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Agentis Air LLC

Test Report

SCOPE OF WORK

CADR Testing on Air Cleaner Model Brio650

REPORT NUMBER
105790792CRT-001

ISSUE DATE
August 20, 2024

[REVISED DATE]
NA

PAGES
11

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DOCUMENT CONTROL NUMBER
GFT-OP-10i (28-Nov-2018)

Test Report

Report Number	105790792CRT-001	
Test Laboratory Name / Address	Intertek Testing Services 3933 US Route 11, Cortland, NY 13045 USA	
Applicant Name / Address	Agentis Air LLC 9505 Berger Rd Columbia, MD 21046 USA	
Manufacturing Name / Address	Agentis Air LLC 9505 Berger Rd Columbia, MD 21046 USA	
Product	Room Air Cleaner	
Authorization Type	Quote Qu-01421220-3	
Authorization Date	April 2, 2024	
Brand Name	Agentis Air	
Model Number(s)	Brio 650	
Model Similarity	NA	
Standby Modes Available	Inactive Mode: No	Comments? NA
	Off Mode: Yes	Comments? NA
Control Number	CRT2408060830-001	CRT2408060830-002
Serial Number	-	-
UPC	-	
Rated Voltage	120 V	
Tested Voltage	120 V	
Rated Frequency	60 Hz	
Tested Frequency	60 Hz	
Rated Power	-	
Connected Functionality	No	
Date of Receipt of Sample(s)	August 6, 2024	
Sample Condition	Prototype (Production Representative)	
Sample Placement	Tested on Floor	
Secondary Features	Yes, Ionizer	
As Shipped Configuration/Settings	Plugg in - Power light onPower button turn on-Auto Speed	
Sample Description	120V/60Hz, High Speed On, Ionizer On	
Date of Test	Aug 06, 2024 - Aug 07, 2024	
Test Standard(s) or Criteria(s)	*ANSI/AHAM AC-1-2020 - Method for Measuring Performance of Portable Household Electric Cord Connected Room Air Cleaners* *AHAM AC-7-2022 - Energy Test Method for Consumer Room Air Cleaners* *Appendix FF to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Air Cleaners* *ENERGY STAR Program Requirements Product Specification for Room Air Cleaners Eligibility Criteria: Version 2.0*	
Conclusion	The results reported for Smoke & Dust are within the minimum and maximum limits of measurability and Pollen are above the maximum limits of measurability of the ANSI/AHAM AC-1-2020 "Association of Home Appliance Manufacturers Method for Measuring Performance of Portable Household Electric Room Air Cleaners" Test Method and model also meet the DOE requirement Tier 1 & Tier 2 for standard Appendix FF to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Air Cleaners.Model does meet the ENERGY STAR Program Requirements version 2.0.	
Date of Issue	August 20, 2024	

Test Methods:

ANSI/AHAM AC-1-2020

Tests were performed in accordance with ANSI/AHAM AC-1-2020 entitled "Association of Home Appliance Manufacturers Method for Measuring Performance of Portable Household Electric Room Air Cleaners". This standard method has defined limits of measurability. The practical limits of measurability are: Dust 10 to 600 CADR, Tobacco smoke 10 to 600 CADR and Pollen 25 to 450 CADR. The statistical validity of test results outside of the stated practical limits is questionable and unevaluated. Clean Air Delivery Rates (CADR's) were determined using Tobacco Smoke, AC Fine Test Dust, and Paper Mulberry Pollen.

Monitored particle size ranges for the three particulates were as follows:
Smoke - 0.10-1.0 microns; Dust - 0.5-3 microns; Pollen - 5-11 microns.

PM2.5 CADR is obtained by combining the CADR of Cigarette smoke particle sizes ranging from 0.1 and 0.5 microns with the CADR of dust particles that fall in the range of 0.5 to 2.5 microns and performing a geometric average calculation.

$$\text{PM2.5 CADR} = \sqrt[2]{Smoke\ CADR(0.1 - 0.5\mu m) X\ Dust\ CADR\ (0.5\ - 2.5)}$$

IEC 62301

Additional requirements for energy taken from IEC 62301 Ed. 2 entitled, “Household Electrical Appliances – Measurement of Standby Power”.

ANSI/AHAM AC-7-2022

Additional calculations were performed in accordance with ANSI/AHAM AC-7-2022 entitled "Energy Test Method for Consumer Room Air Cleaners". This standard primarily utilizes the test methods outlined in the standards above and outlines a calculation to determine annual energy use based on varying modes of usage an air cleaner will encounter including: active mode, inactive mode, and off mode, which make up the combined Annual Energy Consumption (AEC).

