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Environmental Engineering (EE); Powering of equipment in access network

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Foreword

This European Standard (EN) has been produced by ETSI Technical Committee Environmental Engineering (EE).

National transposition dates	
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Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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1 Scope

The present document describes the principles for powering of Telecommunications Equipment (TE) in access networks (both traditional copper based and Next Generation fibre and/or hybrid based) and contains requirements for the powering systems, laying down:

- the characteristics of the input and output interfaces of the power units; the recommendations for TE power protection, also regarding network integrity and public services availability requirements;
- the management data, necessary to guarantee the required availability of the network and provided public services and to ensure the maintenance of the TE power units.

The present document takes into account the innovative characteristics of fibre-based access network equipment, for which the intrinsic limitation of the local power plants should be considered regarding the equipment installed inside telecom centre or local exchanges or installed in streets or inside buildings: it goes from "complete integration of the power plant in the TE" to "remote power feeding from a distant power plant".

The present document provides detailed information in annex A on the improved reliability of public electric power grid and on the improved reliability and availability of new fibre-based NGA network. It should be considered that, for street cabinet TE, the local power scenario is common and, in that case, the main power supply availability characteristics are mainly based on electrical energy provider's performance.

The present document applies to the powering of all equipment of the access network (copper, fibre or radio networks) located inside or outside telecommunications centres or local exchanges, differentiating the applicable and sustainable power protection requirements. The access network is defined as the part of the telecommunications network, which comprises the network termination (passive or active) that is installed inside customer premises and the first exchange that can be also the broadband local exchange.

As innovative fibre-based and hybrid-based NGA network TE are changing the traditional powering paradigm, the present document proposes the viable measures to comply with the integrity, availability and uninterrupted telephone/VoIP provision that European regulatory defines for public networks [i.18].

The present document describes different configurations of powering the TE and the impacts on networks and services continuity and reliability:

- Local power supply for TE (e.g. street cabinet, active network termination, etc.).
- Remote Feeding to TE from central office through copper access pair.
- Cluster Power supply feeding power for a cluster of TE.
- Remote power feeding to TE from centre or cluster power through a power cable.
- Back feeding or Reverse Powering architecture that can supply power to Access Network Units such as ONU or ONT or remote DSL unit from the customer premises through its final distribution access copper pair.

2 References

2.1 Normative 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 https://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.

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

[1] ETSI EN 300 132-1: "Environmental Engineering (EE); Power supply interface at the input to Information and Communication Technology (ICT) equipment; Part 1: Alternating Current (AC)".

[2] ETSI EN 300 132-2: "Environmental Engineering (EE); Power supply interface at the input of Information and Communication Technology (ICT) equipment; Part 2: -48 V Direct Current (DC)".

[3] IEC 62368-3: "Audio/video, information and communication technology equipment - Part 3: Safety aspects for DC power transfer through communication cables and ports".

[4] EN 60038: "CENELEC standard Voltages", (produced by CENELEC).

[5] EN 60664-1: "Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests", (produced by CENELEC).

[6] EN 50310: "Application of equipotential bonding and earthing in buildings with information technology equipment", (produced by CENELEC).

[7] ETSI EN 300 253: "Environmental Engineering (EE); Earthing and bonding of ICT equipment powered by -48 VDC in telecom and data centres".

[8] Recommendation ITU-T K.35: "Bonding configurations and earthing at remote electronic sites".

[9] Recommendation ITU-T K.45: "Resistibility of telecommunication equipment installed in the access and trunk networks to overvoltages and overcurrents".

[10] ETSI ES 203 215: "Environmental Engineering (EE); Measurement Methods and Limits for Power Consumption in Broadband Telecommunication Networks Equipment".

[11] ETSI EN 300 132-3: "Environmental Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 3: Operated by rectified current source, alternating current source or direct current source up to 400 V".

NOTE: A revision is on-going in ETSI and this document should become ETSI EN 300 132-3-1: "Direct current source up to 400 V".

[12] ETSI ES 202 336-1: "Environmental Engineering (EE); Monitoring and Control Interface for Infrastructure Equipment (Power, Cooling and Building Environment Systems used in Telecommunication Networks); Part 1: Generic Interface".

