

# **What is the appropriate voltage for 5G base stations**





## Overview

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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.

How does a 5G power supply work?

The power supply will deliver power to small cells and other nodes in the 5G network via waterproofed wires. The size of the cabinet will depend heavily on the needs of the power supply and whether it needs to house battery backup. In some cases, the manufacturer will waterproof the power supply simply using rubber seals and impermeable plastic.

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.

Should a 5G power amplifier be combined with a power amplifier?

For 5G, infrastructure OEMs are considering combining the radio, power amplifier and associated signal processing circuits with the passive antenna array in active antenna units (AAU). While AAUs improve performance and simplify installation, they also require the power supply to share a heatsink with the power amplifier for cooling.

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.

What is a 5G backhaul power supply?

The backhaul part of the 5G network connects the access interface - including masts, eNodeB, and cell site gateway - to the mobile core and internet beyond. And just like the access equipment, it too has specific power supply requirements. Backhaul power supplies must cater to aggregation routers and core routers.



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In the 5G millimeter wave era, antennas are getting smaller and smaller, and the number is increasing in pairs. Nowadays, most 4G mobile phones are 2x2, 5G is at least 4x4, ...

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5G will propel the cellular industry to frequencies orders of magnitude higher than those used today, and multiple semiconductor technologies are competing to ...

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To further confuse matters, the 3GPP terminology often changes with each generation (e.g., a base station is called eNB in 4G and gNB in 5G). We ...

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### **TS 138 113**

IEC 61000-3-3: "Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in low-voltage supply systems, for equipment with ...

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The 5G transmission is moving toward millimeter wave (mmWave) spectrum spanning up to 71 GHz to achieve the speeds that differentiates it ...

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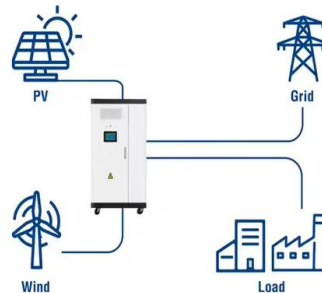
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As a result, a variety of state-of-the-art power supplies are required to power 5G base station components. Modern FPGAs and processors are built using advanced nanometer processes ...

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A 5G base station is the heart of the fifth-generation mobile network, enabling far higher speeds and lower latency, as well as new levels of connectivity. Referred to as gNodeB, 5G base ...

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