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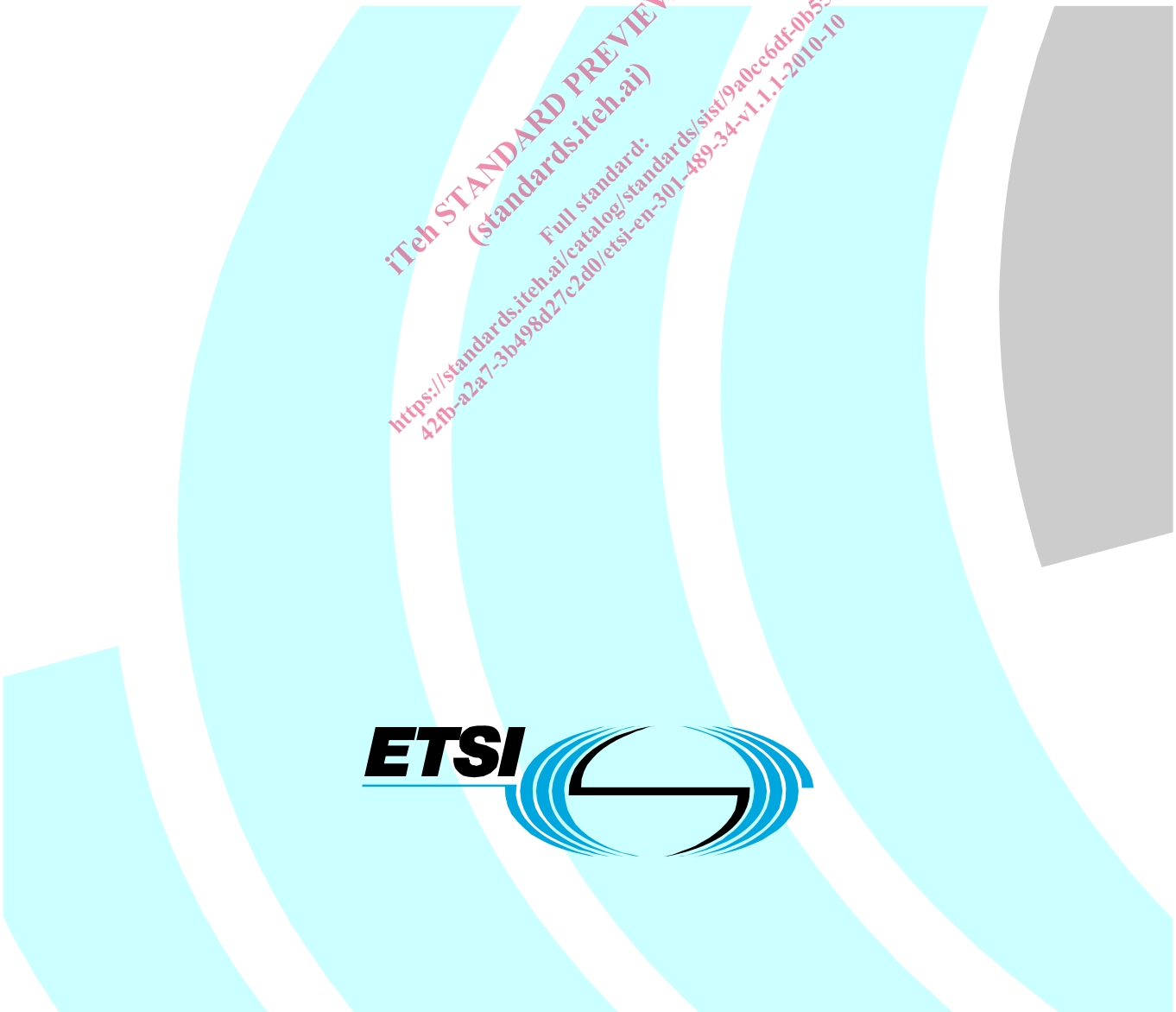
Harmonized European Standard (Telecommunications series)

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



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Foreword

This Harmonized European Standard (Telecommunications series) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM), and is now submitted for the ETSI standards One-step Approval Procedure.

