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PROTECTION OF CABLES AND OTHER ELEMENTS OF  
OUTSIDE PLANT

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## **Informative values on the energy efficiency of telecommunication equipment**

Recommendation ITU-T L.1340



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# Recommendation ITU-T L.1340

## Informative values on the energy efficiency of telecommunication equipment

### Summary

Recommendation ITU-T L.1340 provides informative values on the energy efficiency of different types of telecommunication network equipment and small networking equipment in use in both the fixed and mobile networks. These values are related to energy efficiency metrics, test procedures, methodologies and measurement profiles that have been defined in Recommendation ITU-T L.1310.

These informative values are intended to be a valued reference resource for those in the process of choosing the most energy-efficient technologies for network upgrade and deployment and, in so doing, reducing the carbon footprint of the Information and Communication Technology (ICT) sector.

### History

| Edition | Recommendation | Approval   | Study Group | Unique ID*                                                                   |
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### Keywords

Energy efficiency, informative values, methodology, metrics.

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

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

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## Introduction

The growing demand for Internet connections from both governments and citizens is driving the rapid increase in worldwide deployment of broadband and ultra-broadband networks. Depending on the specific geographic, demographic and economic conditions, such networks can be either fixed (based on FTTx architectures and implementing technologies such as ADSL, ADSL2plus, VDSL2, GPON, GEPON, etc.) or mobile (based on HSPA, LTE, UMTS, etc.) (see Note).

The increasing deployment of broadband and ultra-broadband networks has a real impact on energy consumption and, in more general terms, on the carbon footprint. To address the critical issue of energy efficiency, it is essential that particular attention be given to the choice of specific technologies during the planning phase. An informed choice of available energy-efficient telecommunication equipment is fundamental to reducing energy consumption while guaranteeing the desired level of quality of service (QoS) and reliability.

Recommendation ITU-T L.1340 provides informative values on the energy efficiency of different types of telecommunication network equipment and small networking equipment used in both the fixed and mobile networks.

Such informative values are intended to provide a basic understanding of the energy efficiency performance of different equipment currently available and therefore serve as a useful resource in the upgrading and deployment of green broadband networks.

The informative values that are reported in this Recommendation are related to energy efficiency metrics, test procedures, methodologies and measurement profiles that have been defined in Recommendation ITU-T L.1310.

NOTE – See clause 4 for expanded meanings of abbreviations and acronyms.

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# Recommendation ITU-T L.1340

## Informative values on the energy efficiency of telecommunication equipment

### 1 Scope

This Recommendation defines a set of informative values for telecommunication network equipment and small networking equipment used in the home and small enterprise locations.

The goal is to provide useful information to support a fast deployment of energy-efficient broadband and ultra-broadband networks.

Such informative values refer to the metrics, test procedures, methodologies and measurement profiles that have been defined in [ITU-T L.1310].

### 2 References

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

- |                        |                                                                                                                                                                               |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [ITU-T L.1310]         | Recommendation ITU-T L.1310 (2012), <i>Energy efficiency metrics and measurement methods for telecommunication equipment</i> .                                                |
| [ATIS-0600015.02.2009] | ATIS-06000 (2009), <i>Energy Efficiency for Telecommunication Equipment: Methodology for Measurement and Reporting – Transport Requirements</i> .                             |
| [ATIS-0600015.03.2009] | ATIS-06000 (2009), <i>Energy Efficiency for Telecommunications Equipment: Methodology for Measurement and Reporting for Router and Ethernet Switch Products</i> .             |
| [ETSI TS 102 706]      | ETSI TS 102 706 V1.2.1 (2011), <i>Environmental Engineering (EE) Measurement method for Energy Efficiency of Wireless Access Network Equipment</i> .                          |
| [ETSI ES 203 215]      | ETSI ES 203 215 V1.2.1 (2011), <i>Environmental Engineering (EE) Measurement Methods and Limits for Power Consumption in Broadband Telecommunication Networks Equipment</i> . |
| [IEEE 1904.1]          | IEEE standard 1904.1-2013, <i>Service Interoperability in Ethernet Passive Optical Networks (SIEPON)</i> .                                                                    |
| [ISO 14040]            | ISO 14040:2006, <i>Environmental management – Life cycle assessment – Principles and framework</i> .                                                                          |
| [ISO/IEC 17025]        | ISO/IEC 17025:2005, <i>General requirements for the competence of testing and calibration laboratories</i> .                                                                  |

### 3 Definitions

#### 3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

##### Terms defined in [ITU-T L.1310]:

**3.1.1 active mode:** For small networking equipment, this is the operational mode where all ports (WAN and LAN) are connected, with at least one Wi-Fi connection, if a Wi-Fi function is available.

**3.1.2 energy:** "The capacity for doing work". In the telecommunication systems, where the primary source of energy is electricity, energy is measured in Joules.

**3.1.3 energy efficiency metric:** Ratio between the functional unit and the energy necessary to deliver the functional unit. The higher the value of the metric is, the higher the efficiency of the equipment is.

**3.1.4 idle mode:** For small networking equipment, this means the same as active mode, but with no user data traffic (it is not zero traffic, as service and protocol supporting traffic are present) being used, although it is ready to be used (U1 in routers part).

**3.1.5 line rate/speed:** For small network equipment, this is the maximum possible number of transmitted/received bits per second.

**3.1.6 load-proportional metric:** A metric which is related to equipment that operates under variable-load conditions, where the measured value of the functional unit can fluctuate based on user demand.

**3.1.7 low power (sleep) mode:** For small networking equipment, this means a state that happens after the device detects no user activity for a certain period of time and reduces energy consumption. For this state, no user-facing LAN ports are connected; the Wi-Fi is active but no clients are connected. The WAN port may be inactive. The device will reactivate on detecting a connection from a user port or device.

**3.1.8 small networking device:** A networking device with fixed hardware configuration, designed for home/domestic or small office use, with less than 12 ports. This device can have wireless functionality implemented. Wireless functionality is not considered a port.

**3.1.9 throughput:** For small network equipment, this is the maximum non-drop data rate between WAN and LAN port in ingress direction

**3.1.10 functional unit** (based on [ISO 14040]): A performance representation of the system under analysis. For example, for transport equipment, the functional unit is the amount of information transmitted, the distance over which it is transported and its rate in Gbit/s. Sometimes the term is used to indicate useful output or work.

#### 3.2 Terms defined in this Recommendation

None.

### 4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

|           |                                                                     |
|-----------|---------------------------------------------------------------------|
| AC        | Alternating Current                                                 |
| ADSL2plus | Asymmetric Digital Subscriber Line 2 transceiver extended bandwidth |
| BS        | Base Station                                                        |