



UN38.3 试验概要

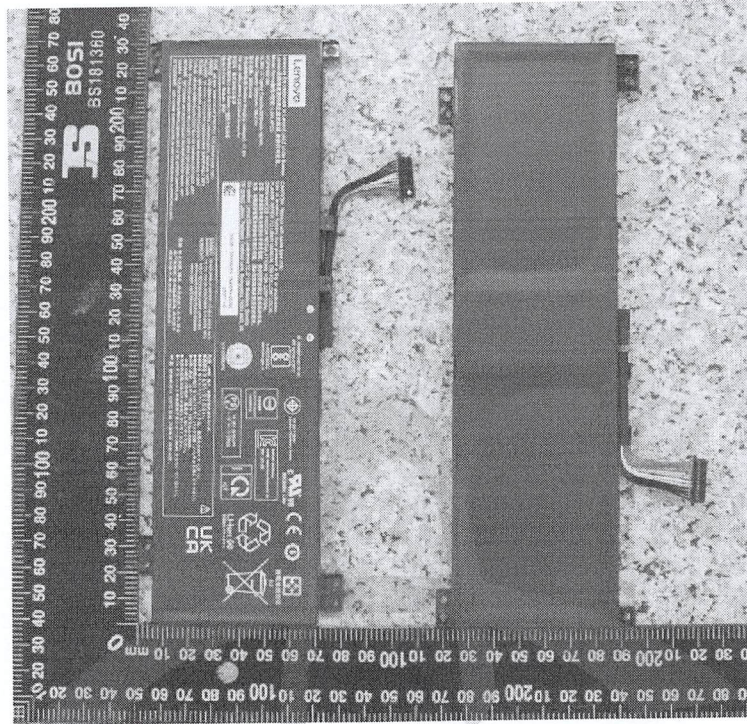
UN38.3 Test Summary



单位信息 Company information			
委托单位 Consignor	乐金化学(南京)信息电子材料有限公司 LG Chem(Nanjing) I&E Materials Co.,Ltd 南京经济技术开发区恒谊路 17 号 NO 17 HENGYI RD NANJING ECONOMICAL & TECHNICAL DEVELOPMENT ZONE 025-85603000 zhanghonglu@lgchem.com www.lgchem.com		
生产单位 Manufacturer	南京莱斯康电子有限公司 Nan Jing Nexcon Electronics Co.,Ltd 南京经济技术开发区栖霞街道刀枪河路 11 号 No.11, Daoqianghe Road, Economic & Technical Development Zone East Side, Qixia Area, Nanjing City, Jiangsu Province, China 15895891460 caolijun132x@nexcontech.net http://www.nexcontech.com/		
测试单位 Test lab	乐金化学(南京)信息电子材料有限公司 LG Chem(Nanjing) I&E Materials Co.,Ltd 南京经济技术开发区恒谊路 17 号 NO 17 HENGYI RD NANJING ECONOMICAL & TECHNICAL DEVELOPMENT ZONE 025-85603000 zhanghonglu@lgchem.com www.lgchem.com		
电池信息 Battery information			
名称 Name	锂离子电池	品牌 Brand	/
型号 Type	L20L4PC0	原始测试型号 Original tested type	/
标称电压(V) Nominal voltage	15.36	容量/能量 Capacity/energy	Rated:3810mAh 58.5Wh Typical:3910mAh 60Wh
描述 Description	可充电锂离子电池组 Rechargeable Li-ion battery	锂含量(g) Li content	/
质量(kg) Mass	0.248	外观 Appearance	黑色塑胶及塑料薄膜外壳 Black plastics cement and plastics film shell
测试信息 Test information			
原报告编号 Original test report No.	QDI-201103-B-L20L4PC0	测试报告日期 Date of test report	2020-11-03
测试标准 Test standard	联合国《关于危险货物运输的建议书 试验和标准手册》第 38.3 章 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria 38.3 ST/SG/AC.10/11/Rev.6/Amendment.1		
T.1 高度模拟 Altitude simulation	合格 Passed	T.2 温度测试 Thermal test	合格 Passed
T.3 振动测试 Vibration	合格 Passed	T.4 冲击测试 Shock	合格 Passed
T.5 外部短路 External short circuit	合格 Passed	T.6 挤压 Crush	合格 Passed
T.7 过度充电 Overcharge	合格 Passed	T.8 强制放电 Forced discharge	合格 Passed
38.3.3 (f)	/	38.3.3 (g)	/

