January 15, 2015

To: European Economic and Social Committee TEN 559 Section
Draft Opinion on Electrosensitivity dated January 13, 2015
Re: BioInitiative Working Group Comments in Support of EESC Draft Opinion on Electrosensitivity as amended, January 13, 2015

The BioInitiative Working Group has been requested by the Radiation Research Trust to submit technical materials for your further consideration on wireless health risks. The BioInitiative 2007 Report and the five-year update BioInitiative 2012 Report both document studies reporting disruption of immune function and electrohypersensitivity (EHS). Electrosensitivity is a growing problem and will have significant global public health consequences. The Draft EESC Opinion on Electrosensitivity should be adopted and should lead to precautionary actions by governments in line with this evidence.

We are providing foundational materials that address the science and public health issues with recommendations on application of the precautionary principle. This submittal is based on recent BioInitiative Working Group publications (1, 2) a scientific review (3) of the international, peer-reviewed published literature on electromagnetic fields and radiofrequency radiation (wireless) and recent publications by BioInitiative Working Group authors (4, 5). It is also keyed to the Human Health Rights Declaration published in 2012 (6) and a recent paper on EHS by David O. Carpenter, MD (7)

The scientific evidence for potential health risk from wireless technologies is sufficient to implement strong and immediate precautionary measures at once, especially for children.

There is no informed consent among global populations. Chronic exposure to everyday use of, or proximity to wireless devices and emissions from voice and data communications networks face potential health risks, including electrohypersensitivity.

Such emissions at very low intensities can produce biologically active and ultimately harmful health impacts from pulsed radiofrequency and microwave radiation, as well as extremely low-frequency modulation of such wireless transmissions (ELF-EMF).

Children are more vulnerable and require special protections from chronic wireless emissions, during fetal development and throughout childhood growth and development.

Pregnant women are at risk for altered fetal neurological development with exposure to wireless emissions at common, everyday levels in the home and workplace.

The 2007 BioInitiative Report summarized public policy findings and recommendations based on thousands of published, peer-reviewed scientific studies. They are:

1) Bioeffects and adverse health effects of chronic exposure to low-intensity (non-thermal) non-ionizing radiation are established.

2) Existing FCC and ICNIRP public safety limits are not sufficiently protective of public health.

3) The World Health Organization International Agency for Research on Cancer has classified wireless radiofrequency as a Possible Human Carcinogen (May, 2011). The designation applies to low-intensity RFR in general, covering all RFR-emitting devices and exposure sources (cell and cordless phones, WI-FI, wireless laptops, wireless hotspots, electronic baby monitors, wireless classroom access points, wireless antenna facilities, etc).

The WHO IARC is the highest health body in the world, and it's mission is to study and classify what is, and what is not a carcinogen, the evidence supporting assessments, and the level of uncertainty. We must listen and take precautionary action now.

4) The continued rollout of wireless technologies and devices imperils public health.

5) New, biologically-based public exposure standards are critically needed.

6) The industry is in control of standards for public safety, and adhere only to limits that permit new and nearly unrestricted wireless commerce.

6) It is not in the public interest to wait.

The evidence is sufficient to provide warnings to governments and institutions that are charged with protecting public health and safety, particularly with respect to children.

We urge the EESC to work with the BioInitiative Working Group on the critical need for new, biologically-based public exposure standards for electromagnetic fields and radiofrequency radiation (wireless), and toward the adoption of a UN Resolution on Human Health Rights addressing wireless technology health risks.

Respectfully submitted on behalf of the BioInitiative Working Group by:

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References

1) BioInitiative Working Group, Cindy Sage and David O. Carpenter, Editors. BioInitiative Report: A Rationale for Biologically-based Public Exposure Standards for Electromagnetic Radiation at www.bioinitiative.org, December 31, 2012 at www.bioinitiative.org

BioInitiative Working Group, Cindy Sage and David O. Carpenter, Editors. BioInitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Fields (ELF and RF) at www.bioinitiative.org, August 31, 2007. (2007 chapters contained now in the 2012 Report online)

2) Research summaries of radiofrequency radiation publications at http://www.bioinitiative.org/research-summaries/

(3) BioInitiative Working Group to SCENIHR Committee, Preliminary Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF) dated April 16, 2014.

