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I am grateful that the FCC has invited comments from the public on the exposure standards for radio frequency (RF) emissions, which have not been updated since 1996. In addition, when the FCC did their 1996 review, they did not incorporate any research findings past 1986 (Levitt, 2009). And of the research prior to 1986, they also, according to Carl F. Blackman, former president of the Bioelectromagnetics Society, did not incorporate expertise on the non-thermal effects of RF (p. 13). Now with the exponential rise in the public's exposure to electromagnetic radio frequency radiation since that time, the inadequacy of the current FCC standards to protect public health has only become more glaring and out of sync with the medical research.

The current standards, for example, justify cell phone radiation exposure limits based on tests which were performed on a fluid filled doll meant to model a 220 pound male (Johnson). Not only does this do a poor job of assessing the effects of cell phone radiation on males (because radiation affects brain tissue and cells differently than it does fluid) it completely disregards exposure effects for women, the developing fetus and children. Children, for example, absorb more radiation than adults because their cells divide more rapidly and their skulls are thinner (Gandhi et al; Black).

The current standards, also, only test for short term thermal effects, that is, for how long and at what level it takes for RF to heat tissue. Dr. Franz Adlkofer, who headed REFLEX (an EU funded research study which found genotoxic effects from exposure to RF) calls this kind of formulation “pseudo science” because it misses long term health effects (2011).

The current standards limit health considerations to an artificially narrow range, allowing the FCC to hand out approvals for cell towers while ignoring their effect on our cells. Their measurement criteria, for example, only requires that RF readings be “averaged,” instead of taking into account peak pulses which experts say can cause the most damage (Sage and Carpenter, p 34). There is also no mention made of the cumulative effect from the simultaneous radiation the public is exposed to, often unknowingly because RF cannot be detected by our senses (ibid, p, 24). Their standards also do not set criteria for what the scientists call “modulation” (when a wave usually of a lower frequency carrying “data” is attached to a higher frequency carrier wave). Carl F. Blackman writes, “There is substantial evidence that some modulated fields (pulsed or repeated signals) are bioactive, which increases the likelihood that they could have health impacts with chronic exposure even at very low exposure levels” (p. 15).

Finally the current FCC standards turn a blind eye to the adverse health effects research shows occur at non thermal levels **thousands of times lower than the FCC limits**. Alasdair Philips of Powerwatch, for example, has stated that all the cancer effects happen at the “non-thermal” level (2012). And Dr. Magda Havas of Trent University wrote in June 2012:

- *We have evidence that cell phone use is associated with cancer.*
- *We have evidence that microwave radiation causes DNA breaks in rat brains and in sperm.*
- *We have evidence that 2.4 ghz.--used in some cordless phones and Wi-fi -- causes primary tumors in rats (U.S. Air Force Study 1992).*
- *We have evidence that this radiation increases the permeability of the blood-brain barrier, enabling potentially toxic chemicals to enter the brain.*
- *We have evidence that it is associated with an increase in the enzyme ornithine decarboxylase that is linked to cancer.*
- *We have evidence that it increases free radicals that can cause cancer.*
- *We have evidence that it increases stress proteins and compromises the immune system.*

- *Indeed, we have epidemiological studies, in vivo studies, and in vitro studies (the three key types of scientific evidence) that microwave radiation below FCC guidelines is associated with AND causes cancer and that the mechanisms involve some combination of free radical production, increased membrane permeability, DNA fragmentation and a compromised immune system.*

This issue is not, as some may say, that those concerned about wireless radiation need to “join the 21st century.” Rather it is the current obsolete standards that need to be updated and brought into the 21st century. The standards, according to experts, need to move from an engineering focus to one which is “biologically based” (Sage and Carpenter, p. 35; Levitt). And we need this not only for the sake of the 21st century but because RF has been found to cause genotoxic damage such as to sperm, which means lowered fertility and possibly children whose damaged DNA will be passed on for generations to come (Sage and Carpenter, p. 12). Therefore, we urgently need scrupulous protective standards for the safety of our children and grandchildren, not just for the 21st century but for all the centuries that follow.

Sincerely,

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References and Notes

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Black K. PBS News Hour, Neurosurgeon: Your Cell Phone is Not Necessarily a Safe Device. URL: http://www.youtube.com/watch?feature=player_embedded&v=-naATQX5Jo4

Blackman CF. Evidence for Disruption by the Modulating Signal. *BioInitiative Report 2012*.

Note: Blackman writes on page 13, “*It appears that by excluding scientists experienced with producing non-thermal biological effects, the usually sound judgment by the selected committees was severely limited in its breadth-of-experience, thereby causing the members to retreat to their own limited area of expertise. . . .*”

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Sage C, Carpenter D. Key Scientific Evidence and Public Health Policy Recommendations (Supplement 2012). *BioInitiative Report 2012, A Rationale for Biologically Based Exposure Standards for Low-Intensity Electromagnetic Radiation* URL: <http://www.bioinitiative.org/>

Note: Sage and Carpenter write on page 12:

Human sperm are damaged by cell phone radiation at very low intensities (0.00034 – 0.07 μ W/cm²). There is a veritable flood of new studies reporting sperm damage in humans and animals, leading to substantial concerns for fertility, reproduction and health of the offspring (unrepaired de novo mutations in sperm). Exposure levels are similar to those resulting from wearing a cell phone on the belt, or in the pants pocket, or using a wireless laptop computer on the lap. Sperm lack the ability to repair DNA damage.