

# What is the expected power consumption of 6G base stations



## Overview

The RAN consumes 70–80% of cellular network energy (Ericsson, 2024), with 5G sites averaging 2.2 kW and 6G baselines projected at 3.0 kW due to denser deployments and higher frequencies (Samsung, 2025). Addressing the growing energy consumption in telecommunications, this white paper explores key standardization areas to enhance 6G energy performance, building on 5G NR's advancements. This also. We model the power consumed by digital and analog signal processing, power amplifiers (PAs), and supply and cooling during four phases (data, signaling, micro-sleep, and idle) in downlink and uplink. Hybrid partially-connected beamforming is compared to fully-digital one. Enter 6G: a game-changer promising greener networks through cutting-edge technologies. ng the European Union (EU) climate neutral in 2050. To achieve this aim, the greenhouse gas (GHG) emission has to be halved by 2030 since GHG emissions and withdrawals must be balanced within the European Union by 2050 at the latest 6G initiative and contribute to a process proposal. Its mission. In this article, we introduce the research results of KDDI Research, Inc.



## Article Content

What France Base Station Antenna Market intelligence highlights ...

" France Base Station Antenna Market Outlook: The European base station antenna market is currently undergoing a transformative phase driven by the rapid deployment of fifth

Base Station Antenna Market Size, Share, Growth, 2034

The base station antenna market size was valued at USD 11.24 billion in 2025 and is projected to grow from USD 13.02 billion in 2026 to USD 44.07 billion by 2034, at a CAGR of 15.86%

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These base stations orchestrate RIS to dynamically shape THz wave propagation, creating virtual LoS paths in obstructed environments through AI-driven phase and amplitude control

An extensive review of THz communication in 6G: Facilitating ...

Section 3 explores the architectural components and system design of native AI-6 G networks. It presents a detailed view of the physical and virtual infrastructure—including THz base

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The path to 6G with unparalleled energy savings

This white paper presents Nokia's vision for achieving unparalleled energy savings in 6G networks. It begins by sketching the foundational principles for designing, deploying and operating

6G energy efficiency | imec

As a general rule, it's more wasteful to add base stations than to increase the output power of an existing station. There's a straightforward reason for this: adding more base stations means

6G standardisation moves closer as 2026 begins ...

Early 6G standardisation is expected in 2026, influencing wireless technology decisions for networks and devices into the 2030s.

5G Base Station Market

5G Base Station Market size was valued at USD 39.67 Billion in 2025 and the total Market revenue is expected to grow at a CAGR of 37.2%

## Ericsson's 6G RAN vision: Boosting energy efficiency

Discover Ericsson's 6G energy efficiency insights. Learn how to minimize network consumption while maintaining peak performance. Explore 5G NR advancements.

## Breaking Down RAN Energy Consumption & How 6G Would Enable

The RAN consumes 70–80% of cellular network energy (Ericsson, 2024), with 5G sites averaging 2.4–3.2 kW and 6G baselines projected at 3.0–4.0 kW due to denser deployments and

## Capacity and Power Consumption of Multi-Layer 6G Networks Using

In this paper, we evaluate the capacity and power consumption of multi-layer 6G networks using FR3. Our analysis highlights the superior performance of strategic 6G deployments

(PDF) The path to 6G with unparalleled energy savings A 3GPP ...

Compared to 5G-Advanced, significant 6G RAN energy reduction can be expected due to the ability to apply the entire network energy-saving toolbox across all cells and all 6G devices from...

## Business Standard

Hier sollte eine Beschreibung angezeigt werden, diese Seite lässt dies jedoch nicht zu.

## RF GaN Dynamics and Forecasts: 2026-2034 Strategic Insights

Key among these is the undeniable momentum generated by the global 5G and future 6G wireless communication infrastructure deployments. The insatiable demand for higher bandwidth,

## Top 10 Telecom Industry Trends to Watch in 2026 | StartUs Insights

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## White Paper 6G Energy Efficiency and Sustainability

From a technical point of view, it is a major challenge not to further increase or even reduce the energy consumption of the base stations despite the exploding demand for mobile data.

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Ericsson's 6G RAN vision: Boosting energy efficiency

High and growing energy consumption receives more and more attention in the telecommunication industry. This also applies to discussions about 6G where delivering continued service growth

A Parametric Power Model of Upper Mid-Band (FR3) Base Stations

We model the power consumed by digital and analog signal processing, power amplifiers (PAs), and supply and cooling during four phases (data, signaling, micro-sleep, and idle) in downlink and uplink.

What 2040 Will Look Like. Predictions For The Future

Predictions for 2040 explore how AI, quantum computing, renewable energy & biotech will reshape our world amidst challenges like climate change

Understanding Energy Efficiency in Communication Networks:

We illustrate their use and limitations through the micro view of an idealized 6G base station (BS). Additionally, we also consider the application of EE metrics to evaluate the macro view

Mobile World Congress 2026: Dates, Location, Big Launches and

Mobile World Congress 2026 is shaping up to be one of the most packed events in recent memory. Running from March 2 to 5 at Fira Barcelona Gran Via, with press days kicking off February 28, this

Towards 6G that Balances High Quality and Power Saving: Reducing

In the demonstration experiment, we confirmed that it is possible to reduce power consumption by up to approximately 40% while maintaining the same communication speed, and

Multilayer Ceramic Capacitor Market Size, Share, Growth & Trends

Multilayer Ceramic Capacitor Market Dynamics DRIVER "Rising demand for miniaturised consumer electronics and automotive electronics." The primary driver for the multilayer ceramic

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Global solar PV growth expected to slow to 10% in 2025, reaching 655 GW new installations 2025 will mark a pivotal year for the global PV industry. Structural solar growth continues

Global 6G Market Report 2026-2036: Sixth Generation Wireless

Global 6G market report 2026-2036. Covers THz spectrum, AI-native networks, reconfigurable intelligent surfaces, national programmes & commercialisation forecasts.

## Contact Us

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