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [i.3] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document together with EN 301 489-1 [1], is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility ("the EMC Directive") (2004/108/EC [i.1] as amended) and Directive 1999/5/EC [2]of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity ("the R&TTE Directive").

The present document is part 34 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	18 months after doa

Introduction

The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive. The modular structure is shown in EG 201 399 [i.2].

1 Scope

The present document contains the Specific conditions for Mobile Phone Common External Power Supply equipment using a USB Micro-B connector as defined in M/455 [3] associated with digital cellular mobile and portable (UE) radio terminal equipment radio communications equipment, in respect of ElectroMagnetic Compatibility (EMC).

Product dependent arrangements necessary to perform the EMC tests on dedicated types of radio communications equipment, and the assessment of test results, are detailed in the appropriate product related parts of EN 301 489 [12].

In case of differences (for instance concerning special conditions, definitions and abbreviations) between the present document and EN 301 489-1 [1], the provisions of the present document take precedence.

The environment classification and the emission and immunity requirements used in the present document are as stated in EN 301 489-1 [1], except for any special conditions included in the present document.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

[1] ETSI EN 301 489-1 (V1.8.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements".

[2] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).

[3] M/455 EN Annex II Part A of Standardisation mandate to CEN, CENELEC and ETSI on a common Charging Capability for Mobile Telephones 12th, January 2010.

NOTE: Available here. This reference will be superseded by the specification produced by CENELEC BTTF 135-1.

[4] CENELEC EN 55022 (2009): "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement".

[5] CENELEC EN 61000-4-2 (2001): "Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test".

[6] CENELEC EN 61000-4-3 (2006): "Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test".

[7] CENELEC EN 61000-4-4 (2004): "Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test".

[8] CENELEC EN 61000-4-5 (2006): "Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test".

[9] CENELEC EN 61000-4-6 (2009): "Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields".

[10] CENELEC EN 61000-4-11 (2004): "Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests".

[11] CENELEC EN 61000-3-3 (2008): "Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection".

[12] ETSI EN 301 489 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services".

[13] CENELEC EN 55016-2-3 (2006) "Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurements of disturbances and immunity - Radiated disturbance measurements".

[14] CENELEC EN 61000-3-2/Amendment 1 (2009): "Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)".

[15] CENELEC EN 60950-1 2nd Edition (2006): Information Technology Equipment - Safety - Part 1: General Requirements.

[16] CENELEC EN 55016-2-1: "Specification for radio disturbance and immunity measuring apparatus and methods -- Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] Council Directive 2004/108/EC of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC (EMC Directive).

[i.2] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of candidate Harmonized Standards for application under the R&TTE Directive".

[i.3] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

adaptor: device with a USB Micro-B receptacle/plug connecting to a specific non USB Micro-B connector

NOTE: An Adaptor can also be a cable.

common EPS: External Power Supply (EPS) with an AC input which meets the requirements of the specifications given in M/455 EN Annex II part A [3]

NOTE: The specifications include:

- A USB Micro-B Plug attached via a cable which delivers power to the device being charged.
- A voltage supplied of 5,0 V ±5 %.
- A maximum output current delivered of between 500 mA and 1 500 mA.
- The Common EPS must be a Limited Power source in accordance with EN 60950-1 [15].

enclosure port: physical boundary of the apparatus through which electromagnetic fields may radiate or impinge

port: particular interface, of the specified equipment (apparatus), with the electromagnetic environment

EXAMPLE: Any connection point on an equipment intended for connection of cables to or from that equipment is considered as a port (see figure 1).

