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Foreword

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

The present document has been prepared under the Commission's standardisation M/544 to provide one voluntary means of conforming to the ecodesign requirements of Commission Regulation (EU) n° 801/2013 [i.2] of 22 August 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment (EC No 1275/2008 [i.1]) and ecodesign requirements for televisions (EC No 642/2009 [i.10]).

Once the present document is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of the present document given in table A.1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding ecodesign requirements of that Regulation, and associated EFTA Regulations.

| National transposition dates | |
|--|-----------------|
| Date of adoption of this EN: | 12 April 2017 |
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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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Introduction

The methods defined in the present document are intended to define requirements for the measurement of the power consumed by the interconnecting equipment having one or more wired or wireless networked port(s) able to resume a function by way of a remotely initiated trigger or reactivation trigger from a network connection.

For the measurement of low power modes, reference is made to CENELEC EN 50564 [1]. The present document also provides a method to test power management and whether it is possible to deactivate wireless network connection(s).

1 Scope

1.1 Equipment in the scope of the present document

The present document specifies methods of measurement of electrical power consumption in networked standby and the reporting of the results for network interconnecting equipment.

Example of interconnecting equipment are in Annex B.

Power consumption in standby (other than networked standby) is covered by CENELEC EN 50564 [1], including the input voltage range.

The present document also provides a method to test power management and whether it is possible to deactivate wireless network connection(s).

The present document applies to electrical products with a rated input voltage of 230 V a.c. for single phase products and 400 V a.c. for three phase products.

The present document is produced under the mandate M/544 and can be used to demonstrate compliance to the EU regulation 801/2013 [i.2].

NOTE 1: The EU regulation 801/2013 [i.2] applies to equipment designed for use with a nominal voltage rating of 250 V and below.

NOTE 2: EU regulation 801/2013 [i.2] does not apply to electrical and electronic household and office equipment placed on the market with a low voltage external power supply to work as intended.

NOTE 3: "*Low voltage external power supply*" is the definition provided in EU regulation 278/2009 [i.3].

NOTE 4: The measurement of energy consumption and performance of equipment during intended use are generally specified in product standards and are not covered by the present document.

NOTE 5: Where the present document is referenced by more specific standards or procedures, these should define and name the relevant conditions to which this test procedure is applied.

1.2 Equipment not in the scope of the present document

The present document does not apply to the measurement of electrical power consumption in networked standby for edge equipment. The edge equipment is a networked equipment that can be connected to a network and interact with that network or other devices and that does not have, as its primary function, the passing of network traffic to provide a network. Edge equipment are covered in CENELEC EN 50643 [i.8].

2 References

2.1 Normative references

References are specific, identified by date of publication and/or edition number or version number. Only the cited version 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] CENELEC EN 50564 (2011): "Electrical and electronic household and office equipment - measurement of low power consumption".

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] Commission Regulation (EC) No 1275/2008 of 17 December 2008 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment.
- [i.2] Commission Regulation (EU) No 801/2013 of 22 August 2013 amending Regulation (EC) No 1275/2008 with regard to ecodesign requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment, and amending Regulation (EC) No 642/2009 with regard to ecodesign requirements for televisions.
- [i.3] Commission Regulation (EC) No 278/2009 of 6 April 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for no-load condition electric power consumption and average active efficiency of external power supplies.
- [i.4] ETSI EN 301 575 (05-2012): "Environmental Engineering (EE); Measurement method for energy consumption of Customer Premises Equipment (CPE)".
- [i.5] "Code Of Conduct on Energy Consumption of Broadband Communication Equipment" European Commission Directorate-General, Joint Research Centre; Final V5: 20 December 2013.

NOTE: Available at http://iet.jrc.ec.europa.eu/energyefficiency/sites/energyefficiency/files/files/documents/ICT_CoC/cocv5-broadband_final.pdf.

- [i.6] Cablelabs: "Data-Over-Cable Service Interface Specifications - DOCSIS® 2.0 Interface".
- [i.7] Cablelabs: "Data-Over-Cable Service Interface Specifications- DOCSIS® 3.0 Interface".
- [i.8] CENELEC EN 50643: "Electrical and electronic household and office equipment - Measurement of networked standby power consumption of edge equipment".
- [i.9] IEC 60050: "International Electrotechnical Vocabulary".
- [i.10] Commission Regulation (EC) No 642/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for televisions.
- [i.11] IEC IEV ref 904-03-01: "Environmental standardization for electrical and electronic products and systems".

