

## **IKEA of Sweden AB**

# **TEST REPORT**

#### **SCOPE OF WORK**

EMC TESTING-LED1903C5

## **REPORT NUMBER**

190505025GZU-001

**ISSUE DATE** 

[REVISED DATE]

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## **DOCUMENT CONTROL NUMBER**

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Intertek Report No: 190505025GZU-001, Amendment 1

## **Test standards**

CFR 47, FCC Part 15, Subpart B:2018

## **Sample Description**

Product : Self-ballasted LED lamp

Model No. : LED1903C5

Electrical Rating : 120VAC, 60Hz, 65mA, 5W, E12 base, 11 pcs non-replaceable LEDs.

Serial No. Not Labeled

Date Received : 24 December 2019

Date Test : --

Conducted

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## 1. TEST RESULTS SUMMARY

Classification of EUT: Class B

Test Item	Standard	Result	
Conducted disturbance voltage at mains ports	CFR 47, FCC Part 15, Subpart B	Pass	
Radiated emission (30 MHz-1 GHz)	CFR 47, FCC Part 15, Subpart B	Pass	
Radiated emission (Above 1 GHz)	CFR 47, FCC Part 15, Subpart B	N/A	
Remark:			
Reference publication is used for methods of measurement: ANSI C63.4:2014			

#### Remark:

- 1. The symbol "N/A" in above table means Not Applicable.
- 2. When determining the test results, measurement uncertainty of tests has been considered.

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#### 2. EMC RESULTS CONCLUSION

RE: EMC Testing Pursuant to FCC part 15 performed on the Self-ballasted LED lamp Model: LED1903C5.

We tested the Self-ballasted LED lamp Model: LED1903C5, to determine if it was in compliance with the relevant standards as marked on the Test Results Summary. We found that the unit met the requirement of FCC part 15 standard when tested as received. The worst case's test data was presented in this test report.

#### Report revision reason:

This report is the revision of the previous test report 190505025GZU-001 dated 10 September 2019 and replace original report.

Change the report format. Added a separate photo document 190505025GZU-001, Amendment 1, Annex 1.

Based on engineering judgement, no additional tests are needed. All test data base on test report 190505025GZU-001 dated 10 September 2019.

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#### 3. LABORATORY MEASUREMENTS

## **Configuration Information**

Support Equipment: N/A

Rated Voltage and frequency under test: 120 V~; 60 Hz

Condition of Environment: Temperature: 22~28°C Relative Humidity:35~60%

Atmosphere Pressure:86~106kPa

#### Notes:

1. The EMI measurements had been made in the operating mode produced the largest emission in the frequency band being investigated consistent with normal applications. An attempt had been made to maximize the emission by varying the configuration of the EUT.

#### 2. Test Facility accreditation:

A2LA Certificate Number 0078.10

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch is accredited by A2LA and Listed in FCC website. FCC accredited test labs may perform both Certification testing under Parts 15 and 18 and Declaration of Conformity testing.

#### 3. Test Location:

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch

All tests were performed at:

Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China

Except Radiated Emissions was performed at:

Room102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China

#### 4. Measurement Uncertainty

No.	ltem	Measurement Uncertainty		
1	Conducted Emission (9 kHz-150 kHz)	2.66 dB		
2	Conducted Emission (150 kHz-30 MHz)	2.44 dB		
3	Disturbance Power (30 MHz-300 MHz)	3.02 dB		
4	Radiated Emission (30 MHz-1 GHz)	4.72 dB		
5	Radiated Emission (1 GHz-6 GHz)	4.96 dB		
6	Radiated Emission (6 GHz-18 GHz)	4.93 dB		

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty is calculated in accordance with CISPR16-4-2:2011

The measurement uncertainty is given with a confidence of 95%, k=2.

Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

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## 4. EQUIPMENT USED DURING TEST

Conducted Di	sturbance-Mains Terminal(1				
Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM080-05	EM080-05 EMI receiver		R&S	18/07/2020	1Y
EM006-05	LISN	ENV216	R&S	16/06/2020	1Y
SA047-112 Digital Temperature-Humidity Recorder		RS210	YIJIE	05/11/2019	1Y
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu	13/01/2020	1Y

Radiated Dis	turbance (30 MHz-1 GHz)				
Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM030-04	M030-04 3m Semi-Anechoic Chamber		ETS-LINDGREN	9/04/2020	1Y
EM031-02	EM031-02 EMI Test Receiver (9 kHz~7 GHz)		R&S	28/02/2020	1Y
EM033-01	TRILOG Super Broadband test Antenna (30 MHz-3 GHz)	VULB 9163	SCHWARZBECK	20/09/2019	1Y
EM031-02-01	M031-02-01 Coaxial cable		R&S	9/04/2020	1Y
EM036-01 Common-mode absorbing clamp		CMAD 20B	TESEQ	21/07/2020	1Y
SA047-118	Digital Temperature-Humidity Recorder	RS210	YIJIE	16/07/2020	1Y
EM045-01-01	EMC32 software (RE/RS)	V10.01.00	R&S	N/A	N/A

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Detail of the equipment calibration due date:

	Cal Dua data
Equipment No.	Cal. Due date
Conducted Distu	(DD-MM-YYYY)
Terminal (1)	Dance-Mains
EM080-05	17/07/2020
EM006-05	16/06/2020
SA047-112	08/11/2020
EM004-04	13/01/2020
Conducted Distu	
Terminal (2)	barree manis
EM080-04	10/11/2020
EM031-04	15/01/2020
EM006-06	08/09/2020
SA047-111	08/11/2020 03/01/2020
EM004-03	03/01/2020
EM031-04-01	N/A
Conducted Distu	
Control Terminal	
EM080-05	17/07/2020
EM080-05-01	08/09/2020
SA047-112	08/11/2020
EM004-04	13/01/2020
Conducted Distu	
Control Terminal	
EM080-05	17/07/2020
EM005-06-01	09/09/2020
SA047-112	08/11/2020
EM004-04	13/01/2020
Conducted Distur	rbance-Telecom
EM080-05	17/07/2020
EM011-05	17/07/2020 07/04/2020
EM011-05	07/04/2020
EM006-06	08/09/2020
SA047-112	08/11/2020
EM004-04	13/01/2020
Conducted Distu	
Terminal	Dance-Antenna
EM080-04	10/11/2020
EM031-04	15/01/2020
EM084-02	18/07/2020
EM041-01	07/01/2020
EM041-02	07/01/2020
SA047-111	08/11/2020
EM004-03	03/01/2020

Carriage and No.	Cal. Due date
Equipment No.	(DD-MM-YYYY)
Radiated Disturb	ance (CDN
Method)	
EM080-05	17/07/2020
EM003-02	10/11/2020
EM003-03	10/11/2020
EM003-01-05	08/09/2020
SA047-112	08/11/2020
EM004-04	13/01/2020
Radiated electron disturbances (9 k	magnetic
disturbances (9 k	Hz-30 MHz)
EM080-04	10/11/2020
EM031-04	15/01/2020
EM061-04	15/01/2020 28/02/2020
SA047-111	08/11/2020
EM004-03	03/01/2020
Radiated Disturb	ance (9 kHz-30
MHz)	
EM030-04	09/04/2020
EM031-02	22/10/2020
EM011-04	24/06/2020
EM031-02-01	09/04/2020
SA047-118	16/7/2020 N/A
EM045-01-01	N/A
Radiated Disturb	ance (30 MHz-1
GHz)	
EM030-04	9/04/2020
EM031-02	22/10/2020 19/09/2020
EM033-01	19/09/2020
EM031-02-01	9/04/2020
EM036-01	21/07/2020 16/07/2020
SA047-118	
EM045-01-01	N/A
Radiated Disturb	ance (1-18 GHz)
EM030-04	09/04/2020
EM031-02	22/10/2020
EM031-03	08/09/2020
EM033-02	22/06/2020
EM033-02-02	09/04/2020 16/05/2020
EM022-03	16/05/2020
SA047-118	16/07/2020
EM045-01-01	N/A

