TEST REPORT

California Energy Commission's Appliance Efficiency Regulations

Report Reference No. ……..……:	AOC250610009ER
Compiled by (print+ signature) …….:	Bruce Lin
Approved by (print+ signature) ……..…:	Robin Liu
Date of issue……..:	2025-06-26

Lab Supervisor

Testing Laboratory.....:	Shenzhen AOCE Electronic Technology Service Co., Ltd
Address……:	Room 202, 2nd Floor, No.12th Building of Xinhe Tongfuyu Industrial Park, Fuhai Street, Baoan District, Shenzhen, Guangdong, China
Testing location/address……...:	Same as above
Applicant's name.....:	SoundAI Microchips Limited
Address……:	Suite 3101, Everbright Centre, 108 Gloucester Road, Wanchai, Hong Kong
Manufacturer name……...:	SoundAI Microchips Limited
Address……:	Suite 3101, Everbright Centre, 108 Gloucester Road, Wanchai, Hong Kong
Test Object……..:	SoundAI FairyClip C1
Trade Mark……..:	N/A
Model / Type reference……:	SAI-SDA503
Rating (s)……..……..:	DC 5V, 0.2A

Test specification:

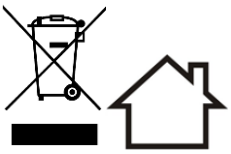
Standard .....:	CEC: California Code Of Regulations, Title 20: Division 2, Chapter 4, Article 4, Sections 1601 - 1609: Appliance Efficiency Regulations 10 CFR Section 430.23 (aa) (Appendix Y to Subpart B of Part 430) (As it appeared in the code of Federal Regulations on June 20, 2016)
Test procedure ..... :	Test report
Non-standard test method .....:	N/A
Test Report Form No......:	TRF No. CEC
Test Report Form(s) Originator .....:	AOCE
Master TRF.....:	2023-03-23

Summary of Testing:	
Tests performed (name of test and test clause):	**Testing location:**
The sample(s) tested complies with the requirements of California Code Of Regulations, Title 20: Division 2, Chapter 4, Article 4, Sections 1601 - 1609: Appliance Efficiency Regulations 10 CFR Section 430.23 (aa) (Appendix Y to Subpart B of Part 430) (As it appeared in the code of Federal Regulations on June 20, 2016)	Shenzhen AOCE Electronic Technology Service Co., Ltd Room 202, 2nd Floor, No.12th Building of Xinhe Tongfuyu Industrial Park, Fuhai Street, Baoan District, Shenzhen, Guangdong, China
Summary of Compliance with National Differences:	
N/A	
Copy of Marking Plate:	

SoundAI FairyClip C1

Model: SAI-SDA503

Rating: DC 5V, 0.2A



SoundAI Microchips Limited

Made in China

Product Type and Test item particulars:	
Battery charger type.....:	☐ UPS ☐ wireless battery charger ☒ Battery charger other than UPS
Powered method.....:	☒ DC input ☐ AC input ☐ Charger with EPS
Manual on-off switch.....:	No
Battery charger configuration.....:	☐ Batch charger ☐ Multi-pole charger ☐ Multi-voltage charger ☒ N/A
Battery information:	
Manufacturer.....:	Shenzhen Lithium Tuo New Energy Technology Co., LTD for charging box. DONGGUAN LIDEA ELECTRONICS CO., LTD for earphone.
Model / Type reference.....:	PL303030-300 for charging box; LIR1040 for earphone.
Battery Chemistry.....:	Li-ion Polymer Cell
Rated battery voltage(V).....:	3.7V for charging box; 3.6V for earphone
Rated battery charge capacity (Ah).....:	35mAh for earphone, 300mAh for charging box
Rated battery charge energy (Wh).....:	Total 3.6V(35*2)mAh+3.7V*300mAh=1.362Wh
Charging temperature limit.....:	-5 to 45 °C for charging box; 0 to 45 °C for earphone
Discharging temperature range.....:	-5 to 45 °C for charging box; -20 to 60 °C for earphone
Possible Test Case Verdicts:	
Test case does not apply to the test object.....:	N/A (Not Applicable)
Test object does meet the requirement.....:	P (Pass)
Test object does not meet the requirement.....:	F (Fail)
Testing:	
Ambient temperature of tested ..... :	25.0 °C
Test inputs ..... :	DC 5V
Date of receipt of test item.....:	2025-05-26
Date (s) of performance of tests.....:	2025-05-26 to 2025-06-18
General Remarks:	
Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Shenzhen AOCE Electronic Technology Service Co., Ltd	
General product information:	
N/A	

