

ETSI EN 303 423 V1.2.1 (2018-08)



**Environmental Engineering (EE);
Electrical and electronic household and office equipment;
Measurement of networked standby power consumption
of Interconnecting equipment;
Harmonised Standard covering the measurement method
for EC Regulation 1275/2008 amended by
EU Regulation 801/2013**

ReferenceREN/EE-EEPS34

Keywordscustomer premises networks, energy efficiency,
network, power measurement**ETSI**650 Route des Lucioles
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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:	6 August 2018
Date of latest announcement of this EN (doa):	30 November 2018
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 May 2019
Date of withdrawal of any conflicting National Standard (dow):	31 May 2020

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

For the measurement of low power modes, reference is made to CENELEC EN 50564 [1].

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] European Commission Directorate-General, Joint Research Centre: "Code Of Conduct on Energy Consumption of Broadband Communication Equipment"; 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 B.

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 B.

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:

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
DSL	Digital Subscriber Line
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
HPNA	Home Phoneline Networking Alliance
IP	Internet Protocol
LAN	Local Area Network
MTBF	Mean Time Between Failures
OS	Operating System
PCI	Peripheral Component Interconnect
PCI-E	Peripheral Component Interconnect Express
PCI-X	Peripheral Component Interconnect eXtended
POF	Plastic Optical Fiber
PSD	Power Spectral Density
QAM	Quadrature Amplitude Modulation
RF	Radio Frequency
UMA	Uniform Memory Access
USB	Universal Serial Bus
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.

NOTE: If a product relies on active wired connection(s) to one or more network port(s) for the intended use, manual deactivation of these network port(s) is allowed instead of physical wire disconnection. The manual deactivation demands manual activation of network port(s) to resume the operational state of the device. As an example some of the technologies that are always relayed on downstream reception like DOCSIS, DSL starts continuous carrier scanning in respective frequency bands to recover its lost connection and consequently the measured power consumption is not representative of the real power consumption of the device; when it is in networked standby.

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:

- a) At least once, all configurations shall be set-up with the information provided according the clause 4.1 and tested following the procedure given in clause 6 to determine the related power consumption to determine the configuration with the highest power consumption.
- b) When the configuration with the reactivation trigger resulting in the highest power consumption in networked standby is known, this configuration shall be selected to conduct the measurement. The source of this information shall be additionally given in the test report.
- c) When the power consumption does not depend on the configuration and its reactivation trigger used, the configuration with the default reactivation trigger setting shall be selected.

The test equipment shall be able to test the EUT at the maximum performance level of the network port's protocol supported by hardware and software of the EUT.

The configuration of the network ports shall be according to the following setups (see also ETSI EN 301 575 [i.4] and Code Of Conduct on Energy Consumption of Broadband Communication Equipment [i.5]):

- WAN: link established and synchronized to verify the on-mode conditions. For the verification of power management functions, the link shall be established and up, the interface is ready to transmit traffic but no user traffic is present.
- ADSL2plus: select a valid ADSL2plus specific test profile, configured in rate adaptive mode. Use a test loop of 1,250 m to verify the on-mode conditions. For the verification of power management functions, the link shall be established and up, the interface is ready to transmit traffic but no user traffic is present.
- VDSL2: Select a valid VDSL2 profile line combination, for the governing profile bandwidth (namely 8 MHz, 12 MHz or 17 MHz), configured in rate adaptive mode. Use a test loop of 300 m for the 8 MHz profile and 150 m for each of the 12 MHz and 17 MHz profiles to verify the on-mode conditions. For the verification of power management functions, the link shall be established but no user traffic is present.
- VDSL2 (30a): VDSL2 Band Profile shall be: Profile 30a, using a valid PSD mask, configured in rate adaptive mode. Use a test loop of 100 m to verify the on-mode conditions. For the verification of power management functions, the link shall be established but no user traffic is present.
- Fast Ethernet WAN: Link established at 100 Mbit/s and passing user traffic: concurrent 1 Mbit/s downstream and 1 Mbit/s upstream sent in bursts of 25 back-to-back 500 bytes Ethernet Frames (CRC included) to verify the on-mode conditions. For the verification of power management functions, the link shall be established and up, the interface is ready to transmit traffic but no user traffic is present.
- Gigabit Ethernet WAN: Link established at 1 000 Mbit/s and passing user traffic: concurrent 50 Mbit/s downstream and 10 Mbit/s upstream sent in bursts of 250 back-to-back 500 bytes Ethernet Frames (CRC included) to verify the on-mode conditions. For the verification of power management functions, the link shall be established and up, the interface is ready to transmit traffic but no user traffic is present.
- Fibre Point-to-Point Fast Ethernet WAN: Link established at 100 Mbit/s and passing user traffic: 20 Mbit/s downstream, 5 Mbit/s upstream to verify the on-mode conditions. For the verification of power management functions, the link shall be established and up, the interface is ready to transmit traffic but no user traffic is present.

