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**Data centre - Resource utilization - Part 3: Energy usage  
effectiveness requirements and measuring methods**

数据中心 资源利用 第3部分：电能能效要求和测量方法

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## Foreword

GB/T 32910 Data Center - Resource Utilization has issued or plans to issue the following parts:

- Part 1: Terminology;
- Part 2: Setting Requirement for Key Performance Indicators;
- Part 3: Energy Usage Effectiveness Requirements and Measuring Methods;
- Part 4: Renewable Energy Utilization;
- Part 5: Data Format for Resource Monitoring Management System;
- Part 6: General Requirements for Distributed Energy Construction;
- Part 7: Energy Effectiveness Management Practices. This Part belongs to Part 3 of GB/T 32910. This Part was drafted as per the rules specified in GB/T 1.1-2009. Please note some contents of this document may involve patents. The issuing agency of this document does not assume the responsibility to identify these patents. This Part was proposed by and under the jurisdiction of National Technical Committee for Standardization of Information Technology (SAC/TC 28). Drafting organizations of this Part: China Electronics Standardization Institute; State Grid Information & Telecommunication Co., Ltd.; Energy Research Institute, National Development and Reform Commission; Beijing Kejitong Electronic Engineering Co., Ltd.; Inspur Electronic Information Industry Co., Ltd.; Huawei Technologies Co., Ltd.; Tsinghua University; Institute of Computing Technology, Chinese Academy of Sciences; CECT China Communications Co., Ltd.; China Mobile Communications Group Co., Ltd.; Information Center of National Energy Administration; Standards Information Center, Standardization Administration of China; Beijing Forestry University; National Government Offices Administration; GDS Services Co., Ltd.; ZTE Corporation; Beijing Nayuanfeng Science & Technology Development Co., Ltd.; National Engineering Research Center for Multimedia Software, Wuhan University; Beijing Tongheshiyi Telecom Science & Technology Research Institute Co., Ltd.; China-Scicooling (Beijing) Science & Technology Co., Ltd.; and Beijing Great Wall Electronic Engineering Technology Co., Ltd. Chief drafting staffs of this Part: Gao Qipeng, Wang Lijian, Lv Junfeng, Feng Shengbo, Li Zhen, Liu Yu, Huang Qunji, Zhao Jizhi, Huang Tao, Chen Jie, Xue Zhiwei, Lin Li, Data Center - Resource Utilization - Part 3: Electric Energy Usage Effectiveness Requirements and Measuring Methods

## 1 Scope

Part 3 of China's national standard series on data centre resource utilization, covering electric energy usage effectiveness. It specifies the EEUE grades and requirements, the classification of the factors affecting a data centre's electric energy usage effectiveness, the measurement method for energy consumption, and the calculation of EEUE, with informative annexes on the climate types of major Chinese cities and on the disclosure requirements for the modified and actual EEUE values. EEUE is the ratio of the total energy a data centre draws to the energy its information equipment uses, so a facility that draws two watts for every watt reaching a server has an EEUE of 2.0 and one that draws 1.3 has

an EEUE of 1.3. The number is simple to state and famously easy to misreport, which is what most of this document is about. Everything depends on where the measurement is taken, over what period, and what is counted as information equipment, and a facility can improve its published figure substantially without touching its actual consumption, simply by measuring in summer instead of across a year, or by putting some of its own overhead on the other side of the boundary. So the standard specifies the measuring equipment, the measuring positions, the conditions and both a standard annual method and a short-term method, and it establishes the grades against which a figure is judged. The affecting factor clause is the part that makes the grades usable: it classifies data centres by security level, by usage nature, by IT load utilisation and by climate, because a facility in Harbin can use outside air for much of the year and one in Guangzhou cannot. Issued on 29 August 2016 and in force since 1 March 2017.

This Part of GB/T 32910 gives the electric energy effectiveness grades and the factors affecting the electric energy effectiveness in the data center; specifies the measuring and computing methods of electric energy effectiveness in the data center. This Part is applicable to the measurement of the electric energy consumption in the data center and the calculation of the electric energy usage effectiveness; it is also applicable to analyze the electric energy effectiveness state in the data center for the reference of design, construction, operation, maintenance and transformation of the data center; it can serve as the assessment basis for the electric energy effectiveness levels in the data center.

## 2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 2887-2011 General Specification for Computer Field

## 3 Terms and Definitions

For the purpose of this document, the following terms and definitions apply.

**3.1 Data center electric energy usage effectiveness** The ratio between the data center total electric energy consumption and information equipment electric energy consumption during the same time period.

**3.2 Data center total electric energy consumption** The sum of all electric energy consumed to maintain the normal operation of the data center. The data center electric energy usage effectiveness directly derived from the measurement value of electric energy consumption of each component in the data center.

**3.11 Adjustment value** The value used to compensate its system difference and to adjust

the actual measurement values of electric energy usage effectiveness, considering the difference by adopting the different cooling technologies, load usage rates, data center levels, different climate environments during the computing process of the EEUEmod. val.  
NOTE: Since the system error can't be fully known, such compensation is incomplete.

**3.12 Modified value of electric energy usage effectiveness** For data centers with different conditions, the value obtained by subtracting the actual measured value of data center electric energy usage effectiveness from the adjustment value gotten by considering the system variation conditions.

**3.1.3 Data center information equipment load rate** The ratio between the actual electric load of the data center information equipment and the design electric load of the data center information equipment.

**3.14 Data center security level** The level defined by the degree of damage to the national security, social order, public interest, according to the post-interruption of the computer system in the data center.

## 4 Abbreviation

EEUE: electric energy usage effectiveness EEUEact. val.: actual measurements of electric energy usage effectiveness EEUEmod. val.: amended measurements of electric energy usage effectiveness PDU: power distribution unit UPS: uninterrupt power supply

## 5 Data Center Electric Energy Usage Effectiveness

**6.3 Data center usage nature** The computer system running business in the data center has periodicity, such as continuous stable running business and random intermittent running business:

- a) Continuous stable running business: It undertakes the operation task all the year round; the electric energy consumption changes regularly; the daily fluctuation of data center information equipment energy consumption is relatively small; such as the internet data center, etc.
- b) Random intermittent running business: It undertakes the phased operation task; the fluctuation of electric energy consumption is greater; such as super- computing data center, etc. the data center operating the random intermittent running business has a large energy consumption fluctuation.

**6.4 Data center information equipment load usage rate** The data center information equipment load usage rate can be divided into under-load, semi-load, over-load and full-load:

- a) Under-load: the data center information equipment load usage rate is less than 25%.