# On the Truncation of the Numerical SAM Phantom Used in Mobile Phone Antenna Simulations

Aimo Arkko
Nokia Corporation, Nokia Research Center, P.O. Box 100, FIN–33721 Tampere, Finland
aimo.arkko@nokia.com

## Abstract

Usage of electromagnetic simulation tools has become a significant part of a typical mobile phone antenna design process. The main reasons for this are the developments in the usability of the commercial software packages and the improvements in the everyday computational resources. In particular, the compatibility between the simulation software packages and the modern mechanical design tools has increased the accuracy as well as the applicability of the simulations. However, at the same time the size and the complexity of the simulation models has also increased thus decreasing the available computational resources required in handling the numerically expensive biological models, like head and hand phantoms, which are essential in mobile phone antenna analyses. Therefore, optimization is needed in order to find a good balance between the efficiency and the stability of the simulations and the reliability of the simulation results. This paper demonstrates a way to improve the efficiency of the simulations involving a mobile phone antenna beside the specific anthropomorphic mannequin (SAM) phantom. In the study the effect of the truncation of the phantom on the simulated performance and specific absorption rate (SAR) results of a typical dual-band (GSM 900/1800) antenna was monitored by cutting out slices around the phantom. The object was to find optimal truncations for both frequency bands enabling efficient and stable simulations still producing reliable simulation results. The paper shows that the SAM phantom can be truncated significantly thus freeing computational resources for other components, like the detailed phone structure or the hand phantom.