

# RF Exposure Evaluation Report

**Application No.:** SZCR2105021165AT  
**Applicant:** Arovast Corporation  
**Address of Applicant:** 1202 N. Miller St. Suite A, Anaheim, CA 92806, USA  
**Manufacturer:** Arovast Corporation  
**Address of Manufacturer:** 1202 N. Miller St. Suite A, Anaheim, CA 92806, USA  
**Factory:** UNI-SPLENDOR TECHNOLOGY(HUI ZHOU)CORP.  
**Address of Factory:** Lidong Village, Baihua, Huidong county, Huizhou, Guangdong province, China

**Equipment Under Test (EUT):**  
**EUT Name:** Levoit Smart Top-fill Humidifier  
**Model No.:** Dual 200S, LUH-D301S-WUSR, LUH-D301S-XXXX  
 (X can represent 0 to 9, A to Z) ♣

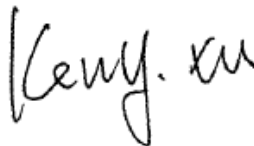
♣ Please refer to section 4.1 of this report which indicates which model was actually tested and which were electrically identical.

**Trade Mark:** Levoit  
**FCC ID:** 2ARBY-DUAL200S  
**Standards:** 47 CFR PART 1, Subpart I, Section 1.1307  
 47 CFR PART 1, Subpart I, Section 1.1310  
 47 CFR PART 2, Subpart J, Section 2.1091

**Date of Receipt:** 2021-05-26  
**Date of Test:** 2021-05-27 to 2021-06-08  
**Date of Issue:** 2021-06-16

<b>Test Result :</b>	<b>PASS*</b>
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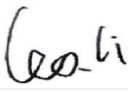
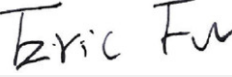
\* In the configuration tested, the EUT complied with the standards specified above.

  
 Keny Xu  
 EMC Laboratory Manager



## 2 Version

<b>Revision Record</b>				
<b>Version</b>	<b>Chapter</b>	<b>Date</b>	<b>Modifier</b>	<b>Remark</b>
01		2021-06-16		Original

<b>Authorized for issue by:</b>			
		 <hr/> <b>Leo Li/Project Engineer</b>	
		 <hr/> <b>Eric Fu/Reviewer</b>	



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## 4 General Information

### 4.1 General Description of EUT

Power supply:	DC 24V from adapter input AC 120V/60Hz Adapter Model: GQ24-240100-AU Input: 100-240V~50/60Hz 1.0A Max Output: 24.0V 1.0A
Cable(s):	DC Cable: 180cm unshielded
For BT:	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V4.2 Dual mode
Modulation Type:	GFSK, pi/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Antenna Type:	PCB Antenna
Antenna Gain:	3.28dBi
For BLE:	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V4.2 Dual mode
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	PCB Antenna
Antenna Gain:	3.28dBi
For WiFi 2.4GHz:	
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz;802.11n(HT40): 2422MHz to 2452MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK);802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11;802.11n(HT40):7
Channel Spacing:	5MHz
Antenna Type:	PCB Antenna
Antenna Gain:	3.28dBi



**Remark:**

Model No.: Dual 200S, LUH-D301S-WUSR, LUH-D301S-XXXX (X can represent 0 to 9, A to Z)

Only the model Dual 200S and LUH-D301S- WUSR were tested, since according to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, with only different as below:

Dual 200S with two touch button control (Power & Mist Level), but LUH-D301S-WUSR with four touch button control (Power, Mist Level, sleep mode, night light)

Dual 200S without Nightlight, But LUH-D301S-WUSR with Nightlight, under such a difference will caused the PCB layout and the circuitry design are not exactly the same.



## 4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China  
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

## 4.3 Test Facility

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

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI (Member No. 1937)**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

## 4.4 Deviation from Standards

None.

## 4.5 Abnormalities from Standard Conditions

None.

## 4.6 Other Information Requested by the Customer

None.



## 5 RF Exposure Evaluation

### 5.1 RF Exposure Compliance Requirement

#### 5.1.1 Limits

According to FCC Part1.1310: 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 part1.1307(b)

**TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	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/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

R = distance between observation point and center of the radiator in cm

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. 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.

#### 5.1.2 Test Procedure

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



### 5.1.3 EUT RF Exposure Evaluation

For BT:

Antenna Gain: 3.28dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.13 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
Highest	2480	5.82	3.82	0.0016	1.0	PASS

Note: Refer to report No. SZCR210502116502 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For BLE:

Antenna Gain: 3.28dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.13 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
Middlest	2440	2.96	1.98	0.0008	1.0	PASS

Note: Refer to report No. SZCR210502116503 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.





For 2.4G:

Antenna Gain: 3.28dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.13 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
Lowest	2412	15.34	34.20	0.0145	1.0	PASS

Note: Refer to report No. SZCR210502116504 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

- End of the Report -

