

# EMC TEST REPORT

No. 2010349STO-104

## Electromagnetic disturbances

### EQUIPMENT UNDER TEST

Equipment: Luminaire with LED  
Type/Model: L2005 Halvklart  
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: March 13, 2020

Tested by:

  
Anna Näslund

Approved by:

  
Per Granberg

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**Revision History**

Test report number	Date	Description	Changes
2010349STO-104	March 13, 2020	First release	

**CONTENTS**

	<b>Page</b>
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 .....	5
3. Test Specifications .....	6
3.1 Standards .....	6
3.2 Additions, deviations and exclusions from standards and accreditation .....	6
3.3 Test site .....	6
3.4 Mode of operation during the test .....	6
3.5 Compliance .....	7
4. Test Summary .....	8
5. Conducted continuous disturbances .....	9
5.1 Operating environment.....	9
5.2 Test setup and test procedure .....	9
5.3 Measurement uncertainty.....	9
5.4 Test results, AC Power input port, Class B.....	10
5.5 Test equipment .....	11
6. Radiated rf Emission in the frequency-range 30 MHz – 1 GHz .....	12
6.1 Operating environment.....	12
6.2 Test setup and test procedure .....	12
6.3 Test conditions .....	12
6.4 Measurement uncertainty.....	12
6.5 Test results, 30 – 1000 MHz, FCC, Class B .....	13
6.6 Test equipment .....	14

**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: Markus Mauritzon

**2. EQUIPMENT UNDER TEST (EUT)**

**2.1 Identification of the EUT**

Equipment: Luminaire with LED  
 Type/Model: L2005 Halvklart  
 Brand name: IKEA  
 Serial Number: -  
 Manufacturer: IKEA of Sweden  
 Rating: Luminaire: 5 V DC, 1 W  
 LED driver: Input: 100 – 240 V, 50 – 60 Hz, Max 0.2 A, 7 W  
 Output: 5 V DC, Max 1 A, 5 W  
 Class: Luminaire: III  
 LED driver: II  
 Highest clock frequency: <108 MHz  
 FCC ID: FHO-L2005

  
 Intertek  
 ???????  
 Type No. L2005  
 Halvklart  
 Made in

Conforms to: UL Std 153 Certified to: CSA  
 Std C22.2 No. 250.4  
 CAN ICES-005 (B) / NMB-005 (B)  
 This device complies with Part 15 of the FCC  
 Rules. Operation is subject to the following  
 two conditions: (1) this device may not  
 cause harmful interference, and (2) this  
 device must accept any interference  
 received, including interference that may  
 cause undesired operation.

FCC ID: FHO-L2005

Sup. No.00000



TYP L2005 NA Version 1

**Rating plate (draft)**

**2.2 Test set up and EUT photos**

Test set up and EUT photos are enclosed in Annex 1 No. 2010349STO-005 to this report.

### 2.3 Additional information about the EUT

The EUT was tested in a tabletop configuration.  
The EUT consists of the following units:

Units	Type	Serial number
Luminaire	L2005 Halvklart	-
LED driver	ICPSW5-5NA-1	-

The EUT was equipped with the following cables:

Port	Type	Length [m]	Specifications
DC power cable	ICPUS-1 1	1.95	USB port

**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 #
5 m CHAMBER	Semi-anechoic 5 m	2042G-3

**3.4 Mode of operation during the test**

The EUT was tested with 120 V, 60 Hz.

The EUT was tested with lights on

**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 5.5.2

**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 5.5.3

**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	33.1	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 (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
	<b>Emission</b>	
<b>FCC Part 15 subpart B</b>  <b>ICES-005</b>	<b>Conducted continuous emission in the frequency range 0.150 – 30 MHz, AC Power input port</b>  The EUT complies with the Class B limits. The margin to the limit was at least 17.8 dB at 0.557 MHz See clause 5.4.	<b>PASS</b>
<b>FCC Part 15 subpart B</b>  <b>ICES-005</b>	<b>Radiated emission of electromagnetic fields in the frequency range 30 – 1000 MHz</b>  The EUT complies with the Class B limits. The margin to the limit was at least 11.9 dB at 54.510 MHz See clause 6.5.	<b>PASS</b>
<b>FCC Part 15 subpart B</b>  <b>ICES-005</b>	<b>Radiated emission of electromagnetic fields in the frequency range &gt;1.0 GHz</b>  Not Applicable. The highest clock frequency of the EUT is below 108 MHz.	<b>N/A</b>

