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Honorable Miguel A. Cardona
Secretary U.S. Department of Education
400 Maryland Avenue
SW Washington DC
20202

Dear Dr. Miguel Cardona U.S. Secretary of Education

Today, we are writing to advise you of the scientific grounds for taking action to mitigate student, teacher and staff exposures to Wi-Fi and other non-ionizing electromagnetic fields in schools.

Wireless radio frequency (RF) electromagnetic (EMF) radiation and magnetic field/extremely low-frequency electromagnetic fields (ELF-EMF) are a rapidly increasing type of environmental exposure for children, teachers and staff in classrooms.

Current federal regulations for wireless radiation are 25 years old and based on outdated science. On August 13, 2021, the United States Court of Appeals for the District of Columbia Circuit ruled that the decision by the Federal Communications Commission (FCC) to retain its 1996 wireless radiation safety limits for human exposure to wireless radiation was "arbitrary and capricious." Specifically, the Court pointed out that the FCC had ignored research showing damage to memory and reproduction, and ignored research finding children more vulnerable to wireless radiation. The Court ordered the FCC to "address the impacts of RF radiation on children, the health implications of long-term exposure to RF radiation, the ubiquity of wireless devices, and other technological developments that have occurred since the Commission last updated its guidelines."

The bottom line from this landmark ruling is that no federal agency on record has done a review of the full body of research and U.S. FCC 1996 limits do not rest on a robust review of recent science.

A recent analysis by the Environmental Working Group concluded that FCC limits should be 200 to 400 times lower than the whole-body exposure limit set by the FCC in 1996, yet school districts nationwide are deploying high capacity Wi-Fi networks in school buildings, testing out 5G networks with students and signing leases with companies that install cell towers on school property, relying on these outdated FCC limits to ensure safety.

A substantial body of research has found these types of non-ionizing EMFs associated with numerous adverse effects including cancer, DNA damage, memory damage, behavioral problems, reproductive damage, tumor promotion, blood-brain barrier damage, increased oxidative stress, impacts to the endocrine system and brain damage. Many of these effects could be irreversible with grave consequences for our children's future.

By eliminating unnecessary sources of non-ionizing radiation on school property, schools can substantially mitigate the risk with lower exposures. A few specific examples of in-school EMF sources are Wi-Fi, wireless networks, chromebooks, laptops, electronics, electrical systems, cordless phones and cell phones.

We are opposed to the field testing of 5G technology in schools. The wireless industry has long pushed Wi-Fi in schools nationwide and is now proposing expanding 5G into classrooms,[2] arguing[3] that "augmented reality" and "virtual reality" are "essential tools" in classrooms.[4]

More protective regulations to mitigate, monitor, investigate and educate are moving forward in the U.S. and internationally.[5] In addition, PTAs and teacher unions are now responding to the strong recommendations by medical organizations, such as the American Academy of Pediatrics, by educating and supporting policy and resolutions on minimizing cell tower, cell phone and wireless radiation in classrooms.

The current body of peer-reviewed published research clearly shows that compliance with outdated 1996 Federal Communications Commission (FCC) regulations regarding human exposure to radio frequency does not ensure the safety of students and staff. Policy action to mitigate risk is needed today.

Both magnetic field (2002) and radiofrequency radiation (2011) were classified[6,7]as a Group 2B possible carcinogen by the World Health Organization International Agency for Research on Cancer (IARC). However, since these determinations years ago, the published peer-reviewed scientific evidence has significantly increased—clearly showing these types of non-ionizing electromagnetic radiation have adverse effects at emission levels governments currently allow.[8,9,10,11] Current published research has documented that the evidence is robust to now determine that RF is a proven human carcinogen.[12,13,14]

Numerous published scientific reports recommend that the public, especially children and pregnant women, reduce their exposure to non-ionizing electromagnetic radiation in order to protect their health, including radiation frequencies that range from extremely low-frequency fields to all wireless and the higher frequencies of 5G.[15,16,17,18,19,20,21,22,23]

Our children are at risk. Research shows that this type of radiation penetrates deeper and more intensely into children due to their thinner skulls and unique physiology. Furthermore, wireless radiation has been shown to damage brain development and is associated with attention, memory and behavioral problems.[24] The American Academy of Pediatrics has repeatedly written to the FCC

on the need for an update to the FCC's 1996 wireless exposure regulations because children are more vulnerable to the exposure.[25]

Electromagnetic radiation exposure presents occupational health issues for teachers and staff, which are especially critical for those who are pregnant or have medical conditions. Yale research[26] found thyroid cancer to be associated with cell phone use in people with genetic susceptibility. Prenatal radio frequency radiation exposure led to higher hyperactivity, poorer memory and altered brain function in mice,[27] corroborating prior published research findings of altered brain development after exposure.

