

EMC TEST REPORT

No. 1816345STO-001, Ed. 3

Electromagnetic disturbances

EQUIPMENT UNDER TEST

Equipment: Decoration lamp with LED
Type/Model: J1826 Stråla
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 4: Lighting Equipment, Class B.

ICES-005 Issue 5: Lighting Equipment, Class B.

For details, see clause 2 – 4.

Date of issue: October 01, 2019

Tested by:


Ann-Christine Norrström

Approved by:


Per Granberg

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Revision History

Edition	Date	Description	Changes
1	2018-12-20	First release	
2	2019-08-23	Second release	The report was updated according to order number 1915582. Standard issue ICES-005 Issue 5 is added as there are no differences compared to ICES-005 Issue 4 that affect the tests performed.
3	2019-10-01	Third release	Clause 2.4 Opinions and interpretations added. Test set up and EUT photos are enclosed in Annex 1 to this test report.

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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
	SVERIGE

Name of contact	Jianqiu Chen
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2. EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT

Equipment	Decoration lamp with LED
Type/Model	J1826 Stråla
Brand name	IKEA
Serial Number	
Manufacturer	IKEA of Sweden AB
Rating	2x1.2 V (rechargeable batteries)
Class	III
Highest clock frequency	-
Software version	-



Conforms to:
UL Std 588
Certified to:
CSA Std C22.2 No. 37 CAN
ICES-005 (B) / NMB-005 (B)

Type No. J1826

Sup. No. 00000

Stråla

Made in



TYP J1826 NA Version 1

Rating plate

2.2 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, ICES-005 Issue 4 and ICES-005 Issue 5.

2.3 Additional information about the EUT

The EUT was tested in a tabletop standing configuration.

2.4 Opinions and interpretations

The change of standard from ICES-005 Issue 4 to ICES-005 Issue 5 does not affect the measurements performed in this report. The tests performed according to ICES-005 Issue 4 fulfils the requirements of ICES-005 Issue 5.

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

3. TEST SPECIFICATIONS

3.1 Standards

Requirements:

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

ICES-005 Issue 4: Lighting Equipment.

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
BJÖRKHALLEN	Semi-anechoic 3 m	2042G-1

3.4 Mode of operation during the test

The EUT was tested with 120 V, 60 Hz.

The EUT was tested with light on + battery charging during Conducted emission.

With light on + battery charging in standby and battery mode during Radiated emission.

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 [dBμV]	
	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

Class B

Frequency range [MHz]	Field strength at 3 m (dBμV/m)	Field strength at 10 m (dBμV/m)	Detector
30 – 88	40.0	29.5	Quasi Peak
88 – 216	43.5	33.0	Quasi Peak
216 – 960	46.0	35.5	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 (dBμV/m)	Field strength at 10 m (dBμV/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:

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 28.2 dB at 0.984 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 10.9 dB at 116.412 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:
2018-10-17	23 [°C]	49 [%]

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.

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.

Photo of the test set-up for conducted emission

5.3 Measurement uncertainty

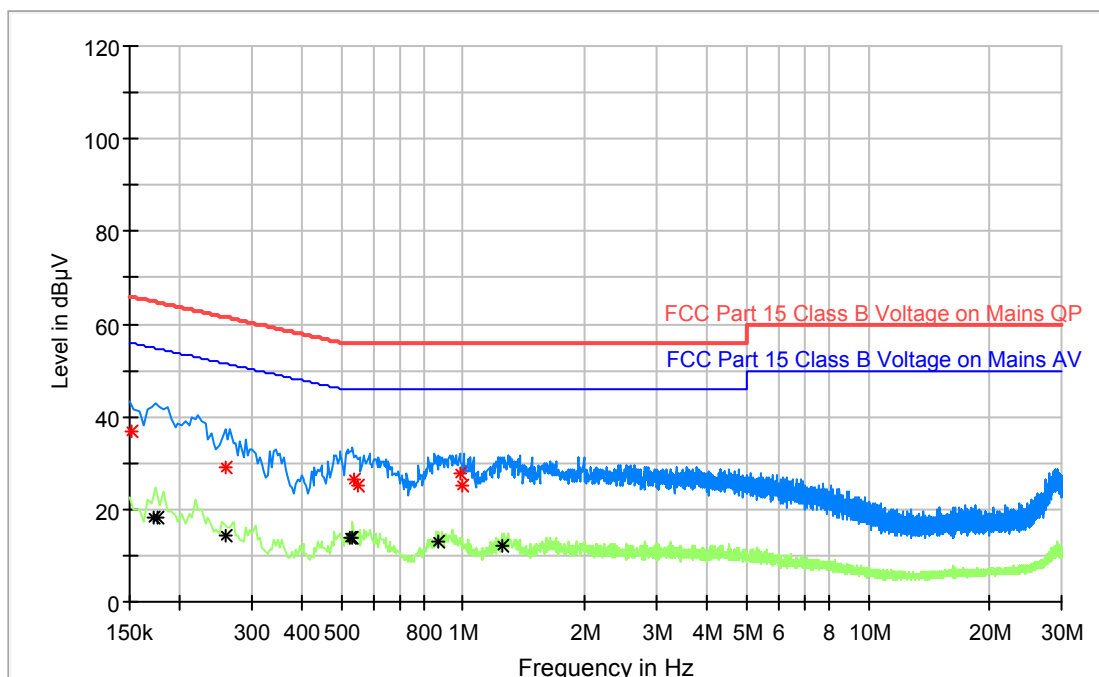
Continuous conducted disturbances with AMN
in the frequency range 150 kHz to 30 MHz

