

July 9, 2019

## Introduction

Dear Reader,

These are audience questions and panelists' answers from "5G, EMF and Your Health: A Symposium at Elk Grove City Hall," held on June 11, 2019 arranged by Mark Graham in cooperation with Mayor Steve Ly and Supervisor Don Nottoli.

On behalf of all of us that produced this Symposium we hope that this sparks your curiosity and contributes to a greater understanding of the complicated issue of 4G and 5G cell antenna permitting and our health. Elk Grove is about to make one of the most significant decisions in its history, one that will affect the entire City forever; what to do about cell antenna permitting policy.

As Mayor Ly said near the end of the audience Q and A at our symposium, we sent the audience questions to all of the panelists for their written answers. We are sharing the questions and answers with the public, the City Council and Planning Commission of Elk Grove and its staff and of course Supervisor Nottoli.

The panelists were asked and answered several of these during the panel discussion.

Some of the questions were directed to Prof. Davis. I have put those first. One was for Prof. Davis and Mr. Windheim. The rest of the questions were not directed to anyone in particular so they were for all 3 panelists.

Panelists' answers are identified as either Davis, Russell or Windheim.

Many thanks to Mayor Steve Ly, Supervisor Don Nottoli, City Clerk Jason Lindgren for tech and AV support, the 3 panelists and everybody who attended. The panelists were Cindy Russell, MD, Eric Windheim, BA, EMRS, BBEC and Christopher C. Davis, Ph.D.

We invited AT&T and Verizon, who have proposed agreements with the City of Elk Grove regarding cell antenna permitting, to send representatives to participate on the panel and answer audience questions. Verizon arranged for Prof. Davis to attend through the CTIA, the industry's lobbying group in Washington, D.C. Prof. Davis is not an employee or representative of Verizon.

This document and an audio and a video of the event will also be posted on line at [www.KeepCellAntennasAwayFromOurElkGroveHomes.org](http://www.KeepCellAntennasAwayFromOurElkGroveHomes.org)

Mark Graham  
Elk Grove, California

Audience questions and panelist answers  
5G, EMF and Your Health: A Symposium at Elk Grove City Hall, June 11, 2019  
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# Participants

## Panelists

Cindy Russell, MD

Executive Director, Physicians for Safe Technology

<https://mdsafetech.org/>

Eric Windheim, BA, EMRS, BBEC

Electromagnetic Radiation Specialist, Certified Building Biologist

<https://www.windheimemfsolutions.com/>

Christopher C. Davis, Ph.D

Physicist and Minta Martin Professor of Engineering and Professor of Electrical and Computer Engineering at the University of Maryland, College Park

<https://ece.umd.edu/clark/faculty/379/Christopher-Davis>

## Moderators

Mayor Steve Ly of Elk Grove

<http://www.elkgrovecity.org/cms/One.aspx?portalId=109669&pageId=225238>

Sacramento County Supervisor Don Nottoli

<http://www.bos.saccounty.net/District5/Pages/default.aspx>

## Master of Ceremonies

Elk Grove resident Mark Graham

<http://www.keepcellantennasawayfromoureelkgrovehomes.org/>

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## **Audience questions and panelists' answers**

### **#1 What qualifies you (Prof. Davis) to be an expert on the biologic effects of EMF?**

Davis:

He is the Minta Martin Endowed Professor of Engineering and Professor of Electrical and Computer Engineering at the University of Maryland in College Park, Maryland. He earned his Ph.D. in Physics at the University of Manchester and completed a Post-Doctoral Fellowship in Applied and Engineering Physics at Cornell University. He teaches many subjects in the fields of Physics and Electrical Engineering, particularly Electromagnetics, including RF electromagnetics. He teaches undergraduates and graduate students who are pursuing Master's and Doctorate (Ph.D.) degrees. He has supervised the research of 73 students who earned Master of Science or Ph.D. degrees in electrical engineering, physics or biophysics.

He has conducted many scientific studies in the fields of physics, biophysics, and electrical engineering, and particularly studies on electromagnetics, bioelectromagnetics, and RF electromagnetics, bioelectromagnetics and dosimetry. He has served on the Institute of Electrical and Electronic Engineers (IEEE) Committee on Man and Radiation (COMAR) and as chair of its Subcommittee on Radio Frequency Fields, which consists of experts who examine the scientific research on RF fields and evaluate the IEEE exposure guidelines.

He has provided expert advice on both power frequency and RF fields, including dosimetry and proposed mechanisms for biological effects other than heating to the United Kingdom Health Protection Agency, the U.S. National Institutes of Health and the U.S. Food and Drug Administration's Center for Devices and Radiological Health.

### **#2 Question for Mr. Davis -**

**What international bodies and what are the specific thousands of studies that say there are little or no health effects in humans?**

Davis:

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A number of public health authorities have examined studies of RF fields and cancer and reach conclusions similar to those of the WHO. These include, for example, the Nordic Radiation Authorities (Denmark, Finland, Iceland, Norway, 20 Sweden) (2009), IARC (2011), the United Kingdom Health Protection Agency (2012), 21 the Norwegian Institute of Public Health (2012), Public Health England (2013), the Royal 22 Society of Canada (2014), the New Zealand Ministry of Health (2015), the European Commission’s Scientific Committee on Emerging and Newly Identified Health Risks (2015), the Swedish Radiation Safety Authority – Scientific Council on Electromagnetic Fields (2016), and the Health Council of the Netherlands (2016).

In addition, several U.S. State public health authorities have investigated whether RF fields from smart meters pose any public health risk. These include the Maine Center for Disease Control (2010), the Vermont Department of Health (2012), Arizona Department of Health, Office of Environmental Health (2014), and North Carolina Department of Health and Human Services, Division of Public Health, Occupational and Environmental Epidemiology Branch (2015). See the reports from these bodies to see the hundreds of studies that they have used in drawing their conclusions,.