10 CFR Part 430			
Clause	Requirement + Test	Result – Remark	Verdict
Appendix Y to Subpart B of Part 430 - Uniform Test Method for Measuring the Energy Consumption of Battery Chargers			P
Testing Requirements for all Battery Chargers Other Than Uninterruptible Power Supplies			
3.1	Standard Test Conditions		P
3.1.1	General		P
	The values that may be measured or calculated during the conduct of this test procedure have been summarized for easy reference in Table 3.1.1. of this appendix.		P
	Duration of the charge and maintenance mode test		P
	Battery Discharge Energy		P
	Initial time and power (W) of the input current of connected battery		P
	Active and Maintenance Mode Energy Consumption		P
	Maintenance Mode Power		P
	24 Hour Energy Consumption		P
	Standby Mode Power		P
	Off Mode Power		P
	Unit Energy Consumption, UEC (kWh/yr)		P
3.1.2	Verifying Accuracy and Precision of Measuring Equipment		P
	Any power measurement equipment utilized for testing must conform to the uncertainty and resolution requirements outlined in section 4, “General conditions for measurement”, as well as annexes B, “Notes on the measurement of low power modes”, and D, “Determination of uncertainty of measurement”, of IEC 62301 (incorporated by reference, see § 430.3)		P
3.1.3	Setting Up the Test Room		P
	All tests, battery conditioning, and battery rest periods shall be carried out in a room with an air speed immediately surrounding the UUT of ≤0.5 m/s.		P
	The ambient temperature shall be maintained at 20 °C ± 5 °C throughout the test.		P

10 CFR Part 430			
Clause	Requirement + Test	Result – Remark	Verdict
	There shall be no intentional cooling of the UUT such as by use of separately powered fans, air conditioners, or heat sinks.		P
	The UUT shall be conditioned, rested, and tested on a thermally non-conductive surface. When not undergoing active testing, batteries shall be stored at 20 °C ± 5 °C.		P
3.1.4	Verifying the UUT's Input Voltage and Input Frequency		P
(a)	If the UUT is intended for operation on AC line- voltage input in the United States, it shall be tested at 115 V at 60 Hz. If the UUT is intended for operation on AC line-voltage input but cannot be operated at 115 V at 60 Hz, it shall not be tested.	DC Input	N/A
(b)	If a charger is powered by a low-voltage DC or AC input, and the manufacturer packages the charger with an external power supply (“EPS”), sells, or recommends an optional EPS capable of providing that low voltage input, then the charger shall be tested using that EPS and the input reference source shall be 115 V at 60 Hz. If the EPS cannot be operated with AC input voltage at 115 V at 60 Hz, the charger shall not be tested.	DC Input	N/A
(c)	If the UUT is designed for operation only on DC input voltage and the provisions of section 3.1.4(b) of this appendix do not apply, it shall be tested with one of the following input voltages: 5.0 V DC for products drawing power from a computer USB port or the midpoint of the rated input voltage range for all other products. The input voltage shall be within ±1 percent of the above specified voltage.	DC Input	N/A
(d)	If the input voltage is AC, the input frequency shall be within ±1 percent of the specified frequency.		N/A
	The THD of the input voltage shall be ≤2 percent, up to and including the 13th harmonic. The crest factor of the input voltage shall be between 1.34 and 1.49.		N/A
(e)	If the input voltage is DC, the AC ripple voltage (RMS) shall be:		P
(1)	≤0.2 V for DC voltages up to 10 V; or		P
(2)	≤2 percent of the DC voltage for DC voltages over 10 V.		N/A
3.2	Unit Under Test Setup Requirements		P
3.2.1	General Setup		P

