

**Documents in Support of Testimony of Vermonters for a Clean Environment**  
Senate Finance Committee, H. 513, April 12, 2019

[http://gencourt.state.nh.us/bill\\_status/billText.aspx?sy=2019&v=HP&id=267](http://gencourt.state.nh.us/bill_status/billText.aspx?sy=2019&v=HP&id=267)

STATE OF NEW HAMPSHIRE

*In the Year of Our Lord Two Thousand Nineteen*

AN ACT establishing a commission to study the environmental and health effects of evolving 5G technology.

*Be it Enacted by the Senate and House of Representatives in General Court convened:*

1 New Subdivision; Commission to Study the Environmental and Health Effects of Evolving 5G Technology. Amend RSA 12-K by inserting after section 11 the following new subdivision:

Commission to Study the Environmental and Health Effects of Evolving 5G Technology  
12-K:12 Commission Established. There is established a commission to study the environmental and health effects of evolving 5G technology, which includes the use of earlier generation technologies. Fifth generation, or 5G, wireless technology is intended to greatly increase device capability and connectivity but also may pose significant risks to humans, animals, and the environment due to increased radiofrequency radiation exposure. The purpose of the study is to examine the advantages and risks associated with 5G technology, with a focus on its environmental impact and potential health effects, particularly on children, fetuses, the elderly, and those with existing health compromises.

12-K:13 Membership.

I. The members of the commission shall be as follows:

- (a) Three members of the house of representatives, including one member from the house science, technology, and energy committee, and one member from the health, human services and elderly affairs committee, appointed by the speaker of the house of representatives.
- (b) Two members of the senate, appointed by the president of the senate.
- (c) A member of the public, appointed by the governor.
- (d) The attorney general, or designee.
- (e) Two members of the New Hampshire High Technology Council, appointed by the council.
- (f) One member representing the Business and Industry Association, appointed by the association.
- (g) One member of the New Hampshire Medical Society who specializes in environmental medicine and is familiar with electromagnetic radiation, appointed by the society.
- (h) One member representing the university system of New Hampshire knowledgeable in radiofrequency radiation, appointed by the chancellor.
- (i) One member of the cell phone/wireless technology industry, appointed by the president of the senate.
- (j) The commissioner of the department of health and human services, or designee.
- (k) One public member with expertise in the biological effects of radiofrequency radiation, appointed by the speaker of the house of representatives.

II. Legislative members of the commission shall receive mileage at the legislative rate when attending to the duties of the commission.

III. The members of the commission shall elect a chairperson from among the members. The first meeting of the commission shall be called by the first-named house member. The first meeting of the commission shall be held within 45 days of the effective date of this section. Seven members of the commission shall constitute a quorum.

12-K:14 Duties and Reporting Requirement.

I. The commission shall:

- (a) Examine the health and environmental impacts from radiofrequency (RF) radiation emitted from the waves in the 30-300 gigahertz(GHZ) range of the electromagnetic spectrum,

which falls somewhere between microwaves and infrared waves, and which are required with the rollout of 5G technology.

(b) Assess the health and environmental impacts of 5G technology, which requires small cell towers to be placed at a distance of 250 meters from each other at telephone pole height from the ground and will operate in conjunction with the 3G and 4G technology infrastructure.

(c) Receive testimony from the scientific community including but not limited to physicists and electrical engineers, the medical community including but not limited to cellular experts and oncologists, the wireless technology industry including but not limited to cell phone businesses and businesses working on the development autonomous vehicles which will rely on 5G technology, as well as other organizations and members of the public with an interest in 5G technology.

(d) Consider the following questions and the impact on New Hampshire citizens, municipalities, and state government of:

(1) Why the insurance industry recognizes wireless radiation as a leading risk and has placed exclusions in their policies not covering damages caused by the pathological properties of electromagnetic radiation?

(2) Why do cell phone manufacturers have in the legal section within the device saying keep the phone at least 5mm from the body?

(3) Why have 1,000s of peer-reviewed studies, including the recently published U.S. Toxicology Program 16-year \$30 million study, that are showing a wide-range of statistically significant DNA damage, brain and heart tumors, infertility, and so many other ailments, being ignored by the Federal Communication Commission (FCC)?

(4) Why are the FCC-sanctioned guidelines for public exposure to wireless radiation based only on the thermal effect on the temperature of the skin and do not account for the non-thermal, non-ionizing, biological effects of wireless radiation?

(5) Why are the FCC radiofrequency exposure limits set for the United States 100 times higher than countries like Russia, China, Italy, Switzerland, and most of Eastern Europe?

