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The challenge of characterizing an inefficient antenna field for health protection purposes MARJORIE LUNDQUIST, The Bioelectromagnetic Hygiene Institute — Growing evidence that the electromagnetic field around electrical wires is harmful to human health prompted a 1990s National Academy of Sciences study of power-frequency (50-60 Hz) fields; results for power-frequency fields were negative but data suggested that fields from *transients* may be hazardous.[1] Transients represent high frequencies that can reach into the radiofrequency (RF) range. What instrument can be used to measure an RF field around electric wires carrying RF current? Such an RF field is that of an *inefficient antenna*, which lacks the pure far-field region characteristic of an *efficient antenna field* for which standard RF measuring instruments are calibrated, making it impossible to obtain a properly calibrated measurement with such instruments. The *magnetic induction current* $\mathrm{d}\mathbf{B}/\mathrm{d}t$ is explored as an alternative way to characterize the *inefficient antenna RF field* sheathing electric wires carrying RF due to *poor power quality* (*e.g.*, switching transients) or to utility use of *power line carrier*[2] or of FCC-approved *broadband on power lines*. [1]National Research Council, **Possible Health Effects of Exposure to Residential Electric and Magnetic Fields**, Washington, DC: National Academy Press, 1997. [2]M. Vignati & L. Giuliani, Environ. Health Perspect. **105**(Suppl 6):1565-1568(1997).

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