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

### 5.1 Operating environment

Date of test:	Temperature:	Relative Humidity:
March 11, 2020	22 [°C]	32 [%]

### 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

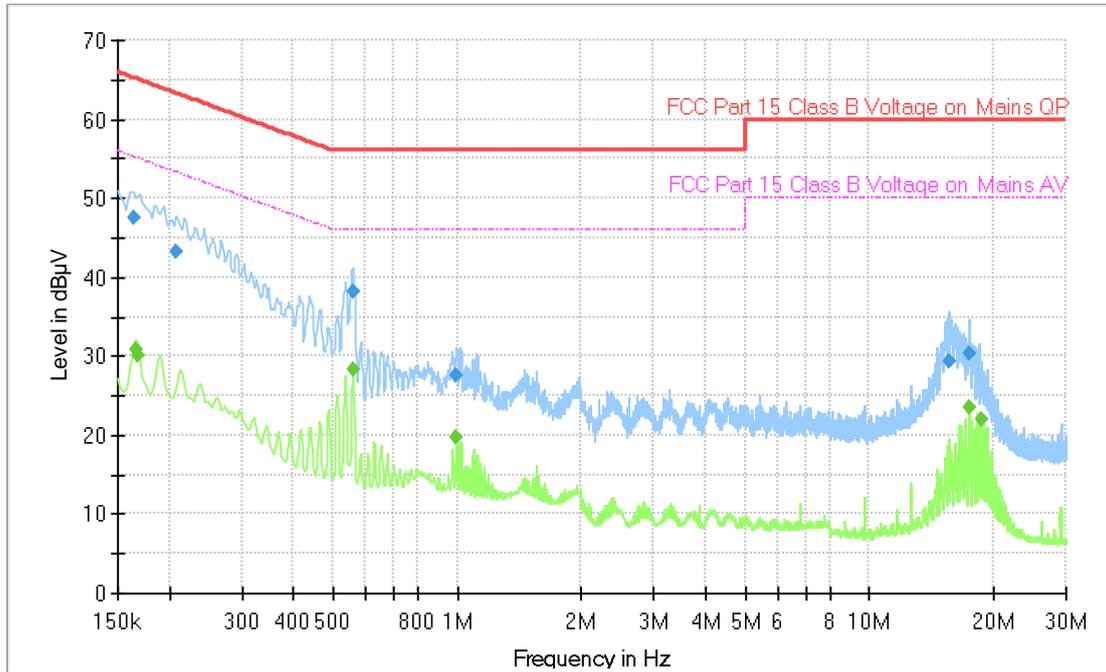
Continuous conducted disturbances with AMN  
in the frequency range 150 kHz to 30 MHz

± 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]
0.163	47.5	65.3	L	17.8
0.557	38.2	56.0	N	17.8

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

Measurement results, Average, Class B

Frequency [MHz]	Result [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0.557	28.2	46.0	N	17.8

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 - Version	--	--	--
Receiver	Rohde & Schwarz	ESU8	12866	06-2019	1 year
AMN / LISN	Rohde & Schwarz	ESH3-Z5	2728	06-2019	1 year
Pulse limiter	Rohde & Schwarz	ESH3-Z2	4623	03-2019	1 year
Cable	Suhner	G03232 D-01	9701	06-2019	1 year
Cable	Suhner	RG 223/U	9815	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:
March 6, 2020	20 [°C]	27 [%]

**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  
 EUT was placed on turntable which is part of the reference ground plane. ( If insulation is used then)  
 EUT was insulated from RGP with 12 mm thick support.  
 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**

