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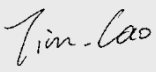
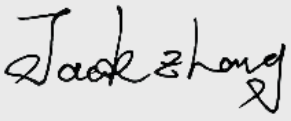
Test report No:
2480839R-RF-US-P20V01

# RF Exposure Evaluation Exemption Report

| | |
|---|---|
| Product Name | Level lock |
| Trademark | level |
| Model and /or type reference | B1,B2,B3,B4 |
| FCC ID | 2ATIO2 |
| Applicant´s name / address | Level Home Inc.<br>935 Main St Redwood City, CA 94063, United States of America |
| Test method requested, standard | FCC 47CFR §1.1307, §1.1310 |
| Verdict Summary | IN COMPLIANCE |
| Documented By (name / position & signature) | Tim Cao/ Project Manager<br>  |
| Approved by (name / position & signature) | Jack Zhang/ Manager<br>  |
| Date of issue | 2024-09-14 |
| Report Version | V1.0 |
| Report template No | Template_FCC MPE-RF-V1.0 |

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**page**

## 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.

**IMPORTANT:** No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

## GENERAL CONDITIONS

| | |
|---|---|
| Test Location | No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China |
| Date (receive sample) | Aug. 28, 2024 |
| Date (start test) | Aug. 29, 2024 |
| Date (finish test) | Sept. 05, 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℃ - 35 ℃ |
| 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
UN : Nominal voltage
Tx : Transmitter
Rx : Receiver
N/A : Not Applicable
N/M : Not Measured

## DOCUMENT HISTORY

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| 2480839R-RF-US-P20V01 | V1.0 | Initial issue of report. | 2024-09-14 |
| | | | |
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## 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 §1.1307 and §1.1310.
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 presented in this report relate only to the object 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 1.3 Antenna information.

# 1. RF Exposure Evaluation

## 1.1. Limits

### SAR exemption limits

According to § 1.1307(b)(3)(i)(C)

Using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least λ/2π, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

| RF Source frequency (MHz) | Threshold ERP (watts) |
|---|---|
| 0.3-1.34 | 1,920 $R^2$. |
| 1.34-30 | 3,450 $R^2/f^2$. |
| 30-300 | 3.83 $R^2$. |
| 300-1,500 | 0.0128 $R^2f$. |
| 1,500-100,000 | 19.2$R^2$. |

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 threshold.

## Exposure limits

According to § 1.1310(e)(1):

Table 1 to § 1.1310(e)(1) sets forth limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields.

Table 1 to § 1.1310(e)(1)—Limits for Maximum Permissible Exposure (MPE)

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density ($mW/cm^2$) | Averaging Time (minutes) |
|---|---|---|---|---|
| (i) Limits for Occupational/Controlled Exposure | | | | |
| 0.3 – 3.0 | 614 | 1.63 | *(100) | ≤6 |
| 3.0 – 30 | 1842/f | 4.89/f | *($900/f^2$) | <6 |
| 30 – 300 | 61.4 | 0.163 | 1.0 | <6 |
| 300 – 1500 | | | f/300 | <6 |
| 1500 – 100000 | | | 5 | <6 |
| (ii) Limits for General Population/Uncontrolled Exposure | | | | |
| 0.3 – 3.0 | 614 | 1.63 | *(100) | <30 |
| 3.0 – 30 | 824/f | 2.19/f | *($180/f^2$) | <30 |
| 30 – 300 | 27.5 | 0.073 | 0.2 | <30 |
| 300 – 1500 | | | f/1500 | <30 |
| 1500 – 100000 | | | 1.0 | <30 |
| f = frequency in MHz. * = Plane-wave equivalent power density. | | | | |

## 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 Name.....: | Level lock |
| Model No. .....: | B1,B2,B3,B4 |
| Trademark .....: | level |
| FCC ID.....: | 2ATIO2 |
| Hardware version .....: | 309000135725R3 / 810-00011-00 Rev6 |
| Software version.....: | 1.6.0.2 |
| Manufacturer .....: | Level Home Inc. |
| Manufacturer address.....: | 935 Main St Redwood City, CA 94063, United States of America |
| Model Difference(s) .....: | These models have the same RF module and antenna, different models are only for different markets. |

| | | | | | | |
|---|---|---|---|---|---|---|
| Wireless specifiction.....: | BLE 5.0 | | | | | |
| 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 Specification .....: | NFC |
| Operating frequency range(s) .....: | 13.56 MHz |
| Type of modulation.....: | ASK |
| Number of channel .....: | 1 |

