

U-shaped inductively coupled feed radio frequency identification tag antennas for gain enhancement

ABSTRACT

An inductively coupled feed novel technique is proposed to enhance the performance of radio frequency identification tag antennas. The applied feeding concept is comprised of two opposing symmetrical U-shaped structures to feed a radiating body. It is a simple alternative to effectively match the antenna impedance with the chip impedance from the flexible augmentation of equivalent inductance to the radiating body. The proposed feeding method offers better expectation of performance among antenna size, impedance, and gain at the size of $50 \times 70 \times 1.6 \text{ mm}^3$. The peak gain of the proposed tag antenna is 2.5 dBi at its operating frequency, which is higher among conventional tag antennas. Measured results indicated that this tag antenna has a good impedance matching characteristic at 9046937 MHz (power reflection coefficient lower than 3 dB). The comparison between the simulation and measurement results verified the proposed technique's capability to improve overall performance of the tag antennas.

Keyword: Antenna gain; Impedance matching; Inductively coupled feed; Radio frequency identification; Tag antenna