

TEST REPORT

ST/SG/AC.10/11 Rev.5 Section 38.3

AMENDMENTS TO THE FIFTH REVISED EDITION OF THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS, MANUAL OF TEST AND CRITERIA

(Section 38.3: Lithium batteries)

Report reference No. STR12108039S

Tested by (name+ signature): Anne Ma

Approved by (+ signature) Ailis Ma

Date of issue Oct. 22, 2012

Testing laboratory SEM.Test Compliance Service Co., Ltd.

District, Shenzhen, P.R.C. (518101)

Testing location As above

Applicant GlobTek, Inc.

Address 186 Veterans Dr. Northvale, NJ 07647 USA

Manufacturer GlobTek (Suzhou) Co., Ltd.

Building 4, No.76, Jin Ling East Rd., Suzhou Industrial Park, Address

Suzhou, Jiangsu 215021, China

Standard ST/SG/AC.10/11Rev.5 Section 38.3

Test procedure Type approved

Procedure deviation N.A.

Non-standard test method N.A.

This test report is specially limited to the above client company and product model only, It may not be duplicated without prior written consent of SEM. Test.

Product Name Li-ion Battery

Trademark GlobTek

Model/type reference BL1950P1034502S1PQPA

Max. charge voltage 8.4V

Max. charge current 925mA

Standard charge current 370mA



Max. discharge current 1850mA	
Standard discharge current 370mA	
Charge cut-off voltage 8.4V	
Discharge cut-off voltage 5.5V	
☐ Cylindrical Batt	ery
Shape of Battery Prismatic Batte	ery
☐ Coin Battery/B	utton Battery
Particulars: test item vs. test requirements	
Classification	Lithium metal batteries
	Lithium metal cells
	∐ Lithium ion batteries
	☐ Lithium ion cells
Samples Type	☐ Large battery
	☐ Large cell
	⊠ Small battery
	☐ Small cell
Dimension:	L : 70.0mm
	W:50.5mm
	T : 10.8mm
Mass of apparatus	83.0g
Possible test case verdicts:	
- test case does not apply to the test object:	N(.A.)
- test object does meet the requirement:	P(ass)
- test object does not meet the requirement	F(ail)
Testing:	
Date of receipt of test item	Oct. 10, 2012
Date(s) of performance of test:	Oct. 10, 2012 to Oct. 22, 2012
Test Conclusion:	
The Li-ion Battery submitted by GlobTek, Inc. is tended the Fifth Revised Edition of the Recommendations on the and Criteria (ST/SG/AC.10/11/Rev.5).	
Test Result: Pass.	



