

EMC TEST REPORT

No. 2019402STO-101

Electromagnetic disturbances

EQUIPMENT UNDER TEST

Equipment: Wall mounted luminaire with LED
Type/Model: V1919 Raksta
Manufacturer: IKEA of Sweden AB
Tested by request of: IKEA of Sweden AB

SUMMARY

Referring to the emission limits, and the operating mode during the tests specified in this report, the equipment complies with the requirements according to the following standards:

FCC 47 CFR Part 15: Radio frequency devices, Subpart B: Unintentional radiators, Class B Equipment.

ICES-005 Issue 5: Lighting Equipment Class B (2018).

For details, see clause 2 – 4.

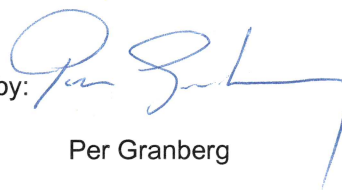
Date of issue: May 26, 2020

Tested by:



Lovisa Gibson

Approved by:



Per Granberg

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Revision History

Test report number	Date	Description	Changes
2019402STO-101	May 26, 2020	First release	

CONTENTS

	Page
1. Client Information	4
2. Equipment under test (EUT).....	4
2.1 Identification of the EUT	4
2.2 Test set up and EUT photos	4
2.3 Additional information about the EUT	4
3. Test Specifications	5
3.1 Standards	5
3.2 Additions, deviations and exclusions from standards and accreditation	5
3.3 Test site	5
3.4 Mode of operation during the test	5
3.5 Compliance	6
4. Test Summary	7
5. Conducted continuous disturbances	8
5.1 Operating environment.....	8
5.2 Test setup and test procedure	8
5.3 Measurement uncertainty.....	8
5.4 Test results, AC Power input port, Class B.....	8
5.5 Test equipment	9
6. Radiated rf Emission in the frequency-range 30 MHz – 1 GHz	10
6.1 Operating environment.....	10
6.2 Test setup and test procedure	10
6.3 Test conditions	10
6.4 Measurement uncertainty.....	10
6.5 Test results, 30 – 1000 MHz, FCC, Class B	11
6.6 Test equipment	12

1. CLIENT INFORMATION

The EUT has been tested by request of

Company	IKEA of Sweden AB Box 702 343 81 Älmhult Sweden
Name of contact	Christian Truedsson
Client observer	-

2. EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT

Equipment	Wall mounted luminaire with LED
Type/Model	V1919 Raksta
Brand name	IKEA
Serial Number	-
Manufacturer	IKEA of Sweden AB
Rating	120 V, 60 Hz, 7.6 W, 82 mA
Class	II
Highest clock frequency	< 108 MHz
Software/Firmware version	-
Transmitting Frequency	-

Rating plate

Model: Wall Ceiling Globe



TYP V1919 Raksta 660lm 7.6W 120V~ 60Hz
82mA Made in China 19972 YYWW
IKEA of Sweden AB, SE-343 81 Älmhult

2.2 Test set up and EUT photos

Test set up and EUT photos are enclosed in 2019402STO-001 Annex 1 to this test report.

2.3 Additional information about the EUT

The EUT was tested in a tabletop standing configuration.

The EUT was equipped with the following cable:

Port	Type	Length [m]	Specifications
AC Mains	Two-core	0,16	

3. TEST SPECIFICATIONS

3.1 Standards

Requirements:

FCC 47 CFR Part 15: Radio frequency devices, Subpart B: Unintentional radiators.

ICES-005 Issue 5: Lighting Equipment (2018).

Test methods:

ANSI C63.4: 2014: American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

3.2 Additions, deviations and exclusions from standards and accreditation

No additions, deviations or exclusions have been made from standards and accreditation.

3.3 Test site

Measurements were performed at:

Intertek Semko AB.
Torshamnsgatan 43,
P.O. Box 1103
SE-164 22 Kista

Intertek Semko AB is a FCC listed test site with site registration number 90913

Intertek Semko AB is a FCC accredited conformity assessment body with designation number SE0002

Intertek Semko AB is an Industry Canada listed test facility with IC assigned code 2042G

Measurement chambers

Measurement Chamber	Type of chamber	IC Site filing #
STORA HALLEN	Semi-anechoic 10 m and 3 m	2042G-2

3.4 Mode of operation during the test

The EUT was tested with light on, supply 120 V, 60 Hz.

