January 16, 2004

Bioelectromagnetic Society
Editor, Bioelectromagnetics Journal
2412 Cobblestone Way
Frederick, MD 21702-2626

Attention: Mr. Ben Greenebaum, Editor in Chief
Subject: BEMS Journal Supplement 6, 2003

Dear Mr. Greenebaum,

Publication of the BEMS Journal Supplement 6, 2003 does offer the opportunity to make more transparent the IEEE review and analysis of radiofrequency scientific papers. This review is being done in anticipation of Subcommittee 4 proposed revisions to the standard for exposure of human beings.

It is apparent that this Supplement could have provided valuable discussion of the role of scientists in evaluation of studies, and the standard of evidence utilized for making judgements on how and when scientific evidence becomes sufficient to revise safety standards that underly prudent public health policy. Further, such discussion could have included an independent person or group qualified to discuss different, legitimate perspectives about how safety standards and prudent public health policy can be made without allowing the implicit standards for scientific certainty to govern absolutely the setting of public exposure standards.

It would be counter-productive for the BEMS Journal to appear to advertise the position of a single interest group, while not offering or providing companion information about wide differences in approach on RF standard-setting in such a controversial issue. Perhaps it was that the USAF did not want to pay the costs for different points of view?

For example, the World Health Organization has issued a draft framework (WHO EMF Program Framework for Developing EMF Standards - Draft October 2003) to address how the Program will assess the adequacy of scientific information, and accepted definitions of bioeffect, adverse health effect and hazard. The WHO definition (Paragraph 3.1) states that:

> "(A)nnoyance or discomforts caused by EMF exposure may not be pathological per se, but, if substantiated, can affect the physical and mental well-being of a person and the resultant effect may be considered as an adverse health effect. A health effect is thus defined as a biological effect that is detrimental to health or well-being. According to the WHO Constitution, health is a state of complete

> physical, mental and social well-being and not merely the absence of disease or infirmity."

In great contrast, Page S138 of the BEMS Supplement provides an entirely different standard for judging effects and hazards where the SC4 IEEE C95 revision working group has defined adverse as:

> "An adverse effect is a biological effect characterized by a harmful change in health. For example, such changes can include organic disease, impaired mental function, behavioral dysfunction, reduced longevity, and defective or deficient reproduction. Adverse effects do not include: biological effects without a detrimental health effect, changes in subjective feelings of well-being that are a result of anxiety about RF effects or impacts of RF infrastructure that are not related to RF emissions, or indirect effects caused by electromagnetic interference with electronic devices. An adverse effects exposure level is the condition or set of conditions under which an electric, magnetic or electromagnetic field has an adverse effect."

Further, Page 2S138 of the Supplement quotes Michaelson and Lin (1987) to extend the working definitions of effect and hazard:

> "If an effect is of such an intense nature that it compromises the individual's ability to function properly or overcomes the recovery capability of the individual, then the 'effect' may be considered a hazard. In any discussion of the potential for 'biological effects', from exposure to electromagnetic energies we must first determine whether any 'effect' can be shown; and then determine whether such an observed 'effect' is 'hazardous."

As a first order question, **who is the SC4 Subcommittee of IEEE to develop a new and highly limited definition on RF effects, adverse effects and hazard that is prejudicial to the interest of the public, and counter to the WHO Constitution principle on health?**

It should be expected that the BEMS Journal Editor would have asked for some independent review about the basic nature of the SC4 scientific review process in light of concurrent efforts at the international level to conduct similar assessment of the RF science, and to develop prudent public health guidance. This stand-alone Supplement does tell us what SC4 thinks about judging risk, but it does not tell us that they stand in such stark opposition to the WHO and other European countries who are also trying to harmonize world RF standards, and who have a **fundamental difference in what counts as harm to people.**

If you analyze the SC4 Committee paragraph defining effects and hazards, some serious questions need to be answered. Following their definition, one would have to <u>prove</u> that RF has caused organic disease or other cited effects that qualify. Whose criteria determine when proof is established? In what forum? With what participation by other

interested parties? **How does this subcommittee place itself in the position of knowing in advance whether adverse effects that today do not conclusively reveal disease or dysfunction might not tomorrow (with chronic, low-level exposure) cause real harm?** It is not possible for this Committee, based on the existing state of the science, to conclude that harm will not occur with the existing safety standards for existing and emerging technologies.

A brief review of the Supplement shows that in a number of the papers, the authors conclude that RF effects may possibly cause disease or dysfunction of the nervous system, or that it is not possible to rule out harmful effects, even at RF exposures lower than current safety standards allow:

> "the studies are unable to confidently exclude any possibility of an increased risk of cancer." (Epidemiological Studies of Radio Frequency Exposures and Human Cancer, J. Mark Elwood, Pages S63-S73).
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> "Reports of change of cognitive function (memory and learning) in humans and laboratory animals are in the scientific literature. Mostly, these are thermally mediated, but other low level effects are not so easily explained by thermal mechanisms." (Behavioral and Cognitive Effects of Microwave Exposure, John D'Andrea, Eleanor Adair, John de Lorge, S39-S62)
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> "Regardless of the mechanism, reports of effects that are at or below current recommended safety guidelines deserve rapid evaluation." "At lower levels of exposure biological effects may still occur but thermal mechanisms are not ruled out. It is concluded that the diverse methods and experimental designs as well of lack of replication of many seemingly important studies prevents formation of definite conclusions concerning hazardous nervous system health effects from RF exposure." (Microwave Effects on the Nervous System, John D'Andrea, C.K. Chou, Sheila Johnston and Eleanor Adair, S-107-S147).

Using SC4 Subcommittee definitions, none of these cautionary findings would produce a precautionary response that translates into prudent public policy action (avoidance, slowed deployment of new sources, reduction or elimination of existing sources at these exposure levels, etc). Using the WHO Constitution principle of health definitions these cautionary findings would likely produce precautionary advice (health advisories, warning labels, cautions to sensitive populations, new directives on safe limits and safety factors, better information to doctors and health agencies, etc).

Respectfully submitted,

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