

Quantifying Hazardous Electromagnetic Fields: Scientific Basis and Practical Considerations

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As commonly recognized, the problem of quantifying hazardous electromagnetic (EM) fields is difficult and has not yet been satisfactorily solved. Essentially, this is because people are often exposed to emanations from powerful sources of EM fields at points close to the sources and at points where arbitrary polarization and multipath interference exist. However, the accepted concepts, standards, and most measuring instrumentation are based on simple plane-wave field propagation and so are inadequate for complicated fields. The complications and problems of quantifying hazardous EM fields involving source-subject coupling, reactive near-field components, multipath components, and arbitrary polarization are examined in some detail. General discussion of dosimetric measurements and hazard survey measurements is given, and also some basic considerations for the design of field probes for these measurements. Recommendations are given for suitable parameters for quantifying complicated EM fields, and essential and desirable characteristics for hazard survey meters are stated. Several recently designed hazard survey probes are capable of measuring these recommended parameters in many complicated fields of interest, and improved instruments are anticipated.

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