10 CFR Part 430			
Clause	Requirement + Test	Result – Remark	Verdict
(a)	The battery charger system shall be prepared and set up in accordance with the manufacturer's instructions, except where those instructions conflict with the requirements of this test procedure. If no instructions are given, then factory or “default” settings shall be used, or where there are no indications of such settings, the UUT shall be tested in the condition as it would be supplied to an end user.		P
(b)	Battery charger has user controls to select from two or more charge rates (such as regular or fast charge) or different charge currents, the test shall be conducted at the fastest charge rate that is recommended by the manufacturer for everyday use		P
3.2.2	Selection and Treatment of the Battery Charger		P
	The UUT, including the battery charger and its associated battery, shall be new products of the type and condition that would be sold to a customer. If the battery is lead-acid chemistry and the battery is to be stored for more than 24 hours between its initial acquisition and testing, the battery shall be charged before such storage.		P
3.2.3	Selection of Batteries To Use for Testing		P
(a)	For chargers with integral batteries, the battery packaged with the charger shall be used for testing. For chargers with detachable batteries, the battery or batteries to be used for testing will vary depending on whether there are any batteries packaged with the battery charger.	Integral battery	P
(1)	If batteries are packaged with the charger, batteries for testing shall be selected from the batteries packaged with the battery charger, according to the procedure in section 3.2.3(b) of this appendix.		P
(2)	If no batteries are packaged with the charger, but the instructions specify or recommend batteries for use with the charger, batteries for testing shall be selected from those recommended or specified in the instructions, according to the procedure in section 3.2.3(b) of this appendix.		P
(3)	If no batteries are packaged with the charger and the instructions do not specify or recommend batteries for use with the charger, batteries for testing shall be selected from any that are suitable for use with the charger, according to the procedure in section 3.2.3(b) of this appendix.		P

10 CFR Part 430			
Clause	Requirement + Test	Result – Remark	Verdict
(b)(1)	From the detachable batteries specified above, use Table 3.2.1 of this appendix to select the batteries to be used for testing		N/A
(b)(2)	If two or more batteries or configurations of batteries of different chemistries, but with equal voltage and capacity ratings, determine the maintenance mode power, as specified in section 3.3.9 of this appendix;		N/A
(c)	A charger is considered as:		--
(1)	Single-capacity if all associated batteries have the same nameplate battery charge capacity (see definition) and, if it is a batch charger, all configurations of the batteries have the same nameplate battery charge capacity.		N/A
(2)	Multi-capacity if there are associated batteries or configurations of batteries that have different nameplate battery charge capacities.		N/A
(d)	The selected battery or batteries will be referred to as the “test battery” and will be used through the remainder of this test procedure.	Refer to the battery information table	P
3.2.4	Limiting Other Non-Battery-Charger Functions		--
(a)	If the battery charger or product containing the battery charger does not have any additional functions unrelated to battery charging, this subsection may be skipped.		P
(b)	Any optional functions controlled by the user and not associated with the battery charging process (e.g., the answering machine in a cordless telephone charging base) shall be switched off. If it is not possible to switch such functions off, they shall be set to their lowest power-consuming mode during the test.		N/A
(c)	If the battery charger takes any physically separate connectors or cables not required for battery charging but associated with its other functionality (such as phone lines, serial or USB connections, Ethernet, cable TV lines, etc.), these connectors or cables shall be left disconnected during the testing.		N/A
(d)	Any manual on-off switches specifically associated with the battery charging process shall be switched on for the duration of the charge, maintenance, and no-battery mode tests, and switched off for the off mode test.		N/A
3.2.5	Accessing the Battery for the Test		P

10 CFR Part 430			
Clause	Requirement + Test	Result – Remark	Verdict
	Accessing to the battery as specified		P
3.2.6	Determining Charge Capacity for Batteries With No Rating		P
	If there is no rating for the battery charge capacity on the battery or in the instructions, then the technician shall determine a discharge current that meets the specified requirements.	The battery shall be fully charged and then discharged at this constant-current rate until it reaches the end-ofdischarge voltage specified in Table 3.3.2 of this appendix.	P

