UN/DOT 38.3

UN 38.3 Test Summary Report for Lithium Batteries

UN38.3 PASSED
Transport Safety Certified

ELERIX EX-L550P

[a] ☐ Cell ☒ Battery ☐ Product || ☒ Tested Type Part #: GFB71173200 || ☒ Same Type Part #: EX-L550P

Lithium Iron Phosphate Battery

Lithium Cell or Battery Test Summary in Accordance with Section 2.9.4 UN Model Regulations and Sub-section 38.3 of the UN Manual of Tests and Criteria, Part III, subsection 38.3.5

TEST RESULT: **PASSED**

[b] **Applicant**	**ELERIX LTD**
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	www.elerix.com

EU Representative	**GIWAL LTD, o.z.**
	Sterboholska 1404/104, 102 00 Praha 10 Czech Republic, EU
	www.giwal.com

[c] Certified Laboratory	**Shenzhen CCJC Technology Co., Ltd -** Add:1-3/F.,Building 101, No.135-3, Shasong Road, Houting, Shajing Street, Bao'an District, Shenzhen, Guangdong, China		
[d] Test Report No/ID.	**CCJC2021A350401**	**[e] Date of issue**	2021-10-12
Test Results	PASSED	**Validity**	Permanent
[i] Tested According To:	ST/SG/AC.10/11/Rev.7/Section 38.3 UN Manual of Tests and Criteria, Part III, sub-section 38.3. third revised edition, am. 1		
[h] Battery assembly	☒ Not Applicable. ☐ UN38.3.3 (f) ☐ UN38.3.3 (g)		

ELERIX

[j] Signatory
Issued: 2021/12/13

Kurt Sanders

Chief Technology Officer

APPLICANT	ELERIX LTD
	Enterprise House 2 Pass Street, Oldham, Manchester, United Kingdom, OL9 6HZ
	www.elerix.com
BRAND	**ELERIX (OEM)**
[f] (iv) DESCRIPTION / MODEL	**EX-L550P**
[f] (v)	**☐ Cell ☒ Battery ☐ Product**
[f] (i) Chemistry	**Li-metal (Li-Fe)**
Nominal Voltage	**3.2 V**
Nominal Capacity	**550 Ah**
[f] (iii) Nominal Energy – Watthour rating	**1760 Wh**
[f] (ii) Nominal Weight – Mass (g)	**11230 g**

TEST DATA RESULTS	
[g] List of Tests Conducted - Test Report ID	**CCJC2021A350401**
38.3.4.1 - T1 – Altitude Simulation (Primary and Secondary Cells and Batteries) Low pressure testing that simulates unpressurized airplane cargo area at 15,000-meter altitude. After storing batteries at 11.6kPa for >6 hours, these criteria shall be met: no mass loss, leaking, venting, disassembly, rupture or fire, and voltage within 10% of pre-test voltage.	**PASSED**
38.3.4.2 - T2 – Thermal Test (Primary and Secondary Cells and Batteries) Test covers changes in temperature extremes from -40C to +75C. Batteries are stored for 6 hours at -40C (12 hours for large cells/batteries), then 6 hours at +75C (12 hours for large cells/batteries), for a total of 10 cycles.	**PASSED**
38.3.4.3 - T3 – Vibration (Primary and Secondary Cells and Batteries) Test simulates vibration during transportation. Test is a Sine Sweep: 7Hz – 200Hz – 7Hz in 15 Minutes; 12 Sweeps (3 hours); 3 mutually perpendicular axes.	**PASSED**
38.3.4.4 - T4 – Shock (Primary and Secondary Cells and Batteries) Test also simulates vibration during transportation. Test is a Half-Sine pulse: 150G/6ms for small cells/batteries; 50G/11ms for large cells/batteries; 3 pulses per direction; 6 directions (+/-z, +/-x, +/-y).	**PASSED**
38.3.4.5 - T5 – External Short Circuit (Primary and Secondary Cells and Batteries) This test simulates an external short to the terminals of the cell or battery. At temperature of +55C, apply short circuit (<0.1ohm) across terminals. Maintain at least an hour after sample temperature returns to +55 +/-2°C. Pass criteria are: Case temperature does not exceed +170°C and no disassembly, rupture, or fire within 6 hours of test. Fuse, current limiting circuit, and venting mechanism activation are allowable.	**PASSED**
38.3.4.5 - T6 – Impact (Primary and Secondary Cells) This test is only applicable to primary and secondary cells. For cylindrical cells >20mm diameter, it simulates impact to case of cell.	**PASSED**
38.3.4.5 - T7 – Overcharge (Secondary Batteries) This test is for secondary or rechargeable batteries only. It simulates an overcharge condition on a rechargeable battery: 2x the manufacturer's recommended charge current for 24 hours. Then battery shall be monitored for 7 days for fire or disassembly.	**N/A**
38.3.4.5 - T8 – Forced Discharge (Primary and Secondary Cells) This testing simulates a forced discharge condition for primary and secondary cells only.	**PASSED**
SUMMARY OF PERFORMED TESTS	**ALL PASSED**

