Power consumption of mobile base station equipment per year

Overview

This paper conducts a literature survey of relevant power consumption models for 5G cellular network base stations and provides a comparison of the models.

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The total global mobile world traffic reached 130 EB per month in 2023, with video content representing 73% of this number [1]. At the same time, new services, with chal-lenging networking demands, are entering the market. For example, extended reality (XR) services are expected to trig-ger a.

The increasing total energy consumption of information and communication technology (ICT) poses the challenge of developing sustainable solutions in the area of distributed computing. Current communication network technologies, such as wireless cellular networks, are required for applications and.

Abstract—As the Information and Communication Technology (ICT) sector represents 1.8% to 3.9% of the global Green House Gas (GHG) emissions, it is of upmost importance to know how much energy is spent annually in mobile networks and how this consumption is evolving. It is quite likely that the huge.

Abstract - This paper presents a comprehensive empirical study of energy consumption within an operational urban LTE Radio Access Network (RAN). Using both site-level measurements and aggregated multi-eNB data collected over a typical workweek, the study analyses traffic trends, PRB utilization.

This thesis presents a comprehensive analysis of power consumption models of base stations. The research delves into the distribution of power consumption across different types of base stations, highlighting the significant role of power amplifiers in macro stations and baseband processing units.

ABSTRACT : The increase in energy consumption of mobile cellular networks has now become a concern not only because of increase in the cost of energy on the part of mobile network operators but also because of its adverse effect on the environment due to global warming. Also with 5G technologies. 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.

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.

What is a base station power consumption model?

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

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%) .

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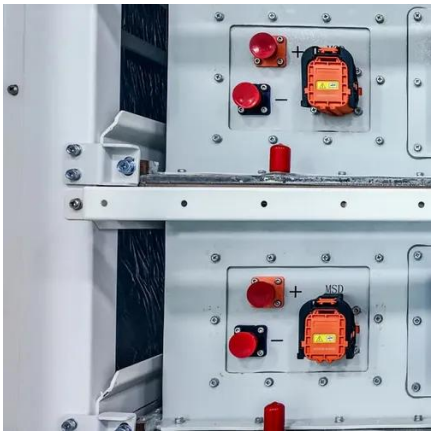

[Comparison of Power Consumption Models for 5G Cellular ...]

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 ...

Power consumption models of base station : measurements and ...

These insights highlight the need for ongoing research into better methods for accurately measuring and optimizing power consumption in base stations. This research is crucial for ...

[Measurements and Modelling of Base Station Power ...]

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Measurements and Modelling of Base Station Power Consumption under Real

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 ...

Empirical Analysis of Power Consumption in LTE Base ...

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 ...

INVESTIGATORY ANALYSIS OF ENERGY ...

This study examines the energy requirements of a multi-tenant BTS, focusing on power consumption patterns, key energy ...

Power consumption based on 5G communication

At present, 5G mobile traffic base stations in energy consumption accounted for 60% ~ 80%, compared with 4G energy consumption increased three times. In the future, high-density ...

INVESTIGATORY ANALYSIS OF ENERGY REQUIREMENT OF A MULTI-TENANT MOBILE

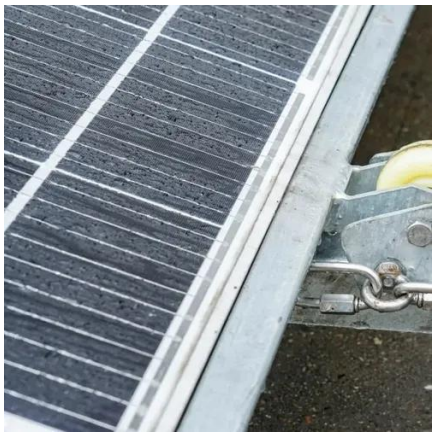
This study examines the energy requirements of a multi-tenant BTS, focusing on power consumption patterns, key energy-intensive components, and optimization strategies.

[Power Consumption Modeling of 5G Multi-Carrier Base ...]

Importantly, this study item indicates that new 5G power consumption models are needed to accurately develop and optimize new energy saving solutions, while also considering the ...

[The Long Road to Sobriety: Estimating the Operational ...]

Therefore, in this paper, we estimate the operational power consumption of cellular Base Stations (BSs) deployed in France from 2015 to 2022. However, unfortunately, the lack of openly ...



Comparison of Power Consumption Models for 5G Cellular Network Base

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PhD school: Comprehensive Energy Consumption Analysis ...

This re-search will aim to identify the key factors contributing to energy usage at the base station level, which plays a criti-cal role in the overall efficiency of mobile networks.

Energy Consumption Assessment of Mobile Cellular Networks

To quantify the energy consumed by a base station site it is important to know the various subsystems or equipment that make up the base station site and their contributions to the total ...

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