While some researchers have reported biological changes associated with RF energy, these studies have failed to be replicated. The majority of studies published have failed to show an association between exposure to radiofrequency from a cell phone and health problems.” See for example

<https://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/CellPhones/ucm116282.htm>

### **#3 Prof. Davis –**

**If there have not been any double blind tests (as you just said) then how do you know 5G is safe?**

Davis:

There have been many double blind studies of the effects of RF exposure. The physics of interaction is well understood. 5G is only different in that in the future it will use higher frequencies than current 4G systems. Higher frequencies are actually safer because they do not penetrate below the skin

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#### **#4 Prof. Davis –**

**Can small cell radiation cause headaches or insomnia?**

Davis:  
No

#### **#5 Prof. Davis -**

**Can RF interfere with sleep? Can it cause headaches?**

Davis:

No. See studies by Herr 2005; Mohler 2010; Danker-Hofpe 2011, and Huss 2015

#### **#6 Prof. Davis -**

**Can Verizon RF stop release of melatonin?**

Davis:

No its frequency is much too high

#### **#7 Prof. Davis and Eric Windheim -**

**At what percent of the FCC limit do headaches and insomnia begin to occur?**

Davis:

There is no accepted evidence of any effects at RF levels below the FCC limits.

Windheim:

It depends on the person, the frequency, modulation pattern and RF power density level. The following is related to my clients: For 2.0 GHz frequencies I have seen it as low as  $5 \mu\text{W}/\text{m}^2$  ( $.0000005 \text{ mW}/\text{cm}^2$ ) for highly traumatized people and often at  $500 \mu\text{W}/\text{m}^2$  ( $.00005 \text{ mW}/\text{cm}^2$ ) or greater. The FCC public exposure limit is  $10,000,000 \mu\text{W}/\text{m}^2$  ( $1.0 \text{ mW}/\text{cm}^2$ ) at 2.0 GHz. When we install RFR shielding the symptoms cease when in the shielded enclosure.

Currently I am working for a family in Sacramento Pocket area where the peak bedroom RF power density level is  $460,000 \mu\text{W}/\text{m}^2$  ( $0.046 \text{ mW}/\text{cm}^2$ ) which is 4.6% of the FCC public exposure limit. Residents and visiting guests get severe headaches in minutes and insomnia per my client's sworn declarations. There is Verizon 4G small cell on the lamp pole 60' from the second story bedroom window. The bedroom is in the main RFR beam. See attached photo.





## #8 Verizon person, Mr. Davis:

**If 5G were established in Elk Grove what controls, if any, would there be? Privacy, amped up microwave power + radiation, facial recognition, eavesdropping, etc.?**

Davis:

All RF communications can, in theory, be hacked. 5G is lower power, does not penetrate through buildings and will be much harder to hack. And encryption can prevent this.

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## **#9 One of the symptoms that was not mentioned, but for me is very obvious and serious, is ringing in the ears, aka tinnitus. How has this been studied in relation to RF???**

For me, this is a direct symptom. from [jostoich@hotmail.com](mailto:jostoich@hotmail.com)

Davis:

Various symptoms have been described as resulting from RF exposure including headaches, dizziness, body aches, buzzing in ears, eye floaters, difficulty concentrating, memory loss, sleep disturbance, nervousness, fatigue, and lethargy, among others. A WHO working group has recommended that these symptoms be described as “Idiopathic” where Idiopathic means “cause unknown.” This is because, as pointed out by Rubin (2010), the theory of electromagnetic hypersensitivity “is controversial” and “most mainstream medical bodies maintain that there is not sufficient evidence to support this theory and that the symptoms experienced by sufferers are unrelated to the presence of electromagnetic fields.”

Russell:

A. Tinnitus is an observed phenomenon with RF. Here is a research paper which reviews this-Tinnitus and cell phones: the role of electromagnetic radiofrequency radiation. 2016 .

<https://www.sciencedirect.com/science/article/pii/S1808869415001639>

It states, “The peripheral auditory pathway has the ability to capture sound waves from the environment and transmit them actively to the cortex. Since EMRFR also presents diverse frequencies (starting at 3 kHz) and amplitudes, similar to that which occurs with sound waves, it is plausible to accept that certain frequencies and amplitudes of EMRFR can be captured by the peripheral auditory system.... The present review of the literature was purposely focused on tinnitus and has found interesting arguments about the possible relationship between this symptom and EMRFR. However, due to multiple neuronal mechanisms involved in the pathogenesis of each one, whether there is a causal association between EMH and tinnitus, whether EMH is a predisposing factor for the worsening of tinnitus, or whether both share a similar pathophysiology is still under discussion.”

Windheim: No answer.

## **#10 How is it that 5G was approved by federal health regulatory agencies without a single health or biological safety test?**

Davis:

There have been hundreds of studies that show that RF is safe at low power levels.

Russell:

That is a good question. Perhaps the telecommunications industry similar to other large corporate industries (like tobacco) are captured agencies with heads of the departments previously working in industry. See Harvard Ethics Fellows white paper, Captured Agency: How the Federal Communications Commission is Dominated by the Industries it Presumably Regulates.

[https://ethics.harvard.edu/files/center-for-ethics/files/capturedagency\\_alster.pdf](https://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf)

Windheim:

The FCC is captured by the corporations it is supposed to be regulating. Ajit Pai is the current FCC Chairman and previously was Associate General Counsel at Verizon Communications Inc.

<https://www.fcc.gov/about/leadership/ajit-pai>

See

[http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency\\_alster.pdf](http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf)

## **#11 Can you speak to the 4 kids and 3 teachers with cancer in Ripon where there was a 5G at the school?**

Davis:

Small cancer clusters sometimes occur at random with no known cause.

Russell:

- A. There is reason to suspect a nearby cell tower. Although within current guidelines of radiation the pulsations that are constant act as a biologic toxin. 8 of 10 studies on

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neurologic impairment found symptoms in a percentage of people 3% to upwards of 50% (in the Japanese study). 3 studies looking at cancer rates showed an increase as well for residents within about 1500 feet of the cell tower. It is also possible that there are other factors involved but the cell tower could be the tipping point for cancer.

