EMC TEST REPORT

No. 2202565STO-101

Electromagnetic disturbances

EQUIPMENT UNDER TEST

Equipment:	Lighting chain for outdoor use with LED
Type/Model:	J1727 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 Part 15 Subpart B (2015): Radio frequency device, Subpart B: Unintentional radiators. Class B equipment.

ICES-005 Issue 4 (2015): Lighting Equipment – Limits and methods of measurement, Class B equipment

For details, see clause 2 – 4.

Date of issue: April 1, 2022

Tested by: Viktor Uusimaa

Approved by: Lovisa Gibson

Revision History

Test report no.	Release no.	Date of issue	Description
1715633STO-001, Ed. 1	1	September 29, 2017	
2202565STO-101	2	April 1, 2022	New report without photos. Photos of test setup and EUT are moved to 2202565STO-102, Annex 1

Terms, definition and abbreviations

The following terms, definitions and abbreviations may be used throughout the report.

Term/definition/abbreviation	Meaning
AAN	Asymmetrical Artificial Network
AC	Alternating Current
AE	Associated Equipment
AMN	Artificial Mains Network
ANSI	American National Standards Institute
AV	Average
BW	Bandwidth
CAV	CISPR Average
CFR	Code of Federal Regulations
CISPR	Comité international spécial des perbutations radioélectriques
CM	Common Mode
CMAD	Common Mode Absorption Device
DC	Direct Current
DM	Differential Mode
EM	Electromagnetic
EMC	Electromagnetic Compatibility
EUT	Equipment Under Test
F	Fail
FAR	Fully Anechoic Room
FCC	Federal Communications Commission
F_X	Highest fundamental frequency generated or used within the EUT, or highest frequency at which it operates
ICES	Interference-Causing Equipment Standard
H	Horizontal
I_{ref}	Reference Current
ISN	Impedance Stabilizing Network
MU	Measurement Uncertainty
N/A	Not Applicable
P	Pass
PE	Protective Earth
PK	Peak
Pol.	Polarisation
QP / QPK	Quasi-Peak
RBW	Resolution Bandwidth
RF	Radio Frequency
RGP	Reference Ground Plane
RH	Relative Humidity
RMS	Root Mean Square
Rx	Receiver / Receiving
SAC	Semi-Anechoic Chamber
Tx	Transmitter / Transmitting
V	Vertical
VBW	Video Bandwidth

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1. CLIENT INFORMATION

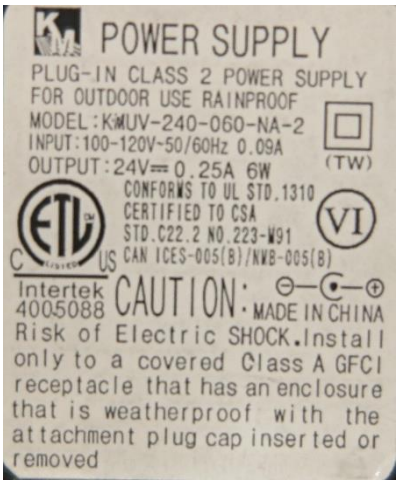
The EUT has been tested by request of

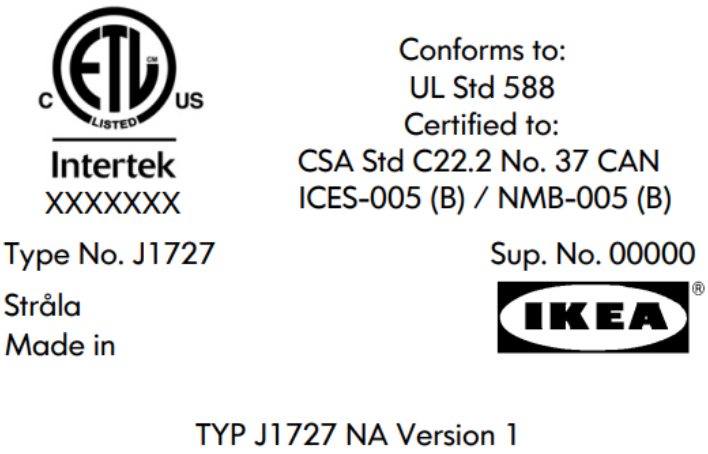
Company	IKEA of Sweden AB Box 702 342 81, Älmhult SWEDEN
Name of contact	Stefan Backlund
Client observer	-

2. EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT

Equipment:	Lighting chain for outdoor use with LED								
Type/Model:	J1727 Stråla								
Brand name:	IKEA								
S/N:	-								
Manufacturer:	IKEA of Sweden AB								
Highest clock frequency, F_X:	< 108 MHz								
Software version:	-								
Hardware version:	-								
Mounting position: (during normal use)	☐ Table-top ☐ Floor-standing ☐ Wall/ceiling ☐ Hand-held ☒ Other:								
Supplementary information:									
Input ratings	**Voltage [V]**	**Freq. [Hz]**	**Current [A]**	**Power [W]**	**Coupling**				
☒ AC	100-120	50/60	0.09	-	**L1** ☒	**L2** ☐	**L3** ☐	**N** ☒	**PE** ☐
☒ DC	24	-	0.25	6	**V+** ☒	**V-** ☒			**PE** ☐
☐ Battery					**V+** ☐	**V-** ☐			**PE** ☐
☐ Other:									





Photo/copy of marking/rating plate(s)

2.2 Test set up and EUT photos

Test set up and EUT photos are enclosed in 2202565STO-102, Annex 1.

The EUT has the following ports:

Port type	Port name	Shielded
AC I/O		
☒ AC power input	AC Mains*	☐
☐ AC power output		☐
DC I/O		
☒ DC power input	DC power	☐
☐ DC power output		☐
Signal/control I/O		
☐ Telecom/network		☐
☐ Signal/control		☐
Supplementary information: *This port refers to the LED driver of the EUT.		

The EUT ports were connected according to the following:

Port name	Cable type	Connected to
DC power	Two core	LED-driver

2.3 Additional information about the EUT

The EUT consists of a lighting chain and a LED-driver, KMUV-240-060-NA-2

2.4 Decision rule

The statements of conformity are reported as:
Passed – When the measured values are within the specified limits.
Failed – When one or more measures values are outside the specified limits.

3. TEST SPECIFICATIONS

3.1 Additions, deviations and exclusions from standards and accreditation

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

3.2 Test site

Measurements were performed at:

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

Intertek Semko AB is an FCC listed test site with site registration number 90913
Intertek Semko AB is an 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
☒ 5 m CHAMBER	Semi-anechoic 5 m	2042G-3

3.3 Mode of operation during the test

Mode no.	Supply	Description
1	120 V, 60 Hz	Light turned on

Test	Mode of operation
Conducted continuous emission	1
Radiated emission of EM fields	1

4. TEST SUMMARY

The test has been carried out at the Intertek Semko AB premises in Kista, Sweden.
The results in this report apply only to sample tested.
Result: P – F – N/A

EMISSION TESTS					
Chapter	**Standard(s)**	**Description**	**Port type(s)**	**Note(s)**	**Verdict**
5	ANSI C63.4	Conducted continuous emission	AC input	-	P
5	CISPR 15	Conducted continuous emission	AC input	-	P
6	ANSI C63.4	Radiated emission of EM fields	Enclosure	-	P
6	CISPR 15	Radiated emission of EM fields	Enclosure	-	P
Supplementary information:					

