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# Silicon Valley Air Expert
# OZONE TEST REPORT

**SCOPE OF WORK**
Ozone Emissions Testing of Air Purifier for Model: KJ300F-X5

**REPORT NUMBER**
180112004GZU-001

**ISSUE DATE**
19-June-2018

**PAGES**
14

**QUOTE NUMBER**
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GFT-OP-10o (16-Oct-2017)


Block E, No,7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China

Telephone: +86 20 82139688
www.intertek.com

# TEST REPORT FOR SILICON VALLEY AIR EXPERT

Report No.: 180112004GZU-001
Date: Jun. 19, 2018

Contact Name: Yan Zhang
Address: 2051 Junction Avenue, San Jose, Ca, 95164 USA
Phone: 408-912-1798
Email: yan@beiangtech.com

## SECTION 1

## SUMMARY

The representative sample(s) have been tested, investigated, and found to comply with the requirements of standards:

*Electrostatic Air Cleaners, [UL 867:2011 Ed.5 +R:16Sep2016],* ***Section 40***

*Electrostatic Air Cleaners, [CSA C22.2#187:2015 Ed.4],* ***Section 7.4***

The equipment identified in this report has been found to meet the criteria for emittance of ozone not exceeding a concentration of 0.050 ppm. Furthermore, a second sample was not required to be tested, according to UL 867, as the first sample's maximum emissions were less than 0.030 ppm, which satisfies the exception in the Section 40.1.1.

This report completes our evaluation covered by Intertek Project Number 180112004GZU which has been authorized by Intertek quote number: QGZ180108037. If there are any questions regarding the results contained in this report, or any of the other services offered by Intertek, please do not hesitate to contact the above signed.

| OZONE EMISSIONS SUMMARY | | | |
|---|---|---|---|
| FAN SPEED | FILTER(S) | 03/VOLTAGE SETTING | $C(t)_{max}$ [ppm] |
| Turbo | Pre-filter/ESP/Carbon | - | 0.006 |
| Sleep | Pre-filter/ESP/Carbon | - | 0.011 |
| Sleep | Pre-filter/Carbon | - | 0.001 |
| Sleep | ESP | - | 0.028 |
| *The maximum Time-Weighted-Average: 0.028 ppmv* | | | |

| | | | |
|---|---|---|---|
| Completed by: | Sunny Zhou | Reviewed by: | Jacob Langenbacher |
| Title: | Assistant Technical Manager | Title: | Lead Engineer |
| Signature: | Sunny Zhou | Signature | Jacob Langenbacher |
| Date | Jun. 1, 2018 | Date: | Jun. 19, 2018 |

## SECTION 2

## INDEX



## CHAMBER EQUIPMENT INFORMATION

TEST EQUIPMENT LIST

| Instrument | Model | Intertek Ctrl # | Cal Due Date |
|---|---|---|---|
| Teledyne – Advanced Pollution Instrumentation Ozone Calibrator | T703 | SA054-14 | 07-Dec-2018 |
| Teledyne – Advanced Pollution Instrumentation Ozone Monitor | T400 | SA054-13 | * |
| Teledyne – Advanced Pollution Instrumentation Ozone Monitor | 400E | SA054-10 | * |
| Vaisala – Temperature & Humidity Transducer | H2120047 | SA054-12-06 | 26-May-2018 |
| QI XING HUA CHUANG – Mass flowmeter | D07-23FM | SA054-12-03 | 18-Jul-2018 |

***** The T400 and e00E Ozone Monitor is calibrated using the T703 calibrator.

## SECTION 3

# UNIT UNDER TEST INFORMATION

| MODEL INFORMATION | | | |
|---|---|---|---|
| Manufacturer: | Silicon Valley Air Expert | Pre-Filter: | Removable |
| Model Number: | KJ300F-X5 | HEPA Filter: | No |
| Production/Prototype/ Design | Prototype | ESP Filter: | Removable |
| Fan Speeds: | 5 | Carbon Filter: | Removable |
| O3/Voltage Settings: | NA | UV Light: | No |
| O3 Monitor: | NA | Ionizer: | Yes |
| Model Notes: | Brand Name: Airdog<br>Fan speed: Turbo-High-Mid-Slow-Sleep.<br>Ionizer is filter type. | | |