(4) Herbert M, Sage C (2013) Autism and EMF/RFR? Plausibility of a Pathophysiological Link-Part I. Pathophysiology Volume 20, Issue 3, 191-209, June 2013.

(5) Herbert M, Sage C (2013) Autism and EMF/RFR? Plausibility of a Pathophysiological Link-Part II. Pathophysiology Volume 20, Issue 3, 211-234, June 2013.

(6) Sage C, Huttunen P (2012) Guest Editorial. *WHO recognizes electromagnetic dangers: let us declare human health rights*. Pathophysiology 19 (2012) 1–3

(7) Carpenter, DO. Excessive Exposure to Radiofrequency Electromagnetic Fields May Cause the Development of Electrohypersensitivity. ALTERNATIVE THERAPIES, NOV/DEC 2014 VOL. 20, 6

Human Health Rights Declaration

Fundamental Human Health Rights

The right to homeostasis in our own bodies

The right to normal central nervous system function

The right to natural environmental cues that synchronize our circadian rhythms

The right to sleep

The right to heal

The right to hear

The right to reproduce

The right to learn and retain memories

The right to an intact genome

If even ONE of these rights is compromised - placed at risk from involuntary wireless exposures in daily life, it is a breach of human health rights. When many of these human health rights are compromised without the consent of the individual, then the deployment of wireless technologies should be halted and existing exposures reduced or eliminated, in accord with the scientific and public health findings on chronic. exposure to low-intensity radiofrequency radiation, and other forms of potentially harmful electromagnetic fields.

Exhibit 1
State of the Science and Public Health on Electromagnetic Fields
And Radiofrequency Radiation (Wireless Technology Risks)

The 2012 BioInitiative Report summarizes the state of the science and public health consequences to date as follows:

The BioInitiative Working Group concluded in 2007 that existing public safety limits were inadequate to protect public health, and agreed that new, biologically-based public safety limits were needed five years ago. The BioInitiative Report was been prepared by more than a dozen world-recognized experts in science and public health policy; and outside reviewers also contributed valuable content and perspective.

From a public health standpoint, experts reasoned that it was not in the public interest to wait. In 2007, the evidence at hand coupled with the enormous populations placed at possible risk was argued as sufficient to warrant strong precautionary measures for RFR, and lowered safety limits for ELF-EMF. The ELF recommendations were biologically-based and reflected the ELF levels consistently associated with increased risk of childhood cancer, and further incorporated a safety factor that is proportionate to others used in similar circumstances. The public health cost of doing nothing was judged to be unacceptable in 2007.

What has changed in 2012? In twenty-four technical chapters, the contributing authors discuss the content and implications of about 1800 new studies.

Overall, these new studies reported in the 2012 BioInitiative Report document abnormal gene transcription (Section 5); genotoxicity and single-and double-strand DNA damage (Section 6); stress proteins because of the fractal RF-antenna like nature of DNA (Section 7); chromatin condensation and loss of DNA repair capacity in human stem cells (Sections 6 and 15); reduction in free-radical scavengers - particularly melatonin (Sections 5, 9, 13, 14, 15, 16 and 17); neurotoxicity in humans and animals (Section 9); carcinogenicity in humans (Sections 11, 12, 13, 14, 15, 16 and 17); serious impacts on human and animal sperm morphology and function (Section 18); effects on the fetus, neonate and offspring (Section 18 and 19); effects on brain and cranial bone development in the offspring of animals that are exposed to cell phone radiation during pregnancy (Sections 5 and 18); and findings in autism spectrum disorders consistent with EMF/RFR exposure. This is only a snapshot of the evidence presented in the BioInitiative 2012 updated report.

