

# FCC RF EXPOSURE EVALUATION REPORT

**Product Name:** Air Purifier  
**Trade Mark:** N/A  
**Model No. / HVIN:** aair  
**Add. Model No. / HVIN:** N/A  
**Report Number:** 210923020RFC-2  
**Test Standards:** FCC 47 CFR Part 1 Subpart I  
 RSS-102 Issue 5  
**FCC ID:** 2A28LAAIRPRO  
**IC:** 27816-AAIRLPRO  
**Test Result:** PASS  
**Date of Issue:** October 29, 2021

Prepared for:


**Aeris Cleantec AG**  
**Knonauerstrasse 54, 6330 Cham, Switzerland**

Prepared by:

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**Version**

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## 1. GENERAL INFORMATION

### 1.1 CLIENT INFORMATION

|                                 |  |
|---------------------------------|--|
| <b>Applicant:</b>               | Aeris Cleantec AG                          |
| <b>Address of Applicant:</b>    | Knonauerstrasse 54, 6330 Cham, Switzerland |
| <b>Manufacturer:</b>            | Aeris Cleantec AG                          |
| <b>Address of Manufacturer:</b> | Knonauerstrasse 54, 6330 Cham, Switzerland |

### 1.2 EUT INFORMATION

|                               |                   |                  |
|-------------------------------|-------------------|------------------|
| <b>Product Name:</b>          | Air Purifier      |                  |
| <b>Model No.:</b>             | aair              |                  |
| <b>Add. Model No.:</b>        | N/A               |                  |
| <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 |

### 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)<br>IEEE 802.11g: OFDM(64-QAM, 16-QAM, QPSK, BPSK)<br>IEEE 802.11n-HT20: OFDM(64-QAM, 16-QAM, QPSK, BPSK) |
| <b>Data Rate:</b>             | IEEE 802.11b: Up to 11 Mbps<br>IEEE 802.11g: Up to 54 Mbps<br>IEEE 802.11n-HT20: Up to MCS7  |
| <b>Number of Channels:</b>    | IEEE 802.11b: 11<br>IEEE 802.11g: 11<br>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: 19.46 dBm<br>IEEE 802.11g: 23.73 dBm<br>IEEE 802.11n-HT20: 23.31 dBm   |
| <b>Normal Test Voltage:</b>   | 120 Vac  |

### 1.4 OTHER INFORMATION

| Mode              | Tx/Rx Frequency      | Test RF Channel Lists |           |              |
|-------------------|----------------------|-----------------------|-----------|--------------|
|                   |                      | Lowest(L)             | Middle(M) | Highest(H11) |
| 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     |

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## 1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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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**  
**RSS-102 Issue 5**

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

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## 1.6 TEST LOCATION

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All tests were performed at:

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

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China  
Telephone: +86 (0) 755 2823 0888  
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## 1.7 TEST FACILITY

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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 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 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

Test Firm Registration Number: 259480

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## 1.8 DEVIATION FROM STANDARDS

None.

## 1.9 ABNORMALITIES FROM STANDARD CONDITIONS

None.

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**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   | RSS-102 Issue 5                                 | Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) |
| 3   | 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

##### 3.2.1.1 FCC 47 CFR Part 1 Subpart I

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 equivalent power density.

### 3.2.1.2 RSS-102 Issue 5

According to RSS-102 Issue 5, 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.

According to RSS-102 Issue 5, 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.

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz<sup>6</sup> and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

### 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 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:

PCB Antenna

##### 3.4.1.2 Antenna Gain:

2412MHz to 2462 MHz: 2 dBi

##### 3.4.1.3 Results for FCC 47 CFR Part 1 Subpart I

| Operating Mode | Freq.             | Maximum conducted output power | Antenna Gain | Calculated maximum EIRP | Declared maximum EIRP | Separation Distance | MPE Limit             | MPE Value |        |
|----------------|-------------------|--------------------------------|--------------|-------------------------|-----------------------|---------------------|-----------------------|-----------|--------|
|                | (MHz)             | (dBm)                          | (dBi)        | (dBm)                   | (mW)                  | (cm)                | (mW/cm <sup>2</sup> ) |           |        |
| SSO            | IEEE 802.11b      | 2412-2462                      | 19.46        | 2                       | 21.46                 | 139.9587            | 20                    | 1         | 0.0278 |
|                | IEEE 802.11g      | 2412-2462                      | 23.73        | 2                       | 25.73                 | 374.1106            | 20                    | 1         | 0.0744 |
|                | IEEE 802.11n-HT20 | 2412-2462                      | 23.31        | 2                       | 25.31                 | 339.6253            | 20                    | 1         | 0.0676 |

##### 3.4.1.4 Results for RSS-102 Issue 5

| Operating Mode | Freq.             | Maximum conducted output power | Antenna Gain | Calculated maximum EIRP | Separation Distance | Declared maximum EIRP | Limit  |        |
|----------------|-------------------|--------------------------------|--------------|-------------------------|---------------------|-----------------------|--------|--------|
|                | (MHz)             | (dBm)                          | (dBi)        | (dBm)                   | (cm)                | (W)                   | (W)    |        |
| SSO            | IEEE 802.11g      | 2412-2462                      | 19.46        | 2                       | 21.46               | 20                    | 0.1400 | 2.6840 |
|                | IEEE 802.11b      | 2412-2462                      | 23.73        | 2                       | 25.73               | 20                    | 0.3741 | 2.6840 |
|                | IEEE 802.11n-HT20 | 2412-2462                      | 23.31        | 2                       | 25.31               | 20                    | 0.3396 | 2.6840 |

#### 3.4.2 Simultaneous Multi-band Transmission MPE Analysis

Not Applicable

## 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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