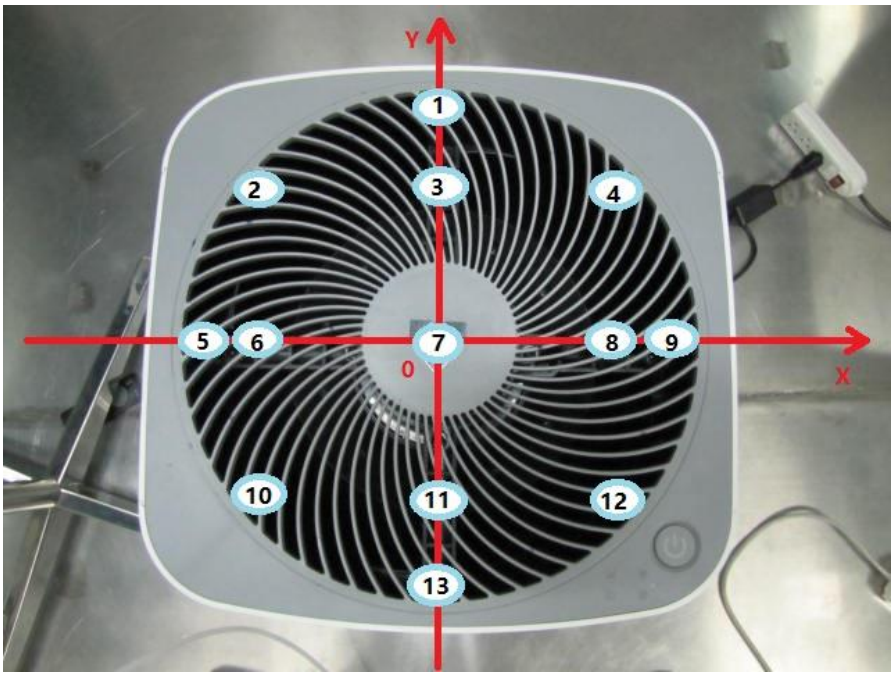
| RUN-IN TEST | | | |
|---|---|---|---|
| FIRST SAMPLE | | | |
| Run-in Start: | Mar.26,2018, 10:00 | Run-in End: | Mar.28,2018, 12:00 |
| Run-in Temperature: | 25±5°C | Sample Number | S180112004-003 |
| Serial Number: | NA | | |
| Sample Notes: | | | |
| SECOND SAMPLE | | | |
| Run-in Start: | NA | Run-in End: | NA |
| Run-in Temperature: | NA | Sample Number | S180112004-002 |
| Serial Number | NA | | |
| Sample Notes: | | | |

## SECTION 4

# PEAK OZONE TEST

| GRILL AND AIR PERIPHERY DIMENSIONS | | | |
|---|---|---|---|
| | | Date of Test: | Apr. 4, 2018;<br>Apr. 7, 2018;<br>Apr. 8, 2018;<br>Apr. 10, 2018 |
| Grill Height: | OD: Ø260mm<br>ID: Ø80mm | Air Periphery Height: | OD: Ø270mm |
| Grill Width: | | Air Periphery Width: | |
| Estimated Grill Area: | Approx. 48000 mm^2 | Est. Air Periphery Area: | Approx. 57200 mm^2 |
| Notes: | Measurements are in mm | | |

| PEAK LOCATION |
|---|




| Loc. | X | Y |
|---|---|---|
| - | [mm] | [mm] |
| 1 | 0 | 135 |
| 2 | *-95.5* | 95.5 |
| 3 | 0 | 95.5 |
| 4 | 95.5 | 95.5 |
| 5 | -135 | 0 |
| 6 | -95.5 | 0 |
| 7 | 0 | 0 |
| 8 | 95.5 | 0 |
| 9 | 135 | 0 |
| 10 | -95.5 | -95.5 |
| 11 | 0 | -95.5 |
| 12 | 95.5 | -95.5 |
| 13 | 0 | -135 |
| | | |
| | | |
| | | |
| | | |