Testing Requirements for Uninterruptible Power Supplies:			N/A
4.1	Standard Test Conditions		N/A
4.1.1	Measuring Equipment		N/A
(a)	The power or energy meter must provide true root mean square (r. m. s) measurements of the active input and output measurements, with an uncertainty at full rated load of less than or equal to 0.5% at the 95% confidence level notwithstanding that voltage and current waveforms can include harmonic components.		N/A
	The meter must measure input and output values simultaneously.		--
(b)	All measurement equipment used to conduct the tests must be calibrated within the measurement equipment manufacturer specified calibration period by a standard traceable to International System of Units such that measurements meet the uncertainty requirements specified in section 4.1.1(a) of this appendix.		N/A
4.1.2	Test Room Requirements		N/A
	All portions of the test must be carried out in a room with an air speed immediately surrounding the UUT of ⩽0.5 m/s in all directions.		N/A
	Maintain the ambient temperature in the range of 20.0 °C to 30.0 °C, including all inaccuracies and uncertainties introduced by the temperature measurement equipment, throughout the test.		N/A
	No intentional cooling of the UUT, such as by use of separately powered fans, air conditioners, or heat sinks, is permitted.		N/A

10 CFR Part 430			
Clause	Requirement + Test	Result – Remark	Verdict
	Test the UUT on a thermally non-conductive surface.		N/A
4.1.3	Input Voltage and Input Frequency		N/A
	The AC input voltage and frequency to the UPS during testing must be within 3 percent of the highest rated voltage and within 1 percent of the highest rated frequency of the device.		N/A
4.2	Unit Under Test Setup Requirements		N/A
4.2.1	Unit Under Test Setup Requirements		N/A
	Configure the UPS according to Annex J.2 of IEC 62040-3 Ed. 2.0 (incorporated by reference, see § 430.3) with the following additional requirements:		N/A
(a)	UPS Operating Mode Conditions.		N/A
	If the UPS can operate in two or more distinct normal modes as more than one UPS architecture, conduct the test in its lowest input dependency as well as in its highest input dependency mode where VFD represents the highest possible input dependency, followed by VI and then VFI.		N/A
(b)	Energy Storage System.		N/A
	The UPS must not be modified or adjusted to disable energy storage charging features. Minimize the transfer of energy to and from the energy storage system by ensuring the energy storage system is fully charged (at the start of testing) as follows:		N/A
(1)	If the UUT has a battery charge indicator, charge the battery for 5 hours after the UUT has indicated that it is fully charged.		N/A
(2)	If the UUT does not have a battery charge indicator but the user manual shipped with the UUT specifies a time to reach full charge, charge the battery for 5 hours longer than the time specified.		N/A
(3)	If the UUT does not have a battery charge indicator or user manual instructions, charge the battery for 24 hours.		N/A
(c)	DC output port(s).		N/A
	All DC output port(s) of the UUT must remain unloaded during testing.		N/A
4.2.2	Additional Features		N/A

10 CFR Part 430			
Clause	Requirement + Test	Result – Remark	Verdict
(a)	Any feature unrelated to maintaining the energy storage system at full charge or delivery of load power (e.g., LCD display) shall be switched off. If it is not possible to switch such features off, they shall be set to their lowest power-consuming mode during the test.		
(b)	If the UPS takes any physically separate connectors or cables not required for maintaining the energy storage system at full charge or delivery of load power but associated with other features (such as serial or USB connections, Ethernet, etc.), these connectors or cables shall be left disconnected during the test.		N/A
(c)	Any manual on-off switches specifically associated with maintaining the energy storage system at full charge or delivery of load power shall be switched on for the duration of the test.		N/A
4.3	Test Measurement and Calculation		N/A
	Efficiency can be calculated from either average power or accumulated energy.		N/A
4.3.1	Average Power Calculations		N/A
	If efficiency calculation are to be made using average power, calculate the average power consumption (Pavg) by sampling the power at a rate of at least 1 sample per second and computing the arithmetic mean of all samples over the time period specified for each test as follows:		N/A
	$P_{avg} = \frac{1}{n}\sum_{i=1}^{n} P_i$		N/A
4.3.2	Steady State		N/A
	Operate the UUT and the load for a sufficient length of time to reach steady state conditions. To determine if steady state conditions have been attained, perform the following steady state check, in which the difference between the two efficiency calculations must be less than 1 percent:		N/A
	$Eff = \frac{P_{avg\_out}}{P_{avg\_in}}$		N/A
	$Eff = \frac{E_{out}}{E_{in}}$		N/A
	Percentage difference=$\frac{IEff1 - Eff2I}{Average(Eff1, Eff2)}$		N/A

