

International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

L.1000

(06/2011)

SERIES L: CONSTRUCTION, INSTALLATION AND
PROTECTION OF CABLES AND OTHER ELEMENTS OF
OUTSIDE PLANT

Universal power adapter and charger solution for mobile terminals and other hand-held ICT devices

Recommendation ITU-T L.1000



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Universal power adapter and charger solution for mobile terminals and other hand-held ICT devices

Summary

Recommendation ITU-T L.1000 provides high level requirements for a universal power adapter and charger solution that will reduce the number of power adapters and chargers produced and recycled by widening their application to more devices and increasing their lifetime.

The solution also aims to reduce energy consumption. The longer life cycle and possibility of avoiding device duplication reduces the demand on raw materials and waste.

The universal power adapter and charger solution is designed to serve the vast majority of mobile terminals and other hand-held ICT devices.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T L.1000	2010-03-09	5
2.0	ITU-T L.1000	2011-06-13	5

Keywords

Charger, ecodesign, energy-efficiency, power adapter, universal charger solution.



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In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Introduction

This Recommendation defines the requirements of a universal charger solution for mobile terminals and other hand-held ICT devices. Further study is required to extend the solution to other ICT devices.

This Recommendation also takes into consideration energy efficiency, emissions reduction and the use of scarce and raw materials. It has been estimated (see Appendix VIII) that the widespread adoption of a universal charger solution for mobile phones will result in a 50 per cent reduction in standby energy consumption and approximately 14 million tons of greenhouse gas emissions each year. The universal power adapter and charger solution will be more convenient and simpler to use for consumers who will be able to charge their mobile phones from any available universal mobile charger and use the same power adapter for many future handsets, thus eliminating up to 50'000 tons of duplicate power adapters and chargers.

It is noted that the environmental impact of any universal charger solution should be considered over the entire life cycle and that the transition towards a universal charger solution does not aim to replace existing chargers immediately; this is because there is an estimated 2 billion of them currently in use.

This Recommendation was drafted with support from and in consideration of activity in other SDOs and other types of organizations.

This Recommendation is designed to ensure the universal charger solution operates within recognized current and voltage safety parameters by adopting existing mobile terminal technologies such as computer USB output or recharging solutions in cars. Battery safety and lifetime issues have been considered in the drafting of this Recommendation.

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Recommendation ITU-T L.1000

Universal power adapter and charger solution for mobile terminals and other hand-held ICT devices

1 Scope

This Recommendation describes the general requirements for a universal power adapter and charger solution for mobile terminals (any terminal able to connect to a mobile network) and other hand-held ICT devices (e.g., MP3/MP4, PDA, camera, wireless earphone) compliant with the electrical current limits set out in Annex B.

This Recommendation includes basic configurations and general requirements for the power adapter and charger interface, energy efficiency, safety, electromagnetic compatibility, resistibility, and eco-environmental specifications.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

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| [ITU-T K.21] | Recommendation ITU-T K.21 (2008), <i>Resistibility of telecommunication equipment installed in customer premises to overvoltages and overcurrents.</i> |
| [ITU-T K.66] | Recommendation ITU-T K.66 (2004), <i>Protection of customer premises from overvoltages.</i> |
| [ITU-T K.74] | Recommendation ITU-T K.74 (2008), <i>EMC, resistibility and safety requirements for home network devices.</i> |
| [CISPR 22] | IEC, CISPR Publication 22 (2008), <i>Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement.</i> |
| [CISPR 24] | IEC, CISPR Publication 24 (1997), <i>Information technology equipment – Immunity characteristics – Limits and methods of measurement.</i> |
| [ETSI EN 301 489-34] | ETSI EN 301 489-34 (2010), <i>Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 34: Specific conditions for External Power Supply (EPS) for mobile phones.</i> |
| [IEC 60950-1] | IEC 60950-1 (2005), <i>Information technology equipment – Safety – Part 1: General requirements.</i> |
| [IEC 62430] | IEC 62430 (2009), <i>Environmentally conscious design for electrical and electronic products.</i> |
| [IEC 62684] | IEC 62684 (2011), <i>Interoperability specifications of common external power supply (EPS) for use with data-enabled mobile telephones.</i> |

[ISO 14040]	ISO 14040 (2006), <i>Environmental management – Life cycle assessment – Principles and framework</i> .
[ISO 14044]	ISO 14044 (2006), <i>Environmental management – Life cycle assessment – Requirements and guidelines</i> .
[IEEE 1680]	IEEE 1680 (2009), <i>IEEE Standard for Environmental Assessment of Electronic Products</i> .
[IEEE 1725]	IEEE 1725 (2006), <i>Standard for Rechargeable Batteries for Cellular Telephones</i> .

