



CEC TEST REPORT

Report No.: SJS20190400202C01

Product: Lithium battery precision electric screwdriver

Model No.: ZPJ1802A

Applicant: SUZHOU CREATION SPACE INTELLIGENT
TECHNOLOGY CO.,LTD.

Address: 2nd Floor of No.2 Workshop, No.50 Weiting Tonghe
Road, Suzhou Industrial Park

Issued by: Shenzhen SJS Testing Technology Co., Ltd.
3rd Floor, Building A,Hongfenghua Internet Creative Park,

Lab Location: Huangtian Community, Hangcheng Street, Baoan District,
Shenzhen, China

Tel: +86-755-2778 4461 **Fax:** +86-755-2778 4461

CEC

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TEST REPORT

Energy Conservation Program for Battery Chargers

Report Reference No. : SJS20190400202C01

Tested by (+ signature)..... : Cora Chan

Cora Chan

Reviewed by (+ signature)..... : Sam Zhu

Sam Zhu

Approved by (+ signature) : Helen Lin

Helen Lin



Date of issue : 2019-04-15

Testing laboratory

Name : Shenzhen SJS Testing Technology Co., Ltd.

Address : 3rd Floor, Building A,Hongfenghua Internet Creative Park, Huangtian Community, Hangcheng Street, Baoan District, Shenzhen, China

Testing location..... : Same as above

Client

Name : SUZHOU CREATION SPACE INTELLIGENT TECHNOLOGY CO.,LTD.

Address : 2nd Floor of No.2 Workshop, No.50 Weiting Tonghe Road, Suzhou Industrial Park

Test specification

Standard..... : **U.S. California Appliance Efficiency Regulations –**
CEC-400-2017-002, January 2017: Battery Charger System
Test Method for Small Battery Charger Systems:
10 C.F.R. section 430.23(aa) (Appendix Y to Subpart B of Part 430)
Energy Consumption of Battery Chargers
IEC 62301(Ed. 2.0): 2011 Household electrical appliances –
Measurement of standby power

Test procedure : CEC Attestation

Conclusion..... : The appliance complies with the requirements of CEC Appliance Efficiency for Federally Regulated Battery Chargers.

Test item

Description : Lithium battery precision electric screwdriver

Trademark..... : creationspace

Model and/or type reference : ZPJ1802A

Rating(s)..... : 5V $\overline{\text{---}}$, 1 A

Manufacturer : SUZHOU CREATION SPACE INTELLIGENT TECHNOLOGY CO.,LTD.

Address : 2nd Floor of No.2 Workshop, No.50 Weiting Tonghe Road, Suzhou Industrial Park

Test item particulars:

Type of appliance..... : Lithium battery precision electric screwdriver

Trademark..... : creationspace

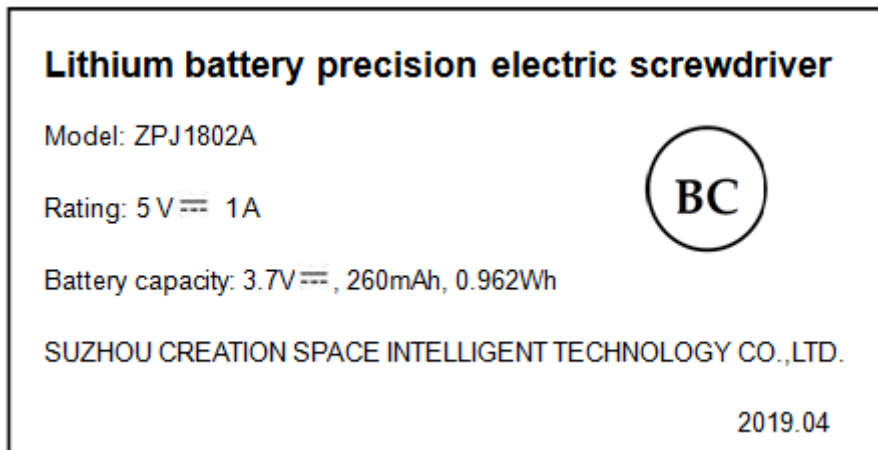
Model and/or type reference.... : ZPJ1802A

Model differences : --Rating(s)..... : 5 V $\overline{=}$, 1 AManufacturer of battery
package..... : HUNAN HUAHUI NEW ENERGY CO.,LTD

Model of battery package : NSC1040

Rating(s) of battery package ... : 3.7 V $\overline{=}$, 260mAh, 0.962Wh

Number of battery package : 1

Copy of marking plate:**Remark:**

The above marking plate is only a draft artwork to show the product ratings and model No.