Kaiser Permanente researchers have published several studies where pregnant women's exposure to non-ionizing electromagnetic fields was associated with increased miscarriage as well as increased ADHD, obesity, and asthma in prenatally exposed children.

Due to the scientific evidence showing adverse effects from wireless and electromagnetic radiation at legally allowed levels,[28,29,30,31,32] we have joined with hundreds of doctors and scientists calling to halt 5G and to reduce children's overall wireless and non-ionizing electromagnetic radiation exposure.[33,34] We recommend practical and actionable measures to eliminate and reduce exposures in the school setting.

Safe alternative solutions exist to connect students to the Internet, bridge the digital divide and ensure equal access. Corded connections in classrooms rather than wireless networks are safer, faster, more secure and do not pose the serious liability risks posed by EMFs and RF radiation.

Importantly, 5G and cell antennas should not be installed on or near schools.

Many countries and schools are taking action. More than 20 countries clearly recommend children reduce cell phone radiation. Cyprus, Belgium, France and Israel are among the countries banning and restricting Wi-Fi in classrooms, and many private schools world-wide[35] have started reducing EMF exposures. New Hampshire[37] launched an investigation into the health effects of electromagnetic radiation and released its final report with 15 recommendations including the recommendation that schools reduce radio frequency radiation and replace Wi-Fi with wired networks in classrooms.

In 2020, the New Hampshire State Commission issued their recommendations which included replacing wireless networks with wired corded Internet connections.

In regards to ELF-EMFs, more than a dozen countries already have some level of protective policy in place with a magnetic field radiation limit for "sensitive areas" that ensures ELF-EMF levels do

not exceed levels associated with cancer in research studies. Aside from the California Department of Education regulation that requires distances between new schools and the edge of a transmission line "right-of-way," there exists little protection in the U.S. for schools, as there is no federal limit for human exposure to magnetic field electromagnetic fields.

We recommend the Secretary of Education provide nationwide guidance on best practices to reduce non-ionizing electromagnetic exposures in schools and colleges. Guidance should include:

1. **Install a safe wired ethernet communication and information technology infrastructure in schools to meet educational needs.** Replacing wireless with wired ethernet and installing a corded, not cordless, telephone system will substantially reduce classroom exposures. Just like classrooms, dormitories should have wired, not Wi-Fi, connections and corded telephones for students in every room. Security systems, HVAC and other building infrastructure should be wired.
2. **Purchase computers, laptops, tablets and other devices for classrooms that have the capability to be ethernet connected with wireless transmissions turned off.** In addition, invest in applications that can be pre-downloaded for classroom activities.
3. **Measure radio frequency, magnetic field and extremely low-frequency electromagnetic fields and reduce levels to as low as possible.** Publicly post all results online.
4. **Ensure school property is not located close to sources of non-ionizing radiation** such as 5G/cell towers, cell network antennas, or electricity substations of high-voltage power lines.
5. **Promote technological literacy with new educational curriculum on how to reduce exposure to cell phone and other wireless radiation.** Students need to know laptops and tablets should be used on tables, not on laps. Students, teachers, and their families should be given clear information on why and how to reduce exposures to cell phone, wireless and magnetic field EMFs to protect their health.

We are aware that many schools and colleges are opting for virtual and/or hybrid classes. We recommend this as an opportunity to install wired technology while students are away from the buildings. In a world where our health is threatened by a rising pandemic, we must stop at nothing to mitigate any external health threats facing our youth. This means eliminating in-school sources of radiofrequency radiation, providing the necessary equipment for students to connect to online school with wires/cords, and educating students on preventative measures they can take to reduce radiation themselves. Most importantly, however, this means taking steps toward a healthy school environment in which each student thrives.

