



# TEST REPORT

## California Energy Commission's Appliance Efficiency Regulations

Report Reference No. .... :	LCSA01155042S	
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Applicant's name .....	myFirst Tech Asia Pte.Ltd.	
Address..... :	31 Woodlands Close, #01-22 Woodlands Horizon Singapore 737855	
Manufacturer's name .....	myFirst Tech Asia Pte.Ltd.	
Address..... :	31 Woodlands Close, #01-22 Woodlands Horizon Singapore 737855	
Test specification:		
Standard .....	CEC: California Code Of Regulations, Title 20: Division 2, Chapter 4, Article 4, Sections 1601 - 1609: Appliance Efficiency Regulations	
Test procedure..... :	<input checked="" type="checkbox"/> 10 CFR Section 430.23 (aa) (Appendix Y and Appendix Y1 to Subpart B of Part 430); Energy Efficiency Battery Charger System Test Procedure(2022.09 Final rules)  DOE incorporated by reference the entire standard for IEC 62301 in § 430.3  <input type="checkbox"/> Small Battery Charger Systems: 10 C.F.R. section 430.23(aa) (Appendix Y to subpart B of part 430) (Jan. 1, 2017)  <input type="checkbox"/> Battery Backups and Non-Federally Regulated Uninterruptible Power Supplies: 10 C.F.R. section 430.23(aa) (Appendix Y to subpart B of part 430) (Jan. 1, 2016)	
Non-standard test method.....:	N/A	
Test Report Form No. .... :	TRF-4-S-122 A/0	
Test Report Form(s) Originator..... :	Shenzhen LCS Compliance Testing Laboratory Ltd.	
Master TRF .....	2023-01-01	



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**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 ..... : N/A

Battery charger configuration..... : ☐ Batch charger  
☐ Multi-pole charger  
☐ Multi-voltage charger

**Possible test case verdicts:**

- test case does not apply to the test object ..... : N/A

- test object does meet the requirement..... : P (Pass)

- test object does not meet the requirement..... : F (Fail)

**Testing .....**

Date of receipt of test item ..... : 2025-01-15

Date (s) of performance of tests ..... : From 2025-01-15 to 2025-02-13

**General remarks:**

The test results presented in this report relate only to the object tested.  
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"(see Enclosure #)" refers to additional information appended to the report.  
"(see appended table)" refers to a table appended to the report.

Throughout this report a comma (point) is used as the decimal separator.

The applicant and manufacturer information, product name, model, trademark and other information in this report are all provided by the applicant, and this laboratory is not responsible for verifying its authenticity.

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**List of Attachments (including a total number of pages in each attachment):**

Attachment No. 1: Photo documentation.

Attachment No. 2: Equipment list

**General product information:**

Factory name and address: Eastern Dynamics (Shenzhen) Technology Co.,Ltd  
Building 9, Zhongbao Longbi Industrial Zone, 27 Dafa Road, Bantian Street, Longgang District, Shenzhen



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<b>General information</b> ..... :	
Battery charger information..... :	
Product Type.....	myFirst Fone S3+
Brand .....	myFirst
Model Number .....	KW1401
Date Manufactured .....	N/A
Date Product Received .....	N/A
Condition as Received .....	N/A
Charger type .....	<input type="checkbox"/> Inductive <input checked="" type="checkbox"/> Non-inductive
Wireless Charger type.....	<input type="checkbox"/> Fixed-location <input type="checkbox"/> Open-placement
Rated charge current(A), if applicable .....	N/A
Control settings, if applicable .....	N/A
Additional features unrelated to battery charger.....	No such functions
Battery charger configuration.....	<input type="checkbox"/> Batch charger <input type="checkbox"/> Multi-pole charger <input type="checkbox"/> Multi-voltage charger <input checked="" type="checkbox"/> N/A
EPS information(if applicable).....	N/A
Manufacturer .....	N/A
Powered method .....	<input type="checkbox"/> DC input <input type="checkbox"/> AC input <input type="checkbox"/> Charger with EPS
Manufacturer Model Number .....	N/A
Series Number .....	N/A
Date Manufactured .....	Xx/YY/ZZ
Date Product Received .....	Xx/YY/ZZ
Condition as Received .....	Xx/YY/ZZ
Battery information .....	See below
Manufacturer .....	ZHONGSHAN ZHONGWANGDE NEW ENERGY TECHNOLOGY Co., LTD
Powered method .....	<input checked="" type="checkbox"/> DC input <input type="checkbox"/> AC input <input type="checkbox"/> Charger with EPS
Manufacturer Model Number .....	ZWD603026V
Series Number .....	N/A
Date Manufactured .....	N/A



