

the 313th

Open Seminar for Sustainable Humanosphere

RISH, Kyoto University

# Novel Design and EM Simulation of Planar Antennas for UHF RFID and Near-Field WPT Applications

9/11 (WED), 2024 12:30-13:20



Admission:  
**FREE**

Associated  
Mission

Key-  
words

Mission2 Advanced Development of Science and Technology towards a Solar Energy Society

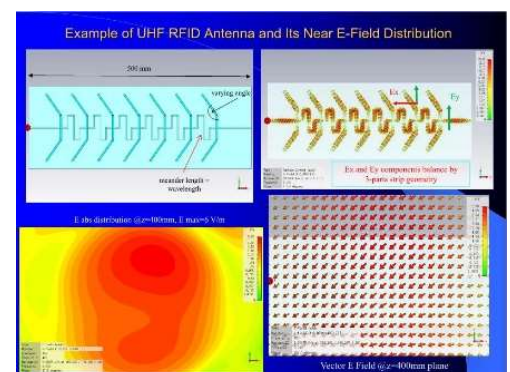
- ✧ UHF RFID
- ✧ Smart Shelf Antenna
- ✧ Near Field Polarization
- ✧ E-Field Distribution
- ✧ Radiative Near-Field WPT
- ✧ RF-to-RF Transmission Efficiency



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One practical example of the radiative wireless power transfer (WPT) is the passive radio frequency identification (RFID) technology which has matured and became an indispensable tool in a variety of applications, such as security, retail tracking, counterfeit prevention, and healthcare. The operation of UHF (916-920 MHz) RFID systems is based on the activation of RFID tags by the EM field produced by the reader antenna so that an accurate wave-front characterization plays an important role in improving the system reliability and data capacity. This talk will present the design of planar UHF RFID antennas for the so-called smart shelf applications. The concept of the quasi-circular polarization (CP) in the near-field zone will be analyzed and illustrated by the E-field distribution of the proposed antennas. Next, application of the proposed antennas for radiative near-field WPT system will be discussed. It will be shown how the polarization control of the quasi-CP E-field is provided so that all receiving devices oriented randomly in the plane parallel to transmitter antenna can be charged. Thus, it reduces the so-called RF energy pollution and minimizes human exposure to radiated energy by limiting the charging volume.



The "open seminar" is a casual research meeting during lunch time on Wednesdays, with the aim of sharing research results, and enhancing collaborations.

[https://www.rish.kyoto-u.ac.jp/open\\_seminar\\_2022\\_en/](https://www.rish.kyoto-u.ac.jp/open_seminar_2022_en/)



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