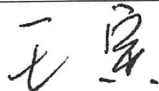


样品图片 Sample Picture



Lenovo is the trademark of Lenovo, used under license.
 Lenovo是联想集团所属企业的商标, 根据许可使用。
 Model Name 型号/型號: L20L4PC0
 4ICP4/62/100
 15.36V = Typical Capacity 3910mAh / 60Wh,
 Rated Capacity 3810mAh / 58.5Wh
 额定容量: 3810mAh
 充电限制电压 (limited charging voltage): 17.6V
 For use with Lenovo personal computer
 制造商: 株式会社LG化学
 Rechargeable Li-ion Battery / 锂离子电池组
 Made in China 制造地: 中国



结论 Conclusion	测试样品符合联合国《关于危险货物运输的建议书试验和标准手册》ST/SG/AC.10/11/Rev.6/Amend.1 38.3 标准要求。The tested samples meet the requirements of test items of the UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria ST/SG/AC.10/11/Rev.6/Amend.1 38.3	
备注 Remark	/	
签名 Signature 职务 Title	 王寅 副总工程师 Vice chief engineer	签发日期 Issued date 2020-11-10 

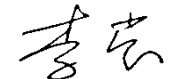
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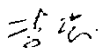
报告结束

UN38.3 Test Summary

Manufacturer's contact information	LG Chem, Ltd. 128 Yeoui-Daero, Yeongdeungpo-gu, SEOUL, 150-721, REPUBLIC OF KOREA Telephone : +82-10-7742-5427 E-mail : kkammy@lgchem.com Website : www.lgchem.com		
Test Laboratory information	LG Chem, Ltd. / RESEARCH PARK 188 Munjiro, Yuseong-gu, Daejeon, 305-738, REPUBLIC OF KOREA Telephone : +82-10-3099-3724 E-mail : juhongpark@lgchem.com Website : www.lgchem.com		
	LG Chem (Nanjing) I&E Materials Co., Ltd NO.17 Hengyi Road, Nanjing Economic & Technological Development Zone, Nanjing, Jiangsu, China Telephone : +86-025-85603000-8231 E-mail : njliying@lgchem.com Website : www.lgchem.com		
Description		List of Test Completed	
Cell/Battery Type (Physical Description)	Lithium Ion battery pack (Pouch)	Revised edition	Revision 6 Amendment 1
Test Report Number	QDI-201103-B-L20L4PC0	Test 1. Altitude Simulation	Pass
Date of test report	2020.11.03	Test 2. Thermal Test	Pass
Model name	L20L4PC0	Test 3. Vibration	Pass
Nominal voltage (V)	15.36	Test 4. Shock	Pass
Capacity (Min Wh)	58.50	Test 5. External Short Circuit	Pass
Weight (g)	247.10	Test 6. Impact or Crush	Pass
Dimensions (mm)	229.20X65.15x8.60	Test 7. Overcharge	Pass
Reference to assembled battery testing requirements	Not applicable	Test 8. Forced Discharge	Pass

Approved By: Ying Li
 Team Leader
 Cyl NPI&CE lab part DQA Team
 LG Chem, Ltd.
 E-mail: njliying@lgchem.com



