

# FCC RF EXPOSURE EVALUATION REPORT

Product Name: Smart Thermostat  
Trade Mark: N/A  
Model No.: LAKE X  
Report Number: 190827010RFC-2  
Test Standards: FCC 47 CFR Part 1 Subpart I  
FCC ID: 2AJ5K-LAKE-X  
Test Result: PASS  
Date of Issue: October 25, 2019

Prepared for:

**Beijing Hailin Energy Saving Technology Co., Ltd.**  
**Huilongguan International Information Industry Base, Changping**  
**District, Beijing, China**

Prepared by:

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**Version**

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## 1. GENERAL INFORMATION

### 1.1 CLIENT INFORMATION

<b>Applicant:</b>	Beijing Hailin Energy Saving Technology Co., Ltd.
<b>Address of Applicant:</b>	Huilongguan International Information Industry Base, Changping District, Beijing, China
<b>Manufacturer:</b>	Beijing Hailin Energy Saving Technology Co., Ltd.
<b>Address of Manufacturer:</b>	Huilongguan International Information Industry Base, Changping District, Beijing, China

### 1.2 EUT INFORMATION

<b>Product Name:</b>	Smart Thermostat	
<b>Model No.:</b>	LAKE X	
<b>Trade Mark:</b>	N/A	
<b>DUT Stage:</b>	Production Unit	
<b>EUT Supports Function:</b>	2.4 GHz ISM Band:	IEEE 802.11b/g/n
<b>Sample Received Date:</b>	August 27, 2019	
<b>Sample Tested Date:</b>	August 27, 2019 to September 27, 2019	

### 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

For 2.4 GHz ISM Band of Wi-Fi	
<b>Frequency Band:</b>	2400 MHz to 2483.5 MHz
<b>Frequency Range:</b>	2412 MHz to 2462 MHz
<b>Support Standards:</b>	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20
<b>Type of Modulation:</b>	IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM(64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT20: OFDM(64-QAM, 16-QAM, QPSK, BPSK)
<b>Data Rate:</b>	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS7
<b>Number of Channels:</b>	IEEE 802.11b: 11 IEEE 802.11g: 11 IEEE 802.11n-HT20: 11
<b>Channel Separation:</b>	5 MHz
<b>Antenna Type:</b>	PCB Antenna
<b>Antenna Gain:</b>	2 dBi
<b>Maximum Peak Power:</b>	IEEE 802.11b: 18.78 dBm IEEE 802.11g: 22.41 dBm IEEE 802.11n-HT20: 22.41 dBm

## 1.4 OTHER INFORMATION

Test channels for 2.4 GHz ISM Band of Wi-Fi				
Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11b	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11g	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n-HT20	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz

## 1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

### FCC 47 CFR Part 1 Subpart I

All test items have been performed and recorded as per the above standards

## 1.6 TEST LOCATION

All tests were performed at:

### Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109  
Telephone: +86 (0) 755 2823 0888  
Fax: +86 (0) 755 2823 0886

## 1.7 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

### CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

### A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

### ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

### FCC Accredited Lab.

Designation Number: CN1194

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[Http://www.uttlab.com](http://www.uttlab.com)

Test Firm Registration Number: 259480

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## **1.8 DEVIATION FROM STANDARDS**

None.

## **1.9 ABNORMALITIES FROM STANDARD CONDITIONS**

None.

## **1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER**

None.

## **2. EQUIPMENT LIST**

Please refer to the RF test report.

### 3. MPE EVALUATION

#### 3.1 REFERENCE DOCUMENTS FOR EVALUATION

No.	Identity	Document Title
1	FCC 47 CFR Part 1 Subpart I	PROCEDURES IMPLEMENTING THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969
2	KDB 447498 D01 General RF Exposure Guidance v06	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES

#### 3.2 MPE COMPLIANCE REQUIREMENT

##### 3.2.1 Limits

According to §1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

##### 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 <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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

##### 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 <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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	30

**Note:** f = frequency in MHz: \* = Plane-wave equivalents power density.

##### 3.2.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

#### 3.3 MPE CALCULATION METHOD

$$S = PG/4\pi R^2 = EIRP/4\pi R^2$$

S = power density (in appropriate units, e.g., mw/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)



### 3.4

### 3.5 MPE CALCULATION RESULTS

**Note:** For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

#### 3.4.1 For WLAN

For Wi-Fi function, operating at 2412MHz to 2462 MHz for IEEE802.11b/g/n

##### 3.4.1.1 Antenna Type:

Chain 0: PCB Antenna

##### 3.4.1.2 Antenna Gain:

Chain 0: 2412MHz to 2462 MHz: 2 dBi

##### 3.4.1.3 Results for WLAN

Operating Mode		Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value
		(MHz)	(dBm)		(dBi)	(dBm)	(mW)	(mw/cm <sup>2</sup> )	
SS	IEEE 802.11b	2412	18	1	2	22	158.4893	1	0.0315
		2437	18	1	2	22	158.4893	1	0.0315
		2462	18	1	2	22	158.4893	1	0.0315
	IEEE 802.11g IEEE 802.11n-HT20	2412	22	1	2	25	316.2278	1	0.0629
		2437	22	1	2	25	316.2278	1	0.0629
		2462	22	1	2	25	316.2278	1	0.0629

Remark:

1. MPE evaluate distance is 20cm from user manual provide by manufacturer.



## APPENDIX 1 PHOTOS OF TEST SETUP

N/A

## APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

\*\*\* End of Report \*\*\*

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