ContainerPower Energy Solutions

Power restriction for 5G base stations

Overview

The RF output power is strongly depending on the available bandwidth and on the target data rate. Output power is typically limited by the EMF constraints of the site. In general, the nominal output power ha.

Are 5G NR base stations 3GPP-compliant?

Every 5G NR base station or UE manufacturer must pass all the necessary tests before releasing the products to market. Otherwise, the products do not have 3GPP-compliant recognition and are not usable for network deployment. We start with a quick overview of 3GPP base station conformance testing requirements.

What is a 5G NR power class?

Each power class is tailored to different device requirements and use cases within the 5G NR spectrum, ensuring that a range of devices can operate efficiently and effectively within the set power constraints, from high-power base stations to low-power IoT devices.

What are 5G New radio power levels?

In 5G New Radio (NR), maximum output power levels are categorized into different power classes to support various use cases and device types. Setting appropriate power classes is an important part of configuring both user equipment (UE) and base stations to ensure adequate coverage and quality of service while minimizing interference.

What is the limiting factor of a 5G UE?

However, the uplink with the fixed user equipment output power of 23dBm (20mW) will be anyway the limiting factor. User equipment output power will be limited to 23dBm. This is also related to how many transmitting paths are to be assumed. In a typical 5G configuration, the UE has to support 4Rx diversity as a minimum.

How do engineers design 5G base stations?

Engineers designing 5G base stations must contend with energy use, weight, size, and heat, which impact design decisions. 5G New Radio (NR) uses Multi-User massive-MIMO (MU-MIMO), Integrated Access and Backhaul (IAB), and beamforming with millimeter wave (mmWave) spectrum up to 71 GHz.

How much power does a 5G system need?

To keep the power density per MHz similar to LTE systems, the 100MHz 3.5GHz spectrum will require 5x 80 W, which is not easy to be achieved. 5G trials need to define a realistic output power trade-off between coverage, power consumption, EMF limits, and performance.

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