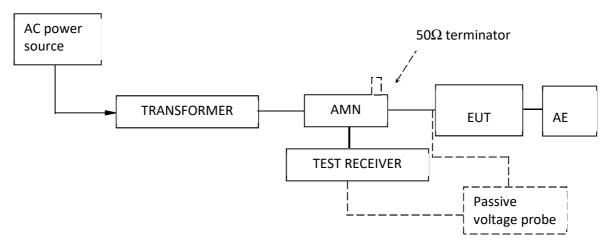


#### 5. EMI TEST

#### 5.1 Conducted Disturbance Voltage at mains ports

**Test Result: Pass** 

#### 5.1.1 Block Diagram of Test Setup



#### 5.1.2 Test Setup and Procedure

The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provides a  $50\Omega$  linear impedance Artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The table-top EUT was placed on a 0.8m high non-metallic table above earthed ground plane(Ground Reference Plane). And for floor standing EUT, was placed on a 0.1m high non-metallic supported on GRP. The EUT keeps a distance of at least 0.8m from any other of the metallic surface. The Artificial Mains Network is situated at a distance of 0.8m from the EUT. During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver was set at 9 kHz. The frequency range from 150 kHz to 30MHz was checked.

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## 5.1.3 Limit

Frequency range MHz	AC mains te dB (u\		
141112	Quasi-peak	Average	
0.15 to 0.5	66 to 56*	56 to 46*	
0.5 to 5	56	46	
5 to 30	60	50	

Note 1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to  $0.5 \, \mathrm{MHz}$ .

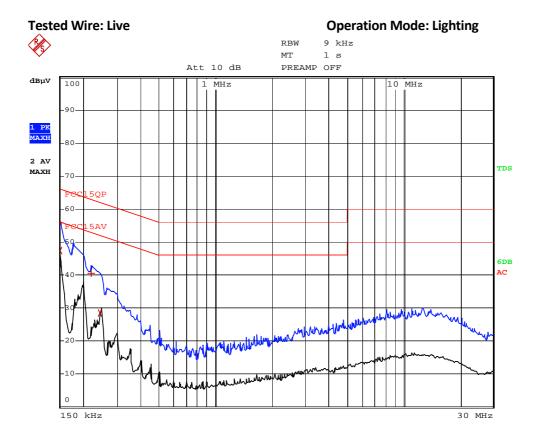
Note 2: The lower limit is applicable at the transition frequency.

## 5.1.4 Test Data and curve

At mains terminal:

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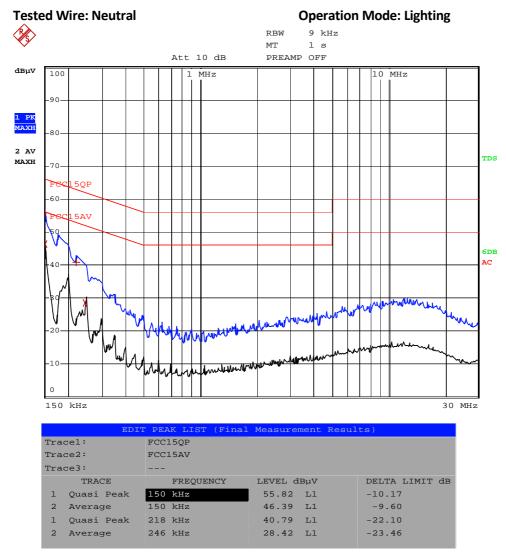


EDIT PEAK LIST (Final Measurement Results)						
Tracel:	FCC15QP					
Trace2:	FCC15AV	FCC15AV				
Trace3:						
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB			
1 Quasi Peak	150 kHz	55.83 L1	-10.16			
2 Average	150 kHz	47.29 L1	-8.70			
1 Quasi Peak	218 kHz	40.57 L1	-22.31			
2 Average	246 kHz	28.59 L1	-23.29			

## Remark:

- 1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
- 2. Level (dB $\mu$ V) = Corr. (dB) + Read Level (dB $\mu$ V)
- 3. Delta Limit (dB) = Level (dB $\mu$ V)-Limit (dB $\mu$ V)





