






TEST REPORT	
UL 964	
STANDARD FOR SAFETY –	
Electrically Heated Bedding	
Job Number..... :	STL2020S0729123-Y1
Date of issue..... :	August 10, 2020
Total number of pages..... :	17 Pages
Tested by (name + signature)..... :	Eris 
Approved by (name + signature)..... :	Jeewah 
Testing Laboratory..... :	Shenzhen STL Testing Technology Co., Ltd
Address..... :	4th Floor, Building A, Shenghengji Industrial Park, First Fuyongfuyuan Road, Baoan District, Shenzhen
Applicant's name..... :	Eigday Power Electronics Limited.
Address..... :	FLAT/RM 1103 HANG SENG MONGK OK BUILDING 677 NATHAN ROAD HONGKONG
Manufacturer's name..... :	Shenzhen Eigday Heating Limited
Address..... :	301 B8 Building, Tianrui Industry Park, Fuyuan 1st road No 35, Xinhe community Fuhai street, Baoan district, Shenzhen
Test Standard..... :	<input checked="" type="checkbox"/> UL 964, 12th Ed., Rev. Jun. 5, 2015
Test procedure..... :	<input checked="" type="checkbox"/> Type Test
Non-standard test method..... :	<input checked="" type="checkbox"/> N/A <input type="checkbox"/>
Product information	
Product name..... :	Electrically heated gloves
Brand name..... :	--
Model/Type reference..... :	SHGS01, SW04, SD30, SDW02, BH06
Ratings..... :	For Adapter: Input: 100-240v~, 50-60Hz, 1.5A; Output: DC8.4V, 1.5A. For Heated gloves: 8.4V  1.5A
Possible test case verdicts	
- test case does not apply to the test object..... :	N/A (or N)
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing	
Date of receipt of test item..... :	July 27, 2020
Date(s) of performance of tests..... :	July 27-August 10, 2020
General product information:	
The product covered in this report is a Electrically heated gloves, which is supplied from external power adapter or internal built-in re-charging Battery.	
Relevant Technical consideration:	
-Mass of equipment (kg): 263g	
-Maximum ambient temperature: 40°C	

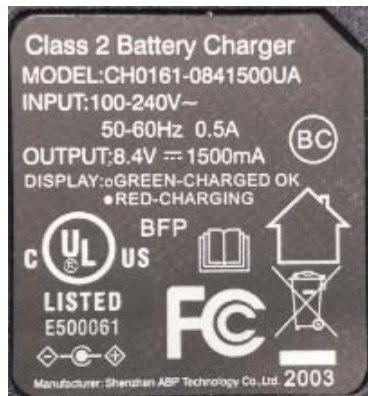
The model SHGS01 was selected as representative model and all the test were performed on it. And found to comply with the standard was subjected to all the tests.

Copy of marking plate (Representative):

Marking plate for Electrically heated gloves:



Marking plate for Adapter:



Marking plate for Battery:



**UL 964 - TEST LIST SUMMARY**

Clause	Performance	Required	Remark
16	Input Test	Y	P
17	Control Impact and Calibration Test	Y	P
18	Control Units Tests	Y	P
19	Normal Temperature Test	Y	P
20	Flexing Test	N	NA
21	Connector Flexing Test	Y	P
22	Throw Blanket Cord Flexing Test	Y	P
23	Leakage Current Test (All Products Except Mattresses)	Y	P
24	Dielectric Voltage-Withstand Test (All Products Except Mattresses)	Y	P
25	Laundrying (All Products Except Mattresses)	Y	P
26	Roller Flexing Test (Mattresses, Mattress Pads, and Foot Warmers)	N	NA
27	Leakage Current Test – Repeated (All Products Except Mattresses)	Y	P
28	Dielectric Voltage-Withstand Test – Repeated (All Products Except Mattresses)	Y	P
29	Normal Temperature Test – Repeated (All Products)	Y	P
30	Immersion Test (Blankets, Sheets, Quilts, and Comforters)	N	Not integral pendant control
31	Abnormal Temperature Tests	Y	P
32	Pull Out Test	Y	P
33	Final Mattress Tests	N	Not mattress.
34	Flammability of Shells	N	NA
35	Ease of Ignition Test	N	NA
36	Effect of Cleaning Solvents on Bedding Tests (All Products Except Mattresses)	N	Not intended for dry-clean
37	Thermostats in Bedding	N	No thermostat
38	Abnormal Operation Test for Products Employing Semiconductor Heater Wire	Y	P
39	Push-Back Strain Relief Test	Y	P
Engineering Note: Standard for Electrically Heated Bedding (UL 964, 12th Ed., Rev. Jun. 5, 2015)			

