

**Study on Wireless Power Distribution System for Buildings**

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We can apply the wireless power transmission (WPT) to the ground. Our research group advances two types of applications of wireless power transmission on the ground. One is a ubiquitous power source with weak wireless power density under  $10\text{W}/\text{m}^2$ [1]. The other is high power WPT to an electric vehicle[2] in closed transmitter and receiver and the WPT for wireless power distribution system for buildings as a new application of microwave power transmission (Fig. 1).  $10\text{W}/\text{m}^2$  is limitation of safety of human body. Therefore, if there is no human, we can increase the wireless power which is limited by the system, mainly the limited by semiconductors. This system supplies electric power wirelessly by using building materials themselves as a microwave transmission line. The purpose of the present research is to confirm the feasibility and to clarify the technical problems. We have developed variable power dividers (Fig. 1) whose split ratios are from  $-10\text{dB}$  to  $-3\text{dB}$ . And we constructed the power distribution system that actively controls the distribution. We have examined the methods to take out microwave power from the deck plate waveguide. We analyzed methods using a coaxial probe and E-plane T-junction, and established the design technique. Finally, we did a practical examination of the whole system based on the abovementioned experiments. We designed the wireless power distribution system in detail, and explained its technical problems.

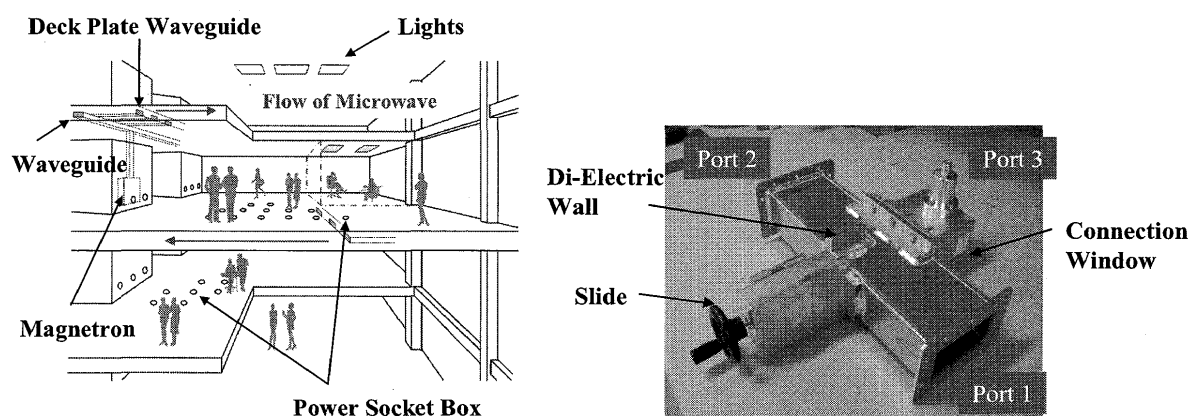


Fig. 1 Concept of Wireless Power Distribution System for Buildings and Developed Power Distribution System that Actively Did the Distribution Control

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ACKNOWLEDGEMENT

This study is supported by Japan Science and Technology Agency. We corroborate with Kajima Technical Research Institute, Okayama University, and University of Tokushima.