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July 19, 2017

The Honorable Lorena Fletcher Gonzalez, Chair
Assembly Appropriations Committee
State Capitol, Room 2114
Sacramento, California 95814

Re: SB 649 (Hueso): Wireless Telecommunications Facilities – As Amended – OPPOSE

Dear Assembly Member Gonzalez:

On behalf of more than 3.3 million AARP members in California, I am writing in opposition of SB 649, which would harm California consumers. AARP believes that government should conduct the public's business in an open, inclusionary, and equitable manner, and that administrative agencies should promote fairness, openness, and accountability in public decision-making. Unfortunately, SB 649 does just the opposite. It is part of a nationwide effort to undermine the authority of local jurisdictions by allowing the installation of wireless or "small-cell" technology without requiring city or county discretionary permits. The wireless industry has convinced the Federal Communications Commission to launch a proceeding that preempts local authority if permits are not processed as quickly as the industry desires. This is clearly a usurpation of local authority and is contrary to the public's interest in transparent, accountable government.

In addition, this bill aims to bypass the standard California Environmental Quality Act (CEQA) review, which identifies the environmental impact of physical developments. SB 649 also prevents local jurisdictions from rejecting small-cell towers on public property, with the only exception being fire departments. This essentially negates a jurisdiction's local zoning rights. Furthermore, this bill denies municipalities the right to charge a telecommunications company a fair market rate for the lease and rental of public property, which could potentially harm the economic welfare of the community through lost revenue and subsequent taxation in order to make up for that loss.

In summary, AARP opposes SB 649 because it undermines the authority of local governments and thereby deprives local citizens the right to have a say about where small-cell towers are located in their communities. For these reasons, we urge you to vote "NO" this bill. If you have any questions about AARP's opposition to SB 649, please contact Blanca Castro, Advocacy Director, at (916) 556-3021 or bcastro@aarp.org

Sincerely,

Nancy McPherson, State Director

cc: Senator Ben Hueso

AARP
Real Possibilities

June 26, 2017

The Honorable Cecilia Aguilar-Curry, Chair
Assembly Local Gov't Commission
Room 157, 1020 N Street
Sacramento, CA 95814

RE: SB 649 (Hueso) – Small Cell Wireless Facilities - -OPPOSE

Dear Chair Aguilar-Curry:

Environmental Working Group (EWG) opposes SB 649 by Senator Hueso. This bill would make the installation of small cell wireless facilities, such as those used to facilitate 5G networks, ministerial rather than discretionary at the local government level.

The health impacts of cellular transmissions have been debated more and more passionately the last ten years because there are studies that raise real concerns about the effects of radio frequency (RF) energy or radiation on humans. This is why EWG sponsored two bills by former Senator Leno (SB 1212 in 2010 and SB 932 in 2011) that would have required sellers of cell phones to inform consumers that minimizing exposure to cell phone radiation is prudent and in fact recommended by cell phone manufacturers in their included manuals.

Studies on the health impacts of cell phones and their transmission infrastructure are continuing. As new information becomes available, local government ought to be able to use it to help guide their decision-making, including locational issues such as proximity to homes, school, and hospitals. EWG believes that allowing cities and counties to weigh the potential impacts of transmission networks before permits are issued for their construction is essential and SB 649 would prevent them from doing so. And, if more definitive health concerns arise, state law would have to be changed in order to give local governments the flexibility to do their due diligence.

For these reasons, we must oppose SB 649 and urge a “no” vote in the Local Government Committee.

Sincerely,



Bill Allayaud
California Director of Government Affairs
Environmental Working Group

cc: Senator Hueso

July 26, 2017

The Honorable Ben Hueso
Member of the California State Senate
Room 4035, State Capitol
Sacramento, CA 95814

RE: SB 649 (Hueso) – Small Cell Wireless Facilities - OPPOSE

Dear Senator Hueso:

Environmental Working Group (EWG) respectfully opposes your SB 649, which would make the installation of small cell wireless facilities, such as those used to facilitate 5G networks, ministerial rather than discretionary at the local government level.

The health impacts of cellular transmissions have been debated for over ten years because there are studies that raise real concerns about the effects of radio frequency radiation on humans. This is why EWG sponsored two bills by former Senator Leno, SB 1212 (2010) and SB 932 (2011) that would have required sellers of cell phones to inform consumers to minimize exposure to cell phone radiation by reading the manual that comes with the phone, as this is in fact recommended by cell phone manufacturers in their included manuals.

Studies on the health impacts of cell phones and their transmission infrastructure are continuing, but there is already adequate existing sound science for government to proceed with caution on the roll-out of the new technology. In particular, the results of the \$25 million National Toxicology Program study (2016) that showed tumors in rats caused by a typical amount of heavy cell phone use are to be reckoned with. And, most of the past science has analyzed older cellular technology like 2G and 4G, so we are moving into uncharted waters with 5G with its different wavelengths and energy levels.

Local governments must be able to evaluate science and respond to the wishes of their citizens and neighborhoods before permits are issued for this technology and SB 649 short-circuits that process. This includes important decisions about locating the technology near homes, schools, and hospitals. We simply cannot rely upon the word of the FCC (in terms of safety standards) to protect the health of Californians.

For these reasons, EWG will be urging a “no” vote for the Assembly floor. We will be writing a separate letter to the Assembly Appropriations Committee on fiscal concerns.

Sincerely,



Bill Allayaud
California Director of Government Affairs
Environmental Working Group



August 15, 2017

The Honorable Cecilia Aguiar-Curry
Chair, Assembly Local Government Committee
State Capitol Building, Room 5144
Sacramento, CA 95814

SB 649 (Hueso)- Wireless Telecommunications Facilities- OPPOSE

Chair Aguiar-Curry,

On behalf of the undersigned, we write to register our opposition to SB 649 (Hueso) which would prohibit local discretionary review of "small cell" wireless antennas, including equipment collocated on existing structures or located on new "poles, structures, or non-pole structures," including those within the public right-of-way and buildings. The proposal preempts adopted local land use plans by mandating that "small cells" be allowed in all zones as a use by-right, including all residential zones. Because of this, this proposal essentially provides a CEQA exemption for installation of these facilities, undermining the ability for communities to comment and register their concerns associated with previously mentioned installation. These "small cell" installations not only can cause an aesthetic blight, but can release levels of radiation that we don't yet know conclusively the health impacts they can impose of humans, especially developing bodies and minds of children. These small cell boxes could pop up anywhere: grocery stores, outside school, playgrounds, communal places, with no requirement to mitigate effects or understand potential environmental and health hazards.

For these reasons, we urge your "no" vote in committee.

Thank you,

Jena Price, Legislative Affairs Manager
California League of Conservation Voters

Kyle Jones, Legislative Associate
Sierra Club California

Jane Williams, Executive Director
California Communities Against Toxics

Alliance of Nurses for Healthy Environments



June 26, 2017

The Honorable Cecilia Aguilar-Curry,
Chair Assembly Local Gov't Commission
Room 157, 1020 N Street Sacramento,
CA 95814

RE: SB 649 (Hueso) – Small Cell Wireless Facilities - - OPPOSE

Dear Chair Aguilar-Curry:

I am a Professor of Public Health at the University of San Francisco and a Board Member of the national Alliance of Nurses for Healthy Environments. I am very concerned about moving forward with expanding the use of small-scale wireless technologies at the same time that there is mounting evidence of the potential for health risks from the associated radio frequency energy and radiation, particularly to children. The Alliance of Nurses for Healthy Environments ascribes to the precautionary principle as it applies to human health. We firmly believe that early warnings in the scientific literature should be heeded and that our policy development should reflect the synthesis of the best and latest scientific evidence.

At this point in time, we oppose SB 649 and believe that we need an exhaustive review of the science before we allow significant expansion of small cell wireless facilities, such as those to facilitate 5G networks. The results of the literature review should inform our policies. We must be sure that vulnerable populations such as pregnant women and young children will not be unduly harmed from their proximity to unnecessary radio frequency energy. It is important that we continue to examine what constitutes a safe distance and how we can continue to pivot when more information becomes available. We are concerned that the passage of SB 649 will entrench us in a policy for which we have insufficient assurances and which, if passed, will require the burden of effort to reverse.

For these reasons, we oppose SB 649 and urge a “no” vote in the Local Government Committee.

Thank you for considering our concerns.

Sincerely,

Barbara Sattler, RN, MPH, DrPH, FAAN
Board Member

June 27, 2017

Assembly Member Cecilia M. Aguiar-Curry
Local Government Committee Chair
State Capitol
P.O. Box 942849
Sacramento, CA 94249-0004
Via email

Re: SB 649 - OPPOSE

Dear Chair Aguiar-Curry,

On behalf of The Greenlining Institute, I am writing to express our opposition to SB 649. SB 649 will not close the digital divide. Instead, it will allow phone and broadband providers to override community decisions about how those communities use public space. Additionally, SB 649 will allow providers to use community-owned property without paying just compensation.

Local Communities Fully Understand the Need for Advanced Phone and Broadband Services.

Every community in California is eager to see faster, more reliable, and more affordable phone and broadband service. Local governments are very aware that advanced telephone and broadband services are critical for access to educational, employment, and economic opportunities. Access to these opportunities is particularly critical for communities of color, who, as a result of the racial wealth and income divides, are more likely to live in areas that lack access to advanced phone and broadband services. State and local governments are particularly well-positioned to ensure that providers are serving communities equitably and non-discriminatorily and that community members have equitable access to economic opportunity.

SB 649 Would Not Help Close The Digital Divide.

Sadly, communications providers have repeatedly demonstrated that they will not make advanced services available to low-income or rural areas unless **they are required to do so**. SB 649 contains no such requirement, instead allowing providers to pick and choose where to build their networks without any community input. Under SB 649, it is likely that providers will focus any service improvements on high-income areas. SB 649 in no way guarantees that low-income communities and communities of color will gain increased access to advanced communications services. Accordingly, SB 649 will not help close the digital divide.

SB 649 Would Eliminate the Ability of Communities to Promote their Interests and Priorities.

It is important to remember that the rights-of-way that providers use to build out their networks are **owned by communities and managed by municipalities**.¹ Currently, if a phone or broadband provider wants access to a local community's right-of-way, it can negotiate with that community for a franchise, paying fair-market value for that access. Additionally, communities can currently negotiate with providers to advance community priorities and interests in exchange for access to community-owned rights of way. For example, if a provider seeks access to build out its network in a high-income area, a community could grant access to that in exchange for that providers' providing high-speed broadband to anchor institutions in lower-income areas. SB 649 would eliminate communities' ability to manage their rights-of-way, unduly interfering with those communities' right to self-determination.

SB 649 Would Allow Providers to Use Community-Owned Property without Paying Just Compensation.

Phone and broadband providers already reap windfall profits from Californians. SB 649 limits communities to charging set prices and fees for access to their rights-of-way. These artificial restrictions distort the market and force consumers to subsidize providers' costs. SB 649 prevents communities from getting full market value in exchange for access to rights-of-way. Accordingly, SB 649 increases the power of providers to extract profits from local communities that already face monopoly or near-monopoly prices.