UL746C - TEST LIST SUMMARY

Clause	Performance	Required	Remark
31	Strain-Relief Test after Mold Stress-Relief Distortion	Y	P
56	Polymeric Enclosure Impact Test	Y	P
61	Mold Stress Distortion Test	Y	P

Engineer note:

Standard for Polymeric Materials – Use in Electrical Equipment Evaluations (UL 746C, 6th Ed., Rev. May 19, 2017)



INPUT TEST

METHODS:

The wattage or current input to a product shall not be more than **105 percent** of the rated wattage or current when the appliance is operated at **120V, 60Hz** while in a well-heated condition.

[NA] If a max. and a min. voltage are marked (eg, 110-120 V), the voltage of the supply circuit shall be the arithmetic mean of the two values (**CUL**).

RESULT:

mode	Supply Voltage (V)	initial		steady		Rating (W)	Limitation	Result (P=Pass F=Fail)
		Input (W)	Current (A)	Input (W)	Current (A)	--	--	--
SHGS01	120V,60Hz	12.6	0.112	9.86	0.092	--	--	--
	DC8.4V	11.09	1.32	8.82	1.05	12.6W	≤13.23W	Pass

CONCLUSION:

Test result: Pass. These results complied with the requirements

Sample No: _ 1#



CONTROL IMPACT AND CALIBRATION TEST

METHODS:

While Energized at **120V, 60Hz**, and connected to the bedding, Each of **three representative** control units shall withstand the impact due to dropping from a height of **914 mm** without exposure of uninsulated live parts and, unless short-circuited during the normal temperature test, or unless the impact due to dropping results in a fail-safe condition, shall not show a plus variation of more than 10°C in its maximum cut-off temperature, at the ambient temperature of 25.0 ±2.0°C.

RESULT:

Sample No.	Model	Maximum cut-off temperature, °C			
		as received		After the dropping	
		Temperature	Resistance	Temperature	Resistance
2#	SHGS01	35.6	12.3	39.5	12.5
Result	The max. variation (did / didn't) exceed the limitation of 10°C. Following the dropping, there (was / wasn't) exposure of live parts.				

CONCLUSION:

Test result: Pass. These results complied with the requirements

Sample No: 2#

Engineering notes: Sec. 17 of UL 964;

NORMAL TEMPERATURE TEST

METHODS:

To determine compliance with the requirements, the complete product is to be laid out flat as in actual service on the **test mattress (see 15.3)** and connected to a supply circuit, completely covered with two wool blankets each with a mass of approximately 3-3/4 lb (1.7 kg). The supply-circuit voltage is to be:

[✓] 120V, 60Hz (UL);

The temperature of the ambient air is to be within the range of 0 – 25.0°C (32.0 – 77.0°F), the specific temperature being that which results in the most severe operating conditions. ~~The control unit is to be short-circuited so that it will not cycle during the test, unless units were subjected to the control impact and calibration test in accordance with 17.1 – 17.3;~~ but, if a control is to remain in the circuit, the one having the highest cut-off temperature is to be used and, if adjustable, is to be set for maximum temperature. Operation is then to be continued until thermal equilibrium is attained but, if any internal thermostats interrupt operation, the test is to be completed with one or both blankets removed in order to determine the most severe operating condition.

