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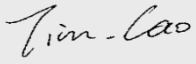
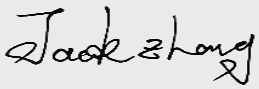
Test report No:
24B0863R-RF-US-P20V01

FCC EXPOSURE TEST REPORT

Product Name	LED Lamp
Trademark	PHILIPS; hue; Signify
Model and /or type reference	9290038538, 9290038537, 9290038551, 9290038552
FCC ID	2AGBW9290038538X, 2AGBW9290038537X, 2AGBW9290038551X, 2AGBW9290038552X
Applicant´s name / address	Signify (China) Investment Co., Ltd No.9, Lane 888, Tian Lin Road, 200233, Shanghai, China
Test method requested, standard	FCC 47CFR §2.1091
Verdict Summary	IN COMPLIANCE
Documented By (name / position & signature)	Tim Cao / Project Manager 
Approved by (name / position & signature)	Jack Zhang / Manager 
Date of issue	2025-01-16
Report Version	V1.0
Report template No	Template_FCC-MPE-RF-V1.0

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COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.
In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Nov. 26, 2024
Date (start test)	Dec. 05, 2024
Date (finish test)	Dec. 10, 2024

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT : Equipment Under Test
QP : Quasi-Peak
CAV : CISPR Average
AV : Average
CDN : Coupling Decoupling Network
SAC : Semi-Anechoic Chamber
OATS : Open Area Test Site
BW : Bandwidth
AM : Amplitude Modulation
PM : Pulse Modulation
HCP : Horizontal Coupling Plane
VCP : Vertical Coupling Plane
U_N : Nominal voltage
*T*x : Transmitter
*R*x : Receiver
N/A : Not Applicable
N/M : Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
2B0683R-RF-US-P20V01	V1.0	Initial issue of report.	2025-01-16

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with FCC 47CFR §2.1091.
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.
4. The test results relate only to the samples tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:

- Chapter 1.1 General Description of the Item(s);
- Chapter 1.2 Antenna Informaion;

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name.....:	LED Lamp
Model No. .....:	9290038538, 9290038537, 9290038551, 9290038552
Trademark. .....:	PHILIPS; hue; Signify
FCC ID .....:	2AGBW9290038538X, 2AGBW9290038537X, 2AGBW9290038551X, 2AGBW9290038552X
Manufacturer.....:	Signify (China) Investment Co., Ltd
Manufacturer Address .....:	No.9, Lane 888, Tian Lin Road, 200233, Shanghai, China
Operating temperature.....:	-20 ~ +45 ℃
Model difference .....:	All models have the same mechanical construction, circuit diagram and PCB layout except rated power, software and model name. There are two capacitors in the driver board. So all test was done on model 9290038552. Additional Band Edge and RSE test was done on model 9290038552 with alternative capacitor.

Wireless specifiction .....:	Bluetooth (LE)					
Operating frequency range(s)	2402~2480MHz					
Type of Modulation .....:	GFSK					
PHYs.....:	☒	LE 1M	☒	LE 2M	☒	LE Coded S=2/8
Data Rate.....:	☒	1Mbit/s	☒	2Mbit/s	☒	500/125 Kbit/s
Number of channel .....:	40					

Wireless specifiction .....:	Zigbee
Operating frequency range(s)	2405~2480MHz
Type of Modulation .....:	O-QPSK
Data Rate.....:	250kbps
Number of channel .....:	16

Rated power supply .....:	Voltage and Frequency	
	☐	AC: 220 - 240 V, 50/60 Hz
	☒	AC: 110 - 130 V, 50/60 Hz 7.2 W, 9.5 W
	☐	Adapter:
Mounting position.....:	☒	Tabletop equipment
	☒	Wall/Ceiling mounted equipment
	☐	Floor standing equipment
	☐	Hand-held/Portable equipment

1.2 Antenna Informaion

Antenna Delivery .....:	☒	1TX + 1RX		
	☐	2TX + 2RX		
	☐	Others: ……		
Antenna technology .....:	☒	SISO		
	☐	MIMO	☐	CDD
			☐	Beam-forming
Antenna Type .....:	☐	External	☐	Dipole
			☐	Sectorized
	☒	Internal	☐	Ceramic Chip
			☐	PIFA
			☒	Slot Antenna
			☐	Others……..
Antenna Gain .....:	0.5 dBi			

Note: The general description of the Item(s), antenna information in clause 1 are provided and confirmed by the client.

