

Miniaturized metal mount Minkowski fractal RFID tag antenna with complementary split ring resonator

ABSTRACT

This paper proposes miniature radio frequency identification (RFID) tag antenna designed to operate on metallic objects, in the UHF frequency range (915 MHz), without significantly degrading its read range. The antenna structure is composed of two parts: Part 1 comprises two square patches electrically connected to the ground plane through vias while Part 2 is an unconnected inter-layer consisting of two square complementary split ring resonators to allow for capacitive reactance increase. Consequently, its self-resonant frequency will shift towards low frequency, which theoretically allows shrinking RFID tag antenna into smaller size. The antenna was simulated and measured to verify its conjugate matching with chip impedance. The results of experimental tests show that the proposed RFID tag offers a maximum read range of 0.82 m when placed on a metallic object. The tag's overall size is $36.7 \times 18.1 \times 3.2$ mm³. Both simulation and measurement results are provided to validate the design.

Keyword: RFID tag antenna; Tag antenna; Minkowski