

Advanced Antenna Design for RFID Technology

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Radio frequency identification (RFID) technology employs short-range wireless communications to read certain digital information stored in a tag attached to an object being tracked. An RFID system consists of one or more tags with IC chips, and a read/write (R/W) device incorporating an R/W antenna as its main component. Tags come in many sizes and shapes, but they are usually small and lightweight, and are typically used for wireless data communication with R/W devices at distances ranging from a few millimeters to several meters.

This lecture will present all the technical aspects of UHF band RFID antenna design and applications. It will begin with a detailed introduction of the basic principles of wireless communications as incorporated in real-life RFID systems. Next, the performance requirements of various R/W antennas for RFID systems would be discussed. Several designs of R/W antennas, as well as RFID tag antennas will be presented and their implementation in various RFID systems will be described. The topics to be covered are listed below:

1. Design and optimization of high-gain single feed RHCP and LP parasitic R/W patch antennas.
2. Implementation of LP 2-element dipole-on-glass R/W antenna for show case applications.
3. Single-feed CP loop coupled dipole antenna for automated ID of library books and files.
4. Environmental effects on the performance of RHCP R/W patch antenna located outdoors.
5. Simulation and design of custom-made RFID tag antennas and their implementation.