3 Definitions

3.1 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.1.1 charger: A common term used to describe the power adapter for the mobile terminal or other hand-held ICT devices used to apply power to the battery.

3.1.2 detachable cable: A detachable cable connects the power adapter to the mobile terminal or other hand-held ICT device for powering through two connectors, one on the charger side and one on the side of the mobile terminal or other hand-held ICT device.

3.1.3 power adapter: The equipment that converts mains AC power voltage at the input to low DC power voltage at the output, or the equipment which transfers DC power supply, e.g., car voltage to another low voltage of DC power output.

3.1.4 universal charger solution: Overall initiative that defines the charger solution for different mobile terminals and other hand-held ICT devices.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

DC	Direct Current
GHG	Green House Gas emission
ICT	Information and Communication Technology
LVDC	Low Voltage Direct Current
OMTP	Open Mobile Terminal Platform
PDA	Personal Digital Assistant
SCCP	Short Chain Chlorinated Paraffins
USB	Universal Serial Bus

5 Basic configuration of universal power adapter and charger solution

The target basic configuration of a universal charger solution consists of:

- 1) a power adapter (charger of the mobile terminal), other ICT device for charging (which can also be used for data transfer), or a renewable energy power supply (e.g., solar, wind);
- 2) a detachable cable (used for charging or data transfer) or optionally a captive cable (used for charging only), depending on market demand;
- 3) a mobile terminal or other hand-held ICT device.

NOTE – Further study is needed to specify more details (e.g., logical, functional or physical).

6 General requirements

6.1 Power adapter interface

The power adapter is required to provide an output DC voltage and DC current.

NOTE – A dedicated specification for mobile terminals is shown in Annex B.

6.2 Energy efficiency requirements

6.2.1 No-load power consumption

The no-load power consumption of the power adapter should be as low as practicable. It is expected that the industry will aim for a figure as close to zero as possible. If practicable, the power adapter should indicate to the customer its no load condition.

It is expected that industry will aim for power adapters and chargers to enter a shut-down mode to minimize power consumption either when the unit is removed from the supply or when the battery is fully charged, thereby ensuring significant energy savings.

NOTE – A dedicated specification for mobile terminals is shown in Annex B.

6.2.2 Power efficiency with load

It is expected that industry will aim to minimize the power dissipated in the power adapter whilst powering the load device. An example of an evaluation of battery charging efficiency is given in Annex B.

NOTE – A dedicated specification for mobile terminals is shown in Annex B.

6.2.3 Solar power for chargers and mobile phones and related ICT devices

Solar-powered mobile terminals could provide mobile connectivity to about two billion people across the globe that do not have access to electricity. Solar power has the advantage of being more sustainable and better for the environment than the electricity grid which currently uses fossil fuel in its mix of energy sources.

It is therefore recommended that power adapters and chargers, mobile terminals and other ICT devices be designed to make maximum use of available renewable energy sources.

NOTE 1 – This can be of considerable interest for the requirements of some developing countries, e.g., solar, wind power.

As an example, power adapter and charger interfaces would need to be designed so that they do not stress the batteries inside the mobile terminal or other ICT device by providing too much current when solar input is also taking place. High temperature stresses on the ICT device caused by sun exposure should also be avoided.

NOTE 2 – In the future, this Recommendation may be updated to use additional renewable energy sources such as wind or other forms of energy harvesting as a source of power.

6.3 Safety requirements

The power adapter must be a limited power source in accordance with clause 2.5 of [IEC 60950-1], and comply with the safety requirements of [IEC 60950-1], [ITU-T K.74]. National regulations override the content of this Recommendation.

The power adapter is required to have a safety circuit in order to prevent any heat generation, leakage of electricity, fire ignition, etc., in fault condition.

The power adapter and detachable cable are required to not harm the human body by heat generation, leakage of electricity, fire ignition, etc., during normal/abnormal usage.