Test mattress

15.2 The inch-thick felt mentioned in 19.2.2, 31.2.1, and 31.6.4 is to be minimum 1-inch thick (25 mm), 100 percent standard-weight, all-cattle-hair, punched felt with center reinforcement consisting of burlap having a mass of 5 oz/yd² (170 g/m²). The felt is to have a mass of 105 ±15 oz/yd² (3.56 ±0.51 kg/m²).

Exception: SAE J314, Grade F-11, minimum one inch-thick wool felt is also acceptable.

15.3 The test mattress mentioned in 19.1.4, 31.1.2, 31.4.1, and 31.6.2 is to consist of two 1-inch thick (25-mm thick) coarse hair pads as described in 15.2 that are to be attached to a nominal 1/2-inch (12.7 mm) or thicker plywood sheet. The mattress is to be of a size that accommodates the blanket when laid out flat.

Thermocouples for surface temperature

Thermocouples used for determining the temperature of the surface of a blanket are soldered to the middle of a blackened sheet of copper or brass 2.56 inches (65 mm) square and 0.02 inch (0.5 mm) thick. The plates are positioned to cover the maximum number of heating element runs possible with one side parallel to the direction of the run.

Thermocouples for heating element

Thermocouples used for determining the temperature of the heating element are tied to the heating element by textile thread, over a length of at least 0.4 inch (10 mm) adjacent to the junction.

Test method

Half of the pad or foot warmer, from the center to the end, is then to be covered with 1-inch (25-mm) thick felt pads (see 15.2) on which are to be placed, but not covering any thermostats that may be employed, dummy weights consisting of sand bags totalling 210 lbf (934 N or 95.3 kgf).

The test is then to be repeated with the other half of the product covered.

Sample No:3#

Engineering notes: Sec. 19 of UL 964;



NORMAL TEMPERATURE TEST

RESULTS:

Input: 120 V, 60 Hz, 0.112 A, 12.6 W

Load: Full Load

Ch.	Location	Temp. Rise (K)		Rise Limit (K)
		Left	Right	
101	Ambient temperature	24.3	24.3	Ref.
102	Enclosure of appliance	32.3	31.9	T80-25=55
103	Connector Housing	35.3	36.2	T105-25=80
104	heating element-1	36.3	36.9	T75-25=50
105	heating element-2	37.2	35.7	T75-25=50
106	heating element-3	36.9	36.7	T75-25=50
107	heating element-4	36.5	36.8	T75-25=50
108	Battery body	38.2	38.6	Ref.
--	Attachment No.:	1#	2#	--

Result:

The appliance (~~did~~ / **didn't**) attain at any point a temperature that would constitute a risk of fire or damage any materials employed in the appliance; The sample (~~did~~ / **didn't**) show greater temperature rises at certain specified points; The appliance (~~did~~ / **didn't**) have any serious defects that alone or in combination constitute an increase in the risk of fire, electric shock, or injury.

CONCLUSION:

Test result: Pass. These results complied with the requirements

Sample No: 1# 2#

Engineering notes: Sec. 19 of UL 964;

**LEAKAGE CURRENT TEST and DIELECTRIC VOLTAGE-WITHSTAND TEST**

(ALL PRODUCTS EXCEPT MATTRESSES for UL)

(ALL PRODUCTS for CUL)

METHODS:

A representative product proper – no controls, cord connectors and the like shall be immersed in water for 1 hour in **THE SALT SOLUTION**. A metal tub is to be employed as a container.

For rigid bedding (eg, mattresses), 1 quart of **THE SALT SOLUTION**, shall be applied to the most unfavorable location and the leakage current be measured between live parts of the bedding and a piece of metal foil 3600 cm² in size that is held in direct contact with the wetted section of the bedding (**CUL**).

While still immersed in **THE SALT SOLUTION**, shall be capable of withstanding for 1 minute without breakdown a 60 Hz essentially sinusoidal potential of 1000 V plus twice its rated voltage (**UL**) and 1250 Vac (**CUL**) applied between the solution and live parts of the product. The connections to the plug of the product and any associated controls shall remain dry and out of the solution throughout the test.

