

TEST REPORT

LABORATORY MEASUREMENTS

Pursuant to 47 CFR Part 15 [10-01-22 Edition], ANSI C63.4:2014 and ANSI C63.4a:2017

Report No.:	24031251HKG-001
Company:	IKEA OF SWEDEN AB Box 702, SE-343 81 Älmhult, SWEDEN
Equipment Under Test (EUT):	
Product Description:	LED Lamp Bulb
Model:	LED2333B2
Brand Name:	
FCC ID:	FHO-LED2333B2
ITS Registration Number:	523770
Equipment Type:	Class B Digital Device / Unintentional Radiator
Sample Receipt Date:	March 27, 2024
Test Conducted Date:	March 27, 2024 to April 11, 2024
Issue Date:	April 12, 2024
Test Site Location:	2nd Floor, Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong SAR, China.
Relevant Standard(s):	47 CFR Part 15 [10-01-22 Edition], ANSI C63.4:2014 and ANSI C63.4a:2017
Conclusion:	Test was conducted by client submitted sample. The submitted sample as received complied with the 47 CFR Part 15 requirement.

This test report is issued to the Company indicated based on the request of the Applicant of the product mentioned in this report.

Prepared and Checked by:

Approved by:

Signed on File

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Assistant Supervisor

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1. GENERAL INFORMATION

1.1 Client Information

Company: IKEA of Sweden AB

1.2 General Description of EUT

Product Description: LED Lamp Bulb
Model No.: LED2333B2
Serial No.: Not Labelled

1.3 Details of EUT

Rated Voltage: 120VAC 60Hz
Cables: N/A

For more detail features, please refer to user's Manual.

1.4 Description of Peripherals

Not Applicable

1.5 Decision Rule

Decision Rule for compliance: For FCC/IC standard, the measured value must be within the limits of applicable standard without accounting for the measurement uncertainty. For EN/IEC/HKTA/HKTC standard, conformity rules will be used as per standard directly excepted EN/IEC 61000-3-2, EN/IEC 61000-3-3, HKTA1004, HKCA1008, HKTA1019, HKTA1020, HKTA1041 and HKTA1044. For these excepted or not mentioned standards, Cl 4.2.2 of ILAC-G8:09/2019 decision rules will be reference and guard band will be equal to our measurement uncertainty with 95% confidence level ($k=2$). In case, the measured value is within guard band region, undetermined decision will be used.

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2. TEST SUMMARY

Test	Standard	Class	Result
Conducted Emission	Section 15.107 of 47 CFR Part 15	Class B	Pass
Radiated Emission	Section 15.109 of 47 CFR Part 15	Class B	Pass

Remark:

The EUT has been tested/evaluated and pass the 47 CFR Part 15 without modification.
The production units are required to conform to the initial sample as received when the units are placed on the market.

Enclosed please find the FCC Labelling and Instruction Manual Requirements.

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3. TEST SPECIFICATIONS

3.1 Standards

Both conducted and radiated emission tests were performed according to the procedures in ANSI C63.4:2014 and ANSI C63.4a:2017. Test results are in compliance with the requirements of 47 CFR Part 15 [10-01-22 Edition].

The EUT setup configuration please refers to the photo of test configuration in item.

3.2 Definition of Device Classification

Unintentional radiator:

A device which is not intended to emit RF energy by radiation or induction.

Class A Digital Device:

A digital device which is marketed for use in commercial or business environment.

Class B Digital Device:

A digital device which is marketed for use by the general public or in a residential environment.

Note:

A manufacturer may also qualify a device intended to be marketed in a commercial, business or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

3.3 EUT Operation Condition

The EUT was powered by 120VAC 60Hz and was running in accordance with the manufacturer's operation manual.

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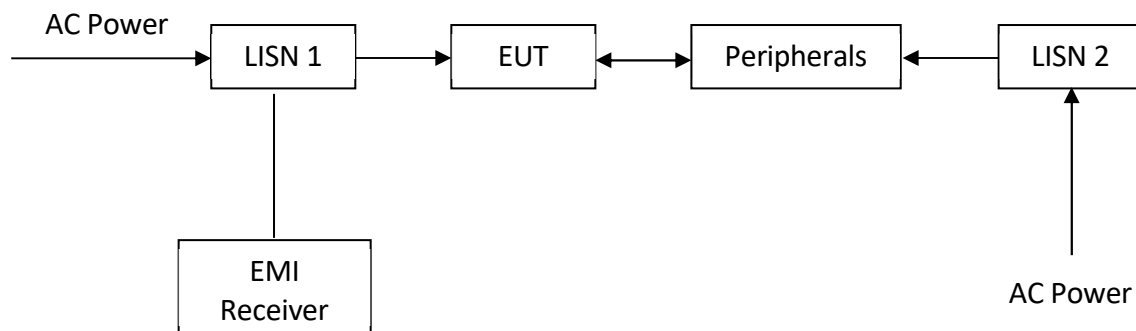
4. CONDUCTED EMISSION MEASUREMENTS (SECTION 15.107 OF 47 CFR PART 15)