(6) Why did the World Health Organization (WHO) signify that wireless radiation is a Group B Possibly Carcinogenic to Humans category, a group that includes lead, thalidomide, and others, and why are some experts who sat on the WHO committee in 2011 now calling for it to be placed in the Group 1, which are known carcinogens, and why is such information being ignored by the FCC?

(7) Why have more than 220 of the worlds leading scientists signed an appeal to the WHO and the United Nations to protect public health from wireless radiation and nothing has been done?

(8) Why have the cumulative biological damaging effects of ever-growing numbers of pulse signals riding on the back of the electromagnetic sine waves not been explored, especially as the world embraces the Internet of Things, meaning all devices being connected by electromagnetic waves, and the exploration of the number of such pulse signals that will be created by implementation of 5G technology?

II. The commission shall prepare and publish an interim and final report of its findings and recommendations. The reports shall:

(a) Outline the advantages of, and risks associated with, 5G technology running in conjunction with the 3G and 4G technology infrastructure.

(b) Develop a strategy, if deemed necessary, to limit RF radiation exposure from 5G or lesser generation technology relying upon electromagnetic waves.

(c) Include a public policy statement on 5G wireless systems, which either declares the technology safe or outlines actions required to protect the health of its citizens and environment.

(d) Consider alternatives to 5G technology that will accelerate information flow speeds and volumes without the use of electromagnetic waves that emit high levels of radiation.

(e) Provide any recommendations for proposed legislation developed by the commission.

III. The commission shall submit the interim report required under paragraph II to the speaker of the house of representatives, the president of the senate, the house clerk, the senate clerk, the governor, and the state library on or before November 1, 2019, and shall submit the final report on or before November 1, 2020.

2 Repeal. RSA 12-K:12 - 12-K:14 and the subdivision heading preceeding RSA 12-K:12, relative to commission to study the environmental and health effects of the evolving 5G technology, are repealed.

3 Effective Date.

I. Section 2 of this act shall take effect November 1, 2020.

II. The remainder of this act shall take effect upon its passage.

<https://www.usatoday.com/story/tech/2019/04/09/at-t-expands-5-g-rollout-seven-new-cities-total-rises-19/3409787002/>

## AT&T expands mobile 5G rollout with seven new cities, total rises to 19

Eli Blumenthal, USA TODAY April 9, 2019

Verizon may have been getting buzz for turning on its mobile 5G network last week in Chicago and Minneapolis, but AT&T isn't letting it keep the spotlight for long.

On Tuesday the nation's second-largest network announced that it has started turning on its mobile 5G network in "parts" of seven more cities: Austin, Los Angeles, Nashville, Orlando, San Diego, San Francisco, and San Jose.

With the seven new areas, AT&T ups its mobile 5G city count to 19, a decent headstart on coverage compared to its rivals. Unlike Verizon, however, users in these areas are currently not able to use any 5G phones on the new network.

So far AT&T only offers one 5G device, the Netgear Nighthawk 5G mobile WiFi hotspot. Like the other carriers it will offer Samsung's new Galaxy S10 5G, but that device won't come to the carrier until later this spring.

AT&T promises a second 5G Samsung phone will arrive later in the year.

Verizon currently offers a "mod" accessory that will turn last year's Moto Z3 into a 5G phone. It will also be the first to offer the Galaxy S10 5G. Noted phone leaker Evan Blass recently tweeted that Verizon will get that Galaxy on May 16. Sprint, which turns on its 5G network in Chicago, Atlanta, Dallas and Kansas City in May, will launch with LG's new V50 ThinQ 5G.

Meanwhile, T-Mobile will launch a 5G network in the first half of the year as well, but it has yet to announce exact timing or launch cities.

Unlike the "5G E" logo that is increasingly appearing on more 4G LTE AT&T phones, including recent Galaxys and iPhones, this new network is based on what is accepted as actual 5G, complete with the promised faster speeds and lower latency, the latter a measure of network responsiveness.

Last December, AT&T turned on [mobile 5G in its first 12 cities](#), though the company has yet to elaborate on if it will be changing its 5G pricing. When it launched in December it charged \$70 per month for 15GB of 5G hotspot data. Verizon, meanwhile, is charging an additional \$10 for 5G access for phones,

assuming you have one of its latest unlimited data plans. The carrier is also waiving the fee for the first three months as it builds out its new network.

Why you will want to wait

As with AT&T's first dozen cities, and the new networks from Verizon and T-Mobile, AT&T's current 5G network is based off a technology known in industry jargon as "mmWave," or millimeter wave. While this network promises super fast speeds, coverage will be much more limited, particularly at launch.