± 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, operation mode battery charging + light on



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	36.7	65.9	N	29.2
0.260	28.9	61.5	N	32.6
0.536	26.6	56.0	N	29.4
0.548	25.1	56.0	L	30.9
0.984	27.8	56.0	L	28.2
0.992	25.1	56.0	L	30.9

Measurement results, Average, Class B

Frequency [MHz]	Result [dBμV]	Limit [dBμV]	Line L/N	Margin [dB]
0.173	18.0	54.8	N	36.8
0.176	18.1	54.7	N	36.6
0.260	14.4	51.5	N	37.1
0.528	13.7	46.0	N	32.3
0.532	13.8	46.0	N	32.2
0.872	12.8	46.0	N	33.2
1.248	12.1	46.0	N	33.9

All other measured disturbances have a margin of more than 20 dB to the limits.

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
Measurement software	Rohde & Schwarz	EMC32 -9	--	--	--
Receiver	Rohde & Schwarz	ESCI	12804	2018-07-04	1 year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	32455	2018-07-04	1 year
AMN	Rohde & Schwarz	ESH3-Z5	2728	2018-07-09	1 year
Coaxial cable	Suhner	RG 58	9728	2018-01-18	1 year
Coaxial cable	Suhner	G03232 D-01	9701	2018-08-01	1 year

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

6.1 Operating environment

Date of test:	Temperature:	Relative Humidity:
2018-12-07/2018-12-17	23/21 [°C]	31/23 [%]

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 and 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

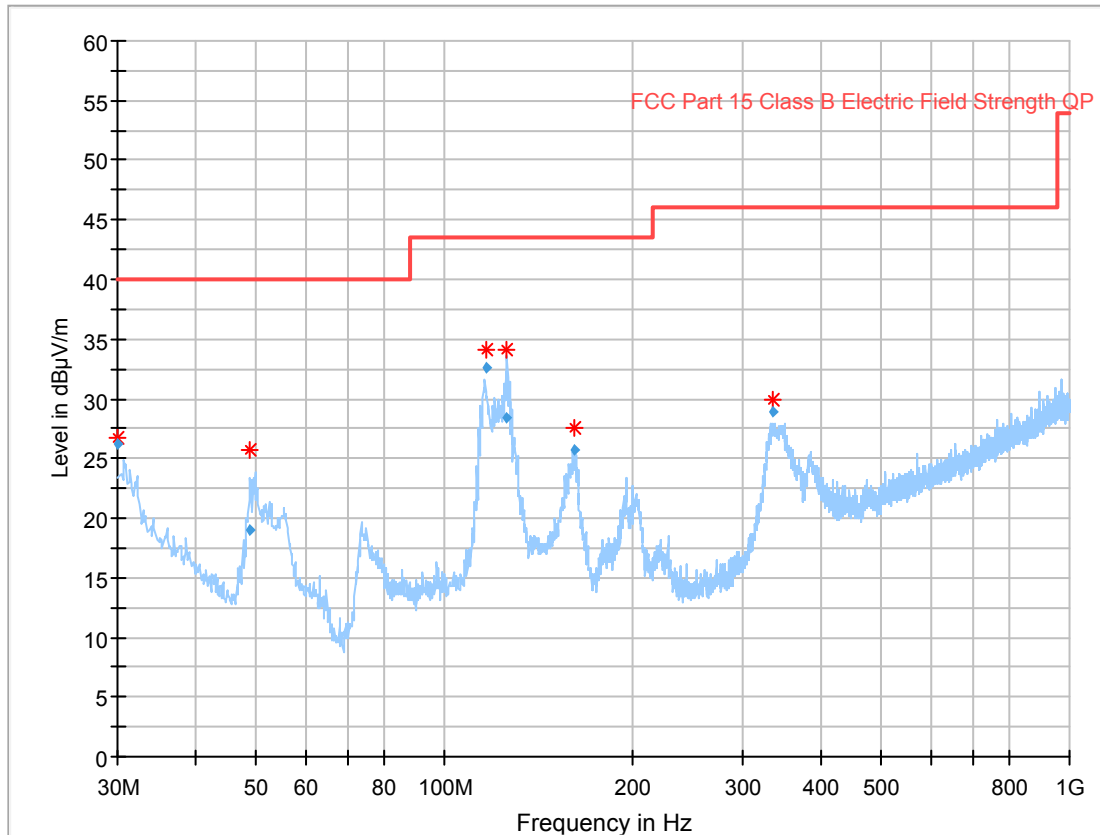
Uncertainty for the frequency range 30 to 1000 MHz at 3 m	± 5.1 dB
Uncertainty for the frequency range 30 to 1000 MHz at 10 m	± 5.0 dB