4.1 Operating Environment

Temperature: $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$

Test Voltage: 120VAC

4.2 Test Setup and Procedure



The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were moved to find the maximum emission.

The EUT setup configuration please refers to the photo of test configuration in - 24031251HKG-001ANNEX.

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4.3 Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.
EW-2500	EMI Test Receiver (9kHz to 3GHz) - LCK	ROHDESCHWARZ	Oct 30, 2023	Oct 30, 2024
EW-3578	LISN	ROHDESCHWARZ	Jan 29, 2024	Jan 29, 2025

4.4 Conducted Emission Limits

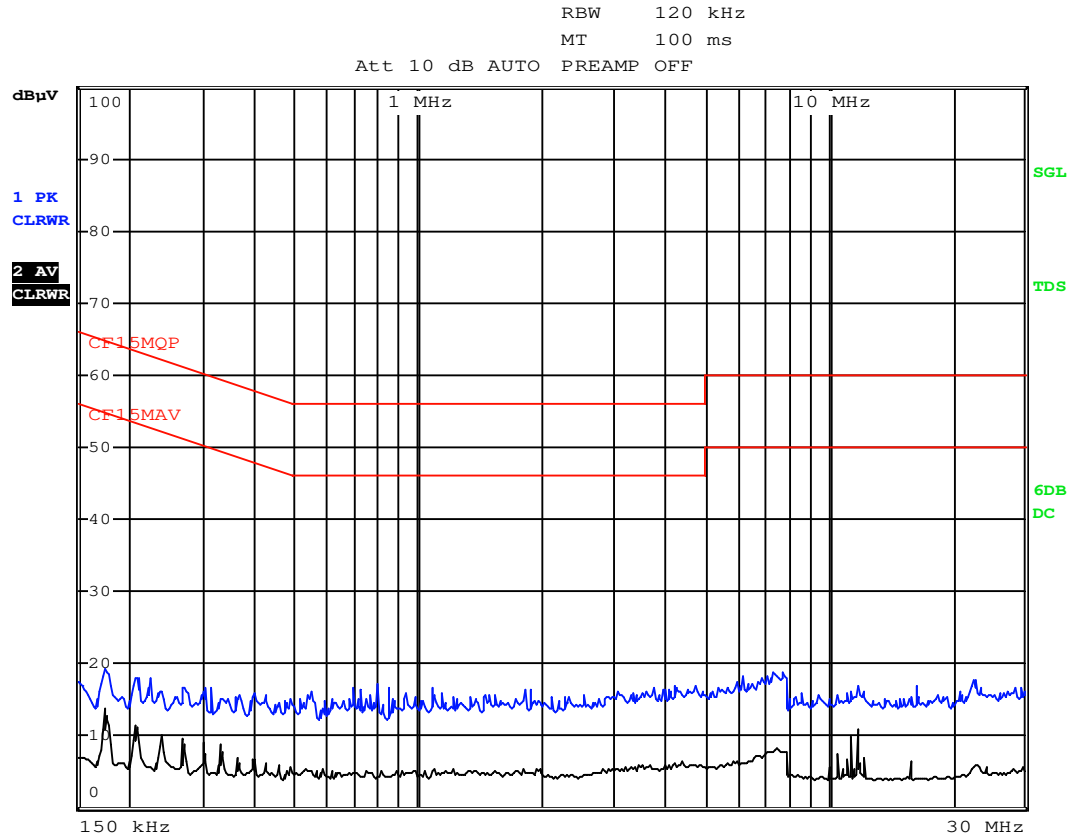
Frequency (MHz)	Maximum RF Line Voltage			
	Class A (dBμV)		Class B (dBμV)	
	Q.P.	Ave.	Q.P.	Ave.
0.15~0.50	79	66	66~56	56~46
0.50~5.00	73	60	56	46
5.00~30.0	73	60	60	50

Note: Uncertainty: $\pm 3.46\text{dB}$ at a Level of Confidence of 95%

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4.5 Conducted Emission Test Data

