
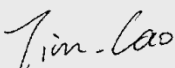
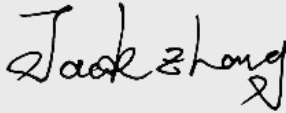




Test report No:
22B0536R-RF-US-P20V01

TEST REPORT

Rules&Requations FCC Exposure Evaluation Declaration

| | |
|---|---|
| Product Name | Level lock |
| Trademark |  |
| Model and /or type reference | B1,B2,B3,B4 |
| FCC ID | 2ATIO2 |
| Applicant's name / address | Level Home Inc. 935 Main St Redwood City, CA 94063, United States of America |
| Test method requested, standard | KDB 447498D01V06 FCC Part1.1310 |
| Verdict Summary | IN COMPLIANCE |
| Documented by (name / position & signature) | Tim Cao/Project Engineer  |
| Approved by (name / position & signature) | Jack Zhang/ Supervisor  |
| Date of issue | 2022-11-28 |
| Report Version | V1.1 |
| Report template No | Template_FCC 1.1310-RF-V1.0 |

INDEX

| | page |
|---|------|
| Competences and Guarantees..... | 3 |
| General conditions..... | 3 |
| Environmental conditions..... | 3 |
| Possible test case verdicts..... | 4 |
| Abbreviations..... | 4 |
| Document History..... | 5 |
| Remarks and Comments..... | 5 |
| 1. General Information..... | 6 |
| 1.1. EUT Description..... | 6 |
| 1.2. Antenna information..... | 6 |
| 1.3. Mode of Operation..... | 8 |
| 1.4. Configuration of Tested System..... | 9 |
| 1.5. EUT Exercise Software..... | 10 |
| 2. Test Environment..... | 11 |
| 3. Electric Field Strength..... | 12 |
| 3.1 Test Equipment..... | 12 |
| 3.2 Test Setup..... | 12 |
| 3.3 Limit..... | 13 |
| 3.4 Test Procedure..... | 14 |
| 3.5 Uncertainty..... | 15 |
| 3.6 Test Result..... | 16 |
| 4. RF Exposure Evaluation..... | 17 |
| 4.1. Limits..... | 17 |
| 4.2. Test Procedure..... | 19 |
| 4.3. Test Result of RF Exposure Evaluation..... | 19 |

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) | Nov. 14, 2022 |
| Date (start test) | Nov. 15, 2022 |
| Date (finish test) | Nov. 21, 2022 |

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 |
|-----------------------|---------|----------------------------------|-------------|
| 22B0536R-RF-US-P20V02 | V1.0 | Initial issue of report. | 2022-11-24 |
| 22B0536R-RF-US-P20V02 | V1.1 | P6 P7 add bluetooth information. | 2022-11-28 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

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 KDB 447498 and FCC Part 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 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.

1. General Information

1.1. EUT Description

| | |
|--------------------|-------------|
| Product Name | Level lock |
| Model No. | B1,B2,B3,B4 |
| Working Voltage | DC 3V |
| Carrier Frequency | 13.56 MHz |
| Type of Modulation | ASK |

| | |
|------------------------------|----------------|
| Wireless specification | Bluetooth 5.0 |
| Operating frequency range(s) | 2400~2483.5MHz |
| Type of Modulation | GFSK |
| Number of channel..... | 40 |

1.2. Antenna information

NFC

| | | | |
|----------------------|---|---|------------------------------------|
| Model No. | N/A | | |
| 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"/> Sectorized | |
| | | <input type="checkbox"/> Beam-forming | |
| Antenna Type | <input type="checkbox"/> External | <input type="checkbox"/> Dipole | |
| | | <input type="checkbox"/> Sectorized | |
| | <input checked="" type="checkbox"/> Internal | <input type="checkbox"/> PIFA | |
| | | <input checked="" type="checkbox"/> FPC | |
| | | <input type="checkbox"/> Ceramic Chip Antenna | |
| | | <input type="checkbox"/> Coil antenna | |
| | | <input type="checkbox"/> Type F antenna | |

BLE

| | | | |
|-----------------------------------|-------------------------------------|--------------------------------------|---|
| Antenna model / type number | N/A | | |
| Antenna serial number | N/A | | |
| Antenna Delivery | <input checked="" type="checkbox"/> | 1TX + 1RX | |
| | <input type="checkbox"/> | 2TX + 2RX | |
| Antenna technology | <input checked="" type="checkbox"/> | SISO | |
| | <input type="checkbox"/> | MIMO | <input type="checkbox"/> CDD <input type="checkbox"/> Beam-forming |
| Antenna Type | <input type="checkbox"/> | External | <input type="checkbox"/> Dipole |
| | | | <input type="checkbox"/> Sectorized |
| | <input checked="" type="checkbox"/> | Internal | <input type="checkbox"/> PIFA |
| | | | <input checked="" type="checkbox"/> PCB |
| | | | <input type="checkbox"/> Ceramic Chip |
| | | <input type="checkbox"/> Others..... | |
| Antenna Gain..... | N/A | | |