Test Equipment:

Power meter : <YOKOGAWA>, <WT210>
 Last cal. date: 2018-10-28, Next cal. date: 2019-10-27

DC Power Supply : < MAISHENG >, < MP6010D >

Temperature & Humidity Recorder..... : <Certer Technology>, <313>
 Last cal. date: 2018-10-28, Next cal. date: 2019-10-27

Battery test system..... : < NEWARE >, < CT-3008-5V6A-S1-F >
 Last cal. date: 2018-10-28, Next cal. date: 2019-10-27

DC Electronic Load : < ITECH >, < IT8511A+ >
 Last cal. date: 2018-10-28, Next cal. date: 2019-10-27

TEST DESCRIPTION

Test parameters for measurements	
Test ambient temperature (°C):	24.1
Humidity:	54.3%RH
Test voltage in V:	5 Vdc
Total harmonic distortion (THD) of the electricity supply system:	--



1. General Remarks

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

"(See appended table)" refers to a table appended to the report.

1.1 Abbreviations May Used throughout This Report

UUT: Unit Under Test	I/p: Input
THD: Total Harmonic Distortion	O/p: Output
EPS: External Power Supply	RMS: Root Mean Square
BCS: Battery Charger Systems	P/D: Photo Documentation
SBCS: Small Battery Charger Systems	BC: Battery Charger
N.A.: Not Applicable	UCL: Upper 97.5-percent Confidence Limit
UEC: Unit Energy Consumption	

2. General Product Information

2.1 Brief Description of UUT

The UUT consists of one Wireless headphones and one integral battery.
The UUT is considered as consumer product and small BCS.

2.2 Location of BC Marking

The marking with "BC inside a circle", as shown below, will be legible and permanently affixed to either
 the product nameplate that houses the battery charging terminals, or
 the retail packaging and the cover page of the user's manual.





3. General Test Set-up Conditions

3.1 Test Sample and 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 (E₂₄) 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).

Unless otherwise specified, **the minimum number of units tested shall be no less than two** (except where a different minimum limit is specified in §§ 429.14 through 429.62 of this subpart)

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.

For each basic model, using the sample from equation (A), calculate the represented values of each metric (i.e., maintenance mode power (P_m), standby power (P_{sb}), off mode power (P_{off}), battery discharge energy (E_{Batt}), 24-hour energy consumption (E₂₄), and duration of the charge and maintenance mode test (t_{cd})).

3.2 Test Conditions (reference to sub-clause 4, IEC 62301-2011)

The testing was carried out in a room that has an air speed close to the UUT of ≤ 0.5 m/s, and the ambient temperature was maintained at $20^\circ\text{C} \pm 5^\circ\text{C}$ throughout the test.

Measurements of power 0.5 W or greater shall be made with an uncertainty of ≤ 2 percent at the 95 percent confidence level. Measurements of power less than 0.5 W shall be made with an uncertainty of ≤ 0.01 W at the 95 percent confidence level. The power measurement instrument shall have a resolution of:

- (1) 0.01 W or better for measurements up to 10 W;
- (2) 0.1 W or better for measurements of 10 to 100 W; or
- (3) 1 W or better for measurements over 100 W.

Measurements of energy (Wh) shall be made with an uncertainty of ≤ 2 percent at the 95 percent confidence level. Measurements of voltage and current shall be made with an uncertainty of ≤ 1 percent at



the 95 percent confidence level. Measurements of temperature shall be made with an uncertainty of ≤ 2 °C at the 95 percent confidence level.

3.3 Test Voltage

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. The input voltage shall be within ± 1 percent of the above specified voltage.

If the input voltage is AC, the input frequency shall be within ± 1 percent of the specified frequency. 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.

If the UUT is designed for operation only on DC input voltage and the provisions of paragraph 3.4 (b) above 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.