Phase: Live / Neutral
Model No.: LED2333B2
Worst Case: Light On Mode



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5. RADIATED EMISSION MEASUREMENTS (SECTION 15.109 OF 47 CFR PART 15)

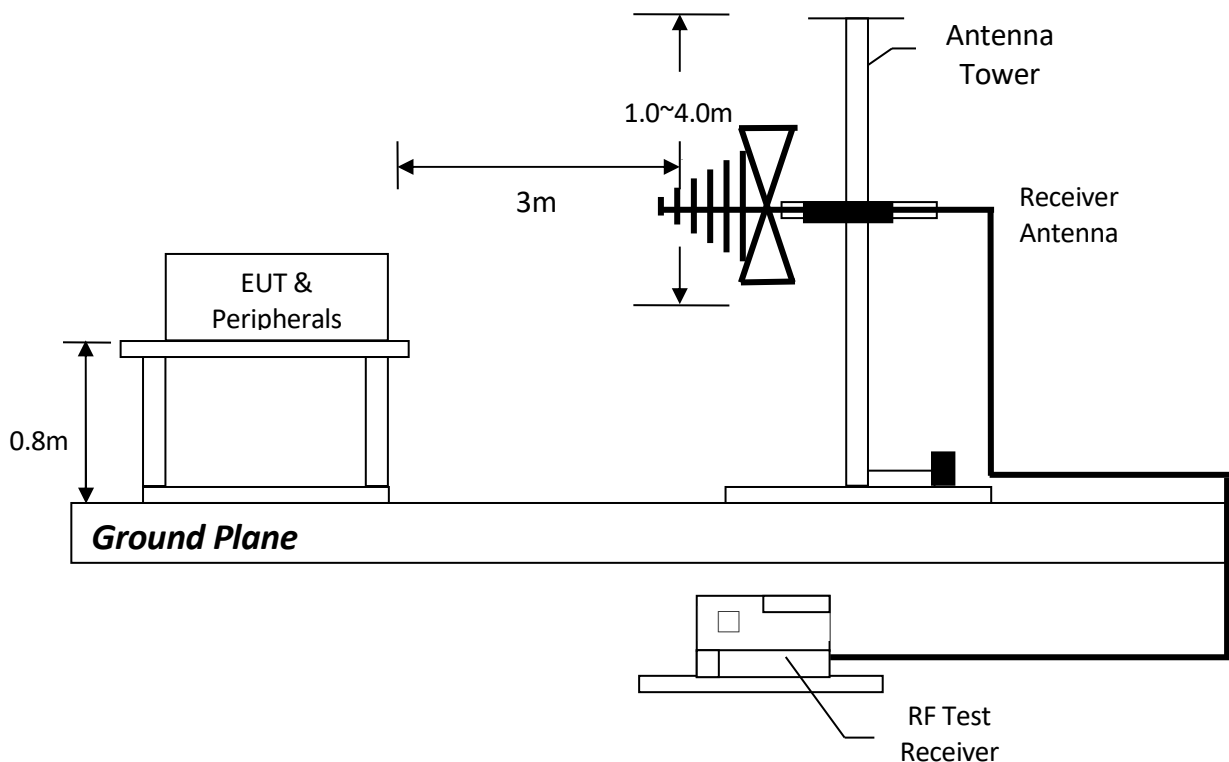
5.1 Operating Environment

Temperature: $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ Test Voltage: 120VAC

5.2 Test Setup and Procedure

The figure below shows the test setup, which is utilized to make these measurements.

The frequency spectrum from 30MHz to 1000MHz was investigated.



The equipment under test was placed on the top of rotation table 0.8 meter above ground plane.

The table was 360 degrees to determine the position of the highest radiation.

EUT is set 3 meters from the EMI receiving antenna, which is mounted on a variable height mast. The antenna height is varied between one meter and four meters above ground to find the maximum value of the field strength. Both horizontal polarization and vertical polarization of the antenna are set to make the measurement. The bandwidth was setting on the EMI meter 120kHz.

The levels are quasi peak value readings. The frequency spectrum from 30MHz to 1000MHz was investigated.

