

A Balance-fed Planar Antenna for Mobile Applications

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ABSTRACT

Two balance-fed printed antennas are newly proposed in this thesis for modern mobile applications: A T-monopole antenna and a triangular-monopole antenna. This T-monopole antenna is for stripline-feeding with balanced signals. The antenna is compact and has the particular merit of immunity to the influence of size variation in feed ground. The balance-fed T-monopole antenna can be designed by three steps: (1) design an unbalance-fed T-monopole antenna for the specified band; (2) design a broadside-edge-coupled balun for this band; (3) merge the antenna and the balun implemented in Steps 1 and 2 into a balance-fed antenna. A prototype of the antenna for operating at the international mobile telecommunications 2000 (IMT-2000) band has been constructed and is shown as an example. Its return loss and radiation patterns have been simulated and measured. The experimental results demonstrate the broad bandwidth and omnidirectional radiation characteristics. Its impedance-matching bandwidth, determined by -10 dB return loss, is about 670 MHz, which is large enough to cover IMT-2000 band. The maximum antenna gain is estimated at 2.6 dBi across this band. The design procedure for the triangular-monopole antenna is the same as the T-monopole antenna. It is worth mentioning that the impedance-matching bandwidth of the triangular-monopole antenna is broader than that of the T-monopole antenna. The bandwidth of triangular-monopole antenna is broad enough to cover the DCS, PCS, IMT-2000, WLAN and WiMax bands. Its impedance-matching bandwidth is about 1290 MHz.

Keywords : planar antenna ; balanced-fed antenna ; mobile communication

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