EMC TEST REPORT

Radio Frequency Devices - Unintentional Radiators

Test Report No. .....:	TCT220228E011	
Date of issue .....:	Mar. 07, 2022	
Testing laboratory.....:	SHENZHEN TONGCE TESTING LAB	
Testing location/ address.....:	TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China	
Applicant's name .....:	Shenzhen Tianlihe Technology Co., Ltd	
Address.....:	2 F102 and 5 F, 3 Building, Tianhao Industrial Park, Songbai Road 2852, Shiyan Street Longteng Community, Bao'an District, Shenzhen	
Manufacturer's name .....:	Shenzhen Tianlihe Technology Co., Ltd	
Address.....:	2 F102 and 5 F, 3 Building, Tianhao Industrial Park, Songbai Road 2852, Shiyan Street Longteng Community, Bao'an District, Shenzhen	
Standard(s) .....:	FCC 47 CFR Part 15 Subpart B	
Test item description.....:	Lithium Ion Battery	
Trade Mark.....:	N/A	
Model/Type reference .....:	4S-WHDL	
Rating(s) .....:	DC 14.8 V, 2600 mAh, 38.48 Wh	
Date of receipt of test item.....:	Feb. 28, 2022	
Date (s) of performance of test:	Feb. 28, 2022- Mar. 07, 2022	
Tested by (+signature).....:	Mark ZHANG	Mark Zhang
Check by (+signature) .....:	Howie LYU	Howie LYU
Approved by (+signature) .....:	Tomsin	Tomsin

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1. General Product Information

1.1. EUT description

Test item description ..... :	Lithium Ion Battery
Model/Type reference ..... :	4S-WHDL
Rating(s) ..... :	DC 14.8 V, 2600 mAh, 38.48 Wh
Highest internal frequency F_x..... :	☒ *Fx* ≤ 108 MHz ☐ 108 MHz < *Fx* ≤ 500 MHz ☐ 500 MHz < *Fx* ≤ 1 GHz ☐ *Fx* > 1 GHz
AC Line ..... :	☐Shielded ☐Unshielded ☐Detachable ☐Un-detachable ☒No applicable ☐Length:
DC Line ..... :	☐Shielded ☐Unshielded ☐Detachable ☐Un-detachable ☒No applicable ☐Length:

1.2. Model(s) list

None.

2. Test Information

2.1.EUT operation mode(s)

Mode #	Operating mode description	Test voltage
1	Discharging	DC 14.8 V

2.2.Special accessories and auxiliary equipment

Product Type	Manufacturer	Model No.	Serial No.
/	/	/	/

2.3.Configuration of system under test

(EUT: Lithium Ion Battery)

2.4.General test conditions

Environmental reference conditions

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment.

The climatic conditions during the tests were within the following limits:

Temperature	Humidity	Atmospheric pressure
15 °C – 35 °C	30 % - 60 %	86 kPa – 106 kPa

If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.

Measurement uncertainties

Test Item	Uncertainty
Uncertainty for Disturbance voltage at the mains terminals	3.10 dB
Uncertainty for Radiated emission (30 MHz to 1 GHz)	4.56 dB
Uncertainty for Radiated emission (above 1 GHz)	4.22 dB

The overall measurement uncertainty of a measurement is defined as the range of which can be supposed that it contains the true value with a specified probability.

This probability is 95 % for the generally specified measurement uncertainty (so-called expanded measurement uncertainty).

The limits for emission measurements and the Test levels for immunity tests in the applied standards were defined taking into consideration the accuracy limits for measurement and testing equipment required by the Basic standards.

All measurement and test results of the EMC laboratory of SHENZHEN TONGCE TESTING LABfulfil the requirements for measurement uncertainties according to the standards applied.

Decision rule for statement(s) of conformity is based on accuracy method specified in Clause 4.4.3 in IEC Guide 115:2021.