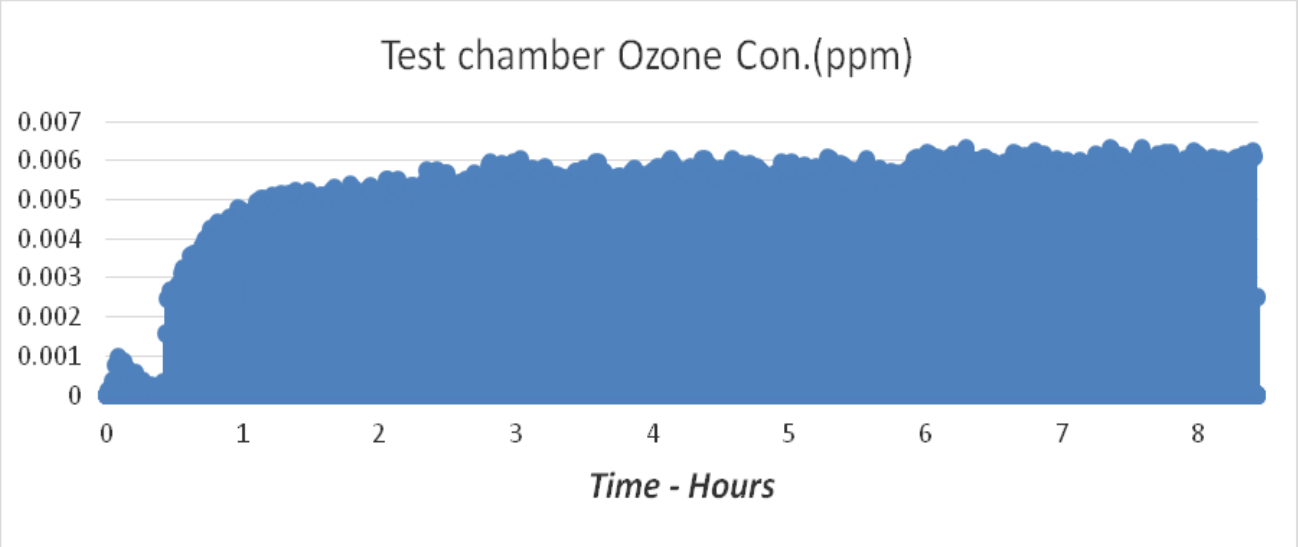
| PEAK OZONE CONCENTRATIONS (ppm) | | | | |
|---|---|---|---|---|
| Location | *With Filter(s)* | | *Without ESP (With Pre-filter/Carbon)* | *Without Filter(s) (With ESP)* |
| | *Highest* | *Sleep* | *Sleep* | *Sleep* |
| 1 | 0.0012 | 0.0029 | 0.0000 | 0.0049 |
| 2 | 0.0018 | 0.0032 | 0.0004 | 0.0018 |
| 3 | 0.0021 | 0.0065 | **0.0011** | 0.0076 |
| 4 | 0.0014 | 0.0032 | 0. 0002 | 0.0042 |
| 5 | 0.0010 | 0.0043 | 0. 0006 | 0.0055 |
| 6 | **0.0026** | 0.0064 | 0. 0007 | 0.0074 |
| 7 | 0.0019 | 0.0056 | 0. 0001 | 0.0078 |
| 8 | 0.0023 | 0.0068 | 0. 0002 | **0.0080** |
| 9 | 0.0014 | 0.0038 | 0. 0002 | 0.0047 |
| 10 | 0.0012 | 0.0058 | 0. 0003 | 0.0037 |
| 11 | 0.0018 | **0.0070** | 0. 0002 | 0.0077 |
| 12 | 0.0016 | 0.0056 | 0. 0000 | 0.0037 |
| 13 | 0.0018 | 0.0028 | 0. 0000 | 0.0043 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**Note**: Result is minus background.