- Fibre Point-to-Point Gigabit Ethernet WAN: Link established at 1 000 Mbit/s and passing user traffic: 50 Mbit/s downstream, 10 Mbit/s upstream to verify the on-mode conditions. For the verification of power management functions, the link shall be established and up, the interface is ready to transmit traffic but no user traffic is present.
- GPON: passing user traffic: 10 Mbit/s downstream, 10 Mbit/s upstream to verify the on-mode conditions. For the verification of power management functions, the link shall be established but no user traffic is present.
- 1G-EPON: passing user traffic: 10 Mbit/s downstream, 10 Mbit/s upstream to verify the on-mode conditions. For the verification of power management functions, the link shall be established but no user traffic is present.
- 10/1G-EPON: passing user traffic: 50 Mbit/s downstream, 5 Mbit/s upstream to verify the on-mode conditions. For the verification of power management functions, the link shall be established but no user traffic is present.
- 10/10G-EPON: passing user traffic: 50 Mbit/s downstream, 10 Mbit/s upstream to verify the on-mode conditions. For the verification of power management functions, the link shall be established and up, the interface is ready to transmit traffic but no user traffic is present.
- XG-PON1: passing user traffic: 50 Mbit/s downstream, 10 Mbit/s upstream to verify the on-mode conditions. For the verification of power management functions, the link shall be established but no user traffic is present.
- DOCSIS® 2.0 [i.6]: Active with a downstream channel with a modulation type of 256 QAM and an upstream channel with a modulation type of 64 QAM and a symbol rate of 5,12 Ms/s to verify the on-mode conditions. For the verification of power management functions, the link shall be established but no user traffic is present.
- DOCSIS® 3.0 [i.7]: Active with an NxM configuration with N downstream channels with a modulation type of 256 QAM and M upstream channels with a modulation type of 64 QAM and a symbol rate of 5,12 Ms/s to verify the on-mode conditions. For the verification of power management functions, the link shall be established but no user traffic is present.
- WiMAX, 3G, LTE Passing user traffic: 1 Mbit/s downstream, 200 kbit/s upstream to verify the on-mode conditions. For the verification of power management functions, the link shall be established but no user traffic is present.
- LAN Fast Ethernet ports: all ports active, link established at 100 Mbit/s, cable length is 10 m and passing user traffic: concurrent 1 Mbit/s downstream and 1 Mbit/s upstream per port sent in bursts of 25 back-to-back 500 bytes Ethernet Frames (CRC included). For the verification of power management functions, the link shall be established but no user traffic transmission.
- LAN Gigabit Ethernet ports: all ports active, link established at 1 000 Mbit/s, cable length is 10 m and passing user traffic: concurrent 10 Mbit/s downstream and 10 Mbit/s upstream per port sent in bursts of 250 back-to-back 500 bytes Ethernet Frames (CRC included). For the verification of power management functions, the link shall be established but no user traffic transmission.
- Wi-Fi 802.11g [i.12] or 11a: beacon on, 1 Wi-Fi client associated and 1 - 5 m away from AP in the same room, avoid interference in the same band, with user traffic: concurrent 5 Mbit/s downstream and 5 Mbit/s upstream (where simultaneous dual-band operation is supported, this traffic is used). For the verification of power management functions, beacon is on, but no user traffic transmitted, no client associated.
- Wi-Fi 802.11n [i.12] or 11ac: beacon on, 1 Wi-Fi 802.11n client associated and 1 - 5 m away from AP in the same room, avoid interference in the same band, with user traffic: concurrent 10 Mbit/s downstream and 10 Mbit/s upstream (where simultaneous dual-band operation is supported, this traffic is used). For the verification of power management functions, beacon is on, but no user traffic transmitted, no client associated.
- Alternative LAN technologies (e.g. HPNA, MoCA, Powerline, POF): MoCA, Powerline, HPNA, or POF capability is activated, with user traffic: concurrent 10 Mbit/s downstream and 10 Mbit/s upstream per interface. For the verification of power management functions, MoCA, Powerline, HPNA, or POF capability is activated, but no user traffic transmitted.
- FXS: 1 phone connected (200 Ohm/loop current of 20 mA/5 m max cable length), off hook, 1 active call. For the verification of power management functions, 1 FXS port with phone connected, phone on-hook, off hook detection active. Remaining FXS ports: no phone or other load connected, but able to detect a connection.

