

High gain coplanar UHF RFID tag antenna using inductively coupled feed for metallic applications

ABSTRACT

In this design, a coplanar slim antenna had been proposed and designed for UHF RFID (860-960) MHz metallic objects. The slim antenna was presented with proximity coupled feeding, two symmetrical coplanar ground layers, and a transmission line fed by a U-shaped inductively coupled feed. Furthermore, the U-shaped inductive feeder consisted of two opposing symmetrical U-shaped structures to feed the top radiator of the antenna. The size of the antenna was $97.5 \times 50 \times 1.5$ mm³ at 915 MHz. As a result, the peak gain for the antenna reached up to 5 dBi at 915 MHz. Furthermore, the bandwidth of the antenna was 24.875 MHz (900.125-925) MHz (the power reflection coefficient was lower than -3 dB), while the reading range reached up to 11 meters. Besides, the results obtained from the measurement displayed very good impedance matching due to the flexibility generated by the U-shaped inductive feeder. Moreover, the results retrieved exhibited very good agreement with the results obtained from the simulations.

Keyword: Slim antenna; Coplanar; UHF RFID; U-shaped inductive feeder