10 CFR Part 430			
Clause	Requirement + Test	Result – Remark	Verdict
4.3.3	Power Measurements and Efficiency Calculations		N/A
	Measure input and output power of the UUT according to Section J.3 of Annex J of IEC 62040-3 Ed. 2.0 (incorporated by reference, see § 430.3), or measure the input and output energy of the UUT for efficiency calculations with the following exceptions:		N/A
(a)	Test the UUT at the following reference test load conditions, in the following order: 100 percent, 75 percent, 50 percent, and 25 percent of the rated output power.		N/A
(b)	Perform the test at each of the reference test loads by simultaneously measuring the UUT's input and output power in Watts (W), or input and output energy in Watt-Hours (Wh) over a 15 minute test period at a rate of at least 1 Hz. Calculate the efficiency for that reference load using one of the following two equations:		N/A
	$Eff_{n\%} = \frac{P_{avg\_out\ n\%}}{P_{avg\_in\ n\%}}$		N/A
	$Eff_{n\%} = \frac{E_{out\ n\%}}{E_{in\ n\%}}$		N/A
4.3.4	UUT Classification		N/A
	Optional Test for determination of UPS architecture. Determine the UPS architecture by performing the tests specified in the definitions of VI, VFD, and VFI (sections 2.28.1 through 2.28.3 of this appendix).		N/A
4.3.5	Output Efficiency Calculation		N/A
(a)	Use the load weightings from Table 4.3.1 to determine the average load adjusted efficiency as follows		N/A
	$Eff_{avg}=(t_{25\%} \times Eff\|_{25\%}) + (t_{50\%} \times Eff\|_{50\%}) + (t_{75\%} \times Eff\|_{75\%}) + (t_{100\%} \times Eff\|_{100\%})$		N/A
	Rated output power(W)		N/A
	UPS architecture	☒ VFD ☒ VI ☒ VFI	N/A
	Portion of time spent at reference load		N/A
(b)	Round the calculated efficiency value to one tenth of a percentage point.		N/A
Appendix Y1 to Subpart B of Part 430 - Uniform Test Method for Measuring the Energy Consumption of Battery Chargers (corresponding to the Appendix Y)			P

10 CFR Part 430			
Clause	Requirement + Test	Result – Remark	Verdict
3	Testing Requirements for all Battery Chargers Other Than Uninterruptible Power Supplies and Open-Placement Wireless Chargers		N/A
4	Testing Requirements for Uninterruptible Power Supplies		N/A
5	Testing Requirements for Open-Placement Wireless Chargers		N/A
5.1	Standard Test Conditions and UUT Setup Requirements		N/A
	The technician will set up the testing environment according to the test conditions as specified in sections 3.1.2, 3.1.3, and 3.1.4 of this appendix.		N/A
	The unit under test will be configurated according to section 3.2.1 and all other non-battery charger related functions will be turned off according to section 3.2.4.		N/A
5.2	Active Mode Test		N/A
5.3	No-Battery Mode Test		N/A
(a)	Connect the UUT to mains power and place it in no-battery mode by ensuring there are no foreign objects on the charging surface (i.e., without any load).		N/A
(b)	Monitor the AC input power for a period of 5 minutes to assess the stability of the UUT. If the power level does not drift by more than 1percent from the maximum value observed, the UUT is considered stable.		N/A
(c)	If the AC input power is not stable, follow the specifications in Section 5.3.3. of IEC 62301 for measuring average power or accumulated energy over time for the input. If the UUT is stable, record the measurements of the AC input power over a 5- minute period.		N/A
(d)	Power consumption calculation. The power consumption of the no-battery mode is equal to the active AC input power (W).		N/A

