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Communication base station hybrid energy internal circulation heat dissipation principle

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Overview

Does a 5G base station have heat dissipation?

Currently, the majority of research concerning heat dissipation in 5G base stations is primarily focusing on passive cooling methods. Today, there is a clear gap in the literature in terms of research investigations that tend to quantify the temperature performances in 5G electronic devices.

Are enhanced liquid-cooled base transceiver stations possible?

Many authors have been trying over the years to develop enhanced liquid-based coolers of base transceiver stations . For example, Figure 11 illustrates an enhanced liquid-cooled base transceiver station (BTS) developed by Huttunen et al., 2020 , compared to an old one with a traditional heat sink.

Is a PCB a passive cooling solution for antenna arrays?

Aslan et al., 2019 addressed a fully passive cooling approach using double-sided printed circuit board (PCB) configuration for antenna arrays. In comparison to conventional structures, their research findings indicated that utilizing a thicker ground plane leads to a better thermal performance.

Can a microchannel thermosyphon array improve the design of 5G heat-dissipation devices?

Feng et al., 2024 , proposed a new heat sink solution based on a microchannel thermosyphon array with air cooling; this was an attempt to optimize the design of 5G heat-dissipation devices. Their experimental measurements focused on the temperature uniformity across various filling ratios, heating power levels, and wind speeds.

Why is heat-dissipation important?

Innovative heat-dissipation solutions are necessary in preventing overheating and ensuring the reliable operation of future antennas and equipment. Energy consumption reduction should be developed in combination with a reduction

in operational costs, all while retaining respect for the environment.

How many base stations are in a heterogeneous network?

As an example, one can mention the transition from homogeneous networks (comprising 1 to 3 base stations (BSs) per km 2) to heterogeneous networks (comprising 10 to 100 nodes per km 2). Furthermore, the growing need for larger storage capacities adds to energy requirements.

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