3. Test Result Summary

FCC 47 CFR Part 15 Subpart B	
Requirement – Test case	**Verdict**
Classification Class (☐A ☒B)	—
Disturbance voltage at the mains terminals	N/A
Radiated emission	Pass

Test case verdicts	
- Test case does not apply to the test object ..... :	N/A
- Test object does meet the requirement ..... :	P (Pass)
- Test object does not meet the requirement ..... :	F (Fail)

4. List of Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Due
Disturbance voltage at mains terminals				
EMI Test Receiver	R&S	ESCI3	100898	2022/07/07
Line Impedance Stabilisation Newtork(LISN)	Schwarzbeck	NSLK 8126	8126453	2022/03/11
Attenuator	N/A	10dB	164080	2022/07/07
Radiated emission (30 MHz to 1 GHz)				
Broadband Antenna	Schwarzbeck	VULB9163	340	2022/09/04
EMI Test Receiver	R&S	ESIB7	100197	2022/07/07
Pre-amplifier	HP	8447D	2727A05017	2022/07/07
Radiated emission (above 1 GHz)				
Horn Antenna	Schwarzbeck	BBHA 9120 D	02372	2023/03/06
EMI Test Receiver	R&S	ESIB7	100197	2022/07/07
Pre-amplifier	SKET	LNPA_0118G-45	SK2021012102	2022/03/11

5. Test Conditions and Results

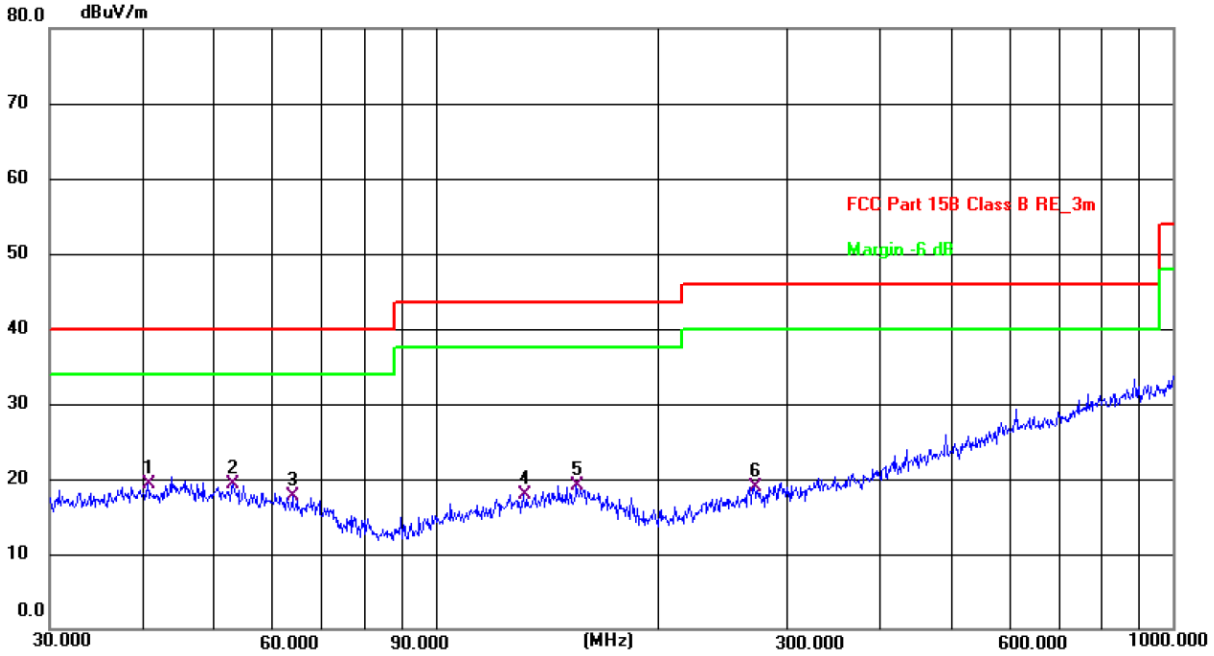
5.1. Disturbance voltage at mains terminals

