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The Honorable Jerry Brown  
Governor, State of California  
c/o State Capitol, Suite 1173  
Sacramento, CA 95814  
September 17, 2017

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

Honorable Governor Brown,

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 veto SB 649 as advanced by Senator Hueso. I have personally served as an expert advisor to the California Department of Public Health as well as the city of San Francisco and Berkeley governments on matters relevant to this bill.

You are globally recognized as a champion of the environment and public health. I remain deeply grateful to you for your forward thinking on climate change and toxics policies which provide moral and political leadership at a time when it is sorely lacking. As someone who has been a presidential appointee confirmed by the US Senate, I fully understand the challenges that you face politically. You have provided leadership on the right side of history in too many ways to enumerate.

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.

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 wireless technologies.

Specific design standards must first be funded and created for 5G facilities for the more than thirty thousand expected new radiating 5G cell antennas to be constructed on city and county utility light poles and in the right of ways in close proximity to city and county workers, children, residents and visitors. Both federal and local zoning controls are absolutely 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.

Now the challenge before you is one of the most momentous you will have ever faced. The telecom industry is a global multi-trillion dollar phenomenon. They have provided massive amounts of political support throughout the political spectrum. Despite this, the weight of science has inexorably demonstrated that the experiment they

have been conducting on ourselves and our progeny is without merit and has already exacted a serious toll for public health.

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.<sup>1,2,3</sup> 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 health threat. Recently, studies have found that the frequencies which will be used in 5G and other future technologies can have harmful effects<sup>4</sup>, as Dr. Cindy Russell, Vice President of Community Health for the Santa Clara Medical Association noted.<sup>5</sup> As articulated in their state Constitution, California cities and counties have a duty to protect the health and safety of their residents.

State and local authority and duty should not be overridden by any preemptive 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.”*

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<sup>1</sup> World Health Organization. [“IARC classifies radiofrequency electromagnetic fields as possibly carcinogenic to humans.”](#) WHO, Press Release, no. 208, 2011.

<sup>2</sup> 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.

<sup>3</sup> 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.

<sup>4</sup> 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.

<sup>5</sup> 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.

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 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.<sup>6</sup> 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.<sup>7,8</sup> 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.<sup>9</sup> 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.<sup>10</sup> 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.<sup>11</sup> Previous [published re-analysis](#) of the multi country Interphone study data has found stronger positive associations to glioma risk

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<sup>6</sup> 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.

<sup>7</sup> 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.

<sup>8</sup> 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.

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

<sup>10</sup> 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.

<sup>11</sup> 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.

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.<sup>12,13</sup> A [2017 review](#) published by Hardell and Carlberg concludes that “RF radiation should be regarded as a human carcinogen causing glioma.”<sup>14</sup> I invite you to view videos from Environmental Health Trust’s expert forum in Jackson Hole, Wyoming on July 30, 2017 where longtime World Health Organization advisor [Dr. Anthony Miller](#) presented the scientific evidence for his [updated opinion](#) that RF is a human carcinogen.

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.<sup>15</sup> This work extends studies first produced in 1986.<sup>16</sup> The potential long-term impact of such stimulation on precancerous skin growths should be evaluated carefully, including potential super-growth of bacteria.<sup>17</sup> A [lecture](#) by Paul Ben-Ishai, PhD, and published research on this issue can be found on the [2017 Conference website](#).<sup>18,19,20</sup>

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.<sup>21, 22, 23, 24</sup>

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<sup>12</sup> 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.

<sup>13</sup> 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.

<sup>14</sup> 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* 2017.9218486 (2017).

<sup>15</sup> 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* 7.5 (2017): 521-8.

<sup>16</sup> 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.

<sup>17</sup> 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.

<sup>18</sup> Feldman, Yuri and Paul Ben-Ishai. ["Potential Risks to Human Health Originating from Future Sub-MM Communication Systems."](#) *Conference on Wireless and Health*, 2017.

<sup>19</sup> 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.

<sup>20</sup> 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.

<sup>21</sup> 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.

<sup>22</sup> 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.

<sup>23</sup> 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.

<sup>24</sup> 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.

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 health risks, particularly risks to children and fetal development.<sup>23</sup> The EMF Scientists later submitted [Comments to the FCC](#) asking the FCC to critically consider the health impact of the 5G.

Most recently, in September 2017, over 180 scientists and doctors from 35 countries sent a [declaration](#) to the European Union calling for a moratorium on 5G expansion citing potential neurological impacts, infertility, and cancer.<sup>25</sup>

California firefighters have [lobbied](#) to protect themselves and successfully received exemption on health grounds from the installation of these cell towers.<sup>26</sup> 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.

The organization that I founded a decade ago, Environmental Health Trust, is not opposing cell phones. We are in favor of public health and we note that the California Department of Public Health has [drafted guidelines](#) for safer use of phones so that the public reduce radiofrequency exposure for more than a decade.

As my colleagues who have been supported by the US Department of Defense on 5G have written to you, the evidence is compelling that this technology can interact with human body in ways that have never been evaluated for their long-term impact on health and safety. Recently, studies have found that the frequencies which will be used in 5G and other future technologies can have harmful effects<sup>27</sup>, as Dr. Cindy Russell, Vice

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<sup>25</sup> [“Appeal to the European Union: Scientists warn of potential serious health effects of 5G.”](#) 13 September 2017.

<sup>26</sup> [““The Firefighters Wake Up Call To Us All” By Susan Foster RE: SB 649 Opposing Cell Towers In Rights Of Way.”](#) *Environmental Health Trust* (2017).

<sup>27</sup> 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.

President of Community Health for the Santa Clara Medical Association noted.<sup>28</sup> As articulated in their state Constitution, California cities and counties have a duty to protect the health and safety of their residents.

Cardiologists are reporting increased numbers of patients with atrial fibrillation and heart disease who have no inherited risk factors. A recent study by Professor Gemma Figtree, published in the [European Journal of Preventive Cardiology](#), found that the rate of heart attacks and heart disease in persons with no known risk factors has more than doubled in less than a decade.<sup>29</sup> Similar rates of serious eye problems and attention deficit disorder continue to increase without any knowns. Certainly, the phenomenal growth in the use of wireless technology should be explored as one of the explanations for these serious public health.

Please veto SB 649 and uphold the rights of local government to protect public health and the environment.

Sincerely,



**Devra Davis, PhD, MPH**

Founder & President, Environmental Health Trust

Fellow, American College of Epidemiology

Visiting Professor of Medicine, Hebrew University of Jerusalem and Ondokuz Mayıs University

CC

Tom Dyer, Chief Deputy Legislative Affairs Secretary

[Letter from Dr. Paul Ben Ishai to Governor Brown](#)

[Order Instituting Rulemaking to update the Commission's policies and procedures related to Rulemaking 04-08-020 electromagnetic fields emanating from regulated \(Filed August 19, 2004\) utility facilities.](#)

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<sup>28</sup> 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.

<sup>29</sup> Vernon, Stephen T., et al. "Increasing proportion of ST elevation myocardial infarction patients with coronary atherosclerosis poorly explained by standard modifiable risk factors." *European Journal of Preventive Cardiology* (2017). doi: [10.1177/2047487317720287](#).