Greenlining supports any legislative measure that increases the availability of advanced communications services to communities of color. Unfortunately, SB 649 is not such a measure. The bill promises to widen the digital divide, place control over community-owned property in the hands of providers, and fail to compensate communities fairly. Accordingly, Greenlining OPPOSES SB 649.

If you have any questions, please do not hesitate to contact me.

Sincerely,



Stephanie Chen
Energy & Telecommunications Policy Director

¹ Frederick E. Ellrodd III & Nicholas P. Miller, Property Rights, Federalism, and Public Rights-of-Way (2003) 26 Seattle Univ. Law. Rev. 475, 477.

Martin Pall, PhD

August 7, 2017

Dear California Legislators,

I am Dr. Martin Pall, Professor Emeritus of Biochemistry and Basic Medical Sciences at Washington State University. I am a published and widely cited scientist on the biological effects of electromagnetic fields and speak internationally on this topic. I am particularly expert in how wireless radiation impacts the electrical systems in our bodies. I have published 7 studies showing there exists exquisite sensitivity to electromagnetic fields (EMFs) in the voltage sensor in each cell, such that the force impacting our cells at the voltage sensor has massive impact on the biology on the cells of our bodies [1-7]. These papers are discussed in over 360,000 web sites which can be easily found by Googling (Martin Pall electromagnetic). I received my PhD at Caltech, one of the top scientific institutions in the world.

EMFs act by activating channels in the membrane that surrounds each of our cells, called voltage-gated calcium channels (VGCCs). The EMFs put forces on the voltage sensor that controls the VGCCs of about 7.2 million times greater than the forces on other charged groups in our cells [4,6,7]. This is why weak EMFs have such large biological effects on the cells of our bodies! EMFs works this way not only on human and diverse animal cells [1-7] but also in plant cells [7] so that this is a universal or near universal mechanism of action.

Thousands of published studies show biological and health effects from electromagnetic fields. We now know the mechanism that can explain these effects. The mechanism is a function of the electromagnetics of each cell—not solely about heating effects from the radiation (on which present FCC guidelines are based).

This new understanding [1-7] means we can debunk the claims of the wireless industry that there cannot be a mechanism for effects produced by these weak EMFs. The 20 years plus of industry propaganda claims are false. Rather the thousands of studies showing diverse health impacts of these EMFs can be explained. We now have a mechanism, one that is supported by both the biology and the physics, both of which are pointing in exactly the same direction. I am sending as a separate document a list of 134 reviews, each of which provides from 12 to over a thousand individual citations showing health impacts of low intensity EMFs, EMFs that the telecommunications industry claims cannot have such effects. **These 134 reviews and thousands of primary scientific papers they cite show that the industry propaganda has no scientific support whatsoever.**

The consensus among independent scientists on this is further confirmed by the 2015 (and later) appeal made to the United Nations and member states, stating that the current EMF safety guidelines are inadequate because they do not take into consideration non-thermal effects. This was signed by 225 scientists from 41 countries, each of whom had

published peer reviewed studies on EMF health effects – a total of 2,000 papers published in this area by the signers, a substantial fraction of the total publications in this area.

According to industry, the forces electromagnetic fields place on electrically-charged groups in the cell are too weak to produce biological effects. However, the unique structural properties of the voltage-gated calcium channel (VGCC) protein can, it turns out, explain why the force on a cell's voltage sensor from low-intensity EMFs are millions of times stronger than are the forces on singly-charged groups elsewhere in the cell.

It would be a disaster for the health of Californians to be exposed to the antennas envisioned in SB.649. The State of California would be making a grave mistake to proceed with supporting the commercial interests of the wireless industry with this legislation. **Legislators would best pause to understand the gravity of the biological effects, and the ramifications for physical and mental health, as well as consequences from continual damage to human DNA, and learn the facts from scientists who are independent of the wireless industry, not from the industry lobbyists who have a gigantic conflict of interest.**

VGCC activation in cells produced by low intensity EMFs can explain long-reported findings that electromagnetic fields and a wide range of biological changes and health effects. The first 6 of these (see below) were well documented 46 years ago in the U.S. Office of Naval Medical Research report, published in 1971 [8]. The others that follow have been extensively documented subsequently in the peer-reviewed scientific literature:

- 1) Various neurological/neuropsychiatric effects, including changes in brain structure and function, changes in various types of psychological responses and changes in behavior.
- 2) At least eight different endocrine (hormonal) effects.
- 3) Cardiac effects influencing the electrical control of the heart, including changes in ECGs, producing arrhythmias, changes that can be life threatening.
- 4) Chromosome breaks and other changes in chromosome structure.
- 5) Histological changes in the testes.
- 6) Cell death (what is now called apoptosis, a process important in neurodegenerative diseases).
- 7) Lowered male fertility including lowered sperm quality and function and also lowered female fertility (less studied).
- 8) Oxidative stress.
- 9) Changes in calcium fluxes and calcium signaling.
- 10) Cellular DNA damage including single strand breaks and double strand breaks in cellular DNA and also 8-OHdG in cellular DNA.
- 11) Cancer which is likely to involve these DNA changes but also increased rates of tumor promotion-like events.
- 12) Therapeutic effects including stimulation of bone growth.
- 13) Cataract formation (previously thought to be thermal, now known not to be).
- 14) Breakdown of the blood-brain barrier.
- 15) Melatonin depletion and sleep disruption.

They may be low intensity but with regard to the VGCCs, electromagnetic fields can have a tremendously powerful impact on the cells of our bodies. Furthermore, published studies showing that calcium channel blocker drugs block or greatly lower biological effects from electromagnetic fields confirm there is a VGCC activation mechanism that is causing various effects. Higher frequency electromagnetic fields from 5G technologies on the horizon pose even greater biological concern than those to which we are exposed today. We should be moving, instead, to wired technologies at every opportunity, based on what we know in science today, not expanding and supporting the proliferation of wireless.

I want to make several additional points very clear:

1. The Physics and the Biology are both pointing in the same direction. Both show that EMFs act primarily via activating the VGCCs in the cells of our bodies.
2. DNA damage known to be produced by these EMFs occur in human sperm and may also occur in human eggs, leading to large increases in mutation in any children born. It is thought that an increase in mutation frequency of 2.5 to 3-fold will lead to extinction because of accumulation of large numbers of damaging mutations. We may already be over this level, and if so, simply continuing our current exposures will lead to eventual extinction. Further increases in exposures will be more rapidly self-destructive.
3. Pulsed EMFs are, in most cases, more biologically active and therefore more dangerous than are non-pulsed (continuous wave) EMFs. All cordless communication devices communicate via pulsations, because it is the pulsations that carry the information communicated. All the industry claims of safety are based on a theory (only thermal effects) that was known to be wrong back in 1971 [8] – and that was before many thousands of additional studies were published providing massive confirmation that industry claims are false.
4. The industry is trying to move to much higher frequencies because these much higher frequencies allow much higher pulsations and therefore much higher transmission of information. However, these higher pulsation rates make these ultra-high devices vastly more dangerous. This is part of the reasons why it is so important to vote down SB.649.
5. None of our wireless communication devices are ever tested biologically for safety – not cell phone towers, not cell phones, not Wi-Fi, not cordless phones, not smart meters and certainly not 5G phones, or radar units in cars – before they are put out to irradiate an unsuspecting public.
6. The telecommunications industry has corrupted the agencies that are supposed to be regulating them. The best example of this is that the FCC which regulates EMFs in the U.S. is a “captured agency”, captured by the industry it is supposed to regulate, according to an 8 chapter document published by the Edmond J. Safra Center for Ethics at Harvard University [9]. Is it any wonder, therefore, that the industry keeps touting that their devices are within the safety guidelines set by the FCC?

I urge you to do the right thing on behalf of the health of Californians and future generations. Please let me know if I can provide further information. (503) 232-3883.

Sincerely,

Martin Pall, PhD (Caltech, 1968)

Professor Emeritus of Biochemistry and Basic Medical Sciences

Washington State University

Citations:

1. Pall ML. 2013 Electromagnetic fields act via activation of voltage-gated calcium channels to produce beneficial or adverse effects. *J Cell Mol Med* 17:958-965.
2. Pall ML. 2014 Electromagnetic field activation of voltage-gated calcium channels: role in therapeutic effects. *Electromagn Biol Med*. 2014 Apr 8.
3. Pall ML. 2015 Scientific evidence contradicts findings and assumptions of Canadian Safety Panel 6: microwaves act through voltage-gated calcium channel activation to induce biological impacts at non-thermal levels, supporting a paradigm shift for microwave/lower frequency electromagnetic field action. *Rev Environ Health* 30:99-116.
4. Pall ML. 2015 Elektromagnetische Felder wirken über die Aktivierung spannungsabhängiger Calciumkanäle, um günstige oder ungünstige Wirkungen zu erzeugen. *Umwelt-Medizin-Gesellschaft* 28: 22-31.
5. Pall ML. 2015 How to approach the challenge of minimizing non-thermal health effects of microwave radiation from electrical devices. *International Journal of Innovative Research in Engineering & Management (IJIREM)* ISSN: 2350-0557, Volume-2, Issue -5, September 2015; 71-76.
6. Pall ML. 2016 Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression. *J Chem Neuroanat* 75(Pt B):43-51. doi: 10.1016/j.jchemneu.2015.08.001. Epub 2015 Aug 21.
7. Pall ML. 2016 Electromagnetic fields act similarly in plants as in animals: Probable activation of calcium channels via their voltage sensor. *Curr Chem Biol* 10: 74-82.
8. Naval Medical Research Institute Research Report, June 1971. Bibliography of Reported Biological Phenomena ("Effects") and Clinical Manifestations, Revised, ZR Glaser.
9. *Captured Agency: How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates*, by Norm Alster. Published by Edmond J. Safra Center for Ethics, Harvard University. An e-book under the Creative Commons 4.0 License: <https://creativecommons.org/licenses/by/4.0/>

September 08, 2017

The Honorable Jerry Brown
Governor, State of California
c/o State Capitol, Suite 1173
Sacramento, CA 95814

RE: SB 649 (Hueso) – Small Cell Wireless Facilities

Honorable Governor Brown,

I have recently learned of proposed Bill SB 649 regarding the streamlining of small cell wireless facilities.

As a member of the Physics department of Ariel University, and before that the Hebrew University of Jerusalem, I have studied the subtle effects of electromagnetic radiation on biology and biological materials. I have published more than 50 articles in the field of Dielectrics (the study of the interaction of materials with radio waves), including many on the interaction of cellular frequencies with biological materials such as proteins and blood. My last article investigated the interaction of 5G electromagnetic radiation with human skin.¹ One could argue that I have a certain amount of expertise.

In light of our work and a growing number of publications showing the frequency range of 5G can have serious biological effects, we believe that current efforts to accelerate the implementation of 5G should be delayed until additional studies are made to assess the critical impact on human health.