There is reinforced scientific evidence of risk from chronic exposure to low-intensity electromagnetic fields and to wireless technologies (radiofrequency radiation including microwave radiation). The levels at which effects are reported to occur is lower by hundreds of times in comparison to 2007. The range of possible health effects that are adverse with chronic exposures has broadened. There has been a big increase in the number of studies looking at the effects of cell phones (on the belt, or in the pocket of men radiating only on standby mode) and from wireless laptops on impacts to sperm quality and motility; and sperm death (fertility and reproduction). In other new studies of the fetus, infant and young child, and child-in-school – there are a dozen or more new studies of importance. There is more evidence that such exposures damage DNA, interfere with DNA repair, evidence of toxicity to the human genome (genes),

more worrisome effects on the nervous system (neurology) and more and better studies on the effects of mobile phone base stations (wireless antenna facilities or cell towers) that report lower RFR levels over time can result in adverse health impacts.

Importantly, some very large studies were completed on brain tumor risk from cell phone use. The 13-country World Health Organization Interphone Final study (2010) produced evidence (although highly debated among fractious members of the research committee) that cell phone use at 10 years or longer, with approximately 1,640 hours of cumulative use of a cell and/or cordless phone approximately doubles glioma risk in adults. Gliomas are aggressive, malignant tumors where the average life-span following diagnosis is about 400 days. That brain tumors should be revealed in epidemiological studies at ONLY 10 or more years is significant; x-ray and other ionizing radiation exposures that can also cause brain tumors take nearly 15-20 years to appear making radiofrequency/microwave radiation from cell phones a very effective cancer-causing agent. Studies by Lennart Hardell and his research team at Orebro University in Sweden later showed that children who start using a mobile phone in early years have more than a 5-fold (more than a 500%) risk for developing a glioma by the time they are in the 20-29 year age group. This has significant ramifications for public health intervention.

In short order, in 2011 the World Health Organization International Agency on Cancer Research (IARC) classified radiofrequency radiation as a Group 2B Possible Human Carcinogen, joining the IARC classification of ELF-EMF that occurred in 2001. The evidence for carcinogenicity for RFR was primarily from cell phone/brain tumor studies but by IARC rules, applies to all RFR exposures (it applies to the exposure, not just to devices like cell phones or cordless phones that emit RFR).

The stakes are very high. Exposure to electromagnetic fields (both extremely low-frequency ELF-EMF from power frequency sources like power lines and appliances; and radiofrequency radiation or RFR) has been linked to a variety of adverse health outcomes that may have significant public health consequences. The most serious health endpoints that have been reported to be associated with extremely low frequency (ELF) and/or radiofrequency radiation (RFR) include childhood and adult leukemia, childhood and adult brain tumors, and increased risk of the neurodegenerative diseases, Alzheimer's and amyotrophic lateral sclerosis (ALS). In addition, there are reports of increased risk of breast cancer in both men and women, genotoxic effects (DNA damage, chromatin condensation, micronucleation, impaired repair of DNA damage in human stem cells), pathological leakage of the blood–brain barrier, altered immune function including increased allergic and inflammatory responses, miscarriage and some cardiovascular effects. Insomnia (sleep disruption) is reported in studies of people living in very low-intensity RF environments with WI-FI and cell tower-level exposures. Short-term effects on cognition, memory and learning, behavior, reaction time, attention and concentration, and altered brainwave activity (altered EEG) are also reported in the scientific literature. Biophysical mechanisms that may account for such effects can be found in various articles and reviews (Sage, 2012).