After immersion of the product proper – no controls, cord connectors and the like – for 1 hour in **THE SALT SOLUTION**, the leakage current between the solution and live parts of the product shall not be higher than:

UL: 5.0 mA when an a-c potential of 120 V / 0.5 mA when a d-c potential of 120 V;

CUL: for bedding employing PTC type heater element, 5.0 mA when an a-c potential of 120 V / 0.5 mA when a d-c potential of 120 V; for other product, 2.5 mA;

THE SALT SOLUTION: 8 g of NaCl per liter.

RESULTS:

While still immersed in **THE SALT SOLUTION**, The product (was / wasn't) capable of withstanding for 1 minute without breakdown the application of _1250_Vac.

After immersion of the product, The leakage current was measured max. 0.01 mA and (did / didn't exceed the limitation of (~~0.5 / 2.5 / 5.0~~) mA.

CONCLUSION:

Test result: Pass. These results complied with the requirements

**LAUNDERING (ALL PRODUCTS EXCEPT MATTRESSES)****METHODS:**

A representative product shall be subjected to five laundering process (five consecutive washings and dryings) in the most severe manner and then immersed in **THE SALT SOLUTION**:

Laundering process:

- The manufacturer's instructions for the bedding material employed or ;
- If not specified in the manufacturer's instructions, the product shall be laundered as following **(UL)**:
- A product to be laundered in an automatic washer** shall be laundered as follows: The washer is to be filled with 65 °C warm water and a minimum amount of all-purpose powdered detergent or mild soap chips is to be added and dissolved by agitation. The product is then to be placed in the washer and allowed to soak for 5 minutes followed by 2 minutes of slow agitation and spin drying at normal speed. The washer is then to be filled for a cool rinse, agitated for 1 minute, and spun at normal speed. A second, identical rinse is to be made. The product is then to be draped over a clothes line and allowed to dry until damp, or it may be damp-dried in an automatic dryer on high heat for 5 minutes. The product is then to be formed to its original shape and size on a flat surface until completely dry.
- or
- A product permanently marked to be washed by hand only** is to be laundered as follows: A large tub is to be filled with warm water and a minimum amount of all-purpose powdered detergent or mild soap chips is to be added and dissolved by agitation. The bedding is then to be placed in the tub and allowed to soak for 5 minutes followed by 15 minutes of vigorous scrubbing with a washboard, scrubbing brush, or similar scrubbing aid. The tub is then to be filled with cool water and rinsed until all cleaning agents are removed. A second identical rinse is then to be made. The product is then to be draped over a clothes line and allowed to dry until damp. The product is then to be formed to its original shape and size on a flat surface until completely dry.
- A product** shall be laundered as follows **(CUL)**: the test method is the same as that for **Product to be laundered in an automatic washer** except: The product is then to be placed in the washer and allowed to soak for 5 minutes followed by 5 minutes of slow agitation and spin drying at normal speed; The product is then to be damp-dried in an automatic dryer on high heat for 10 minutes. And finished by being hung on a line to dry with the blanket ends hung down.

RESULTS:

After the product is laundered:

There (~~was~~/ wasn't) Loosening of the male connector body;

There (~~was~~ / wasn't) Unraveling, breakage or loosening of the stitching at the ends of the dividers for a distance greater than 19 mm;

There (~~was~~/ wasn't) Breakage or loosening of any wiring connections;

There (~~was~~ / wasn't) Appreciable shifting of position of the heating element within the shell; or

There (~~was~~ / wasn't) Breakage of the heating-element conductor or other interruption of the electrical circuit through the product; or water inside the seal around a thermostat.

The size of the bedding of cover type was measured 145 mm x 190 mm and _____ mm x _____ mm before and after being laundered respectively. The sample (did / didn't) show shrinkage in either direction of more than 150 mm **(CUL)**.