- B. A new article that describes tipping points for neurologic impairment with toxins and EMF was just published. Make the same argument. **Are rises in Electro-Magnetic Field in the human environment, interacting with multiple environmental pollutions, the tripping point for increases in neurological deaths in the Western World?** Pritchard et al. Medical Hypothesis. June 2017.  
[https://www.sciencedirect.com/science/article/pii/S0306987719300040?fbclid=IwAR3N9av6NzSVGUFsKgtLBS0yYZb\\_9tpgVs7aOojSLxqozM5ko3Qh9-7x3tQ](https://www.sciencedirect.com/science/article/pii/S0306987719300040?fbclid=IwAR3N9av6NzSVGUFsKgtLBS0yYZb_9tpgVs7aOojSLxqozM5ko3Qh9-7x3tQ)
- C. See also Physicians for Safe Technology post on Ripon. **CELL TOWER REMOVED AFTER 4TH RIPON STUDENT DIAGNOSED WITH CANCER** MARCH 25, 2019.  
<https://mdsafetech.org/2019/03/25/cell-tower-to-be-removed-after-4th-ripon-student-diagnosed-with-cancer/>
- D. **Cell Tower Health Effects Scientific Literature**-See Physicians for Safe Technology page on Cell Towers Health Effects where the research is listed-  
<https://mdsafetech.org/cell-tower-health-effects/>

Windheim:

It was not 5G at Weston Elementary School In Ripon, CA. It was a SPRINT 2.5 GHz cell antenna. Campus peak RFR exposure from the cell tower was about 40,000  $\mu\text{W}/\text{m}^2$  measured outdoors at 120' feet from the antenna tower which is about 25% of the RF power density I typically find in school classrooms where WIFI and Laptops are both in operation. Time did not allow me to assess the entire campus or do a complete EMF assessment which would have included magnetic fields, electric fields, RF-wireless radiation and dirty electricity. The kindergarten classrooms & playground are closest to the Sprint cell tower.

This CBS video covers the situation:

<https://sacramento.cbslocal.com/2019/03/12/school-cell-tower-causing-cancer/>

The City of Ripon also has carcinogenic toxic water due to previous industrial ground water pollution in the city. In the case of Weston Elementary School in Ripon all toxic sources need to be investigated as there can be a synergistic effect from multiple toxins even if each one is individually at levels deemed "safe enough" by government regulators.

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## #12 Compare EMF exposure from electric transportation (inverter driven) vs 5G cell tower.

Davis:

Low frequency EMF exposure is predominantly due to magnetic fields that are much larger than those associated with 5G.

Russell:

This is for Eric Windheim however we do not yet know what will be in the 5G cell tower. There will need to be many 4G cell towers to act as backhaul. It is an unknown as far as I can tell what the power density will be. As Eric pointed out research indicates that at the current standards thermal burns may occur with fast large data downloads which is the reason that 5G is being promoted. Safer to do all of of this with fiber or wired connection.

You can look at 5G scientific literature on the website of Physicians for Safe Technology at <https://mdsafetech.org/5g-telecommunications-science/>

Here is Neufeld paper:

New research by Neufeld and Kuster 2018 highlights the significant tissue heating generated by 5G technology with rapid short bursts of data transfer on a device, prompting them to call for reevaluation of thermal safety standards (let alone biological standards). The researchers state, “The results also show that the peak-to-average ratio of 1,000 tolerated by the International Council on Non-Ionizing Radiation Protection guidelines may lead to permanent tissue damage after even short exposures, highlighting the importance of revisiting existing exposure guidelines.”

<https://www.ncbi.nlm.nih.gov/pubmed/?term=SYSTEMATIC+DERIVATION+OF+SAFETY+LIMITS+FOR+TIME-VARYING+5G+RADIOFREQUENCY+EXPOSURE+BASED+ON+ANALYTICAL+MODELS+AND+THERMAL+DOSE>

Windheim:

Hybrid and electric cars use a pulse-width modulator to convert direct current (DC current) from batteries into pulsed DC current to drive electric motors that propel the car. This creates high levels of high frequency, pulsed magnetic fields in the passenger compartment of the car. You can read more about this on this link:

<https://www.saferemr.com/2014/07/shouldnt-hybrid-and-electric-cars-be-re.html>

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Cell towers use an AC to DC inverter to convert alternating utility current (AC current) into DC current to power the radio transmitters that send the RF signal to the antennas which is then radiated into the airways. Inverters can make small or large amounts of high frequency voltage transients, also known as dirty electricity, which travel on the AC powerlines connected to the inverter and even back into the local power grid. Dirty electricity radiates off wires in the form of KHz frequency RF radiation. Inverters are also found in variable speed pool pumps, HVAC systems, electric car chargers and solar electric inverters.

## **#13 I understand that some countries, i.e. S. Korea, have extensive 5G coverage.**

### **Q: Have they studied health effects?**

Davis:

Indirectly they have because they are members of the WHO.

Russell:

No health studies that I know of

### **Q: Which is more damaging to a person's health, walking all day long with a cell phone to the ear vs. living near a 5G tower?**

Davis:

None of these activities is dangerous except driving while using a cell phone.

Russell:

Both are damaging depending on your age, general health and genetics. Biologic damage is being done as these waves pass through bodies. The distance of the cell phone to ear is closer thus worse however. One can choose to turn off the phone but cannot choose to turn off the cell tower.

Note that harm from radio frequency exposure varies with power, distance, device, modulation (pulsations and wave design) and length of time of exposure, as well as the health and age of the person exposed. The pulse spike is what disrupts the membranes much more than a continuous wave form. The most vulnerable among us are pregnant women, children, the elderly and those with a chronic illness.

Windheim:

Both can cause cancer in different ways. Right now, we have mostly 3G & 4G towers whose RFR penetrates deeply into the human body and buildings.

1. The California Department of Public Health (CDPH) states in their April 2014 flyer titled “Cell Phones and Health” that “cancers were on the same side of the head that people usually held their phones.” So, if you carry your cell phone in a pocket or bra you are at greater risk since you are violating the FCC minimum safe distance of about .5” from your body: the phone is transmitting frequently to stay synchronized to the nearest cell tower. The FCC requires cell phone manufacturers to inform consumers to keep the phone away from your body by .5 inches or so to avoid exceeding the FCC limits.

CDPH Press Release

<https://www.cdph.ca.gov/Programs/OPA/pages/nr17-086.aspx>

CDPH Cell Phone Guidance document (Editor: The link to the pdf file works. You may have to copy and paste it into your browser.)

<https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHIB/CDPH%20Document%20Library/Cell-Phone-Guidance.pdf>

2. Cell tower RFR exposure during sleep time can reduce the release of melatonin from your pineal gland. Melatonin is a medically and scientifically documented antioxidant and is required for rest and repair of cellular and DNA damage that was sustained during the day. Cell tower RFR during sleep time can create insomnia or at least low-quality sleep. Without great sleep the pineal gland does not release Melatonin, the body does not repair and a variety of neurological problems develop along with incomplete repair of single strand DNA breaks sustained during waking hours: this can lead to development of cancer or accelerate existing cancer. Poor sleep also leads to a lower overall immune function.