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

| | | |
|---|---|---|
| Rated power supply..... : | Voltage and Frequency | |
| | ☐ | AC: 220 – 240 Vac, 50/60 Hz |
| | ☐ | AC: 110 – 130 Vac, 50/60 Hz |
| | ☐ | DC: …… |
| | ☒ | Battery: 3Vdc |
| | ☐ | PoE: …… |
| Mounting position ..... : | ☒ | Table top equipment |
| | ☐ | Wall/Ceiling mounted equipment |
| | ☐ | Floor standing equipment |
| | ☐ | Hand-held equipment |
| | ☐ | Other: ……. |

**Antenna information:**

**Bluetooth, Thread:**

| | | | | |
|---|---|---|---|---|
| Antenna model / type number .....: | N/A | | | |
| Antenna serial number .....: | N/A | | | |
| Antenna Delivery .....: | ☒ | 1TX + 1RX | | |
| | ☐ | 2TX + 2RX | | |
| | ☐ | Others:…… | | |
| Antenna technology.....: | ☒ | SISO | | |
| | ☐ | MIMO | ☐ | CDD |
| | | | ☐ | Beam-forming |
| Antenna Type .....: | ☐ | External | ☐ | Dipole |
| | | | ☐ | Sectorized |
| | ☒ | Internal | ☐ | Ceramic Chip |
| | | | ☐ | PIFA |
| | | | ☒ | PCB |
| | | | ☐ | Others…….. |
| Antenna Gain.....: | -6.1 dBi | | | |

**NFC:**

| | | | | |
|---|---|---|---|---|
| Model No. .....: | N/A | | | |
| Antenna manufacturer.....: | N/A | | | |
| Antenna Delivery .....: | ☒ | 1TX + 1RX | | |
| | ☐ | 2TX + 2RX | | |
| | ☐ | Others:…… | | |
| Antenna technology.....: | ☒ | SISO | | |
| | ☐ | MIMO | ☐ | Basic |
| | | | ☐ | CDD |
| | | | ☐ | Sectorized |
| | | | ☐ | Beam-forming |
| Antenna Type .....: | ☐ | External | ☐ | Dipole |
| | | | ☐ | Sectorized |
| | ☒ | Internal | ☐ | PIFA |
| | | | ☒ | FPC |
| | | | ☐ | Ceramic Chip Antenna |
| | | | ☐ | Coil antenna |
| | | | ☐ | Type F antenna |

Note: The antenna information for the EUT in clause 1.3 are provided and confirmed by the client.

## Standalone modes:

### Bluetooth, Thread:

The tune-up power is 1dB, so the maximum conducted we used to calculate RF exposure is 2.66 dBm for Bluetooth and 7.56 dBm for Thread.

| Mode | Exposure Condition | Maximum conducted Output power (dBm) | EIRP (mW) | ERP (mW) | Distance (mm) | λ/2π (mm) | f(MHz) | Threshold ERP (mW) | RF exposure evaluation verdict |
|---|---|---|---|---|---|---|---|---|---|
| Bluetooth | Body | 2.66 | 0.45 | 0.28 | 200 | 19.9 | 2402 | 768 | Not required |
| Thread | Body | 7.56 | 1.40 | 0.85 | 200 | 19.9 | 2405 | 768 | Not required |

Note: Bluetooth data is quoted form original report, report no. 2032061R-RF-US-P06V01.

### NFC:

| Axial | Test Freq. (MHz) | Maximum Level (mV/m) | Limit (V/m) | Result |
|---|---|---|---|---|
| X | 13.56 | 148 | 60.77 | Pass |
| Y | 13.56 | 132 | 60.77 | Pass |
| Z | 13.56 | 111 | 60.77 | Pass |
| Axial | Test Freq. (MHz) | Maximum Level (μA/m) | Limit (A/m) | Result |
| X | 13.56 | 25 | 0.16 | Pass |
| Y | 13.56 | 29 | 0.16 | Pass |
| Z | 13.56 | 22 | 0.16 | Pass |

Note: NFC data is quoted form original report, report no. 22B0536R-RF-US-P20V01.

Conclusion: SAR test is not required..

The End