Document Number	QDI-201103-B-L20L4PC0	
Prepared	Jie Ma	
Approved	Ying Li	

UN38.3 Test Report

- L20L4PC0 (Min.58.50Wh, 15.36V)-

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3. Sample Image

2020. 11. 03



1. UN38.3 Test Condition

Rev.6 Amendment 1

Test item	Test Condition	Requirements	Etc.
Test 1. Altitude Simulation	Storing at (low pressure) 11.6kPa for 6hr at 20+/-5°C	- After OCV (%) ≥ 90% - No leakage, no venting, no disassembly, no rupture, no fire - Mass loss limit (leakage) 1) If M<1g, less than 0.5%, 2) If 1g≤M≤75g, less than 0.2%, 3) If M>75g, less than 0.1%	T1~T5 : Sequence Tests <pre> graph TD T1[Test 1 Altitude Simulation] --> T2[Test 2 Thermal Test] T2 --> T3[Test 3 Vibration] T3 --> T4[Test 4 Shock] T4 --> T5[Test 5 Ext. Short Circuit] </pre>
Test 2. Thermal Test	[72±2°C, 6hr ↔ -40±2°C, 6hr, interval max. 30min] x 10 cycle Storing at 20±5°C for 24h		
Test 3. Vibration	[7Hz↔200Hz↔7Hz, in 15min] x 12 times x 3 direction 1) sinusoidal waveform with a logarithmic sweep 2) 7Hz 18Hz (maintaining 1gn) app. 50Hz (until 8gn) 200Hz (maintaining 8gn), 1.6mm total excursion		
Test 4. Shock	Half sine shock 1) Peak acceleration - For cells & single cell batteries : 150gn - For batteries (whichever is smaller) : 150gn or $\sqrt{\frac{100850}{Mass(kg)}} gn$ 2) Pulse duration : 6msec 3) 6 direction (±x, y, z) x 3 cycle		
Test 5. External Short Circuit	1) Samples to be heated to 57±4°C in chamber (Measured on external case) 2) Less than 0.1Ω, ext. short-circuit at 57±4°C 3) 1hr continue after returning to 57±4°C		
Test 6. Impact	Φ=15.8±0.1mm bar, 9.1±0.1kg mass, 61±2.5cm height	- No disassembly, no fire within 6 hours after the test - Max. Temp ≤ 170°C	for cylindrical cells (dia ≥ 18mm)
Test 6. Crush	Crushing rate : 1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation		for cylindrical cells (dia < 18mm) for prismatic, pouch, coin/button cells
Test 7. Overcharge	Current = Manufacturer's recommended max. continuous charge current X 2 Voltage 1. If charge voltage ≤ 18V, V (min.) = 2 x (max. charge voltage) or 22V. 2. If charge voltage > 18V, V (min.) = 1.2 x (max. charge voltage)	- No disassembly, no fire within 7 days after the test	Only for Single Cell Battery / Battery
Test 8. Forced Discharge	Discharge at max. discharge current (connecting in series with 12V DC power supply), Duration time = rated capacity/initial test current	- No disassembly, no fire within 7 days after the test	Resistance of Electric Loader $R_t = \frac{12V + V_c}{Max\ discharge\ current}$ - Rc-Rw

2-1. T1-T4 Test Result

Before			Altitude (T1)					Thermal (T2)					Vibration (T3)					Shock (T4)				
NO.	OCV	Mass (g)	After OCV (V)	Mass (g)	After OCV(%)	Mass Loss(%)	Result	After OCV (V)	Mass (g)	After OCV(%)	Mass Loss(%)	Result	After OCV (V)	Mass (g)	After OCV(%)	Mass Loss(%)	Result	After OCV (V)	Mass (g)	After OCV(%)	Mass Loss(%)	Result

A. 1st cycle fully charged state

1	17.1447	246.96	17.1373	246.94	99.96	0.008	Pass	16.8111	246.91	98.10	0.012	Pass	16.8031	246.92	99.95	0.000	Pass	16.8006	246.90	99.99	0.008	Pass
2	17.1482	246.94	17.1416	246.92	99.96	0.008	Pass	16.8131	246.90	98.08	0.008	Pass	16.8053	246.91	99.95	0.000	Pass	16.8041	246.89	99.99	0.008	Pass
3	17.1503	246.93	17.1431	246.93	99.96	0.000	Pass	16.8149	246.89	98.09	0.016	Pass	16.8097	246.90	99.97	0.000	Pass	16.8085	246.87	99.99	0.012	Pass
4	17.1529	247.06	17.1457	247.06	99.96	0.000	Pass	16.8155	247.01	98.07	0.020	Pass	16.8108	247.01	99.97	0.000	Pass	16.8093	247.04	99.99	0.000	Pass