The air cleaner's AEC along with the PM2.5 CADR, are used in the following equation to determine the Integrated Energy Factor (IEF).

$$IEF = \left[\frac{CADR\left(\frac{ft^3}{min}\right)}{\left(AEC\left(\frac{kWh}{year}\right) * \frac{1\ year}{5840\ hours} * \frac{1000\ Wh}{1\ kWh}\right)}\right]$$

$$IEF\ (PM_{2.5}\ CADR/watt) = \left[\frac{CADR}{\left(\frac{AEC}{5.840}\right)}\right]$$

§ 429.68 Air cleaners.

(a) ***Sampling plan for selection of units for testing.***

(1) The requirements of § 429.11 are applicable to air cleaners; and

(2) For each basic mode of air cleaners, a sample of sufficient size shall be randomly selected and tested to ensure that—

(i) Any represented value of annual energy consumption or other measure of energy consumption of a basic mode for which consumers would favor lower values shall be greater than or equal to the higher of:

(A) The mean of the sample:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$$

Where:

$\bar{x}$ is the sample mean;

n is the number of samples; and,

x_i is the i^{th} sample.

Or,

(B) The upper 95 percent confidence limit (UCL) of the true mean divided by 1.10:

$$UCL = \bar{x} + t_{0.95}\left(\frac{s}{\sqrt{n}}\right)$$

Where:

$\bar{x}$ is the sample mean;

s is the sample standard deviation;

n is the number of samples; and,

$t_{0.95}$ is the t statistic for a 95 percent one-tailed confidence interval with n-1 degrees of freedom (from appendix A).

And

(ii) Any represented value of the integrated energy factor or other measure of energy consumption of a basic mode for which consumers would favor higher values shall be less than or equal to the high:

(A) The mean of the sample:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$$

Where:

$\bar{x}$ is the sample mean;

n is the number of samples; and,

x_i is the i^{th} sample.

Or,

(B) The lower 95 percent confidence limit (LCL) of the true mean divided by 0.90:

$$LCL = \bar{x} - t_{0.95}\left(\frac{s}{\sqrt{n}}\right)$$

Where:

$\bar{x}$ is the sample mean;

s is the sample standard deviation;

n is the number of samples; and,

$t_{0.95}$ is the t statistic for a 95 percent one-tailed confidence interval with n-1 degrees of freedom (from appendix A).

And

(3) Any represented value of the pollen, smoke, dust, and $PM_{2.5}$ clean air delivery rate (CADR) of a basic model must be the mean of the CADR for each tested unit of the basic model. Round the mean clean air delivery rate value to the nearest whole number.

(4) Any represented value of the effective room size, in square feet, of a basic model must be calculated as the product of 1.55 and the represented smoke CADR value of the basic model as determined in paragraph (a)(3) of this section. Round the value of the effective room size, in square feet, to the nearest whole number.

