# UN 38.3 Test Report

## Lithium cell or battery test summary in accordance with sub-section 38.3 of Manual of Tests and Criteria.

| | |
|---|---|
| **Test Report Number** | UN-HB9790T7ECW-32C-A1 |
| **Customer Name** | HUAWEI |
| **Product Name** | Rechargeable Li-ion Polymer Battery |
| **Model Name** | HB9790T7ECW-32C |
| **Test specification** | ST/SG/AC.10/11/REV.6/Amend.1 |
| **UN38.3 Test Item** | T.1, T.2, T.3, T.4, T.5, T.6, T.7, T.8<br>(Note that T.6 and T.8 are for Cell) |
| **Test sample No** | UN-HB9790T7ECW-32C - 01~46 |
| **Test Date** | 2020/5/14~ 2020/6/4 |
| **Date of Test Report** | 2020/6/5 |
| **Product Manufacturer & Test Laboratory** | Dynapack Electronic Technology (Suzhou) Co., Ltd |
| **Manufacturer & Test Laboratory information** | Address: No. 8 Hua-Gang Road, WuJiang Economical and Technological Development Zone,Suzhou city, JiangSu. PRC.<br>Tel: 0086-051263408688 E-mail: Wesley.Wu@dynapack.com.tw<br>ZIP: 215200 Website: http://www.dynapack.com.tw |

| Description of Battery | |
|---|---|
| **Model Name** | HB9790T7ECW-32C |
| **Battery Type** | Small rechargeable Li-ion Polymer Battery Pack |
| **Pack Configuration** | 3 Series / 2 Parallel |
| **Nominal Voltage** | 11.46 Vdc |
| **Rated Capacity(mAh/Wh)** | 7330mAh / 84Wh |
| **Mass** | 356.3 g |
| **Pack Dimension(mm)** | 296.8(L)*101.9(W)*9.7(T) |
| **Cell model** | 436281 |

| Performed Tests | | Results |
|---|---|---|
| **UN38.3 T1** | Altitude simulation | ■ PASS □ FAIL |
| **UN38.3 T2** | Thermal test | ■ PASS □ FAIL |
| **UN38.3 T3** | Vibration | ■ PASS □ FAIL |
| **UN38.3 T4** | Shock | ■ PASS □ FAIL |
| **UN38.3 T5** | External short circuit | ■ PASS □ FAIL |
| **UN38.3 T6** | Crush | ■ PASS □ FAIL |
| **UN38.3 T7** | Overcharge | ■ PASS □ FAIL |
| **UN38.3 T8** | Forced discharge | ■ PASS □ FAIL |

Reference to assembled battery testing requirements:

■Not Applicable □ UN38.3.3(f) □ UN38.3.3(g)

Prepared By : Engineer

Checked By : Senior Engineer

Approved By : Senior Manager



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## 1. Test Equipment

| Inst. No. | Description | Series No | Function/Range |
|---|---|---|---|
| WJ6014 | Learning Machine | D14106-2 | 20 V / 10 A |
| WJ6015 | Chamber | 6609K | -40～150°C |
| WJ6102 | Electronic Scales | 07093410 | 0~600g,Accuracy 0.01g |
| WJ6108 | 3560 AC mΩMeter | 051139050 | 0~5/50 V /30mΩ-3kΩ |
| WJ6105 | Vacuum Machine | GS55-221 | -76~0cmHg |
| WJ6189 | Thermal shock2 | 9811K | 200°C ~-80°C |
| WJ6073 | Vibration Machine | D1202031 | 5~2000Hz Level/5~1500Hz Vertical；<br>Max. acceleration: 100gVertical； |
| WJ6188 | Shock | M-15488 | 100G/10ms~5000G/0.2ms |
| WJ6115 | Chamber | 6514K | 0-150°C /20%RH~98%RH |
| WJ6104 | 34970 data recorder | MY44039623 | -100~+400°C |
| WJ4035 | Digital Caliper | 05565311 | 0~200mm |
| WJ6052 | Crush | LG2975 | 0~20KN |
| WJ7006 | 34970 data recorder | MY44042480 | -100~+400°C |
| WJ7008 | POWER SUPPLY | 006103156267001009 | 0~30V;0~18A |
| WJ7009 | POWER SUPPLY | 006103156273001007 | 0~30V;0~18A |
| WJ6197 | DC E-LOAD | 002022506570001023 | 3~120 V / 0~60 A |
| WJ7015 | DC E-LOAD | 123354F6A001 | 3~120 V / 0~60 A |
| WJ8000 | Digital T-H-Meter | 0046160D04 | – 45.0 to 250.0°C |