If the input voltage is DC, the AC ripple voltage (RMS) shall be:

- (1) ≤ 0.2 V for DC voltages up to 10 V; or
- (2) ≤ 2 percent of the DC voltage for DC voltages over 10 V.



4. Test Result

4.1 List of Measured Values

Name of measured value	UUT1	UUT2	UUT3	Represented Value Mean
duration of the charge and maintenance mode test (t_{cd}) in hours (hrs)	24	24	--	24
battery discharge energy (E_{batt}) in watthours (Wh)	0.958	0.960	--	0.959
maintenance mode power (P_m) in watts (W):	0.01	0.01	--	0.01
24-hour energy consumption (E_{24}) in watt-hours (Wh)	1.679	1.695	--	1.687
no battery mode power in watts (W).....	0.01	0.01	--	0.01
standby mode power (P_{sb}) in watts (W)	--	--	--	--
off mode power (P_{off}) in watts (W)	--	--	--	--

4.2 CEC Efficiency Requirements

Name of calculated value	UUT1	UUT2	UUT3
Unit Energy Consumption (UEC) in kilowatt-hours per year (kWh/yr)	0.167	0.171	--
<input type="checkbox"/> equation (i) <input checked="" type="checkbox"/> equation (ii) See note ¹⁾ .			
Mean	0.169		
Upper 97.5-percent Confidence Limit (UCL)	0.1944		
The upper 97.5-percent confidence limit (UCL) of the true mean divided by 1.05.....	0.1851		
Maximum UEC (kWh/yr)	3.087		
See note ²⁾ .			
Verdict	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		



Note:

1) Unit energy consumption (UEC) shall be calculated for a battery charger using one of the two equations (equation (i) or equation (ii)) listed as below:

equation (i)*

$$UEC = 365(n(E_{24} - 5P_m - E_{batt})\frac{24}{t_{cd}} + (P_m(t_{a\&m} - (t_{cd} - 5)n)) + (P_{sb}t_{sb}) + (P_{off}t_{off}))$$

equation (ii)*

$$UEC = 365(n(E_{24} - 5P_m - E_{batt})\frac{24}{(t_{cd} - 5)} + (P_{sb}t_{sb}) + (P_{off}t_{off}))$$

*[(tcd-5) * n > ta&m] use equation (ii)

If a battery charger is tested and its charge duration minus 5 hours is greater than the threshold charge time listed in table 3.3.3 (i.e. (t_{cd} - 5) * n > t_{a&m}), equation (ii) shall be used to calculate UEC; otherwise a battery charger's UEC shall be calculated using equation (i).

TABLE 3.3.3—BATTERY CHARGER USAGE PROFILES

Product class				Hours per day***			Charges (n)	Threshold charge time*
Number	Description	Rated battery energy (ebatt)**	Special characteristic or 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) Battery chargers manufactured on or after June 13, 2018, must have a unit energy consumption (UEC) less than or equal to the prescribed "Maximum UEC" standard when using the equations for the appropriate product class and corresponding rated battery energy as shown in the following table:

Product class	Product class description	Rated battery energy (E _{batt} ^{**})	Special characteristic or battery voltage	Maximum UEC (kWh/yr) (as a function of E _{batt} ^{**})
1	Low-Energy	≤5 Wh	Inductive Connection*	3.04
2	Low-Energy, Low-Voltage	<100 Wh	<4 V	$0.1440 * E_{batt} + 2.95$
3	Low-Energy, Medium-Voltage		4-10 V	For E _{batt} <10 Wh, 1.42 kWh/y E _{batt} ≥10 Wh, $0.0255 * E_{batt} + 1.16$
4	Low-Energy, High-Voltage		>10 V	$0.11 * E_{batt} + 3.18$
5	Medium-Energy, Low-Voltage	100-3000 Wh	<20 V	$0.0257 * E_{batt} + .815$
6	Medium-Energy, High-Voltage		≥20 V	$0.0778 * E_{batt} + 2.4$
7	High-Energy	>3000 Wh		$0.0502 * E_{batt} + 4.53$

