

Metal wire cutting ACPW-fed shorted monopole antenna design for WiFi triple applications

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A metal wire-cutting monopole antenna, which is shorted to a co-planar waveguide and fed by a mini-coaxial cable to create a balanced-feed structure for WiFi triple band applications, is being proposed, as shown in Fig. 1. A prototype of the antenna, measuring 45 mm in length and 17.5 mm in width, has been fabricated and experimentally tested. The ground trace features a chiseled slot structure to create a defected-ground structure (DGS), which improves impedance bandwidth. The notch filter characteristics of DGS can be utilized in the proposed antenna to reduce unwanted responses and out-of-band signals during both transmission and reception. The electrical-length of the radiating elements can be determined from the one quarter-wave length at the 2.45 GHz and 5.5 GHz, for covering 2400 MHz-2500 MHz (denoted as lower-operating band), 5150 MHz-5850 MHz (denoted as middle-operating band) and 5925 MHz-7125 MHz (denoted as upper-operating band). The function of top-loading is increasing the operating bandwidth of lower- and middle band. The shorted monopole is introduced to divide the surface current into three traces to increase operating band and bandwidth of antennas, the unwanted current that induced by the imperfect ground-plane is also decrease by this mechanism, to let the surface current concentrated on antenna itself to suppress the near-field coupling. The features of the proposed antenna are shown in the Fig. 2. Details of the design considerations of the proposed designs and the experimental results of constructed prototype are presented and discussed.

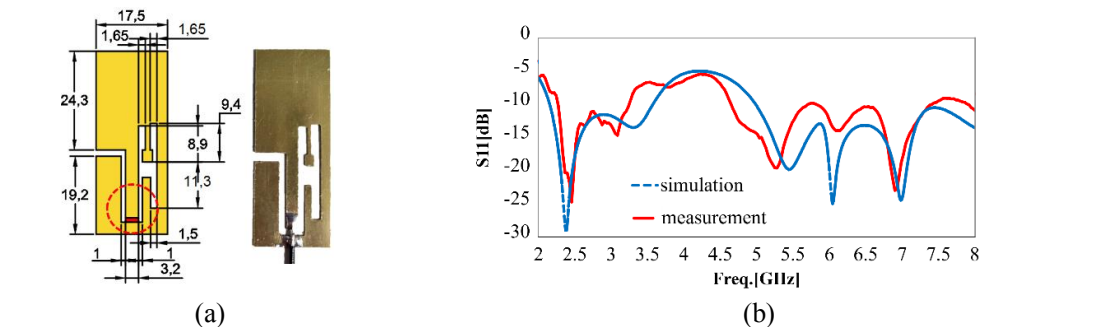


Figure 1. (a). Geometry and dimensions of the proposed antenna. (Unit: mm)
(b). The S11 against frequency results of proposed antenna.

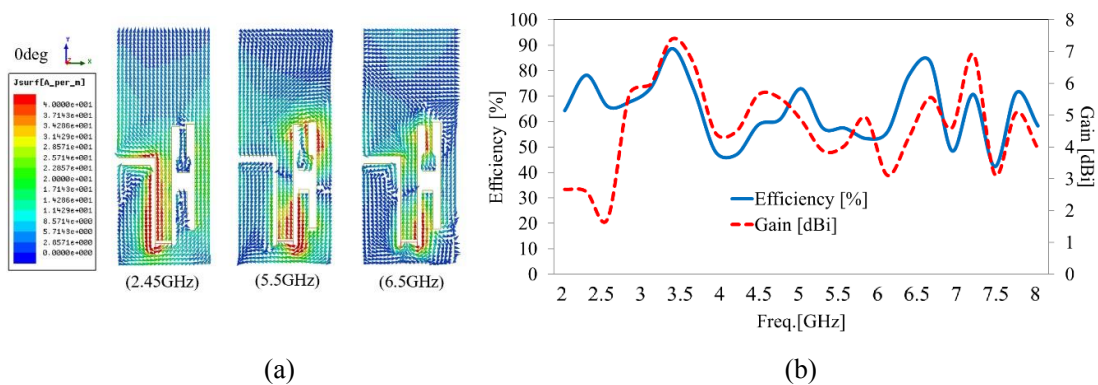


Figure 2. (a). The current distribution of proposed antenna.
(b). The radiated gain and efficiency against frequency results of proposed antenna.