

Test report No:
6282956.52

TEST REPORT

US FCC Exposure Evaluation

Identification of item tested	LED luminaire
Trademark	PHILIPS, hue, SIGNIFY
Model and /or type reference	9290043198, 9290043200, 9290043202
Ratings	100-130 Vac, 50/60 Hz;
Other identification of the product	FCC ID: 2AGBW9290043198X FCC ID: 2AGBW9290043200X FCC ID: 2AGBW9290043202X
Applicant's name / address	Signify (China) Investment Co., Ltd. Building no.9, Lane 888, Tianlin Road, Minhang District, Shanghai, 200233, China.
Test method requested, standard	FCC Rules and Regulations Title 47 CFR Chapter I – Part 2 – Subpart J, Section 2.1091. (10-1-24 Edition)
Verdict Summary	IN COMPLIANCE
Tested by (name / position & signature)	Kayuan Dai Project Manager 
Approved by (name / position & signature)	Zuyao Fan Project Manager 
Date of issue	2026-08-14
Report template No	TRF_FCC Exposure_EMF V1.0

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7. Samples undergoing test have been selected by: The client.

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%
Atmospheric pressure	86 kPa – 106 kPa

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

DEFINITION OF SYMBOLS USED IN THIS TEST REPORT

☒ Indicates that the listed condition, standard or equipment is applicable for this report/test/EUT.			
☐ Indicates that the listed condition, standard or equipment is not applicable for this report/test/EUT.			
Decimal separator used in this report	☐	Comma (,)	☒ Point (.)

ABBREVIATIONS

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

EUT	: Equipment Under Test
SAC	: Semi-Anechoic Chamber
OATS	: Open Area Test Site
DC	: Duty Cycle
DSSS	: Direct Sequence Spread Spectrum
OFDM	: Orthogonal Frequency Division Multiplexing
E.I.R.P.	: Equivalent Isotropically Radiated Power
ERP	: Effective Radiated Power
FHSS	: Frequency Hopping Spread Spectrum
RMS	: Root Mean Square
U_N	: Nominal voltage
N/A	: Not Applicable
N/M	: Not Measured

DOCUMENT HISTORY

Report nr.	Date	Description
6282956.52	2026-08-14	First release.

DATA PROVIDED BY THE APPLICANT

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested", "Applicant's name / address", "Ratings" and "Derived model(s)", "Antenna Gain").
2. Derived model not tested. These models have been declared by the applicant as being the same as the model under test.

DEKRA declines any responsibility with respect to the information provided by the applicant and that may affect the validity of results.

CONCLUSION, REMARKS AND COMMENTS

The equipment under test (EUT) does meet the requirements of the stated standard(s)/test(s).

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The tests described in this report do not result in the right to use any approval mark as conferred by DEKRA. As far as the tests were based on certain specifications, these are mentioned in the report.

According to the declaration from the manufacturer, these products are LED luminaire. Model 9290043198, 9290043200 and 9290043202 share the same RF module, same function, identical RF power setting and antenna gain except for different dimensions, rated power and LED driver. Model 9290043198 uses one type of driver, while models 9290043200 and 9290043202 use the same driver of a different type. They utilize both IEEE 802.15.4 and Bluetooth protocols for connectivity.

During the normal operation, a minimum separation distance of 20 cm between the radiating structure and any person can be maintained. Therefore, the EUT is evaluated under mobile exposure conditions according to the requirements of FCC Rules and Regulations Title 47 CFR Chapter I–Part 2–Subpart J, Section 2.1091 for mobile devices, FCC Part 1–Subpart I Section 1.1307 for RF exposure exemption criteria, and FCC Part 1–Subpart I Section 1.1310 for RF exposure limits, with reference to FCC KDB 447498 D04 Interim General RF Exposure Guidance v01.

No direct RF exposure measurement was performed. The evaluation is based on the maximum measured RF output power from the referenced RF test report **6282956.50 and 6282956.51**.

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Description of the item..... :	LED luminaire
Trademark..... :	PHILIPS, hue, SIGNIFY
Manufacturer..... :	Signify (China) Investment Co., Ltd. Building no.9, Lane 888, Tianlin Road, Minhang District, Shanghai, 200233, China.