It is not for me to lecture to elected officials on how cities should develop technologically, nor is it for me to try and stop the juggernaut that is the cellular industry. However, I would like to point out to you important information on the possible public health implications of the explosion in unregulated cellular phone and wireless device use.

The term “health” has never featured too heavily in the lexicon of the Cellular Industry. It has been assumed, conveniently, that any possible effects on the human anatomy from the use of cell phones would be only mild heating. And that this is something that the body could easily deal with. As a consequence, the governing safety limits were set in 1998 by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) based on the premise that if radiofrequency radiation limits protected human tissue from overheating, then the public was adequately protected. They considered that the effect to humans would at most cause the agitation of water inside cellular tissues that would dissipate as heat, similar to what a microwave oven does, but at far lower energies.

The trouble is that our knowledge has progressed in the last 19 years and we now understand that the interaction of microwave energy and our tissues is far more subtle. There is increasing evidence of non-thermal biological consequences arising from our interaction with cellular phone radiation. A few examples; in 2014 a team from the University of Exeter, UK published a report linking the effect of

¹ Betzalel, Noa, Yuri Feldman and Paul Ben Ishai. “The Modeling of the Absorbance of Sub-THz Radiation by Human Skin.” *IEEE Transactions on Terahertz Science and Technology* PP.99 (2017): 1-9. [doi: 10.1109/TTHZ.2017.2736345](https://doi.org/10.1109/TTHZ.2017.2736345).



cellular phones on declining sperm quality.² They based their research on over 1492 subjects from around the world. In 2009, Columbia University showed that radio frequencies were leading to stress in living cells.³ This in turn seriously affects their ability to perform, as particular cellular pathways were disrupted. Further evidence along this direction was provided by a group from the University of Rennes.⁴ I can add plenty more examples, but I think that it is summed up by a recent public announcement. Advisors to the World Health Organization International Agency for Research on Cancer (WHO/IARC), themselves well versed in radio frequencies and in cancer, have publicly stated that evidence has been met to classify cellular radiation as meeting scientific criteria for a Group 1 carcinogenic agent to humans.^{5,6}

As I said above, it is not my job and neither is it realistic for me to stop the placing of thousands of antennas throughout your state. But it is my job to point out the health hazard to you before you make such a momentous decision.

Yours sincerely



Dr. Paul Ben Ishai
Department of Physics
Ariel University

CC
Tom Dyer, Chief Deputy Legislative Affairs Secretary

² Adams, J.A., et al. "Effect of mobile telephones on sperm quality: a systematic review and meta-analysis." *Environment International* 70 (2014): 106-12. [doi: 10.1016/j.envint.2014.04.015](https://doi.org/10.1016/j.envint.2014.04.015).

³ Blank, M. and R. Goodman. "Electromagnetic fields stress living cells." *Pathophysiology* 16.2-3 (2009): 71-8. [doi: 10.1016/j.pathophys.2009.01.006](https://doi.org/10.1016/j.pathophys.2009.01.006).

⁴ Habauzit, Denis, et al. "Transcriptome analysis reveals the contribution of thermal and the specific effects in cellular response to millimeter wave exposure." *PLoS One* 9.10 (2014): e109435. [doi: 10.1371/journal.pone.0109435](https://doi.org/10.1371/journal.pone.0109435)

⁵ "Cancer Expert Declares Cell Phone and Wireless Radiation As Carcinogenic to Humans." Environmental Health Trust (2017). <https://ehtrust.org/cancer-expert-declares-cell-phone-wireless-radiation-carcinogenic-humans/>

⁶ Carlberg, Michael and Lennart Hardell. "Evaluation of Mobile Phone and Cordless Phone Use and Glioma Risk Using the Bradford Hill Viewpoints from 1965 on Association or Causation." *BioMed Research International* 2017 (2017): 9218486. [doi: 10.1155/2017/9218486](https://doi.org/10.1155/2017/9218486).



892 Arlington Av. Berkeley, CA, 94707 (307) 200-9358
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June 28, 2017

The Honorable Cecilia Aguiar-Curry
Chair of the Local Government Committee
1020 N Street, Room 157
Sacramento, CA 95814

RE: SB 649 (Hueso) – Small Cell Wireless Facilities — OPPOSE

Dear Chair Aguiar-Curry:

As a nonprofit research and policy organization dedicated to identifying and reducing environmental health hazards, Environmental Health Trust (EHT) writes to advise you of serious scientific grounds to reject SB 649 as advanced by Senator Hueso. I have personally served as an expert advisor to the California Department of Health as well as the San Francisco and Berkeley City governments on matters relevant to this bill. EHT has been honored to work with California government and scientists for over a decade. At the invitation of the Israel Institute for Advanced Study of the Hebrew University of Jerusalem, EHT recently organized and chaired an [Expert Forum on Wireless Radiation and Health](#), bringing together scientists and engineers from more than ten high tech nations. Reflecting these efforts, EHT provides independent scientific research and advice on avoidable environmental health hazards to local, state and national governments.

SB 649 will pave the way for widespread introduction of 5G microwave wireless radiation frequency (RF) that has never been tested for its impact of public health or the environment. Other RF microwave radiation such as that used by cellphones and other wireless devices has been [classified as a 'possible carcinogen'](#) by the International Agency for Research on Cancer in 2011 and more recently dubbed a ['probable carcinogen.'](#) by expert researchers looking at newer information in 2015.^{1,2,3} In addition, this bill could result in the loss of hundreds of millions of dollars in local revenue, as the [San Francisco Chronicle noted](#) today.

By ignoring growing scientific evidence of harm, the bill effectively will ensure the widespread exposures of millions of Californians to an agent that growing numbers of scientists and nations consider a serious

¹ World Health Organization. ["IARC classifies radiofrequency electromagnetic fields as possibly carcinogenic to humans."](#) WHO, Press Release, no. 208, 2011.

² IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. ["Non-ionizing radiation, Part 2: Radiofrequency electromagnetic fields."](#) *IARC Monographs On The Evaluation of Carcinogenic Risks to Humans*, vol. 102, pt. 2, 2013.

³ Morgan, L. Lloyd, et al. ["Mobile phone radiation causes brain tumors and should be classified as a probable human carcinogen \(2A\)."](#) *International Journal of Oncology*, vol. 46, no. 5, 2015, 1865-71.

health threat. Recently, studies have found that the frequencies which will be used in 5G and other future technologies can have harmful effects⁴, as Dr. Cindy Russell, Vice President of Community Health for the Santa Clara Medical Association noted.⁵ As articulated in their state Constitution, California cities and counties have a duty to protect the health and safety of their residents.

EHT has a longstanding history of research and policy advice to state, local and national governments regarding strategies to reduce disease and promote health by avoiding environmental health hazards. Our organization opposes the broad scale installation of untested wireless antennas and associated electrical equipment close to humans and through critical wildlife habitat and corridors. Both federal and local zoning controls are needed to assure that cellular equipment are installed to avoid significant and serious safety threats of electrical shock, fire, and radio frequency (RF) microwave radiation exposures, as well as chronic impacts on public health and the environment.

Consistent with public health concepts of preventing harm by reducing exposure to suspected carcinogens, EHT opposes the usurpation and preemption of local authority that will allow federal and state authorities to place what state reports of the bill indicate can be thirty thousand new radiating 5G cell antennas on city and county utility, light poles, and other right of ways in close proximity to city and county workers, children, residents and visitors. In some cases towers will need to be sited every 100 feet with antennas at a height of 30 feet or less. Local authority and duty should not be overridden by preemptive federal or state policies such as SB 649 which disregards scientific evidence on this matter as outlined below.

Regarding potential health risks from RF a number of corporations advise their shareholders that they face serious risks from RF. For instance, Crown Castle's [2016 10-K ANNUAL REPORT](#), states that,

"If radio frequency emissions from wireless handsets or equipment on our wireless infrastructure are demonstrated to cause negative health effects, potential future claims could adversely affect our operations, costs or revenues. The potential connection between radio frequency emissions and certain negative health effects, including some forms of cancer, has been the subject of substantial study by the scientific community in recent years. We cannot guarantee that claims relating to radio frequency emissions will not arise in the future or that the results of such studies will not be adverse to us...If a connection between radio frequency emissions and possible negative health effects were established, our operations, costs, or revenues may be materially and adversely affected. We currently do not maintain any significant insurance with respect to these matters."

Most wireless companies from [AT&T](#) to [Nokia](#) to [T Mobile](#) to [Verizon Wireless](#) have issued [similar warnings](#) to their shareholders.

Regarding public health impacts, recently released research findings from the premiere test program of the National Institute of Environmental Health Sciences (NIEHS) add to the body of scientific evidence

⁴ Feldman, Yuri, et al. "[Human Skin as Arrays of Helical Antennas in the Millimeter and Submillimeter Wave Range.](#)" *Physical Review Letters*, vol. 100, no. 128102, 2008.

⁵ Russell, Cindy. "[A 5G Wireless Future: Will it give us a Smart Nation or Contribute to an Unhealthy One?](#)" Santa Clara Bulletin, Jan./Feb. 2017.

indicating that RF microwave radiation can be harmful. The 10 year \$25 million NIEHS National Toxicology Program's [Studies of the Toxicology and Carcinogenicity Cell Phone Radiation](#) reports that RF produced increases rates of highly malignant very rare tumors: gliomas of the brain and schwannomas of the heart.⁶ These experimental findings are consistent with human studies showing increased rates of gliomas and acoustic neuromas (schwann cells) among humans exposed to cell phone radiation. In addition to increased cancers, the NTP study also reported that prenatally exposed animals produced offspring with lower birth weight and [evidence of direct genetic damage](#).

Since the 2011 WHO/IARC classification, the peer reviewed research connecting microwave exposure to cancer has significantly strengthened. In [2015, a study](#) replicated a 2010 [experiment](#) that found that weak cell phone signals significantly promote the growth of tumors in mice, and that toxic chemical exposures combine with RF to more than double the tumor response.^{7,8} The Ramazzini Institute is engaged in similar research with RF that is 1000 less than the NTP exposures—set to mimic radiation exposure levels caused by network equipment (e.g., cell tower antenna emissions).

Consistent with the [NTP findings](#), the Ramazzini Institute team [report](#) significantly lower litter weights, as presented at the January 2017 [Conference on Wireless and Health](#) at Israel Institute for Advanced Study, Hebrew University of Jerusalem.⁹ Findings of effects at such low levels is indication of the capability of low level electromagnetic radiation exposure to result in biological effects.

Other studies finding serious increased risk of glioma in regular cell phone users are of special relevance. In 2014, a [French national study](#) linked higher cell phone exposure to increased glioma in cell phone users.¹⁰ A newly published research [report](#) in the *American Journal of Epidemiology* finds that Canadians who have used cell phones for 558 hours or more have more than a doubled risk of brain cancer.¹¹ Previous [published re-analysis](#) of the multi country Interphone study data has found stronger positive associations to glioma risk among long term users and heavy users and a [statistically significant](#) association between where tumors were located and how much radiation an individual received from their phone.^{12,13}

⁶ Wyde, Michael, et al. "[Report of Partial findings from the National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley® SD rats \(Whole Body Exposure\)](#)." *bioRxiv*, no. 055699, 2016.