5 Photographs of the UUT

Figure 1: Products General

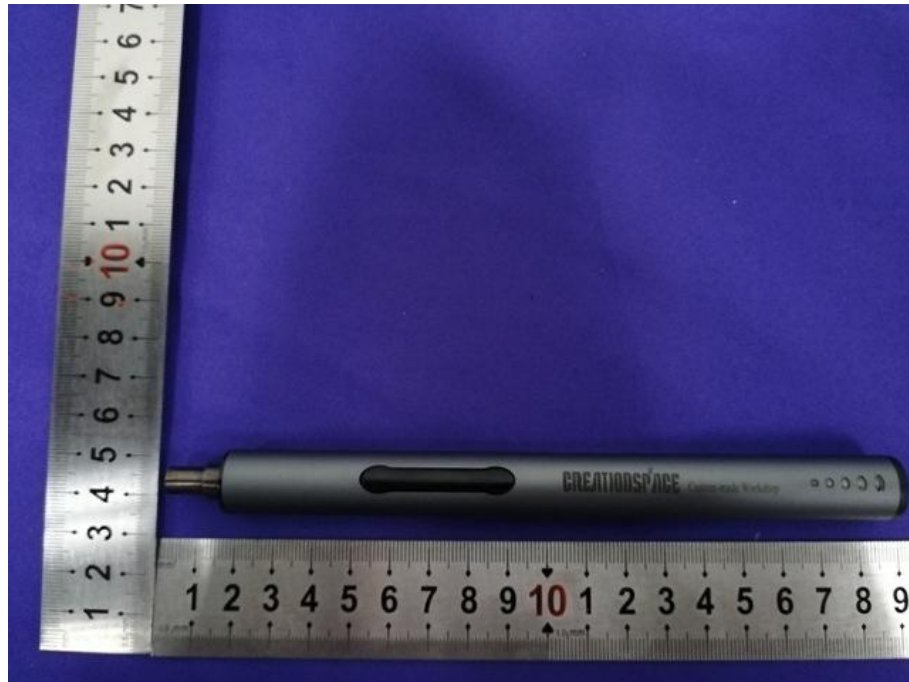


Figure 2: Products General





Figure 3: Lithium battery package

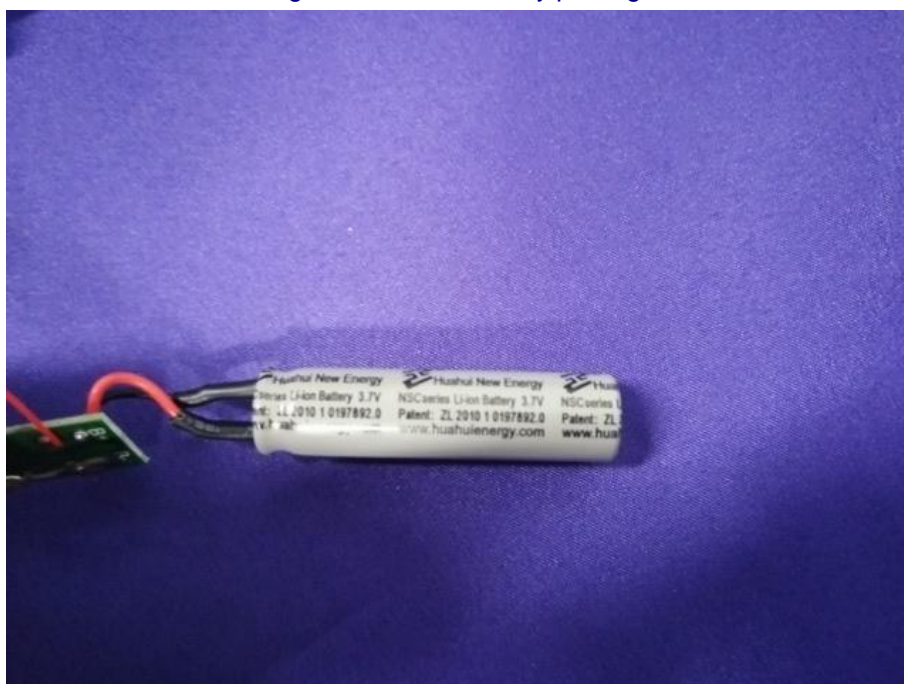


Figure 4: Lithium battery package

*****END OF REPORT*****