Traditional scientific consensus and scientific method is but one contributor to deciding when to take public health action; rather, it is one of several voices that are important in determining when new actions are warranted to protect public health. Certainly it is important, but not the exclusive purview of scientists alone to determine for all of society when changes are in the public health interest and welfare of children. Human beings are bioelectrical systems. Our hearts and brains are regulated by internal bioelectrical signals. Environmental exposures to artificial EMFs can interact with fundamental biological processes in the human body. In some cases, this may cause discomfort, or sleep disruption, or loss of well-being (impaired mental functioning and impaired metabolism) or sometimes, maybe it is a dread disease like cancer or Alzheimer's disease. It may

be interfering with one's ability to become pregnant, or to carry a child to full term, or result in brain development changes that are bad for the child. It may be these exposures play a role in causing long-term impairments to normal growth and development of children, tipping the scales away from becoming productive adults. The use of common wireless devices like wireless laptops and mobile phones requires urgent action simply because the exposures are everywhere in daily life; we need to define whether and when these exposures can damage health, or the children of the future who will be born to parents now immersed in wireless exposures.

Since World War II, the background level of EMF from electrical sources has risen exponentially, most recently by the soaring popularity of wireless technologies such as cell phones (six billion in 2011-12, up from two billion in 2006), cordless phones, WI-FI , WI-MAX and LTE networks. Some countries are moving from telephone landlines (wired) to wireless phones exclusively, forcing wireless exposures on uninformed populations around the world. These wireless exposures at the same time are now classified by the world's highest authority on cancer assessment, the World Health Organization International Agency for Research on Cancer. to be a possible risk to health. Several decades of international scientific research confirm that EMFs are biologically active in animals and in humans. Now, the balance has clearly shifted to one of 'presumption of possible adverse effects' from chronic exposure. It is difficult to conclude otherwise, when the bioeffects that are clearly now occurring lead to such conditions as pathological leakage of the blood-brain barrier (allowing toxins into the brain tissues); oxidative damage to DNA and the human genome, preventing normal DNA repair in human stem cells; interfering with health sperm production; producing poor quality sperm or low numbers of healthy sperm, altering fetal brain development that may be fundamentally tied to epidemic rates of autism and problems in school children with memory, attention, concentration, and behavior; and leading to sleep disruptions that undercut health and healing in numerous ways.

A. Evidence for Damage to Sperm and Reproduction
Several international laboratories have replicated studies showing adverse effects on sperm quality, motility and pathology in men who use and particularly those who wear a cell phone, PDA or pager on their belt or in a pocket (See Section 18 for references - Agarwal et al, 2008; Agarwal et al, 2009; Wdowiak et al, 2007; De Iuliis et al, 2009; Fejes et al, 2005; Aitken et al, 2005; Kumar, 2012). Other studies conclude that usage of cell phones, exposure to cell phone radiation, or storage of a mobile phone close to the testes of human males affect sperm counts, motility, viability and structure (Aitken et al, 2004; Agarwal et al, 2007; Erogul et al, 2006). Animal studies have demonstrated oxidative and DNA damage, pathological changes in the testes of animals, decreased sperm mobility and viability, and other measures of deleterious damage to the male germ line (Dasdag et al, 1999; Yan et al, 2007; Otitoloju et al, 2010; Salama et al, 2008; Behari et al, 2006; Kumar et al, 2012). There are fewer animal studies that have studied effects of cell phone radiation on female fertility parameters. Panagopoulous et al (2012) report decreased ovarian development and size of ovaries, and premature cell death of ovarian follicles and nurse cells in *Drosophila melanogaster*. Gul et al (2009) reported rats exposed to stand-by level RFR (phones on but not transmitting calls) had a decrease in the number of ovarian follicles in pups born to these exposed dams. Magras and Xenos (1997) reported irreversible infertility in mice after five (5) generations of exposure to RFR at cell phone tower exposure levels of less than one microwatt per centimeter squared (μW/cm2). See Section 18 at www.bioinitiative.org for references.