PHOTOS OF PRODUCTS AND SAMPLES

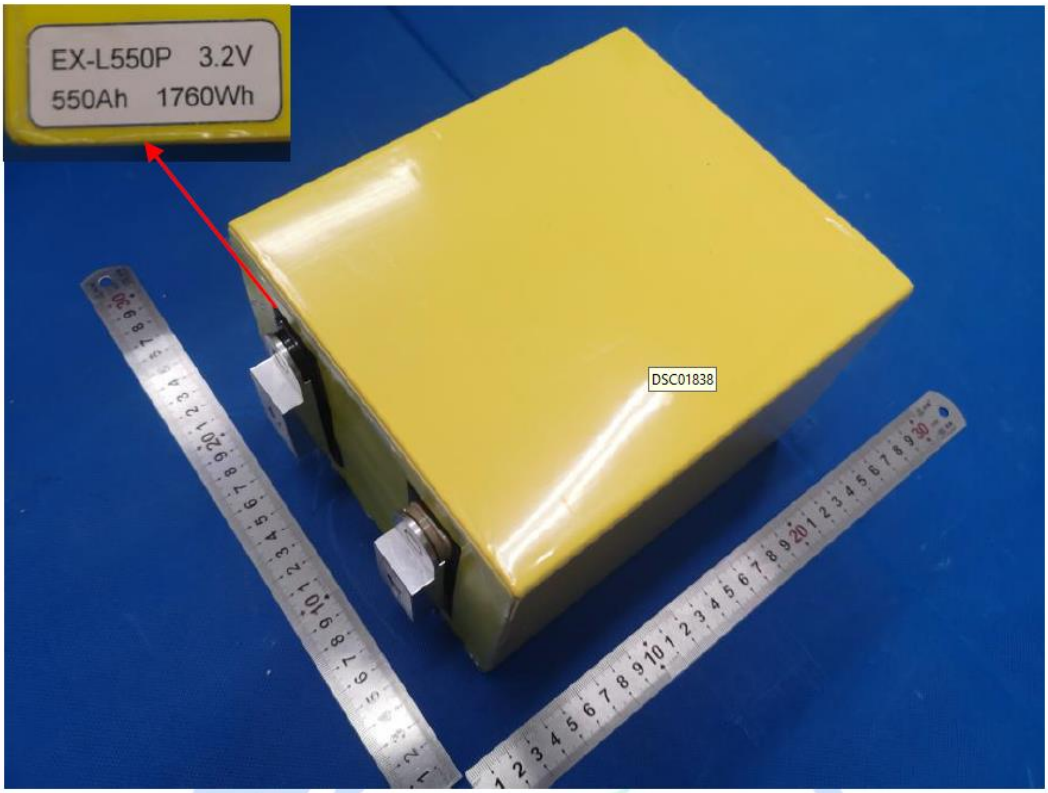

Fig. 1 – Front view of Battery

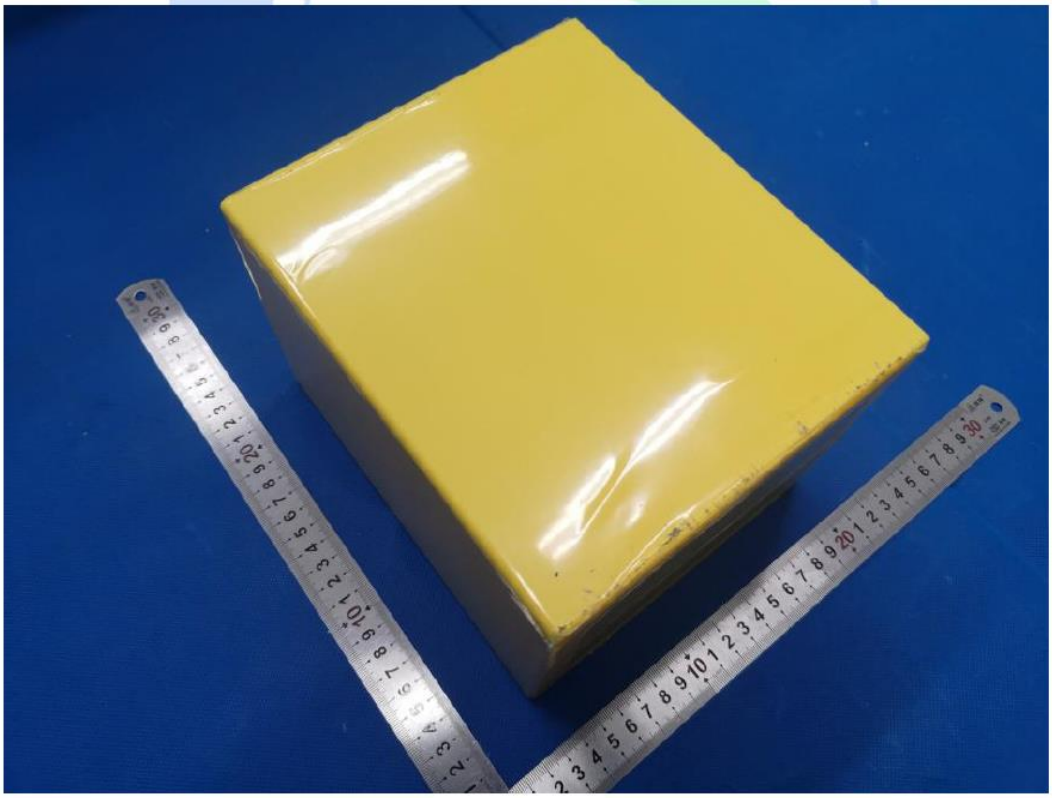

Fig.2 – Back view of Battery

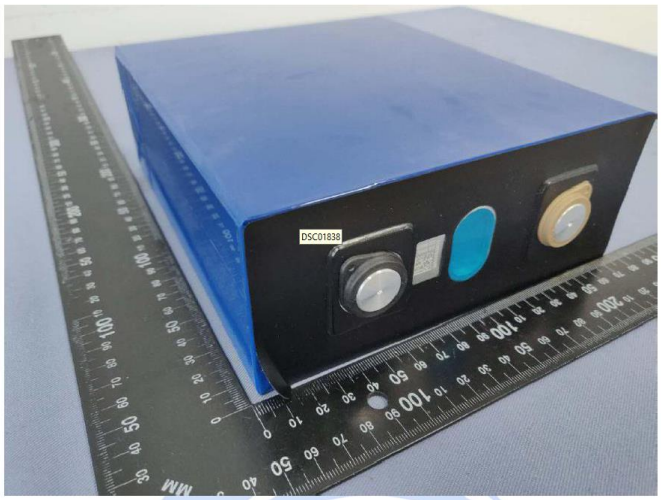

Fig. 3 – Front view of Cell

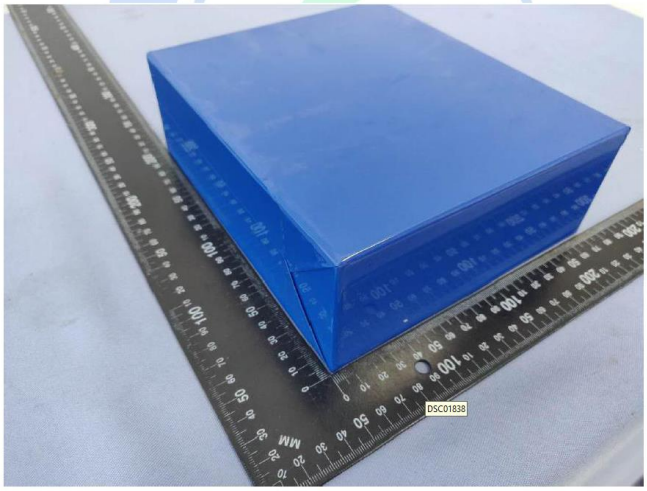

Fig.4 – Back view of Cell

TECHNICAL SUMMARY OF THE TEST DATA

表 1 Table 1	高度模拟 Altitude simulation						
样品编号 Sample No	测试前 Before		测试后 After		质量损失 Mass loss (%)	电压损失 Voltage loss (%)	测试结果 Test result
	电池质量 m_1 (kg)	开路电压 V_1 (V)	电池质量 m_2 (kg)	开路电压 V_2 (V)			
B01	11.208	3.48	11.207	3.47	0.009	0.29	P
B02	11.212	3.47	11.211	3.47	0.009	0.00	P
B03	11.224	3.48	11.223	3.47	0.009	0.29	P
B04	11.219	3.48	11.218	3.47	0.009	0.29	P
B05	11.241	3.48	11.240	3.48	0.009	0.00	P
B06	11.235	3.47	11.234	3.46	0.009	0.29	P
B07	11.228	3.46	11.227	3.46	0.009	0.00	P
B08	11.215	3.47	11.214	3.46	0.009	0.29	P

表 2 Table 2	温度试验 Thermal test						
样品编号 Sample No	测试前 Before		测试后 After		质量损失 Mass loss (%)	电压损失 Voltage loss (%)	测试结果 Test result
	电池质量 m_1 (kg)	开路电压 V_1 (V)	电池质量 m_2 (kg)	开路电压 V_2 (V)			