⁷ Lerchl, Alexander, et al. "[Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans](#)." *Biochemical and Biophysical Research Communications*, vol. 459, no. 4, 2015, pp. 585-90.

⁸ Tillmann, Thomas, et al. "[Indication of cocarcinogenic potential of chronic UMTS-modulated radiofrequency exposure in an ethylnitrosourea mouse model](#)." *International Journal of Radiation Biology*, vol. 86, no. 7, 2010, pp. 529-41.

⁹ Belpoggi, Fiorella. "[Recent findings on wireless radiation and health from the Ramazzini Institute could reinforce the NTP results](#)." *Conference on Wireless and Health*, 2017.

¹⁰ Coureau, Gaëlle, et al. "[Mobile phone use and brain tumours in the CERENAT case-control study](#)." *Occupational Environmental Medicine*, vol. 71, no. 7, 2014, pp. 514-22.

¹¹ Momoli, F., et al. "[Probabilistic multiple-bias modelling applied to the Canadian data from the INTERPHONE study of mobile phone use and risk of glioma, meningioma, acoustic neuroma, and parotid gland tumors](#)." *American Journal of Epidemiology*, 2017.

¹² Turner, Michelle C., et al. "[Investigation of bias related to differences between case and control interview dates in five INTERPHONE countries](#)." *Annals of Epidemiology*, vol. 26, 12, 2016, pp. 827-32.

More recently, research carried out by physicists in Israel and others have shown that the higher millimeter wave frequencies to be used in 5G applications uniquely interacts with sweat ducts of the human skin which can then function as antennas to amplify signals. This work extends studies first produced in 1986.¹⁴ The potential long-term impact of such stimulation on precancerous skin growths should be evaluated carefully, including potential super-growth of bacteria.¹⁵ A [lecture](#) by Paul Ben-Ishai, PhD, and published research on this issue can be found on the [2017 Conference website](#).^{16, 17, 18}

Cancer is not the only health concern presented by wireless devices and infrastructure. Impacts on [reproduction](#) and [brain development](#) have also been repeatedly reported in the peer reviewed literature in addition to a myriad of other adverse effects.^{19, 20, 21, 22}

In light of these developments showing growing evidence of the biological impact of RF, it is imperative that new infrastructure and 5G not be introduced widely into commerce at this time. The State of California needs to critically consider the potential impact of massive new and possibly carcinogenic wireless exposures to their population. Before introducing additional untested wireless technology into the environment, it is necessary to:

- model exposures to infants, children and pregnant women;
- conduct experimental tests on exposures' impacts on wildlife; and
- evaluate impacts on human systems through in vitro and in vivo toxicology

In 2015, the [International EMF Scientist Appeal](#), now signed by over 225 scientists from 41 nations, was submitted to the Secretary-General of the United Nations, the Director-General of the World Health Organization and U.N. Member Nations urging the development of more protective guidelines for EMF (including RF-EMF), encouraging precautionary measures, and calling for education of the public about

¹³ Grell, Kathrine, et al. ["The intracranial distribution of gliomas in relation to exposure from mobile phones: analyses from the INTERPHONE study."](#) *American Journal of Epidemiology*, vol. 184, no. 11, 2016, pp. 818-28.

¹⁴ Gandhi OP, Riaz A. ["Absorption of millimeter waves by human beings and its biological implications."](#) *IEEE Transactions on Microwave Theory and Techniques*, vol. 34, no. 2, 1986, pp. 228-235.

¹⁵ Soghomonyan D, K. Trchounian and A. Trchounian. ["Millimeter waves or extremely high frequency electromagnetic fields in the environment: what are their effects on bacteria?"](#) *Applied Microbiology and Biotechnology*, vol. 100, no. 11, 2016, pp. 4761-71.

¹⁶ Feldman, Yuri and Paul Ben-Ishai. ["Potential Risks to Human Health Originating from Future Sub-MM Communication Systems."](#) *Conference on Wireless and Health*, 2017.

¹⁷ Hayut, Itai, Paul Ben Ishai, Aharon J. Agranat and Yuri Feldman. ["Circular polarization induced by the three-dimensional chiral structure of human sweat ducts."](#) *Physical Review E*, vol. 89, no. 042715, 2014.

¹⁸ Feldman, Yuri, et al. ["Human Skin as Arrays of Helical Antennas in the Millimeter and Submillimeter Wave Range."](#) *Physical Review Letters*, vol. 100, no. 128102, 2008.

¹⁹ Adams, Jessica A., et al. ["Effect of mobile telephones on sperm quality: a systematic review and meta-analysis."](#) *Environment International*, 70, 2014, pp. 106-112.

²⁰ Deshmukh, P.S., et al. ["Cognitive impairment and neurogenotoxic effects in rats exposed to low-intensity microwave radiation."](#) *International Journal of Toxicology*, vol. 34, no. 3, 2015, pp. 284-90.

²¹ Aldad, T.S., et al. ["Fetal Radiofrequency Radiation Exposure From 800-1900 MHz-Rated Cellular Telephones Affects Neurodevelopment and Behavior in Mice."](#) *Scientific Reports*, vol. 2, no. 312, 2012.

²² Sonmez, O.F., et al. ["Purkinje cell number decreases in the adult female rat cerebellum following exposure to 900 MHz electromagnetic field."](#) *Brain Research*, vol. 1356, 2010, pp. 95-101.

health risks, particularly risks to children and fetal development.²³ Most recently, the EMF Scientists have submitted [Comments to the FCC](#) asking the FCC to critically consider the potential impact of the 5th generation wireless infrastructure on the health and safety of the U.S. population before proceeding to deploy this infrastructure.

California firefighters have lobbied to protect themselves and successfully received exemption on health grounds from the installation of these cell towers. Similarly cities and counties should be given the needed local controls to protect their citizens from the health and safety risks of these installations. As currently envisioned, transmitters can be placed in close proximity to bedrooms and schools without consideration of the health of their occupants. Research is critically needed to evaluate the public health and environmental impacts of proposed wireless facilities before deployment.

Worldwide, governments are acting to minimize exposures to children as they are most vulnerable. For example, the Supreme Court of India upheld the High Court of the State of Rajasthan's decision to remove all cell towers from the vicinity of schools, hospitals and playgrounds because of radiation "hazardous to life." In Chile, the 2012 "[Antennae Law](#)" prohibits cell antennae/towers in "sensitive areas".²⁴ Please learn more about international policy actions such as these in our [online briefing](#).²⁵

The assumption that all wireless technology is safe has been shown through recent studies to be incorrect. EHT strongly opposes the widespread installation of 5G antennas and towers and believes that the state should move forward on its commitment to support the installation of fiber optic cables buried in the ground to every business, home, school, and hospital in California. We urge the state not to ignore this evidence of harm from RF. Please vote "no" vote on SB 649 and uphold the rights of local government to protect public health and the environment.

Sincerely,



Devra Davis, PhD, MPH

Fellow, American College of Epidemiology

Visiting Prof. Hebrew Univ. Hadassah Medical Center & Ondokuz Mayis Univ. Medical School

Associate Editor, *Frontiers in Radiation and Health*

President, Environmental Health Trust

²³ Blank, M., et al. "[International Appeal: Scientists call for protection from non-ionizing electromagnetic field exposure.](#)" *European Journal of Oncology*, vol. 20, no. 3/4, 2015, pp. 180-2.

²⁴ "[New communications antenna law in Chile.](#)" *Communications Law: Newsletter of the International Bar Association Legal Practice Division*, vol. 20, no. 1, 2013, pp. 14-16.

²⁵ "[International Policy Briefing: Cautionary Policy on Radiofrequency Radiation Actions by Governments, Health Authorities and Schools Worldwide.](#)" Environmental Health Trust, 2017.



Reply to: Alice Fredericks
Chair, Legislative Committee
MCCMC Tiburon Town Hall
1505 Tiburon Blvd
Tiburon, CA 94920

March 27, 2017

The Honorable Ben Hueso
California State Senate, District 40
State Capitol Building, Room 4035
Sacramento, CA 95814
VIA FAX: 916-651-4940

**RE: SB 649 as Proposed to be Amended by RN 17 08941 (Hueso). Wireless and Small Cell Telecommunications Facilities
Notice of Opposition**

Dear Senator Hueso:

The Legislative Committee of Marin County Council of Mayors and Councilmembers (MCCMC) recommended by consensus that MCCMC oppose SB 649 and proposed amendments related to the permitting of wireless and small cell telecommunications facilities. This proposal unnecessarily and unconstitutionally strips local authority over public property and shuts out public input and local discretion by eliminating consideration of the aesthetic and environmental impacts of “small cells.”

This proposal would prohibit local discretionary review of “small cell” wireless antennas, including equipment collocated on existing structures or located on new “poles, structures, or non-pole structures,” including those within the public right-of-way and buildings. The proposal preempts adopted local land use plans by mandating that “small cells” be allowed in all zones as a use by-right, including all residential zones.

The proposal provides a de facto exemption to the California Environmental Quality Act (CEQA) for the installation of such facilities and precludes consideration by the public of the aesthetic and environmental impacts of these facilities, all of which are of particular importance when the proposed location of facilities is within a residential zone.

The proposal preempts local authority by requiring local governments to make available sites they own for the installation of a “small cell.” While a city may place “fair and reasonable terms and conditions” on the use of city property, the proposal does not provide the city with any discretion to deny a “small cell” to be located on city property except for fire department sites. This measure gives control of public property to private telecommunications companies, while also precluding local governments from leasing or licensing publicly owned property. Under this proposal, local governments would be required to give preferential treatment to one industry that has received “most favored nation” status under state law.

The Legislative Committee of MCCMC opposes SB 649.

Respectfully,

A handwritten signature in cursive script, appearing to read 'Alice Fredericks', written in black ink.

Alice Fredericks, Chair
Legislative Committee
Marin County Council of Mayors and Councilmembers

cc:
Senator McGuire
Assembly Member Levine
David Jones
Nancy Hall Bennett

Harry Vere Lehmann
Principal Attorney

Law Offices of Harry V. Lehmann PC
4 Vineyard Court
Novato, California 94947

Area Code 415
Telephone: 897-2121
Facsimile: 898-6959

Via fax: 916-319-2181

August 24, 2017

The Hon. Assemblymember Lorena Gonzalez-Fletcher, District 80
Chair, Assembly Appropriations Committee,
Care Of: Ms. Jennifer Galehouse, Deputy Chief Consultant
Assembly Appropriations Committee

RE: Due to multi-axial EMF crossfire, SB 649 will disproportionately injure the poor, in District 80, and in the rest of urban and suburban California.