Test Sheet Table

Table 1	**Test parameters for measurements**
Ambient temperature (°C):	24.2
Ambient temperature	57.0%
Air speed (m/s):	0.1
Test voltage in V:	☐ 115 ±1% ☒ 5V ±1%(USB) ☐ Midpoint of rated range±1%(Other)
Test frequency in Hz:	/
Total harmonic distortion (THD) of the electricity supply system:	/

Table 1a	For earphone			
Test item		**Sample #1**	**Sample #2**	**Represent value mean**
Product class		Consumer products	Consumer products	--
Battery Voltage(V)		3.6	3.6	--
Hours Per Day(h)	Active+Maintenance(ta&m)	7.82	7.82	--
	Standby(tsb)	5.29	5.29	--
	Off(toff)	0.00	0.00	--
	n	0.54	0.54	--
Number of charges per day		--	--	--
Battery Discharge Energy (Wh)		0.235	0.232	0.234
Maintenance Mode Average Power(W)		0.01	0.01	0.01
24 Hour Energy Consumption (Wh)		0.376	0.371	0.374
Standby Mode Power(W)		0	0	0
Off Mode Power(W)		--	--	--
Charge test duration(tcd)		24	24	--
The UEC		--	--	--
Table 1a	For charging box			
Test item		**Sample #1**	**Sample #2**	**Represent value mean**
Product class		Consumer products	Consumer products	--
Battery Voltage(V)		3.7	3.7	--

Test Sheet Table

Hours Per Day(h)	Active+Maintenance(ta&m)	7.82	7.82	--
	Standby(tsb)	5.29	5.29	--
	Off(toff)	0.00	0.00	--
	n	0.54	0.54	--
Number of charges per day		--	--	--
Battery Discharge Energy (Wh)		1.02	1.01	1.02
Maintenance Mode Average Power(W)		0.01	0.01	0.01
24 Hour Energy Consumption (Wh)		1.632	1.616	1.624
Standby Mode Power(W)		0	0	0
Off Mode Power(W)		--	--	--
Charge test duration(tcd)		24	24	--
The UEC		--	--	--

Battery Charger Usage Profiles

Product class				Hours per day ***			Charges (n)	Threshold charge time *
Number	Description	Measured battery energy (measured E_{batt}) **	Special characteristic or highest nameplate battery voltage	Active + maintenance ($t_{a\&m}$)	Standby (t_{sb})	Off (t_{off})	Number per day	Hours
1	Low-Energy	≤5 Wh	Inductive Connection ****	20.66	0.10	0.00	0.15	137.73
2	Low-Energy, Low-Voltage	<100 Wh	<4 V	7.82	5.29	0.00	0.54	14.48
3	Low-Energy, Medium-Voltage		4-10 V	6.42	0.30	0.00	0.10	64.20
4	Low-Energy, High-Voltage		>10 V	16.84	0.91	0.00	0.50	33.68
5	Medium-Energy, Low-Voltage	100-3000 Wh	<20 V	6.52	1.16	0.00	0.11	59.27
6	Medium-Energy, High-Voltage		≥20 V	17.15	6.85	0.00	0.34	50.44
7	High-Energy	>3000 Wh		8.14	7.30	0.00	0.32	25.44

2.2 UEC Calculation:

Unit energy consumption (UEC) for a battery charger

Formula	UEC		Verdict
	Sample 1	Sample 2	
(i)$UEC=365(n(E_{24}-5P_m-\text{Measured } E_{batt})\frac{24}{tcd}+(P_m(t_{a\&m}-(t_{cd}-5)n))+(P_{sb}\ t_{sb})+(P_{off}\ t_{off})$	--	--	N/A
(ii)$UEC=365(n(E_{24}-5P_m-\text{Measured } E_{batt})\frac{24}{(tcd-5)}+(P_{sb}\ t_{sb})+(P_{off}\ t_{off})$	0.225 kWh/yr	0.221 kWh/yr	P

Note: Unit energy consumption (UEC) shall be calculated for a battery charger using one of the two equations (equation (i) or equation (ii)) listed in this section. If a battery charger is tested and its charge duration as determined in section 3.3.2 of this appendix minus 5 hours is greater than the threshold charge time listed in Table 3.3.3 of this appendix (i.e. (tcd – 5) * n > ta&m), equation (ii) shall be used to calculate UEC; otherwise a battery charger's UEC shall be calculated using equation (i).

