A Compact Monopole Antenna with Reconfigurable Band Notch for Underlay Cognitive Radio Applications

ABSTRACT

A compact printed ultra-wide band (UWB) antenna with a switchable band notch for underlay cognitive radio applications is presented in this paper. The antenna patch is partially covered by a ground plane with a staircase slot in order to enhance the matching between the feed line and the antenna. A broadband notch centered at 3.5 GHz and extended along the frequency range (2.9-3.9) GHz is produced by etching a complementary split-ring resonator on the radiating patch, while the presence and absence of this band notch are controlled by a PIN diode. On the other hand, the sensing mode of the proposed antenna scans a frequency range with a fractional bandwidth equal to 130.6% over the range (2.3-11.16) GHz. The results show that the proposed antenna has reasonable radiation characteristics with omnidirectional radiation pattern suitable for portable devices. The gain value surpasses 2.5 dBi over the entire sensing range, but it drops to value less than -4 dB within the notched band. Furthermore, the fabricated version of the proposed antenna gives measurements that are in good agreement with the simulated results.

EXISTING SYSTEM

- A varactor diode was embedded on an E-shaped slot to present a tunable band notch covering the frequency range of the 5GHz WLAN applications .

- A band notch was also reconfigured by mounting a photoconductive switch across a T-shaped slot to eliminate the radiation of the WiMAX applications.

- Finally, a band notch was generated by modifying the slot length of an elliptical planar monopole antenna owing on the operation of a MEMS switch.

PROPOSED SYSTEM

- This paper proposes a compact printed monopole antenna with a reconfigurable band notch for underlay cognitive radio communication systems.

- A staircase slot is presented in the ground plane to improve the matching between the feed line and the antenna patch.

- The band notch is generated by etching a complementary split ring resonator (CSRR) on the antenna radiating patch to reject the radiation of the WiMAX applications.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS:

·   Processor   -   intel core i3

·   RAM   -   2GB

·   Hard Disk   -   20 GB

SOFTWARE REQUIREMENTS:

·   Ansoft HFSS(High Frequency Structure Stimulator)

REFERENCE

[1]. Y. T. Christos Christodoulou, and Joseph Costantine, Antenna Design for Cognitive Radio. Artech House (July 1, 2016), 2016.

[2]. "Federal Communications Commission revision of Part 15 of the commission's rules regarding ultra-wideband transmission systems," FCC, Washington, DC, First Report and Order FCC, V48, pp. 1–118, 2002.

[3]. A. Naghar, A. V. Alejos, O. Aghzout, and M. Essaidi, "Compact microstrip omnidirectional ultrawideband antenna with dual broadband nested U-shaped slots and flat frequency response," Microwave and Optical Technology Letters, vol. 57, no. 12, pp. 2854–2856, 2015.

[4]. K. S. Ryu and A. A. Kishk, "UWB antenna with single or dual band-notches for lower WLAN band and upper WLAN band," IEEE Transaction on Antennas and Propagation, vol. 57, no. 12, pp. 3942–3950, 2009.

[5]. N. Ojaroudi, and M. Ojaroudi, "Novel Design of Dual Band-Notched Monopole Antenna With Bandwidth Enhancement for UWB Applications," IEEE Antennas and Wireless Propagation Letters, vol. 12, pp. 698–701, 2013.