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Technical Requirement and Test Method of Charger and Interface for Mobile Telecommunication Terminal Equipment

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Foreword

This Standard is prepared referring to the following standards:

1. GB 4943-2001 Security of Information Technical Equipment

2. YD 1268.2-2003 Security Requirement and Test Method of Lithium Battery Charger for the Mobile Communication Terminal

3. GB 9254 Wireless Interference Limit and Measure Method of Information Technical Equipment

4. GB 17465.1 Housing and Similar Appliance Coupler Part I: Universal Requirement

5. GB 17625.1 Magnetic Compatibility Limit Emission Limit for Harmonic Current

6. GB 17625.2 Magnetic Compatibility Limit Limit for the Voltage Fluctuation Generated by the Equipment with the Rated Current Less than 16A in the Low-Voltage Supply System.

When the charger simultaneously works with the mobile communication terminal, its magnetic compatibility feature shall respectively meet the magnetic compatibility requirement of the mobile communication terminal in different modes. Meanwhile, during the preparing process of this Standard, it also refers to the electric feature and mechanical structure of “universal serial bus specification (version 2.0)” interface.

With the development of the technology, the related standards will be continually prepared. After this Standard is issued, we will conduct researches on the technical requirement and test methods of the equipment such as on-board DC charger and plan to supplement the corresponding parts as the supplementary documents of this Standard if necessary.

This Standard is proposed and managed by China Communication Standardization association.

This Standard is Drafted by: Telecom Research Institute of Ministry of Information and

Industry, and Konka Group Co., Ltd.

Key drafters of this Standard: Liu Jun, Men Meng, Yuan Weijun, Yuan, Zhang Xia, He Guili, Li Hongtao, and Du Yong.

Introduction

This Standard is prepared to guarantee the security of the product and availability, meanwhile, it enables the mobile communication terminals with different types to use the charger having the same specification to reduce the electronic waste, protect the environment, save resource and reduce the use cost of the mobile communication terminal through the uniform interface mode and technical requirement.

Considering the requirement for the data exchange between the mobile communication terminal and peripheral equipment and sharing possibility of the charging cable, this Standard refers to the A series interface specification of the Universal Serial Bus (USB) to improve the application efficiency and convenience of the related components.

Considering the individual development of the mobile communication terminal, this Standard regulates the uniform connection interface and sets it on the charger side, and the connection interface on the mobile communication terminal side is identified by the design and manufacturer of the products.

Technical Requirement and Test Method of Charger and Interface for Mobile Telecommunication Terminal Equipment

1 Scope

This Standard regulates the technical requirements and test methods of charger and interface of the mobile communication terminal (hereafter called as the “terminal”), including the physical feature, electric feature, security feature, magnetic compatibility and environment adaptability of the AC charger and interface.

This Standard is applicable to the interface of the terminal charger, AC charger and connection cable.

2 Reference documents

The articles in the following documents become the articles of this Standard through the reference of this reference. For any reference document with the date, its subsequent modified contents (not including corrected content) or revisal versions are not applicable to this Standard, however, it is encouraged that all parties reaching this agreement on this Standard study whether the latest versions of these documents can be used. For any reference files without the date, its latest version is not applicable to this Standard.

GB 2099.1-1996 Housing and Similar Plug and Socket Part I: Universal Requirement

GB 4943-2001 Security of Information Technical Equipment

GB 5023.5-1997 Insulation Cable Polythene below the Rated Voltage 450/750V Part V: Software Cable (chord)

GB9254 Wireless Interference Limit and Measure Method of the Information Technology Equipment

GB 17465.1-1998 Housing and Similar Appliance Coupler Part I Universal Requirement

GB 17625.1 Magnetic compatibility Limit Emission Limit for Harmonic Wave Current

exceed 35N and the required force for pulling the plug from the socket can not be less than 10N.

4.2.2.2 Plug lifetime

Plug in/plug out for 15000 periods at the maximum speed during the 200 periods of one hour, after the plugging ends, the mechanical structure shall not be damaged. The required minimum force for pulling the connection plug out from the socket is not less than 8N, the electric performance shall meet the requirement in the 4.2.3.

4.2.3 Electric performance of the connection interface

4.2.3.1 Electric performance requirement of the connection interface on the terminal side

(1) The DC input voltage of the terminal charging interface is 5V(1±5%): maximum absorption current is 1800mA. Regardless of the input power of the charger, the charging control circuit on the terminal side shall be securely charged according to self requirement and the phenomena such as the over heating, combustion, explosion and other circuit damage shall not occur.

(2) The charging control circuit on the terminal side shall include the voltage limit protection set. when the charging interface of the terminal is imported by over 6V voltage, if the secure charging can not be guaranteed, the charging control circuit on the terminal side shall securely charge according to self requirement, the phenomena such as the over heating, combustion, explosion and other circuit damage shall not occur.

(3) When the connecting power supply set is not standard regulated charger (such as the built-in USB A series interface of the computer or portable computer).