1.3. Mode of Operation

DEKRA has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

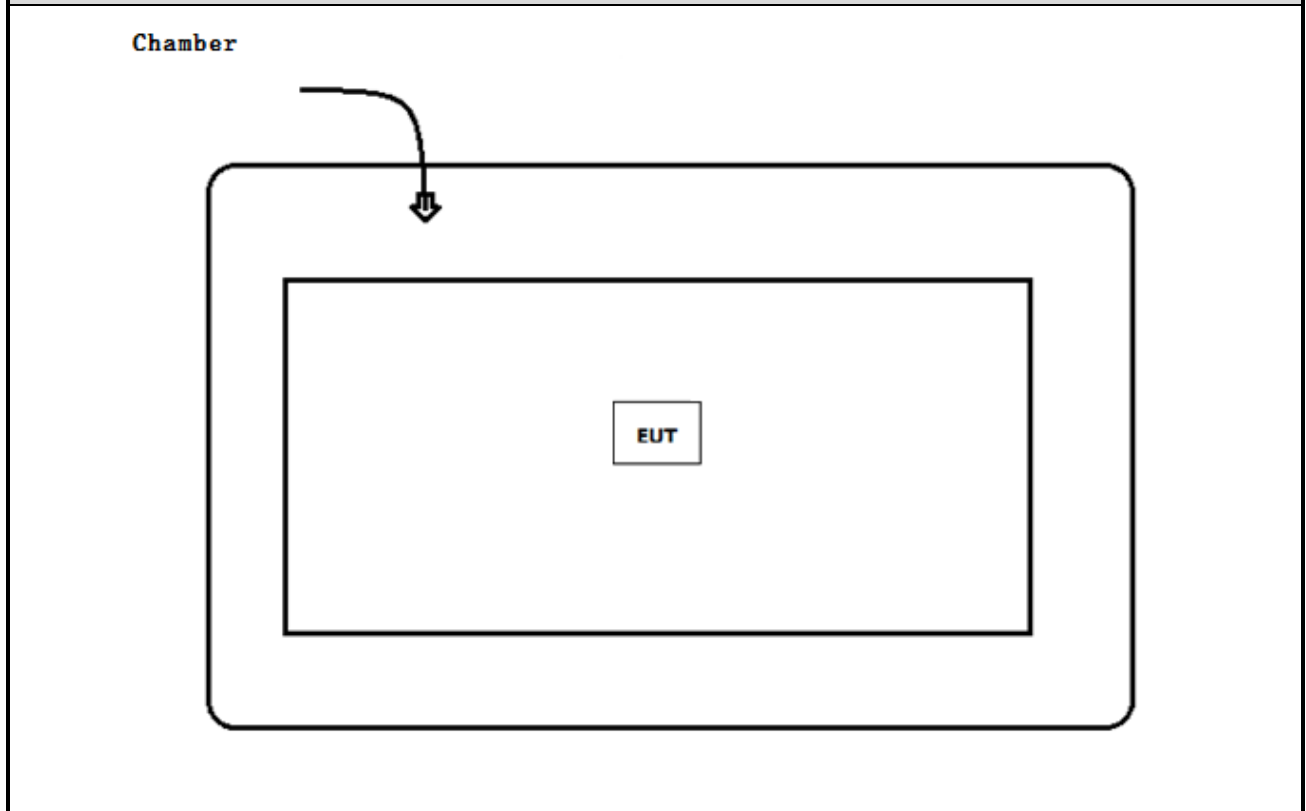
| |
|------------------|
| Test Mode |
| Mode 1: Transmit |

Note:

1. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. For portable device, radiated spurious emission was verified over X, Y, Z Axis, and shown the worst case on this report.

1.4. Configuration of Tested System

Test setup Diagram- Radiated Emission



1.5. EUT Exercise Software

| | |
|---|---|
| 1 | Setup the EUT and simulators as shown on above. |
| 2 | Turn on the power of equipment. |
| 3 | Start to continue transmit. |

2. Test Environment

| Items | Required (IEC 68-1) | Actual |
|----------------------------|---------------------|----------|
| Temperature (°C) | 15-35 | 22 |
| Humidity (%RH) | 25-75 | 53 |
| Barometric pressure (mbar) | 860-1060 | 950-1000 |

