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Integrated broadband cable telecommunication networks (CABLE); Energy management; Operational infrastructures; Global KPIs; Part 4: Design assessments; Sub-part 4: Cable Access Networks

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**Integrated broadband cable  
telecommunication networks (CABLE);  
Energy management;  
Operational infrastructures;  
Global KPIs;  
Part 4: Design assessments;  
Sub-part 4: Cable Access Networks**

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# Foreword

This European Standard (EN) has been produced by ETSI Technical Committee Integrated broadband cable telecommunication networks (CABLE).

The present document is part 4, sub-part 4 of a multi-part deliverable covering Global Key Performance Indicators for energy management of operational broadband deployment infrastructures as identified below:

Part 1: "General requirements";

Part 2: "Specific requirements";

Part 3: "ICT sites";

**Part 4: "Design assessments";**

**Sub-part 4: "Cable Access Networks".**

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# Modal verbs terminology

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# Introduction

Energy costs continue to rise, a trend that will continue in the future, while broadband penetration is introducing new active equipment to the network architecture. In this context, and to reflect other environmental aspects of sustainability, it is vital that the main telecommunication operators implement effective general engineering of fixed and mobile broadband networks and sites provisioning, managing or using those networks (i.e. ICT sites) in order to respond to critical issues of energy consumption while proposing essential solutions to true broadband deployment. To guide this process, it is essential that metrics are defined, termed Global Key Performance Indicators (KPIs), that enable energy usage to be managed more effectively.

The Global Key Performance Indicators of the ETSI EN 305 200 [i.4] series address operational infrastructures and do not consider design/operation of components of broadband deployment networks.

The ETSI EN 305 200 series of standards [i.4] comprises:

- ETSI EN 305 200-1 [i.5]: a generic requirements document addressing Global KPIs for operational infrastructures;
- a sub-series ETSI EN 305 200-2 that defines the Global KPIs, and drives energy management targets, for specific operational networks and sites and which describes how the Global KPIs are to be applied (which may be used to support future regulatory objectives):
  - ETSI EN 305 200-2-1 [i.6]: ICT sites;
  - ETSI EN 305 200-2-2 [i.7]: Fixed broadband access networks;

NOTE: Excluding cable access networks.

- ETSI EN 305 200-2-3 [i.8]: Mobile broadband access networks;

The standards do not define weightings of Objective KPIs or targets or limits for Global KPIs but may contain information on values that have been used by certain organizations.

- a sub-series ETSI EN 305 200-3 [i.9] including ETSI EN 305 200-3-1 [i.10] that defines particular implementations of Global KPIs within ICT sites based on the requirements of ETSI EN 305 200-2-1 [i.6], and which may define levels of performance to simplify and provide clearer understanding of Global KPIs allowing the evaluation of performance of energy use management in ICT sites;

The standards do not define weightings of Objective KPIs or targets or limits for Global KPIs but may contain information on values that have been used by certain organizations.

- a sub-series ETSI EN 305 200-4 including ETSI EN 305 200-4-4, the present document, that defines design assessments of Global KPIs, and drives energy management targets, for specific operational networks and sites and which describes how the Global KPIs are to be applied (which may be used to support future regulatory objectives).

These standards may be considered to be a contribution to the application of ISO 50001 [i.11] in relation to the development of policy for the continuous improvement of energy management and will accelerate:

- the availability of operational infrastructure architectures and network implementations that use energy more efficiently;
- the definition and attainment objectives for other environmental aspects of sustainability for operational broadband networks.

The present document specifies the requirements for a Global KPI for energy management ( $KPI_{EM}$ ) and its underpinning Objective KPI for energy consumption for cable access networks of broadband deployment employing DOCSIS 3.0 and/or DOCSIS 3.1. The requirements are mapped to the general requirements of ETSI EN 305 200-1 [i.5].

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# 1 Scope

The present document specifies the requirements for a Global KPI for energy management (designated  $KPI_{EP}$ ) and its underpinning Objective KPI for energy consumption addressing the following objectives for the cable operator access networks of broadband deployment:

- energy consumption;
- renewable energy.

The requirements are mapped to the concepts of ETSI EN 305 200-1 [i.5].

Energy management of cable access networks comprises a number of independent layers. The present document addresses performance of infrastructures that supports the normal function of hosted ICT equipment within the cable access network (e.g. power distribution, environmental control, security and safety). The present document does not address other layers such as performance of ICT equipment itself, performance of usage of available processing power, and layers related to final service delivered (e.g. processing power required per itemized outcome) or overlay layers (e.g. final energy required per itemized outcome).