Test requirement.....:	FCC 47 CFR Part 15 Subpart B		
Basic standard .....:	ANSI C63.4: 2014		
Test frequency range.:	150 kHz to 30 MHz		
Limits.....:	**Limits for Class A**		
	Frequency (MHz)	**dBµV Quasi-peak**	**dBµV Average**
	0.15 to 0.5	79	66
	0.5 to 30	73	60
	Limits for Class B		
	Frequency (MHz)	**dBµV Quasi-peak**	**dBµV Average**
	0.15 to 0.5	66 to 56	56 to 46
	0.5 to 5	56	46
	5 to 30	60	50
Test method.....:	The AMN placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment were at least 0.8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN).		
Ambient temperature.:	/		
Relative humidity.....:	/		
Test location .....:	/		
Test model(s) .....:	/		
EUT operation mode..:	/		
Test results .....:	N/A		
Remark.....:	According to the electrical construction of the EUT, there is no AC terminal incorporated. Therefore this test is not applicable for this EUT.		

5.2.Radiated emission

Test requirement.....:	FCC 47 CFR Part 15 Subpart B				
Basic standard .....:	ANSI C63.4: 2014				
Test frequency range..:	30 MHz to 40 GHz				
Limits.....:	**Frequency (MHz)**	**3 m measurement distance**			
		Quasi-peak (dBμV/m)			
		Class A		**Class B**	
	30 to 88	49		40	
	88 to 216	53.5		43.5	
	216 to 960	56.4		46	
	960 to 1000	59.5		54	
	Frequency (MHz)	**3 m measurement distance**			
		Class A		**Class B**	
		Peak (dBμV/m)	**Average (dBμV/m)**	**Peak (dBμV/m)**	**Average (dBμV/m)**
	Above 1000	79.5	59.5	74	54
Test method.....:	Measurements were made in a 3-meter semi-anechoic chamber that complies to CISPR 16. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3 meters with the receive antenna located at 1 to 4-meter height in both horizontal and vertical polarities. Final measurements (quasi-peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.				
Ambient temperature..:	25.3 °C				
Relative humidity.....:	54 %				
Test location.....:	TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China				
Test model(s) .....:	4S-WHDL				
EUT operation mode..:	Mode 1				
Test results .....:	Pass				
Remark.....:	/				

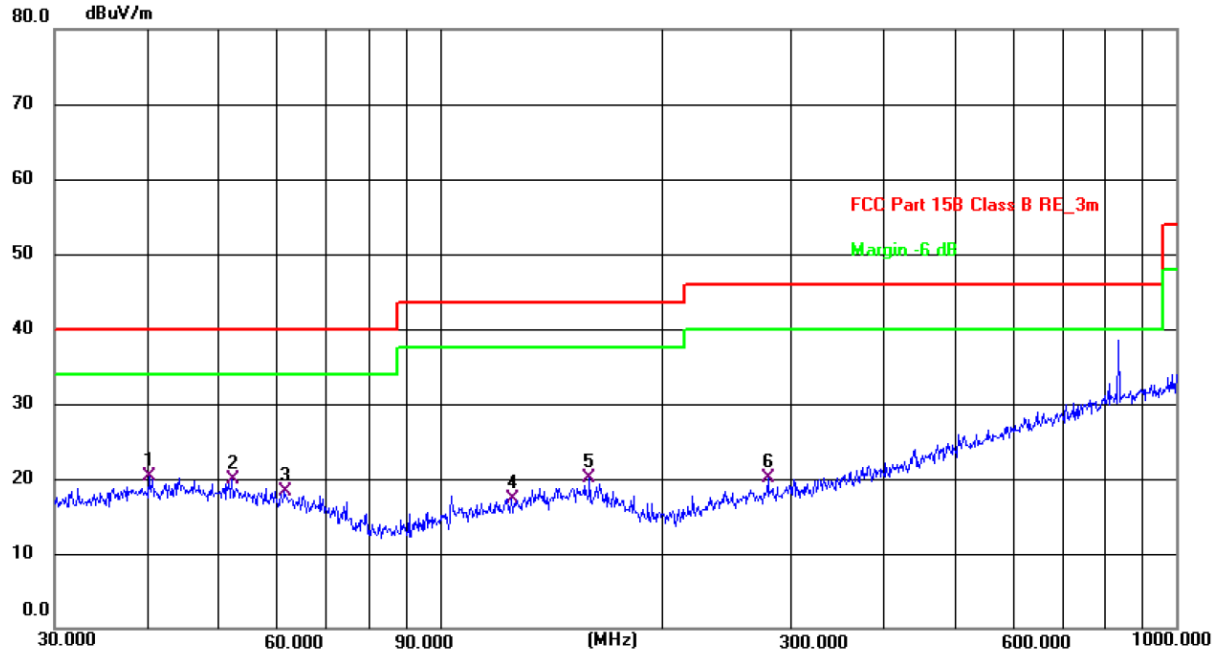
Measurement data and Graphical presentation of the result