CONCLUSION:

Test result: Pass. These results complied with the requirements

Sample No: 5#

Engineering notes: Sec. 25 of UL964;

ABNORMAL TEMPERATURE TESTS (CONT'D)

[✓] **Bunch test**

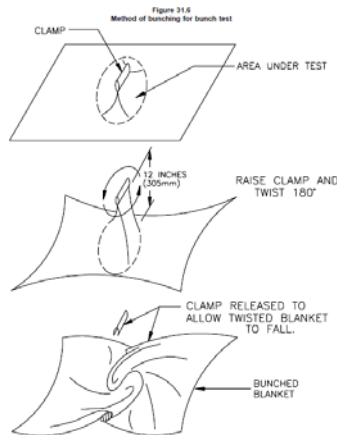
Three representative blankets, sheets, or similar bedding intended to be placed over the user shall be subjected to the bunching test while energized at a 120 V ac potential. A controlled ambient temperature of 25.0 ±2.0°C (77.0 ±3.6°F) is specified. Neither the test bedding, nor the 100-percent cotton sheet is stated below shall become charred – that is, there shall not be deterioration of the product or cotton sheet fiber, including melting and embrittlement. Discoloration alone shall not be considered unacceptable.

A bleached, white, 100-percent cotton sheet is to be laid out flat on top of **THE TEST MATTRESS**. The sheet is to be secured at the edges to keep it from shifting when the test bedding is bunched. The test bedding is to be laid out flat on top of the sheet.

Test 1): The approximate center of an unprotected portion of the wired area of the product is to be grasped by a wooden clamp. The clamp is to be raised vertically through a distance of 305 mm so that the product material, including any discrete sensing devices, surrounding the clamp is uniformly drawn toward the center. The clamp is to be rotated 180 degrees on its minor axis and the product released so that the twisted material falls back on the approximate center of the test area. **THE WOODEN CLAMP** shall consist of two pieces, each approximately 6.4-mm thick, with a gripping surface measuring 102 mm by 25.4 mm. The product is to be grasped so that the long edge (major axis) of the clamp runs parallel to the heater wire.

Test 2): A 508-mm diameter, **THE FELT PAD**, is to be gently placed on top of the product so that the center of the pad contacts the center of the twisted material, and so that the perimeter of the pad does not extend beyond the wired area. A 2.27 kg, 127-mm diameter disc is to be placed on the top center of the pad for 1 minute while the perimeter of the pad is gently pressed down to ensure contact with the product. The weight is then to be removed and the product energized as intended for 7 hours.

[✓] When testing a product that does not incorporate discrete temperature sensing devices (such as an over-blanket, sheet, comforter, and the like), or that employs fewer than the minimum number as required, the diameter of the cover pad described above may be varied within the inclusive range of 254 – 508 mm in order to produce the most unfavorable result.



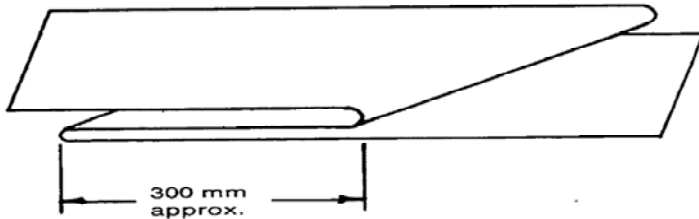
Sample No:3#

Engineering notes: Sec. 31 of UL964;

ABNORMAL TEMPERATURE TESTS (CONT'D)**[✓] Disabled control (UL)**

If the control unit is allowed to function during the **NORMAL TEMPERATURE TEST**, and, if an open circuit in one or more sections of the heating element causes the control not to function or to function improperly, the **Normal Temperature Test** is to be repeated with one or more sections of the heating element open-circuited.

[] In addition to the abnormal tests described in this section, a product incorporating an unusual construction shall be subjected to tests deemed necessary for the application.

[✓] Folding Bedding (CUL)

The bedding shall be folded as shown in figure 7 to give a 3 thickness fold with a width of fold of approximately 300 mm. The fold shall be made in the most unfavorable area of the bedding and at any angle to the runs of the heating element.