- Femtocell (Home use, RF power < 10 mW, RF power 10 mW - 50 mW): active, client 5 m away in the same room, with user traffic: 2 Mbit/s to verify the on-mode conditions. For the verification of power management functions, the link shall be established but no user traffic is present.

For types of network connections not described above, the manufacturer of the EUT shall specify the test conditions.

5.6 Measurement uncertainty

Uncertainty introduced by the instrument that measures the input power shall be determined according to clause 4.4.1 of CENELEC EN 50564 [1]. Annex D of CENELEC EN 50564 [1] also describes the determination of measurement uncertainty, taking other parameters into account.

In order to avoid uncertainty associated to the communication link of the equipment under test, the cable lengths and measurement distances specified in clause 5.5 shall be respected where applicable. The test network should be restricted to the necessary test and ancillary equipment, directly related connected devices and the EUT.

6 Measurement procedures

6.1 General

The requirements specified in clause 5.1 of CENELEC EN 50564 [1] shall apply.

6.2 Wireless network port management

6.2.0 General

Activation and deactivation of wireless network port is verified according to the following procedure.

6.2.1 Test sequence

Wireless network port management shall be tested using the following steps or, where applicable, information supplied by the manufacturer:

- 1) Identify all logical network ports provided by the EUT which utilize a wireless network technologies; make sure the EUT is provided with, or connected to, a suitable antenna.
- 2) Deactivate all logical network ports provided by the EUT which utilize one or more wireless network technologies.
- 3) Verify that all wireless transmitters corresponding to the logical network ports identified in step 1 are off, according to clause 6.2.2.
- 4) In sequence, for each logical network port identified in step 1:
 - Activate the logical network port under test.
 - Verify that the logical network port under test is active according to clause 6.2.3.
 - Deactivate the logical network port under test.
 - Verify that wireless transmitters of the logical network port under test are off, according to clause 6.2.2.

6.2.2 Verifying that wireless connections are deactivated

To verify that wireless transmitters are in off mode, a suitable detection device shall be used to determine that wireless signals are not transmitted by the EUT in the normal operating frequencies or wavelengths provided by the manufacturer for each wireless logical network port.

NOTE: For determining whether an RF transmitter has been deactivated, an antenna connected to a suitable measurement instrument (including an RF Spectrum Analyser, RF Fast Fourier Transform analyser, or an RF Receiver) is used.

6.2.3 Verifying that wireless logical network port is active

A wireless logical network port is deemed to be active when it allows the EUT to identify other devices or to be identified by them.

6.3 Preparation of the EUT and general testing aspects

The requirements specified in clause 5.2 of CENELEC EN 50564 [1] shall apply.

6.4 Power management, reactivation and networked standby power consumption

This clause describes the procedure to test the power management function, measure the network standby power consumption, and test the reactivation function. This procedure shall be applied to each type of logical network port on an individual basis. Where network ports cannot be managed separately, the procedure shall be applied to groups of network ports managed simultaneously.

The EUT shall be tested using the following steps or, where applicable, using information supplied by the manufacturer (see clause 4):

- 1) Setup the EUT network ports according to the configurations given in clause 5.5 of the present document or according to the manufacturer specifications if the EUT has network ports not defined in clause 5.5 of the present document. If the EUT is equipment with HiNA functionality, the HiNA function shall be enabled if available when HiNA port is measured.
- 2) Configure the EUT and dependent devices so that the power management function automatically initiates the transition of the EUT into a condition having networked standby and the logical network port through which the EUT will be reactivated is enabled. Deactivate all other wireless ports not under test and deactivate or disconnect all wired network ports not under test; see note 1.