## SECTION 5

# MAX OZONE TEST

START DATE OF TEST: 7-Apr-2018
SAMPLE: S180112004-003
FAN SPEED: Turbo (highest)
FILTER(S): Pre- filter/ESP/Carbon installed, Ionizer ON

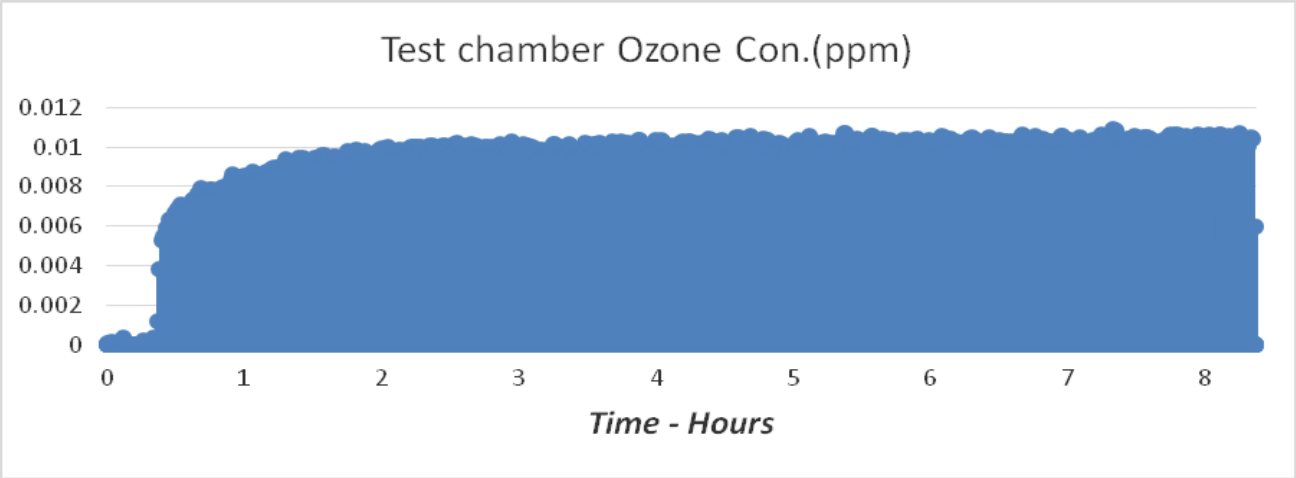



| MAXIMUM OZONE TEST RESULTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **UL Ref.** | **Pass/Fail** | **Mean** | **Min** | **Max** | **Delta** | **Units** |
| Background C(t) O3: | 40.4.3 | PASS | 0.000 | 0.000 | 0.001 | 0.001 | [ppm] |
| Test 1min C(t) O3: | 40.1.2 | PASS | 0.006 | 0.001 | **0.006** | 0.005 | [ppm] |
| Test 5min C(t) O3: | 40.1.2 | PASS | 0.006 | 0.001 | 0.006 | 0.005 | [ppm] |
| Chamber Temperature: | 40.4.2 | PASS | 23.91 | 23.43 | 25.41 | 1.98 | [degC] |
| Chamber Humidity: | 40.4.2 | PASS | 50.94 | 48.16 | 52.75 | 4.59 | [%RH] |
| Chamber Static Pressure: | - | PASS | 5.00 | 4.60 | 5.40 | 0.80 | [Pa] |
| Chamber Supply Air Flow: | - | - | 34.00 | 33.98 | 34.02 | 0.04 | [m3/h] |
| Required to Test 2nd Sample: | 40.1.1 | NO | | | | | |
| Test Duration: | 40.4.6 | 8 hours | | | | | |

NOTES: Peak Test Location 6.
According to a) of 40.4.6, 24 hours testing is not needed.

