A Novel RFID Tag Antenna for an Intelligent Library System

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Abstract

Radio Frequency identification (RFID) technology is a system that allows a user to read or write data using wireless signals. RFID tag antennas are typically miniaturized and planar design. The cost of one tag is mere pennies.

In this paper, a novel RFID tag antenna is proposed for an intelligent library system using RFID Technology. An Intelligent library system provides efficient and reliable methods for automated book checkout, shelf management, book drop-off and most importantly, anti-theft detection.

Radiation pattern of most RFID tags is normally omnidirectional to ensure that the tag can be read from any direction regardless of polarization. For the application of a smart library, however, only one-way readable direction of the tag is acceptable. By designing a directive RFID tag, the reading distance can be drastically increased. The designed tag attached on a front cover enables librarians to quickly do inventory and significantly decrease work effort simply by walking past a bookshelves. If the books is in the incorrect location, the tag reader could then signal the incorrect placement. The proposed tag antenna design is a planar top-loaded, two-element, parasitic array antenna. Higgs 3 RFID chip which holds up to 480 EPC or up to 512 bits is used for the chip of the RFID tag. This chip allows 2^{480} -1 differentiation of books. Together with a simple database of the books and a RFID tag reader, the successful implementation of intelligent library system on a smaller scale can be realized and furthermore a full smart library plan can be devised.

Biographies

DEON LUCIEN is currently an undergraduate at Georgia Southern University pursuing a Bachelors in electrical engineering. After fall 2016 he will pursue a Master's degree. Mr. Lucien may be reached at dl02399@georgiasouthern.edu.

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