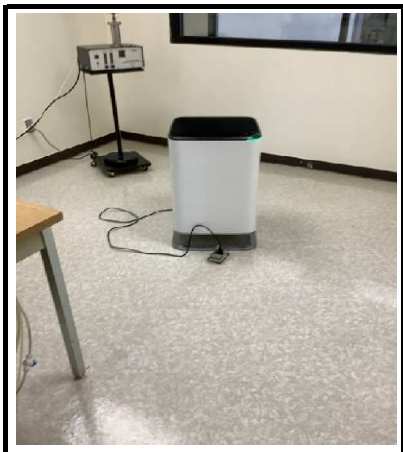
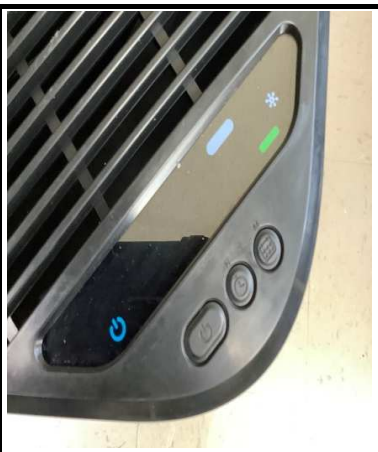
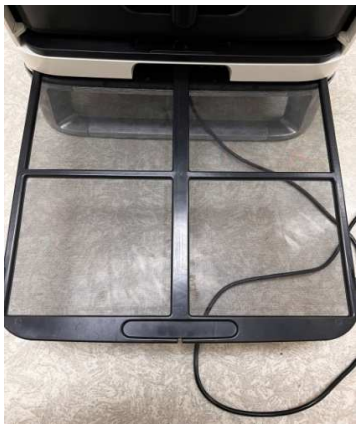
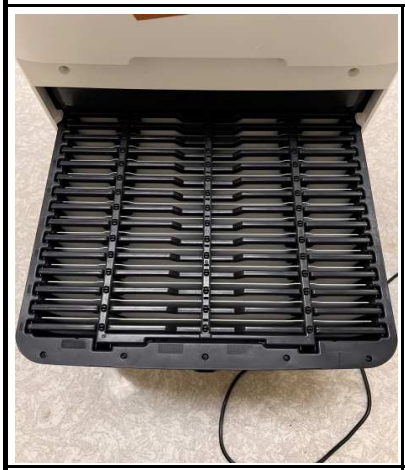
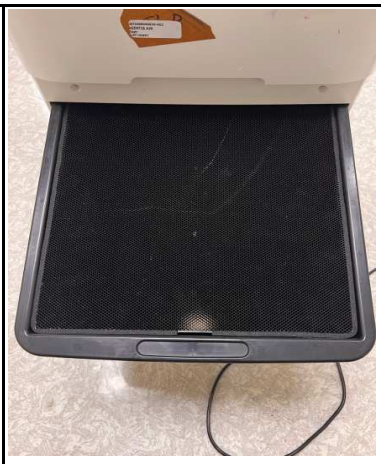
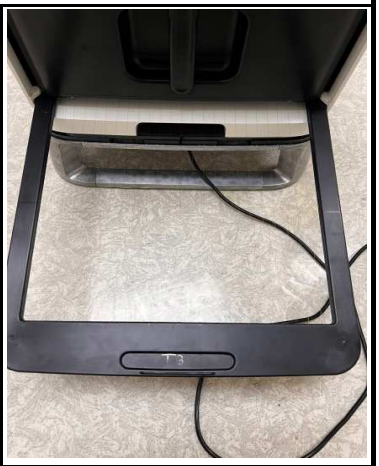
(5) Round the value of the annual energy consumption, in kWh/year, of a basic model to the nearest whole number.

(6) Round the value of the integrated energy factor of a basic model to the nearest 0.1 CADR/W

Calibrated Test Equipment List:

Equipment Name	Model No	Asset Number	Calibration Date	Due Date
Laser Aerosol Spectrometer	3340A	D708	4/15/2024	4/15/2025
Aerodynamic Particle Sizer	3321	A261	9/7/2023	9/7/2024
Fluidized Bed Aerosol Generator	3400A	--	--	--
Temperature/Humidity Sensor	HMW30YB	T680	9/11/2023	9/11/2024
Stop Watch	EX0BP	D715	12/7/2023	12/7/2024
Scale	SP202	S281	3/26/2024	3/26/2025
Laser Tachometer	HHT13	D826	11/16/2023	11/16/2024
Flow Meter	RMA-5	D716	1/11/2024	1/11/2025
Power Supply	3001 Lx	--	--	--
Power Analyzer	WT210	G065	9/11/2023	9/11/2024

Device Under Test Photos:

		
Unit in Test	**Control Panel in Test**	**Mesh Pre-Filter**
		
Main Filter Cartridge	**Carbon Filter**	**Ionizer Filter**

CADR Results of Performance Tests:

Model/Configuration	Test Particulate	Natural Decay Rate	CADR (FT^3/Min)	CADR STDEV	Power (Watts)
CRT2408060830-001 Model Brio 650	Smoke	0.00213	313.2	2.5	59.2
Tested on Floor	Dust	0.00601	368.5	4.5	60.1
120V/60Hz, High Speed On, Ionizer On	Pollen	0.11875	>450	9.1	59.8
	PM2.5	-	339.5	-	59.6
CRT2408060830-002 Model Brio 650	Smoke	0.00271	268.3	2.1	53.2
Tested on Floor	Dust	0.00764	314.8	3.8	54.4
120V/60Hz, High Speed On, Ionizer On	Pollen	0.11232	>450	35.6	54.0
	PM2.5	-	290.5	-	53.8

Dust Operating Power Test

Test Sample	Test Voltage V	Test Frequency Hz	Ambient Test Temperature °F	Ambient Humidity %RH	Dust CADR	Power Watts
CRT2408060830-001	120.0	60.0	72.0	37.0	368.5	60.1
CRT2408060830-002	120.0	60.0	72.0	38.0	314.8	54.4

Pollen Operating Power Test

Test Sample	Test Voltage V	Test Frequency Hz	Ambient Test Temperature °F	Ambient Humidity %RH	Pollen CADR	Power Watts
CRT2408060830-001	120.0	60.0	71.0	38.0	>450	59.8
CRT2408060830-002	120.0	60.0	71.0	38.0	>450	54.0

Conclusion:

The results reported for Smoke & Dust are within the minimum and maximum limits of measurability and Pollen are above the maximum limits of measurability of the ANSI/AHAM AC-1-2020 "Association of Home Appliance Manufacturers Method for Measuring Performance of Portable Household Electric Room Air Cleaners" Test Method.