Test Sheet Table

Maximum UEC limit					
Product class	Product class description	Rated battery energy (Ebatt**)	Special characteristic or battery voltage	Maximum UEC (kWh/yr) (as a function of Ebatt**)	Verdict
1	Low-Energy	≤5 Wh	Inductive Connection*	3.04	N/A
2	Low-Energy, Low-Voltage	<100 Wh	<4 V	0.1440 * E_{batt}+2.95	P
3	Low-Energy, Medium-Voltage		4-10 V	For E_{batt} < 10 Wh, 1.42 kWh/y For E_{batt} ≥ 10 Wh, 0.0255 * E_{batt} + 1.16	N/A
4	Low-Energy, High-Voltage		>10 V	0.11 * E_{batt} + 3.18	N/A
5	Medium-Energy, Low-Voltage	100-3000 Wh	<20 V	0.0257 * E_{batt} + 0.815	N/A
6	Medium-Energy, High-Voltage		≥20 V	0.0778 * Ebatt + 2.4	N/A
7	High-Energy	>3000 Wh		0.0502 * Ebatt + 4.53	N/A

Note:
** Measured E_{batt} = Measured battery energy as determined in section 3.3.8.
*** If the total time does not sum to 24 hours per day, the remaining time is allocated to unplugged time, which means there is 0 power consumption and no changes to the UEC calculation needed.
**** Fixed-location inductive wireless charger only.

3. Determination of represented values:

Department of Energy (DOE) sampling plan for Battery chargers

Determination of represented values. Manufacturers must determine represented values, which include certified ratings, for each basic model of battery charger in accordance with the following sampling provisions.

Represented values include: the unit energy consumption (UEC) in kilowatt-hours per year (kWh/yr), battery discharge energy (E_{batt}) in watt-hours (Wh), 24-hour energy consumption (E_{24}) in watt-hours (Wh), maintenance mode power (P_m) in watts (W), standby mode power (P_{sb}) in watts (W), off mode power (P_{off}) in watts (W), and duration of the charge and maintenance mode test (t_{cd}) in hours (hrs).

For each basic model, a sample of sufficient size shall be randomly selected and tested to ensure that the represented value of UEC is greater than or equal to the higher of:

(A) The mean of the sample, where:

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

and, $\bar{x}$ is the sample mean; n is the number of samples; and xi is the UEC of the ith sample; or,

Test Sheet Table

(B) The upper 97.5-percent confidence limit (UCL) of the true mean divided by 1.05, where:

$$UCL = \bar{x} + t_{0.975}\left(\frac{s}{\sqrt{n}}\right)$$

and x̄ is the sample mean; s is the sample standard deviation; n is the number of samples; and t0.975 is the t-statistic for a 97.5-percent one-tailed confidence interval with n-1 degrees of freedom (from appendix A of this subpart).

FIGURE 1—T-DISTRIBUTION VALUES FOR CERTIFICATION TESTING
[ONE-SIDED]

Degrees of freedom (from Appendix A)	Confidence Interval			
	90%	95%	97.5%	99%
1	3.078	6.314	12.71	31.82
2	1.886	2.920	4.303	6.965
3	1.638	2.353	3.182	4.541
4	1.533	2.132	2.776	3.747
5	1.476	2.015	2.571	3.365
6	1.440	1.943	2.447	3.143
7	1.415	1.895	2.365	2.998
8	1.397	1.860	2.306	2.896
9	1.383	1.833	2.262	2.821
10	1.372	1.812	2.228	2.764
11	1.363	1.796	2.201	2.718
12	1.356	1.782	2.179	2.681
13	1.350	1.771	2.160	2.650
14	1.345	1.761	2.145	2.624
15	1.341	1.753	2.131	2.602
16	1.337	1.746	2.120	2.583
17	1.333	1.740	2.110	2.567
18	1.330	1.734	2.101	2.552
19	1.328	1.729	2.093	2.539
20	1.325	1.725	2.086	2.528