		ST/SG/AC.1	10/11Rev.5	Section 3	8.3			
Requiremen	t – Test					Result -	Remark	Verdict
Procedure								Р
		nducted in s	equence on	the				Р
Test 6 and 8	should be		using not ot	herwise				Р
previously us	ed in test							Р
Test 1: Altitu	-							P
Purpose								Р
This test sim conditions.	ulates air	transport ur	der low-pres	ssure				-
Test procedu	ire)	9	Р
stored at a pi	ressure				11	1.6 kPa)	-
ambient temp	perature ((20 ± 5°C)			24	1 ℃		-
Stored times	(≥ 6 hou	ırs)			8(hours		-
Requirement								Р
mass loss, no no rupture ar each test cell 90% of its vo The requirem	o leakage nd no fire I or batter Itage imm nent relati	e, no venting and if the op y after testin nediately prion ng to voltage	, no disassel pen circuit vo ng is not less or to this pro e is not appli	mbly, oltage of than cedure. cable to	di ar te 90	o venting, no sassembly, no fire. Basting is not low of its voltamediately p	no rupture attery after ess than age	P
		Mass N	of Test Ba	ttery (g)			OCV (V)	
	No.	M1 (before the test)	M2 (after the test)	Loss lin	nit	OCV1 (before the test)	OCV2 (after the test)	OCV (≥90%)
	01×	83.557	83.554	0.004%	6	8.353	8.350	99.964%
first cycle, in	02	83.735	83.733	0.002%	6	8.363	8.361	99.976%
fully charged states)		83.679	83.677	0.002%	6	8.359	8.356	99.964%
CEM.	04	83.620	83.617	0.004%	6	8.358	8.357	99.988%
2	05	83.616	83.613	0.004%	6	8.365	8.362	99.964%
ter fifty na in fully	06	83.554	83.551	0.004%	6	8.357	8.355	99.976%
tes)	07	83.474	83.470	0.005%	6	8.362	8.360	99.976%
	08	83.544	83.541	0.004%	6	8.361	8.359	99.976%
	Procedure Test 1 to 5 m same cell or Test 6 and 8 tested cells of Test 7 may b previously us on cycled bar Test 1: Altitu Purpose This test simiconditions. Test procedustored at a procedustored at a procedure and test cells and bar mass loss, no no rupture areach test cell 90% of its voon The requirement test cells and test cells are test cells and test cells and test cells are	Requirement – Test Procedure Test 1 to 5 must be cosame cell or battery. Test 6 and 8 should be tested cells or batterie. Test 7 may be conducted previously used in test on cycled batteries. Test 1: Altitude Simulates air conditions. Test procedure stored at a pressure ambient temperature (Stored times(≥ 6 hours leading to the procedure) Cells and batteries means loss, no leakage no rupture and no fire each test cell or batter 90% of its voltage immore the power	Procedure Test 1 to 5 must be conducted in a same cell or battery. Test 6 and 8 should be conducted tested cells or batteries. Test 7 may be conducted using un previously used in tests 1 to 5 for pon cycled batteries. Test 1: Altitude Simulation Purpose This test simulates air transport un conditions. Test procedure stored at a pressure ambient temperature (20 ± 5°C) Stored times(≥ 6 hours) Requirement Cells and batteries meet this requiremass loss, no leakage, no venting no rupture and no fire and if the opeach test cell or battery after testing 90% of its voltage immediately prior The requirement relating to voltage test cells and batteries at fully discrete the test) No. Mass Mon. Mass	Procedure Test 1 to 5 must be conducted in sequence on same cell or battery. Test 6 and 8 should be conducted using not of tested cells or batteries. Test 7 may be conducted using undamaged by previously used in tests 1 to 5 for purposes of on cycled batteries. Test 1: Altitude Simulation Purpose This test simulates air transport under low-presconditions. Test procedure stored at a pressure ambient temperature (20 ± 5℃) Stored times(≥ 6 hours) Requirement Cells and batteries meet this requirement if the mass loss, no leakage, no venting, no disasse no rupture and no fire and if the open circuit voeach test cell or battery after testing is not less 90% of its voltage immediately prior to this promotest cells and batteries at fully discharged states No. Mass M of Test Batteries testing is not applitest cells and batteries at fully discharged states No. Mass M of Test Batteries testing is not applitest cells and batteries at fully discharged states No. Mass M of Test Batteries testing is not applitest cells and batteries at fully discharged states No. Mass M of Test Batteries at fully discharged states No. Mass M of Test Batteries at fully discharged states No. Mass M of Test Batteries at fully discharged states No. Mass M of Test Batteries at fully discharged states No. Mass M of Test Batteries at fully discharged states No. Mass M of Test Batteries No. Mass M of Test Batteries No. No. No. No. No. No. No. No	Procedure Test 1 to 5 must be conducted in sequence on the same cell or battery. Test 6 and 8 should be conducted using not otherwise tested cells or batteries. Test 7 may be conducted using undamaged batteries previously used in tests 1 to 5 for purposes of testing on cycled batteries. Test 1: Altitude Simulation Purpose This test simulates air transport under low-pressure conditions. Test procedure stored at a pressure ambient temperature (20 ± 5°C) Stored times(≥ 6 hours) Requirement Cells and batteries meet this requirement if there is no mass loss, no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states. No.	Procedure Test 1 to 5 must be conducted in sequence on the same cell or battery. Test 6 and 8 should be conducted using not otherwise tested cells or batteries. Test 7 may be conducted using undamaged batteries previously used in tests 1 to 5 for purposes of testing on cycled batteries. Test 1: Altitude Simulation Purpose This test simulates air transport under low-pressure conditions. Test procedure stored at a pressure ambient temperature (20 ± 5°C) Stored times(≥ 6 hours) Requirement Cells and batteries meet this requirement if there is no mass loss, no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states. Mass M of Test Battery (g) Mass (after the test) Mass (0.1%)	Requirement - Test	Requirement - Test

Remark

- 1. Mass loss (%)=(M1-M2)/M1*100% (Where M_1 is the mass before the test and M_2 is the mass after the test).
- When mass loss does not exceed the value in Table: Mass loss limit, it shall be considered as "no mass loss".
- 3. The OCV of each test cell after testing is not less than 90% of its voltage immediately prior to this procedure.
- 4. Ambient temperature: 24°℃

Conclusion:

Li-ion Battery had passed altitude simulation test.