Site #1 3m Anechoic Chamber Polarization: ***Horizontal*** Temperature: 25.3(C) Humidity: 54 %

Limit: FCC Part 15B Class B RE_3m Power: DC 14.8 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	40.7016	5.33	13.98	19.31	40.00	-20.69	QP	P	
2 *	53.1313	6.00	13.37	19.37	40.00	-20.63	QP	P	
3	63.9828	5.65	12.04	17.69	40.00	-22.31	QP	P	
4	131.7577	5.15	12.74	17.89	43.50	-25.61	QP	P	
5	155.3644	5.38	13.73	19.11	43.50	-24.39	QP	P	
6	270.3748	5.61	13.23	18.84	46.00	-27.16	QP	P	



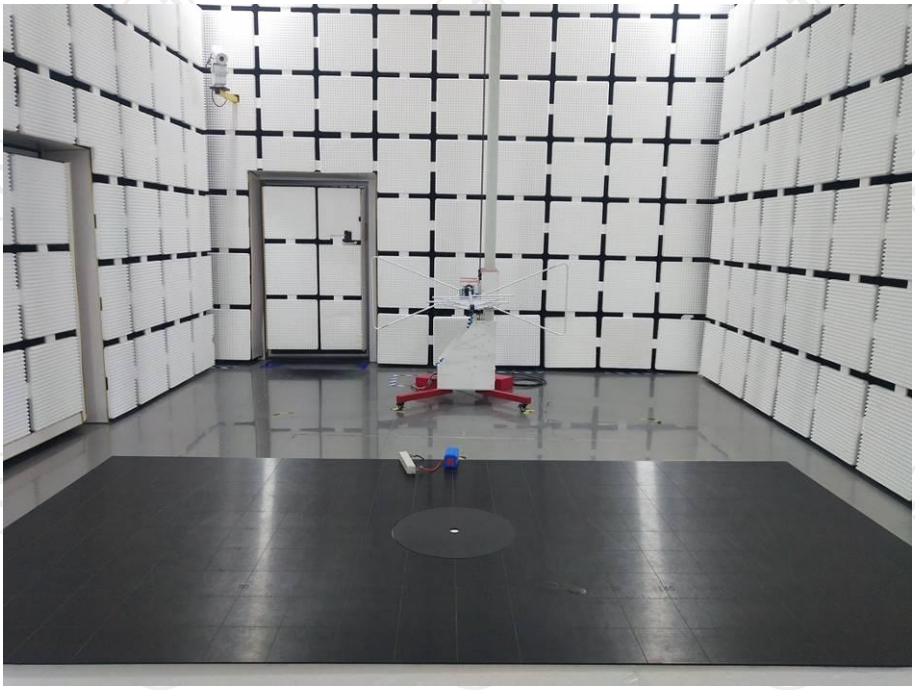
Site #1 3m Anechoic Chamber Polarization: ***Vertical*** Temperature: 25.3(C) Humidity: 54 %