Dear Assemblymember Gonzalez-Fletcher:

Due to multi-axial overlapping signal saturation, if SB 649 is enacted as intended, the negative health consequences will fall disproportionately upon the poor. Below are relevant factors supporting this fact:

1. One goal of installing 50,000 new cellular distribution antennas is that 5G customers will be able to receive the digital entertainment now provided by cable through the 5G network.
2. The cellular broadcast signals from these incorrectly-labeled 'small cell,' microwave transmitters are not cohesive, but rather spherical; not like a laser, more like a lightbulb.
3. With the 5G approach a single local microwave broadcast antenna can carry many different programs simultaneously.
4. When non-coherent broadcasts are from the same or nearby towers, their signals will overlap, think of overlapping 3D Venn Diagrams, or like a yard lit by lights of many different colors from the same pole.
5. It is therefore unavoidable that such differing signals from the same (or separate and nearby local) 'small cell' 5G antennas will overlap.
6. The result of overlapping of non-coherent radio-frequency broadcasts is expanded signal concentration, ***with an increase in received signal density proportional to the proximity of recipient sites to each other.***

7. Anyone familiar with the lives of our more recently arrived Hispanic residents knows that their living situations tend to be more dense than the density experienced by financially secure residents. People of all races who live in assisted circumstances are in the same situation: The square footage in apartment units is proportional to what can be afforded.
8. For example, if on any given evening at 8 p.m. there are 16 units in an apartment building, and each one is viewing 5G digital entertainment, ***then all 16 units will be saturated from each of the non-coherent broadcasts being made from the 'small cell' antenna(s) involved.***
9. While there will also be increased signal density in apartments occupied by well-to-do residents, the radiation saturation experienced by the poor will be greater, because the units are closer together.
10. Poorer residents, in addition to living in more tightly packed units, due to financial circumstance will sometimes live with more people in each unit than the well-to-do. With 5G entertainment, an increase in people using tablets in any given also increases saturation density.
11. Well established science already supplied to Appropriations shows that cellular radiofrequency non-ionizing radiation causes harm to the human biological system, including glioblastoma, and that this harm is caused in part by breakage of the DNA molecule strands as well as disruption of cellular calcium ion utilization. Even 'ordinary' single unit cellular phones will cause a kill-off of 50% of the sperm in a male who keeps a cellular device in his front pants pocket. A recent Israeli study showed a kill-rate at 47%. The poor will be hurt worse than people who live in single family homes far from the streets.

The above noted effects are not tied to race but they ***are*** tied to money and resulting density of occupation. People who are living in the most congested circumstances will experience far greater levels of signal density. My father was a truly great man who worked as a school custodian in his later years and I was working full time in a restaurant while a freshman in high school. I am glad to still see the world in many ways with the eyes of a person from the serving classes. This is a time when each of us, regardless of background, should recognize that the deployment of so-called 'small cell' 5-G will hurt the poor more than the rich. As a lawyer and as CEO of Green Swan, our advocacy company, I volunteer to debate this with whatever lawyer the telecom industry wishes to sacrifice for that process.

Very truly yours,



Harry V. Lehmann, as a lawyer
and as CEO of Green Swan, Inc.

Transmission Log

LEHMANN LAW OFFICE

Thursday, 2017-08-24 10:13

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Date	Time	Type	Job #	Length	Speed	Station Name/Number	Pgs	Status
2017-08-24	10:12	SCAN	02311	0:24	24000	9163192181	2	OK -- V.34 1B31

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Via fax: 916-319-2181

August 24, 2017

The Hon. Assemblymember Lorena Gonzalez-Fletcher, District 80
Chair, Assembly Appropriations Committee,
Care Of: Ms. Jennifer Galehouse, Deputy Chief Consultant
Assembly Appropriations Committee

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1. One goal of installing 50,000 new cellular distribution antennas is that 5G customers will be able to receive the digital entertainment now provided by cable through the 5G network.
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3. With the 5G approach a single local microwave broadcast antenna can carry many different programs simultaneously.
4. When non-coherent broadcasts are from the same or nearby towers, their signals will overlap, think of overlapping 3D Venn Diagrams, or like a yard lit by lights of many different colors from the same pole.
5. It is therefore unavoidable that such differing signals from the same (or separate and nearby local) 'small cell' 5G antennas will overlap.
6. The result of overlapping of non-coherent radio-frequency broadcasts is expanded signal concentration, *with an increase in received signal density proportional to the proximity of recipient sites to each other.*



June 22, 2017

Assembly Member Cecilia M. Aguiar-Curry
Chair of the Local Government Committee
1020 N Street, Room 157
Sacramento, California 95814

RE: SB 649

Dear Assembly Member Aguiar-Curry:

I am writing in opposition to SB 649 which will deny the public's right to participate in local decisions. The public has a constitutional right to protect our homes, our privacy, our health and the health of our children from RF radiation which soon will be in the form of 5G millimeter waves.

5G, the technology for which these small cells are a foundational part of the infrastructure, has not been tested on humans. On June 20, 2016 then-outgoing FCC Chairman Tom Wheeler announced at the Washington Press Club that 5G "redefines network connectivity for years to come." When asked by a Bloomberg reporter about health concerns, Chairman Wheeler replied the FCC did not have time to study health because the infrastructure for 5G will "generate tens of billions of dollars in economic activity." In short, 5G is a moneymaker. That concept is driving this bill and it is simply wrong. Not only is it wrong, but it is dangerous, and we need to listen to the firefighters before approving a bill from which there is no viable return.

SB 649 states: "the impact on local interests from individual small wireless facilities will be sufficiently minor." I disagree. The Bill was written by the industry, for the industry. It fails the consumer. It particularly fails the unborn, children, those with immune suppression, the infirm, the disabled, and the elderly. This technology has the capacity to completely disable sensitive segments of the population. It has the ability to inhibit repair of DNA, an essential component to our survival. An increasing number of studies show it has the ability to break DNA outright.

From a neurological and immunological perspective, RF (wireless) radiation has the power to interfere with how we think, how we behave, how we feel. It affects the Central Nervous System (the brain), and it affects our immune system. Those two systems overlap more than any other bodily systems, and thus if one is adversely affected, the other may be, as well. Many people are rendered EHS or "electro-hypersensitive" after continuous exposure to WiFi, cell towers, or cell phone exposure. This is particularly true if the exposure is 24/7, which small cells would be.

Over 15 years ago California did a survey and determined as many as 7% of its population was EHS or electro-hypersensitive, e.g. they have adverse reactions sometimes hours after exposure to wireless such as headache, cognitive impairment, inability to sleep, inability to stay awake, tinnitus, depression, or inability to focus. Conservative estimates in Europe and the US put the number at 3% with respect to EHS in a given population. Some studies show 11% as a more current reflection of EHS. In 2015 the US Census Bureau put the population of California at 39.14 million. Assuming the more conservative 3%, that translates to over 11.7 million Californians who must seek relief from wireless exposure for medical reasons.

Because 5G (for which SB 649 was requested by industry) is designed to penetrate walls with a focused, amplified beam there will be no safe haven, thus leaving California without a low cost prudent avoidance policy for those who are disabled from EMF exposure. Many of these small cells will be directly outside the homes and work places of individuals who are EHS.

Furthermore, there is virtually no oversight with respect to our existing RF exposure to 2G, 3G and 4G, and none is written into the bill to monitor or in any way assess the health impact of 5G. This bill will instantly make life more difficult for the 11 million-plus people who are EHS to find refuge from wireless. In fact, it will make it virtually impossible because 5G on small cell antenna can penetrate any wall, any barrier. That is what 5G is designed to do. This will be in direct violation of the Americans with Disabilities Act.

Additionally, health care costs for California will rise with this massive build out of infrastructure resulting in an exponential increase in radiation exposure not just at work and at school, but at home.

This bill is being rushed to passage, and there is a failure on the part of the bill's sponsors to take the potential health impact into consideration. It is up to you all as legislators to pause and consider the implications of what you are doing. Somehow people have come to believe wireless is like oxygen. We need it to survive. The truth is the exact opposite is true. When did anyone ever think microwave radiation was safe? Yes, this is microwave radiation. RF radiation is a euphemism. It is window-dressing. This technology is *not* safe.

I am far from alone in voicing this opinion. Just look at the firefighters. They are very well aware of the dangers as firestations were among the first commercial spaces targeted for cell tower placement, and the firefighters have lived with this exposure 24/7 for years. **The firefighters oppose SB 649 due to health concerns and have been granted an exemption for their stations.** I concur with the exemption for the firefighters.

As an Honorary Firefighters for the San Diego Fire Department, as the organizer of the only SPECT brain scan study of firefighters in California or anywhere in the US and Canada, as the original author of Res. 15 to call for a moratorium on the placement of cell towers throughout the US and Canada (2003), as a US Adviser to the Radiation Research Trust, and as a medical writer I can assure you that the language of your bill suggesting a "minor" impact is dangerously wrong. I am far from alone. 122 cities throughout California officially oppose SB 649. In addition, to date, 12 counties and myriad organizations oppose this bill.

I have worked with firefighters for over 15 years. My focus has been testing and educating firefighters about the neurological effects of RF radiation, yet the carcinogenic effects are deeply disturbing, as well. Brain cancer is now one of the leading cancers among firefighters and is considered a presumptive cancer in many states. Bottom line: Cell towers have made firefighters ill, impaired their ability to work and protect the public, and may have contributed to deaths.

On February 23, 2013 under WT Docket No. 12-357 I filed my comments with the FCC detailing the findings of a 2004 brain study I organized in which Dr. Gunnar Heuser and Dr. J. Michael Uszler of Santa Monica, CA conducted a pilot study of six (6) California firefighters who had been exposed to a cell tower 9' from their station for five years. These men had become ill – some within minutes, some within hours – after activation of the cell tower next to their station *in spite of months of reassurances from the industry that there were no ill effects from the towers*. The men were experiencing profound neurological symptoms.

The symptoms experienced by the firefighters, all of whom had passed rigorous physical and cognitive exams prior to being hired by the fire department, included but were not limited to the following: headaches, extreme fatigue, sleep disruption, anesthesia-like sleep where the men woke up for 911 calls “as if they were drugged”, inability to sleep, depression, anxiety, unexplained anger, getting lost on 911 calls in the town they grew up in, a twenty (20) year medic forgetting basic CPR in the midst of resuscitating a coronary victim, and immune-suppression manifest in frequent colds and flu-like symptoms.

All six (6) firefighters were found to have brain abnormalities on SPECT scan [single-photon emission computed tomography]. The doctors thought they would find areas of limited function in the brain based on the symptomatology. Instead, they found a pervasive, hyper-excitability of the neurons which suggested the exposure to RF (microwave) radiation was causing the neurons to continually fire without benefit of rest. RF radiation appeared to act as a constant stimulant even when the men were away from the station and in repose. The SPECT scans were considered abnormal in all six firefighters.

Cognitive function, reaction time, and impulse control were measured objectively using T.O.V.A. testing [Test of Variables of Attention]. In all six (6) firefighters, impairment was found with cognitive function, reaction time and impulse control. Three (3) of the six (6) firefighters were captains. The captain on each shift is in charge of making life altering decisions for all firefighters and potential victims. They order firefighters into a burning building, and conversely, they order them out before a roof may collapse, for example. Impairment of all three critical functions could cost firefighters and the community they serve either life or limb.