Verizon's mmWave network, for example, is only in a handful of locations in Chicago and Minneapolis and AT&T is making it clear that today's launch will only have 5G live in "parts" of its own new cities.

A second 5G technology, known as "sub-6," will be rolled out by AT&T later this year and should provide a much larger, more consistent coverage area and can work in tandem with today's mmWave network.

AT&T calls mmWave "5G+" for its faster speeds, referring to its larger "sub-6" network as simply "5G."

The first phones and devices, such as that Galaxy S10 5G, only will be capable of connecting to the mmWave 5G network. They lack the necessary chip to tap into the larger "sub-6" network that is coming and prevent you from getting the full 5G experience.

AT&T's second Samsung 5G phone that is due out later this year will, however, support both mmWave and sub-6 making it, for most people, the likely first 5G phone worth to wait for.

<http://www.brusselstimes.com/brussels/14753/radiation-concerns-halt-brussels-5g-for-now>

## **Radiation concerns halt Brussels 5G development, for now**

01 April 2019

### **Plans for a pilot project to provide high-speed 5G wireless internet in Brussels have been halted due to fears for the health of citizens, according to reports.**

In July, the government concluded an agreement with three telecom operators to relax the strict radiation standards in Brussels. But according to the Region, it is now impossible to estimate the radiation from the antennas required for the service.

"I cannot welcome such technology if the radiation standards, which must protect the citizen, are not respected, 5G or not," Environment minister Céline Fremault (CDH) told Bruzz. "The people of Brussels are not guinea pigs whose health I can sell at a profit. We cannot leave anything to doubt," she added.

A pilot project is not feasible with the current radiation standards, and Fremault told Bruzz that she does not intend to make an exception.

The Brussels region has particularly strict radiation standards for telecom applications. The standard of 6 volts per metre has already led to problems in the past with providing fast mobile internet via 4G in the capital.

Last week, the various governments in Belgium once again failed to reach agreement on the auctioning of the 5G licences. The file remains stuck on the distribution of the proceeds. It will be up to the next government to handle the proposal, said Telecom Minister Philippe De Backer (Open VLD) last week.

*The Brussels Times*

<https://news.streetroots.org/2019/03/15/portland-city-council-votes-fcc-action-5g-research>

## **Portland City Council votes for FCC action on 5G research**

### A city resolution demands updated research on the safety of the wireless technology

by **Joanne Zuhl** | 15 Mar 2019

The Portland City Council has voted unanimously on a resolution demanding the Federal Communications Commission update its research on the health and environmental impacts of 5G radio frequency wireless emissions. It also calls on the FCC to make the results of that research publicly available.

The resolution, which the council passed Wednesday, March 13, notes that the last time the FCC updated its studies, in 2015, it based its conclusions on recommendations from other federal agencies after reviews of scientific literature primarily from the 1990s. The resolution also notes that there are no federally mandated radio frequency, or RF, exposure standards.

Commissioner Amanda Fritz presented the resolution, noting that she authored a similar resolution 10 years ago.

“My goal in formulating this resolution is absolutely to get the FCC to do the studies that they should have done 10 years or more ago,” Fritz said before the vote Wednesday.

Commissioner Chloe Eudaly likened telecommunication companies to tobacco and gun industries that “obfuscate health issues instead of trying to understand them. It’s an embarrassment the federal government not only won’t do the research but bans it at the local level.”

That bitterness stems from the fact that Portland, like all local governments across the country, have been hogtied when it comes to regulating the deployment of 5G technology, regardless of health or environmental concerns.

The FCC, in its campaign to “ensure the United States wins the global race to 5G,” passed new rules in 2018 to streamline the installation of 5G, “small cell” infrastructure by overriding state and local regulatory barriers. The rules mandate shorter time limits for state and local reviews and in some cases waive fees if the FCC deems them barriers to deploying service, which includes the market rate the city of Portland would charge.

Numerous states, not including Oregon, have followed suit with the FCC, enacting legislation to further nullify local control and streamline the implementation of 5G networks.

Several people who testified Wednesday called on the city to go even further than this resolution and put up a fight against the federal rules, comparing it to the city's stance as a sanctuary city in the face of federal immigration policy.

The resolution references several causes for alarm, including a 2017 appeal to the European Union by 180 scientists and doctors from 36 countries. The appeal calls for the European Union to place a moratorium on the 5G roll-out across Europe "until potential hazards for human health and the environment have been fully investigated by scientists independent from industry." The signees say 5G will substantially increase exposure to radio frequency electromagnetic fields on top of the 2G, 3G, 4G, Wi-Fi, etc., for telecommunications already in place. "(Radio frequency – electromagnetic frequency) has been proven to be harmful for humans and the environment," the doctors state in their appeal.