Numerous independently funded scientific studies from around the world document show that close proximity to cell towers is correlated to an increasing variety and intensity of neurological symptoms, a higher cancer rate and death rate. These studies are available on request. Please see the Santini graphic below.

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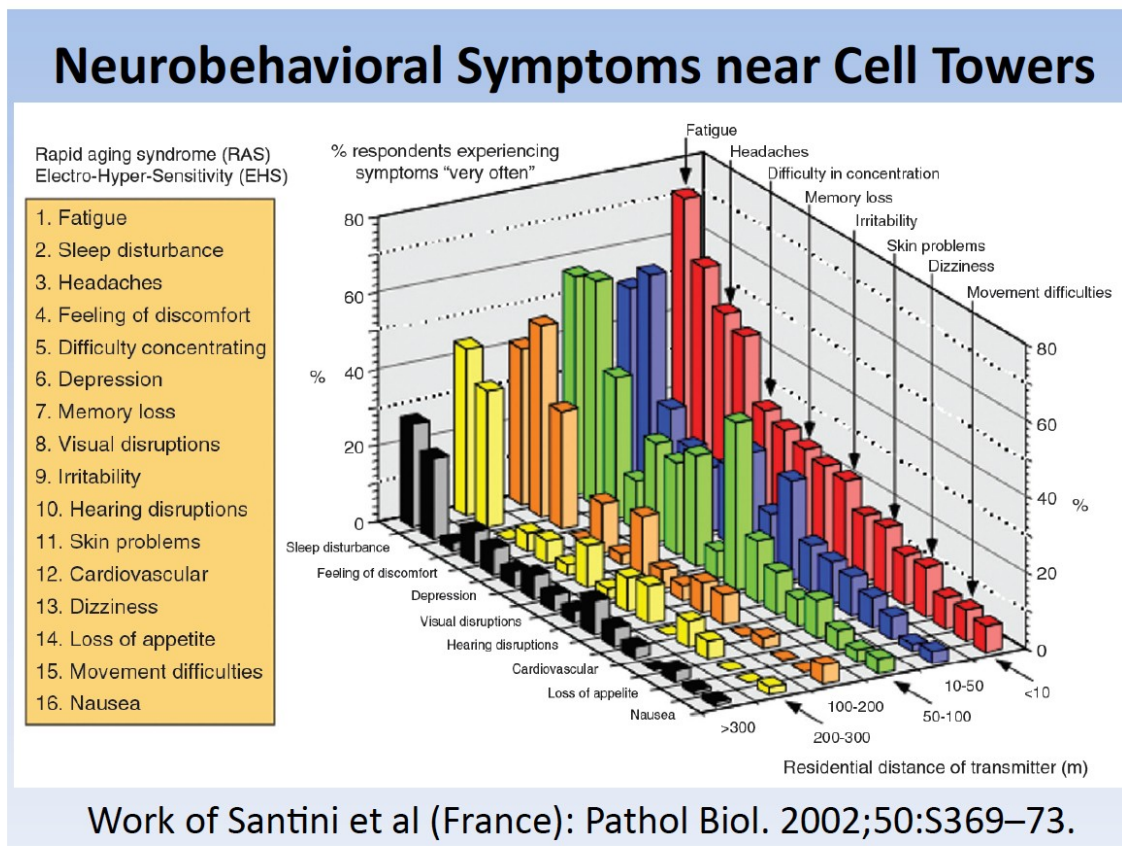
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True mm-wave 5G RFR is at 28 GHz for Verizon and 39 GHz for AT&T. This high frequency mm-wave RFR does not penetrate very well and deposits all of its energy in the skin, or eye, about 1 mm deep. There has been zero human safety testing on this.

3. 5G towers may need 4G towers for subscriber device location, back haul and the fill in when mm-wave frequencies are blocked by houses and trees as part of the 5G system so you will get some of both. The risk from a 5G tower depends if you are in the beam or not as 5G towers send narrow and highly focused beams of mm-wave RFR to the 5G user. The key is to stay out of the beam. The IEEE states in a recent paper that hand held 5G mobile devices will overheat human skin at currently allowed power levels. Since cell phones are often held to the head or near the face the human eyeball and cornea will be getting very high RFR exposure. I suggest that you avoid people who are using a 5G device and stay out of the beam. The International Institute for Building-Biology & Ecology is coming out with an overall position paper on mm-wave 5G written in lay-man's language: it will be here: <https://hbelc.org>





The Santini study shows a clear relationship between proximity to a cell tower/antenna and neurological symptoms. Close proximity produces many types and high intensity of symptoms and further away is less so.

Comments on Notice of Inquiry, ET Docket No. 13-84  
**Netanya, Israel (1997-1998)**



New cell phone tower set up in city of Netanya, Israel, in July, 1996.

1500 watt, 850 MHz.

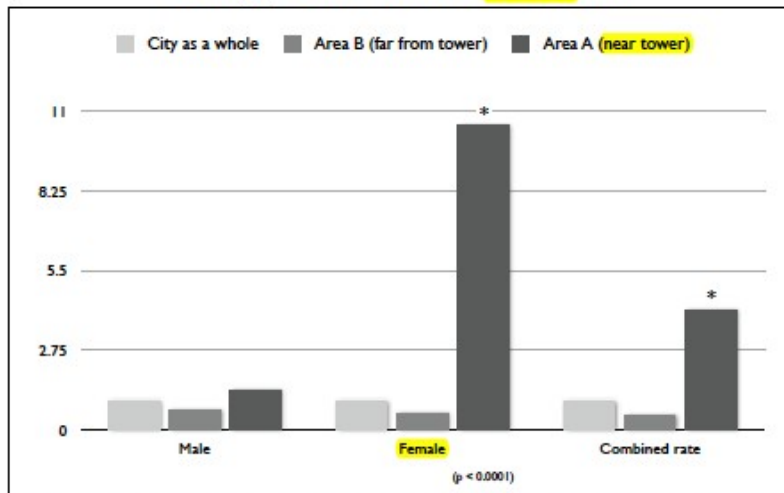
Power density in the whole exposed area was far below  $0.53 \mu\text{W}/\text{cm}^2$ .

This is 1000 times less than the FCC Guidelines of  $600 \mu\text{W}/\text{cm}^2$  for 850 MHz exposure.

Comparison of cancer rates during the second year of exposure, in 677 long-term residents near the tower, compared to 1,222 matched controls living in another area of the city.

