RF Exposure Evaluation Declaration

Product Name	:	Hue Outdoor Lightstrip 2m
Model No.	:	9290018187A
FCC ID	:	2AGBW9290018187AX
IC	:	20812-8187AX

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

Date of Receipt	:	May. 07, 2018
Test Date	:	May. 10, 2018~ Jun. 04, 2018
Issued Date	:	Aug. 08, 2018
Report No.	:	1852049R-RF-US-P20V01
Report Version	:	V 1.0

Test Report Certification

Issued Date : Aug. 08, 2018
Report No. : 1852049R-RF-US-P20V01

Product Name	:	Hue Outdoor Lightstrip 2m
Applicant	:	Philips Lighting (China) Investment Co., Ltd.
Address	:	Building 9, Lane 888, Tianlin Road, Minhang district, Shanghai, China
Manufacturer	:	Philips Lighting (China) Investment Co., Ltd.
Address	:	Building 9, Lane 888, Tianlin Road, Minhang district, Shanghai, China
Model No.	:	9290018187A
FCC ID	:	2AGBW9290018187AX
IC	:	20812-8187AX
Brand Name	:	Philips
EUT Voltage	:	100 ~ 240Vac, 50-60Hz; 600mA; Max 25W
Test Voltage	:	AC 120V/60Hz; 240V/60Hz
Applicable Standard	:	KDB 447498D01V06 FCC Part1.1310 RSS-102: Issue 5, 2015
Test Result	:	Complied
Performed Location	:	DEKRA Testing & Certification (Suzhou) Co., Ltd. No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098 FCC Designation Number: CN1199; IC Lab Code: 4075B

Documented By : Kitty Li

(Project Assistant: Kitty Li)

Reviewed By : Frank He

(Senior Project Manager: Frank He)

Approved By : Harry Zhao

(Engineering Manager: Harry Zhao)

1. RF Exposure Evaluation

1.1. Limits

For FCC:

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm2)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: Pd = (Pout*G)/(4*pi*r2)

Where

Pd = power density in mW/ cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm^2 . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

For ISED:

According to RSS 102 Issue 5: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in RSS 102 Clause 4

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
0.003-10[21]	83	90	-	Instantaneous*
0.1-10	-	$0.73/f$	-	6**
1.1-10	$87/f^{0.5}$	-	-	6**
10-20	27.46	0.0728	2	6
20-48	$58.07/f^{0.25}$	$0.1540/f^{0.25}$	$8.944/f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142f^{0.3417}$	$0.008335f^{0.3417}$	$0.02619f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	$0.158f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000/f^{1.2}$

Note: f is frequency in MHz.
*Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).

F= Frequency in MHz

Friis Formula

Friis transmission formula: Pd = (Pout*G)/(4*pi*r2)

Where

Pd = power density in mW/cm2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 0.540 mW/cm^2 for 2.4GHz . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.
The temperature and related humidity: 18℃and 78% RH.

1.3. Test Result of RF Exposure Evaluation

Product	:	Hue Outdoor Lightstrip 2m
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-6

- **Antenna Information:**

Antenna manufacturer	N/A					
Antenna Delivery	☒	1*TX+1*RX	☐	2*TX+2*RX	☐	3*TX+3*RX
Antenna technology	☒	SISO				
	☐	MIMO	☐	Basic		
			☐	CDD		
			☐	Beam-forming		
Antenna Type	☐	External	☐	Dipole		
	☒	Internal	☐	PIFA		
			☒	PCB		
			☐	Ceramic Chip Antenna		
			☐	Metal plate type F antenna		
Antenna Gain	6.19dBi					

- **Power Density:**

The tune-up power is ±0.5dB, so the maximum conducted power we used to calculate RF exposure is 0.65dBm.

Test Mode	Frequency Band (MHz)	Conducted Power (dBm)	EIRP (dBm)	Limit of Power Density S(mW/cm^2)		Power Density at R = 20 cm (mW/cm^2)
				FCC	IC	
Zigbee	2400 ~ 2483.5	0.65	6.84	1	0.54	0.000961

Note:

The power density is 0.000961mW/cm^2 for Hue Outdoor Lightstrip 2m without any other radio equipment.

The End