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Date Product Received .....	: N/A
Condition as Received .....	: N/A
Battery Chemistry .....	: Li-ion Battery
Rated battery voltage(V) .....	: 3.87V
Rated battery charge capacity(Ah) .....	: 650mAh
Rated battery charge energy(Wh) .....	: 3.8V*605mAh=2.5Wh



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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	See appendix table	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)		
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 <a href="#">§ 430.3</a> ).		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 $\leq 0.5$ m/s.		P
	The ambient temperature shall be maintained at $20\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ throughout the test.		P
	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 $20\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ .		P
3.1.4	Verifying the UUT's Input Voltage and Input Frequency		P



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(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 $\pm 1$ percent of the above specified voltage.	DC input	P
(d)	If the input voltage is AC, the input frequency shall be within $\pm 1$ percent of the specified frequency.		N/A
	The THD of the input voltage shall be $\leq 2$ 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)	$\leq 0.2$ V for DC voltages up to 10 V; or		P
(2)	$\leq 2$ 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
(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



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	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
(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		--



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(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.	No such functions	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.	No such physically connectors exist	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.	No such switches	N/A
3.2.5	Accessing the Battery for the Test		P
	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-of-discharge 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 $\leq 0.5$ m/s in all directions.	See below.	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
	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	General Setup		N/A
	Configure the UPS according to Annex J.2 of IEC 62040-3 Ed. 2.0 (incorporated by reference, see <a href="#">§ 430.3</a> ) 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
(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.		N/A
(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 ( $P_{avg}$ ) 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
	(1) $Eff = \frac{P_{avg,out}}{P_{avg,in}}$		N/A



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	(2)		N/A
	$Eff = \frac{E_{out}}{E_{in}}$		
	$Percentage\ difference = \frac{ Eff_1 - Eff_2 }{Average(Eff_1, Eff_2)}$		N/A
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
	(1)		N/A
	$Eff_{n\%} = \frac{P_{avg.out\ n\%}}{P_{avg.in\ n\%}}$		
	(2)		N/A
	$Eff_{n\%} = \frac{E_{out\ n\%}}{E_{in\ n\%}}$		
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	<input checked="" type="checkbox"/> VFD <input checked="" type="checkbox"/> VI <input checked="" type="checkbox"/> VFI	N/A
	Portion of time spent at reference load	25%: 50%: 75%: 100%:	N/A
(b)	Round the calculated efficiency value to one tenth of a percentage point.		N/A



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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
3	Testing Requirements for all Battery Chargers Other Than Uninterruptible Power Supplies and Open-Placement Wireless Chargers		P
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	See appendix table	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 configured 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 <a href="#">Section 5.3.3</a> 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





## 1. Test condition and instruments

### 2.1 General conditions for measurements

Test condition parameter	Requirements	Measured
Air speed close to the EUT	$\leq 0.5 \text{ m/s}$	0.1 m/s
Ambient temperature	15-25°C	24.0°C
Relative Humidity	10-80%	57.0%
Test voltage	<input type="checkbox"/> 115 $\pm 1\%$ <input checked="" type="checkbox"/> 5V $\pm 1\%$ (USB) <input type="checkbox"/> Midpoint of rated range $\pm 1\%$ (Other)	5V
AC ripple voltage(RMS)(For DC input only)	<input type="checkbox"/> 0.2V for that $\leq 10\text{V}$ <input type="checkbox"/> 2% of the V DC for that $> 10\text{V}$	N/A
Test frequency	<input type="checkbox"/> 60 Hz $\pm 1\%$	--
Total harmonic content (up to and including the 13th harmonic)	$\leq 2 \%$	--
Voltage crest factor of the power meter under test	1.34-1.49	--
Resolution of power meter	0.01 W (at least)	0.01W