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Our recommendations to reduce radiation exposure during virtual and/or hybrid schooling include:

- Ensure that students have the hardware and software to hardwire Internet connections with ethernet (instead of Wi-Fi or wireless hotspots) for virtual school at home.
- Educate students and staff on how to hook up their devices with an ethernet connection.
- Purchasing departments can request devices that are easily hardwired.
- Educate students and staff on how to reduce EMF exposure and on the importance of keeping devices off their laps and away from their bodies.

We recommend the Department of Education take a leadership role by calling for federal action that includes:

1. **Call on the EPA to develop science-based safety limits for schoolchildren's exposures to RF radiation and magnetic field non-ionizing EMF.** The FCC human exposure limits for RF radiation were adopted in 1996 and have not changed since then. There are no limits for magnetic field EMF. The EPA should develop human exposure limits based on a systematic review of the full body of scientific research including cancer, impacts to the brain, impacts on reproduction and children's unique vulnerabilities. Currently there are no safety limits for EMF exposures in schools.
2. **Develop a national educational technology policy on Best Practices for Digital Devices in Schools that addresses the social, emotional and physical effects of screen use.** In addition to students learning how to minimize the health effects of screens, school curriculum should adhere to best practices developed for various age groups in order to minimize health effects to students, teachers and staff.
3. **Call on the Department of Occupational Safety and Health to urgently address non-ionizing EMF as an environmental exposure to workers in the school setting.** An evaluation of current and projected occupational exposures in classrooms and educational settings is needed. Occupational exposure limits for the classroom setting must be developed to protect teachers and staff. Practical measures to reduce exposures is critical to supporting the health of teachers and staff.
4. **Develop a list of purchasing recommendations for No/Low-EMF purchases**. Develop a list of classroom and educational technology hardware and software that will eliminate and significantly reduce EMF emissions and exposures in classrooms. For example, tablets and laptops should have a convenient ON/OFF hard switch for Wi-Fi and an ethernet port so using ethernet is convenient. Overhead projectors, printers, and other educational technology should have Wi-Fi set to OFF as the default setting.
5. **Disseminate Best Practices for schools to reduce non-ionizing EMF.** School Districts need a step by step list of recommended practical measures they can take to mitigate EMF exposures. This should include first-, second- and third-hand exposures. Blueprints for ethernet cabling that accommodate various classroom scenarios must be made available to

school district facilities departments so they can replace Wi-Fi access points with wired networks.

We have attached to this letter the following resources and tools you can use to address these environmental exposures in schools:

- The Collaborative for High Performance Schools (the United States' first green building rating program especially designed for K-12 schools) developed Best Practices for Low-EMF classrooms in 2014, addressing both wireless and ELF-EMF.[43]
- In 2017, the Maryland State Children's Environmental Health And Protection Advisory Council issued first ever state recommendations for reducing wireless exposure in schools by providing wired—rather than wireless—Internet connections.
- The New Jersey Education Association article, "Minimize Health Risks from Wireless Devices"[44] details several recommendations for reducing the health risks posed by wireless technology, such as "Keep devices away from the body" and "hard wire all devices, including printers, projectors and boards." Download PDF.[45]
- "Guidelines for Safer Use of Wireless Technology in Classrooms" were developed for the New York State United Teachers, who also passed a Resolution "Hazards of Wireless Radiation Emission."[46,47]
- The United Educators of San Francisco (teacher union) passed a resolution recommending the California Department of Public Health issued guidance on how to reduce exposure to cell phone radiation be disseminated to all students and staff.[50,51]
- Education modules to educate students on cell phone radiation were developed in partnership with the Massachusetts Breast Cancer Coalition to teach high school and middle schoolers about why and how to reduce radiation from cell phones and wireless devices.[52]
- A 2017 study found the environmental exposure to RF radiation in some schools with Wi-Fi is higher than reported levels for non-thermal biological effects and the researchers recommend schools prefer wired network connections and allow laptop, tablet and mobile phone usage only in flight/airplane mode.
- A 2019 publication in the industry journal *Building and Environment* details best practices in buildings to reduce radio frequency as including wired technology instead of Wi-Fi and including corded (instead of cordless and other wireless mobile) phones.[48]
- Environmental Health Trust has developed a checklist of actions for schools to reduce EMF.[49]

The Risk of Inaction is High

Wi-Fi, cell phones, cell towers, 5G in the classroom and cell towers on school property present serious liability issues.