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 at 3 m distance, Class B, operation mode battery charging + light on

Full Spectrum



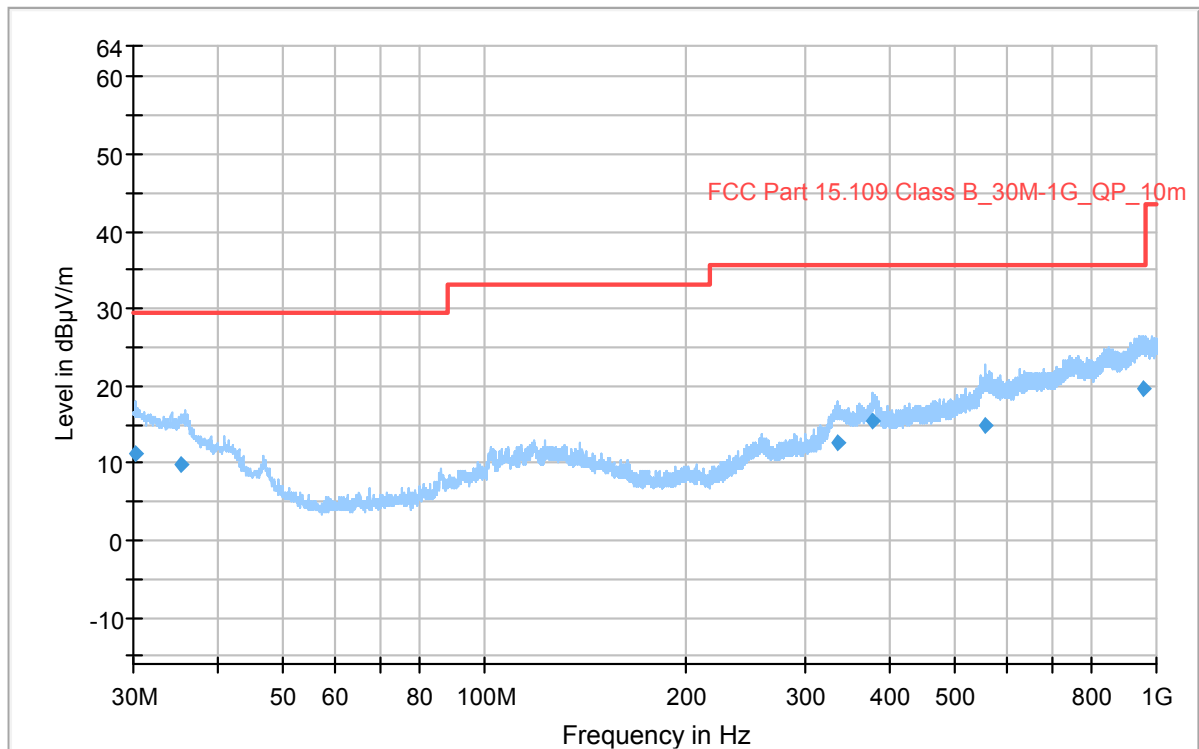
Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance.

