Methods for High Frequency and Very High Frequency Wireless Power Transfer

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OVERVIEW

A method to combine primitive converters to scale power and frequency

- Maintains WPT efficiency with the same device utilization
- Provides high power density wireless power transfer

BACKGROUND

Wireless power transfer (WPT) permits the powering of devices and machines across a wide array of applications. This technology both negates a need for physical connections such as cords or cables and provides advantages of miniaturization plus integration. While WPT also offers benefits such as increased convenience, improved safety, and reduced clutter, its use is still limited because transmission is inefficient at very high frequencies. Depending upon a particular device technology, power converter, and operational frequency, WPT maximum efficiency is therefore defined by a specific power, voltage, or current level. So, a need exists for technological advances in WPT that optimize miniaturization and integration while also achieving high efficiency and power.

INNOVATION

Researchers have invented a method to combine several primitive converters which can scale power and frequency while maintaining WPT efficiency with the same device utilization. To achieve this maximum efficiency at higher power, the power conversion can be segmented and the outputs combined with each segment operating at the maximum efficiency point. This WPT technology has been built and tested in a laboratory, and it has demonstrated 100 MHz at 20 W of power. The ability to run technologies at their maximum efficiency will provide benefits by minimizing energy losses, improving capabilities in both the electronics and energy industries. Additional applications would include use in biomedical devices, medical implants, electric vehicle charging, renewable energy, and data centers.

PATENT APPLICATION

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Category
Hardware
Engineering & Physical Sciences
Semiconductor and Electronics

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