Limit: FCC Part 15B Class B RE_3m Power: DC 14.8 V

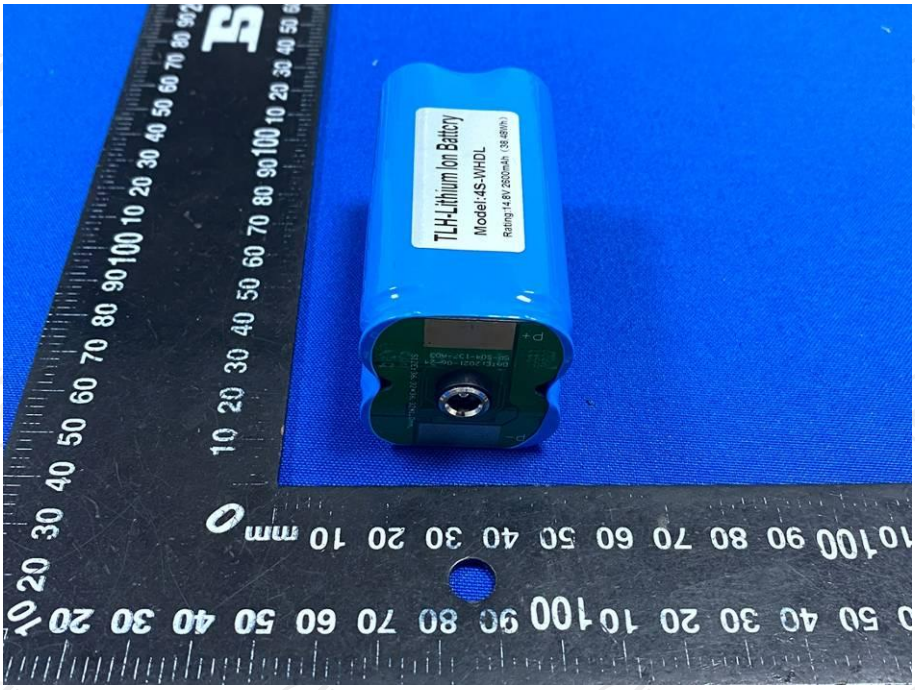
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 *	40.2757	6.34	13.99	20.33	40.00	-19.67	QP	P	
2	52.2079	6.42	13.49	19.91	40.00	-20.09	QP	P	
3	61.5618	6.03	12.34	18.37	40.00	-21.63	QP	P	
4	125.0066	4.95	12.39	17.34	43.50	-26.16	QP	P	
5	159.7844	6.15	13.88	20.03	43.50	-23.47	QP	P	
6	279.0436	6.50	13.55	20.05	46.00	-25.95	QP	P	