The testing was conducted in 2004. The cell towers were in place at the two (2) fire stations where the test subjects work for the duration of a twenty-two (22) year lease. The men we tested have remained at the stations as this is the only work they know in the only community they have ever lived in. One (1) of the six (6) men tested did move to another department after his wife gave birth to a boy who was diagnosed with Autism at age 2. This was the first live birth experienced by the “firefighter family” at this department since activation of the tower three (3) years earlier.

What is particularly germane to the critical decisions you are currently facing with SB 649 has to do with the industry line that the radiation from these small cells will be well under the safety guidelines set by the FCC. The FCC currently allows 1,000 microwatts per centimeter squared (uW/cm²) as an emission standard from cell towers. Yet all the symptoms attributed by the firefighters, as well as measurable brain and central nervous system abnormalities described above, occurred within close proximity to a cell tower measured at between 1 - 2 uW/cm² by Peter Sierck, BBEC, CEO of Environmental Testing & Technology in Encinitas, CA. **Thus the emissions from towers were measured at approximately 1/1000th to 1/500th of the FCC's allowable limit.** "Hot spots" of reflected radiation were measured at 15 and 30 uW/cm², yet these "hot spots" were still a fraction of what the FCC allows. Therefore, I strongly suggest **the FCC is not basing its standards on biological effects, but rather physics, and principles of physics do not protect the brains and central nervous systems of even the strongest among us -- our firefighters.** Please see my FCC filing at <https://ecfsapi.fcc.gov/file/7022117660.pdf>

You know the gist of this, or you would not have granted an exemption for firefighters from SB 649. In fact, Section 65964.2 specifically states small cells will not be located on a fire department facility. I know the firefighters asked for and received this exemption based on their concerns about adverse health effects from cell towers on or near their stations.

I know this exemption would not have been granted had you not believed that firefighters were at risk. And if firefighters, the strongest of the strong among us, are experiencing symptoms that impair their work performance due to severe headache, disorientation, sleep disturbance, cognitive impairment, delayed reaction time, lack of impulse control and mood swings, that begs the obvious question: What about the rest of us?

I implore you to see this bill for what it is. It is industry's gift to industry carried out by well-intentioned senators and assembly members who think they are doing what is best for their constituents. The "best" is to deny this carte blanche blanketing of small cells without local control.

Listen to the firefighters, and understand these brave men and women speak for all of us. If they are concerned about harm to their health, then we should be as well.

Respectfully Submitted,

Susan Foster

/s/ Susan Foster

Susan Foster *for the* RADIATION RESEARCH TRUST
US Adviser
Honorary Firefighter, San Diego Fire Department
Medical Writer
Rancho Santa Fe, CA 92091
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July 6, 2017

VIA PRIORITY MAIL and/or HAND DELIVERY and/or EMAIL

Assemblymember Marc Levine
5135 State Capitol
Sacramento, CA 95814

Re: Mass casualties are likely in District 10 from passage of SB 649

Dear Assemblymember Levine,

Senate Bill 649, a decision now before you, will likely result in mass fatalities in your District including children, who due to skull development levels and other factors, are more subject than adults to the effects of the carcinogenic cellular radiation which will saturate the homes in your District if this Bill is passed. Like you, I disdain inflammatory phases as such are so often deployed by emotionally over-loaded people with incomplete capture of the facts and science. Yet, directly relevant to SB 649, the Toxicology Program of our federal National Institutes of Health has shown through their \$25 million study, as announced on May 27, 2016, that cellular wireless radiation affects human tissue via non-thermal means and the formation of glioma, the cancer cell which results in glioblastoma (the brain cancer that kills people). Brain cancer killed four of my colleagues and friends which is what led me several years ago into dedication to our work educating consumers about smartphone proximity through www.greenswan.org. SB 649 is not about smart phone proximity but the constant radiation from the 50,000 towers from SB 649 presents a moral necessity to oppose this Bill. SB 649, now pushed by an industry which makes huge donations and contributions, is being advocated to wirelessly supplant cable as a main means of delivering TV, et al. Senate Bill 649 should be stopped in its tracks in order to protect the residents of your District. At the very least, SB 649 should be put on hold pending further study, as our federal Senate decided regarding the federal version of the same Bill, called S-19, pending further study.

As a trial lawyer, I have specialized in engineering and scientific proof civil cases since 1983. As nearly as I can tell I've personally handled approximately 1,600 civil cases, including certified class actions like the Chevron aviation gasoline matter (new engines for 1647 aircraft), the Mobil Oil AV-1 matter (overhauled or replaced engines for 850 aircraft, mostly twins), and I served as part of the plaintiffs' team in the Yuba Flood Cases, which after far too long settled against the State for \$423 million, as well as many hundreds of other cases, some of them also involving large groups of plaintiffs. I am not important, or by contemporary standards wealthy. Like you, I want facts, not hot-headed opinion from

some alarmist. Rather, our opposition to SB 649 is not grounded in emotion, but strongly grounded in science. If this Bill is allowed to be passed by our Assembly and is then signed into law, mass Crimes Against Humanity will likely result due to radiation exposure, **as you are hereby notified and warned**. Dated May 23, 2017, a 14 page submission on this subject was made to the already-overworked Senate Appropriations Committee, which presentation was composed of a detailed and annotated letter over my signature and supported by a Declaration under Penalty of Perjury by Mr. Paul McGavin. Paul and I are mere two of the large of California residents who, like representatives of cities and counties, oppose SB 649. Rather than taking up your time with more of my own words, and having given you this legal Notice of the likely consequences from the passage of SB 649, I respectfully advise you of said letter submitted to Senate Appropriations to your attention, and hereby incorporate that May 23rd Appropriations letter herein by this reference as though more fully set forth. Copies of that letter and Declaration should be immediately available to you from Senator Lara's office if you so request. I note in closing the additional factor that if SB 649 becomes law in California, the State will face ruinous financial loss from the resulting ADA complaints, all as set forth in that incorporated letter. **A selection of sources for your study is listed below**. Thank you.

Very truly yours,



Harry V. Lehmann

A small selection of articles and sources related to non-ionizing radiation and health:

<https://ehtrust.org>

<http://scientists4wiredtech.com>

<http://scientists4wiredtech.com/2017/03/rfr-hazards/>

<https://www.niehs.nih.gov/news/newsletter/2016/6/science-highlights/cellphones/index.htm>

<http://www.motherjones.com/environment/2016/05/federal-study-links-cell-phone-radiation-cancer/>

<http://www.cbc.ca/news/cell-tower-radiation-harmful-to-humans-study-1.958047>

<https://www.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055>

<http://www.latimes.com/business/la-fi-cellphone-5g-health-20160808-snap-story.html>



DATE: July 12, 2017
 TO: Members of the California State Assembly
 FROM: A Coalition of California Cities
 RE: **SB 649 (Hueso) Special Permitting and Mandated Leasing of Public Property for "Small Cell" Wireless Infrastructure**

Over 215 California Cities are on record remaining strongly opposed to SB 649 (Hueso), which would require special permitting and mandated leasing of public property for "Small Cell" wireless infrastructure. This bill represents a major shift in telecommunications policy and law by: requiring local governments to lease out the public's property; placing a cap on attachment rates; eliminating the ability for cities to negotiate public benefits such as free Wi-Fi in public parks; and disregarding the public's input and full discretionary review in all communities in the state except for areas in coastal zones and historic districts.

SB 649 makes key changes to existing law, this measure:

1. Forces cities and counties to lease out their public property for wireless equipment;
2. Eliminates negotiated leases, and places a \$250 cap on what they call an attachment rate instead;
3. Eliminates public input, full local discretion, and ability to reduce equipment blight by using encroachment and building permits instead of discretionary permits;
4. Eliminates any conditional requirements to provide public benefits. This bill specifically prohibits "in-kind" conditions for issuing a permit such as free Wi-Fi in public parks as a condition of the permit; and
5. Eliminates ability to remove equipment that is blighting neighborhoods.

These permitting changes are significant because:

- This bill allows for antennas as large as 6 cubic feet, associated and ground mounted equipment totaling 35 cubic feet, with no size or quantity limitations for a host of "ancillary" equipment;
- This bill is aimed at street lights, traffic lights, and public buildings such as libraries where communities currently have a say. To clarify, the equipment identified in the bill is already permissible on utility poles; and
- This bill gives the wireless industry too much control over public infrastructure without imposing any meaningful requirements that these private, for-profit companies use the facilities appropriately.

Cities have a responsibility to protect public property and to condition fair use over taxpayer assets. Unlike the wireless industry, cities are not driven by profit, but by the public services we strive to deliver – from police, fire, libraries, infrastructure, and parks. Despite promises made by the wireless industry, this bill does nothing to require the technology meet 5G, that there is equitable deployment to unserved/underserved areas, or that whatever cost savings these private companies will benefit from this bill are passed onto their customers.

SB 649 is the wrong answer for California.



5th Generation (5G) Wireless Communications Fact Sheet

On July 14, 2016 the Federal Communications Commission allocated a high-frequency spectrum for 5G communications utilizing millimeter waves (mmW), the next phase in wireless cellular technology. But critical questions about the safety of this technology remain.

Thousands of published studies have established indisputable evidence of harmful health effects from exposure to microwave or radio-frequency radiation.

5G technology will require a dense network of millions of RF antennas, deployed in neighborhoods in towns and cities across the country, further exposing Americans to radio-frequency radiation in their homes, schools and businesses.



Wireless transmitters in a residential neighborhood

Concurrent with the rollout, new laws are being introduced in state legislatures across the country that would block the rights of local governments to control the installation of 5G antennas in public “rights of way.” This unprecedented appropriation of local regulatory control prohibits local authorities from considering health, safety, aesthetic or environmental issues related to 5G technology.

Additional Facts about 5G:

- **5G mobile networks/wireless systems** are designed to deliver even faster internet speeds and expand the capacity of “smart devices” and machine-to-machine communications – the “Internet of Things” (IOT). It will be capable of transmitting large amounts of data over short distances.
- **5G wireless networks will utilize millimeter waves (mmWaves).** Compared with current cellular and WiFi networks which rely on microwaves that employ frequencies up to 6 gigahertz (GHz), 5G will use millimeter and sub-millimeter waves in higher frequency ranges (between 30 GHz and 300 GHz).
- **5G antennas will be placed on utility poles, lamp posts and commercial buildings.** mmWaves have short wavelengths, making it difficult for them to travel through buildings or other obstacles, including foliage on trees and even rain. 5G technology will require many closely spaced antennas for optimum functionality.
- **Exposure to all types of wireless radiation is associated with cancer and other health effects.** The World Health Organization has classified wireless radiation as a Group 2B “possible human carcinogen,” and a recent study conducted by the National Institutes of Health has corroborated this finding. Studies have also found that normal exposures to radio frequency radiation can cause disruption of normal brain development in fetuses and learning disabilities, heart abnormalities and electro-hypersensitivity. Populations especially at risk from this type of radiation include pregnant women, children, those with implanted medical devices, electromagnetically sensitive individuals and the elderly.