Wolf R, Wolf D. Increased Incidence of Cancer Near a Cell-Phone Transmitter Station. *International Journal of Cancer Prevention* (2004); 1(2):1-19.

**Netanya, Israel - Relative Cancer Risk**



Relative risk of cancer in residents near a new cell phone tower in Netanya, Israel, during the second year of exposure.

Overall risk of cancer in Area A was 4.15 times higher than in the town as a whole.

For men in area A, the cancer rate was 1.4 times higher.

For women in area A, the cancer rate was 10.5 times higher ( $p < 0.0001$ )

[the probability of this being a random finding is one hundredth of 1%

Wolf R, Wolf D. Increased Incidence of Cancer Near a Cell-Phone Transmitter Station. *International Journal of Cancer Prevention* (2004); 1(2):1-19.

[https://www.powerwatch.org.uk/news/20050207\\_Israel.pdf](https://www.powerwatch.org.uk/news/20050207_Israel.pdf)

The Wolf and Wolf study in Netanya, Israel study shows a clear relationship between proximity to a cell tower/antenna and incidence of Cancer.

Close proximity produces a cancer incidence 4.5X greater than the town as a whole and 10.5X greater for women living near the tower.

## **#14 Effects from driving auto.**

?

(The panelists did not answer this one.)

## **#15 What happens to 5G towers in a fire or if it falls down?**

(There were 2 questions on this card. Keep reading.)

Davis:

It is bad for anything large to fall on you. Should we ban trees?

Russell:

In a fire 5G would be melted and not work. 5G main selling point is streaming data and most of this is porn. Kids are being exposed to this at much younger ages. This needs to be thought out. As Mark Zuckerberg says “ Move Fast and break things.” That is the tech motto, not think about the possible consequences down the road to vulnerable populations especially.

Q: My understanding is 5G is only for streaming, not texting or emails. 30% of streaming is porn. Health outcomes are more important than video & games.

Davis:

No comment

Russell:

The main selling point of 5G is streaming data and the data show, as you point out, much of this is porn. Kids are being exposed to this media inappropriately at much younger ages with unfortunate psychosocial consequences. A great book that discusses this is "The Big Disconnect" by Catherine Steiner Adair. These issues need to be thought out prior to the widespread dissemination and commercialization of any major technology product. As Mark Zuckerberg says "Move Fast and break things." That is the tech motto, not to think about the possible consequences down the road to vulnerable populations especially.

This is the motto for many industries that have left us a legacy of toxic pollution. They create a chemical, commercialize, market and disseminate the product or chemical as a breakthrough. People and the economy become dependent on it, then the toxic hazard is discovered with little hope of correcting the situation due to lack of political will. Hazardous chemicals and high tech appear to have the same rights as humans... "Innocent until proven guilty." The only way to avoid toxins is to educate yourself about what and where they are and not purchase or use them. Even so, chemicals leach into air, water, soil and food to live another toxic life. The wireless radiation from wi fi and cell phones can be turned off when not in use or switched to wired connection. Cell towers that permeate the air with a mix of radiation frequencies, however, cannot be turned off. As we are not independently monitoring this radiofrequencies we are in the dark about exposures and health effects. I agree public health should supersede fast downloads.

Windheim:

No answer.

## **#16 Compare and contrast health concerns of 4G vs 5G for general public.**

Davis:

Both are perfectly safe at low power levels..

Russell:

This is from sections of our Physicians for Safe Technology website- [www.MDsafetech.org](http://www.MDsafetech.org)

## Summary of Risks from 5G

- Damage to the eyes- cataracts, retina
- Immune system disruption
- Metabolic disruption
- Damage to sperm
- Skin damage – potentially cancer
- Collapse of insect populations, the base of food for birds and bats
- Rise in bacterial antibiotic resistance and bacterial shifts
- Damage to plants and trees

## Summary of Risks from 3G, 4G

- Damage to the eyes- cataracts, retina- through oxidation
- Cancer of the brain, heart, pancreas, prostate- and tumor promotion (synergy of toxins to produce cancer)
- Nervous system damage and disruption
- Electrosensitivity-microwave illness
- Immune system disruption
- Metabolic disruption
- Lowering of melatonin/sleep disruption
- Damage to sperm, embryos, ovaries with reproductive failure
- Collapse of insect populations- 3G and 4G technology is already being used to kill insect larvae in grainaries.
- Rise in bacterial antibiotic resistance and bacterial shifts
- Damage to plants and trees

## What is the Difference Between 5G and 4G Wireless Technology?

5G (Fifth Generation) Technology is not to be confused with the 5Gigahertz (GHz) frequencies used in wireless devices. Some devices state they are 5G, but at this point in time it is meant to be 5GHz frequency of transmission. 5G technology uses much higher frequencies (10-300GHz) and is still in planning stages (with exception of pilot projects).

See also [What's the Difference Between 5G and 5GHz Wi-Fi?](#)

5G technology is different than prior 2G, 3G or 4G technology in the following ways:

**Frequencies:**4G uses several different frequencies from 750MHz to about 2,400-5,000 MHz(2.4 GHz to 5 GHz- typical Wi Fi and cell phone)- 5G (proposed 5th generation) uses10GHz to 300GHz

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**Wavelengths:**4G electromagnetic wavelengths are inches to feet long, 5G frequencies are in centimeters to millimeters

**Mixed Frequencies Required:** 4G is stand alone and does not require other cell towers.

**Depth of Skin and Body Absorption:**4G microwave radiation (2.4GHz and 5 GHz) passes through bodies and the energy is absorbed by anything that contains water (can't cook dry rice in a microwave oven) while 5G (5th Generation) penetrates typically only the skin in humans

**Distance Radiation Travels in the Body:**4G can travel dozens of miles in a line of sight and if poles are placed high. In experiments 5G can travel a few miles but is easily blocked by objects, trees and plants thus poles are planned for every 300 feet in “Smart Cities”..

**Mechanisms of Harm:** 4G emissions can cause oxidation of tissues (93 of 100 studies), 5G radiation can have its effect through heat (tissue destruction), and at low power levels through signaling of skin structures that can affect metabolism, the nervous system, the endocrine system, the reproductive system (declassified military studies).

**Amount of Testing Done:** 4G technology has been tested by the military and by international scientists with an abundance of studies showing broad harm to animals, humans, plants, insects. 5G technology has been studied by some in the military showing broad harm and some newer studies are showing damage to insects, tissue burns and overheating with streaming of data, but there has been NO safety testing of 5G before it is rolled out.

