

A compact high directional beam antenna for WiMAX and WiFi application

Abstract

A high directional beam antenna for wireless interoperability microwave access (WiMAX) and wireless fidelity (WiFi) is proposed. With a single circular radiator and a full ground plane, the antenna has successfully achieved a high directional gain of 6.7 dBi. Moreover, the proposed antenna is compact with a square substrate dimension of $50 \times 50 \text{ mm}^2$. The implementation of the slot with a dimension of $0.8 \times 10 \text{ mm}^2$ at the center of the radiator has resulted the circular current distribution that leads to the antenna efficiency of up to 87%. The patch antenna performed under tolerable S_{11} of -10 dB covering operating frequencies of 2.36 GHz up to 2.40 GHz. Parametric study of the narrow slot size, coaxial port position, and the substrate size have been conducted in order to achieve the best antenna dimension with an optimum performance. The measured radiation patterns of the proposed single antenna show a top main beam of 0° and a peak side-lobe level of -17.6 dB, exhibiting a good agreement with the simulated results. Both simulation and measurement results prove that this optimized circular antenna is reliable for IEEE 802.16d fixed WiMAX, IEEE 802.16e mobile WiMAX, and WiFi application.

Keywords

Compact antenna; High directional; WiMAX antenna