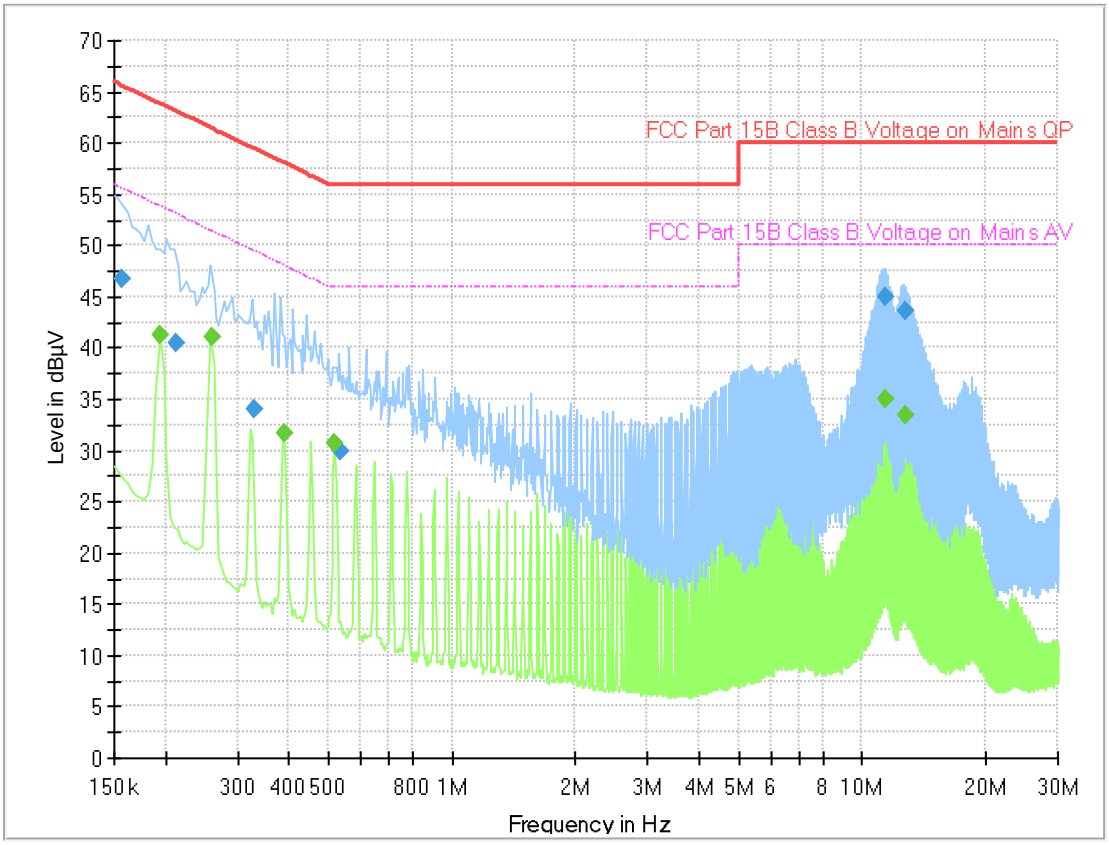
5. CONDUCTED CONTINUOUS DISTURBANCES in the frequency-range 0.15 – 30 MHz

Date of test	Temp. [°C]	Humidity [%RH]	Tested by
September 5, 2017	22	41	Urban Hollström Stevan Skrobic

Test setup and procedure:	EUT was placed 0.8 m from the AMN /ISN. Overview sweeps were performed for each lead of the cable(s). AE requiring mains power to operate was/were connected to AMN /ISN terminated with 50 Ω, when applicable.		
EUT position:	☒ Table-top (EUT 0.4 m from the RGP) ☐ Floor-standing (EUT 12 mm from the RGP) ☐ Other:		
Tested port type(s):	**Coupling device**	**Measurement uncertainty**	
		Frequency range	**Value**
☒ AC power	☒ AMN	0.15 – 30 MHz	± 3.3 dB
Supplementary information: Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2011. The measurement uncertainty is given with a confidence of 95 %.			

Port	**Frequency [MHz]**	**Voltage limits [dBµV] (2)**	
		QP	**AV**
Limits FCC Part 15 subpart B and ICES-005			
☐ AC power input Class A	0.15 – 0.50	79	66
	0.50 – 30.0	73	60
☒ AC power input Class B	0.15 – 0.50	66 – 56 (1)	56 – 46 (1)
	0.50 – 5.00	56	46
	5.00 – 30.0	60	50
Supplementary information: (1) The limits decrease linearly with the logarithm of the frequency. (2) At transitional frequencies the lower limit applies.			

5.1 Test results, AC Power input port, Class B



Diagram, Peak and AV overview sweep

Measurement results, Quasi-peak

Frequency [MHz]	Quasi Peak [dBµV]	Limit [dBµV]	Line	Margin [dB]
0.157	46.8	65.6	L1	18.8
0.213	40.4	63.1	L1	22.7
0.331	34.1	59.4	L1	25.3
0.537	30.0	56.0	L1	26.0
11.394	45.0	60.0	L1	15.0
12.689	43.7	60.0	L1	16.3

Measurement results, Average

Frequency [MHz]	Average [dBµV]	Limit [dBµV]	Line	Margin [dB]
0.194	41.2	53.9	L1	12.7
0.259	41.1	51.5	N	10.4
0.389	31.8	48.1	L1	16.3
0.518	30.7	46.0	L1	15.3
11.395	35.0	50.0	N	15.0
12.752	33.5	50.0	N	16.5