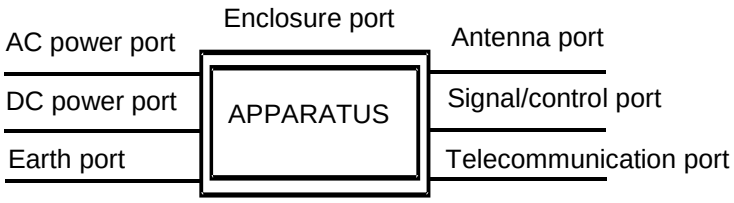

Figure 1: Examples of ports

NOTE: An interface, which uses optical fibre, is not a port for the purposes of testing because it does not interact with the electromagnetic environment within the frequency range, which is applicable for the present document. An optical fibre interface may still be used in the assessment of performance.

representative generic test load: EPS load which fully exercise the EPS and is supplied by the EPS manufacturer

NOTE: E.g. as in clause 4.3.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AC	Alternating Current
AMN	Artificial Mains Network
AN	Artificial Network
CDN	Coupling/Decoupling Network
DC	Direct Current
EM	ElectroMagnetic
EMC	ElectroMagnetic Compatibility
EPS	External Power Supply
ESD	Electro Static Discharge
EUT	Equipment Under Test
HS	Harmonized Standard
RF	Radio Frequency
rms	root mean square
UE	User Equipment (Mobile phone)

NOTE: UE=MS.

4 Test conditions

4.1 General

The present document relates to the testing of the Common EPS, and seeks to ensure that a Common EPS which is compliant to the provisions of the present document will, when used with a compatible UE which is compliant to the applicable provisions of the EN 301 489 [12], comply with the requirements of EN 301 489-1 [1].

The present document describes testing the Common EPS with a Representative generic test load, which is intended to emulate a UE for the purpose of testing the EPS.

Because the choice of UE may have some impact on the EMC performance of the Common EPS certain criteria and/or limits have been tightened beyond those applied in the case of testing intended to determine the compliance of a specific EPS – UE combination. Such specific combinations may be tested as described in other parts of the EN 301 489 [12], but such testing does not demonstrate compliance to the requirements of a Common EPS.

The provisions of EN 301 489-1 [1] clause 4.2 shall apply with the following modifications:

- The EPS shall be connected with a Representative generic test load exercising the DC output port.
- Adequate measures shall be taken to avoid the effect of immunity RF test signals on the measuring equipment.
- Measurements shall be taken with the cable supplied with the EPS at the USB Micro-B port. The type and length of cable used shall be recorded in the test report.

4.2 Arrangements for test signals

Adequate measures shall be taken to avoid the effect of immunity test signals on both the measuring equipment and the signal sources for the wanted signals located outside the test environment.

4.3 Representative generic test load

An EPS Representative generic test load which is representative of a UE shall have the following characteristics:

- A USB Micro-B socket connection.
- An input capacitance of 1μF in parallel with the EPS output.
- An input impedance with switchable range of:
  - 10k Ω (for 0 % rated current).
  - Selection of resistances to obtain the currents and output voltages of the test procedures.
  - A resistance to obtain Maximum rated current.
- A shielded casing/enclosure.

5 Performance assessment

EN 301 489-1 [1], clause 5 shall apply with the following modification stated in clause 6.

6 Performance criteria

For the common EPS, the performance criteria are based on a UE intended to be used with the EPS. For some specific test cases a different compliance level and/or performance criteria has been defined in order to ensure the compliance at the UE and EPS.

The performance criteria are used to make a decision on whether an EPS passes or fails immunity tests.

For the purpose of the present document two categories of performance criteria apply:

- performance criteria for continuous phenomena applied to EPS;
- performance criteria for transient phenomena applied to EPS.

6.1 Performance criteria for Common EPS

For a Common EPS the performance criteria shall meet the requirements whilst tested with the representative generic test load as given below:

- Output Voltage Range: 5 V ±0,25 V from no load to maximum output current measured at the USB Micro-B plug.
- Output Current Range at 5 V ±0,25 V: 500 mA to 1 500 mA.
- Output Voltage Ripple (Under load conditions from idle to full): 80 mVp-p measured at 20 MHz bandwidth using the test method as defined in Addendum II of M/455 EN Annex II Part A [3].
- While the parameters above should monitored at the USB Micro-B plug, the reference for the output voltage is the USB Micro-B plug for an EPS with captive cable and the Standard-A plug for an EPS with detachable cable.

The above criteria shall also be met after exposure to transient phenomena.