While the sample standard deviation, s, is calculated using the formula below:

$$s = \sqrt{\frac{\sum_{i=0}^{n}(x_i - X)^2}{n-1}}$$

Where:

X is the mean of sample

n is the number of units tested

x_i is the i^{th} test result

$\sum_{i=0}^{n} x_i$ is the sum of the results of n tests.

Test sample number	Active model energy consumption UEC (kWh/yr)	Product class	The represented value of Maximum UEC (kWh/yr)
1 (first)	0.225	2	0.227

Test Sheet Table

2 (second)	0.221		
Mean	0.223		
UCL / 1.05	0.227		

Test Equipment List

Equipment Name	Manufacturer	Model No.	Reference No.	Calibration Due Date
Frequency Converter	OYHS	OYHS-98850-50KVA	AOC-S-001	2026-04-13
Digital Power Meter	YOKOGAWA	WT310E	AOC-S-012	2026-04-13
THERMD-HYGROGRAPH	SATO	7210-00	AOC-S-022	2026-04-13
Oscillograph	Tektronix	MDO3012	AOC-S-028	2026-04-13
Oscilloprobe	LONSA	P4100	AOC-S-029	2026-04-13
Digital multimeter	FLUKE	F15B	AOC-S-039	2026-04-13
Tape	MUTIAN	RS-319	AOC-S-057	2026-04-13
Illuminometer	TES ELECTRICAL ELECTRONIC CORP	TES-1330A	AOC-S-110	2026-04-13
Digital anemometer	SUWEI	AG598WJE14	AOC-S-135	2026-04-13

Product Photo

Fig. 1

Fig. 2

Fig. 3

Fig. 4

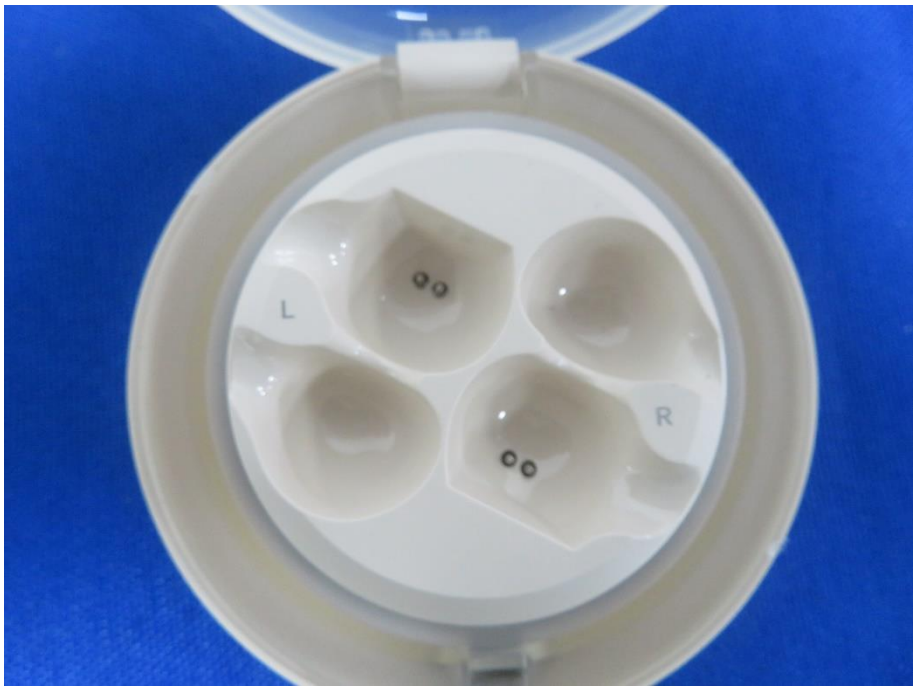


Fig. 5

Fig. 6

-- End of Report --