



RF Exposure Evaluation Declaration

Product Name : LED lamp
Model No. : 9290011998C
FCC ID : 2AGBW9290011998CX
IC : 20812-1998CX

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

Date of Receipt : Aug. 30, 2017
Issued Date : Feb. 06, 2018
Report No. : 1782159R-RF-US-P20V01
Report Version : V 1.0

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

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Test Report Certification

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Product Name : LED lamp
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. : 9290011998C
FCC ID : 2AGBW9290011998CX
IC : 20812-1998CX
Brand Name : Philips
EUT Voltage : 110 ~ 130Vac, 9W, 50-60Hz
Test Voltage : AC 120V/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 Registration Number: CN1199; IC Lab Code: 4075B

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(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/cm ²)	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: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

P_d = power density in mW/ cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is the limit of MPE, 1 mW/cm². 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/ <i>f</i>	-	6**
1.1-10	87/ <i>f</i> ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ <i>f</i> ^{0.25}	0.1540/ <i>f</i> ^{0.25}	8.944/ <i>f</i> ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> ^{0.3417}	0.008335 <i>f</i> ^{0.3417}	0.02619 <i>f</i> ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616000/ <i>f</i> ^{1.2}
Note: <i>f</i> is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is the limit of MPE, 0.540 mW/cm² 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°C and 78% RH.

1.3. Test Result of RF Exposure Evaluation

Product	:	LED Lamp
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-6

● Antenna Information:

Antenna manufacturer	N/A				
Antenna Delivery	<input checked="" type="checkbox"/>	1*TX+1*RX	<input type="checkbox"/>	2*TX+2*RX	<input type="checkbox"/> 3*TX+3*RX
Antenna technology	<input checked="" type="checkbox"/>	SISO			
	<input type="checkbox"/>	MIMO	<input type="checkbox"/>	Basic	
			<input type="checkbox"/>	CDD	
			<input type="checkbox"/>	Beam-forming	
Antenna Type	<input type="checkbox"/>	External	<input type="checkbox"/>	Dipole	
	<input checked="" type="checkbox"/>	Internal	<input type="checkbox"/>	PIFA	
			<input checked="" type="checkbox"/>	PCB	
			<input type="checkbox"/>	Ceramic Chip Antenna	
			<input type="checkbox"/>	Metal plate type F antenna	
Antenna Gain	-2.08dBi				

- **Power Density:**

The tune-up power is $\pm 0.5\text{dB}$, so the maximum conducted power we used to calculate RF exposure is 9.26dBm.

Test Mode	Frequency Band (MHz)	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	7.18	1	0.54	0.00104

Note:

The power density is 0.00104 mW/cm² for LED Lamp without any other radio equipment.

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