B. Evidence that Children are More Vulnerable: Many studies demonstrate that children are more sensitive to environmental toxins of various kinds (See Section 24 for references - Barouki et al, 2012; Preston, 2004; WHO, 2002; Gee, 2009; Sly and Carpenter, 2012). Some studies report that the fetus and young children are at greater risk than are adults from exposure to

environmental toxins. This is consistent with a large body of information showing that the fetus and young child are more vulnerable than older persons are to chemicals and ionizing radiation. The US Environmental Protection Agency (EPA) proposes a 10-fold risk adjustment for the first 2 years of life exposure to carcinogens and a 3-fold adjustment for years 3 to 5. These adjustments do not deal with fetal risk, and the possibility of extending this protection to the fetus should be examined because of fetus' rapid organ development. The issue around exposure of children to RFR is of critical importance. There is overwhelming evidence that children are more vulnerable than adults to many different exposures (Sly and Carpenter, 2012), including RFR, and that the diseases of greatest concern are cancer and effects on neurodevelopment. Yet parents place RFR-emitting baby monitors in cribs, provide very young children with wireless toys, and give cell phones to young children, usually without any knowledge of the potential dangers. A growing concern is the movement to make all student computer laboratories in schools wireless. A wired computer laboratory will not increase RFR exposure, and will provide safe access to the internet (Section, Sage and Carpenter, BioInitiative 2012 Report).

C. Evidence for Fetal and Neonatal Effects: Effects on the developing fetus from *in-utero* exposure to cell phone radiation have been observed in both human and animal studies since 2006. Sources of fetal and neonatal exposures of concern include cell phone radiation (both paternal use of wireless devices worn on the body and maternal use of wireless phones during pregnancy). Sources include exposure to whole-body RFR from base stations and WI-FI, use of wireless laptops, use of incubators for newborns with excessively high ELF-EMF levels resulting in altered heart rate variability and reduced melatonin levels in newborns, fetal exposures to MRI of the pregnant mother, and greater susceptibility to leukemia and asthma in the child where there have been maternal exposures to ELF-EMF. Divan et al (2008) found that children born to mothers who used cell phones during pregnancy develop more behavioral problems by the time they have reached school age than children whose mothers did not use cell phones during pregnancy. Children whose mothers used cell phones during pregnancy had 25% more emotional problems, 35% more hyperactivity, 49% more conduct problems and 34% more peer problems (Divan et al, 2008). Aldad et al (2012) showed that cell phone radiation significantly altered fetal brain development and produced ADHD-like behavior in the offspring of pregnant mice. Exposed mice had a dose-dependent impaired glutamatergic synaptic transmission onto Layer V pyramidal neurons of the prefrontal cortex. The authors conclude the behavioral changes were the result of altered neuronal developmental programming *in utero*. Offspring mice were hyperactive and had impaired memory function and behavior problems, much like the human children in Divan et al (2008). See Sections 19 and 20 at www.bioinitiative.org for references.

D. Evidence for Effects on Autism (Autism Spectrum Disorders)

Physicians and health care practitioners should raise the visibility of EMF/RFR as a plausible environmental factor in ASD clinical evaluations and treatment protocols. Reducing or removing EMF and wireless RFR stressors from the environment is a reasonable precautionary action given the overall weight of evidence for a link to ASDs.

Several thousand scientific studies over four decades point to serious biological effects and health harm from EMF and RFR. These studies report genotoxicity, single-and double-strand DNA damage, chromatin condensation, loss of DNA repair capacity in human stem cells, reduction in free-radical scavengers (particularly melatonin), abnormal gene transcription, neurotoxicity, carcinogenicity, damage to sperm morphology and function, effects on behavior, and effects on brain development in the fetus of human mothers that use cell phones during pregnancy. Cell phone exposure has been linked to altered fetal brain development and ADHD-like behavior in the offspring of pregnant mice.