NOTE 1: According to EU Regulation n° 801/2013 [i.2], "networked equipment that has one or more standby mode(s) shall comply with the requirements for these standby mode(s) when all wired network ports are disconnected and when all wireless network ports are deactivated".

NOTE 2: If a product relies on active wired connection(s) to one or more network port(s) for the intended use, manual deactivation of these wired network port(s) is allowed instead of disconnection.

- 3) Measure, with an accuracy of 10 seconds, the time after which the power management function automatically initiates the transition of the EUT into a condition providing networked standby by the following steps:
 - leave the EUT in a mode where it is not providing a main function (as determined in step 1) and no other devices are dependent on its functions. Start the timer used for measurement;
 - measure the time taken until the power management function initiates an automatic power mode change instigating network standby.

NOTE 3: For electronic household and office equipment other than televisions and computers, Regulation (EU) No 801/2013 [i.2] says "*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 shall not exceed 20 minutes*".

- 4) When the EUT has entered a condition providing networked standby, measure the power consumption according to clause 5.3 of CENELEC EN 50564 [1]. For an EUT requiring connection to an external network, if stability of networked standby power consumption is not attained, then the network connection shall be checked to detect influence of external factors (see clause 5.1).

NOTE 4: Instability of power consumption due to external influences could be compared with periodic or cyclic patterns being present. See note 2 of clause 5.3.2 in CENELEC EN 50564 [1].

- 5) Considering the specific network port configuration under test, verify that the EUT can be reactivated through the network port configuration being tested. The EUT shall be reactivated using a network trigger appropriate for the logical network port being tested. The required reactivation trigger shall be declared by the manufacturer. If this reactivation trigger uses proprietary technology it shall be specified in detail or supplied by the manufacturer. If the reactivation trigger does not initiate reactivation of the EUT, the EUT is not considered to be in networked standby.

Steps 2 to 5 shall be repeated for each type of logical network port. If the EUT can be manually set to networked standby, perform steps 4 and 5 after manually setting the EUT to networked standby. This shall also be repeated for each type of logical network port. The EUT may need to be reset before the next measurement starts.

6.5 Measurement of standby power consumption with all network ports disconnected

The EUT shall be tested using the following steps, utilizing information (including whether it has HiNA functionality) supplied by the manufacturer (see clause 4):

- 1) Configure the EUT and dependent devices so that all wired network ports are disconnected and all wireless network ports are deactivated (according to clause 5.5).
- 2) Configure the EUT with the power management function that automatically initiates the transition of the EUT into a condition having standby (or a similar low power mode). If applicable the EUT may be manually set to standby.

NOTE 1: Equipment with HiNA functionality does not normally go automatically into standby or similar low power mode.

- 3) Measure the power consumption according to clause 5.3 of CENELEC EN 50564 [1], when the EUT has entered a stable condition providing standby or similar low power modes.

NOTE 2: If the EUT has not a stable power condition, the method defined in clause 5.3.2 of CENELEC EN 50564 [1] applies.

6.6 Measurement of networked standby power consumption with all network ports connected

The EUT shall be tested using the following steps, utilizing information (including whether it has HiNA functionality) supplied by the manufacturer (see clause 4):

- 1) Configure the EUT and dependent devices so that all wired network ports are connected and all wireless network ports are activated (according to clause 5.5).
- 2) Configure the EUT with the power management function that automatically initiates the transition of the EUT into a condition having networked standby for all logical network ports. If applicable the EUT may be manually set to networked standby.
- 3) When the EUT has entered a condition providing networked standby, measure the power consumption according to clause 5.3 of CENELEC EN 50564 [1]. For an EUT requiring connection to an external network, if stability of networked standby power consumption is not attained, then the network connection shall be checked to detect influence of external factors (see clause 5.1 and note 4 of clause 6.4).

7 Test report

7.1 Test and laboratory details

The requirements specified in clause 6.4 of CENELEC EN 50564 [1] shall apply.

7.2 Details of product under test

The requirements specified in clause 6.1 of CENELEC EN 50564 [1] shall apply.