- **mmWaves have unique health impacts on the human body.** Sweat ducts within our skin, the largest organ in the human body, act as antennae when in contact with mmWaves. The waves penetrate 1 to 2 millimeters of human skin tissue and are also absorbed by the surface layers of the eye's cornea.
- **Plants and animals are also harmed by wireless radiation.** Studies have found that electromagnetic radiation from mobile phone cell sites damages trees, and several studies have clearly demonstrated that radio-frequency radiation changes the makeup and structure of plants. Many research analyses also cite wireless technology as a contributing factor in the decline of bird, frog, bat, and honeybee populations.
- **mmWaves could make bacteria resistant to antibiotics.** One study analyzing mmWave interaction with bacteria found that the waves can cause changes in bacteria's sensitivity to different biologically active chemicals, such as antibiotics. This study suggests that mmWaves might create antibiotic resistance in bacteria, creating concern in the medical community.
- **The FCC is pushing for implementation of 5G without considering its potential impacts on public health.** To date, the FCC has failed to conduct any analysis of the potential biological health effects of 5G technology (or for that matter, 2G, 3G or 4G), despite a growing body of science. FCC guidelines to avoid the thermal (heat) effects of exposure to microwaves was last updated in the 1990s.

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August 18, 2017

To whom it may concern,

I urge in the strongest terms that you vigorously oppose California SB 649.

If this bill passes, many people will suffer greatly, and needlessly, as a direct result.

This sounds like hyperbole. It is not.

My research group at UC San Diego alone has received hundreds of communications from people who have developed serious health problems from electromagnetic radiation, following introduction of new technologies. Others with whom I am in communication, have independently received hundreds of similar reports. Most likely these are a tip of an iceberg of tens or perhaps hundreds of thousands of affected person. As each new technology leading to further exposure to electromagnetic radiation is introduced – and particularly introduced in a fashion that prevents vulnerable individuals from avoiding it – a new group become sensitized to health effects. This is particularly true for pulsed signals in the radiowave and microwave portion of the spectrum, the type for which the proposed bill SB 640 will bypass local control.

Mechanisms by which health effects are exerted have been shown to include oxidative stress (the type of injury against which antioxidants protect, see optional section below), damage to mitochondria (the energy producing parts of cells), damage to cell membranes^{1,21}, and via these mechanisms, an impaired “blood brain barrier”³⁻⁵ (the blood brain barrier defends the brain against introduction of foreign substances and toxins; additionally, disruption can lead to brain edema⁶), constriction of blood vessels and impaired blood flow to the brain⁷, and triggering of autoimmune reactions^{8,9}. Following a large exposure, that depresses antioxidant defenses, magnifying vulnerability to future exposures, some persons no longer tolerate many other forms and intensities of electromagnetic radiation that previously caused them no problem, and that currently cause others no problem. But this group deserves – nay needs -- the right to be able to avoid these exposures.

Affected individuals not only experience “symptoms” that “merely” cause them distress and suffering, when they are exposed – symptoms like headaches^{10,11}, ringing ears^{10,11} and chest pain¹⁰ from impaired blood flow, heart rhythm abnormalities^{10,11}, and inability to sleep^{10,11}. These symptoms arise from physiological injury. Moreover, **many experience significant health problems that can include seizures¹¹, heart failure, hearing loss¹²⁻¹⁴ and severe cognitive impairment^{11,15}**. The mechanisms involved are those also involved in development and progression of neurodegenerative conditions including Alzheimer’s disease¹⁶.



Fully half who were employed when their problems developed lost their job because of the problem, among participants of a survey we conducted. They reported that their condition had cost them up to 2 million dollars to date. Many had lost their homes. A number became homeless, and have swelled the ranks of so-called “EMF refugees”¹⁷⁻¹⁹. Among those affected, many were previously high functioning individuals – engineers, doctors, lawyers. The best and the brightest are among those whose lives – and ability to contribute to society – will be destroyed. High profile individuals with acknowledged electrohypersensitivity include, for instance, Gro Harlem Brundtland – the former 3-time Prime Minister of Norway and former Director General of the World Health Organization²⁰; Matti Niemela, former Nokia Technology chief²¹; as well as the wife of Frank Clegg²², who formerly headed Microsoft Canada and is current head of Canadians for Safe Technology²³.

Each new roll-out of electromagnetic technology for which exposure is obligatory, swells the ranks of those who develop problems with electromagnetic fields (EMF).- particularly following a significant exposure to pulsed radiowave-microwave radiation, and particularly when people have no ability to avoid it.

Many state that they didn’t give credence to the problem (if they had heard of it at all) **until they themselves fell prey to it.**

This is not a psychologically driven condition. Multiple objective physiological changes reflecting mechanisms of injury have been shown in persons with this condition^{24, 25}.

The role for oxidative stress, that has been shown in innumerable studies (below), **is affirmed by evidence of a link of this condition to genetic variants in antioxidant defenses,** that are less avid in defending against oxidative stress³⁰⁷. People cannot manipulate their genes, to produce such an outcome by suggestibility.

An analysis by a University of Washington researcher showed that most studies funded by industry reported failure to show physiological effects. However, most studies without such industry bias affirmed effects. This is redolent of findings shown in medicine²⁶, regarding which the former editor in chief of the BMJ (the British Medical Journal), Richard Smith, noted, based on findings of a study, “This {result} suggests that, far from conflict of interest being unimportant in the objective and pure world of science where method and the quality of data is everything, it is the main factor determining the result of studies.”²⁷. So where articles deny injury from nonionizing radiowave-microwave radiation, there is commonly a stake aligned with financial benefit from such denial.

Those who are affected are in desperate need of protection by our elected officials. They need creation of safe spaces and housing, and roadways to allow travel, not removal of any prospect of one; protection of local rights to make decisions - **not removal of any recourse or ability to avoid what injures them.** They are far more strongly in need of protections than a great many protected classes – their problems arose due to actions of others, against which they were given no control – *and can be reversed*, in most cases, if the assault on them is rolled back. Through no fault of their own, and in some cases against their will (e.g. before opt out was permitted with smart meters), they were subjected to an



exposure that has altered their lives as they knew them, and forced them – needlessly - to the margins of society.

Let our focus be on safer, wired and well shielded technology – not more wireless.

This legislation, if passed, and the resulting unrestricted roll-out of this technology, will predictably and directly injure and disable a new group, and add depth of suffering to those already affected.

In other spheres we abridge freedoms to protect the vulnerable few. We require that every schoolchild be vaccinated, supposedly to protect the vulnerable few who may not respond effectively to a vaccine. The need to protect the vulnerable group is deemed to be so great that it justifies the decision to abridge individual rights.

In contrast, this bill seeks to abridge individual freedoms, and local rights, in the service of *harming* a vulnerable group, and creating a new one.

(The common factor appears to be that in both cases, the direction is aligned with a powerful industry that influences political decisions.)

Luckily, no abridgment of individual rights and freedoms is required to protect, here.

If any group can opt out (such as, I understand, firefighters*)²⁸; **then every group deserves that equal right.** Others should not be second class citizens, subject to fewer protections.

It would go far to helping this cause if anyone complicit in promoting or passing the legislation (and then after that, *their* families) were required to be the first subjected, for a substantial test period, to the *greatest* amount of exposure that anyone *else* (and their families) may be subjected to, when new policies of this type are rolled out. It will still not do them equal damage; because they may not represent the vulnerabilities that others will have; but such a policy might help them to think twice. *That* is a bill I would strongly endorse.

Most who are now affected – were not, until they were. This may become you – or your child or grandchild. Moreover, if you have a child, or a grandchild, his sperm, or her eggs (all of which she will already have by the time she is a fetus in utero), will be affected by the oxidative stress damage created by the electromagnetic radiation, in a fashion that may affect your future generations irreparably.

It was noted above that, among survey completers, fully half of those who were employed at the time they developed electrosensitivity, lost employment *due to* this problem. (This may understate the scope of the tragedy, since this most-affected group may be least likely to be able to respond to an online survey.) **Many who previously had no problem navigating in the world are now restricted from access to basic services** like hospital care, post offices and libraries because of these problems. With each new introduction of technology that exposes many to yet a new nondiscretionary source of electromagnetic radiation, particularly (but not exclusively) that which emits pulsed radiation in the radiowave-microwave part of the spectrum, a new group of people are affected; and the suffering of those who are already affected increases greatly.



Please, defend the public and our future. Protect the rights of the individual and the locality, against a form of incursion that will lead to serious harm to some – and set a terrible precedent. **Vote no on California SB 649**, and urge that everyone else do the same.

Sincerely,

Beatrice Alexandra Golomb, MD, PhD
 Professor of Medicine
 UC San Diego School of Medicine

*Comment on the fire fighter exemption: “The legislature granted an exemption from SB 649 to the firefighters who requested it for health reasons. Throughout California firefighters have long complained of often disabling symptoms from cell towers on their stations. Cities frequently rent out space on fire stations to add to city revenue. ... Symptoms experienced by the firefighters have included neurological impairment including severe headache, confusion, inability to focus, lethargy, inability to sleep, and inability to wake up for 911 emergency calls. Firefighters have reported getting lost on 911 calls in the same community they grew up in, and one veteran medic forgot where he was in the midst of basic CPR on a cardiac victim and couldn’t recall how to start the procedure over again... Prior to the installation of the tower on his station, this medic had not made a single mistake in 20 years. A pilot study (2004) of California firefighters showed brain abnormalities, cognitive impairment, delayed reaction time, and lack of impulse control in all 6 firefighters tested (<https://ecfsapi.fcc.gov/file/7022117660.pdf>). This study led to the overwhelming passage of Resolution 15 by the International Association of Firefighters in Boston in August 2004. Res. 15 called for further study and was amended to impose a moratorium on the placement of cell towers on fire stations throughout the US and Canada.”^{15 28}
 Clearly, others who experience similar problems also deserve protections.

Optional – More on the Science

There is a robust literature showing that electromagnetic radiation, including in nonionizing frequencies, and at levels^{29,30} below those that are cause thermal effects (heating) – causes physiological effects, injury, and cell death –not only in humans but many animals and plants^{3, 7, 31-49}. Unsurprisingly, industry has sought – against the tide of evidence to the contrary - to maintain that radiation must be ionizing or heating to cause injury.

Scores or hundreds of studies show that radiation, including specifically radiowave-microwave spectrum radiation, and including low-level exposure, can impair antioxidant defenses, increase “oxidative stress” (free radical injury) and damage mitochondria, the energy producing parts of cells^{1, 2, 34, 50-6930, 70-104105-13646, 137-171}. These effects occur with ionizing and nonionizing radiation, at thermal and subthermal levels. (Indeed, much or most of the damage by ionizing radiation, and radiation above the thermal limit, occurs by mechanisms also documented to occur without ionization, and below the thermal limit.) These



mechanisms cohere with the mechanisms documented to play a role in symptoms and health conditions that are reported in those who are electrosensitive – extending to seizures¹⁷²⁻¹⁷⁶, heart failure¹⁷⁷⁻¹⁸⁴ and cognitive decline^{5, 32, 57, 108, 185-195}.