5.2 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32 - 9	--	--	--
Receiver	Rohde & Schwarz	ESCI	12741	07-2017	1 year
Pulse limiter	Rohde & Schwarz	ESH3-Z2	32798	07-2017	1 year
AMN / LISN	Rohde & Schwarz	ESH3-Z5	5875	07-2017	1 year
Coaxial cable	SUHNER	RG 223/U	9784	08-2017	1 year
Coaxial cable	Bedea	RG223	39024	08-2017	1 year
Multimeter	GOSSEN METRAWATT	Metra Hit 16S	7725	06-2017	1 year

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

Date of test	Temp. [°C]	Humidity [%RH]	Tested by
2017-09-08	22	40	Urban Hollström Stevan Skrobic

Test setup and procedure:	The EUT was placed on a non-conductive support on the RGP. Overview sweeps were performed with the measurement receiver in max hold mode and the peak detector activated in the frequency range 30 – 1000 MHz. Above 1 GHz, both the peak and average detectors were activated, when applicable. During height scan above 1 GHz the EUT was kept in antennas cone of radiation.
EUT position:	☒ Table-top (EUT 0.8 m from the RGP) ☐ Floor-standing (EUT 12 mm from the RGP) ☐ Other:
Highest measured frequency:	☒ F_X ≤ 108 MHz: 1 GHz ☐ 108 MHz < F_X ≤ 500 MHz: 2 GHz ☐ 500 MHz < F_X ≤ 1 GHz: 5 GHz ☐ F_X > 1 GHz: 5 x F_X up to a max. of 40 GHz ☐ F_X is unknown: 40 GHz

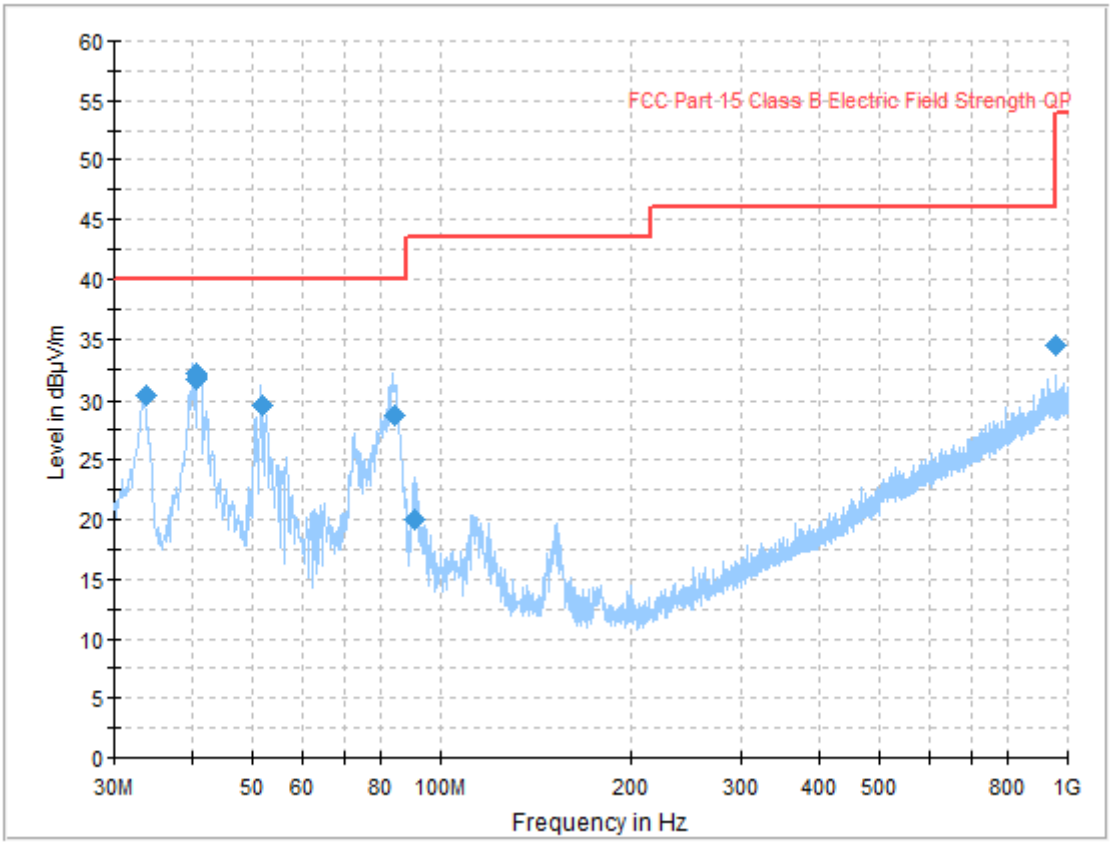
Frequency range:	Measuring distance	Measurement uncertainty
☒ 30 to 1000 MHz	3 m	± 5.1 dB
☐ 30 to 1000 MHz	10 m	± 5.0 dB
☐ 1.0 to 18 GHz	3 m	± 4.5 dB
☐ 18 to 26 GHz	3 m	± 4.8 dB
☐ 26 to 40 GHz	3 m	± 5.7 dB