- Insurers rank 5G and electromagnetic radiation as a "high" risk, comparing the issue to lead and asbestos.[38,39] A 2019 Report by Swiss Re Institute, a world leading provider of insurance,[42] classifies 5G mobile networks as a "high," "off-the-leash" risk, stating, "Existing concerns regarding potential negative health effects from electromagnetic fields (EMF) are only likely to increase. An uptick in liability claims could be a potential long-term consequence" and "[a]s the biological effects of EMF in general and 5G in particular are still being debated, potential claims for health impairments may come with a long latency."
- Due to their understanding of the magnitude of this future financial risk, most insurance plans have "electromagnetic field exclusions" applied as the market standard.[40] Portland Oregon Public School Insurance[41] (Pg 30) states as an example, "Exclusions: This insurance does not apply to: Bodily injury, personal injury, advertising injury, or property damage arising directly or indirectly out of, resulting from, caused or contributed to by electromagnetic radiation, provided that such loss, cost or expense results from or is contributed to by the hazardous properties of electromagnetic radiation."
- U.S. mobile operators have been unable to get insurance to cover liabilities related to damages from long-term exposure to radio frequency emissions for over a decade.
- Wireless and non-ionizing electromagnetic radiation are defined as a type of "pollution" by wireless companies themselves. According to pg. 10 of the Verizon Total Mobile Protection Plan, "Pollution" is defined as "The discharge, dispersal, seepage, migration or escape of pollutants. Pollutants means any solid, liquid, gaseous, or thermal irritant or contaminant including smoke, vapor, soot, fumes, acid, alkalis, chemicals, artificially produced electric fields, magnetic field, electromagnetic field, sound waves, microwaves, and all artificially produced ionizing or nonionizing radiation and/or waste." We found similar definitions for pollution in the product protection plans for AT&T, Sprint, Verizon, T-Mobile and Asuria.
- Wireless companies warn their shareholders of this potential future risk related to radio frequency radiation exposure but they do not warn the users of these products, nor do they warn the people exposed to emissions from their products and infrastructure. These corporate investor warnings by companies such as AT&T, Verizon, Vodaphone and Crown Castle are contained in their Annual Reports filed on Form 10-K (or Form 20-F or 40-F for foreign companies) with the Securities and Exchange Commission (SEC) and they clearly inform shareholders that companies may incur significant financial losses related to electromagnetic fields. Safety is not assured.

As an example, Crown Castle states in their 2020 Annual Report, *"If radio frequency emissions from wireless handsets or equipment on our communications 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*

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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."

Federal leadership regarding wireless radiation is critical to supporting the serious challenges that state education and health authorities are facing today.

As an example, the Oregon Health Authority (OHA) released a research review on the health effects of wireless in schools that was found to be "shoddy, biased" and "scrubbed" of science, according to an investigation published in the Washington Spectator. Expert scientists wrote to the Governor of Oregon calling for the OHA Wi-Fi Health report to be retracted; as well as Environmental Working Group and Physicians for Safe Technology. Environmental Health Trust issued a 100+ page report substantiating the call to retract the report. In response, the Oregon Senate has now scheduled a September 2021 hearing to address the OHA report, the scientific criticisms and transparency issues.

As another example making headline news, more than a dozen people, including several children, reported debilitating symptoms after a cell tower began transmitting in Pittsfield, Massachusetts. Despite the local Pittsfield health department's request for help, Massachuttsetts state authorities lacked expertise in the area and declined from assisting with research study or presentation to the community. Although the Pittsfield Health Department did hold a groundbreaking community forum with leading experts presenting the science on health impacts from wireless radiation, the cell tower company will likely argue that "emission levels are compliant with 1996 FCC limits" and that no action is needed. In fact, there is no health or environmental government agency tasked to evaluate the full body of research on cell tower radiation.

These situations could have been avoided if there were adequate safety limits and ongoing research review and surveillance at the federal level.

We write to offer our expertise to support these needed safety measures. Please see the attached resources with additional documentation. We are available to meet with your leadership to present how to reduce and mitigate the risks of radiation exposure. Thank you for your consideration and action on this issue.

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