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"Gheorghe Asachi" Technical University of Iasi, Romania

COMPUTED SAR IN HUMAN HEAD FOR THE ASSESSMENT OF EXPOSURE FROM DIFFERENT PHONE DEVICE ANTENNAS

Mihaela Morega*, Alexandru Mihail Morega

University Politehnica of Bucharest, Department of Electrical Engineering, 313 Splaiul Independentei Blvd., 060042 Bucharest, Romania

Abstract

Several computational models are introduced here for the study of microwaves penetration in the human head, when exposed in the near field of an antenna, in conditions specific to mobile telephony. Monopole and patch antennas are integrated into a conventional cell phone device and normalized exposure conditions are simulated. The generic human head considered here reproduces in shape and dimensions the Specific Anthropomorphic Mannequin (SAM), in order to be comparable with the experimental phantom; both homogeneous and non-homogeneous head structures were analyzed. Differences in head structure and in cell phone design lead to different absorption paths and quantities of energy, which are estimated here. The numerical 3D models presented in the paper are implemented with the finite elements method (FEM). They are built as simulation tools, intended to complement experimental measurements, usually performed for the compliance testing and certification of hand-held devices that act as microwave emitters in close proximity to the ear. The original numerical model was previously validated versus a certified experimental setup; some results obtained by computational dosimetry analysis are presented here.

Key words: finite element method, microwaves, mobile phone emissions, numerical dosimetry, numerical exposimetry, SAR computation

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* Author to whom all correspondence should be addressed: e-mail: mihaela@iem.pub.ro; Phone: +40214029338; Fax: +40213181016