

SAFEGUARDS

SGS CONSUMER TESTING SERVICES

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SAFETY OF LITHIUM-ION BATTERIES IN MOBILE COMMUNICATIONS DEVICES

Over the years lithium-ion batteries have become the primary source of power for mobile communications devices. One of the advantages of lithium-ion batteries is their ability to provide longer operation times when compared to other battery chemistries. This advantage can also be a disadvantage when it comes to safety. Lithium-ion batteries are more likely to present dangers to the user when mishandled or not properly manufactured. The biggest risk that faces users is explosion and fire. Some common causes are internal short-circuits in the battery cell or exposure to heat or fire.

To address these concerns some countries have implemented certification programs to reduce the risk to the user of communication devices. This article focuses on three of the main certification schemes faced by manufacturers of mobile communications devices. This article does not address battery safety for other devices, performance or transportation regulations.

Three important regions today are Brazil, the European Union and the United States. Of these three, the European Union requires the least time and effort, followed by the United States and Brazil.

Brazil

ANATEL is the agency that regulates mobile devices in Brazil. The safety

tests required by ANATEL are taken from IEC 62133, ("Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications"). The biggest concern with ANATEL is that the tests must be carried out by a Designated Certification Organization (OCD) located in Brazil.

European Union

Europe has regulations in place based on CE Marking and the Radio and Telecommunications Terminal Equipment Directive (RTTE). Although the Low Voltage Directive (LVD) does not apply due to the voltage of the battery, the RTTE Directive removes the lower voltage limit which allows the use of EN 60950-1. Most of the requirements are not related to the battery however there are some clauses that do apply. It is not required to use a specific lab for this testing, but some companies will employ the CB Scheme certification for assurance.

United States

In the United States cellular devices are commonly evaluated to the CTIA IEEE 1725 based requirements. The CTIA certification program is enforced by the wireless operators. The CTIA program includes product review and test items to evaluate cells, battery packs, power supplies (adapters) and the phone itself. This testing must be conducted by a CTIA Authorized Test Lab (CATL) qualified in the battery program.



Testing

The testing performed on the battery pack is detailed in the table below. Although tests have different requirements, some of them are identical or very similar in rational. Similar tests are combined in the same columns. In addition, all three regions have other tests that are not specific to the pack. The following test items will also need to be addressed in addition to the battery testing.



| Country | Agency | TESTS | | | | | | | | | | |
|---------|---------|-------|--|----------------------------|-----------------|--|----------------|---------------|--|--|---------------------------|---------------------------|
| | | ESD | Extended Charge | Stress on High Temperature | Thermal Cycling | External Short Circuit | Free Fall | Thermal Abuse | Overcharge | | | |
| Brazil | ANATEL | ESD | Extended Charge | Stress on High Temperature | Thermal Cycling | External Short Circuit | Free Fall | Thermal Abuse | Overcharge | | | |
| EU | CENELEC | | Overcharging of a rechargeable battery | | | Excessive discharging rate for any battery | | | Unintentional charging of a non-rechargeable battery | Reverse charging of a rechargeable battery | | |
| US | CTIA | ESD | | | | Pack Overcurrent Protection Requirement and Limit Output Current | Pack Drop Test | | | | Thermal Protection Design | Mechanical Considerations |

Brazil

- Performance of the Battery
- Safety of the Charger

European Union

- Safety of the Battery Cell
- Safety of the Mobile Device

United States

- Safety of the Battery Cell
- Safety of the Power Supply (Adapter)
- Safety of the Mobile Device (Host)

SGS has the expertise and capabilities to provide certification solutions for Brazil, the European Union and the United States. SGS is also a CTIA Battery CATL and CB-Scheme approved for IEC 62133 and IEC 60950-1 as well as Wireless Testing and Certification of mobile devices. Don't hesitate to contact us for further information.

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