B. 25th cycle fully charged state

5	17.1691	247.10	17.1633	247.09	99.97	0.004	Pass	16.8445	247.05	98.14	0.016	Pass	16.7589	247.05	99.49	0.000	Pass	16.6175	247.04	99.16	0.004	Pass
6	17.1659	247.06	17.1605	247.05	99.97	0.004	Pass	16.8332	247.02	98.09	0.012	Pass	16.7463	247.02	99.48	0.000	Pass	16.5975	247.02	99.11	0.000	Pass
7	17.1695	247.00	17.1638	246.99	99.97	0.004	Pass	16.8372	246.96	98.10	0.012	Pass	16.8318	246.96	99.97	0.000	Pass	16.6660	246.95	99.01	0.004	Pass
8	17.1564	246.54	17.1497	246.52	99.96	0.008	Pass	16.8240	246.49	98.10	0.012	Pass	16.7244	246.50	99.41	0.000	Pass	16.5680	246.48	99.06	0.008	Pass

2-2. T5/T7 Test Result

EXT.Short Circuit (T5)			
NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle fully charged state

1	16.8006	58.48	Pass
2	16.8041	59.02	Pass
3	16.8085	57.84	Pass
4	16.8093	58.57	Pass

B. 25th cycle fully charged state

5	16.6175	58.44	Pass
6	16.5975	58.43	Pass
7	16.6660	57.70	Pass
8	16.5680	57.90	Pass

Over Charge (T7)			
NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle fully charged state

9	17.1571	25.72	Pass
10	17.1481	25.65	Pass
11	17.1529	25.62	Pass
12	17.1594	25.42	Pass

Over Charge (T7)			
NO.	Initial OCV(V)	Max. Temp (°C)	Result

B. 25th cycle fully charged state

13	17.1625	25.48	Pass
14	17.1706	25.22	Pass
15	17.1630	25.38	Pass
16	17.3999	25.15	Pass

2-3. T6/T8 Test Result (P3862A0A1)

Crush (T6)			
NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle 50% charged state

C-1	3.872	21.44	Pass
C-2	3.873	21.64	Pass
C-3	3.872	21.66	Pass
C-4	3.871	21.73	Pass
C-5	3.872	21.60	Pass

B. 25st cycle 50% charged state

C-6	3.873	21.67	Pass
C-7	3.874	21.55	Pass
C-8	3.873	21.52	Pass
C-9	3.873	21.60	Pass
C-10	3.873	21.49	Pass

Forced Discharge (T8)							
NO.	Initial OCV(V)	Max. Temp (°C)	Result	NO.	Initial OCV(V)	Max. Temp (°C)	Result