# MAX OZONE TEST

START DATE OF TEST: 8-Apr-2018
SAMPLE: S180112004-003
FAN SPEED: Sleep
FILTER(S): Pre- filter/ESP/Carbon installed, Ionizer ON



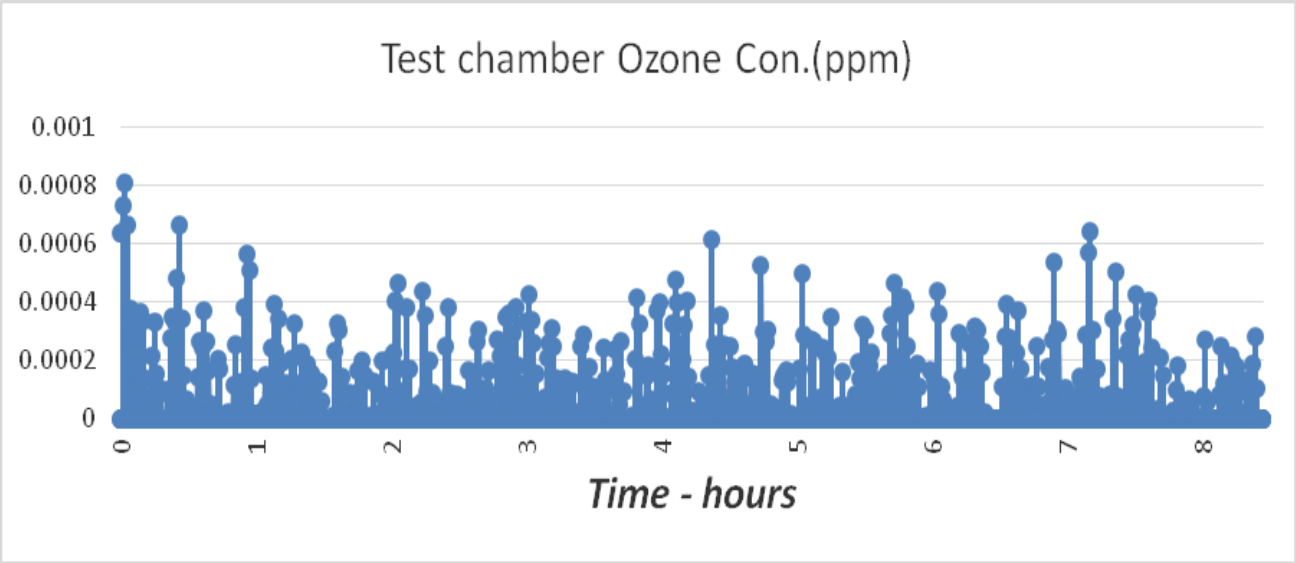

**MAXIMUM OZONE TEST RESULTS**

| | UL Ref. | Pass/Fail | Mean | Min | Max | Delta | Units |
|---|---|---|---|---|---|---|---|
| Background C(t) O3: | 40.4.3 | PASS | 0.000 | 0.000 | 0.000 | 0.000 | [ppm] |
| Test 1min C(t) O3: | 40.1.2 | PASS | 0.011 | 0.001 | **0.011** | 0.010 | [ppm] |
| Test 5min C(t) O3: | 40.1.2 | PASS | 0.011 | 0.001 | 0.011 | 0.010 | [ppm] |
| Chamber Temperature: | 40.4.2 | PASS | 25.31 | 25.08 | 25.52 | 0.43 | [degC] |
| Chamber Humidity: | 40.4.2 | PASS | 51.95 | 50.54 | 52.71 | 2.16 | [%RH] |
| Chamber Static Pressure: | - | PASS | 5.00 | 4.80 | 5.20 | 0.40 | [Pa] |
| Chamber Supply Air Flow: | - | - | 34.00 | 33.98 | 34.02 | 0.04 | [m3/h] |
| Required to Test 2nd Sample: | 40.1.1 | NO | | | | | |
| Test Duration: | 40.4.6 | 8 hours | | | | | |