(4) Considering that absorption current’s security to the power supply set when the terminal is charging which has been produced and sold before this Standard is implemented, the designer shall carefully consider whether the sold terminals meet the secure charging measure regulated in this Standard, when this Standard is adopted, the physical design of the interface between the terminal and connection cable different from old design shall be used,

4.4.13.2 Magnetic compatibility requirement for the charger

4.4.13.2.1 Continued emission interference

The emission interference of the charger shell port shall meet the requirement of the class B information technical equipment in GB 9254.

4.4.13.2.2 Continued conduction interference

The conduction interference of the AC power input port of the charger shall meet the requirement of the class B information technical equipment in GB 9254.

4.4.13.2.3 Harmonic wave current

The harmonic wave current of AC power input port of the AC charger shall meet the limit requirement for class A equipment in GB 17625.1.

4.4.13.2.4 Voltage fluctuation and flickering

The voltage fluctuation and flickering of the AC power input port of the AC charger shall meet the requirement of GB 17625.2.

4.4.413.2.5 Interference-resistance of the static discharging

The shell port of the AC charger shall pass the static discharging anti-interference test under the test grade regulated in 5.4.13.2.5. During the test period and after test, the charger shall be able to normally operate.

4.4.13.2.6 Anti-interference of current fast instantaneous pulse cluster

The shell port of the AC charger shall pass the anti-interference test of current fast instantaneous pulse cluster under the test grade regulated in 5.4.13.2.6. During the test, the charger shall keep normal operation, and the level of current fast instantaneous pulse cluster leaked at the output port of the charger DC power shall be less than the 10% of the test level of AC input port. After test, the charger shall be able to normally operate.

5.2.3.2 Interface test of the charger

(1) Check whether the anode and cathode of the interface on the charger side is correct, check whether D+ and D- is short circuit and test whether the D+ or D- and VBus line, ground line and other charger circuits are insulated.

(2) Check whether the related normal voltage and current marked by the charger is correct

5.2.3.3 Test for the insulation resistance

Respectively use the DC 500V and 1000V test voltage to measure insulation resistance of each insulation layer.

The insulation resistance shall be measured between the nearest contacts, and between the plug and socket shell, or between bottom plate and nearest contact. Under each case, it is tested for 6 times (3 adjacent contacts and/or 3 contacts connecting to the shell and/or 3 contacts connecting to the bottom plate), the resistance takes the value of the minimum limit or the larger part of the 10% of all contacts. When the insulation resistance is tested, each time same contact area of a given plug and socket shall be used.

The test duration is 1 min, the minimum value in the test is recorded as the test result. When the current condition has influences on the insulation feature of the insulation resistance, the insulation test shall be instantly tested within 2 min after the current is released.

5.2.3.4 Voltage endurance test of the insulation material

The test voltage increases from 0 to 500V at the 500V/s speed and the keep 1 min at this voltage.

a) The test voltage shall be imposed between the nearest interval contacts or contact between the shell of the plug and socket and nearest shell.

The tested sample is fixed on the impact table without any packing, the sample shall be installed according to the requirement in the GB/T 2423.43. the tested sample keeps semi-sine pulse for 18ms at the peak acceleration 300m/s2, impose the 3 times of the continual impacts along each direction of the 3 mutually vertical axis, namely total time is 18 times, after the test ends, make the test in the 5.4.4, 5.4.5, 5.4.7 and 5.4.14.4.

5.4.15.6 Falling

Place the tested sample at the plane with the height (1.0±0.10) m without any packing and make freely fall to the concrete ground, fall for two times on each side, total 12 times are for 6 sides, after the test ends, observe the appearance and check the function.

5.4.16 Mark test

Test in accordance with the testing method regulated in the GB 4923-2001.

References

[1] Universal Serial Bus Specification Version 2.0
[2] GB/T 2423.1-2001 Environmental testing for electric and electronic products-part 2: Test methods-Tests A:Cold.
[3] GB/T 2423.2-2001 Environmental testing for electric and electronic products-part 2: Test methods-Tests B:dry heat
[4] GB/T 2423.5-2001 Environmental testing for electric and electronic products-part 2: Test methods-Test Ea and guidance: Shock
[5] GB/T 2423.8-1981 Environmental testing for electric and electronic products-part 2: Test methods-Test Ea: free fall
[6] GB/T 2423.9-2001 Environmental testing for electric and electronic products-part 2: Test methods-Test Cb: Constant Humidity and Heat
[7] GB/T 2423.10-1995 Environmental testing for electric and electronic products-part 2: Test methods-Test Fc and guidance: Vibration (Sinusoidal)
[8] GB/T 2423.43-1995 Environmental testing for electric and electronic products-part 2: Test methods-Installation requirement and guidance for Component, equipment and other product in Ea, Eb, Fc and Fd, Ga and other Dynamics tests
[9] GB/T 2828.1-2003 Sampling procedures for inspection by attributes--Part 1: Sampling schemes indexed by acceptance quality limit for lot by lot Inspection
[10] GB/T 2829-2002 Sampling procedures and tables for periodic inspection by attributes (Apply to inspection of process stability)
[11] GB/T 3873-1983 General specifications for products packaging of communication equipment.

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