In addition, following information shall be provided:

- a) The number and type of network ports and, with the exception of wireless network ports, where these ports are located on the equipment; in particular it shall be declared if the same physical network port accommodates two or more types of network ports.
- b) Whether all network ports are deactivated before delivery.
- c) The normal range of frequencies or wavelengths for each wireless network port.
- d) Whether the equipment qualifies as HiNA equipment or equipment with HiNA functionality.

When no information is provided according to point (d), equipment shall be considered to be neither HiNA equipment nor equipment with HiNA functionality.

7.3 Test parameters and network configuration

The requirements specified in clause 6.2 of CENELEC EN 50564 [1] shall apply.

The configuration of the test network in accordance to clauses 5.5, 6.2, 6.4 and 6.5 shall be documented for each measurement conducted in respect to interconnecting equipment and access point used (name of manufacturer, model name and serial number, relevant settings), the cabling (type & length), layout and distances for wireless connections and network connection speeds.

Where manufacturer instructions have been used, this shall be documented.

7.4 Measured and documented data

The requirements specified in clause 6.3 of CENELEC EN 50564 [1] shall apply. In addition, the following information shall be provided in the test report:

- a) Network configuration used for each type of network port (for example where applicable: cable length & type, distance from the EUT, network equipment utilized and network connection speeds).
- b) Time taken for the EUT to automatically power down into a condition providing networked standby mode for each type of network port.
- c) Power measurements for the EUT in networked standby mode, for each type of network port (following automatic or manual power down).
- d) Confirmation of successful remote reactivation for each type of network port.
- e) Wireless measurement for EUT after each wireless logical network port has been deactivated.
- f) Power measurement in networked standby mode, with all wired network port connected and all wireless network ports activated.

NOTE: Annex E provides an example of a test report template.

Annex A (informative): Relationship between the present document and the ecodesign requirements of the Commission Regulation (EU) n° 801/2013

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.

Table A.1: Relationship between the present document and the ecodesign requirements of Commission Regulation (EU) n° 1275/2008 [i.1] amended by Commission Regulation (EU) n° 801/2013 [i.2]

Harmonised Standard ETSI EN 303 423				
Requirement			Requirement Conditionality	
No	Description	Reference: Clause No	U/C	Condition
1	Ecodesign requirements (Annex II of Commission Regulation (EU) n° 1275/2008 [i.1] amended by Commission Regulation (EU) n° 801/2013 [i.2] Annex II, point 3(a))	6.2	U	Possibility of deactivating wireless network connection(s)
2	Ecodesign requirements (Annex II of Commission Regulation (EU) n° 1275/2008 [i.1] amended by Commission Regulation (EU) n° 801/2013 [i.2] Annex II, point 3(b))	6.4 (step 3)	U	Power management for networked equipment
3	Ecodesign requirements (Annex II of Commission Regulation (EU) n° 1275/2008 [i.1] amended by Commission Regulation (EU) n° 801/2013 [i.2] Annex II, point 4(a))	6.5	U	Standby mode(s) when all wired network ports are disconnected and when all wireless network ports are deactivated
4	Ecodesign requirements (Annex II of Commission Regulation (EU) n° 1275/2008 [i.1] amended by Commission Regulation (EU) n° 801/2013 [i.2] Annex II, point 4(b))	6.5	U	Power management for Networked equipment other than HiNA equipment when all wired network ports are disconnected and when all wireless network ports are deactivated
5	Ecodesign requirements (Annex II of Commission Regulation (EU) n° 1275/2008 [i.1] amended by Commission Regulation (EU) n° 801/2013 [i.2] Annex II, point 4(c))	6.4 (step 4)	C	Power consumption in a condition providing "networked standby"

