1987; Lin and Gandhi, 1996]. A special emphasis of this discussion is placed on RF field coupling and its distribution inside homogeneous and inhomogeneous phantom head models.

Experimental Dosimetry

A direct measure of the induced electric field would be preferred because (1) it facilitates understanding of biological phenomena, (2) it relates the field to specific responses of the body, (3) it helps in the delineation of mechanisms of interaction, and (4) it contributes to the establishment of guidelines for safe human exposure. Once the induced field is known, quantities such as SAR can be derived from it by a simple conversion formula. Unfortunately, there are a limited number of small, isotropic, implantable electric field probes. Consequently, a common practice in experimental dosimetry relies on the use of temperature elevation produced under a short-duration, high-intensity exposure condition. In this case, the time rate of initial rise in temperature can be related to SAR through a secondary procedure that involves dielectric conductivity and specific heat capacity of the tissue medium [Michaelson and Lin, 1987].

It is noteworthy that the quantity SAR was officially designated by NCRP as a dosimetric measure. It is defined as the time derivative of the incremental energy absorbed by (or dissipated in) an incremental mass contained in a volume of a given density [NCRP, 1981]. The acceptance of SAR as a meaningful dosimetric measure enabled ANSI to base its 1982 revision of ANSI C95.1 standards on dosimetric ideas. For the first time, it incorporated frequency-dependent absorption of RF radiation by the human body into the ANSI C95.1 safety standards. It is important to distinguish the use of SAR and its derivation from temperature elevation, and not to confuse the quantity of SAR (which is often expressed in either W/kg or mW/g) with a thermal mechanism of interaction.

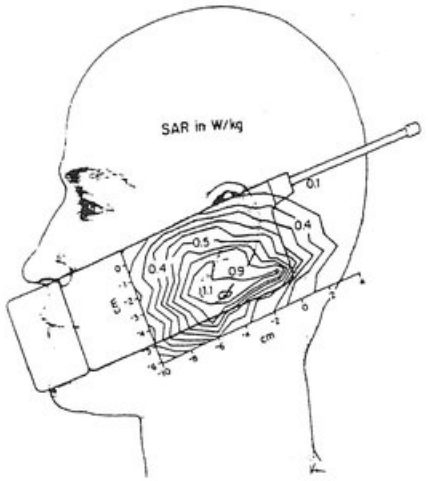

Figure 1 SAR measured inside a phantom human head irradiated by a flip cellular telephone with its antenna extended. The peak output power is 0.6 W. [From Balzano et al., 1995].