NOTE: Available at <http://www.electropedia.org/iev/iev.nsf/display?openform&ievref=904-03-01>.

- [i.12] IEEE™ 802.11-2012: "IEEE Standard for Information technology--Telecommunications and information exchange between systems Local and metropolitan area networks--Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document the terms and definitions given in CENELEC EN 50564 [1] and the following apply:

NOTE: When the present document is used to provide presumption of conformity to a European Directive or Regulation, definitions given in the Directive or Regulation prevail.

edge equipment: networked equipment that can be connected to a network and interact with that network or other equipment and that does not have, as its primary function, the passing of network traffic to provide a network

NOTE: Examples of edge equipment are given in Annex A.

interconnecting equipment: networked equipment that has, as its primary function, the passing of network traffic to provide a network

NOTE: Examples of interconnecting equipment are given in Annex A.

logical network port: network technology running over a physical network port

NOTE 1: EU Commission Regulation n° 801/2013 [i.2] definition.

NOTE 2: Different communication protocols result in different network technologies.

low voltage power supply: external power supply with a nameplate output voltage of less than 6 volts and a nameplate output current greater than or equal to 550 milliamperes

NOTE: EC Commission Regulation n° 278/2009 [i.3] definition.

network: communication infrastructure with a topology of links, an architecture, including the physical components, organizational principles, communication procedures and formats (protocols)

NOTE: EU Commission Regulation n° 801/2013 [i.2] definition.

network availability: capability of the equipment to resume functions after a remotely initiated trigger has been detected by a network port

NOTE: EU Commission Regulation n° 801/2013 [i.2] definition.

network port: wired or wireless physical interface of the network connection located on the equipment through which the equipment can be remotely activated

NOTE 1: EU Commission Regulation n° 801/2013 [i.2] definition.

NOTE 2: The International Electrotechnical Vocabulary (IEC 60050 [i.9]) defines "port (of a network)" as: "*a termination through which signals can enter or leave a network*".

networked equipment: equipment that can connect to a network and has one or more network ports

NOTE: EU Commission Regulation n° 801/2013 [i.2] definition.

networked standby: condition in which the equipment is able to resume a function by way of a remotely initiated trigger from a network connection

NOTE: EU Commission Regulation n° 801/2013 [i.2] definition.

physical network port: physical (hardware) medium of a network port. A physical network port can host two or more network technologies

NOTE 1: EU Commission Regulation n° 801/2013 [i.2] definition.

NOTE 2: A "physical network port" can consist of multiple "logical network ports".

power management: automatic control mechanism that achieves the smallest input power consistent with a pre-determined level of functionality

NOTE: Source: IEV 904-03-01 [i.11], modified by omission of the note to entry.

reactivation trigger: signal that brings the equipment back to active mode

NOTE: The reactivation may be remotely initiated.

remotely initiated trigger: signal that comes from outside the equipment via a network

NOTE: EU Commission Regulation n° 801/2013 [i.2] definition.

3.2 Abbreviations

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

| | |
|-----------|---|
| °C | Grade Celsius |
| AC | Alternating Current |
| ADSL | Asymmetric Digital Subscriber Line |
| ADSL2plus | Second generation ADSL with extended bandwidth |
| AP | Access Point |
| BOB | Buffered On Board |
| CPU | Central Processing Unit |
| CRC | Cyclic Redundancy Check |
| DC | Direct Current |
| DOCSIS® | Data Over Cable Service Interface Specification |
| ECC | Error-Correcting Code |
| EFTA | European Free Trade Association |
| EPON | Ethernet Passive Optical Network |
| EUT | Equipment Under Test |
| FB | Frame Buffer |
| FXS | Foreign eXchange Station |
| GPON | Gigabyte Passive Optical Network |
| HiNA | High Network Availability |
| Hz | Hertz |
| IP | Internet Protocol |
| LAN | Local Area Network |
| Ms/s | Mega symbols per second |
| MTBF | Mean Time Between Failures |
| OS | Operating System |
| PCI | Peripheral Component Interconnect |
| PSD | Power Spectral Density |
| QAM | Quadrature Amplitude Modulation |
| RF | Radio Frequency |
| UMA | Uniform Memory Access |
| USB | Universal Serial Bus |
| V | Volt |
| VDSL | Very high speed Digital Subscriber Line |
| VDSL2 | Second generation VDSL |
| WAN | Wide Area Network |
| WiMAX | Worldwide Interoperability for Microwave Access |
| XG-PON | 10-Gigabit-capable Passive Optical Network |