Many disrupted physiological processes and impaired behaviors in people with ASDs closely resemble those related to biological and health effects of EMF/RFR exposure. Biomarkers and indicators of disease and their clinical symptoms have striking similarities. At the cellular and molecular level many studies of people with ASDs have identified oxidative stress and evidence of free-radical damage, as well as deficiencies of antioxidants such as glutathione. Elevated intracellular calcium in ASDs can be associated with genetic mutations but more often may be downstream of inflammation or chemical exposures. Lipid peroxidation of cell membranes, disruption of calcium metabolism, altered brain wave activity and consequent sleep, behavior and immune disfunction, pathological leakage of critical barriers between gut and blood or blood and brain may also occur. Mitochondria may function poorly, and immune system disturbances of various kinds are common. Changes in brain and autonomic nervous system electrophysiology can be measured and seizures are far more common than in the population at large. Sleep disruption and high levels of stress are close to universal. All of these phenomena have also been documented to result from or be modulated by EMF/RFR exposure. The public needs to know that these risks exist, that transition to wireless should not be presumed safe, and that it is very much worth the effort to minimize exposures that still provide the benefits of technology in learning, but without the threat of health risk and development impairments to learning and behavior in the classroom.

Broader recommendations also apply, related to reducing the physiological vulnerability to exposures, reduce allostatic load and build physiological resiliency through high quality nutrition, reducing exposure to toxicants and infectious agents, and reducing stress, all of which can be implemented safely based upon presently available knowledge.

In line with the 1990 UN Rights of the Child consensus, the fetus and the developing child should enjoy protections that are scaled to their heightened vulnerability to environmental toxins and the environment in which they develop and grow. The 2012 BioInitiative Report, Section 20 (3) and Herbert and Sage, 2013 (4, 5) address protections needed for learning environments for children:

· Children with existing neurological problems that include cognitive, learning, attention, memory, or behavioral problems should as much as possible be provided with wired (not wireless) learning, living and sleeping environments.
- Special education classrooms should observe 'no wireless' conditions to reduce avoidable stressors that may impede social, academic and behavioral progress.
- All children should reasonably be protected from the physiological stressor of significantly elevated EMF/RFR (wireless in classrooms, or home environments).
- School districts that are now considering all-wireless learning environments should be strongly cautioned that wired environments are likely to provide better learning and teaching environments, and prevent possible adverse health consequences for both students and faculty in the long-term.
- Monitoring of the impacts of wireless technology in learning and care environments should be performed with sophisticated measurement and data analysis techniques that are cognizant of the non-linear impacts of EMF/RFR and of data techniques most appropriate for discerning these impacts.
- There is sufficient scientific evidence to warrant the selection of wired internet, wired classrooms and wired learning devices, rather than making an expensive and potentially health-harming commitment to wireless devices that may have to be substituted out later.
- Wired classrooms should reasonably be provided to all students who opt-out of wireless environments. (Herbert and Sage, 2012 – Section 20)

E. Evidence for Electrohypersensitivity: The contentious question of whether electrohypersensitivity exists as a medical conditon and what kinds of testing might reveal biomarkers for diagnosis and treatment has been furthered by several new studies presented in Section 24 – Key Scientific Evidence and Public Health Policy Recommendations. What is evident is that a growing number of people world-wide have serious and debilitating symptoms that key to various types of EMF and RFR exposure. Of this there is little doubt. The continued massive rollout of wireless technologies, in particular the wireless 'smart' utility meter, has triggered thousands of complaints of ill-health and disabling symptoms when the installation of these meters is in close proximity to family home living spaces.

McCarty et al (2011) studied electrohypersensitivity in a patient (a female physician). The patient was unable to detect the presence or absence of EMF exposure, largely ruling out the possibility of bias. In multiple trials with the fields either on or not on, the subject experienced and reported temporal pain, feeling of unease, skipped heartbeats, muscle twitches and/or strong headache when the pulsed field (100 ms, duration at 10 Hz) was on, but no or mild symptoms when it was off. Symptoms from continuous fields were less severe than with pulsed fields. The differences between field on and sham exposure were significant at the $p < 0.05$ level. The authors conclude that electromagnetic hypersensitivity is a neurological syndrome, and statistically reliable somatic reactions can be provoked in this patient by exposure to 60-Hz electric fields at 300 volts per meter (V/m). Marino et al (2012) responded to comments on his study with McCarty saying *"EMF hypersensitivity can occur as a bona fide environmentally inducible neurological syndrome. We followed an empirical approach and demonstrated a cause-and-effect relationship ($p < 0.05$) under conditions that permitted us to infer the existence of electromagnetic hypersensitivity (EHS), a novel neurological syndrome*."