			ST/SG/AC	.10/11Rev.5	Section 3	38.3		
Clause	Requiremen	t – Test				Result	- Remark	Verdict
38.3.4.2	Test 2: Ther	mal Test						Р
38.3.4.2.1	Purpose							-
	This test ass internal elect using rapid a	rical conn	ections. Th	e test is cond	ducted			-
38.3.4.2.2	Test procedu	est procedure						Р
	Test tempera	Test temperature and stored hours				1) 75°C, ≥6h 2) -40°C, ≥6h	-	
	The maximum	The maximum time interval				Between test extremes is 3	t temperature 30 minutes.	-
	Test times					repeated 10	times	-
		ter which all test cells and batteries are to be stored $^{\circ}$ 24 hours at ambient temperature (20 \pm 5 $^{\circ}$ C)				24℃	-	
		rge cells and batteries the duration of exposure test temperature extremes should be at least 12 Small battery					<i>y</i>	N
38.3.4.2.3	Requirement	Requirement					Р	
	mass loss, no no rupture ar each test cel 90% of its vo The requiren	no leakage, no venting, no disassembly, and no fire and if the open circuit voltage of ell or battery after testing is not less than voltage immediately prior to this procedure. The ment relating to voltage is not applicable to and batteries at fully discharged states. No mass loss, no leakage no venting, no disassembly, no rupture and no fire. Battery after testing is not less than 90% of its voltage immediately prior to this procedure.						P
	I		Mass I	W of Test Ba	ttery (g)		OCV (V)	
Group		No.	M1 (before the test)	M2 (after the test)	Mass Loss lin (0.1%)	nit (before	OCV2 (after the test)	OCV (≥90%)
		01	83.554	83.521	0.039%	8.350	8.300	99.401%
Group A (at	t first cycle, in	02	83.733	83.700	0.039%	8.361	8.312	99.414%
fully charge	d states)	03	83.677	83.648	0.035%	6 8.356	8.311	99.461%
		04	83.617	83.585	0.038%	6 8.357	8.313	99.473%
-	CHI	05	83.613	83.585	0.033%	6 8.362	8.323	99.534%
Group B (at cycles endi		06	83.551	83.526	0.030%	8.355	8.332	99.725%
charged sta		07	83.470	83.440	0.036%	8.360	8.342	99.785%
		80	83.541	83.510	0.037%	6 8.359	8.342	99.797%

Remark

- 1. Mass loss (%)=(M1-M2)/M1*100% (Where M_1 is the mass before the test and M_2 is the mass after the test).
- 2. When mass loss does not exceed the value in Table: Mass loss limit, it shall be considered as "no mass loss".
- 3. The OCV of each test cell after testing is not less than 90% of its voltage immediately prior to this procedure.
- 4. Ambient temperature: 24°C

Conclusion:

Li-ion Battery had passed thermal test.



	<u> </u>		ST/SG/AC.	10/11Rev.5	Section 3	38.3		TNO STRI	21000000	
Clause	Requiremen	Requirement – Test						Remark	Verdict	
38.3.4.3	Test 3: Vibra	ation							Р	
38.3.4.3.1	Purpose								Р	
	This test sim	ulates vib	ration during	transport.					-	
38.3.4.3.2	Test procedu	ire							Р	
	of the vibration	Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration.							-	
		ne vibration shall be a sinusoidal waveform with a							Р	
	Duration					15	5min		-	
	Frequency ra	ange				7ł	Hz200Hz	7Hz	-	
	Amplitude					0.	8mm		-	
	hours for each	h of three						· ·		
38.3.4.3.3	Requirement					(C_0 .		Р	
	mass loss, no no rupture ar each test cel 90% of its vo The requiren	and batteries meet this requirement if there is no loss, no leakage, no venting, no disassembly, outure and no fire and if the open circuit voltage of leakage, no venting, no disassembly, no rupture and no fire is no mass loss, releakage, no venting, no disassembly, no rupture equirement relating to voltage is not applicable to						enting, no	P	
			Mass N	l of Test Ba	ttery (g)			OCV (V)		
Group		No.	M1 (before the test)	M2 (after the test)	Mass Loss lim (0.1%)	nit	OCV1 (before the test)	OCV2 (after the test)	OCV (≥90%)	
		01	83.521	83.520	0.001%	6	8.300	8.295	99.940%	
Group A (at	first cycle, in	02	83.700	83.696	0.005%	6	8.312	8.310	99.976%	
fully charge	d states)	03	83.648	83.646	0.002%	6	8.311	8.308	99.964%	
	(04	83.585	83.583	0.002%	6	8.313	8.310	99.964%	
	CM.	05	83.585	83.583	0.002%	6	8.323	8.320	99.964%	
Group B (afficycles endir		06	83.526	83.521	0.006%	6	8.332	8.330	99.976%	
charged sta		Is and batteries are firmly secured to the vibration machine without distortion in a manner as to faithfully transmit to vibration shall be a sinusoidal wave arithmic. In ation It is quency range politude Is cycle shall be repeated 12 times for responsitions of the cell. It is and batteries meet this requirement is and batteries meet this requirement is and batteries meet this requirement is and batteries and if the open continuity to the cell or battery after testing is received in the cell of the test of the te	83.432	0.010%	6	8.342	8.340	99.976%		
		08	83.510	83.502	0.010%	6	8.342	8.339	99.964%	

Remark

- 1. Mass loss (%)=(M1-M2)/M1*100% (Where M_1 is the mass before the test and M_2 is the mass after the test).
- When mass loss does not exceed the value in Table: Mass loss limit, it shall be considered as "no mass loss".
- 3. The OCV of each test cell after testing is not less than 90% of its voltage immediately prior to this procedure.
- 4. Ambient temperature: 24°C

Conclusion:

Li-ion Battery had passed vibration test.



1251		ST/SG/AC.	10/11Rev.5	Section 3	38.3		TNO STRT	21000000	
Clause Requiremen	t – Test					Result -	Remark	Verdict	
38.3.4.4 Test 4: Shoo	ck							Р	
38.3.4.4.1 Purpose								Р	
This test sim	ulates po	ssible impac	ts during tra	nsport.				-	
38.3.4.4.2 Test procedu	Test procedure							Р	
machine by r	Fest cells and batteries shall be secured to the testing						This is small batteries.		
a half-sine sh	nock of pe	eak accelera	tion		15	50 g _n		-	
Pulse duration	n				6r	ns		-	
the positive of	direction f	ollowed			th	ree times sh	ocks	-	
in the positive negative dire	battery shall be subjected to three shocks e direction followed by three shocks in the ection of three mutually perpendicular sitions of the cell or battery for a total of						-		
38.3.4.4.3 Requirement	İ							Р	
mass loss, no rupture ar each test cel 90% of its vo	atteries meet this requirement if there is no no leakage, no venting, no disassembly, and no fire and if the open circuit voltage of ell or battery after testing is not less than oltage immediately prior to this procedure. ment relating to voltage is not applicable to						P		
<u>.</u>			l of Test Ba				OCV (V)		
Group	No.	M1 (before the test)	M2 (after the test)	Mass Loss lim (0.1%)	nit	OCV1 (before the test)	OCV2 (after the test)	OCV (≥90%)	
	01	83.520	83.518	0.002%	6	8.295	8.290	99.940%	
Group A (at first cycle, in	02	83.696	83.695	0.001%	6	8.310	8.303	99.916%	
fully charged states)	03	83.646	83.643	0.004%	6	8.308	8.305	99.964%	
(04	83.583	83.580	0.004%	6	8.310	8.306	99.952%	
	05	83.583	83.581	0.002%	6	8.320	8.316	99.952%	
Group B (after fifty	06	83.521	83.509	0.014%	6	8.330	8.325	99.940%	
cycles ending in fully charged states)	07	83.432	83.430	0.002%	6	8.340	8.336	99.952%	
- ,	08	83.502	83.500	0.002%	6	8.339	8.337	99.976%	