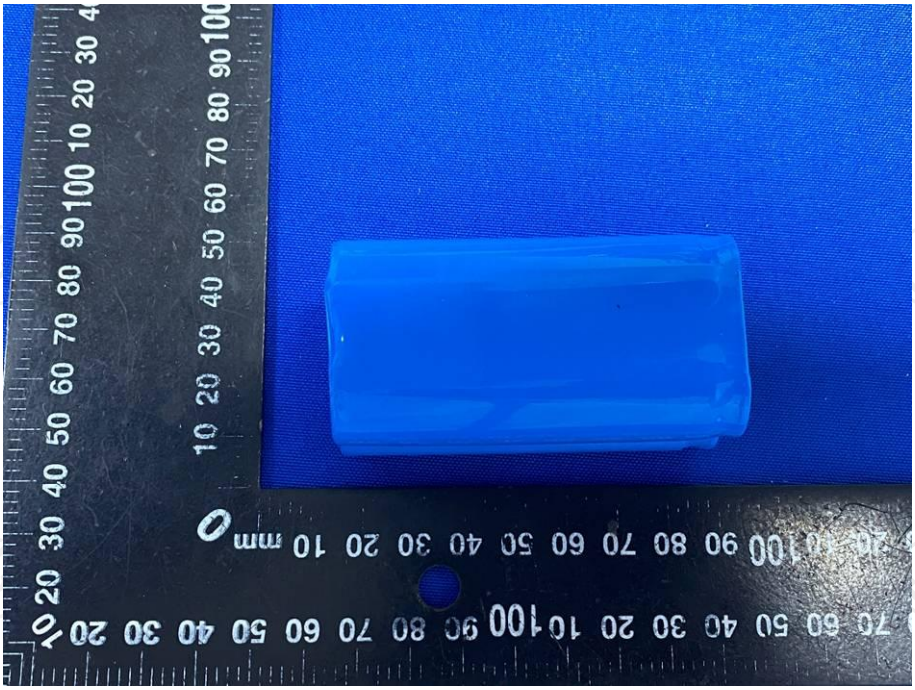
6. Test set-up photo

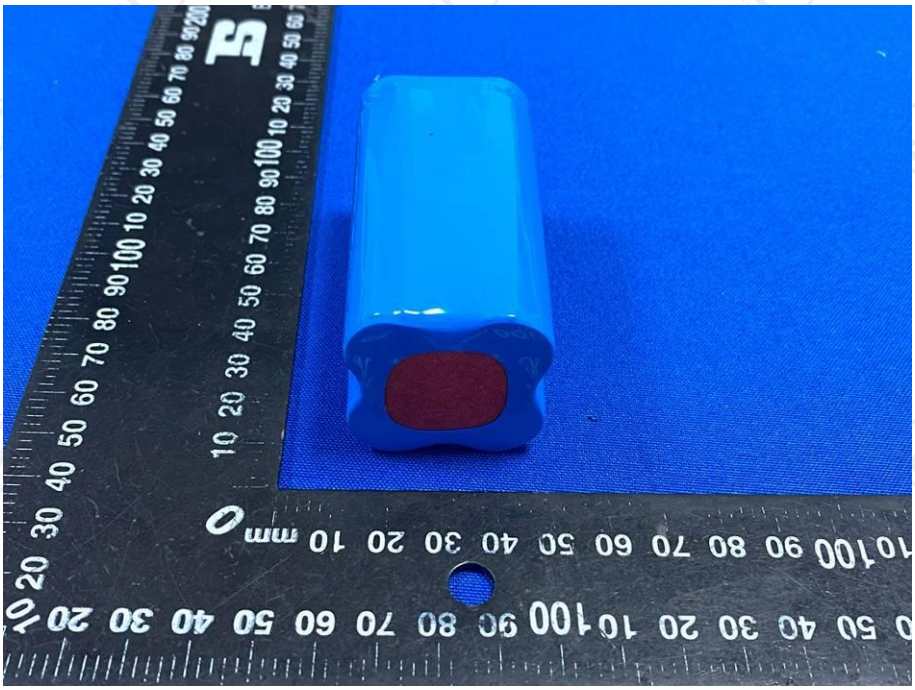
Radiated emission (30 MHz to 1 GHz) Test View



7. Photo of the EUT







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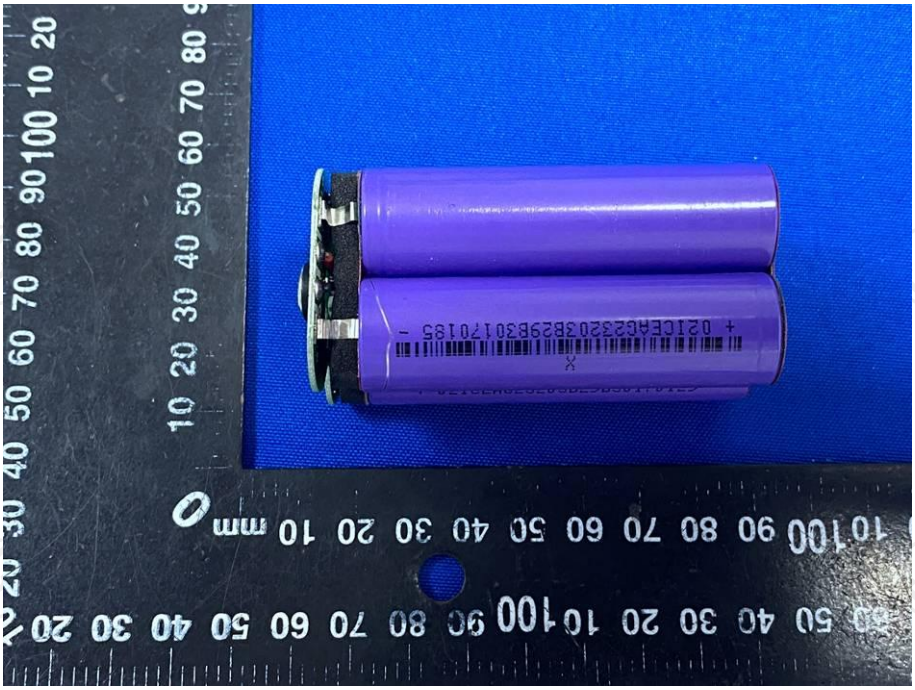