The team of Sandstrom, Hansson Mild and Lyskov produced numerous papers between 1994 and 2003 involving people who are electrosensitive (See Section 24 - Lyskov et al, 1995; Lyskov et al, 1998; Sandstrom et al, 1994; Sandstrom et al, 1995; Sandstrom et al, 1997; Sandstrom et al, 2003). Sandstrom et al (2003) presented evidence that heart rate variability is impaired in people with electrical hypersensitivity and showed a dysbalance of the autonomic nervous system.

"*EHS patients had a disturbed pattern of circadian rhythms of HRF and showed a relatively 'flat' representation of hourly-recorded spectral power of the HF component of HRV"*. This research team also found that *"EHS patients have a dysbalance of the autonomic nervous system (ANS) regulation with a trend to hyper-sympathotonia, as measured by heart rate (HR) and electrodermal activity, and a hyperreactivity to different external physical factors, as measured by brain evoked potentials and sympathetic skin responses to visual and audio stimulation*." (Lyskov et al, 2001 a,b; Sandstrom et al, 1997).

The reports referenced above provide evidence that persons who report being electrosensitive differ from others in having some abnormalities in the autonomic nervous system, reflected in measures such as heart rate variability.

F. Evidence for Effects from Cell Tower-Level RFR Exposures

Very low exposure RFR levels are associated with bioeffects and adverse health effects. At least five new cell tower studies are reporting bioeffects in the range of 0.001 to 0.05 μW/cm2 at lower levels than reported in 2007 (0.05 to 0.1 uW/cm2 was the range below which, in 2007, effects were not observed). Researchers report headaches, concentration difficulties and behavioral problems in children and adolescents; and sleep disturbances, headaches and concentration problems in adults. Public safety standards are 1,000 – 10,000 or more times higher than levels now commonly reported in mobile phone base station studies to cause bioeffects.

Exhibit 2

BioInitiative Working Group
Comment on the European Commission's
Scientific Committee on Emerging and Newly-Identified Health Risks (SCENIHR)
Preliminary Opinion on Potential Effects of Electromagnetic Fields

The BioInitiative Working Group provided expert review and comment on the Preliminary Opinion on Potential Health Effects of Electromagnetic Fields by the SCENIHR in April of 2014.

The letter and attached exhibits form a current record of the scientific and public health issues regarding chronic exposure to low-intensity wireless technology emissions, and the wider issues of health risks from electromagnetic fields.

These materials are incorporated by reference in this submittal, and available at: http://www.bioinitiative.org/potential-health-effects-emf/

BioInitiative Working Group Letter to SCENIHR

Exhibit A – Consistent Failure to Identify the Potential for Health Effects

Exhibit B: Comment by Drs. Lennart Hardell, Fredrik Soderqvist, PhD and Michael Carlberg, MSc. on brain tumor epidemiology

Exhibit C: Reference List for Important Fertility and Reproduction Papers and Misrepresentation of Key Study Findings on Effects on Sperm

Exhibit D: An Update on Neurological Effects of Nonionizing Electromagnetic Fields by Prof. Henry Lai, PhD, University of Washington, Emeritus

Exhibit E: An Update on the Genetic Effects of Nonionizing Electromagnetic Fields by Prof. Henry Lai, PhD, University of Washington, Emeritus

Exhibit F: An Update on Physical and Biological Variables, Cancer and Safety Standards Prof. Igor Belyaev, Dr.Sc., Cancer Research Institute, Slovak Academy of Sciences, Slovak Republic

Exhibit G: Mitochondrial Dysfunction and Disruption of Electrophysiology