Figure 7

CONCLUSION:

Test result: Pass. These results complied with the requirements

Sample No: 5#

Engineering notes: Sec. 31 of UL964;



PULL OUT TEST

METHODS:

Except that the attachment plug is to be excluded, the attachment and strain relief provided at each end of each supply, control, interconnecting, and pigtail cord and the attachment of the half of each bedding connector attached to the bedding without a pigtail cord shall withstand for 1 minute the stress indicated in following Table:

Stresses to be used in Pull Out Test

Parts of the complete bedding between which stress is to be applied	Stress
Between the supply cord and the control unit or switch to which the cord is attached Between any interconnecting cord and the control unit at one end of the cord and then, separately, the control unit at the other end of the cord	✓ 25 lbf (111 N)
Between the control cord and the control unit or switch at one end of the cord and then, separately, the half of the bedding connector at the other end of the cord	✓
Between any pigtail cord and the half of the bedding connector at one end of the cord	✓
Between any pigtail cord and the bedding to which the cord is connected	35 lbf ^a (156 N)
Between the half of any bedding connector attached to the bedding without a pigtail cord and the bedding to which the connector is attached	✓ 20 lbf (89 N) (Remark: 111N for CETL)

^a For a mattress the stress shall be 50 lbf (222 N).

- [✓] Bedding other than a mattress is to be hung vertically across its full width with 305 mm of its length hanging free above the point of pigtail or connector attachment.
- [NA] For male connector to the Bedding of the mattress type or the mattress pad type for use next to the mattress, the stress shall be 220N if the flexible cord enters the bedding directly (CUL).

RESULTS:

- [✓]The strain relief (~~was~~ / wasn't) at the point of severance or disconnection:
 - a) The ends of the conductors are seen to separate by any amount;
 - b) The insulation on the conductors is seen to slip off of any conductor to any degree; or
 - c) There is any other appreciable manifestation of stress having resulted on the connections.
- [✓]For The attachment and strain relief of a pigtail cord or pigtailless connector to the bedding, the following condition (~~did~~/ didn't) occur:
 - a) The pigtail cord or the connector becomes loose or detached;
 - b) There is any displacement of the heating element or other wiring internal to the bedding; or
 - c) There is any loosening or breaking of any electrical connection.

CONCLUSION:

[✓]Test result: Pass. These results complied with the requirements

Sample No: 6#

Engineering notes: Sec. 32 of UL964;

**ABNORMAL OPERATION TEST FOR PRODUCTS EMPLOYING SEMICONDUCTOR HEATER WIRE****METHODS:**

Test 1: The product is to be connected to a 120 V, 60 Hz supply source, having a minimum 20 A branch circuit overcurrent protection. One conductor of the semiconductor heater wire of a previously untested product is to be opened to simulate a break in the wire. The product is then to be operated as intended for 7 hours or until at least one of the following results are observed:

- a) A risk of fire develops;
- b) The branch-circuit overcurrent protection opens;
- c) The equipment protective device opens;
- d) Any other circuit component opens; or
- e) A minimum of one hour elapses, circuit conditions stabilize, and there is no further evidence of overheating of parts.

[] **Test 2:** If none of the results described in (a) - (e) occurs, a second open is to be introduced in the same conductor of the semiconductor heater wire to simulate a second break.

Test 3: A short is to be introduced between the two conductors of the semiconductor heater wire of a second, previously untested product. The above test shall be repeated. The product is then to be operated as intended for 7 hours or until at least one of the following results are observed:

- a) A risk of fire develops;
- b) The branch-circuit overcurrent protection opens;
- c) The equipment protective device opens;
- d) Any other circuit component opens; or
- e) A minimum of one hour elapses, circuit conditions stabilize, and there is no further evidence of overheating of parts.

RESULTS:

During the tests, the breakdown of semiconductor heater wire employed in electrically heated bedding (~~did~~/ didn't) result in the risk of fire as determined by glowing, charring, or flaming of the product.

CONCLUSION:

Test result: Pass. These results complied with the requirements.