1.2 Test data

Test Location	DEKRA Testing and Certification (Shanghai) Ltd.
Address	No.1050, Xingxian Road, Jiading District, Shanghai City, People's Republic of China
FCC Designation number	CN1358
FCC Test Firm Registration number	988331
IC Designation number	CN0155
IC Test Firm Registration number	31268
Date of receipt of test item	2026-08-04
Date(s) of performance of tests	2026-08-04 to 2026-08-14

2 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

2.1 Standards

Standard	Year	Description
FCC Rules and Regulations Title 47 CFR Chapter I–Part 2 – Subpart J, Section 2.1091	10-1-24 Edition	Radio frequency radiation exposure evaluation: Mobile devices
FCC Part 1 – Subpart I Section 1.1307	10-1-24 Edition	Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared
FCC Part 1 – Subpart I Section 1.1310	10-1-24 Edition	Radio frequency radiation exposure limits
KDB 447498 D04 Interim General RF Exposure Guidance v01	2021	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices

2.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards:

No Deviation.

3 ASSESSMENT PROCEDURE

3.1 General RF Exposure Test Exemption Considerations

RF exposure test exemptions provide means to obtain certification without the need of showing data (measurements, or analytical / numerical modeling) to demonstrate compliance. Hereafter, in this context, an RF source is referred to as “exempt RF device” in the sense that it is not required to show data demonstrating compliance to RF exposure limits.

Test exemptions apply for devices used in general population/uncontrolled exposure environments, according to the SAR-based, or MPE-based exemption thresholds.⁸ However, it is always possible, especially when the potential for exposure cannot be easily determined, that an RF exposure evaluation may become required according FCC Part 1.1307(c) and (d).

The 1-mW and SAR-based test exemption conditions are in terms of source-based available maximum time-averaged (matched conducted) output power for all operating configurations, adjusted for tune-up tolerance, and at the minimum test separation distance [Glossary] required for the particular RF exposure scenario under consideration. This minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander.

To qualify for SAR test exemption, the test separation distances applied must be fully explained and justified (typically in the SAR measurement, or SAR analysis report, according to KDB Pub. 865664) by showing the actual operating configurations and exposure conditions of the transmitter, and applicable host platform requirements (e.g., KDB Pubs. 648474, 616217, 941225)

When no other RF exposure testing or reporting is required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for SAR test exemption.

If RF exposure testing requirements for a specific device are covered in a KDB publication, those requirements must be satisfied before applying any SAR test exemption provisions. For example, this is the case for handheld PTT two-way radios, handsets, laptops, and tablets, etc.

Finally, when 10-g extremity SAR applies, SAR test exemption may be considered by applying a factor of 2.5 to the SAR-based exemption thresholds.

3.2 1-mW Blanket Exemption

Per FCC Part 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance.

This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

3.3 SAR-Based Exemption

A more comprehensive exemption, considering a variable power threshold that depends on both the separation distance and power, is provided in FCC Part 1.1307(b)(3)(i)(B). This exemption is applicable to the frequency range between 300 MHz and 6 GHz, with test separation distances between 0.5 cm and 40 cm, and for all RF sources in fixed, mobile, and portable device exposure conditions.

Accordingly, a RF source is considered an RF exempt device if its available maximum time-averaged (matched conducted) power or its effective radiated power (ERP), whichever is greater, are below a specified threshold. This exemption threshold was derived based on general population 1-g SAR requirements.

3.4 MPE-Based Exemption

An alternative to the SAR-based exemption is provided in FCC Part 1.1307(b)(3)(i)(C), for a much wider frequency range, from 300 kHz to 100 GHz, applicable for separation distances greater or equal to $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power.¹⁰ For this case, a RF source is an RF exempt device if its ERP (watts) is no more than a frequency-dependent value, as detailed tabular form. These limits have been derived based on the basic specifications on Maximum Permissible Exposure (MPE) considered for the FCC rules in FCC Part 1.1310(e)(1).

4 RF EXPOSURE EXEMPTION CRITERIA

This section provides the exemption criteria and summarizes relevant parameters and usage considerations based on descriptions in FCC 19-126.

4.1 1 mW Blanket Exemption

The 1 mW Blanket Exemption of FCC Part 1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

The 1 mW blanket exemption applies at separation distances less than 0.5 cm, including where there is no separation. This exemption shall not be used in conjunction with other exemption criteria other than those for multiple RF sources in paragraph FCC Part 1.1307(b)(3)(ii)(A).

The 1 mW exemption is independent of service type and covers the full range of 100 kHz to 100 GHz, but it shall not be used in conjunction with other exemption criteria or in devices with higher-power transmitters operating in the same time-averaging period. Exposure from such higher-power transmitters would invalidate the underlying assumption that exposure from the lower-power transmitter is the only contributor to SAR in the relevant volume of tissue.