3.5 Compliance

The EUT shall comply with the emission limits according to the standards as listed below

Radiated Emission requirements:

The EUT shall meet the limits for the standards.

Reference: 47 CFR §15.109

ICES-005, section 5.5.3

Limits for radiated emission according to FCC

Class B

Frequency range [MHz]	Field strength at 3 m (dB μ V/m)	Field strength at 10 m (dB μ V/m)	Detector
30 – 88	40.0	29.5	Quasi Peak
88 – 216	43.5	33.1	Quasi Peak
216 – 960	46.0	35.6	Quasi Peak
960 – 1000	54.0	43.5	Quasi Peak
Above 1000	54.0 / 74.0	43.5 / 63.5	Average / Peak

The values for 10 m measuring distance are calculated by subtracting 10.5 dB from the 3 m limit. (i.e. an extrapolation factor of 20 dB/decade according to §15.31(f)(1))

Limits for radiated emission according to ICES-005

Class B

Frequency range [MHz]	Field strength at 3 m (dB μ V/m)	Field strength at 10 m (dB μ V/m)	Detector
30 – 88	40.0	29.5	Quasi Peak
88 – 216	43.5	33.1	Quasi Peak
216 – 1000	46.0	35.6	Quasi Peak

4. TEST SUMMARY

The results in this report apply only to sample tested:

Result: Pass – Fail – N/A= Not applicable

Standard	Description	Result
	Emission	
FCC Part 15 subpart B ICES-005	Conducted continuous emission in the frequency range 0.150 – 30 MHz, AC Power input port The EUT complies with the Class B limits. The margin to the limit was at least 9,1 dB at 0,152 MHz See clause 5.4.	PASS
FCC Part 15 subpart B ICES-005	Radiated emission of electromagnetic fields in the frequency range 30 – 1000 MHz The EUT complies with the Class B limits. The margin to the limit was at least 7.2 dB at 68.640 MHz The measured value is within the measurement uncertainty. See clause 6.5.	PASS
FCC Part 15 subpart B ICES-005	Radiated emission of electromagnetic fields in the frequency range 1.0 – X.0 GHz Not applicable. The clock frequency is below 108 MHz.	N/A

5. CONDUCTED CONTINUOUS DISTURBANCES in the frequency-range 0.15 – 30 MHz

5.1 Operating environment

Date of test:	Temperature:	Relative Humidity:
May 15, 2020	22 [°C]	21 [%]

5.2 Test setup and test procedure

The test method is in accordance with ANSI C63.4.

The EUT was connected to the power via Artificial Mains Networks AMN.

The EUT was placed on an insulating support 0.8 m above the floor, 0.4 m from the vertical reference ground plane (RGP) and 0.8 m from the AMN/ISN.

Overview sweeps were performed for each lead.

During the tests the EUT was operated according to the mode of operation mentioned in clause 3.4.