The resolution also specifically notes a study released in November by the National Toxicology Program that showed a link between cancer in rats and exposure to high levels of RF radiation like that used in 2G and 3G cellphones. That study did not apply to 4G and 5G technologies.



<https://www.rcrwireless.com/20190313/carriers/firstnet-is-atts-springboard-to-5g>

## FirstNet is AT&T's springboard to 5G

By Kelly Hill MARCH 13, 2019

The FirstNet network build-out is helping AT&T to increase its network capacity by about 50% as it adds additional band support while turning up FirstNet's Band 14 spectrum, according to John Stephens, AT&T's CFO. Stephens spoke at the the Deutsche Bank Media, Internet and Telecom Conference yesterday.

As AT&T builds out the FirstNet network, he said, it is also adding support for its AWS and Wireless Communications Spectrum holdings, as well as enabling LTE features such as 4x4 multiple-input multiple-output, four component-carrier aggregation and 256 QAM modulation, Stephens said. With those spectrum aggregation capabilities, he went on, the difference is akin to having four single-lane highways compared to one four-lane highway.

"We're putting all this in place at once and getting a step-function above the LTE that we had, and evolving it toward 5G at the same time," Stephens said, noting that the equipment AT&T is using is 5G-upgradeable via software and towers will not need to be climbed again to enable the upgrade.

Stephens said that he had run a speed test on AT&T's LTE network on his mobile device as he was walking to the venue and achieved speeds of 160 MB — and "we don't have a mini cell tower out in the parking lot," he added, crediting the speed to the overall network improvement work that AT&T is doing.

That network improvement "will also bring our cost per megabit down significantly," he said.

AT&T said in early January that it had increased its LTE coverage area for the AT&T network and FirstNet by more than 50,000 square miles nationwide and boosted the potential customers covered by 1 million. The carrier said at the time that it had turned up Band 14 coverage in more than 500 markets, and that it had signed up more than 5,250 public safety agencies to FirstNet with more than 425,000 connections. Stephens said Tuesday that figure is at about 450,000 connections.

"A lot of those customers were customers of AT&T before they migrated over to our FirstNet service," Stephens said, but went on to say that now FirstNet is "starting to add significant numbers of FirstNet customers." While there are about 3 million first responders in the market, he said, AT&T sees the FirstNet opportunity in terms of multiple devices per user — a tablet, a body-worn camera, perhaps even drones — which would put the market at more like 10

million potential devices to connect, in a market where AT&T has not had much market share. He also said that providing first responders with devices and service plans opens up the possibility of serving their spouses and children to AT&T's commercial plans.

In terms of fiber build-out, Stephens said that AT&T will have fiber-to-the-premises reaching 14 million potential customers by July to will both bolster its backhaul capacity as well as provide a new footprint for selling broadband services. Stephens also noted that in terms of handset revenues, AT&T continues to see "modest levels" of handset upgrades as "customers continue to hold their handsets longer" due to the prices of new smartphones, with handset revenues for the first two months of 2019 around \$2.3 billion, compared to \$2.4 billion during the same period last year.

Stephens said that AT&T plans to cover more than 200 million people with 5G by 2020; the carrier **has said** that it plans to build a nationwide mobile 5G footprint using its sub-6 GHz spectrum holdings. The company expects to see that "business will lead in the innovation around 5G" with application of the technology in areas such as healthcare, automated factories and so on, Stephens said, adding that AT&T is engaged with its Fortune 1000 customer base around their abilities to make use of 5G.

<https://www.wired.com/story/why-5g-makes-reconsider-health-effects-cellphones/>

## WHY 5G MAKES ME RECONSIDER THE HEALTH EFFECTS OF CELLPHONES

By **SUSAN CRAWFORD** (@scrawford) is an Ideas contributor for WIRED, a professor at Harvard Law School, and author of *Fiber: The Coming Tech Revolution—and Why America Might Miss It*.

04.01.19

**OVER THE PAST** couple of weeks, I've been reading *The Uninhabitable Earth*. The author, David Wallace-Wells, had me from his first sentence ("It is worse, much worse, than you think"). Wallace-Wells has done us all the great favor of clearly laying out incontestable evidence for what global warming will mean to the way we live. The book's chapters focus on humanity's ability to work and survive in increasingly hot environments, climate-change-driven effects on agriculture, the striking pace of sea-level rise, increasingly "normal" natural disasters, choking pollution, and much more. It's not an easy read emotionally. But it forces the reader to look squarely in the face of the science.