These mechanisms have known involvement in induction of brain cancer, metabolic diseases like obesity and diabetes, autism, autoimmune disease, and neurodegenerative conditions, conditions that have exploded. In each case these have been linked, or presumptively linked, in some studies to electromagnetic radiation^{8, 9, 16, 34, 196-219}.

Such radiation also has effects on sperm^{33, 100, 220-228}; and the DNA of sperm²²⁹ (consistent with recent news reports of marked recent declines in sperm counts and function)..

Such radiation also has toxic effects in pregnancy²³⁰, to the fetus and subsequent offspring²³¹⁻²³⁵ including at low levels²³⁶, and is tied to developmental problems in later life, including attention deficit and hyperactivity^{31, 235-241}. It is critical to defend pregnant women (and eggs of girls who may at a later time become pregnant) from exposures with such toxicity.

Electromagnetic radiation across much or most of the spectrum (not excluding visible light) has been shown to depress levels of melatonin^{40, 72, 242-252}, which is best known for its role in sleep (and indeed, impaired sleep is the most consistent symptom in affected individuals^{10, 11}).

Melatonin is in fact a critical antioxidant that defends the body against harm from many toxic exposures²⁵³⁻²⁶⁶ including electromagnetic radiation itself^{61, 66, 67, 82, 101, 107, 118, 121, 138, 144, 151, 204, 249, 267-284} - reducing the oxidative stress that is implicated in cancer, metabolic diseases like obesity and diabetes, autism, autoimmune disease, bipolar disorder and neurodegenerative conditions, and that also plays a role in heart attack and stroke^{9, 285-329, 330-343}.

Radiation, and specifically radiation in the radiowave-microwave portion of the spectrum can also depress levels of other critical antioxidant systems that also defend the body against chemical, radiation, and other sources of injury. These other antioxidant systems include the glutathione system, superoxide dismutase and catalase^{81, 102, 115, 116, 233, 344-358} - which are also involved in defending against health problems.

This suggests that depression of antioxidant defenses due to electromagnetic radiation may magnify risk of chemically induced health effects (and depression of antioxidant systems due to some chemicals may amplify risk of harm from electromagnetic radiation). Indeed just such effects have been reported^{359, 360}.



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Scientists warn of potential serious health effects of 5G

September 13, 2017



We the undersigned, more than 180 scientists and doctors from 35 countries, recommend a moratorium on the roll-out of the fifth generation, 5G, for telecommunication until potential hazards for human health and the environment have been fully investigated by scientists independent from industry. 5G will substantially increase exposure to radiofrequency electromagnetic fields (RF-EMF) on top of the 2G, 3G, 4G, Wi-Fi, etc. for telecommunications already in place. RF-EMF has been proven to be harmful for humans and the environment.

(Note: [Blue links](#) below are references.)

5G leads to massive increase of mandatory exposure to wireless radiation

5G technology is effective only over short distance. It is poorly transmitted through solid material. Many new antennas will be required and full-scale implementation will result in antennas every 10 to 12 houses in urban areas, **thus massively increasing mandatory exposure.**

With "[the ever more extensive use of wireless technologies](#)," nobody can avoid to be exposed. Because on top of the increased number of 5G-transmitters (even within housing, shops and in hospitals) according to estimates, "[10 to 20 billion connections](#)" (to refrigerators, washing machines, surveillance cameras, self-driving cars and buses, etc.) will be parts of the Internet of Things. All these together can cause a substantial increase in the total, long term RF-EMF exposure to all EU citizens.

Harmful effects of RF-EMF exposure are already proven

[More than 230 scientists from 41 countries](#) have expressed their "serious concerns" regarding the ubiquitous and increasing exposure to EMF generated by electric and wireless devices already before the additional 5G roll-out. They refer to the fact that "numerous recent scientific publications have shown that *EMF affects living organisms at levels well below most international and national guidelines*". Effects include increased cancer risk, cellular stress, increase in harmful free radicals, genetic damages, structural and functional changes of the reproductive system, learning and memory deficits, neurological disorders, and negative impacts on general well-being in humans. Damage goes well beyond the human race, as there is growing evidence of harmful effects to both [plants](#) and [animals](#).

After the scientists' appeal was written in 2015 additional research has convincingly confirmed serious health risks from RF-EMF fields from wireless technology. The world's largest study (25 million US dollar) [National Toxicology Program \(NTP\)](#), shows statistically significant increase in the incidence of *brain and heart cancer* in animals exposed to EMF below the ICNIRP (International Commission on Non-Ionizing Radiation Protection) guidelines followed by most countries. These results support results in human epidemiological studies on RF radiation and brain tumour risk. [A large number of peer-reviewed scientific reports](#) demonstrate harm to human health from EMFs.

The International Agency for Research on Cancer (IARC), the cancer agency of the World Health Organization (WHO), in 2011 concluded that EMFs of frequencies 30 KHz – 300 GHz are possibly [carcinogenic to humans \(Group 2B\)](#). However, new studies like the NTP study mentioned above and several epidemiological investigations including the latest studies on mobile phone use and brain cancer risks [confirm that RF-EMF radiation is carcinogenic to humans](#).

The [EUROPA EM-EMF Guideline 2016](#) states that "there is strong evidence that *long-term exposure to certain EMFs is a risk factor for diseases* such as certain cancers, Alzheimer's disease, and male infertility...Common EHS (electromagnetic hypersensitivity) symptoms include headaches, concentration difficulties, sleep problems, depression, lack of energy, fatigue, and flu-like symptoms."

An increasing part of the European population is affected by ill health symptoms that have for many years been linked to exposure to EMF and wireless radiation in the scientific literature. The International [Scientific Declaration on EHS & multiple chemical sensitivity \(MCS\)](#), Brussels 2015, declares that: "In view of our present scientific knowledge, we thereby stress all national and international bodies and institutions...to recognize EHS and MCS as true medical conditions which acting as sentinel diseases may create a *major public health concern in years to come worldwide* i.e. in all the countries implementing unrestricted use of electromagnetic field-based wireless technologies and marketed chemical substances... ***Inaction is a cost to society*** and is not an option anymore... we unanimously acknowledge this serious hazard to public health...that major primary *prevention measures are adopted and prioritized, to face this worldwide pan-epidemic in perspective.*"

Precautions

The [Precautionary Principle](#) (UNESCO) was [adopted by EU 2005](#): "*When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm.*"

[Resolution 1815](#) (Council of Europe, 2011): "*Take all reasonable measures to reduce exposure to electromagnetic fields, especially to radio frequencies from mobile phones, and particularly the exposure to children and young people who seem to be most at risk from head tumours...Assembly strongly recommends that the ALARA (as low as reasonably achievable) principle is applied, covering both the so-called thermal effects and the athermic [non-thermal] or biological effects of electromagnetic emissions or radiation" and to "improve risk-assessment standards and quality".*

The [Nuremberg code](#) (1949) applies to all experiments on humans, thus including the roll-out of 5G with new, higher RF-EMF exposure. All such experiments: "*should be based on previous knowledge (e.g., an expectation derived from animal experiments) that justifies the experiment. No experiment should be conducted, where there is an a priori reason to believe that death or disabling injury will occur; except, perhaps, in those experiments where the experimental physicians also serve as subjects.*" (Nuremberg code pts 3-5). Already published scientific studies show that there is "a priori reason to believe" in real health hazards.

The [European Environment Agency](#) (EEA) is warning for "Radiation risk from everyday devices" in spite of the radiation being [below the WHO/ICNIRP standards](#). EEA also concludes: "*There are many examples of the failure to use the precautionary principle in the past, which have resulted in serious and often irreversible damage to health and environments...harmful exposures can be widespread before there is both 'convincing' evidence of harm from long-term exposures, and biological understanding [mechanism] of how that harm is caused.*"

"Safety guidelines" protect industry – not health

The current ICNIRP "safety guidelines" are obsolete. All proofs of harm mentioned above arise although the radiation is [below the ICNIRP "safety guidelines"](#). Therefore new safety standards are necessary. The reason for the misleading guidelines is that "[conflict of interest of ICNIRP members](#) due to their *relationships with telecommunications or electric companies* undermine the impartiality that should govern the regulation of Public Exposure Standards for non-ionizing radiation...To evaluate cancer risks it is necessary to include scientists with competence in medicine, especially oncology."

The current ICNIRP/WHO guidelines for EMF are based on the obsolete hypothesis that "The critical effect of RF-EMF exposure relevant to human health and safety is [heating of exposed tissue](#)." However, scientists have proven that many different kinds of *illnesses and harms are [caused without heating](#)* ("non-thermal effect") at radiation levels well below ICNIRP guidelines.

We urge the EU:

- 1) To take all reasonable measures to halt the 5G RF-EMF expansion until independent scientists can assure that 5G and the total radiation levels caused by RF-EMF (5G together with 2G, 3G, 4G, and WiFi) will not be harmful for EU-citizens, especially infants, children and pregnant women, as well as the environment.
- 2) To recommend that all EU countries, especially their radiation safety agencies, follow Resolution 1815 and inform citizens, including, teachers and physicians, about health risks from RF-EMF radiation, how and why to avoid wireless communication, particularly in/near e.g., daycare centers, schools, homes, workplaces, hospitals and elderly care.
- 3) To appoint immediately, without industry influence, an EU task force of independent, truly impartial EMF-and-health scientists with no conflicts of interest¹ to re-evaluate the health risks and:
 - a) To decide about new, safe “maximum total exposure standards” for all wireless communication within EU.
 - b) To study the total and cumulative exposure affecting EU-citizens.
 - c) To create rules that will be prescribed/enforced within the EU about how to avoid exposure exceeding new EU “maximum total exposure standards” concerning all kinds of EMFs in order to protect citizens, especially infants, children and pregnant women.
- 4) To prevent the wireless/telecom industry through its lobbying organizations from persuading EU-officials to make decisions about further propagation of RF radiation including 5G in Europe.
- 5) To favor and implement wired digital telecommunication instead of wireless.

We expect an answer from you no later than **October 31, 2017** to the two first mentioned signatories about what measures you will take to protect the EU-inhabitants against RF-EMF and especially 5G radiation. This appeal and your response will be publicly available.

Respectfully submitted,

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WE will add signatories to the following list through the end of 2017. The updated list of signatories and the appeal can be found later [HERE](#).



¹ Avoid similar mistakes as when the [Commission \(2008/721/EC\)](#) appointed [industry supportive members for SCENIHR](#), who submitted to EU [a misleading SCENIHR report](#) on health risks, [giving telecom industry a clean bill to irradiate](#) EU-citizens. The report is now quoted by radiation safety agencies in EU.

Signatories to the 5G Appeal (As of September 13, 2017)

Note: The endorsements are personal and not necessarily supported by the affiliated universities or organizations.

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