5.3 Measurement uncertainty

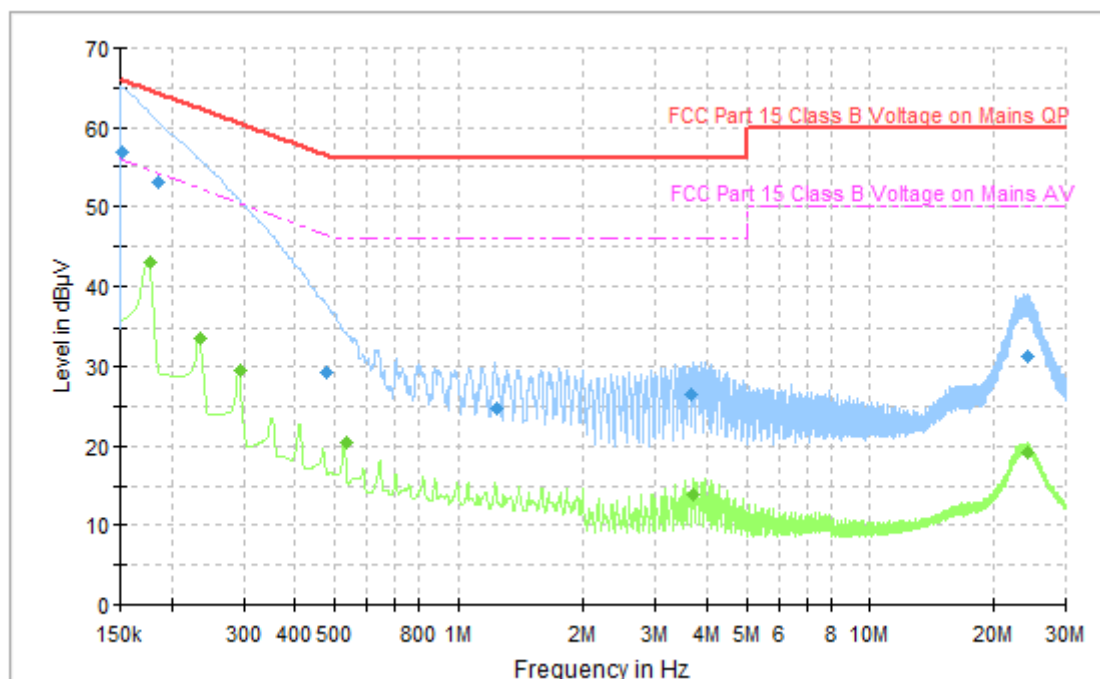
Continuous conducted disturbances with AMN
in the frequency range 150 kHz to 30 MHz

± 3.3 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2011.

The measurement uncertainty is given with a confidence of 95 %.

5.4 Test results, AC Power input port, Class B



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak, Class B

Frequency [MHz]	Result [dBμV]	Limit [dBμV]	Line L/N	Margin [dB]
0.152	56.8	65.9	L	9.1
0.186	53.0	64.2	N	11.2
0.476	29.2	56.4	N	27.2
1.241	24.7	56.0	N	31.3
3.671	26.5	56.0	N	29.5
24.164	31.3	60.0	N	28.7

Measurement results, Average, Class B

Frequency [MHz]	Result [dBμV]	Limit [dBμV]	Line L/N	Margin [dB]
0.177	42.9	54.6	N	11.7
0.236	33.6	52.3	N	18.7
0.296	29.6	50.4	N	20.8
0.535	20.4	46.0	N	25.6
3.692	13.9	46.0	N	32.1
24.322	19.1	50.0	N	30.9

Result [dBμV] = Analyser reading [dBμV] + cable loss [dB] + LISN insertion loss [dB]

5.5 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Test receiver	Rohde & Schwarz	ESU8	12866	06-2019	1 year
Cable	Suhner	G03232 D-01	9701	06-2019	1 year
Power unit	Chroma	61604	31757	-	-
Cable	Suhner	RG 223/U	9815	06-2019	1 year
Pulse limiter	Rohde & Schwarz	ESH3-Z2	4623	05-2020	1 year
Artificial Mains Network	Rohde & Schwarz	ESH3-Z5	2728	06-2019	1 year

6. RADIATED RF EMISSION IN THE FREQUENCY-RANGE 30 MHz – 1 GHz

6.1 Operating environment

Date of test:	Temperature:	Relative Humidity:
May 25, 2020	19 [°C]	43 [%]

6.2 Test setup and test procedure

The test method is in accordance with ANSI C63.4.

The EUT was set up according to the standard

The EUT was placed on an insulating support 0.8 m above the turntable which is part of the reference ground plane.

Overview sweeps were performed with the measurement receiver in max-hold mode and the peak detector activated in the frequency-range 30 – 1000 MHz.

