

# Technical Challenges and Practical Development for Social Implementation of In-motion Wireless Power Transfer

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This study focuses on the installation of transmitter coils in front of urban traffic lights as a practical application of in-motion wireless power transfer (WPT) systems. To address key challenges such as transmission distance and construction time, a method is proposed in which transmitter coils are directly installed on the road surface without pavement covering, as shown in Fig. 1. To ensure safety during vehicle traffic and protect the wiring, the structure routes the wiring through protective piping from the bottom of the coil to the roadbed, rather than from the side. The prototype transmitter coil shown in Fig. 2 has a three-layer structure consisting of a top cover, a winding plate, and a base plate, fixed using resin screws. Proof-of-concept experiments were conducted to evaluate the feasibility of the proposed design and its installation method. The flush-mounted transmitter coil is presented in Fig. 3, and the measured electrical characteristics are summarized in Fig. 4. While the proposed method has the potential to simplify construction while maintaining comparable performance to conventional embedded systems, challenges such as durability and performance stability remain. Future studies will focus on improving system performance and reducing costs for practical applications.

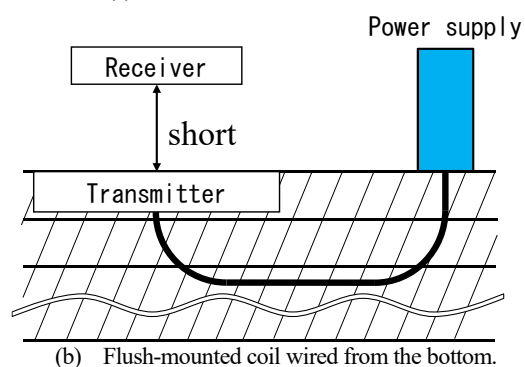
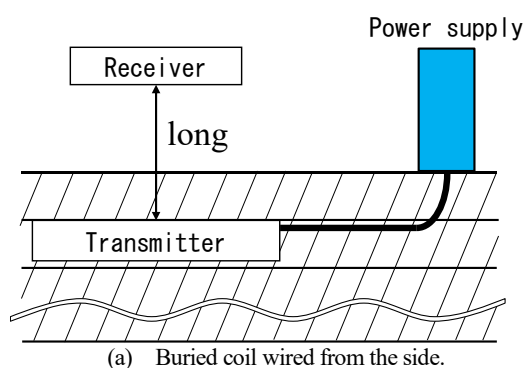


Fig. 1 Coil installation in wireless power transfer systems.

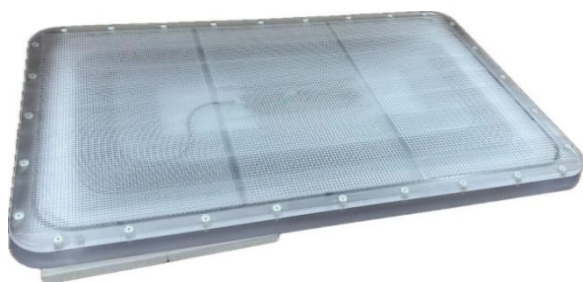


Fig. 2 Prototype transmitter coil.



Fig. 3 Flush-mounted transmitter coil.

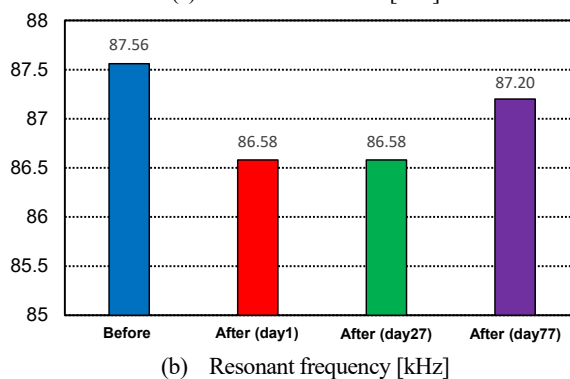
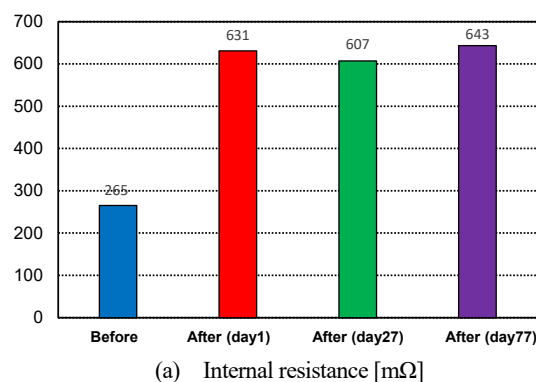


Fig. 4 Measured electrical characteristics of the transmitter coil.