### **Old and New Research on Millimeter Waves is Alarming**

New research by [Neufeld and Kuster 2018](#) highlights the significant tissue heating generated by 5G technology with rapid short bursts of data transfer on a device, prompting them to call for reevaluation of thermal safety standards (let alone biological standards). The researchers state, **“The results also show that the peak-to-average ratio of 1,000 tolerated by the International Council on Non-Ionizing Radiation Protection guidelines may lead to permanent tissue damage after even short exposures, highlighting the importance of revisiting existing exposure guidelines.”**

### **Millimeter Wavelengths Hazards: Cell Membranes, Internal Signalling, Skin Changes,**

Millimeter wavelengths (MMW) have been used in non-invasive complementary medicine in many Eastern European countries, typically to therapeutically heat the tissues over a short time frame. Millimeter wavelengths (at high intensity) have also been used in military applications in

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active denial systems (non-lethal crowd control weapons). Some research on non-thermal effects has shown that millimeter wavelengths target cell membranes and have adverse biological effects as well as clinical effects such as cataracts, immune system alterations and physiological effects on the heart and blood pressure. **Betzalal et al (2018)** have demonstrated that the sweat glands which are coiled structures in the upper layers of the skin can act as antenna receiver for 5G sub-THz band wavelengths. The presence of sweat glands in skin significantly increase the specific absorption rate (SAR), or heat absorption, for millimeter radio frequency radiation. This varies depending on factors such as perspiration and stress levels. **Le Quement (2012)** looked at non-thermal skin genome effects of 60.4 GHz exposure for 1, 6 or 24 hours and found at 6 hours there was differential expression of 5 transcripts. He states, “this is the first large-scale study reporting on potential gene expression modification associated with MMW radiation used in wireless communication applications.”

Adverse effects have also been found in bacteria and insects (**Trchounian 2016**). The cellular and organism effects are nonlinear and depend on a variety of individual factors as well as specific wavelengths, phasing and modulation of the wavelength signals. With widespread exposure even small physiologic alterations would be magnified in a population and contribute to a negative public health outcome.

## References

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- **MDSafeTech.org- 5G Scientific Literature-** <https://mdsafetech.org/5g-telecommunications-science/>
- **What’s the Difference Between 5G and 5GHz?** <https://www.howtogeek.com/398620/whats-the-difference-between-5g-and-5ghz-wi-fi/>
- **Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation.** (2016) Yakymenko et al. Electromagn Biol Med. 2016;35(2):186-202. <https://www.ncbi.nlm.nih.gov/pubmed/26151230>
- **Systematic Derivation of Safety Limits for Time. Varying 5G Radiofrequency Exposure Based on Analytical Models and Thermal Dose.** Nuefeld and Kuster. (2018) <https://www.ncbi.nlm.nih.gov/pubmed/30247338>

Windheim:

See my previous answer above.

## **#17 What cities in this area and the Bay Area already have 5G?? (I know Alameda has signed up.)**

Davis:

I haven't looked into this.

Russell:

Sacramento is the only one so far but many applications for "small cells" are in process. These may not have 5G but likely 4G LTE to start with.

Windheim:

No answer.

## **#18 (There were 3 questions on this card.)**

### **A. EMF exposures are used as human torture: how close are the EMF ranges to telecom/ EMF levels?**

Davis:

Take a look at [https://en.wikipedia.org/wiki/Active\\_Denial\\_System](https://en.wikipedia.org/wiki/Active_Denial_System). This military system uses 95 GHz and much high power levels than 5G.

Russell:

There is one study that looks at 95GHz as deployment weapons for the military, Not sure about other frequencies. The Active Denial System: A Revolutionary, Non-lethal Weapon for Today's Battlefield. (2009). Levine S. Center for Technology and National Security Policy National Defense University. National Defense University Press.

<http://ndupress.ndu.edu/Media/News/Article/1229000/dtp-065-the-active-denial-system-a-revolutionary-non-lethal-weapon-for-todays-b/>

Windheim:

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RFR creates sleep deprivation which is also used for torture and at POW camps.

**B. Does Elk Grove City have requirements for safe levels of exposure?**

Davis:

No answer.

Russell:

Elk Grove requirements are set by the FCC and cannot be changed. These standards are based on heat, not biological effects seen in the laboratory or observed in humans at much lower frequencies. Scientists are arguing that we need biologically based standards as we have for other toxins. This point has been argued in the Bioinitiative report which has an extensive list of research studies. <https://bioinitiative.org>

Windheim:

While cities may not be able to restrict RF power density levels they can create cell tower exclusions zones IN residential areas and set backs of 1,500 feet from those areas for any cell tower/antenna.

**C. Are the telecom providers measuring EMF levels in communities where towers / units are located?**

Davis:

No answer.

Russell:

Companies can be required to take measurements. Ordinances can require both industry and independent measurements. Ordinances can also require that the industry not change the output

of signals unless they notify the city.

Windheim:

No and in many documented cases they are exceeding FCC public limits after the tower is installed which is call “Powering Up”. In some cases, the antenna will exceed FCC limits as designed and it can be powered up to higher RFR levels at any-time. The FCC does not provide RFR measurement unless there is a formal complaint and then they often notify the wireless carrier the day that they will be doing the testing so the carrier has advance notice to adjust the RFR power level for the FCC test. This is per:

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## **#19 Will there be a codified mechanism to protest, or veto, a 5G cell transmitter from outside our homes?**

Davis:

No answer.

Russell:

A. There are organizations opposing this. The group Americans for Responsible Technology is the most organized at this time and led the May 15, 2019 Day of Action for 5G. 50 cities signed up to protest. They are holding another protest in the near future.

<https://www.americansforresponsibletech.org>

B. Stop 5G: May 15, 2019 Day of Action as EU Cities Call for a Ban on 5G.

<https://mdsafetech.org/2019/04/28/stop-5g-may-15-2019-day-of-action/>

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Windheim:

No answer.

Editor's note: Elk Grove residents can have input on what the City does on this!

## **#20 Who specifically makes these cell towers?**

Davis:

No answer.

Russell:

There are cell tower companies that either own/operate the land/ cell towers, and those that are wireless service carriers for wireless customers. The cell tower owners rent space to wireless carriers, government agencies and broadband data providers. They are structured as a real estate investment trust (REIT).

