

EMC TEST REPORT

No. 1818192STO-001, Ed. 2

Electromagnetic disturbances

EQUIPMENT UNDER TEST

Equipment: Surface-mounted luminaire with LED
Type: T1713 Svallis
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 device, 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: 2020-03-10

Tested by:


Ann-Christine Norrström

Approved by:


Per Granberg

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Revision History

Edition	Date	Description	Changes
1	2019-02-13	First release	
1	2020-03-10	Second release	The report was updated according to order number 2011426 Photos of EUT and test setups in annex 1.

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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 Elias Molin

2. EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT

Equipment Surface-mounted luminaire with LED
Type T1713 Svallis
Brand name IKEA
Serial Number -
Manufacturer IKEA of Sweden AB
Rating AC Input: 100-120 V, 60 Hz, 24 W
Class I



Rating plate

2.2 Test set up and EUT photos

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

2.3 Purpose of the test.

The purpose of the tests was to verify that the EUT fulfills the requirements according to FCC 47 CFR Part 15: Radio frequency device, Subpart B: Unintentional radiators Class B and ICES-005 Issue 5: Lighting Equipment, Class B.

2.4 Additional information about the EUT

The EUT was tested in a tabletop standing configuration.
The EUT was tested with the following cables

Port	Type	Length [m]	Specifications
AC Mains	Three-core	*	

*The EUT did not come with a fixed cable. The cable was attached by the engineer and the length of the cable differs depending on the test setup.

3. TEST SPECIFICATIONS

3.1 Standards

Requirements:

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

ICES-005 Issue 5: Lighting equipment.

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 120 V, 60 Hz.

3.5 Compliance

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

Conducted emission requirements:

The EUT shall meet the limits for the standards.

Reference: 47 CFR §15.107
ICES-005, section 4.5.1

Limits for conducted emission according to FCC and ICES-005

Class B

Frequency range [MHz]	Limits [dB μ V]	
	Quasi-Peak	Average
0.15 – 0.50	66 – 56	56 – 46
0.50 – 5.00	56	46
5.00 – 30.0	60	50

Radiated Emission requirements:

The EUT shall meet the limits for the standards.

Reference: 47 CFR §15.109
ICES-005, section 4.5.2

Limits for radiated emission according to FCC and 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	33.0	Quasi Peak
216 – 1000/ ICES	46.0	35.5	Quasi Peak
216 – 960/ FCC	46.0	35.5	Quasi Peak
960 – 1000/ FCC	54.0	43.5	Quasi Peak
Above 1000/ FCC	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))

4. TEST SUMMARY

The results in this report apply only to sample tested:

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 12.8 dB at 0.178 MHz and 0.254 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 26.4 dB at 946.950 MHz See clause 6.5.	PASS

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

5.1 Operating environment

Date of test:	Temperature:	Relative Humidity:
2019-01-02	23 [°C]	14 [%]