[13] ETSI TS 101 548-1: "Access, Terminals, Transmission and Multiplexing (ATTM); European Requirements for Reverse Powering of Remote Access Equipment; Part 1: Twisted pair networks".

[14] ETSI EN 301 605: "Environmental Engineering (EE); Earthing and bonding of 400 VDC data and telecom (ICT) equipment".

[15] Recommendation ITU-T L.1200 (May 2012): "Direct current power feeding interface up to 400 V at the input to telecommunication and ICT equipment".

[16] HD 60364 series: "Low Voltage electrical installations material", produced by CENELEC.

[17] ETSI ES 202 336-8: "Environmental Engineering (EE); Monitoring and Control Interface for Infrastructure Equipment (Power, Cooling and Building Environment Systems used in Telecommunication Networks); Part 8: Remote Power Feeding System control and monitoring information model".

2.2 Informative 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.

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

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] ETSI EN 300 019-1-1: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-1: Classification of environmental conditions; Storage".

[i.2] ETSI EN 300 019-1-3: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-3: Classification of environmental conditions; Stationary use at weather protected locations".

[i.3] ETSI EN 300 019-1-4: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-4: Classification of environmental conditions; Stationary use at non-weather protected locations".

[i.4] ETSI EN 300 019-1-8: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-8: Classification of environmental conditions; Stationary use at underground locations".

[i.5] Void.

[i.6] Void.

[i.7] HD 60364-1: "Low-voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, definitions", (produced by CENELEC).

[i.8] ETSI EN 302 999: "Safety; Remote Power Feeding Installations; Safety requirements for the erection and operation of information technology installations with remote power feeding".

[i.9] ENISA: "Power Supply Dependencies in the Electronic Communications Sector Survey, analysis and recommendations for resilience against power supply failures", December 2013.

[i.10] CEER (Council of European Energy Regulators): "Benchmarking Report 5.2 on the Continuity of Electricity Supply" - Ref: C14-EQS-62-03 (12 February 2015).

NOTE: Available at https://www.ceer.eu/documents/104400/-/-/cbc48e6a-5d5e-a170-ae1d-7b7b298d46a4.

[i.11] AEEGSI report 16th November 2015.

NOTE: Available at www.autorita.energia.it/allegati/com_stampa/15/151116cs.pdf.

[i.12] ETSI TS 103 553-1: "Environmental Engineering (EE); Innovative energy storage technology for stationary use; Part 1: Overview".

[i.13] IEC EN 60950-21: "Information technology equipment. Safety. Remote power feeding".

[i.14] IEC EN 60950-22: "Information technology equipment. Safety. Equipment installed outdoors".

[i.15] IEC EN 62368-3: "Audio/video, information and communication technology equipment - Part 3: Safety aspects for DC power transfer through communication cables and ports".

[i.16] Recommendation ITU-T L.1001: "External universal power adapter solutions for stationary information and communication technology devices".

[i.17] IEC EN 62368-1: "Audio/video, information and communication technology equipment - Part 1: Safety requirements".

[i.18] Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 as emended by Directive 2009/136/EC of the European Parliament and of The Council of 25 November 2009, in particular regarding the Article 23 provisions.

[i.19] ETSI EN 303 215 (V1.3.1) (2015-04): "Environmental Engineering (EE); Measurement methods and limits for power consumption in broadband telecommunication networks equipment".

[i.20] EN 60896-2: "Stationary lead-acid batteries - General requirements and methods of test - Part 2: Valve regulated types", (produced by CENELEC).

[i.21] TR 62102: "Electrical safety - Classification of interfaces for equipment to be connected to information and communications technology networks", (produced by CENELEC).

[i.22] Void.

[i.23] Recommendation ITU-T L.1220 (2017-08): "Innovative energy storage technology for stationary use - Part 1: Overview of energy storage".

[i.24] EN 60950-1: "Information technology equipment - Safety - Part 1: General requirements", (produced by CENELEC).

[i.25] Recommendation ITU-T L.1202 (2015): "Methodologies for evaluating the performance of an up to 400 VDC power feeding system and its environmental impact".

[i.26] ETSI ES 203 408 (V1.1.1) (2016-12): "Environmental Engineering (EE); Colour and marking of DC cable and connecting devices".

[i.27] Broadband Forum TR-301.