Measurement results, Quasi Peak, Class B

Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
30.060	26.3	40.0	V	13.7
48.920	18.9	40.0	V	21.1
116.412	32.6	43.5	H	10.9
126.072	28.4	43.5	H	15.1
160.984	25.7	43.5	V	17.8
336.331	29.0	46.0	V	17.0

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

6.6 Test results, 30 – 1000 MHz at 10 m distance, Class B, operation mode battery

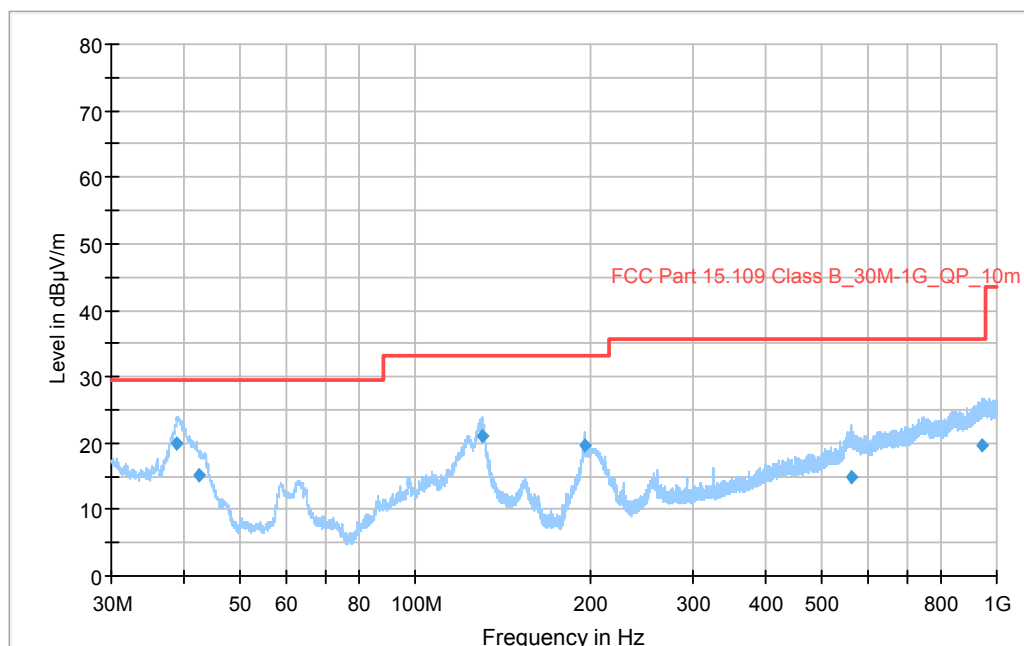


Diagram, Peak overview sweep, 30 – 1000 MHz at 10 m distance.

Measurement results, Quasi Peak, Class B

Frequency [MHz]	Result [dBµV/m]	Limit [dBµV/m]	Polarization H/V	Margin [dB]
30.180	11.1	29.5	V	18.4
35.250	9.9	29.5	V	19.6
335.430	12.8	35.6	H	22.8
376.860	15.3	35.6	H	20.3
555.000	14.9	35.6	V	20.7
958.140	19.6	35.6	V	16.0

6.7 Test results, 30 – 1000 MHz at 10 m distance, Class B, operation mode standby



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]
38.970	19.8	29.5	V	9.7
42.360	15.2	29.5	V	14.3
130.170	21.1	33.1	V	12.0
195.150	19.6	33.1	V	13.5
561.720	14.9	35.6	V	20.7
944.820	19.7	35.6	V	15.9

6.8 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32 - 9	--	--	--
Measurement Receiver	Rohde & Schwarz	ESIB26	32288	2018-02-22	1 year
Antenna	Rohde & Schwarz	HL562	30711	2018-01-25	3 year
Transformer	Tufvassons	AFM1500	30317	--	--
Measurement cable	Radiall	SHF8M	9975	2018-08-03	1 year
Measurement cable	Rosenberger	UFB311A	39055	2018-05-02	1 year
Measurement software	Rohde & Schwarz	EMC32 - 8	--	--	--
Measurement Receiver	Rohde & Schwarz	ESW44	33890	2018-07-04	1 year
Bilog antenna	Chase	CBL 6111A	971	2017-09-20	3 years
Measurement cable	Rosenberger	LA5-S003-7000	39162	2018-10-01	1 year
Measurement cable	Huber & Suhner	Sucoflex 106	39122	2017-12-21	1 year