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Reconfigurable rectangular microstrip patch antenna with multiple frequency and gain enhancement

Abstract

A reconfigurable rectangular microstrip antenna with multiple frequency bands and enhanced gain is presented in this work. The suggested antenna, with dimensions of 60 × 46 × 0.857 mm, was designed on the Rogers RT5880 substrate where relative permittivity, ϵr of 2.2, and loss tangent, 0.0009 with a thickness of 0.787 mm, is used. The structure of the reconfigurable rectangular microstrip patch is made up of two slots and a single switch that can be reconfigured. The resonance frequencies can be adjusted by changing the state of the switch. When the switch is turned OFF, the proposed antenna resonates at 2.85GHz, 3.86GHz, 4.14GHz, and 4.4GHz with reflection coefficients of -10.57 dB, -20.421 dB, - 18.951 dB, and -12.627 dB. When the switch is turned ON, the recommended antenna resonates at 2.4 GHz, 2.7 GHz, 2.86 GHz, 3.875 GHz, and 5.52 GHz, with reflection coefficients of -24.658 dB, -14.06 dB, -16.565 dB, -20.932 dB, and - 13.913 dB, respectively. There are nine frequencies with improved gain values between 2.845 dBi and 6.11 dBi that were obtained during the antenna's on and OFF conditions. For both conditions, this antenna achieves a reflection coefficient of less than -10 dB and a VSWR of less than 2. The proposed antenna has a lot of potential in today's communication applications.