Wallace-Wells points out that even though thousands of scientists, perhaps hundreds of thousands, are daily trying to impress on lay readers the urgency of collective action, the religion (his word) of technology creates a belief that, to the extent there is some distant-and-disputed problem, everything will be mysteriously solved by some combination of machine learning and post-Earth survival. We'll live in spaceships and eat lab-printed meat, and Elon Musk will fix things.

I see a parallel in another big news story: the hype and enthusiasm about 5G wireless as the "thing that will make the existing [communications] model obsolete." 5G is touted as the solution to all our problems—which sounds pretty unrealistic, as I've written in the past. (We'll still need fiber wires everywhere, including deep in rural areas, to make 5G serve everyone, and there's a real risk that we'll end up with local 5G monopolies absent wise government intervention.) And there's a new (to me) angle to 5G that I've resisted in the past: What if transmissions to and from 5G cells, which will need to be everywhere, and much closer to us than traditional cell towers, pulsing out very-high-frequency radio waves at high power levels, pose real risks to human health?

I've been impatient for years with people complaining about the health effects of wireless communications. The phrase "tin foil hat" leaps to mind, I readily concede. But I am learning that hundreds of scientists and tens of thousands of others believe that the intensity of 5G represents a phase change and that 5G's

effects on mankind should be studied closely before this technology is widely adopted.

As with climate change, where denial rhetoric has been driven by companies interested in maintaining the status quo, the wireless industry is vitally interested in assuring us that 5G poses no issues—or that there's an unresolved debate, so we should trust the existing radio-frequency exposure standards. That's where we are now.

So far, the European Commission, focused on ensuring its market players lead the way in advanced wireless services, has rejected pausing to consider the human health effects of 5G. The Federal Communications Commission has acted similarly.

But what if the FCC is measuring public health effects against a decades-old standard that (a) measures the wrong thing and (b) was based on the work of an insular, private group, half of whose initial funding came from the power and telecom industries and that elects its own members? I am bothered enough to suggest that we need better, more neutral standards based on widely accepted science.

Here's the quick summary: The FCC standard for measuring the health effects of electromagnetic radiation is based on whether the exposure, on average, will heat human tissue over short periods (6 minutes for occupational work and 30 minutes for public exposure). That standard was adopted in 1996. (The FCC launched a process in 2013 to re-examine this standard, but its review doesn't seem to be progressing.) But some very persistent scientists say that's the wrong standard, for at least two reasons: Human cells can be disrupted by mechanisms that don't necessarily involve heating, and the standard measures average exposure rather than potentially harmful peaks. They're particularly worried about effects on the skin and eyes of bursts of 5G transmissions that may lead to short, harmful temperature spikes in exposed people. But that's not the only concern.

Other scientists worry about mental health effects, sterility, cancer, and a host of other problems they say can be triggered by long-term exposure to base stations and handheld devices. Canadian scientist Magda Havas, who studies and writes about electromagnetic radiation and teaches at the University of Trent, asserts that the governmental bodies and agencies that say that "non-ionizing" (effectively, non-heating) radiation is safe and can't cause cancer below existing heat guidelines are wrong; she points to what she calls "sufficient scientific evidence of cellular damage" caused by these transmissions.

This got my attention: It turns out that sweat glands, right under the skin, effectively act as antennas in response to the very-high-frequency millimeter waves planned to be used in 5G communications—which is why the Department of Defense uses millimeter-wave crowd-control guns. If you're hit by one of these

beams, it apparently feels as if your body is on fire. But there's no lasting harm, according to DOD.

At any rate, the FCC's 1996 rules don't account for long-term exposure or cellular/biological effects that don't involve heating. And the FCC's standard is based in turn on standards adopted 30 years ago by a private group based in Germany called the International Commission on Non-Ionizing Radiation Protection (ICNIRP). ICNIRP has been described as loyal to both the telecom and energy industries, elects its own members, and is accountable to no one.

As an outsider, it feels to me that the scientific concern about 5G health effects is relatively underfunded and that there's a lot of denial and confusion about the health risks. To his credit, Senator Richard Blumenthal (D-Connecticut) asked about scientific evidence on the health effects of 5G during a hearing a couple of months ago, titled *Winning the Race to 5G and the Next Era of Technology Innovation in the United States*. "I believe that Americans deserve to know what the health effects are," Blumenthal said. "Not to prejudge what scientific studies may show. They deserve also a commitment to do the research on outstanding questions." Told there were no industry-funded studies on the health effects of 5G, Blumenthal said, "So, we are flying blind here on health and safety." At least he's asking.

This all feels very familiar. If we were wise, we'd figure this out before we go further. As Nathaniel Rich pointed out last summer in *The New York Times Magazine*, 30 years ago we had a chance to save the planet.