HUMAN EMEXPOSURE MODELING USING FDTD AND METHOD OF AUXILIARY SOURCES

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Due to a tremendous increase of Mobile phones and other wireless communication devices and their use in everyday life, it is very important to study their EM influence on humans, since the excitation source is located very close to the sensitive tissues.

During the EM Exposure influence investigation it is forbidden to carry out real experiments on humans. Because of this the main tools of investigation represent the computer modeling based on numerical methods.

The presented research concerns the human EM influence study on a human body in case of different exposure scenarios. In the Laboratory of Applied Electrodynamics and Radio-engineering the researches are conducted in two directions:

1)The EM exposure study for the small-scale scenarios is conducted on non-homogenous discrete human models ("Virtual Population", IT'IS Foundation) with FDTD method. The main aim of the proposed research is to study Mobile phone EM exposure thermal influence on human non-homogenous models, in particular, to estimate the absorbed EM field energy in the tissue (SAR) and temperature rise caused by this absorption.

2) In case of large-scale scenarios the consideration of other surrounding objects (like room walls, cars, etc.) is realized with the Method of Auxiliary sources (MAS), which represents the efficient tool to solve the diffraction problems on a homogenous objects with smooth geometry. The EM influence modeling is considered on the human homogenous model (with averaged parameters). The main aim of the research is to investigate EM exposure influence on a human homogenous model located in a room and to study possible resonant fields created by multiple reflections inside the room.

The standard frequencies: 300, 900, 1800, 1900, 3700 [MHz] are selected for numerical experiments.