Sample No:6#

Engineering notes: Sec. 38 of UL964;

Appendix 3: Product Photos



Overview-1 of appliance



Overview-2 of appliance



Overview-3 of appliance



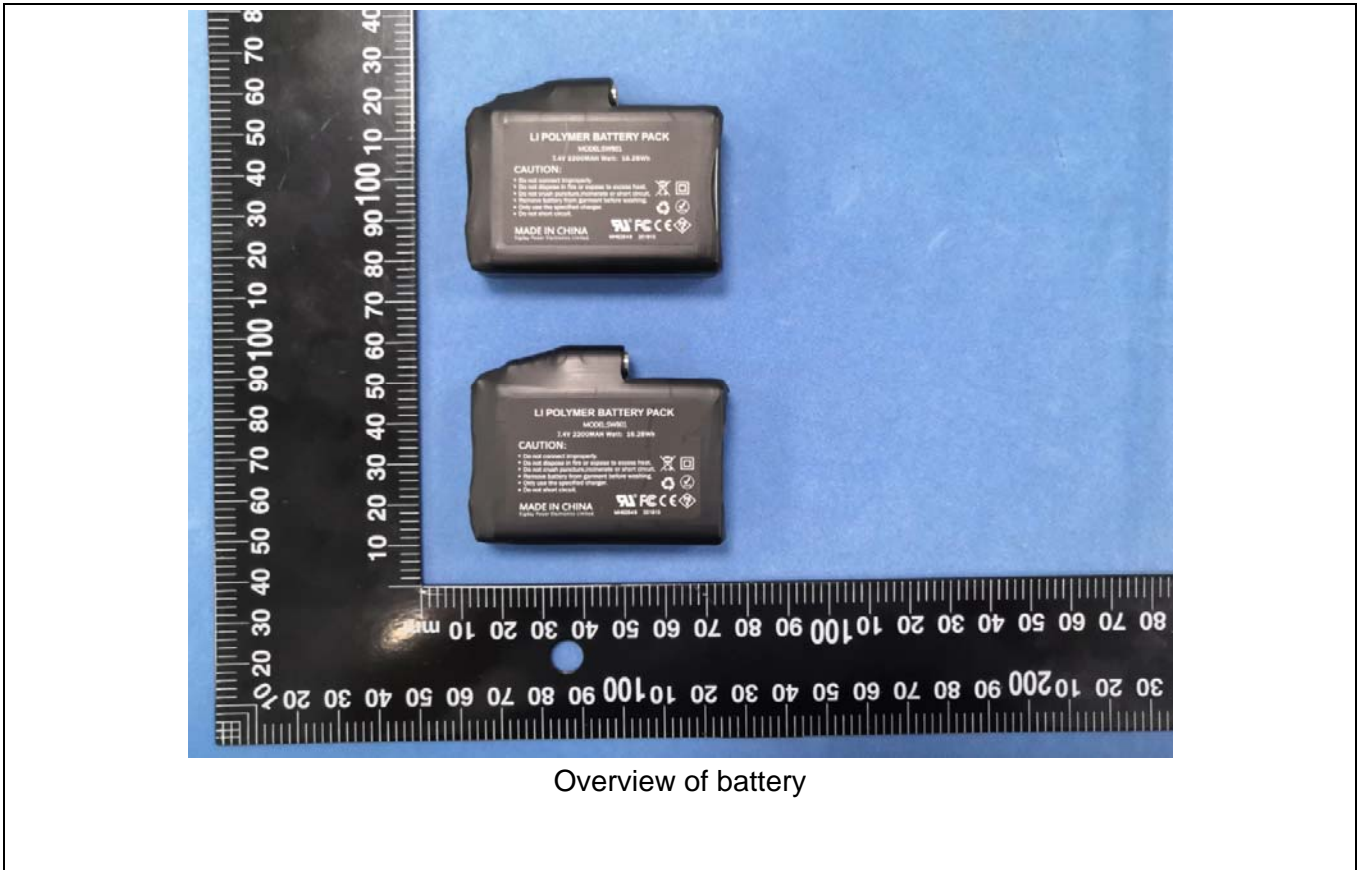
Internal view of appliance



Front view of adapter



Label view of adapter



Overview of battery

***** End of report *****