INNOVATION PARTNERSHIPS
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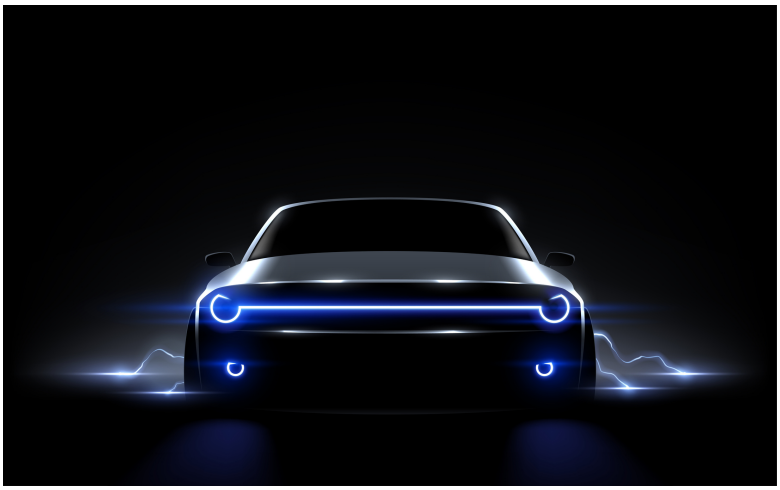
Method for Fair and Accurate Metering for Wireless Power Transfer

TECHNOLOGY NUMBER: 7514



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Hardware
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OVERVIEW

Accurate power measurement system for wireless EV charging

- Minimizes errors in energy metering, reducing costs for consumers/providers
- Applicable to reliable EV charging, fair energy billing, regulatory compliance

BACKGROUND

Electric Vehicles (EVs) are projected to consume 1,900 TW-Hrs of electricity worldwide per year by 2040. Accurate energy metering is crucial, as a mere 1% error in calculations can lead to a staggeringly large cost discrepancy for consumers and providers. Current energy measurement methods involve utility-type meters placed directly on plug-in EV chargers. However, with the advent of wireless power transfer (WPT) systems for EV charging, these traditional methods fall short. Power measurements are typically taken from the voltage and current of either the transmitter (Tx) or receiver (Rx). Measuring at the Tx can overlook transmitter losses, overcharging customers, while measuring at the Rx can miss receiver losses, undercharging customers. This omission creates a need for an improved method to measure transfer power more accurately and fairly between the transmitter and receiver.

INNOVATION

Researchers have created a Transfer Power Measurement (TPM) system that utilizes sensing elements to measure the magnetic field between the transmitter (Tx) and receiver (Rx) in a wireless EV charging system. By capturing power transfer in the gap between Tx and Rx, this method can accurately attribute and minimize energy losses, ensuring precise metering. TPM acts like a gasoline fuel pump monitor, where an unbiased third party, such as the US Department of Agriculture's Weights and Measures Program, could arbitrate calibration and inspection. Proof-of-concept experiments have demonstrated power estimation errors as low as 0.059% to 0.839%, significantly better than prevailing standards. Applications include reliable EV wireless charging, fair energy billing, and facilitating regulatory compliance, ultimately enhancing consumer confidence and operational efficiency in the expanding EV market.

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