The EUT setup configuration please refers to the photo of test configuration in - 24031251HKG-001ANNEX

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5.3 Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.
EW-2500	EMI Test Receiver (9kHz to 3GHz) - LCK	ROHDESCHWARZ	ESCI	100847
EW-3061	BiConiLog Antenna (with one attenuator) - 26MHz to 6000MHz	EMCO	3142E	00166104
EW-0194	Double Ridged Guide Antenna (1GHz - 18GHz)	EMCO	3115	9208-3911
EW-3271	RF Cable SMA-SMA (0.15MHz to 18GHz) 2m length	GREATBILLION	SMA m /blue cable/SMAM 18G 2m	Nil

5.4 Radiated Emission Limits

According to Section 15.109 of 47 CFR Part 15, except for Class A digital device, the field strength of radiated emission from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Class B Radiated Emission Limits:

Frequency (MHz)	Field Strength (dBμV/m)
30-88	40.0
88-216	43.5
216-960	46.0
Above 960	54.0

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5.5 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + \text{Corr. (AF \& CF)}$$

Where FS = Field Strength in dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

Corr. = Cable Attenuation Factor + Antenna Factor in dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + \text{Corr.}$$

Example

Assume a receiver reading of 23.0 dB μ V is obtained. The Corr. factor of 9 dB is added. The net field strength for comparison to the appropriate emission limit is 32.0 dB μ V/m. This value in dB μ V/m is converted to its corresponding level in μ V/m.

$$RA = 23.0 \text{ dB}\mu\text{V}$$

$$\text{Corr.} = 9 \text{ dB}$$

$$FS = 23 + 9 = 32.0 \text{ dB}\mu\text{V/m}$$

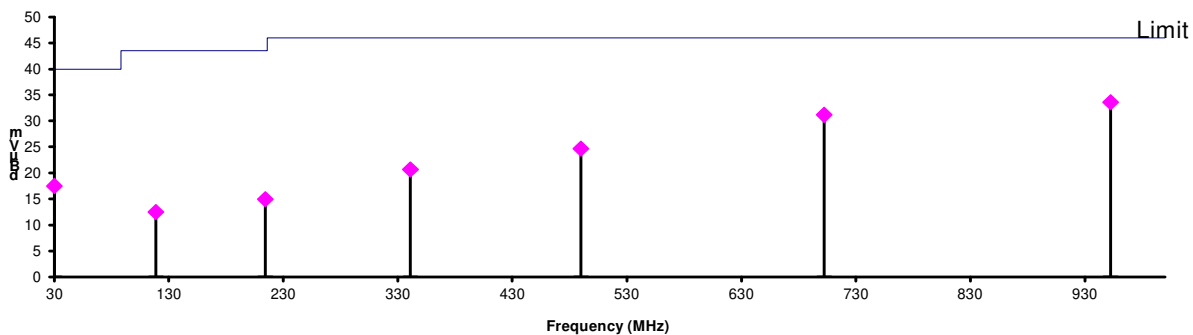
$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32.0 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

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5.6 Radiated Emission Test Data

Pursuant to Section 15.109 of 47 CFR Part 15: Emissions Requirement

Polarity: Horizontal / Vertical
Model No.: LED2333B2
Worst Case: Light On Mode



Polarization	Frequency (MHz)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
H	30.000	17.5	40.0	-22.5
V	118.755	12.5	43.5	-31.0
V	214.300	14.9	43.5	-28.6
H	341.006	20.7	46.0	-25.3
H	490.023	24.7	46.0	-21.3
H	702.453	31.2	46.0	-14.8
V	952.531	33.6	46.0	-12.4

- Notes:
1. Quasi-Peak Detector Data.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30 MHz to 1000 MHz.
 4. Only emissions significantly above equipment noise floor are reported.
 5. Uncertainty: ± 5.3 dB at a Level of Confidence of 95%.

FCC LABELLING AND INSTRUCTION MANUAL REQUIREMENTS

Devices subject to FCC Part 15, Subpart B (not certification) must be labelled with the following statement. The label can be affixed at any space external to the product except the battery door or detachable parts.

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.

In addition, for a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

If shielded cables or other specialized accessories are necessary for the unit to achieve compliance, a statement similar to the following should be added:

Shielded cables must be used with this unit to ensure compliance with the Class B FCC limits.

Devices subject to FCC Part 15, Subpart B shall be labelled with an **unique identifier**. e.g. model number, serial number, etc. However, the identification shall not be of a format which could be confused with the FCC Identifier required on certified, notified or type accepted equipment. The importer or manufacturer shall maintain adequate identification records to facilitate positive identification for each verified device.

Receivers associated with the operation of a licensed radio service subject to FCC Part 15, Subpart B (not certification) must be labelled with the following statement. The label can be affixed at any space external to the product except the battery door or detachable parts.

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

In addition, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.