Abstracts

Power absorption and temperature elevations induced in the human head by a dual-band monopole-helix antenna phone

P. Bernardi, M. Cavagnaro, S. Pisa and E. Piuzzi. "Power absorption and temperature elevations induced in the human head by a dual-band monopole-helix antenna phone." 2001 Transactions on Microwave Theory and Techniques 49.12 (Dec. 2001 [T-MTT] (Special Issue on 2001 International Microwave Symposium)): 2539-2546.

A numerically efficient way to evaluate specific absorption rate (SAR) deposition and temperature elevation inside the head of a user of a cellular phone equipped with a dual-band monopole-helix antenna is proposed. The considered antenna operates at both frequencies (900 and 1800 MHz) employed in global system for mobile communication. The results obtained show that, for a given radiated power, although the maximum SAR value as averaged over 1 g in the brain is higher at 900 MHz than at 1800 MHz, the maximum temperature increase in the brain is higher at 1800 MHz. However, taking into account that the average power levels radiated at the two operating frequencies are different (250 mW at 900 MHz and 125 mW at 1800 MHz), higher temperature elevations are obtained at 900 MHz. In this last case, the temperature increases are of the order of 0.2/spl deg/C in the ear, and less than 0.1/spl deg/C in the external brain region close to the phone. When the heating effect due to the contact of the ear and cheek with the phone is also taken into account, it is found that the predominant heating effect in the ear, able to cause temperature increases as high as 1.5/spl deg/C, is the one due to the phone contact, while SAR deposition plays a significant role only in the heating of the external brain region.

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