4.2 MPE-based Exemption

General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table 1 to support an exemption from further evaluation from 300 kHz through 100 GHz.

Table 1 Thresholds For Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency			Minimum Distance			Threshold ERP
F_L (MHz)	-	F_H (MHz)	$\lambda_L / 2\pi$	-	$\lambda_H / 2\pi$	W
0.3	-	1.34	159 m	-	35.6 m	1920 R ²
1.34	-	30	35.6 m	-	1.6 m	3,450 R ² /f ²
30	-	300	1.6 m	-	159 mm	3.83 R ²
300	-	1500	159 mm	-	31.8 mm	0.0128 R ² f
1500	-	100000	31.8 mm	-	0.5 mm	19.2R ²
Subscripts L and H are low and high; λ is wavelength. From FCC Part 1.1307(b)(3)(i)(c), modified by adding Minimum Distance columns.						

The table applies to any RF source (i.e., single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at least $\lambda/2\pi$. The thresholds are based on the general population MPE limits with a single perfect reflection, outside of the reactive near-field, and in the main beam of the radiator.

For mobile devices that are not exempt per Table B.1 [Table 1 of FCC Part 1.1307(b)(3)(i)(C)] at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in FCC Part 1.1310 is necessary if the ERP of the device is greater than $ERP_{20\text{ cm}}$ Formula:

$$P_{\text{th}} (\text{mW}) = ERP_{20\text{ cm}} (\text{mW}) = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

4.3 SAR-based Exemption

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of $\lambda/4$.

As for devices with antennas of length greater than $\lambda/4$ where the gain is not well defined, but always less than that of a half-wave dipole (length $\lambda/2$), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.

The SAR-based exemption formula of FCC Part 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive).

P_{th} is given by Formula:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm), and ERP 20cm is per Formula.

The example values shown in below table are for illustration only.

Example Power Thresholds (mW)											
Distance (mm)											
Frequency (MHz)		5	10	15	20	25	30	35	40	45	50
	300	39	65	88	110	129	148	166	184	201	217
	450	22	44	67	89	112	135	158	180	203	226
	835	9	25	44	66	90	116	145	175	207	240
	1900	3	12	26	44	66	92	122	157	195	236
	2450	3	10	22	38	59	83	111	143	179	219
	3600	2	8	18	32	49	71	96	125	158	195
	5800	1	6	14	25	40	58	80	106	136	169

4.4 Tolerances in RF Exposure Test Methodologies

Device samples used for compliance testing must have the same physical, mechanical, and thermal characteristics, and operational tolerances as for production units.

All devices must be tested within the tune-up tolerance specification range. More specifically, each device must be evaluated for SAR or MPE compliance in the required operating modes and test configurations, at the maximum rated output power, and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance.

5 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 (Evaluated_k term) shall be used to determine exemption for simultaneous transmission according to below Formula.

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

a Number of fixed, mobile, or portable RF sources claiming exemption using the FCC Part 1.1307(b)(3)(i)(B) formula for P_{th}, including existing exempt transmitters and those being added.

b Number of fixed, mobile, or portable RF sources claiming exemption using the applicable FCC Part 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.

P_i 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).

P_{th,i} The exemption threshold power (P_{th}) according to the FCC Part 1.1307(b)(3)(i)(B) formula for fixed, mobile, or portable RF source i.

ERP_j The available maximum time-averaged power or the ERP, whichever is greater, of fixed, mobile, or portable RF source j.

ERP_{th,j} Exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least λ/2π, according to the applicable FCC Part 1.1307(b)(3)(i)(C) Table 1 formula at the location in question.

Evaluated_k 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 Limit_k 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.

5.1 1-mW Test Exemption for Multiple Sources

As discussed in § 1.1307(b)(3)(ii)(A), the 1-mW exemption intended for single transmitters may be also applied to simultaneous transmission conditions, within the same host device, according one of the following criteria:

- a) When maximum available power each individual transmitting antenna within the same time averaging period is ≤ 1 mW, and the nearest parts of the antenna structures of the simultaneously operating transmitters are separated by at least 2 cm.
- b) When the aggregate maximum available power of all transmitting antennas is ≤ 1 mW in the same time-averaging period.

This exemption may not be combined with any other exemption.