Harmonised Standard ETSI EN 303 423				
Requirement			Requirement Conditionality	
No	Description	Reference: Clause No	U/C	Condition
6	Ecodesign requirements (Annex II of Commission Regulation (EU) n° 1275/2008 [i.1] amended by Commission Regulation (EU) n° 801/2013 [i.2] Annex II, point 5	6.4 (step 4)	U	Power consumption of networked equipment other than HiNA equipment or other than equipment with HiNA functionality, in a condition providing networked standby into which the equipment is switched by the power management function, or a similar function
7	Ecodesign requirements (Annex II of Commission Regulation (EU) n° 1275/2008 [i.1] amended by Commission Regulation (EU) n° 801/2013 [i.2] Annex II, point 7 (b)	6.6	U	power consumption in networked standby if all wired network ports are connected and all wireless network ports are activated
8	Ecodesign requirements (Annex II of Commission Regulation (EU) n° 1275/2008 [i.1] amended by Commission Regulation (EU) n° 801/2013 [i.2] Annex II, point 9	7.4	U	Information to be provided in the technical documentation

Key to columns:**Requirement:**

- No** A unique identifier for one row of the table which may be used to identify a requirement.
- Description** A textual reference to the requirement.
- Clause Number** Identification of clause(s) defining the requirement in the present document unless another document is referenced explicitly.

Requirement Conditionality:

- U/C** Indicates whether the requirement is unconditionally applicable (U) or is conditional upon the manufacturer's claimed functionality of the equipment (C).
- Condition** Explains the conditions when the requirement is or is not applicable for a requirement which is classified "conditional".

Presumption of conformity stays valid only as long as a reference to the present document is maintained in the list published in the Official Journal of the European Union. Users of the present document should consult frequently the latest list published in the Official Journal of the European Union.

Other Union legislation may be applicable to the product(s) falling within the scope of the present document.

Annex B (informative): Equipment classification

B.1 General

Networked equipment can be classified as edge equipment or interconnecting equipment. Depending on the application, the same equipment may sometimes fall into either or both of those classifications. Examples of equipment and their classification can be found in table B.1.

Table B.1: Example of equipment definition and classifications

Defined term in Commission Regulation (EU) 801/2013 [i.2]	Definition from EU Regulation	Edge device	interconnecting
networked equipment	equipment that can connect to a network and has one or more network ports.	Yes	Yes
networked equipment with high network availability (HiNA equipment)	equipment with one or more of the following functionalities, but no other, as the main function(s): router, network switch, wireless network access point, hub, modem, VoIP telephone, video phone.	See specific products: router, network switch, wireless network access point, hub, modem, VoIP telephone, video phone	
networked equipment with high network availability functionality (equipment with HiNA functionality)	equipment with the functionality of a router, network switch, wireless network access point or combination thereof included, but not being HiNA equipment.	See specific products: router, network switch, wireless network access point	
router	a network device whose primary function is to determine the optimal path along which network traffic should be forwarded. Routers forward packets from one network to another, based on network layer information (L3).	No	yes
network switch	a network device whose primary function is to filter, forward and distribute frames based on the destination address of each frame. All switches operate at least at the data link layer (L2).	No	Yes
wireless network access point	device whose primary function is to provide IEEE 802.11™ (Wi-Fi) [i.12] connectivity to multiple clients.	No	Yes
hub	a network device that contains multiple ports and is used to connect segments of a Local Area Network.	No	Yes
modem	a device whose primary function is to transmit and receive digitally modulated analogue signals over a wired network.	No	Yes
printing equipment	equipment that generates paper output from electronic input. Printing equipment may have additional functions and may be marketed as a multifunctional device or multifunctional product.	Yes	no
large format printing equipment	printing equipment designed for printing on A2 media and larger, including equipment designed to accommodate continuous-form media of at least 406 mm width.	Yes	no
tele-presence system	dedicated system for high-definition video conferencing and collaboration which includes a user interface, a high-definition camera, a display, a sound system and processing capabilities for encoding and decoding video and audio.	Yes	no