NOTES: Peak Test Location 11.
According to a) of 40.4.6, 24 hours testing is not needed.

# MAX OZONE TEST

START DATE OF TEST: 9-Apr-2018
SAMPLE: S180112004-003
FAN SPEED: Sleep
FILTER(S): ESP removed, Pre- filter/Carbon installed
Ionizer ON

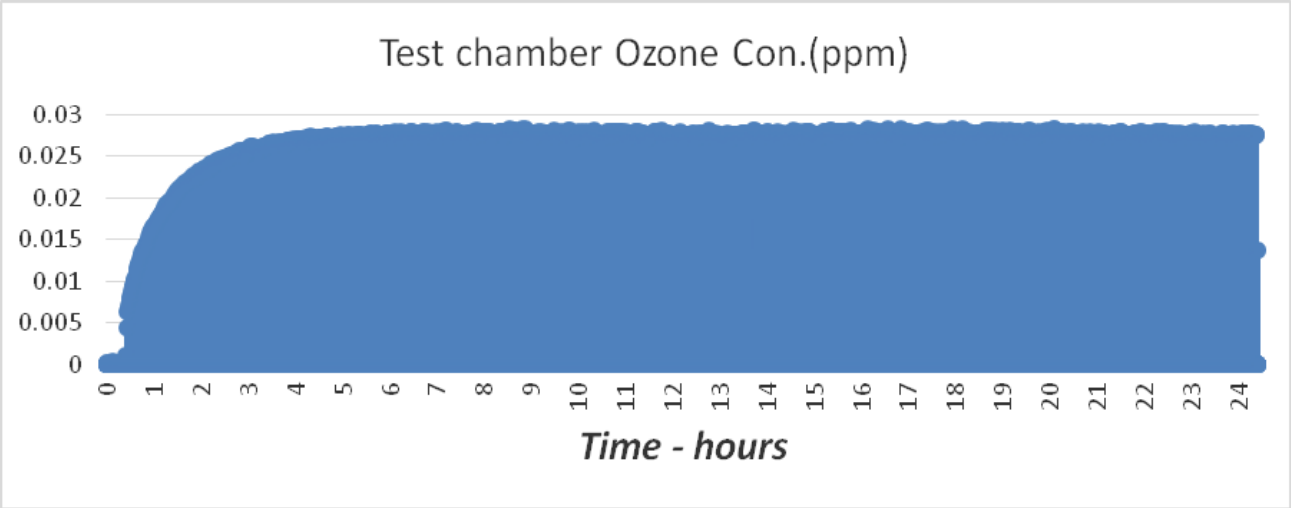



| MAXIMUM OZONE TEST RESULTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **UL Ref.** | **Pass/Fail** | **Mean** | **Min** | **Max** | **Delta** | **Units** |
| Background C(t) O3: | 40.4.3 | PASS | 0.000 | 0.000 | 0.001 | 0.001 | [ppm] |
| Test 1min C(t) O3: | 40.1.2 | PASS | 0.001 | 0.000 | **0.001** | 0.001 | [ppm] |
| Test 5min C(t) O3: | 40.1.2 | PASS | 0.000 | 0.000 | 0.001 | 0.001 | [ppm] |
| Chamber Temperature: | 40.4.2 | PASS | 25.20 | 25.03 | 25.39 | 0.36 | [degC] |
| Chamber Humidity: | 40.4.2 | PASS | 52.04 | 51.43 | 52.63 | 1.20 | [%RH] |
| Chamber Static Pressure: | - | PASS | 5.00 | 4.60 | 5.40 | 0.80 | [Pa] |
| Chamber Supply Air Flow: | - | - | 34.00 | 33.98 | 34.02 | 0.04 | [m3/h] |
| Required to Test 2nd Sample: | 40.1.1 | NO | | | | | |
| Test Duration: | 40.4.6 | 8 hours | | | | | |

