

Design of Multiband Microstrip Antenna Using Stepped Cut Method for WLAN/WiMAX and C/Ku-Band Applications

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Abstract : In this paper, a planar monopole antenna for multi band applications is proposed. The antenna structure operates at three operating frequencies at 3.7, 6.2, and 13.5 GHz which cover different communication frequency ranges. The antenna consists of a quasi-modified rectangular radiating patch with a partial ground plane and two parasitic elements (open-loop-ring resonators) to serve as coupling-bridges. A stepped cut at lower corners of the radiating patch and the partial ground plane are used, to achieve the multiband features. The proposed antenna is manufactured on the FR4 substrate and is simulated and optimized using High Frequency Simulation System (HFSS). The antenna topology possesses an area of $30.5 \times 30 \times 1.6 \text{ mm}^3$. The measured results demonstrate that the candidate antenna has impedance bandwidths for 10 dB return loss and operates from 3.80 – 3.90 GHz, 4.10 – 5.20 GHz, 11.2 – 11.5 GHz and from 12.5 – 14.0 GHz, which meet the requirements of the wireless local area network (WLAN), worldwide interoperability for microwave access (WiMAX), C- (Uplink) and Ku- (Uplink) band applications. Acceptable agreement is obtained between measurement and simulation results. Experimental results show that the antenna is successfully simulated and measured, and the tri-band antenna can be achieved by adjusting the lengths of the three elements and it gives good gains across all the operation bands.

Keywords : planar monopole antenna, FR4 substrate, HFSS, WLAN, WiMAX, C and Ku

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