### 2.2 Test instruments

Number	Model designation	Measurement	Calibration date	Next Calibration date
LCS-S-117	WT310	Digital Power Meter	2024/09/18	2025/09/17
LCS-S-081	RD-3010	DC source	2024/09/18	2025/09/17
LCS-S-104	CT-3008-15V3A-A	Battery charge tester	2024/09/18	2025/09/17
LCS-S-015	ZJ1-2B	Hydrograph	2024/09/18	2025/09/17
LCS-S-029	PC396	Stop Watch	2024/09/18	2025/09/17
LCS-S-122	AR866A	Anemometer	2024/09/18	2025/09/17



**Test Data****2. Unit Energy Consumption Calculation and Determination of represented values:****2.1 Test Data Result:**

Measurement				
Items		Sample #1	Sample #2	Represent value mean
Product class		Consumer products	Consumer products	--
Battery Voltage(V)		3.87	3.87	--
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)		2.44	2.48	2.46
Maintenance Mode Average Power(W)		0.07	0.08	0.075
24 Hour Energy Consumption(Wh)		4.62	4.65	4.635
Standby Mode Power(W)		0	0	0
Off Mode Power(W)		--	--	--
Charge test duration(tcd)		24	24	--
The UEC		See tabel 2.2	See tabel 2.2	--

**NOTE:****TABLE: BATTERY CHARGER USAGE PROFILES**

Product class				Hours per day***			Charges (n)	Threshold charge time*
No.	Description	Rated battery energy (Ebatt)**	Special characteristic or battery voltage	Active + maintenance (ta&m)	Standby (tsb)	Off (toff)	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	<100 Wh	4-10 V	6.42	0.30	0.00	0.10	64.20
4	Low-Energy, High-Voltage	<100 Wh	>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	100-3000 Wh	≥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



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Standards for Small Battery Charger Systems			Sample 1 (first sample)	
Performance Parameter	Requirements		Measured	Verdict
Maximum 24 hour charge and maintenance energy (Wh) ( $E_b$ = capacity of all batteries in ports and $N$ = number of charger ports)	For $E_b$ of 2.5 Wh or less: $16 \times N$	--	--	N.A
	For $E_b$ greater than 2.5 Wh and less than or equal to 100 Wh: $12 \times N + 1.6E_b$	--	--	N.A
	For $E_b$ greater than 100 Wh and less than or equal to 1000 Wh: $22 \times N + 1.5E_b$	--	--	N.A
	For $E_b$ greater than 1000 Wh: $36.4 \times N + 1.486E_b$	--	--	N.A
Maintenance Mode Power and No Battery Mode Power (W) ( $E_b$ = capacity of all batteries in ports and $N$ = number of charger ports)	The sum of maintenance mode power and no battery mode power must be less than or equal to: $1 \times N + 0.0021 \times E_b$ Watts	--	--	N.A
Note: measured $E_b$ of battery is --- Wh, Number of charger port is one.				

Standards for Small Battery Charger Systems			Sample 2 (second sample)	
Performance Parameter	Requirements		Measured	Verdict
Maximum 24 hour charge and maintenance energy (Wh) ( $E_b$ = capacity of all batteries in ports and $N$ = number of charger ports)	For $E_b$ of 2.5 Wh or less: $16 \times N$	--	--	N.A
	For $E_b$ greater than 2.5 Wh and less than or equal to 100 Wh: $12 \times N + 1.6E_b$	--	--	N.A
	For $E_b$ greater than 100 Wh and less than or equal to 1000 Wh: $22 \times N + 1.5E_b$	--	--	N.A
	For $E_b$ greater than 1000 Wh: $36.4 \times N + 1.486E_b$	--	--	N.A
Maintenance Mode Power and No Battery Mode Power (W) ( $E_b$ = capacity of all batteries in ports and $N$ = number of charger ports)	The sum of maintenance mode power and no battery mode power must be less than or equal to: $1 \times N + 0.0021 \times E_b$ Watts	--	--	N.A
Note: measured $E_b$ of battery is --- Wh, Number of charger port is one.				