NOTES: Peak Test Location 3.
According to a) of 40.4.6, 24 hours testing is not needed.

# MAX OZONE TEST

START DATE OF TEST: 11-Apr-2018
SAMPLE: S180112004-003
FAN SPEED: Sleep
FILTER(S): Pre- filter /Carbon removed, ESP installed
Ionizer ON




| MAXIMUM OZONE TEST RESULTS | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **UL Ref.** | **Pass/Fail** | **Mean** | **Min** | **Max** | **Delta** | **Units** |
| Background C(t) O3: | 40.4.3 | PASS | 0.000 | 0.000 | 0.000 | 0.000 | [ppm] |
| Test 1min C(t) O3: | 40.1.2 | PASS | 0.028 | 0.001 | **0.028** | 0.027 | [ppm] |
| Test 5min C(t) O3: | 40.1.2 | PASS | 0.028 | 0.001 | 0.028 | 0.027 | [ppm] |
| Chamber Temperature: | 40.4.2 | PASS | 25.37 | 25.16 | 25.56 | 0.41 | [degC] |
| Chamber Humidity: | 40.4.2 | PASS | 52.20 | 51.11 | 53.36 | 2.25 | [%RH] |
| Chamber Static Pressure: | - | PASS * | 5.00 | 4.40 | 5.60 | 1.20 | [Pa] |
| Chamber Supply Air Flow: | - | - | 34.00 | 33.98 | 34.02 | 0.04 | [m3/h] |
| Required to Test 2nd Sample: | 40.1.1 | NO | | | | | |
| Test Duration: | 40.4.6 | 24 hours | | | | | |

NOTES: Peak Test Location 8.

0 to 8-hour Time-Weighted-Average: 0.025ppmv
8 to 16-hour Time-Weighted-Average: 0.028 ppmv
16 to 24-hour Time-Weighted-Average: 0.028 ppmv

## SECTION 6

# APPENDIX

## DATA FILES

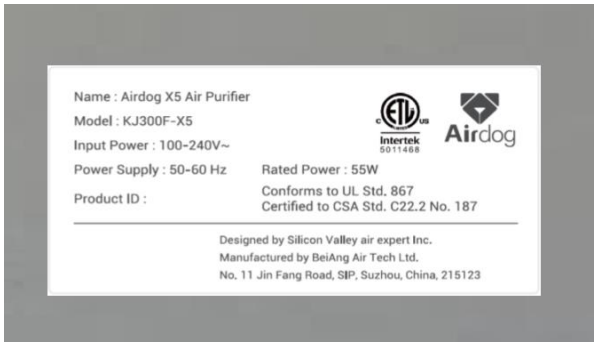
| TEST NAME | RAW DATA FILE |
|---|---|
| Half Life Test | RawData-half-life-2018-04-6.xls |
| Max Ozone: High w/ Filter | RawData-MAX test-filter-H.xls |
| Max Ozone: Sleep w/ Filter | RawData-MAX test-filter-Sleep.xls |
| Max Ozone: Sleep w/o ESP | RawData-MAX test-wo ESP-Sleep.xls |
| Max Ozone: Sleep w/o Filter | RawData-MAX test-wo filter-Sleep-24h.xls |