Remark

- 1. Mass loss (%)=(M1-M2)/M1*100% (Where M_1 is the mass before the test and M_2 is the mass after the test).
- When mass loss does not exceed the value in Table: Mass loss limit, it shall be considered as "no mass loss".
- 3. The OCV of each test cell after testing is not less than 90% of its voltage immediately prior to this procedure.
- 4. Ambient temperature: 24°C

Conclusion:

Li-ion Battery had passed shock test.



			ST/SG/AC.10/1	11Rev.5 Section	38.3	
Clause	Requireme	nt – Test	t		Result - Remark	Verdict
38.3.4.5	Test 5: Ext	ernal Sh	ort Circuit			Р
38.3.4.5.1	Purpose					Р
	This test sin	nulates a	s an external short circuit. It to be tested shall be temperature its external case temperature ition with a total External resistance im. It must be observed for a further six to be concluded. Condition is continued for at least one or battery external case temperature of the concluded it is more in the condition of the concluded it is more in the concluded in the concluded it is more in the concluded in the concluded it is more in the concluded in the concluded it is more in the concluded it is more in the concluded in the concluded it is more in the concluded it is more in the concluded			
38.3.4.5.2	Test proced	lure				Р
		o that its				-
	of less than	0.1ohm.				-
	hours for the	e test to b	oe concluded.			-
		ne cell or	battery external c		-	
38.3.4.5.3	Requiremen	nt			Р	
	external ten	nperature disassem	does not exceed bly, no rupture an	170°C and	temperature does not exceed 170°C, and there is no disassembly, no fire and no rupture within six	Р
Group		No.	Highest Temperature	Criteria	•	Result
		01				Р
Group A		02	55.3		•	Р
(at first cycl charged sta		03	55.6			Р
	,	04	56.2		Р	
		05_X	56.3			Р
Group B		< 06	55.8			Р
	ycles ending ged states)	07	55.7			Р
	CE	08	55.9			Р
Ambient ter	mperature: 23	$^{\circ}$ C				

Conclusion:

Li-ion Battery had passed external short circuit test.



Requirement - Test

Clause

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Verdict P

Result - Remark

The test sample

38.3.4.6	Test 6: Imp	act			I he test sample Component cell of rechargeable batteries.	Р
38.3.4.6.1	Purpose				rechargeable batteries.	Р
	This test sin	nulates a	n impact.			Р
38.3.4.6.2	Test proced	lure		Р		
	- Dropped h	eight			61±2.5cm,	-
	- mass				9.1Kg	-
	- diameter b	ar		15.8mm	-	
	- Impact pos Prismatic co axis parallel the longitud surface lying Prismatic co its longitudii sides will be	ell is to be I to the flat inal axis g across ell is also nal axis s	Co., 1x9	Р		
	A coin or bu surface of th	itton cell ne sampl	is to be impacted e parallel to the fla er curved surface	at surface and 🤇	N	
38.3.4.6.3	Requiremen	nt		CO)	Р	
	Cells and component cells meet this requirement if their external temperature does not exceed 170°C and there is no disassembly and no fire within six hours of this test.				After the test, The, component Cells external temperature does not exceed 170°C and there is no disassembly and no fire within six hours of this test.	Р
Group		No.	Component cells external temperature (°C)	Criteria	,	Result
		× 09	106.1		Cells external temperature	Р
Group C,		10	31.4		d 170℃ and there is no d no fire within six hours of	Р
at first cycle the design	e at 50% of	11	29.5	this test.		Р
capacity (H		12	38.5			Р
		13	39.6			Р
			i e	1		Р
		14	29.2			P
Group D,		14 15	29.2 30.5			P
at first cycle						
	rated	15	30.5			Р

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Conclusion:

Li-ion Battery had passed Impact test.