Appendix FF to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Air Cleaners

Product Class	IEF (PM2.5 CADR/W)	
	Tier 1 (December 31, 2023)	Tier 2 (December 31, 2025)
PC1: 10 ≤ PM2.5 CADR < 100	1.7	1.9
PC2: 100 ≤ PM2.5 CADR < 150	1.9	2.4
PC3: PM2.5 CADR ≥ 150	2.0	2.9

Inactive Mode Power Results

Test Sample	Test Voltage (V)	Test Frequency (Hz)	THD (%)	Ambient Temp. (°F)	Measured Inactive Mode Power
CRT2408060830-001	NA	NA	NA	NA	NA
CRT2408060830-002	NA	NA	NA	NA	NA

Off Mode Power Results

Test Sample	Test Voltage (V)	Test Frequency (Hz)	THD (%)	Ambient Temp. (°F)	Measured Off Mode Power
CRT2408060830-001	115.1	60.0	0.17%	70	0.72
CRT2408060830-002	115.1	60.0	0.17%	71	0.73

E_{active} (kWh/year)	E_{TLP} (kWh/year)	PM2.5 CADR	AEC (kWh/year)	IEF (PM2.5 CADR/watt)
331	2.1	315	401	5.1

Conclusion:

The Integrated Energy Factor illustrated above shows that model does meet the DOE Performance Criteria for Tier 1 and Tier 2.

Energy Star v2.0 Smoke CADR/Watt Requirement

Smoke CADR Bins	Minimum Smoke CADR/W
30 ⩽ CADR < 100	1.9
100 ⩽ CADR < 150	2.4
CADR ⩾ 150	2.9

Energy Star v2.0 Smoke Operating Power Test

Test Sample Information

Applicant Name	Model Number	Nameplate Voltage V	Nameplate Frequency Hz	Nameplate Watts
Agentis Air LLC	Brio 650	120	60	-

Test Criteria

Test Voltage	Test Frequency Hz	Ambient Test Temperature °F	Ambient Humidity %RH
120 ± 1	60 ± 1	70 ± 5	40 ± 5

Test Results

Test Sample	Test Voltage V	Test Frequency Hz	Ambient Test Temperature °F	Ambient Humidity %RH	Smoke CADR	Power Watts	Smoke CADR/Watt
CRT2408060830-001	119.9	60.0	72	40	313.2	59.2	5.3
CRT2408060830-002	120.0	60.0	72	37	268.3	53.2	5.0

Conclusion:

These results illustrate that model does meet the Energy Star Program performance requirements.

Energy Star v2.0 Partial On Mode Power Test Requirement

Item	Partial On Mode Power Allowance (W) for models without Wi-Fi capability	Partial On Mode Power Allowance (W) for models with Wi-Fi capability
$P_{Base\_Allowance}$	1.00	1.00
$P_{Network\_Connected}$	0.00	1.00
$P_{Maximum\_Partial\_On}$	1.00	2.00

Note: $P_{Maximum\_Partial\_On} = P_{Base\_Allowance} + P_{Network\_Connected}$

Energy Star v2.0 Partial On Mode Power Test

Test Criteria - IEC 62301

Test Voltage V	Test Frequency Hz	Total Harmonic Distortion of the Electricity Supply System	Ambient Test Temperature °F
115 ± 1	60 ± 1	⩽ 2%	73.4 ± 9

Test Results

Test Sample	Test Voltage (V)	Test Frequency (Hz)	THD (%)	Ambient Temp. (°F)	Measured Partial ON Mode Power	$P_{Maximum\_Partial\_On}$ (W)
CRT2408060830-001	115.1	60.0	0.17%	70	0.72	1.00
CRT2408060830-002	115.1	60.0	0.17%	71	0.73	1.00

Conclusion:

The results illustrated in the Partial ON Mode Power Data shows that model does meet the Energy Star Performance Criteria.

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Revision Summary

Date/ Proj # Site ID	Project Handler/ Reviewer	Page No	Description of change
			None

End of Report