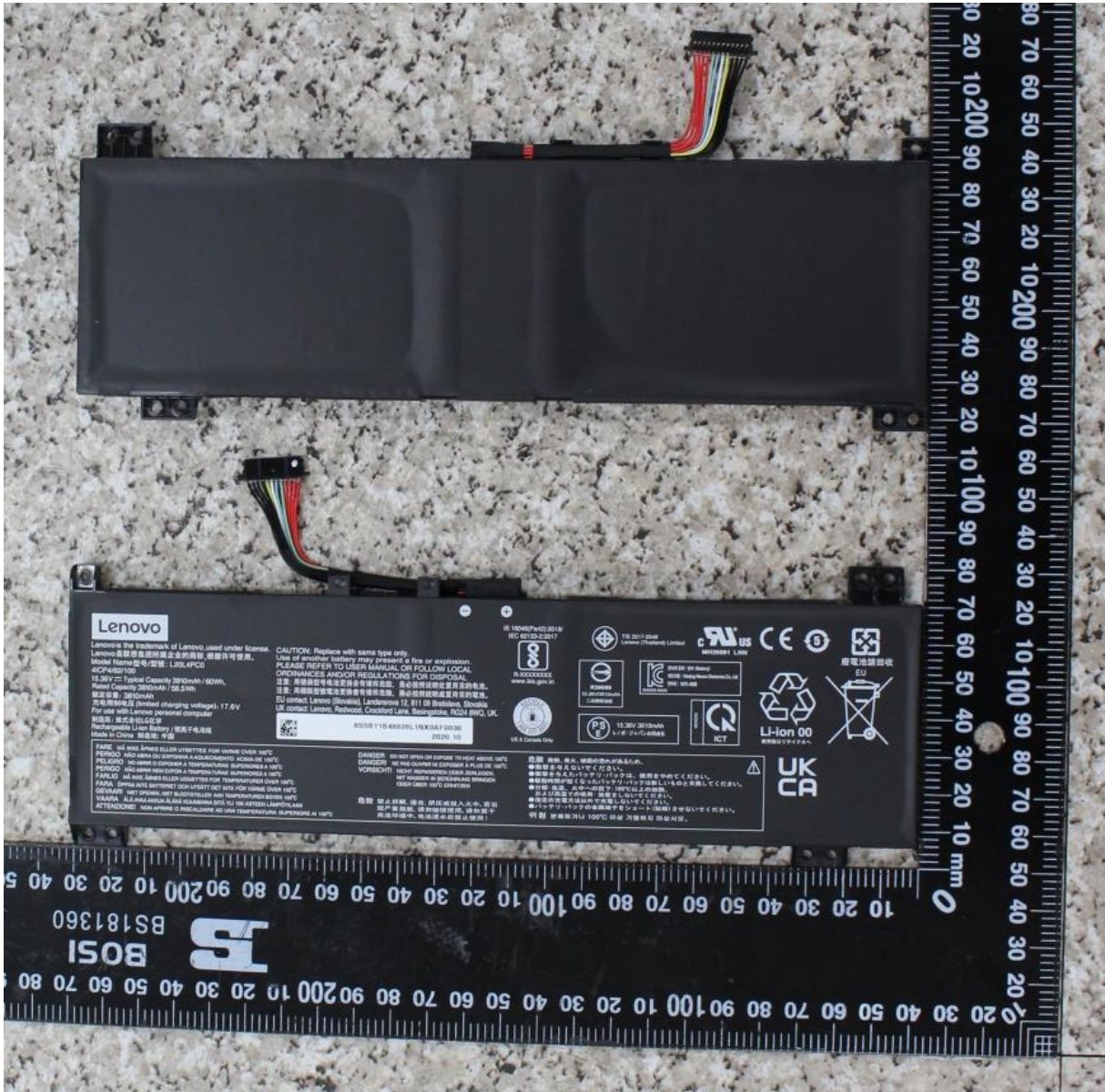
A. 1st cycle fully discharged state

C-6	3.331	72.41	Pass
C-7	3.299	77.24	Pass
C-8	3.360	76.70	Pass
C-9	3.349	74.13	Pass
C-10	3.346	69.46	Pass
C-11	3.341	79.04	Pass
C-12	3.344	76.74	Pass
C-13	3.355	77.49	Pass
C-14	3.366	76.14	Pass
C-15	3.371	73.32	Pass

B. 25th cycle fully discharged state

C-16	3.322	78.73	Pass
C-17	3.316	81.89	Pass
C-18	3.314	88.44	Pass
C-19	3.320	72.88	Pass
C-20	3.320	89.78	Pass
C-21	3.322	84.20	Pass
C-22	3.324	86.84	Pass
C-23	3.319	80.51	Pass
C-24	3.314	88.70	Pass
C-25	3.317	75.45	Pass

3. Sample Image



Document Number	QDI-201104-B-L20L4PC0-D2	
Prepared	Jie Ma	
Approved	Ying Li	

1.2m Drop Test Report

-L20L4PC0 (Min. 58.50Wh, 15.36V) -

2020. 11. 04



1.2m Drop Test Report

A. Test Information

Standard requirement or The Clause Number of Standard	Test Condition	Requirement
UNITED NATIONS “Recommendations on the TRANSPORT OF DANGEROUS GOODS” Model Regulations(18 th) special provisions 188	1.2m Box Drop - 1st drop : corner - 2nd drop : flat on the bottom - 3rd drop : flat on the top - 4th drop : flat on the long side - 5th drop : flat on the short side 	Without ; - Damage to cells or batteries contained therein - Shifting of the contents so as to allow battery to battery (or cell to cell) contact - Release of contents

B. Box Information

Dimensions	375 X275 X155 mm	Battery Quantity	24 pcs/Box
Gross weight	7.300 kg	Net Weight of Batteries	5.927 kg

C. Image

Image-1	Image-2
	

D. Test Result

Result	Result Detail
PASS	The box was not cracked, the contents were not damaged and not shifted.