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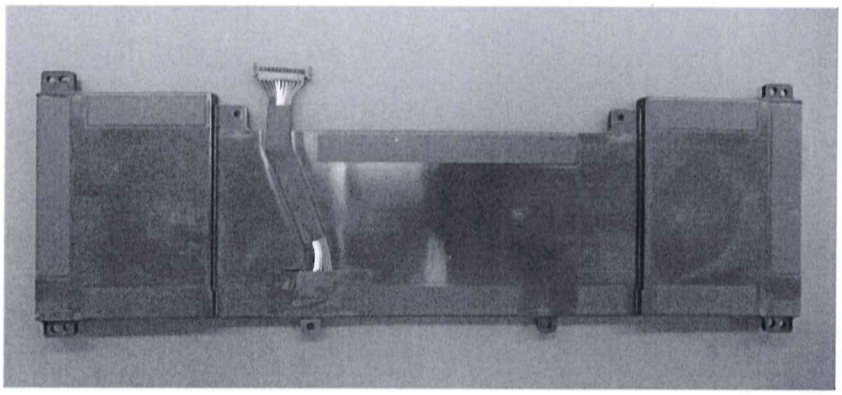
## 2. Detail records as below:

### 2.1 Photograph

型号/Model/모델: HB9790T7ECW-32C
额定容量/Rated Capacity/정격용량: 7330mAh/84Wh
额定电压/Rated Voltage/정격전압: 11.46V
充电限制电压/ Limited Charge Voltage: 13.2V



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## 2.2 Test Data:

### 2.2.1 T.1 Altitude

| Sample No. | Sample Status | OCV(V) Before | OCV(V) After | Voltage Residual (%) | Mass(g) Before | Mass(g) After | Mass Loss (%) | Result |
|---|---|---|---|---|---|---|---|---|
| 01 | 1CYC，Fully charge | 13.024 | 13.021 | 99.97% | 356.29 | 356.30 | 0.00% | PASS |
| 02 | 1CYC，Fully charge | 13.024 | 13.019 | 99.96% | 356.33 | 356.27 | 0.02% | PASS |
| 03 | 1CYC，Fully charge | 13.025 | 13.019 | 99.96% | 356.29 | 356.27 | 0.01% | PASS |
| 04 | 1CYC，Fully charge | 13.030 | 13.024 | 99.96% | 356.30 | 356.30 | 0.00% | PASS |
| 05 | 25CYC，Fully charge | 13.029 | 13.023 | 99.96% | 356.26 | 356.26 | 0.00% | PASS |
| 06 | 25CYC，Fully charge | 13.022 | 13.018 | 99.97% | 356.30 | 356.26 | 0.01% | PASS |
| 07 | 25CYC，Fully charge | 13.023 | 13.019 | 99.96% | 356.34 | 356.33 | 0.00% | PASS |
| 08 | 25CYC，Fully charge | 13.022 | 13.017 | 99.97% | 356.26 | 356.28 | 0.01% | PASS |
| Temperature, °C | | 23.1 | | | Humidity, %RH | | 49.5 | |

Criteria:

*Batteries meet requirement regard mass loss was less than (*0.5% ,M<1g;0.2%, 1g ≤ M ≤ 75 g; 0.1%,M > 75 g* )and voltage after testing is not less than 90% of its voltage immediately prior to this procedure.

*No leakage, No venting, No disassembly, No rupture and no fire.

### 2.2.2 T.2 Thermal shock

| Sample No. | Sample Status | OCV(V) Before | OCV(V) After | Voltage Residual (%) | Mass(g) Before | Mass(g) After | Mass Loss (%) | Result |
|---|---|---|---|---|---|---|---|---|
| 01 | 1CYC，Fully charge | 13.021 | 12.810 | 98.38% | 356.30 | 356.33 | 0.01% | PASS |
| 02 | 1CYC，Fully charge | 13.019 | 12.805 | 98.36% | 356.27 | 356.32 | 0.01% | PASS |
| 03 | 1CYC，Fully charge | 13.019 | 12.802 | 98.33% | 356.27 | 356.27 | 0.00% | PASS |
| 04 | 1CYC，Fully charge | 13.024 | 12.820 | 98.43% | 356.30 | 356.29 | 0.00% | PASS |
| 05 | 25CYC，Fully charge | 13.023 | 12.839 | 98.59% | 356.26 | 356.29 | 0.01% | PASS |
| 06 | 25CYC，Fully charge | 13.018 | 12.835 | 98.60% | 356.26 | 356.30 | 0.01% | PASS |
| 07 | 25CYC，Fully charge | 13.019 | 12.831 | 98.56% | 356.33 | 356.31 | 0.01% | PASS |
| 08 | 25CYC，Fully charge | 13.017 | 12.818 | 98.47% | 356.28 | 356.33 | 0.01% | PASS |
| Temperature, °C | | 23.3 | | | Humidity, %RH | | 48.2 | |

