SolarTech Power Solutions

Do global communication base stations consume a lot of power

Overview

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In this post, we explore the energy saving features of 5G New Radio and how this enables operators to build denser networks, meet performance demands and maintain low 5G energy consumption. Ph.D., Expert Radio Network Energy Performance, Ericsson Research Senior Researcher radio networks Ph.D.

Carriers have been looking at energy efficiency for a few years now, but 5G will bring this to top of mind because it’s going to use more energy than 4G. Telcos spend on average 5% to 6% of their operating expenses, excluding depreciation and amortization, on energy costs, according to MTN.

Have you ever wondered how much energy our hyper-connected world is consuming?

5G base stations, the backbone of next-gen connectivity, now draw 3-4 times more power than their 4G counterparts. With global 5G subscriptions projected to hit 5.9 billion by 2027 (Ericsson Mobility Report 2023).

The more we use wireless electronic devices, the more energy we will consume. 5G will exponentially increase energy usage. The Small Cell Forum predicts the installed base of small cells to reach 70.2 million in 2025 and the total installed base of 5G or multimode small cells in 2025 to be 13.1.

The standalone power consumption of 5G base stations is high, and the layout density is also high. According to the above calculation, the total electricity cost of 5G base stations will reach about 10 times that of 4G. Moreover, we

know that 5G consumes a lot of power and generates a lot of heat.

The Information and Communication Technology (ICT) industry currently accounts for approximately 4% of the world’s electricity consumption. With 5G projected to increase capacity up to approximately 1000-fold and high frequency millimeter wave (mmWave) transmission driving exponentially higher cell. What are the components of a base station?

Energy consumption In general, a base station consists of composed of multiple transceivers (TRX), and each of them serves one transmit antenna element. A TRX comprises a power amplifier (PA), a small-signal radio frequency (RF) transceiver, a baseband (BB) unit, a DC-DC power supply unit, a mains supply (MS) unit, an active cooling system.

What parameters are used to evaluate cellular base station Power model?

Parameters used for the evaluations with this cellular base station power model. The 5G NR standard has been designed based on the knowledge of the typical traffic activity in radio networks as well as the need to support sleep states in radio network equipment.

Does 5G configuration affect base station capacity?

In this study, we mainly focused on the commercial 5G non-standalone networks, 2 and the configurations (transmit and receive antennas, spectrum frequency and bandwidth) defined in this part has a decisive impact on base station capacity (see Eq.1).

How does densification affect radio network energy performance?

Ph.D., Expert Radio Network Energy Performance, Ericsson Research Historically, densification of networks has implied higher energy expenditure which can add up to a significant part of operator expenses. This, in turn, can place restraints on the number of base stations in the networks.

Do mobile networks consume more energy than fixed networks?

Transferring data via mobile networks (2G to 5G) was found to consume more energy than with fixed networks (copper networks to fiber optic networks). Per transferred gigabyte (Gb) the energy consumption in the fixed network was 0.05 kilowatt hours (kWh) and for mobile communication networks about 0.12 kWh.

How does a base station agent work?

The annual deployment starts from the postcode with high population density. In each step, the newly built base station agents alter the capacity of in their local postcode spatial area, as well as cause interferences to nearby base stations on adjacent areas. In this way, the ABM updates the changed capacity of influenced areas.

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