1.3 Test Facility

USA	**:**	**FCC Designation Number: CN1199**

2. RF Exposure Evaluation

2.1. Limits: KDB 447498 D04 V01

Mobile Device:
CFR Title 47 §2.1091(b)
(b) For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

Devices operating in standalone mobile exposure conditions may contain a single transmitter or multiple transmitters that do not transmit simultaneously. A minimum test separation distance ≥ 20 cm is required between the antenna and radiating structures of the device and nearby persons to apply mobile device exposure limits. The distance must be fully supported by the operating and installation configurations of the transmitter and its antenna(s), according to the source-based time-averaged maximum power requirements of § 2.1091(d)(2). In cases where cable losses or other attenuations are applied to determine compliance, the most conservative operating configurations and exposure conditions must be evaluated. The minimum test separation distance required for a device to comply with mobile exposure conditions must be clearly identified in the installation and operating instructions, for all installation and exposure conditions, to enable users and installers to comply with RF exposure requirements. For mobile devices that have the potential to operate in portable device exposure conditions, similar to the configurations described in § 2.1091(d)(4), a KDB inquiry is required to determine the SAR test requirements for demonstrating compliance.
When the categorical exclusion provision of § 2.1091(c) applies, the minimum test separation distance may be estimated, when applicable, by simple calculations according to plane-wave equivalent conditions, to ensure the transmitter and its antenna(s) can operate in manners that meet or exceed the estimated distance. The source-based time-averaged maximum radiated power, according to the maximum antenna gain, must be applied to calculate the field strength and power density required to establish the minimum test separation distance. When the estimated test separation distance becomes overly conservative and does not support compliance, MPE measurement or computational modeling may be used to determine the required minimum separation distance.

According to FCC Part 1.1307, systems operating under the provisions of this section shall be operated in a manner the ensures that the public is not exposed to radio frequency energy level in excess of the commission's guidelines.

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)
0.3-1.34	614	1.63	(100)*
1.34-30	824/f	2.19/f	(180/f2)*
30-300	27.5	0.073	0.2
300-1500			f/1500
1500-100,000			1.0

MPE calculation formula

$$S = \frac{PG}{4\pi R^2}$$

P = output power (mW)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = Separation distance between radiator and human body (cm)

Simultaneous Transmission SAR Test Exemption with Respect to Multiple Exemption Criteria

Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (Evaluatedk term) shall be used to determine exemption for simultaneous transmission according to Formula (C.1) [repeated from § 1.1307(b)(3)(ii)(B)].

$$\sum_{i=1}^{a}\frac{P_i}{P_{\mathrm{th},i}}+\sum_{j=1}^{b}\frac{ERP_j}{ERP_{\mathrm{th},j}}+\sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k}\leq 1 \qquad (C.1)$$

a. number of fixed, mobile, or portable RF sources claiming exemption using the § 1.1307(b)(3)(i)(B) formula for Pth, including existing exempt transmitters and those being added.

b. number of fixed, mobile, or portable RF sources claiming exemption using the applicable § 1.1307(b)(3)(i)(C) Table 1 formula for Threshold ERP, including existing exempt transmitters and those being added.

c. number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance.

Pi the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

Pth,i. the exemption threshold power (Pth) according to the § 1.1307(b)(3)(i)(B) formula for fixed, mobile, or portable RF source i. ERPj. the available maximum time-averaged power or the ERP, whichever is greater, of fixed, mobile, or portable RF source j. ERPth,j. exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least λ/2π, according to the applicable § 1.1307(b)(3)(i)(C) Table 1 formula at the location in question.

Evaluatedk . the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation.

Exposure
Limitk. either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable sources, as applicable

The sum of the ratios of the applicable terms for SAR-based, MPE-based and measured SAR or MPE shall be less than 1, to determine simultaneous transmission exposure compliance.

2.2. 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.

2.3. Test Result of RF Exposure Evaluation

The tune-up power is 1.0 dB, so the maximum conducted power we used to calculate RF exposure is 12.0 dBm.

Mode	Frequency (MHz)	Maximum Conducted power Tune up (dBm)	Maximum Conducted power Tune up (mW)	Distance (mm)	Power Density (mW/cm²)	Limit of Power Density (mW/cm²)	Verdict
Bluetooth	2402~2480	12.00	15.85	20	0.003	1.000	PASS
Zigbee	2405~2480	12.00	15.85	20	0.003	1.000	PASS

Conclusion: This EUT is deemed to comply with the reference level limits, therefore the basic restrictions are compliant with human exposure limits.

The End