Power consumption of integrated 5G base station equipment

Why do we need a 5G base station?
The limited penetration capability of millimeter waves necessitates the deployment of significantly more 5G base stations (the next generation Node B,gNB) than their 4G counterparts to ensure network coverage. Notably,the power consumption of a gNB is very high,up to 3-4 times of the power consumption of a 4G base stations (BSs).

Should power consumption models be used in 5G networks?
This restricts the potential use of the power models, as their validity and accuracy remain unclear. Future work includes the further development of the power consumption models to form a unified evaluation framework that enables the quantification and optimization of energy consumption and energy efficiency of 5G networks.

Does a balanced dataset improve energy prediction of 5G base stations?
For energy prediction of 5G base stations,this thesis finds that using a more balanced dataset,in terms of the number of samples for each product,has a positive impactfor the ANN and the Gradient Boosted Trees model while the linear regression performs worse.

How can we improve the energy eficiency of 5G networks?
To improve the energy eficiency of 5G networks,it is imperative to develop sophisticated modelsthat accurately reflect the influence of base station (BS) attributes and operational conditions on energy usage.

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

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Accurate energy consumption modeling is essential for developing energy-efficient strategies, enabling operators to optimize resource uti-lization while maintaining network ...

Mathematical optimization of energy consumption requires a model of the prob-lem at hand. In this thesis linear regression is compared with the gradient boosted trees method and a neural ...

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 ...

Notably, the power consumption of a gNB is very high, up to 3-4 times of the power consumption of a 4G base stations (BSs). The substantial quantity, rapid growth rate, and high ...

Why is 5G Power Consumption Higher? 1. Increased Data Processing and Complexity These 5G base stations consume about three times the power of the 4G stations. ...

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