## ATTACHMENT DOCUMENTS

| DOCUMENT | SOFT-COPY FILE NAME |
|---|---|
| ARB Application | NA |
| Chain of Custody: Sample 1 | COC-S180112004-002&003.pdf |
| Chain of Custody: Sample 2 | COC-S180112004-002&003.pdf |

## UUT PHOTOGRAPHS

UUT




Nameplate

## UUT PHOTOGRAPHS: PEAK TEST

**Location 6**

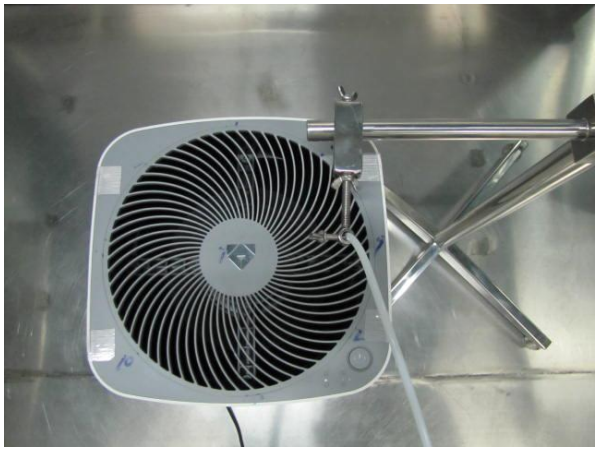
HIGH w/ FILTER

**Location 11**

SLEEP w/ FILTER

**Location 3**

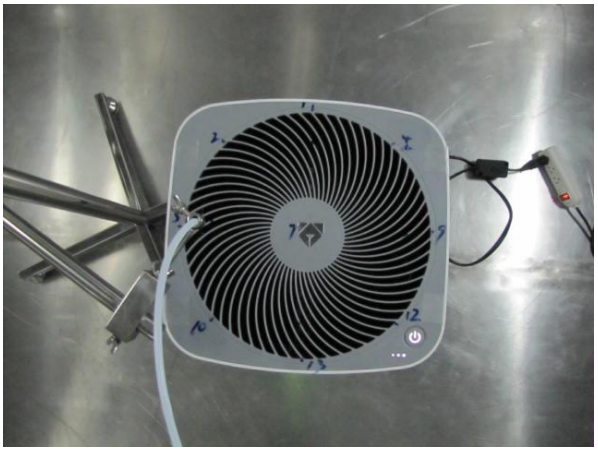
SLEEP w/o ESP



**Location 8**

SLEEP w/o FILTER

## UUT PHOTOGRAPHS: MAX OZONE TESTS



**Location 6**

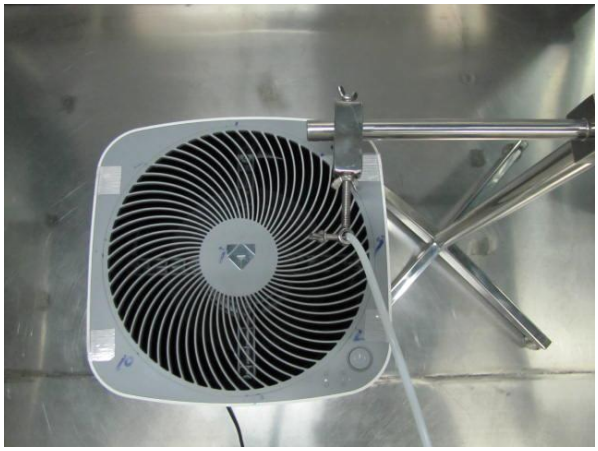
HIGH SPEED w/ FILTER

**Location 11**

SLEEP w/ FILTER

**Location 3**

SLEEP w/o ESP



**Location 8**

SLEEP w/o FILTER

## 7.0 REVISION SUMMARY

| Date/Proj # Site ID | Project Handler/ Reviewer | Section | Description of Change |
|---|---|---|---|
| | | | None |
| | | | |
| | | | |
| | | | |
| | | | |
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