Some companies do both. Industry says now that carriers have leaned away from owning cell tower sites themselves as this is more cost effective than putting capital into and towers. They sold to companies like American Tower (AMT) and Crown Castle. The maintenance responsibility, it is said, falls on both the owner and carriers but the actual cell tower equipment is maintained by the renters (wireless service carriers).

It is big business and according to Forbes "The 54 telecommunications companies on the 2018 [Forbes Global 2000](#) list claim more than \$3.4 trillion in assets and totaled nearly \$1.5 trillion in revenue last year."

There is a lot of consolidation and merging of cell phone carriers which is problematic. The top 2 or 3 dominate the market.

### **Telecom companies that own and operate cell towers- top 3- \$11.2 Billion in Revenue in 2016**

American Tower (AMT)- the largest

Crown Castle International

SBA Communications (25,000 + towers in U.S., Canada and Latin America and India (bought Viom)

### **Telecom Wireless Service Carriers- 4 largest companies- \$191 billion in revenue in 2016.**

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**CTIA- Wireless Association lists about 30 Wireless Service Providers and Competitive Carriers Association (CCA) has over 100. Top of the list for carriers are:**

AT&T  
Verizon  
Sprint  
T-Mobile  
MetroPCS  
Boost  
Cricket  
Virgin  
Straight Talk  
Tracfone

Fiber optic cable is the backhaul to wireless carrier data between cities. Fiber optic is essential to 5G. Apparently XO owns the backbone of this and Comcast owns a fair amount as well. There are many local providers of cable/fiber optic. Fiber optic to premises is being talked about as a solution to wireless cell towers to the home. Connection would need to be made at the street. 5G hopes to connect the fiber throughout cities to utility poles then to the blocks of homes on one street.

## **References**

**Cell tower site acquisition and ownership: tips and tools. 2015.**

<https://www.rcrwireless.com/20151218/network-infrastructure/cell-tower-site-acquisition-and-ownership-tips-and-tools-tag20>

**Merrill Lynch Raises Price Targets on 3 Must-Own Cell Tower Stocks. March 20, 2019.** <https://247wallst.com/telecom-wireless/2019/03/20/merrill-lynch-raises-price-targets-on-3-must-own-cell-tower-stocks/>

**Cell Tower Industry Facts & Figures 2016**

<https://www.celltowerleaseexperts.com/cell-tower-lease-news/cell-tower-industry-facts-figures-2016/>

**Top 100 Tower Companies in the U.S. Wireless Estimator.** <http://wirelessestimator.com/top-100-us-tower-companies-list/>

**The World's Largest Telecom Companies 2018: AT&T, Verizon Remain On Top As Sector Struggles.** Forbes

<https://www.forbes.com/sites/jonathanponciano/2018/06/06/worlds-largest-telecom-companies-2018/#22484edf7d39>

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**Fiber optic vs. 5G wireless networks: A closer look at an emerging debate (Reader Forum).** RCWireless. Feb 20, 2019.

<https://www.rcwireless.com/20190220/opinion/readerforum/fiber-optic-5g-reader-forum>

Windheim:

In this case the city lamp pole will be the tower making them an accessory and party to possible injury and lawsuits. The electronics are made by many different vendors.

## **#21 Why can't the City install 5G only in common zones only for public use and not in urban areas such as home residential areas?**

Davis:

No answer.

Russell:

- A. They can put in their city ordinance that they are forbidden in those zones. The companies may challenge them however. It is common for ordinances to state their preferences in order to not have cell towers near schools, homes or hospitals. That is legal as it does not effectively prohibit cell towers in the city. This challenge is occurring in Sonoma City which also has a preference list for telecom that avoids residential neighborhoods.
- B. Boulder, Colorado has a wonderful Legal Policy Report developed by attorney Grant Wilson, called Policy Report: Small Cell Facilities in Boulder Colorado - Planning Ahead for an Evolving Legal Regime. It explains very well what is within the legal rights of the cities and how they can maximize their control in cell tower placement. Contact [gwilson@earthlaw.org](mailto:gwilson@earthlaw.org) 720-819-7722  
  
<https://whatis5g.info/wp-content/uploads/2019/06/Small-Cell-Facilities-Policy-Guide-for-Boulder1.pdf>
- C. You can visit Physicians for Safe Technology Cell Towers and city Ordinances to see some specific ordinances and updates on the court hearings and HR 530 by Rep. Anna Eshoo (D-CA) to reverse the FCC order that has required cities to deploy these cell towers

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quickly.

<https://mdsafetech.org/cell-tower-and-city-ordinances/>

Windheim: the City can require minimum distances between cell antennas and homes. The City can also prohibit cell antennas in residential zones and set other requirements.

## **#22 Have there been any long term studies to 5G technology? There was a time when people were told smoking, GMOs, plastics, & glyphosate were safe too.**

Davis:

There have been many long term studies of RF exposure on animals. See for example La Regina (2003), Anderson (2004), and Smith (2007). Hazardous chemicals are totally different.

Russell:

- A. No. There are no long term studies of 5G. Nor have there been any long term studies of 3G or 4G. The NTP report on cell phones and cancer used 2G frequencies and was one of the first long term studies on rats. It was the best long term study to date and done by the National Toxicology Program. It took 10 years and cost \$25 million dollars. It was carefully controlled and used special chambers (which were destroyed after the experiment was completed). There were 2 different modulations and 2 frequencies used- 900 Mhz and 1900MHz- which are commonly used in cell phones. The studies showed DNA damage, clear evidence of cancer of the heart, a significant increase in brain tumors, reproductive injury. One of the most alarming is the cardiac changes similar to aging. It would be consistent with the basic science research showing oxidative damage and also higher absorption of RF in the heart as it is 74% water.
- B. Here is the summary. For the full write up with references and letters go to- **NTP Study on Cell Phones and Cancer 2018** .