5.2 Simultaneous Transmission with both SAR-based and MPE-Based Test Exemptions

This case is described in detail in § 1.1307(b)(3)(ii)(B) and covers the situations where both SAR-based and MPE-based exemption may be considered for test exemption in fixed, mobile, or portable device exposure conditions. For these cases, a device with multiple RF sources transmitting simultaneously will be considered an RF exempt device if the condition of Formula (1) is satisfied.

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

Appendix C of KDB provides additional details.

For these test exemptions to apply, the maximum output power, duty factor, and other applicable parameters used in the standalone ERP determination tests, must be the same, or corresponding to a more conservative choice, than those required for simultaneous transmission.

The power level of the standalone SAR used to qualify for SAR test exemption, or additional test exemption, must be clearly explained in the SAR report. When simultaneous transmission SAR- based test exemptions, or when the SPLSR test exemption [Section 2.2.3] cannot be applied, enlarged zoom scan [Glossary] SAR measurements must be performed at the maximum output power required for the applicable simultaneous transmission scenarios. This power level shall account for the tune-up tolerance [Glossary] requirements of all transmitters, but not more than 2 dB lower than the maximum tune-up tolerance limit.

6 EXPOSURE EVALUATION RESULTS

This section provides the exemption criteria and summarizes relevant parameters and usage considerations based on descriptions in FCC 19-126.

According to the declaration from the manufacturer, tune-up tolerance specification range is ± 1 dB.

The conducted output power was verified in these two models 9290043202 and 9290043198. The measured result remains within the declared tune-up tolerance range and does not exceed the maximum RF power condition (Model: 9290043202, Zigbee: **8.5** dBm, Bluetooth: **8.48** dBm).

As stated in DEKRA Testing and Certification (Shanghai) Ltd. test report No. **6282956.50** and **6282956.51**, the maximum measured output power levels for each supported technology are:

Model: 9290043202

Operating mode	Operating frequency range	Max Antenna Gain (dBi)	Max Measured Output Power (dBm)	Max Output Power (dBm)	Max ERP (dBm)	Max ERP (mW)
Bluetooth 5.0	2402 – 2480 MHz	2.2	7.48	8.48	8.53	7.13
IEEE 802.15.4	2400 – 2483.5 MHz	2.2	7.5	8.5	8.55	7.16

Remark: ERP (dBm) = Conducted power (dBm) + Antenna Gain (dBi) – 2.15 dB

Remark: The tune-up tolerance specification range was declared by the applicant; Therefore, the max output power was used for the RF exposure evaluation.

Model: 9290043198

Operating Mode	Operating frequency range	Max Antenna Gain (dBi)	Max Measured Output Power (dBm)	Max Output Power (dBm)	Max ERP (dBm)	Max ERP (mW)
Bluetooth 5.0	2402 – 2480 MHz	2.2	6.95	7.95	8	6.31
IEEE 802.15.4	2400 – 2483.5 MHz	2.2	6.91	7.91	7.96	6.25

Remark: ERP (dBm) = Conducted power (dBm) + Antenna Gain (dBi) – 2.15 dB

Remark: The tune-up tolerance specification range was declared by the applicant; Therefore, the max output power was used for the RF exposure evaluation.

6.1 Test result for blanket 1 mW blanket exemption

Operating Mode	Operating frequency range	Max ERP (mW)	Limit (mW)	Verdict
Bluetooth 5.0	2402 – 2480 MHz	7.13	1	Not applicable
IEEE 802.15.4	2400 – 2483.5 MHz	7.16	1	Not applicable

Remark: The maximum ERP is greater than 1 mW; therefore, the 1 mW blanket exemption is not applicable.

6.2 Test result for MPE-based Exemption

Operating Mode	Operating frequency range	Max ERP (mW)	Min separation distance (cm)	Threshold Limit (mW)	Verdict
Bluetooth 5.0	2402 – 2480 MHz	6.31	20	768	PASS
IEEE 802.15.4	2400 – 2483.5 MHz	6.25	20	768	PASS

Remark: Threshold ERP = $19.2R^2$

The EUT does not support simultaneous transmission. Therefore, simultaneous transmission evaluation is not applicable.

The computed value(s) are below the limit(s). The device meets the applicable RF exposure exemption criteria according to FCC Title 47 CFR Chapter I–Part 2–Subpart J, Section 2.1091, FCC Part 1–Subpart I Section 1.1307, FCC Part 1–Subpart I Section 1.1310 and FCC KDB 447498 guidance.

-----END-----