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Environmental Engineering (EE);
Measurement method for power consumption and energy efficiency of wireless access network equipment

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Contents

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Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Environmental Engineering (EE).

Modal verbs terminology

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Introduction

Energy efficiency is one of the critical factors of the modern telecommunication systems. The energy consumption of the access network is the dominating part of the wireless telecom network energy consumption. Therefore the core network and the service network are not considered in the present document. In the radio access network, the power consumption of the Base Station is dominating (depending on technology often also refered to as BTS, NodeB, eNodeB, etc. and in the present document denoted as BS). The power consumption of Radio Network Control nodes (RNC or BSC) are covered in ETSI ES 201 554 [5].

Since the scope of the present document is to define methods for evaluation of power consumption and energy efficiency of base station in static and dynamic mode respectively the following definitions are defined:

- Average power consumption of BS equipment under static test conditions: the BS average power consumption is based on measured BS power consumption data under static condition when the BS is loaded artifitially in a lab for three different loads, low, medium and busy hour under given reference configuration.
- BS efficiency under dynamic load conditions: the BS capacity under dynamic traffic load provided within a defined coverage area and the corresponding power consumption is measured for given reference configurations.

1 Scope

The present document defines methods to analyse the power consumption and the energy efficiency of base stations in static and dynamic mode respectively.

The present document version covers the following radio access technologies:

- GSM.
- WCDMA.
- LTE.
- WiMAX™ (informative only).

The methodology described in the present document is to measure base station static power consumption and dynamic energy efficiency. Within the present document they are referred to as static and dynamic measurements.

The results based on "static" measurements of the BS power consumption provide a power consumption figure for BS under static load. The results based on "dynamic" measurements of the BS provide energy efficincy information for BS with dynamic load.

Energy consumption of terminal (end-user) equipment is outside the scope of the present document.

The scope of the present document is not to define target values for the power consumption nor the energy efficiency of equipment.

The results should only be used to assess and compare the power consumption and the energy efficiency of base stations.

The present document does not cover multi RAT and MCPA. Only Wide Area Base Stations are covered in this version. Other type of BS will be considered in future versions of the present document.

2 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 reference document (including any amendments) applies.

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2.1 Normative references

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

[1] Void.

[2] ETSI TS 125 104: "Universal Mobile Telecommunications System (UMTS); Base Station (BS) radio transmission and reception (FDD) (3GPP TS 25.104)".

[3] CENELEC EN 50160: "Voltage characteristics of electricity supplied by public electricity networks".

[4] ETSI EN 300 132-2: "Environmental Engineering (EE); Power supply interface at the input to telecommunications and datacom (ICT) equipment; Part 2: Operated by -48 V direct current (dc)".