		ST/SG/AC.10/1	1Rev.5 Section	38.3	
Clause	Requirement – Test	t		Result - Remark	Verdict
38.3.4.7	Test 7: Overcharge				Р
38.3.4.7.1	Purpose				Р
	This test evaluates the				-
38.3.4.7.2	battery to withstand a	an overcnarge cor	idition.		Р
00.0.4.7.2	The charge current			2×925mA=1850mA, Twice the manufacturer's recommended maximum continuous charge current.	Р
	The minimum voltage	<u> </u>	Р		
	a) The minimum volt manufacturer's recor more than 18V).			2×8.4V=16.8V, the lesser of two times the maximum charge voltage of the battery or 22V,	Р
	b) The minimum volt manufacturer's recor than 18V).			¢0.,	N
	Ambient temperature) .		24℃	-
	The duration of the to	est.	· C	24 hours	-
38.3.4.7.3	Requirement				Р
	Rechargeable batter is no disassembly ar test.			There is no disassembly and no fire within seven days of the test.	Р
Group		No.	Criteria	•	Result
		01 .		ssembly and no fire within	Р
Group A	a in fully about a	02	seven days of th	ie test.	Р
states)	e, in fully charged	03			Р
,		04			Р
	c ^X	05			Р
Group B	roles anding in Ault.	06			Р
charged sta	cles ending in fully tes)	07			Р
Ŭ	CHINA	08			Р
Ambient ten	nperature: 24℃				•

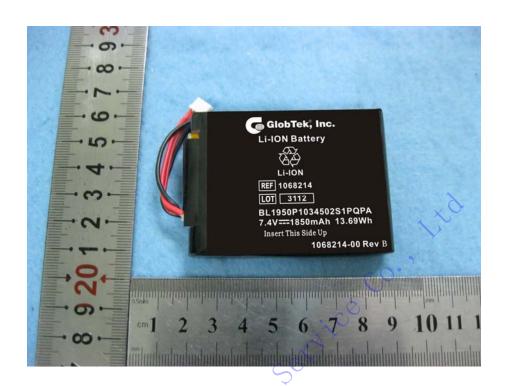
Conclusion:

Li-ion Battery had passed overcharge test.

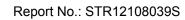


Photos

Model: BL1950P1034502S1PQPA

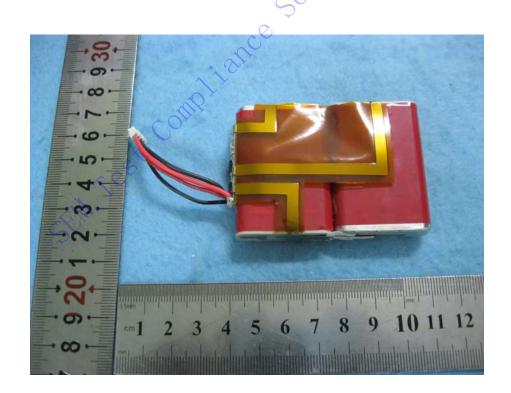






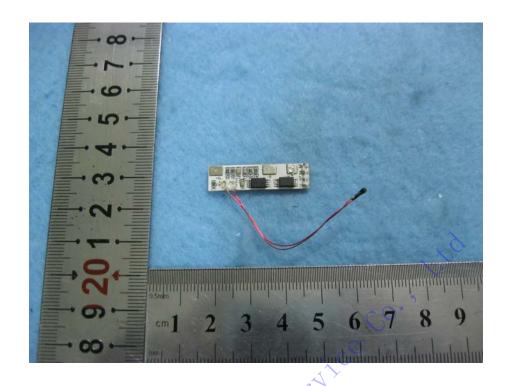


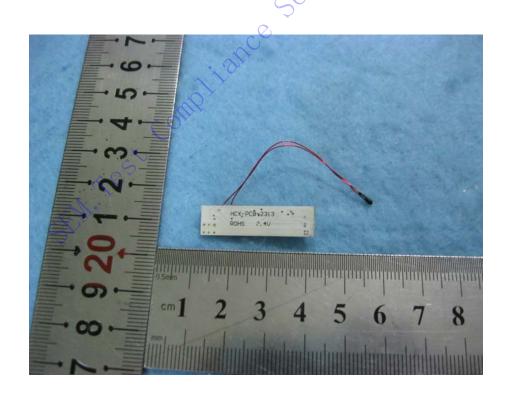












*** End of Report ***

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