5.2 Test set-up 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.

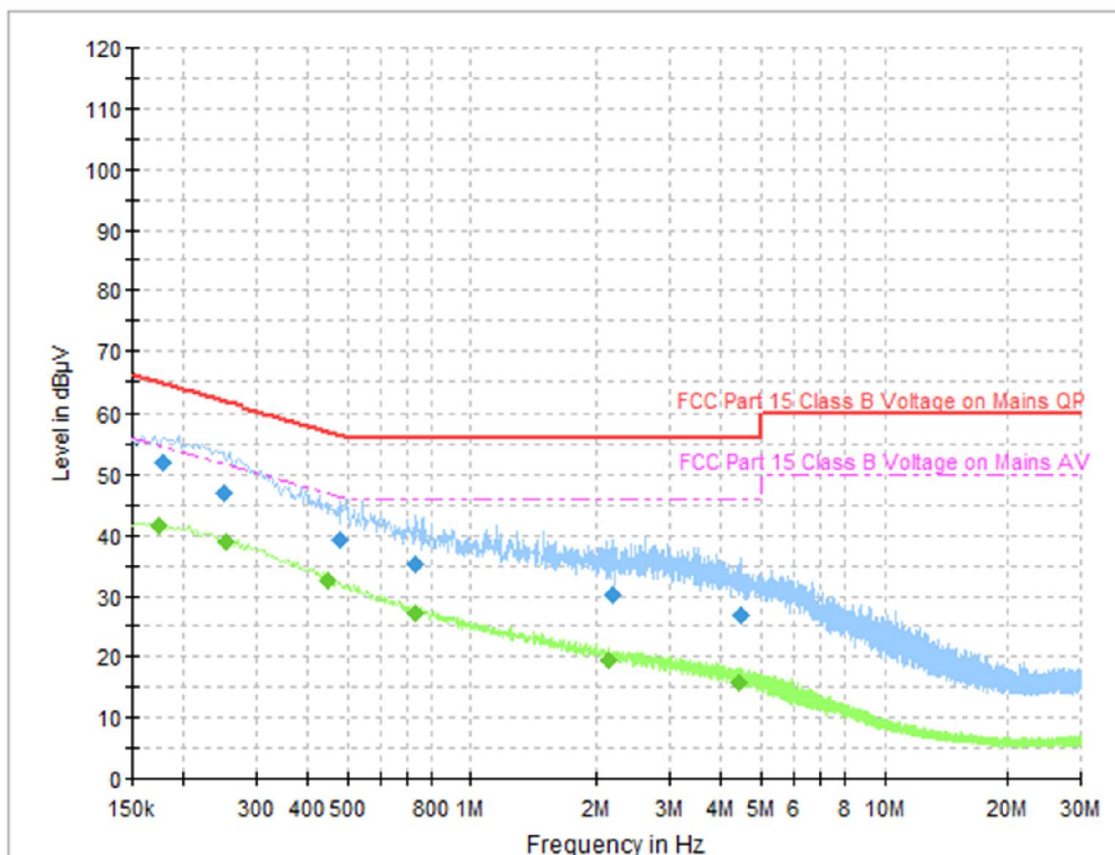
The EUT was placed on an insulating support 0.8 m above the floor, 0.4 m from the vertical reference ground plane (RGP) and 0.8 m from the AMN/ISN.

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]	Level [dBμV]	Limit [dBμV]	Line L/N	Margin [dB]
0.178	51.8	64.6	L	12.8
0.250	46.9	61.8	L	14.9
0.482	39.1	56.3	N	17.2
0.734	35.0	56.0	N	21.0
2.182	30.3	56.0	N	25.7
4.454	26.7	56.0	L	29.3

Measurement results, Average, Class B

Frequency [MHz]	Level [dBμV]	Limit [dBμV]	Line L/N	Margin [dB]
0.174	41.7	54.8	N	13.1
0.254	38.8	51.6	N	12.8
0.450	32.4	46.9	N	14.5
0.734	27.1	46.0	N	18.9
2.130	19.6	46.0	N	26.4
4.406	15.8	46.0	L	30.2

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
Receiver	Rohde & Schwarz	ESCI	12741	07-2018	1 year
AMN / LISN	Rohde & Schwarz	ESH3-Z5	5875	07-2018	1 year
Pulse limiter	Rohde & Schwarz	ESH3-Z2	32798	07-2018	1 year
Coaxial cable	Suhner	RG 223/U	9784	07-2018	1 year

6. RADIATED RF EMISSION IN THE FREQUENCY-RANGE 30 MHZ – 1 GHZ

6.1 Operating environment

Date of test:	Temperature:	Relative Humidity:
2019-01-02	23 [°C]	14 [%]

6.2 Test set-up and test procedure

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

The EUT was set up in order to emit maximum disturbances.