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Inductive Charger Systems			
Mode	Requirement	Measured value	Verdict
Maintenance mode power	1W	--	N.A
No battery mode	1W	--	N.A
Average power consumption during of the charge and maintenance mode test	1W	--	N.A

Battery Backup and Uninterruptible Power Supplies (consumer products manufactured on or after February 1, 2013) and Battery Backup and Uninterruptible Power Supplies (not consumer products manufactured on or after January 1, 2017 )			
Mode	Requirement	Measured value	Verdict
Maintenance mode power	$0.8 + 0.0021 \times E_b$ watts =	--	N.A



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**2.2 UEC Calculation:**

Unit energy consumption (UEC) for a battery charger			
Formula	UEC		Verdict
	Sample1	Sample2	
(i) $UEC = 365(n(E_{24} - 5P_m - E_{batt})^{24}/t_{cd} + (P_m(t_{a\&m} - (t_{cd} - 5)n) + (P_{sb}t_{sb}) + (P_{off}t_{off})))$	--	--	N/A
(ii) $UEC = 365(n(E_{24} - 5P_m - E_{batt})^{24}/(t_{cd} - 5) + (P_{sb}t_{sb}) + (P_{off}t_{off})))$	0.456 kWh/yr	0.441 kWh/yr	Pass
Note: Calculate unit energy consumption (UEC) for a battery charger using one of the two equations (equation (i) or equation (ii)) listed. If a battery charger is tested and its charge duration as determined in section 5.2 of this appendix minus 5 hours is greater than the threshold charge time listed in table 5.3 below (i.e. $(t_{cd}-5) * n > t_{a\&m}$ ), use equation (ii) to calculate UEC; otherwise calculate the battery charger's UEC using equation (i).			

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	≤20 Wh	Inductive Connection*	3.04	N/A
2	Low-Energy, Low-Voltage	<100 Wh	<4 V	$0.1440 * E_{batt} + 2.95$	Pass
3	Low-Energy, Medium-Voltage	<100 Wh	4-10 V	For $E_{batt} < 10$ Wh, 1.42 kWh/y For $E_{batt} \geq 10$ Wh, $0.0255 * E_{batt} + 1.16$	N/A
4	Low-Energy, High-Voltage	<100 Wh	>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	100-3000 Wh	≥20 V	$0.0778 * E_{batt} + 2.4$	N/A
7	High-Energy	>3000 Wh		$0.0502 * E_{batt} + 4.53$	N/A
*Inductive connection and designed for use in a wet environment (e.g. electric toothbrushes). ** $E_{batt}$ = Rated battery energy as determined in 10 CFR part 429.39(a). Maximum UEC (kWh/yr): $0.1440 * E_{batt} + 2.95 = 3.31 \text{ kWh/yr}$					





## 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 ( $E_{\text{batt}}$ ) 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 ( $P_{\text{sb}}$ ) in watts (W), off mode power ( $P_{\text{off}}$ ) in watts (W), and duration of the charge and maintenance mode test ( $t_{\text{cd}}$ ) 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:

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

and,  $\bar{x}$  is the sample mean;  $n$  is the number of samples; and  $x_i$  is the UEC of the  $i$ th sample or,

(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  $\bar{x}$  is the sample mean;  $s$  is the sample standard deviation;  $n$  is the number of samples; and  $t_{0.975}$  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



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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  $i^{\text{th}}$  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)	0.456	2	0.517
2 (second)	0.441		
Mean	0.448		
UCL / 1.05	0.517		

Note 1: For calculate the upper 97.5-percent confidence limit (UCL) of the true mean divided by 1.05:  $n=2$ ,  $t_{0.975}=12.71$ , the sample mean energy consumption UEC is 0.448 with a standard deviation of  $s=0.011$

