

# **How much power load does a communication base station use**





## Overview

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Is there a direct relationship between base station traffic load and power consumption?

The real data in terms of the power consumption and traffic load have been obtained from continuous measurements performed on a fully operated base station site. Measurements show the existence of a direct relationship between base station traffic load and 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.

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.

What is the impact of base stations?

The impact of the Base Stations comes from the combination of the power consumption of the equipment itself (up to 1500 Watts for a nowadays macro base station) multiplied by the number of deployed sites in a commercial network (e.g. more than 12000 in UK for a single operator).

Can a base station Power model be combined?

As the main components are common to most of the models, they can be easily combined to form a new model. Most of the base station power models



are based on measurements of LTE (4G) hardware or theoretical assumptions. For the more recent models, based on measurements of 5G hardware, the parameter values are not publicly available.

What are base station models?

The base station models vary in their approaches and potential use cases. Hereafter, the models are grouped according to these aspects. Main component models only model the power consumption of the main base station components (power amplifier, analog frontend, baseband unit, active cooling, power supply) separately.



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### [5G energy consumption: The impact of 5G NR](#)

The power consumption in this example is calculated using a power model that was used by the 3GPP during 5G-NR standardization. Figure 3: Example of the theoretical base ...

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### [\(PDF\) Power Consumption in Telecommunication ...](#)

Abstract and Figures One of the main challenges for the future of in-formation and communication technologies is the reduction of the power ...

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### [\(PDF\) INVESTIGATORY ANALYSIS OF ENERGY ...](#)

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

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## Cellular Tower Maps

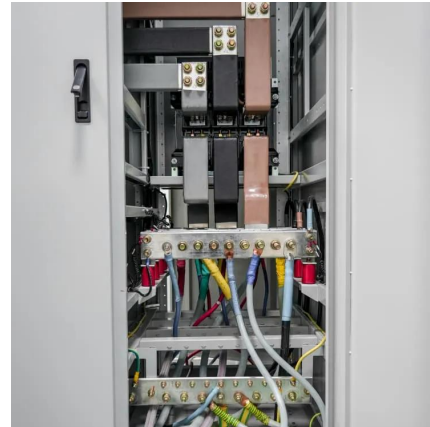
First Time Startup CellMapper is useful app for locating 2G/3G/4G/4G+ base stations. The application measures the signal strength and





other network data ...

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## Comparison of Power Consumption Models for 5G Cellular Network Base

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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## Dynamic Power Management for 5G Small Cell Base Station

5G networks with small cell base stations are attracting significant attention, and their power consumption is a matter of significant concern. As the increase of the expectation, concern for ...

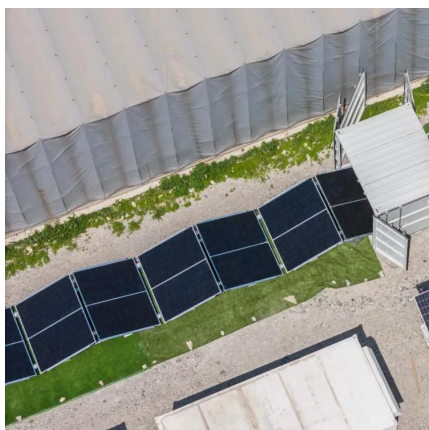
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## Research on Power Load Characteristics and Cluster Analysis of ...

Download Citation , On Jul 28, 2023, Xudong Yao and others published Research on Power Load Characteristics and Cluster Analysis of 5G communication Base Stations , Find, read and cite ...

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## Optimal energy-saving operation strategy of 5G base station with

For 5 G base station software management strategies, there is already a certain amount of research available. Dynamic power consumption modeling for base stations is a prerequisite ...

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## 5G Energy Efficiency Overview

Base station resources are generally unused 75 - 90% of the time, even in highly loaded networks. 5G can make better use of power-saving techniques in the base station part, ...

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## Communication base station

The tower backup battery plays a vital role in the communication base station, especially in the power guarantee and system stability. As a backup power ...

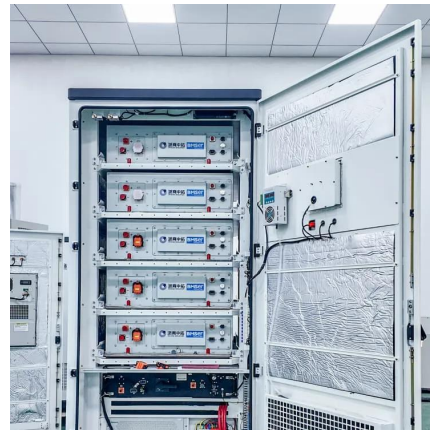
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## On-site Energy Utilization Evaluation of Telecommunication ...

