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Dual-Band, Dual-Sense Textile Antenna with AMC Backing for Localization Using GPS and WBAN/WLAN

Abstract

A wearable textile antenna with dual-band and dual-sense characteristics is presented in this work. It operates at the 2.45 GHz band for WBAN and WLAN applications, and at the 1.575 GHz band for Global Positioning System (GPS) applications. An antenna backing based on an artificial magnetic conductor (AMC) plane operating at 2.45 GHz band is introduced to reduce the backward radiation and to improve antenna gain. It consists of a\times 3$ array of square patch unit cells, where each unit cell is integrated with four square slits and a square ring. A square-shaped patch is then located on top of the substrate as its radiator. To enable dual-band operation, two corners of this radiator are truncated, with each of the four corners incorporated with a rectangular slit to enable its circular polarization characteristic in the GPS band. Simulation and experimental results are in good agreement and indicate proper antenna operation with linear polarization in the 2.45 GHz band and circular polarization in the 1.575 GHz band, with realized gain of 1.94 dBi and 1.98 dBic, respectively.

Keywords

AMC plane; Dual-band dual-sense antenna; Wearable antenna