Supplementary information: Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2011. The measurement uncertainty is given with a confidence of 95 %.

Test	Freq. [MHz]	Meas. angle [°]	Antenna			RBW [kHz]			VBW [kHz]
			Type	Height	Pol.	QP	PK	AV	PK
Preview	30 – 1000	0 – 359	Bilog	1 – 4 m	V and H	-	120	-	1000
Final						120	-	-	-
Preview	1000 – 40000	0 – 359	Horn	1 – 4 m		-	1000	1000	3000
Final						-	1000	1000	-

Measurement distance [m]	Frequency [MHz]	Limits [dBµV/m]		
		QP	PK	AV
Limits, FCC, Class A				
☐ 3 / ☐ 10	30 – 88	49.5 / 39.1	-	-
	88 – 216	54.0 / 43.5	-	-
	216 – 960	56.9 / 46.4	-	-
	960 – 1000	60.0 / 49.5	-	-
☐ 3	Above 1000	-	80.0	60.0
Limits, FCC, Class B				
☒ 3 / ☐ 10	30 – 88	40.0 / 29.5	-	-
	88 – 216	43.5 / 33.1	-	-
	216 – 960	46.0 / 35.6	-	-
	960 – 1000	54.0 / 43.5	-	-
☐ 3	Above 1000	-	74.0	54.0
Limits, ICES-005 Class A				
☐ 3 / ☐ 10	30 – 88	49.5 / 39.1	-	-
	88 – 216	54.0 / 43.5		
	230 – 1000	56.9 / 46.4	-	-
Limits, ICES-005, Class B				
☒ 3 / ☐ 10	30 – 88	40.0 / 29.5	-	-
	88 – 216	43.5 / 33.1	-	-
	230 – 1000	46.0 / 35.6	-	-

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



Diagram, Peak overview sweep

Measurement results, Quasi-peak

Frequency [MHz]	Quasi Peak [dBµV/m]	Limit [dBµV/m]	Pol	Margin [dB]
33.647	30.4	40.0	V	9.6
40.560	32.1	40.0	V	7.9
40.602	31.7	40.0	V	8.3
51.683	29.7	40.0	V	10.3
84.127	28.7	40.0	V	11.3
959.099	34.5	46.0	H	11.5

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

6.2 Test results, 30 – 1000 MHz, ICES-005, Class B

Measurement results, Quasi-peak

Frequency [MHz]	Quasi Peak [dBµV/m]	Limit [dBµV/m]	Pol	Margin [dB]
33.647	30.4	40.0	V	9.6
40.560	32.1	40.0	V	7.9
40.602	31.7	40.0	V	8.3
51.683	29.7	40.0	V	10.3
84.127	28.7	40.0	V	11.3
959.099	34.5	46.0	H	11.5

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

6.3 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32 - 9	--	--	--
Measurement Receiver	Rohde & Schwarz	ESIB26	32286	07-2017	1 year
Antenna	Rohde & Schwarz	HL562	32310	03-2017	1 year
Rotary joint	Spinner	BN 835027	31807	04-2017	1 year
Control platform	Rohde & Schwarz	OSP130	32298	07-2017	1 year
Measurement cable	Rosenberger	UFB311A	39053	04-2017	1 year
Measurement cable	Radiall	SHF8M	9989	07-2017	1 year
Measurement cable	Radiall	SHF8M	9997	07-2017	1 year
Measurement cable	Radiall	SHF8M	39117	07-2017	1 year