3. Electric Field Strength

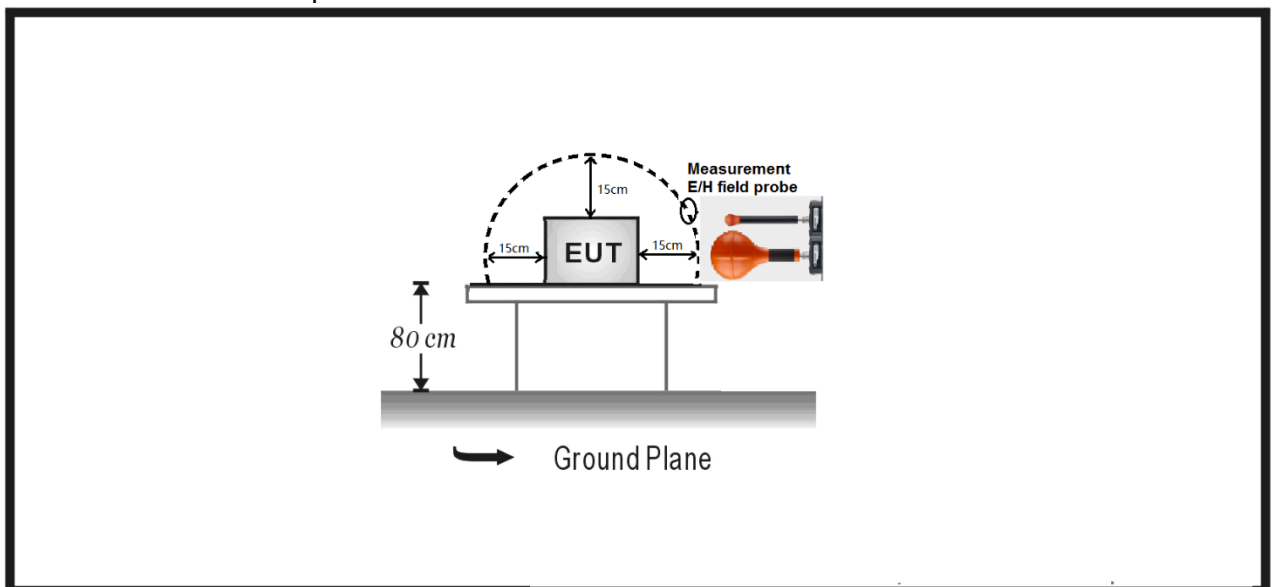
3.1 Test Equipment

| Electric Field Strength / AC-6 | | | | | |
|--------------------------------|--------------|----------|------------|-------------|---------------|
| Instrument | Manufacturer | Type No. | Serial No. | Cal. Date | Cal. Due Date |
| Field Meter | WAVECONTROL | SMP2 | 20SN1286 | 2022.07.19 | 2023.07.18 |
| Temperature/Humidity Meter | Zhicheng | ZC1-2 | RF-06 | 2022.07.007 | 2023.07.06 |

Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

3.2 Test Setup

3kHz~10MHz Test Setup:



3.3 Limit

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)

(a) Limits for Occupational / Controlled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S)(mW/cm ²) | Averaging Times E ² , H ² or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|--|--|
| 0.3-3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0-30 | 1842/f | 4.89/f | (900/f)* | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | -- | -- | F/300 | 6 |
| 1500-100000 | -- | -- | 5 | 6 |

(b) 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) | Averaging Times E ² , H ² or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|--|--|
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/f)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | -- | -- | F/1500 | 30 |
| 1500-100000 | -- | -- | 1.0 | 30 |

Note: f=frequency in MHz; *Plane-wave equivalent power density

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.

3.4 Test Procedure

- a. Set the measurement frequency of the measurement probe to the fundamental frequency of the device under test.
- b. Set the span to encompass the entire emission bandwidth.
- c. Set the RBW greater than the 99% OBW of the fundamental emission.

Note: This step is not required for a broadband measurement probe that integrates the entire frequency range.

- d. Set the detector to Peak and trace display to Max-Hold.
- e. Allow the spectrum to fill; for pulsing devices this may require an increased monitoring period.
- f. Using a marker, set it to the maximum level of the spectral envelope.
- g. Repeat steps (b) to (f) while scanning a parallel plane at the measurement distance of 10cm on each side of the device to find the peak level.
- h. Repeat steps (b) to (g) for any frequencies where the field value is greater than -20 dBc below the maximum level identified.
- i. If there are multiple frequencies transmitted by the device under test, use equations (2) and (3) to determine compliance.

Note: When scanning around the entire device, the location found to be the maximum for the E- or H-field may not be the same location as the opposite field.



3.5 Uncertainty

The measurement uncertainty is defined as ± 3.80 dB

3.6 Test Result

| Axial | Maximum 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 | Maximum Freq. (MHz) | Maximum Level (μ A/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 |

4. RF Exposure Evaluation

4.1. Limits

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

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.

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} |
| <p>Note: <i>f</i> is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).</p> | | | | |

4.2. 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.

4.3. Test Result of RF Exposure Evaluation

| | | |
|-----------|---|------------------------|
| Product | : | Level lock |
| Test Item | : | RF Exposure Evaluation |
| Test Site | : | AC-5 |

Power Density

| Test Mode | Frequency Band (MHz) | EIRP (dBm) | Limit of Power Density S(mW/cm ²) | Power Density at R = 20 cm (mW/cm ²) |
|-----------|----------------------|------------|---|--|
| BT | 2400 ~ 2483.5 | 1.66 | 1 | 0.0003 |

Note:

The maximum power density is 0.0003mW/cm² for Level lock without any other radio equipment.

_____ The End _____