Criteria:

*Batteries meet requirement regard mass loss was less than (*0.5% ,M<1g;0.2%, 1g ≤ M ≤ 75 g; 0.1%,M > 75 g* )and voltage after testing is not less than 90% of its voltage immediately prior to this procedure.

*No leakage, No venting, No disassembly, No rupture and no fire.



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### 2.2.3 T.3 Vibration

| Sample No. | Sample Status | OCV(V) Before | OCV(V) After | Voltage Residual (%) | Mass(g) Before | Mass(g) After | Mass Loss (%) | Result |
|---|---|---|---|---|---|---|---|---|
| 01 | 1CYC，Fully charge | 12.810 | 12.770 | 99.69% | 356.33 | 356.31 | 0.01% | PASS |
| 02 | 1CYC，Fully charge | 12.805 | 12.761 | 99.66% | 356.32 | 356.29 | 0.01% | PASS |
| 03 | 1CYC，Fully charge | 12.802 | 12.761 | 99.68% | 356.27 | 356.30 | 0.01% | PASS |
| 04 | 1CYC，Fully charge | 12.820 | 12.766 | 99.58% | 356.29 | 356.28 | 0.00% | PASS |
| 05 | 25CYC，Fully charge | 12.839 | 12.791 | 99.63% | 356.29 | 356.27 | 0.01% | PASS |
| 06 | 25CYC，Fully charge | 12.835 | 12.798 | 99.71% | 356.30 | 356.33 | 0.01% | PASS |
| 07 | 25CYC，Fully charge | 12.831 | 12.781 | 99.61% | 356.31 | 356.27 | 0.01% | PASS |
| 08 | 25CYC，Fully charge | 12.818 | 12.780 | 99.71% | 356.33 | 356.31 | 0.01% | PASS |
| Temperature, °C | | 23.6 | | | Humidity, %RH | | 47.8 | |

Criteria:

*Batteries meet requirement regard mass loss was less than (*0.5% ,M<1g;0.2%, 1g ≤ M ≤ 75 g; 0.1%,M > 75 g* )and voltage after testing is not less than 90% of its voltage immediately prior to this procedure.

*No leakage, No venting, No disassembly, No rupture and no fire.

### 2.2.4 T.4 shock

| Sample No. | Sample Status | OCV(V) Before | OCV(V) After | Voltage Residual (%) | Mass(g) Before | Mass(g) After | Mass Loss (%) | Result |
|---|---|---|---|---|---|---|---|---|
| 01 | 1CYC，Fully charge | 12.770 | 12.639 | 98.97% | 356.31 | 356.29 | 0.01% | PASS |
| 02 | 1CYC，Fully charge | 12.761 | 12.672 | 99.30% | 356.29 | 356.34 | 0.01% | PASS |
| 03 | 1CYC，Fully charge | 12.761 | 12.665 | 99.25% | 356.30 | 356.33 | 0.01% | PASS |
| 04 | 1CYC，Fully charge | 12.766 | 12.666 | 99.22% | 356.28 | 356.30 | 0.01% | PASS |
| 05 | 25CYC，Fully charge | 12.791 | 12.691 | 99.22% | 356.27 | 356.27 | 0.00% | PASS |
| 06 | 25CYC，Fully charge | 12.798 | 12.674 | 99.04% | 356.33 | 356.32 | 0.00% | PASS |
| 07 | 25CYC，Fully charge | 12.781 | 12.700 | 99.37% | 356.27 | 356.28 | 0.00% | PASS |
| 08 | 25CYC，Fully charge | 12.780 | 12.659 | 99.05% | 356.31 | 356.28 | 0.01% | PASS |
| Temperature, °C | | 23.3 | | | Humidity, %RH | | 47.4 | |

Criteria:

*Batteries meet requirement regard mass loss was less than (*0.5% ,M<1g;0.2%, 1g ≤ M ≤ 75 g; 0.1%,M > 75 g* )and voltage after testing is not less than 90% of its voltage immediately prior to this procedure.

*No leakage, No venting, No disassembly, No rupture and no fire.