6.3 Test conditions

Test setup:	30 – 1000 MHz		
Test receiver set-up:			
Preview test:	Peak,	RBW 120 kHz	VBW 1 MHz
Final test:	Quasi-Peak,	RBW 120 kHz	
Measuring distance:	10 m		
Measuring angle:	0 – 359°		
Antenna			
Height above ground plane:	1 – 4 m		
Polarisation:	Vertical and Horizontal		
Type:	Bilog		

6.4 Measurement uncertainty

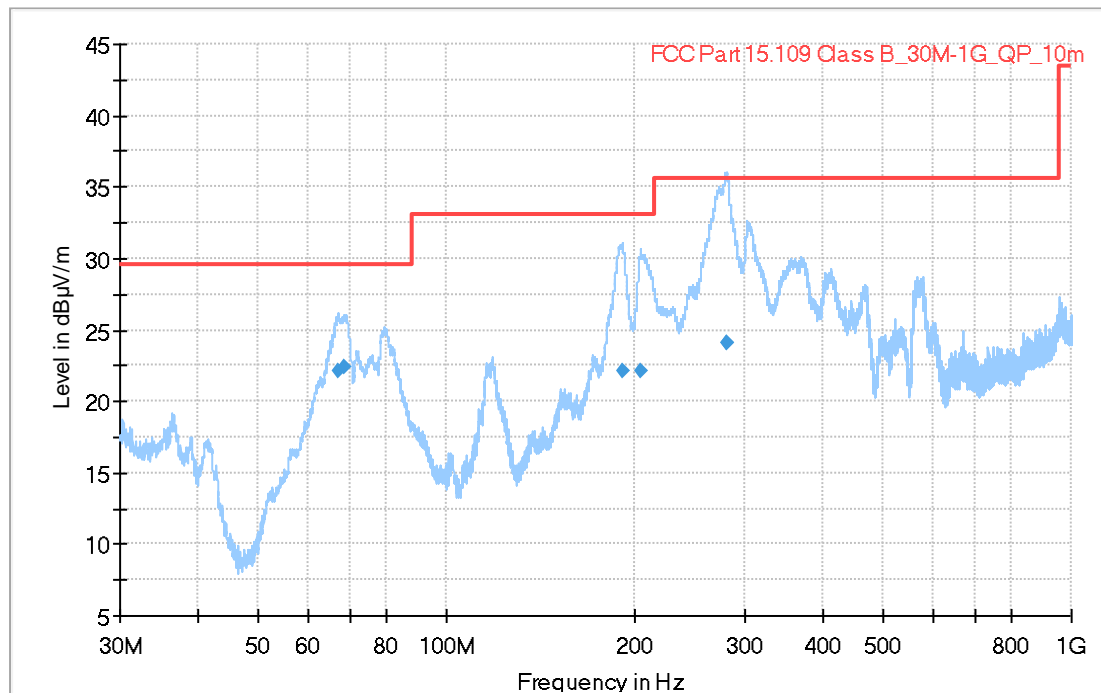
Measurement uncertainty for radiated disturbance

Uncertainty for the frequency range 30 to 1000 MHz at 10 m ± 5.0 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2011.

The measurement uncertainty is given with a confidence of 95 %.

6.5 Test results, 30 – 1000 MHz, FCC, Class B



Diagram, Peak overview sweep, 30 – 1000 MHz at 10 m distance.

Measurement results, Quasi Peak, Class B

Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
67.110	22.1	29.5	V	7.4
68.640	22.3	29.5	V	7.2
191.310	22.1	33.1	V	11.0
204.450	22.1	33.1	V	11.0
280.290	24.1	35.6	V	11.5
280.380	24.1	35.6	V	11.5

Result [dBµV/m] = Analyser reading [dBµV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

The EUT also fulfil the limit of ICES-005, see limit table, clause 3.5 Compliance in this report.
Verified by manual measurement at 280,380 MHz.

6.6 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Pre-amplifier	SEMKO	AM1331	S7992	04/2019	1 year + 1 month
Cable	Rosenberger	LA5-S003-8500	39149	03/2020	1 year
Cable	Huber + Suhner	Sucoflex 106	39122	04/2020	1 year
Cable	Rosenberger	LA5-S003-10000 (UFB293C)	39163	04/2019	1 year + 1 month
Bilog antenna	Teseq	CBL 6111D	34200	03/2020	3 years
Measurement receiver	ROHDE & SCHWARZ	ESW 44	33890	06/2019	1 year