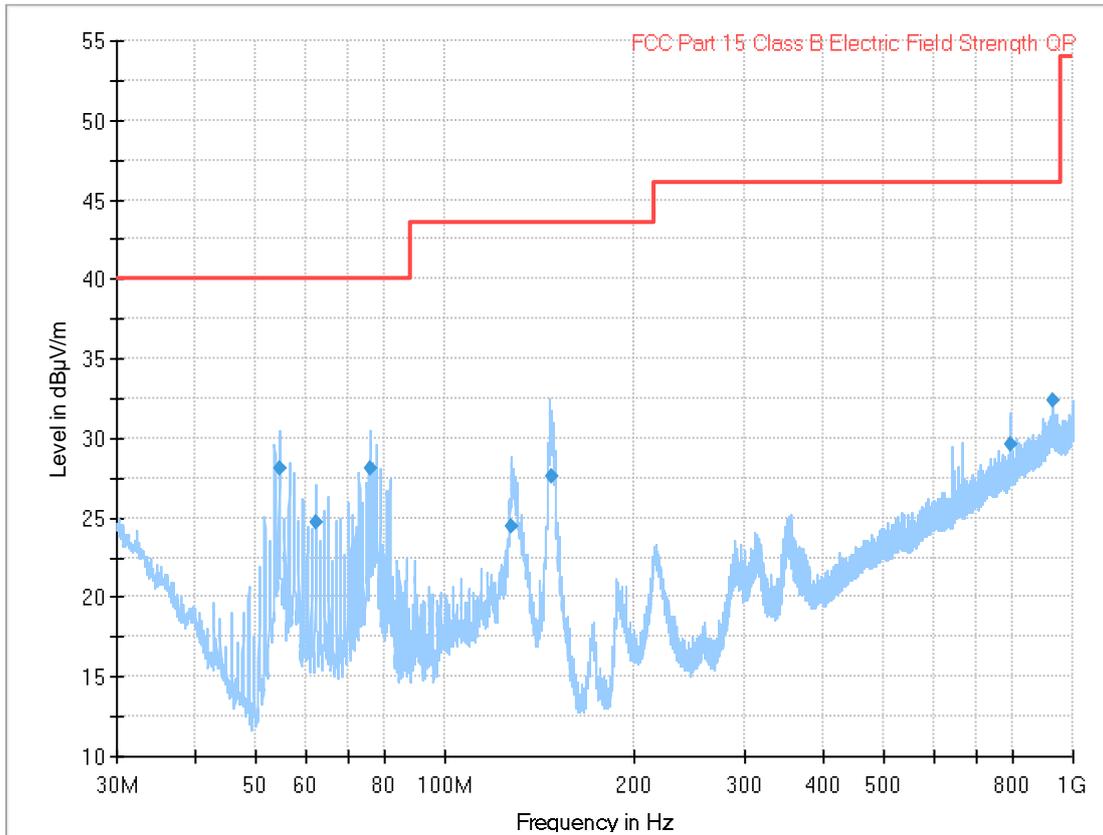
**Test setup:** **30 – 1000 MHz**  
 Test receiver set-up:  
 Preview test: Peak, RBW 120 kHz VBW 1 MHz  
 Final test: Quasi-Peak, RBW 120 kHz

Measuring distance: 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, FCC, Class B



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]
54.510	28.1	40.0	V	11.9
62.310	24.7	40.0	V	15.3
75.930	28.1	40.0	V	11.9
127.560	24.5	43.5	V	19.0
147.330	27.6	43.5	V	15.9
796.240	29.6	46.0	H	16.4
927.760	32.3	46.0	H	13.7

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

The test results are valid for ICES-005, class B as well.

**6.6 Test equipment**

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32 -	--	--	--
Measurement Receiver	Rohde & Schwarz	ESW 44	33950	06-2019	1 year
Antenna	Rohde & Schwarz	HL562	32310	05-2019	3 years
Measurement cable	Suhner	Sucoflex 104	39033	09-2019	1 year
Measurement cable	Suhner	Sucoflex 104	39003	09-2019	1 year
Measurement cable	Rosenberger	UFB311A	39053	03-2019	1 year
Temperature meter	Vaisala	HM41	32403	09-2019	1 year