As the wireless communications have recently expanded, the potential effects on human body of electromagnetic (EM) fields produced by the base-station antennas has become of great concern to people especially living near the exclusion zone of the antennas. This letter presents the simulation of an electromagnetic radiation exposure and the calculation of specific absorption rate (SAR) and temperature variation for a multilayer human tissue model. The fact that field equations for planar wave propagation are analog to the circuit equations for a wave on a transmission line is exploited to use the lossy transmission line models of the ORCAD PSpice simulator. Exposure simulations are carried out considering a distance of 10 m between a base-station antenna and a multilayer human tissue model for exemplary frequencies of 915 and 2450 MHz. To the authors' knowledge, it is the first time PSPICE has been used for SAR and related temperature rise calculation.