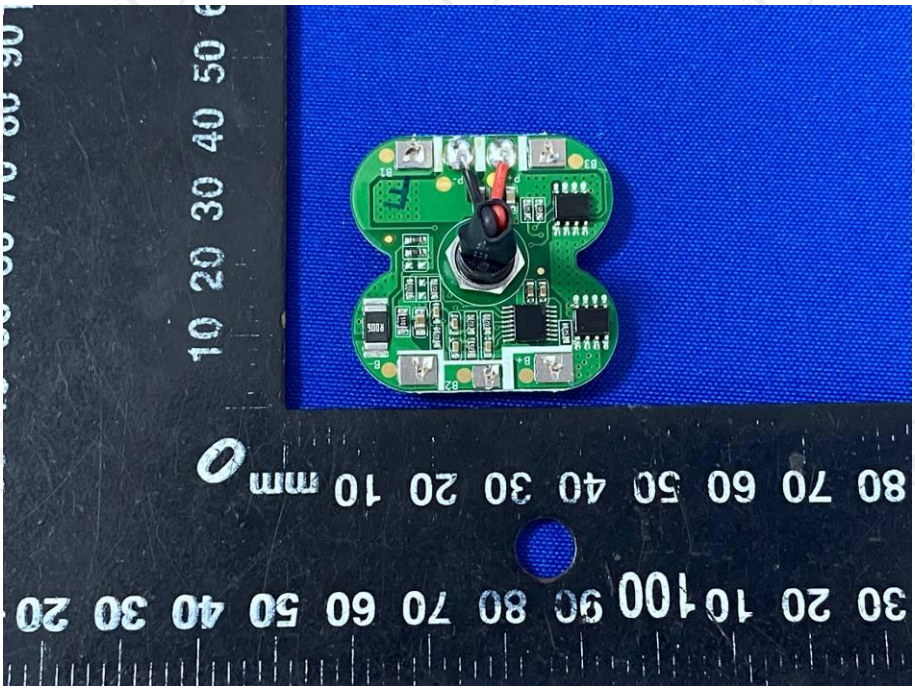

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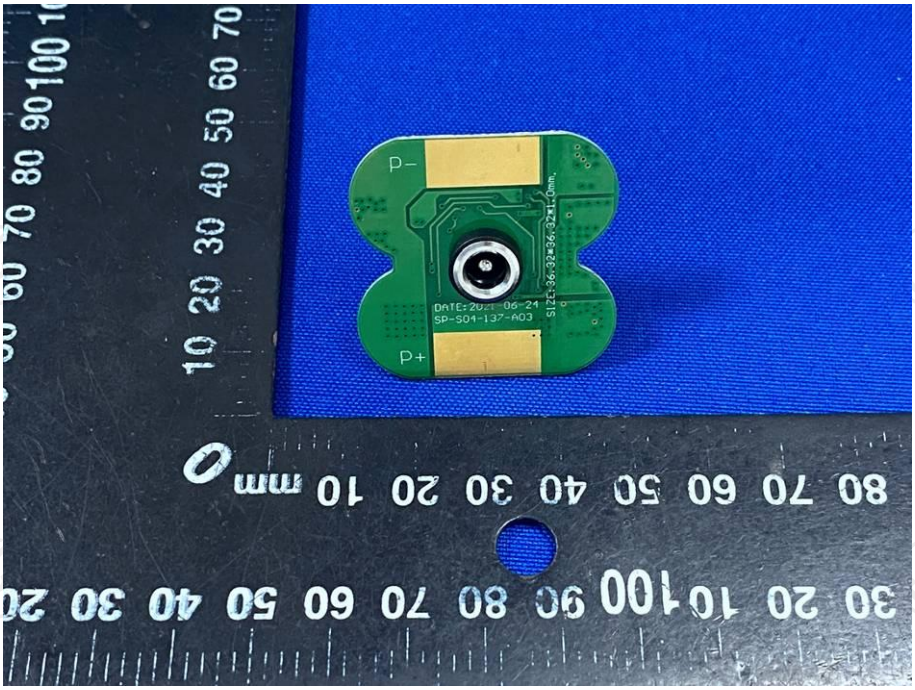

*****End of report*****