

5G small base station power distribution requirements





Overview

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.

What is a small cell in 5G?

Small cells are a new part of the 5G platform that increase network capacity and speed, while also having a lower deployment cost than macrocells. The compact size of a small cell requires that all components – especially power converters – provide high efficiency, better thermals and eventually the best power density possible.

Do 5G small cells need a power supply?

Experts widely believe that 5G small cells need to be able to continue running in the event of electrical anomalies. Pairing them with integrated power supply devices costs more, but it also protects small cells if there are dramatic changes in voltage.

How much DC does a 5G system need?

For example, a 27 dBm output power with a 20% efficient PA would require about 2.5 W DC at the DC supply line (typically, a 5 V DC supply for these low power levels). Keep in mind that 5G systems are typically operating in time division duplexing (TDD) mode, which implies that ~70% of the time, transmit is operating.

What are 5G infrastructure power supply considerations?

While the overall power draw is often lower, 5G equipment has narrower tolerances. It often needs multiple, precise voltages to operate correctly, with scarce leeway on either side. In the following section, we discuss 5G



infrastructure power supply considerations in more detail. 5G delivers coverage to an area in a different way from 4G.

Do 5G equipment power supply units need to be compact?

Small cells will need to be able to fit in compact environments, such as traffic lights, utility poles, and rooftops. So power supply units will need to be compact, able to fit comfortably alongside the equipment they power. There are also considerable heat dissipation issues that 5G equipment power supply units will need to accommodate.



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However, there is still a need to understand the power consumption behavior of state-of-the-art base station architectures, such as multi-carrier active antenna units (AAUs), as well as the ...



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