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

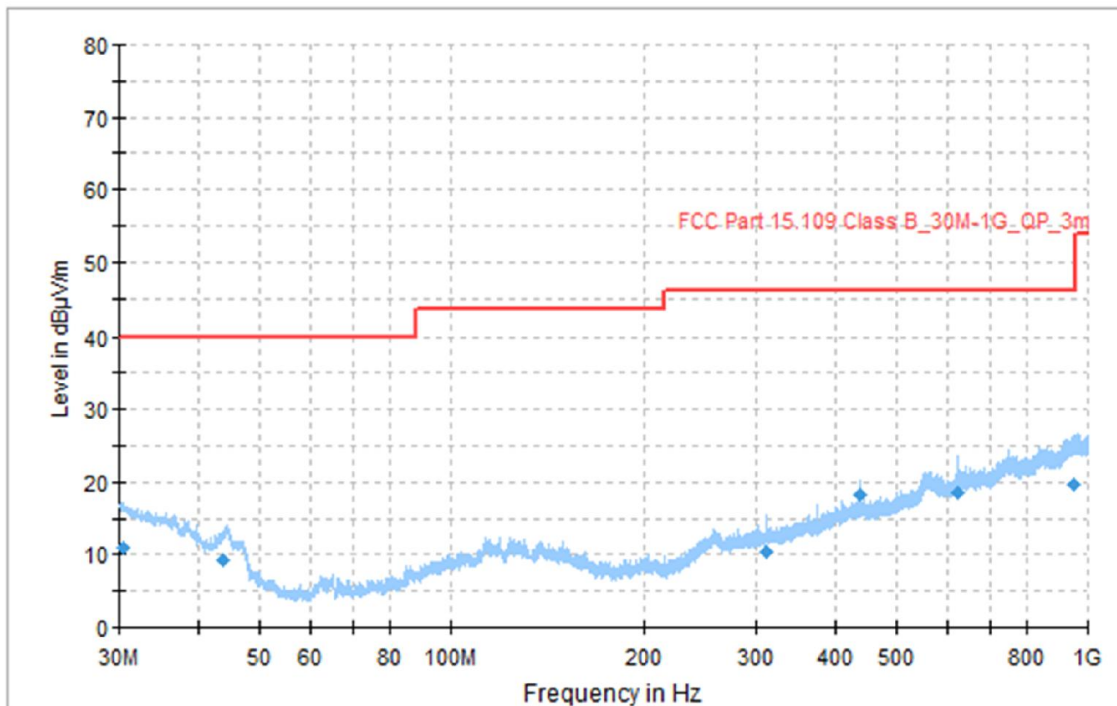
Test set-up:	30 – 1000 MHz		
Test receiver set-up:			
Preview test:	Peak,	RBW 120 kHz	VBW 1 MHz
Final test:	Quasi-Peak,	RBW 120 kHz	
Measuring distance:	3 m		
Measuring angle:	0 – 359°		
Antenna			
Height above ground plane:	1 – 4 m		
Polarisation:	Vertical and Horizontal		
Type:	Bilog		

6.4 Measurement uncertainty

Measurement uncertainty for radiated disturbance
Uncertainty for the frequency range 30 to 1000 MHz at 3 m ± 5.1 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, Class B



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m.

Measurement results, Quasi Peak, Class B

Frequency [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
30.390	11.0	40.0	H	29.0
43.710	9.2	40.0	V	30.8
312.510	10.3	46.0	V	35.7
437.565	18.3	46.0	H	27.7
625.110	18.6	46.0	V	27.4
946.950	19.6	46.0	H	26.4

Includes the test result for radiated emission according to ICES-005

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

6.6 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Receiver	Rohde & Schwarz	ESW 44	33890	2018-02	1 year
Bilog antenna	Chase	CBL 6111A	971	2017-09	3 years
Control device	ETS-Lindgren	2090	32522	-	-
Control device	Mature GMBH	NCD	33670	-	-
Pre amplifier	Semko	-	7992	2018-10	1 year