

Estimation of power consumption of communication base stations

What is a base station power consumption model?

In recent years, many models for base station power consumption have been proposed in the literature. The work in [1] proposed a widely used power consumption model, which explicitly shows the linear relationship between the power transmitted by the BS and its consumed power.

Do base stations dominate the energy consumption of the radio access network?

Furthermore, the base stations dominate the energy consumption of the radio access network. Therefore, it is reasonable to focus on the power consumption of the base stations first, while other aspects such as virtualization of compute in the 5G core or the energy consumption of user equipment should be considered at a later stage.

How can a power consumption model be used to estimate power consumption?

Quantification models are most suitable for quantifying overall power consumption of base station or even networks as part of large-scale evaluations. The number and complexity of parameters is limited, and simple usage with load profiles or traffic models is possible to estimate total energy consumption.

What is the largest energy consumer in a base station?

The largest energy consumer in the BS is the power amplifier, which has a share of around 65% of the total energy consumption. Of the other base station elements, significant energy consumers are: air conditioning (17.5%), digital signal processing (10%) and AC/DC conversion elements (7.5%).

How do base stations affect mobile cellular network power consumption?

Base stations represent the main contributor to the energy consumption of a mobile cellular network. Since traffic load in mobile networks significantly varies during a working or weekend day, it is important to quantify the influence of these variations on the base station power consumption.

How do you calculate energy consumption of wireless communication systems?

The first step when modeling the energy consumption of wireless communication systems is to derive models of the power consumption for the main system components, which are then combined with time-dependent traffic load models to estimate the consumed energy.

The aim was to analyse real-world energy consumption behaviours across urban macro base stations (eNBs), including both temporal usage patterns and internal component-level power ...

Power consumption models for base stations are briefly discussed as part of the development of a model for life cycle assessment. An overview of relevant base station power ...

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Therefore, this paper investigates changes in the instantaneous power consumption of GSM (Global System for Mobile Communications) and UMTS (Universal Mobile ...

In this paper, we present a regression-based power consumption estimation method based on voice and data traffic provided by base stations with 2G and 3G capabilities.

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The energy consumption of the fifth generation (5G) of mobile networks is one of the major concerns of the telecom industry. However, there is not currently an accurate and tractable ...

We demonstrate that this model achieves good estimation performance, and it is able to capture the benefits of energy saving when dealing with the complexity of multi-carrier base stations ...

In this work the electrical input power of macro and micro base stations in cellular mobile radio networks is characterized and quantified in dependence of the load level. The model ...

Abstract: Energy consumed in telecommunication base stations is a significant part of the cellular network energy footprint. Efficient energy use, renewable energy sources, and ...

In this paper, we present a regression-based power consumption estimation method based on voice and data traffic provided by base stations with 2G and 3G capabilities. Our results show ...

When symbol shutdown is activated, the AAU switches off the MCPAs, and its power consumption is reduced to the sum of the baseline power consumption, P_0 , the baseband ...

Download scientific diagram | Breakdown of power consumption in radio base stations [32]. from publication: Approaches to energy efficient wireless access networks | Due to increasing data ...

To further explore the energy-saving potential of 5 G base stations, this paper proposes an energy-saving operation model for 5 G base stations that incorporates communication caching ...

Base stations (BSs) are the primary entities contributing to the power consumption in the telecommunication network. To efficiently deploy solar powered base stations, it is ...

Figure 1: Global mobile data traffic outlook [Ericsson Mobility Report, June 2019]. Base station power

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consumption Today we see that a major part of energy consumption in ...

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