Note 2: The charging system was evaluated according to the 10 CFR Part 430 (the energy conservation standards specified in the Code of Federal Regulations at 10 CFR 430.32(z)) to meets the CEC and DOE energy efficiency requirements

Determination of represented values				
Test sample number	Maximum 24 hour charge and maintenance energy (Wh)	The represented value of Maximum (Wh)	Maintenance Mode Power and No Battery Mode Power (W)	The represented value of Maximum (W)
1	4.62	4.65	0.07	0.234
2	4.65		0.08	
Mean	4.635		0.055	
UCL / 1.05	4.596		0.234	

Note: Unless otherwise specified, the minimum number of units tested shall be no less than two.



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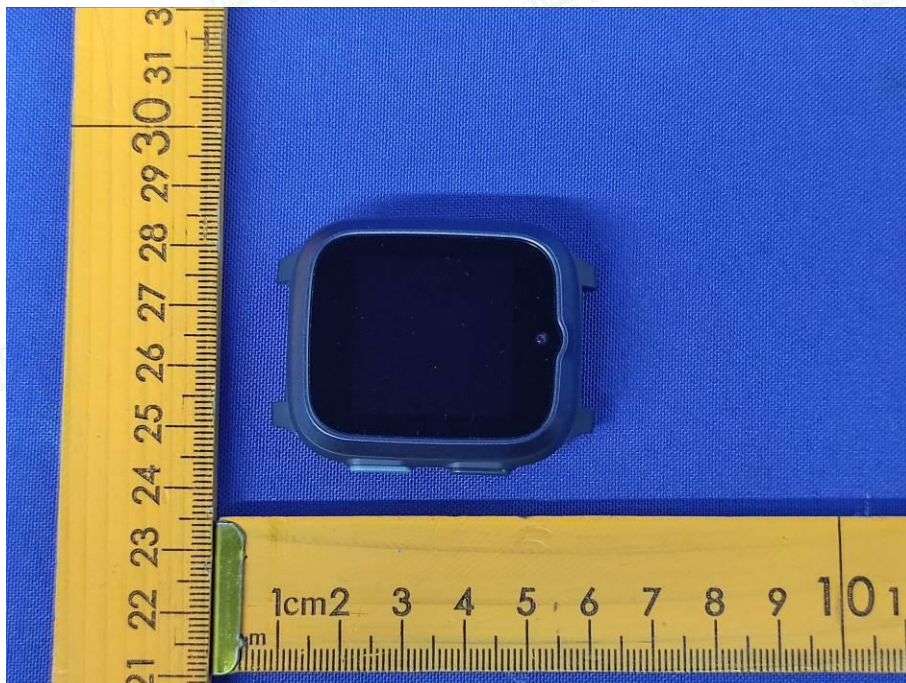




EUT Photo



View 1



View 2







View 3



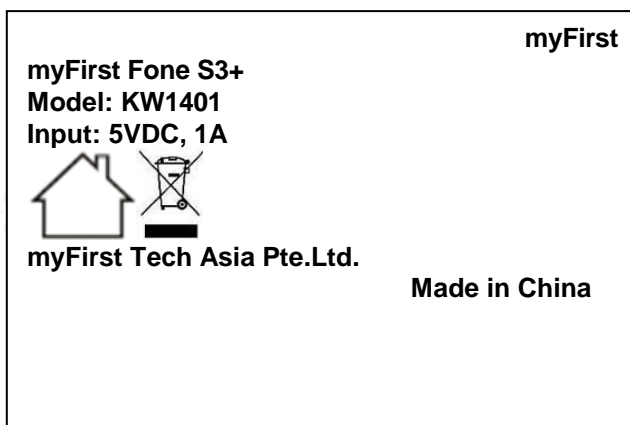
View 4





View 5

## Label



## Notes:

1. The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks. The height of WEEE symbol  $\geq 7.0\text{mm}$ .

-----END OF REPORT-----