The environmental impact and management of different energy sources are outside the scope of the present document.

Within the present document:

- clause 4 describes the energy parameters for cable access networks employing DOCSIS 3.0 and/or DOCSIS 3.1 together with inclusions/exclusions of different energy sources;
- clause 5 specifies the requirements for measurement, calculation, classification and reporting of  $KPI_{EP}$ .

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## 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.

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

Not applicable.

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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 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 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:225:0001:0012:en:PDF>.

- [i.2] 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.

NOTE: Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:339:0045:0052:en:PDF>.

- [i.3] Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products ("Ecodesign Directive").

NOTE: Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:285:0010:0035:en:PDF>.

- [i.4] ETSI EN 305 200 series: "Access, Terminals, Transmission and Multiplexing (ATTM); Energy management; Operational infrastructures; Global KPIs".

- [i.5] ETSI EN 305 200-1: "Access, Terminals, Transmission and Multiplexing (ATTM); Energy management; Operational infrastructures; Global KPIs; Part 1: General requirements".

- [i.6] ETSI EN 305 200-2-1: "Access, Terminals, Transmission and Multiplexing (ATTM); Energy management; Operational infrastructures; Global KPIs; Part 2: Specific requirements; Sub-part 1: ICT Sites".

- [i.7] ETSI EN 305 200-2-2: "Access, Terminals, Transmission and Multiplexing (ATTM); Energy management; Operational infrastructures; Global KPIs; Part 2: Specific requirements; Sub-part 2: Fixed broadband access networks".

- [i.8] ETSI EN 305 200-2-3: "Access, Terminals, Transmission and Multiplexing (ATTM); Energy management; Operational infrastructures; Global KPIs; Part 2: Specific requirements; Sub-part 3: Mobile broadband access networks".

- [i.9] ETSI EN 305 200-3 series: "Access, Terminals, Transmission and Multiplexing (ATTM); Energy management; Operational infrastructures; Global KPIs; Part 3: ICT Sites".

- [i.10] ETSI EN 305 200-3-1: "Access, Terminals, Transmission and Multiplexing (ATTM); Energy management; Operational infrastructures; Global KPIs; Part 3: ICT Sites; Sub-part 1: DCEM".

- [i.11] ISO 50001: "Energy management systems - Requirements with guidance for use".

- [i.12] ETSI EN 302 878-1: "Access, Terminals, Transmission and Multiplexing (ATTM); Third Generation Transmission Systems for Interactive Cable Television Services - IP Cable Modems; Part 1: General; DOCSIS 3.0".

- [i.13] ETSI EN 302 878-2: "Access, Terminals, Transmission and Multiplexing (ATTM); Third Generation Transmission Systems for Interactive Cable Television Services - IP Cable Modems; Part 2: Physical Layer; DOCSIS 3.0".

- [i.14] ETSI EN 302 878-3: "Access, Terminals, Transmission and Multiplexing (ATTM); Third Generation Transmission Systems for Interactive Cable Television Services - IP Cable Modems; Part 3: Downstream Radio Frequency Interface; DOCSIS 3.0".

- [i.15] ETSI EN 302 878-4: "Access, Terminals, Transmission and Multiplexing (ATTM); Third Generation Transmission Systems for Interactive Cable Television Services - IP Cable Modems; Part 4: MAC and Upper Layer Protocols; DOCSIS 3.0".

- [i.16] ETSI EN 302 878-5: "Access, Terminals, Transmission and Multiplexing (ATTM); Third Generation Transmission Systems for Interactive Cable Television Services - IP Cable Modems; Part 5: Security Services; DOCSIS 3.0".

- [i.17] ETSI TS 103 311-1: "Integrated broadband cable telecommunication networks (CABLE); Fourth Generation Transmission Systems for Interactive Cable Television Services - IP Cable Modems; Part 1: General; DOCSIS® 3.1".
- [i.18] ETSI TS 103 311-2: "Integrated broadband cable telecommunication networks (CABLE); Fourth Generation Transmission Systems for Interactive Cable Television Services - IP Cable Modems; Part 2: Physical Layer; DOCSIS® 3.1".
- [i.19] ETSI TS 103 311-3: "Integrated broadband cable telecommunication networks (CABLE); Fourth Generation Transmission Systems for Interactive Cable Television Services - IP Cable Modems; Part 3: MAC and Upper Layer Protocols Interface; DOCSIS® 3.1".
- [i.20] M/462 Standardisation mandate addressed to CEN, CENELEC and ETSI in the field of ICT to enable efficient energy use in fixed and mobile information and communication networks.

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