Defined term in Commission Regulation (EU) 801/2013 [i.2]	Definition from EU Regulation	Edge device	interconnecting
desktop thin client	a computer that relies on a connection to remote computing resources (e.g. computer server, remote workstation) to obtain primary functionality and has no rotational storage media integral to the product. The main unit of a desktop thin client must be intended for use in a permanent location (e.g. on a desk) and not for portability. Desktop thin clients can output information to either an external or, where included with the product, an internal display.	Yes	No
workstation	high-performance, single-user computer primarily used for graphics, Computer Aided Design, software development, financial and scientific applications among other compute intensive tasks, and which has the following characteristics: (a) has a mean time between failures (MTBF) of at least 15 000 hours; (b) has error-correcting code (ECC) and/or buffered memory; (c) meets three of the following five characteristics: (1) has supplemental power support for high-end graphics (i.e. peripheral component interconnect (PCI)-E 6-pin 12 V supplemental power feed); (2) its system is wired for greater than x 4 PCI-E on the motherboard in addition to the graphics slot(s) and/or PCI-X support; (3) does not support uniform memory access (UMA) graphics; (4) includes five or more PCI, PCI-E or PCI-X slots; (5) is capable of multi-processor support for two or more CPU (must support physically separate CPU packages/sockets, i.e. not met with support for a single multi core CPU).	Yes	No
mobile workstation	high-performance, single-user computer primarily used for graphics, Computer Aided Design, software development, financial and scientific applications among other compute intensive tasks, excluding game play, and which is designed specifically for portability and to be operated for extended periods of time either with or without a direct connection to an AC power source. Mobile workstations utilize an integrated display and are capable of operation on an integrated battery or other portable power source. Most mobile workstations use an external power supply and most have an integrated keyboard and pointing device. A mobile workstation has the following characteristics: (a) has a mean time between failures (MTBF) of at least 13 000 hours; (b) has at least one discrete graphics card (dGfx) meeting the G3 (with FB Data Width > 128-bit), G4, G5, G6 or G7 classification; (c) supports the inclusion of three or more internal storage devices; (d) supports at least 32 GB of system memory.	Yes	No

Defined term in Commission Regulation (EU) 801/2013 [i.2]	Definition from EU Regulation	Edge device	interconnecting
small-scale server	<p>a type of computer that typically uses desktop computer components in a desktop form factor but is designed primarily to be a storage host for other computers and to perform functions such as providing network infrastructure services and hosting data/media, and which has the following characteristics:</p> <p>(a) is designed in a pedestal, tower, or other form factor similar to those of desktop computers such that all data processing, storage, and network interfacing is contained within one box;</p> <p>(b) is designed to be operational 24 hours per day and 7 days per week;</p> <p>(c) is primarily designed to operate in a simultaneous multi-user environment serving several users through networked client units;</p> <p>(d) where placed on the market with an operating system, the operating system is designed for home server or low-end server applications;</p> <p>(e) is not placed on the market with a discrete graphics card (dGfx) meeting any classification other than G1.</p>	Yes	No
computer server	<p>a computing product that provides services and manages networked resources for client devices, such as desktop computers, notebook computers, desktop thin clients, internet protocol (IP) telephones, or other computer servers. A computer server is typically placed on the market for use in data centres and office/corporate environments. A computer server is primarily accessed via network connections, and not through direct user input devices, such as a keyboard or a mouse.</p> <p>A computer server has the following characteristics:</p> <p>(a) is designed to support computer server operating systems (OS) and/or hypervisors, and targeted to run user-installed enterprise applications;</p> <p>(b) supports error-correcting code (ECC) and/or buffered memory (including both buffered dual in-line memory modules (DIMMs) and buffered on board (BOB) configurations);</p> <p>(c) is placed on the market with one or more AC-DC power supply(ies);</p> <p>(d) all processors have access to shared system memory and are independently visible to a single OS or hypervisor.</p>	Yes	No

Annex C (informative): General information on network technologies and network configurations with respect to power consumption

C.1 Examples of network port configuration

Examples are provided below on how different types of network port configurations would be assessed with respect to the present document.

Table C.1: Examples of technologies considered for Networked standby

Hardware network port type	Network port 1: Protocol	Network port 1: additional protocol or variant	Network port 2: protocol	Comment:
USB	USB 2.0	-	USB 3.0	Two separate network ports
USB	USB 3.0	USB 2.0	-	One USB 3.0 network port
Ethernet	10 Base-T	100 Base-T	1000 Base-T	Two separate network ports. One 100 Base-T and one 1000 Base-T
Ethernet	100 Base-T	1000 Base-T	-	One 1000 Base-T network port
Coax	DOCSIS		MoCA	Two separate network ports
Coax	DOCSIS	MoCA		Two separate logical network ports connected to the same physical network port
Wi-Fi (802.11)	IEEE 802.11™b	802.11g	802.11n	Two separate network ports. One 802.11g and one 802.11n
Wi-Fi (802.11)	802.11b/g	802.11n		One 802.11n network port