4 Information required for testing purposes

4.1 Information about networked port(s)

For each type of physical and associated logical networked port, the following information shall be provided by the manufacturer:

- a) the default time after which the power management function, or a similar function, automatically switches the equipment into networked standby, and if available, the procedure for:
 - 1) setting a time shorter than the default time; and/or
 - 2) manually switching the equipment into networked standby;
- b) the characteristics of the reactivation trigger (message, signal, etc.) that is used to reactivate the equipment when in networked standby and how to remotely initiate it;
- c) the maximum performance specifications, e.g. the maximum speed or data rate supported by that networked port;
- d) the (maximum) power consumption of the equipment in a condition providing networked standby into which power management function, or a similar function, will switch the equipment, if only this port is used for remote activation, e.g. the declared power consumption of the equipment under defined conditions for a type of port;
- e) the communication protocol used by equipment;
- f) the radio frequency range at which each radio wireless logical network port operates;
- g) the characteristics of wireless logical network ports other than radio wireless logical network ports.

NOTE: Annex D describes examples of product information for network equipment.

4.2 Power management function - periods & conditions

The manufacturer shall provide information on

- whether the equipment under test provides a power management or a similar function. If the EUT does not provide power management or a similar function, the manufacturer shall indicate why such a function would be inappropriate for the intended use;
- the default period of time after which the power management function, or a similar function, switches the equipment automatically into a condition providing networked standby.

NOTE: According to European Regulation n° 1275/2008 [i.1] (as amended by EU Regulation n° 801/2013 [i.2]), the maximum default period is given as 20 minutes during which the equipment has not been providing its main function.

4.3 Activation and deactivation of wireless network connections

The manufacturer shall provide information on the procedure the user needs to follow in order to activate and deactivate each wireless network connection, if any.

The above requirement does not apply to equipment which relies on a single wireless network connection for intended use and does not have a wired network connection.

5 Measurement conditions

5.1 Common requirements

The general conditions for measurements specified in clause 4.1 of CENELEC EN 50564 [1] shall apply.

The tests described in clause 6 of the present document shall be repeated, if applicable, for each type of network port.

Each type of logical network port (as declared by the manufacturer) using the same physical network port shall be tested.

Where the manufacturer declares that multiple physical network ports have the same technical and logical specification(s), tests shall be executed with any one of these physical network ports being connected (the other ones being deactivated for wireless network ports and disconnected for wired network ports).

When a logical network port, as declared by the manufacturer, supports multiple editions of a communication technology standard (e.g. for backward compatibility), the logical network port is tested only according to the specifications of the latest standard edition used by the EUT for retrieving a reactivation message. Examples are shown in Annex C.

NOTE: Some devices can be designed to switch to a lower data rate during networked standby in order to further reduce energy consumption.

In order to restrict influence of external factors, the reactivation trigger shall be initiated within a local test network without external network connections. In the case that a network connection external to the local test network is necessary for remote activation, this external network connection shall be established and maintained during testing so that the reactivation trigger can be received; where identified in the information provided by the manufacturer (see clause 4), the stability of this external network connection may be checked or monitored.

EXAMPLE 1: External factors can be maintenance, information/software update or a denial of service attack.

EXAMPLE 2: External network connections can be WAN, cable network, satellite link, etc.

5.2 Test room

The requirements specified in clause 4.2 of CENELEC EN 50564 [1] shall apply.

5.3 Power supply

The requirements specified in clause 4.3 of CENELEC EN 50564 [1] shall apply.

5.4 Power measuring instruments

The requirements specified in clause 4.4 of CENELEC EN 50564 [1] shall apply.

5.5 Configuration of network ports

When testing only one type of network port, the procedure given in clause 6 shall apply. The network ports of the equipment under test, other than the network port under test shall be deactivated for wireless network ports and disconnected for wired network ports, if possible. Logical network ports which can only be activated and deactivated together shall be tested together following the same procedures used for individual network ports.

The network port under test shall have networked standby functionality enabled and shall be connected to the appropriate test equipment which will form the network configuration for the test. In case more than one type of reactivation trigger is available per type of network port to reactivate the equipment under test when in networked standby, the configuration resulting in the highest power consumption in networked standby shall be determined, as given below: