Abstracts

Appropriate modeling of the ear for compliance testing of handheld MTE with SAR safety limits at 900/1800 MHz

M. Burkhardt and N. Kuster. "Appropriate modeling of the ear for compliance testing of handheld MTE with SAR safety limits at 900/1800 MHz." 2000 Transactions on Microwave Theory and Techniques 48.11 (Nov. 2000, Part I [T-MTT] (Mini-Special Issue on RF/Microwave Applications in Medicine)): 1927-1934.

A variety of phantoms simulating the human head have been used to test compliance of mobile telecommunications equipment with safely standards. Whereas numerical compliance procedures have mostly been performed using complex anatomical phantoms based on magnetic resonance imaging (MRI) data, experimental procedures have mainly relied on homogeneous phantoms, the ears of which have often been modeled as lossless spacers. Previous studies had indeed demonstrated that the absorption in the head tissue, except the outer ear, can be well represented by a homogeneous head of appropriate shape and material. The objectives of this paper were to fill the gap of the remaining open issues, namely: to evaluate the exposure in the ear region with respect to the spatial-peak specific absorption rate and to evaluate the most appropriate modeling of the ear for experimental evaluations such that it represents the maximum exposure of a reasonable cross section of cellular phone users. This paper is based on a detailed numerical phantom produced using high-resolution MRI scans. During scanning, the ear was naturally collapsed as it occurs when using a cellular phone. The results of this study lead to the conclusion that the spatial-peak absorption occurring in the inner and outer ear can be reliably modeled either by a lossless spacer of not thicker than 3-4 mm or by partially filling the simulated pinna with head tissue simulating media, whereas the minimum distance between the device and liquid should not be larger than 3 mm.

❑ Return to main document.