Application for FCC Certification
On behalf of

Philips Lighting (China) Investment Co., Ltd.

Product Name: LED MODULE;

Model No.: Hue Engine V1.0

FCC ID: 2AGBW9290012630X

(MPE Calculation)

Prepared For : Philips Lighting (China) Investment Co., Ltd.
　　　　　　　　Building 9#, Lane 888, Tianlin Road, Minhang District,
　　　　　　　　Shanghai 200233, China

Prepared By :　Audix Technology (Shanghai) Co., Ltd.
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Report No.　　　:　ACI-F16054
Date of Test　　:　Mar. 10, 2016
Date of Report　:　Mar. 16, 2016

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# TEST REPORT FOR FCC CERTIFICATE

| | | |
|---|---|---|
| Applicant | : | Philips Lighting (China) Investment Co., Ltd. |
| EUT Description | : | LED MODULE; |

|  | | | |
|---|---|---|---|
| (A) Model No. | : | Hue Engine V1.0 |
| (B) Power Supply | : | DC 3.3V |

Test Procedure Used:

*FCC Part 1 Subpart I and Part 2 Subpart J*

*KDB 447498 D01 General RF Exposure Guidance v06*

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part2.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report also shows that the EUT (M/N: Refer to Sec2.1), which was tested on Mar. 10, 2016 is technically compliance with the FCC limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : _____ Mar. 10, 2016 _____        Date of Report : ___ Mar. 16, 2016 ___

Producer : _____ *Alan He* _____
ALAN HE / Assistant

Review : _____ *Sammy Chen* _____
SAMMY CHEN / Manager

® For and on behalf of
Audix Technology (Shanghai) Co., Ltd.

Signatory : _____ _____
Authorized Signature EMC BYRON KWO / Assistant General Manager

# 1 GENERAL INFORMATION

## 1.1 Description of Equipment Under Test

Description : LED MODULE;

Type of EUT   ☑ Production   ☐ Pre-product   ☐ Pro-type

Model Number : Hue Engine V1.0

Radio Tech : Zigbee

Channel Freq. : 2405MHz, 2425MHz, 2450MHz, 2475MHz

Tested Freq. : 2412MHz, 2450MHz, 2475MHz

Modulation : O-QPSK

Antenna Gain : 0 dBi

Applicant : Philips Lighting (China) Investment Co., Ltd.
Building 9#, Lane 888, Tianlin Road, Minhang District,
Shanghai 200233, China

## 1.2   Description of Test Facility

| | |
|---|---|
| Site Description (Semi-Anechoic Chamber) | : Sept. 17, 1998 file on Jan. 15, 2015 Renewed Federal Communications Commission FCC Engineering Laboratory 7435 Oakland Mills Road Columbia, MD 21046, USA |
| Name of Firm | : Audix Technology (Shanghai) Co., Ltd. |
| Site Location | : 3F 34 Bldg 680 Guiping Rd., Caohejing Hi-Tech Park, Shanghai 200233, China |
| FCC registration Number | : 91789 |
| Accredited by NVLAP, Lab Code | : 200371-0 |

## 1.3   Measurement Uncertainty

Output Power Expanded Uncertainty     : $U = \pm 1.56$ dB

# 2  SUMMARY OF STANDARDS AND RESULTS

## 2.1 Applicable Standard

FCC Part1 §1.1310

## 2.2 Specification Limits

Limits for General Population/Uncontrolled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/cm$^2$) | Averaging Time $\lvert E \rvert^2$, $\lvert H \rvert^2$ or S (minutes) |
|---|---|---|---|---|
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/f2)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | -- | -- | f/1500 | 30 |
| 1500-100,000 | -- | -- | 1.0 | 30 |

f = frequency in MHz　　　　　*Plane-wave equivalent power density

NOTE: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

The limit value 1.0mW/cm$^2$ is available for this EUT.

## 2.3 MPE Calculation Method

$$S = PG/(4\pi R^2)$$

$$R = [PG/(4\pi S)]^{0.5}$$

where: S = power density (in appropriate units, e.g. mW/ cm$^2$)
　　　　P = power input to the antenna (in appropriate units, e.g., mW)
　　　　(the measured power value see Report: F16053 Section 5.6)
　　　　G = power gain of the antenna in the direction of interest relative to an isotropic radiator
　　　　R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

## 2.4 Calculated Result

### 2.4.1 Radio Frequency Radiation Exposure Evaluation

| Frequency | Peak Power | Output Power to Antenna | Antenna Gain | | Power Density | Limit |
|---|---|---|---|---|---|---|
| (MHz) | (dBm) | (mW) | (dBi) | (Numeric) | (mW/cm$^2$) | (mW/cm$^2$) |
| 2405 | 1.192 | 1.32 | 0 | 1 | **0.000262** | 1.0 |
| 2450 | -1.468 | 0.71 | 0 | 1 | **0.000142** | 1.0 |
| 2475 | -2.755 | 0.53 | 0 | 1 | **0.000106** | 1.0 |

Separation distance R= 20cm.

| Frequency | Peak Power | Output Power to Antenna | Antenna Gain | | Limit | Distance |
|---|---|---|---|---|---|---|
| (MHz) | (dBm) | (mW) | (dBi) | (Numeric) | (mW/cm$^2$) | (cm) |
| 2412 | 1.192 | 1.32 | 0 | 1 | 1.0 | 0.32 |
| 2437 | -1.468 | 0.71 | 0 | 1 | 1.0 | 0.24 |
| 2462 | -2.755 | 0.53 | 0 | 1 | 1.0 | 0.21 |

The antenna used for this transmitter must be installed to provide a separation distance of at least 0.32 cm from all persons.