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### 2.2.5 T.5 External Short circuit

| Sample NO. | Sample Status | Max Battery Temperature(℃) | Result |
|---|---|---|---|
| 01 | 1CYC，Fully charge | 57.68 | PASS |
| 02 | 1CYC，Fully charge | 57.85 | PASS |
| 03 | 1CYC，Fully charge | 57.38 | PASS |
| 04 | 1CYC，Fully charge | 57.01 | PASS |
| 05 | 25CYC，Fully charge | 57.69 | PASS |
| 06 | 25CYC，Fully charge | 57.15 | PASS |
| 07 | 25CYC，Fully charge | 57.81 | PASS |
| 08 | 25CYC，Fully charge | 57.70 | PASS |
| Temperature, °C | 23.4 | Humidity, %RH | 46.9 |

Criteria:

*All Batteries can meet requirement subjected external temperature does not exceed170 ℃.

*All Batteries no disassembly, no rupture and no fire during the test and within six hours of this test.

### 2.2.6 T.6 Crush

| Sample NO. | Sample Status | Max Cell Temperature (℃) | Result |
|---|---|---|---|
| 09 | 1CYC,50% Capacity | 23.94 | PASS |
| 10 | 1CYC,50% Capacity | 23.99 | PASS |
| 11 | 1CYC,50% Capacity | 23.06 | PASS |
| 12 | 1CYC,50% Capacity | 23.05 | PASS |
| 13 | 1CYC,50% Capacity | 23.19 | PASS |
| 14 | 25CYC,50% Capacity | 23.72 | PASS |
| 15 | 25CYC,50% Capacity | 23.09 | PASS |
| 16 | 25CYC,50% Capacity | 23.70 | PASS |
| 17 | 25CYC,50% Capacity | 23.30 | PASS |
| 18 | 25CYC,50% Capacity | 23.99 | PASS |
| Temperature, °C | 23.2 | Humidity, %RH | 47.7 |

Criteria:

*All cells can meet requirement subjected external temperature does not exceed 170℃.

*All cells no disassembly and no fire during the test and within six hours of this test.



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### 2.2.7 T.7 Over Charge

| Sample NO. | Sample Status | Charge Voltage(V) | Charge Current(A) | Result |
|---|---|---|---|---|
| 19 | 1CYC，Fully charge | 22.0000 | 10.2620 | PASS |
| 20 | 1CYC，Fully charge | 22.0000 | 10.2620 | PASS |
| 21 | 1CYC，Fully charge | 22.0000 | 10.2620 | PASS |
| 22 | 1CYC，Fully charge | 22.0000 | 10.2620 | PASS |
| 23 | 25CYC，Fully charge | 22.0000 | 10.2620 | PASS |
| 24 | 25CYC，Fully charge | 22.0000 | 10.2620 | PASS |
| 25 | 25CYC，Fully charge | 22.0000 | 10.2620 | PASS |
| 26 | 25CYC，Fully charge | 22.0000 | 10.2620 | PASS |
| Temperature, °C | | 24.7 | Humidity, %RH | 47.7 |

Criteria:

*All batteries can meet no disassembly and no fire during the test and within seven days after the test.

### 2.2.8 T.8 Forced Discharge

| Sample NO. | Sample Status | Result | Sample NO. | Sample Status | Result |
|---|---|---|---|---|---|
| 27 | 1CYC，Fully discharge | PASS | 37 | 25CYC，Fully discharge | PASS |
| 28 | 1CYC，Fully discharge | PASS | 38 | 25CYC，Fully discharge | PASS |
| 29 | 1CYC，Fully discharge | PASS | 39 | 25CYC，Fully discharge | PASS |
| 30 | 1CYC，Fully discharge | PASS | 40 | 25CYC，Fully discharge | PASS |
| 31 | 1CYC，Fully discharge | PASS | 41 | 25CYC，Fully discharge | PASS |
| 32 | 1CYC，Fully discharge | PASS | 42 | 25CYC，Fully discharge | PASS |
| 33 | 1CYC，Fully discharge | PASS | 43 | 25CYC，Fully discharge | PASS |
| 34 | 1CYC，Fully discharge | PASS | 44 | 25CYC，Fully discharge | PASS |
| 35 | 1CYC，Fully discharge | PASS | 45 | 25CYC，Fully discharge | PASS |
| 36 | 1CYC，Fully discharge | PASS | 46 | 25CYC，Fully discharge | PASS |
| Temperature, °C | | 23.7 | Humidity, %RH | | 49.5 |

Criteria:

*All cells no disassembly and no fire during the test and within seven days after the test.

--- End of Test report ---



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