#### Remark:

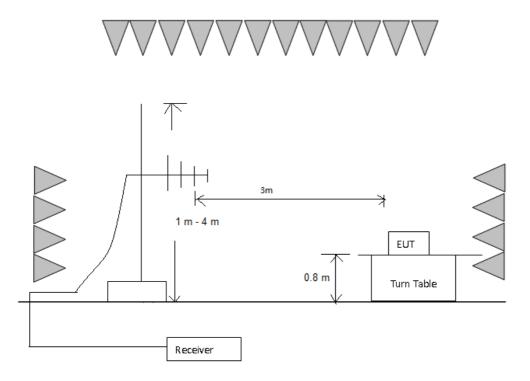
- 1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
- 2. Level (dB $\mu$ V) = Corr. (dB) + Read Level (dB $\mu$ V)
- 3. Delta Limit (dB) = Level (dB $\mu$ V)-Limit (dB $\mu$ V)



#### 5.2 Radiated Emission 30 MHz -1000 MHz

**Test Result: Pass** 

#### 5.2.1 Block Diagram of Test Setup



#### 5.2.2 Test Setup and Procedure

The measurement was applied in a semi-anechoic chamber. The EUT and simulators were placed on a 0.8 m high wooden turntable above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mask. The antenna moved up and down between from 1 meter to 4 meters to find out the maximum emission level.

Broadband antenna was used as receiving antenna. Both horizontal and vertical polarization of the antenna was set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4 requirement during radiated test.

The bandwidth setting on R&S Test Receiver was 120 kHz.

For an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

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Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper Frequency of Radiated Measurement
Below 1.705 MHz	30MHz
1.705 MHz – 108 MHz	1 GHz
108 MHz – 500 MHz	2 GHz
500 MHz – 1 GHz	5 GHz
Above 1 GHz	5th harmonic of the highest frequency
	or 40 GHz, whichever is lower.
At transitional frequencies the lower limit applies.	·

Remark: Radiated Emission was performed from 30 MHz to 1 GHz.

## 5.2.3 Limit

Class B limit at 3m test distance:

Frequency range MHz	<b>Quasi-peak limits</b> dB (μV/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
960 to 1000	54
At transitional frequencies the lower limit applies.	

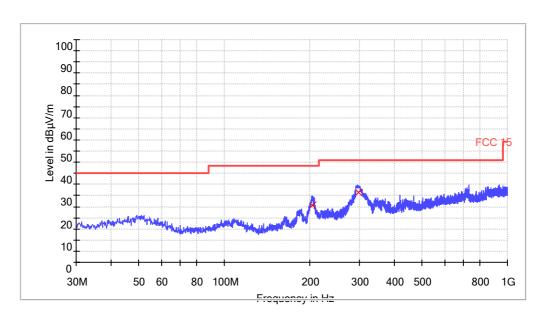
## 5.2.4 Test Data and Curve

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Operation Mode: Lighting

Horizontal

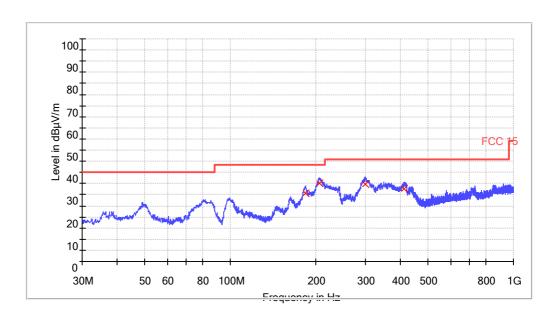


## QP

	Frequency (MHz)	Quasi Peak (dBµV/ m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
	205.200000	25.6	120.000	Н	13.1	17.9	43.5
I	297.360000	31.4	120.000	Н	15.4	14.6	46.0



Vertical



## QP

Frequency (MHz)	Quasi Peak (dBµV/ m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
184.240000	30.8	120.000	٧	11.4	12.7	43.5
206.280000	34.9	120.000	٧	13.1	8.6	43.5
300.400000	34.6	120.000	٧	15.5	11.4	46.0
411.440000	32.6	120.000	٧	18.1	13.4	46.0

## 5.3 Radiated Emission above 1 GHz

**Test Result: Not Applicable** 

Remark:

The highest internal source of the EUT is not more than 108 MHz, so the measurement above 1000 MHz is not applicable.

#### 6. PHOTO OF TEST SETUP AND EUT

Test set up and EUT photos are put in 190505025GZU-001, Amendment 1, Annex 1 separately as part of this test report.