Since the sites we visited were all outdoors, there wasn't much more equipment consuming the energy besides the radio units and the base band units, therefore we constructed regression ...

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## Key Factors Affecting Power Consumption in Telecom Base Stations

Discover the key factors influencing power consumption in telecom base stations. Optimize energy efficiency and reduce operational costs with our expert insights.

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## Understanding the Base Station Subsystem: A Comprehensive ...

In the world of mobile telecommunications, understanding the Base Station Subsystem (BSS) is paramount for grasping how our everyday communications function ...

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### [Keysight Technologies Understanding LTE-Advanced Base ...](#)

frequency range, under normal and extreme conditions, for all transmitters in the base station. Extreme conditions are defined as special states in terms of the temperature, ...

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### [Measurements and Modelling of Base Station Power ...](#)

Measurements show the existence of a direct relationship between base station traffic load and power consumption. According to this relationship, we develop a linear power consumption ...

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### **Comparison of Power Consumption Models for 5G Cellular Network Base**

Comparison of downlink load dependency of macro base station power consumption for Auer, Holtkamp, and Debaillie power models. Sleep mode power consumption for Auer and ...

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### **Measurements and Modelling of Base Station Power Consumption under Real**

Measurements show the existence of a direct relationship between base station traffic load and power consumption. According to this relationship, we develop a linear power consumption ...





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### [Measurements and Modelling of Base Station Power ...](#)

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### **Energy saving in 5G mobile communication through traffic driven ...**

This paper proposes a traffic-driven cell zooming technique, where the coverage area of Base Stations can expand and contract as per the traffic volume. This is done by ...

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### **Optimal energy-saving operation strategy of 5G base station with**

Under full-load conditions, the power consumption of 5 G base stations is approximately 3-4 times that of 4 G base stations, which has a notable impact on energy consumption and ...

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## Power consumption of the base station components for the ...

In this paper, the energy efficiency of a femtocell base station is investigated and compared for various bit rates and for three different wireless technologies namely, mobile WiMAX, HSPA, ...

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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 ...

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## [Front Line Data Study about 5G Power Consumption](#)

The power consumption of a single 5G station is 2.5 to 3.5 times higher than that of a single 4G station. The main factor behind this increase in 5G power consumption is the high power ...

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## [Key Factors Affecting Power Consumption in Telecom ...](#)

Discover the key factors influencing power consumption in telecom base stations. Optimize energy efficiency and reduce operational costs with ...

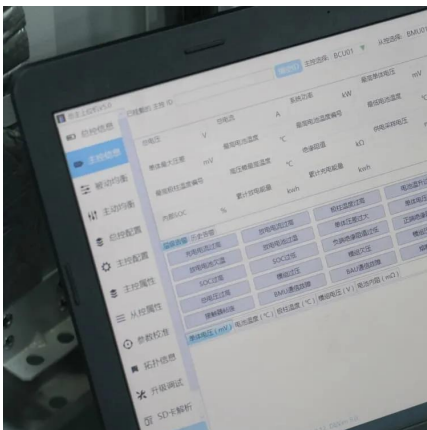
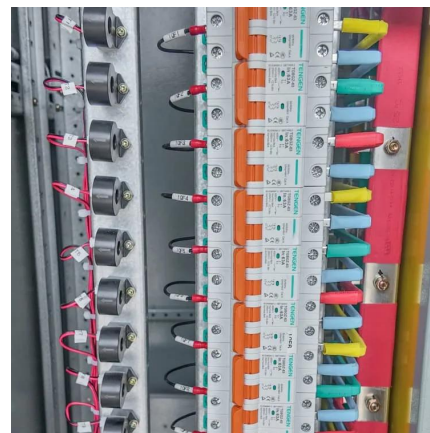
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## On-site Energy Utilization Evaluation of Telecommunication ...

The power consumption of a single 5G station is 2.5 to 3.5 times higher than that of a single 4G station. The main factor behind this increase in 5G power consumption is the high power ...

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## Power Consumption Modeling of Different Base Station ...

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 ...

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## (PDF) INVESTIGATORY ANALYSIS OF ENERGY ...

Abstract Energy consumption in mobile communication base stations (BTS) significantly impacts operational costs and the environmental ...

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## **Energy-Efficient Base Stations , part of Green Communications**

The impact of the Base Stations comes from the combination of the power consumption of the equipment itself (up to 1500 Watts for a nowadays macro base station) multiplied by the ...

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