B01	11.207	3.47	11.204	3.43	0.027	1.15	P
B02	11.211	3.47	11.208	3.42	0.027	1.44	P
B03	11.223	3.47	11.220	3.43	0.027	1.15	P
B04	11.218	3.47	11.214	3.42	0.036	1.44	P
B05	11.240	3.48	11.237	3.43	0.027	1.44	P
B06	11.234	3.46	11.231	3.42	0.027	1.16	P
B07	11.227	3.46	11.224	3.42	0.027	1.16	P
B08	11.214	3.46	11.210	3.41	0.036	1.45	P

表 3 Table 3	振动 Vibration						
样品编号 Sample No	测试前 Before		测试后 After		质量损失 Mass loss (%)	电压损失 Voltage loss (%)	测试结果 Test result
	电池质量 m_1 (kg)	开路电压 V_1 (V)	电池质量 m_2 (kg)	开路电压 V_2 (V)			
B01	11.204	3.43	11.204	3.43	0.000	0.00	P
B02	11.208	3.42	11.208	3.42	0.000	0.00	P
B03	11.220	3.43	11.219	3.43	0.009	0.00	P
B04	11.214	3.42	11.214	3.41	0.000	0.29	P
B05	11.237	3.43	11.237	3.43	0.000	0.00	P
B06	11.231	3.42	11.231	3.42	0.000	0.00	P
B07	11.224	3.42	11.223	3.42	0.009	0.00	P
B08	11.210	3.41	11.210	3.40	0.000	0.29	P

表 4 Table 4	冲击 Shock						
样品编号 Sample No	测试前 Before		测试后 After		质量损失 Mass loss (%)	电压损失 Voltage loss (%)	测试结果 Test result
	电池质量 m_1 (kg)	开路电压 V_1 (V)	电池质量 m_2 (kg)	开路电压 V_2 (V)			
B01	11.204	3.43	11.204	3.43	0.000	0.00	P