<https://mdsafetech.org/ntp-study-2016/>

### **NTP Summary**

**The National Toxicology Program (NTP) Chronic Carcinogenicity Studies of Cell Phone Radiofrequency Radiation** are the most comprehensive, carefully done research performed to date on the long term effects of radio frequency radiation from wireless devices such as cell phones. This 10 year \$25 million dollar study by the National Institute of Environmental Health

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Sciences was completed and peer reviewed March 26-28, 2018 in North Carolina. The animal research looked at long term non-thermal exposure to radio frequency (RF) cell phone radiation. The series of studies demonstrated positive findings (adverse effects) as follows:

- An increase in tumors of the heart (schwannomas), brain (malignant gliomas) and adrenal gland (pheochromocytomas)
- Increases in other organ tumors compared to controls (not statistically significant but noteworthy) for pancreas, prostate, pituitary, liver and lung
- DNA damage in rodents
- Cardiomyopathy similar to aging
- Adverse perinatal effects in some groups

Windheim:

There are Zero human safety studies done on 5G towers and 5G hand held mobile devices. The IEEE has done theoretical modeling and states that human skin will be overheated and FCC limits thereby exceeded, by 5G mobile devices at currently allowed power levels. We are flying blind: particularly if eye damage is caused.

## **#23 Supervisor Nottoli – Why did Sacramento residents not have a say in installing their 5G cell towers?**

(Editor's note: Supervisor Nottoli answered this during the symposium. See the video.)

Davis:

No answer.

Russell:

- A. The **FCC fast plan** required this. <https://www.fcc.gov/5G>  
Rep. Anna Eshoo (D-CA) is opposing this and has introduced HR530 to reverse the FCC Order. It is in the House of Representatives and has about 49 co-sponsors.

<https://www.congress.gov/bill/116th-congress/house-bill/530/all-actions>

B. This is from our **Cell Towers and City Ordinances** page at Physicians for Safe Technology- <https://mdsafetech.org/cell-tower-and-city-ordinances/>

### **New FCC Rulings and Legislation to Preempt Local Control**

The passage of new Federal legislation and Federal Communications Commission **FCC 5G FAST Plan** , in September 2018, aim to streamline deployment of small cell wireless telecommunications facilities (WTF) and limit control by local governments for placement, fees, permit approval and timeline (shot clock) for “small cell” towers. These are in reality not “small” as they have standard cell tower RF emissions (3G, 4G), will be densely placed and will be located close to homes. In addition they will be in the public right of ways.

The requirement for wireless carriers to show a significant gap in coverage or to provide the least intrusive method of filing a gap have been removed for small cells. Permits for small cell facilities are to be administrative and not by approval of city councils or boards (cannot be Conditional Use Permits) There is a limit that cities can charge per pole and batched permits are allowed and cannot be denied. No moratoriums on cell towers are allowed. **This policy took effect January 14, 2019 with a deadline of March 14, 2019.** Cities and Counties are struggling to understand the new rules and decide how they should proceed with updated or interim wireless facilities ordinances as this creates a burden on their governmental processes. Some cities have continued to require similar conditional use single antenna permits for small and large cells towers in the hope that the FCC ruling will be overturned and ultimately deemed unconstitutional.

**FCC Order 18-133:** A fact sheet and ruling of the FCC Order Docket 17-79 and 17-84 **Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment** reviews new state and local requirements.

<https://docs.fcc.gov/public/attachments/DOC-353962A1.pdf>

### **70 Cities in Court to Challenge New FCC Rules**

After the September 26, 2018 Ruling was passed by the FCC, more than a dozen cities including Los Angeles, Seattle and San Jose, **challenged** the FCC over these restrictions. The wireless industry states they will lose \$2 Billion, but the cities consider that it is instead a **giveaway** to industry. The Ninth Circuit Court was asked to review the rules and give an opinion. On November 6, 2018, these lawsuits were **consolidated** with several other lawsuits in the western States including Las Vegas and Portland, and through a lottery, sent to the 10<sup>th</sup> Circuit Court of Appeals.

Links from the previous paragraph:

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[https://www.washingtonpost.com/technology/2018/10/25/cities-are-challenging-fcc-with-court-fight-over-cell-sites/?utm\\_term=.d0c0413ff6c1](https://www.washingtonpost.com/technology/2018/10/25/cities-are-challenging-fcc-with-court-fight-over-cell-sites/?utm_term=.d0c0413ff6c1)

<https://arstechnica.com/tech-policy/2018/10/cities-will-sue-fcc-to-stop-2-billion-giveaway-to-wireless-carriers/>

[https://www.theregister.co.uk/2018/11/07/fcc\\_5g\\_lawsuits\\_bundled/](https://www.theregister.co.uk/2018/11/07/fcc_5g_lawsuits_bundled/)

### **10th Circuit Court of Appeals Transfers FCC Case to 9th Circuit**

On January 10, 2019 the Tenth Circuit Court of Appeals denied the motion to stay the FCC Declaratory Ruling FCC 18-133, stating that the cities did not demonstrate that they would suffer irreparable harm without the stay. The same day however, the Court granted a **transfer** of the cities petition against the FCC back to the Ninth Circuit Court of Appeals where it originated.

Windheim:

No answer.

## **#24 As 5G ramps up there will be apparently 20,000 small satellites (transmitting 5G). Any comments?**

Davis:

5G does not use satellites as far as I know. These are short range RF transmitter on small towers/poles/walls.

Russell:

I am very concerned about this Earth radiation with RF energy. This is poised to interfere with weather systems as well as all biological living organisms in an even more vast experiment than currently being done with 2G, 3G, and 4G wireless technology.

Windheim:

This is over my head.

**#25 I am scared for my children & future generations. Please don't bring this to Elk Grove. We are not guinea pigs. Prioritize our health, unlike the City of Sacramento. There'd be more opposition if only people knew about 5G. Thank you.**

Davis:

It would be a much better strategy to reduce gun ownership and install more crosswalks on the roads.

Russell:

Are you just being a worry wart? Here is an interesting perspective on the 5G rollout by Dr. Don Maisch. 'Are community concerns over the 5G network rollout based on unfounded anxiety or valid evidence?' Guest Blog from Dr. Don Maisch, Australia. Between a Rock and a Hard place. April 25, 2019.

<https://betweenrockandhardplace.wordpress.com/2019/04/25/guest-blog-from-dr-don-maisch-australia-are-community-concerns-over-the-5g-network-rollout-based-on-unfounded-anxiety-or-valid-evidence/>

Windheim:

No answer.

## Conclusion

Editor: This is the end of the document. Thank you for reading.

If you are an Elk Grove resident and want to have input on the City's soon to be adopted 4G and 5G cell antenna permitting policy please write to the City Council care of the City Clerk, Jason Lindgren, at [jlindgren@elkgrovecity.org](mailto:jlindgren@elkgrovecity.org)