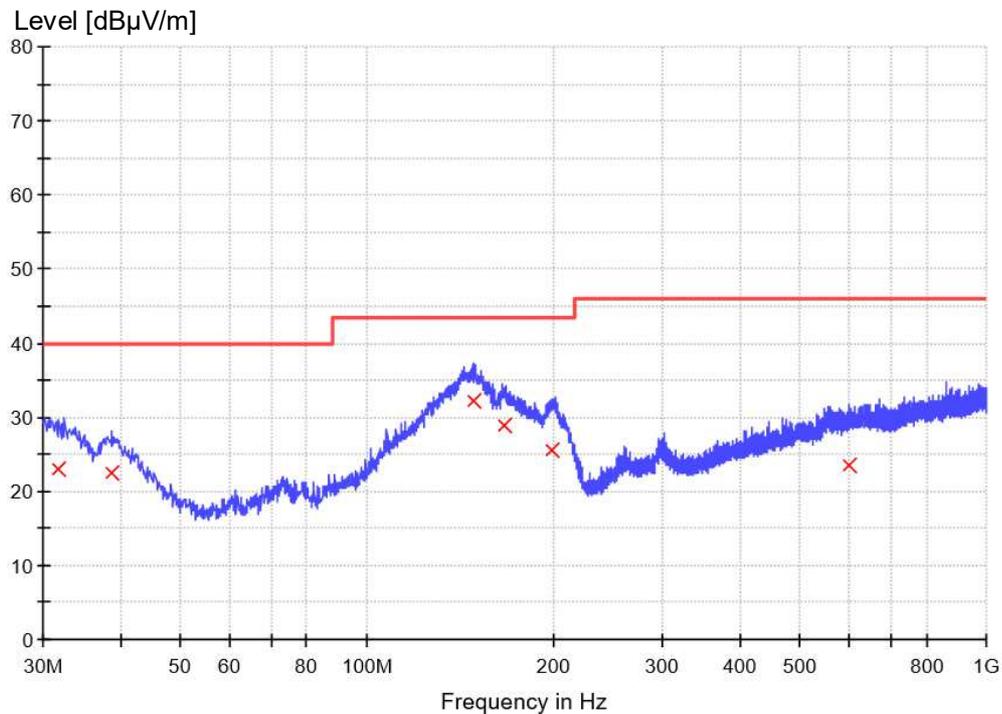
Figure 7: Spectral Diagrams, Radiated Emission, 30 MHz-1000 MHz, Horizontal polarization for minimum light output



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
31.091250	21.2	1000.0	120.000	120.0	H	4.0	24.9	18.8	40.0
144.581250	26.4	1000.0	120.000	132.0	H	12.0	17.8	17.1	43.5
149.552500	26.1	1000.0	120.000	140.0	H	3.0	17.3	17.4	43.5
208.843750	25.3	1000.0	120.000	133.0	H	69.0	16.1	18.2	43.5
575.382500	22.0	1000.0	120.000	150.0	H	15.0	26.0	24.0	46.0
925.795000	25.0	1000.0	120.000	144.0	H	5.0	28.1	21.0	46.0

Figure 8: Spectral Diagrams, Radiated Emission, 30 MHz-1000 MHz, Vertical polarization for minimum light output



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
31.818750	22.9	1000.0	120.000	100.0	V	12.0	24.6	17.1	40.0
38.730000	22.4	1000.0	120.000	100.0	V	5.0	20.7	17.6	40.0
148.218750	32.2	1000.0	120.000	100.0	V	45.0	17.4	11.3	43.5
166.770000	28.8	1000.0	120.000	100.0	V	13.0	16.5	14.7	43.5
198.901250	25.6	1000.0	120.000	102.0	V	33.0	16.2	17.9	43.5
600.602500	23.5	1000.0	120.000	110.0	V	0.0	26.2	22.5	46.0

5 Photographs of the Test Set-Up

Refer to the test setup file

6 List of Test and Measurement Instruments

Equip.	Description	Model	Manufacturer	Last Date DD.MM.YYYY	Due Date DD.MM.YYYY
G1811405	EMI test receiver	ESCI	Rohde&Schwarz	06.03.2020	06.03.2021
G1830003	Artificial mains network	ENV432	Rohde&Schwarz	02.11.2020	02.11.2021
G1824845	EMC measurement software	EMC32 (Ver 10.20.01)	Rohde&Schwarz	N/A	N/A
G1824248	Dual display multimeter	F45	Fluke	18.09.2020	18.09.2022
G1811378	3m modified semi-anechoic chamber	SAC3	Frankonia	27.06.2019	27.06.2022
G1811402	EMI test receiver	ESCI	Rohde&Schwarz	18.09.2020	18.09.2021
G1811425	Bilog antenna	CBL 6112D	Teseq	10.03.2020	10.03.2023

7 List of Figures

Figure 1: Spectral Diagrams, Conducted Emission, 150 kHz-30 MHz, L for maximum light output.....	10
Figure 2: Spectral Diagrams, Conducted Emission, 150 kHz-30 MHz, N for maximum light output	11
Figure 3: Spectral Diagrams, Conducted Emission, 150 kHz-30 MHz, L for minimum light output	12
Figure 4: Spectral Diagrams, Conducted Emission, 150 kHz-30 MHz, N for minimum light output.....	13
Figure 5: Spectral Diagrams, Radiated Emission, 30 MHz-1000 MHz, Horizontal polarization for maximum light output	16
Figure 6: Spectral Diagrams, Radiated Emission, 30 MHz-1000 MHz, Vertical polarization for maximum light output	17
Figure 7: Spectral Diagrams, Radiated Emission, 30 MHz-1000 MHz, Horizontal polarization for minimum light output	18
Figure 8: Spectral Diagrams, Radiated Emission, 30 MHz-1000 MHz, Vertical polarization for minimum light output	19

End of test report