Annex D (informative): Information to be provided to the user and other interested parties

D.1 Information to be provided to the user and other interested parties

D.1.1 Information available on-line

According to the regulation n° 801/2013 [i.2], the following information for networked equipment should be visibly displayed on one or more freely accessible website(s):

- a) for each standby and/or off mode and the condition providing networked standby into which the equipment is switched by the power management function or similar function:
 - the power consumption data in Watt rounded to the first decimal place;
 - the period of time after which the power management function, or a similar function, switches the equipment automatically into standby and/or off mode and/or the condition providing networked standby;
- b) the power consumption of the product in networked standby if all wired network ports are connected and all wireless network ports are activated;
- c) guidance on how to activate and deactivate wireless network ports.

NOTE: Power consumption in Watt is rounded to the first decimal.

D.1.2 Information available in the user manual

According to the regulation n° 801/2013 [i.2], the following information for networked equipment should be included in the user manual:

- a) the power consumption of the product in networked standby if all wired network ports are connected and all wireless network ports are activated;
- b) guidance on how to activate and deactivate wireless network ports.

Annex E (informative): Example of a test report template

Product under test			
Brand name as identified on product			
Model identification			
Version or serial number			
Product description			
Regulatory reference			
Name of applicant			
Address of applicant			
Name of test laboratory			
Address of test laboratory			
Test report number		Test date	
Prepared by		Approved by	
Test results			
Name of mode (see note 1)		Test standard/ measurement method	
How is the mode selected or programmed			
Sequence of events to reach the mode where the product automatically changes mode			
Any notes regarding the operation of the product			
Result in W			
Limit applied			
Verdict			
If applicable, technical justification of inappropriateness for intended use (see note 2)			
Specific requirements for networked equipment			
Number and type of network ports, where the ports are located on the equipment and if the same physical network port accommodates two or more types of network ports			
network ports deactivated before delivery			
HiNA equipment or equipment with HiNA functionality			

Specific requirements for network ports	
default time after which the power management function, or a similar function, switches the equipment into a condition providing networked standby	
Remotely initiated trigger used to reactivate the equipment	
Wireless network ports can be deactivated	
Maximum performance specifications	
Maximum power consumption of the equipment in a condition providing networked standby into which the power management function, or a similar function, will switch the equipment, if only this port is used for remote activation	
communication protocol used by the equipment	
Test conditions	
Ambient temperature in °C	
Test voltage in V	
Test frequency in Hz	
Total harmonic distortion of the supply system in %	
Information and documentation on the instrumentation, set-up and circuits used for electrical testing	
Test equipment information	
Test equipment description	
Test equipment model number	
Test equipment serial number	
Calibration due date	
<p>NOTE 1: The definition of off-mode mode and standby mode is given in EC Commission Regulation n° 1275/2008 [i.1]. The definition of networked standby mode is given in Commission Regulation (EU) n° 801/2013 [i.2].</p> <p>NOTE 2: EC Commission Regulation n° 1275/2008 [i.1] requires that, if applicable, the technical justification shall be provided where the requirements set out in Annex II point 1(c), or the requirements set out in Annex II points 2(c) and/or 2(d), are inappropriate for the intended use of equipment.</p>	

Annex F (informative): Bibliography

- Guidelines accompanying 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.

NOTE: Available at

https://ec.europa.eu/energy/sites/ener/files/documents/Guidance%20document_Lot%2026_Networked%20Standby_clean%20FIN.pdf.

- M/544 Commission implementing decision of 5.1.2016 on a standardisation request to the European standardisation organisations as regards ecodesign requirements for networked standby in support of Regulation (EC) No 1275/2008 and Regulation (EC) No 642/2009.

Annex G (informative): Change history

Version	Information about changes
1.1.1	First publication of the EN.
1.2.1	Revision to address products that rely on active cable connection(s) (e.g. DOCSIS3.0) and comments received from EU Commission; deleted products from Annex B because not under regulation 801/2013.

History

Document history		
V1.1.1	April 2017	Publication
V1.1.8	May 2018	EN Approval Procedure AP 20180806: 2018-05-08 to 2018-08-06
V1.2.1	August 2018	Publication