ABSTRACT

Cognitive radio is one of the solutions to improve the frequency spectrum efficiency and the radio communications performance. Cognitive Radio technology allows other users to use a frequency spectrum when the primary user is not using it. This final project designed and realized a suitable microstrip antenna for Cognitive Radio applications at working frequency 1.8, 2.1, 2.3 and 2.6 GHz. This antenna is composed of a sensing and communicating antenna that has a different template but is located on the same substrate. Antenna constructed as printed monopole using FR-4 substrate material and partial ground. Communication antennas has patches which are combined with switches in order to reconfigure its working frequency. The main focus in this final project is a study of antennas that can perform frequency sensing and change the communication frequency into four different frequencies.

The measurement results show that, for VSWR <2, the sensing antenna can work on frequencies 1.8, 2.1, 2.3 and 2.6 GHz with 1500 MHz bandwidth, has wideband characteristics, omnidirectional radiation pattern and elliptical polarization. The communication antenna works on four state of switch combinations. The first state is when all of the switches OFF, working at 2.6 GHz frequency with 770 MHz bandwidth. The second state is when switch 1 ON and switch 2, 3 OFF, working on the 2.3 GHz frequency with 620 MHz bandwidth. The third state is when switch 2 ON and switch 1, 3 OFF, working at 2.1 GHz frequency with 540 MHz bandwidth and the last state is when switch 2.3 ON and switch 1 OFF working at 1.8 GHz frequency with 210 MHz bandwidth.

Keywords: Cognitive radio, printed monopole, partial ground