B02	11.208	3.42	11.208	3.42	0.000	0.00	P
B03	11.219	3.43	11.219	3.43	0.000	0.00	P
B04	11.214	3.41	11.214	3.41	0.000	0.00	P
B05	11.237	3.43	11.236	3.43	0.009	0.00	P
B06	11.231	3.42	11.231	3.41	0.000	0.29	P
B07	11.223	3.42	11.223	3.42	0.000	0.00	P
B08	11.210	3.40	11.210	3.40	0.000	0.00	P

表5 Table5	外部短路 External short circuit							
样品编号 Sample No	B01	B02	B03	B04	B05	B06	B07	B08
温度 (°C) Temp (°C)	58.4	58.5	58.2	58.1	58.4	58.3	58.2	58.0

表 6 Table6	挤压 Crush									
样品编号 Sample No	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10
试验前电压(V) OCV prior to test	3.29	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
温度 (°C) Temp (°C)	23.2	22.9	23.1	23.3	23.3	23.2	22.9	23.4	23.2	23.3

表 8 Table 8	强制放电 Forced discharge									
样品编号 Sample No	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20
试验前电压(V) OCV prior to test	2.96	2.98	3.01	3.02	2.98	3.02	3.00	3.02	3.00	3.01
样品编号 Sample No	C21	C22	C23	C24	C25	C26	C27	C28	C29	C30
试验前电压(V) OCV prior to test	3.01	2.98	2.96	2.94	2.93	2.92	2.97	2.93	3.02	3.01

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