
Quick Guide to Understanding the Small Cell Tower (4G & 5G) Rollout

Table of contents

	Slide #		Slide #
What is 5G?	3		
Proposed Rollout	4	Why Fiber Optic Cable is a	12
Why is This a Problem?	5	Better Option	
5G Health Hazards	6	Legal Options	13
Sample Health Studies	7	Three Additions for Ordinance	14
Why Communities Are		Appendices	15
Resisting 5G	8	A. Industry Playbook	16
Firefighters Exemption	9	B. 5G as a Marketing Tool	17
Gaps in Coverage and		C. Review of the Literature	18-24
Fire Safety	10	D. Contact	25
Assessing Gaps			
11			

Fact Sheet – What is 5G

What 5G is:

- 5G is a term used to describe the next generation of wireless cell technology
- 4G/5G Close Proximity Microwave Radiation Antennae (CPMRA), are small cell towers on telephone poles, PG&E poles and street lights **which transmit pulsed, data-modulated, Radio-frequency Electromagnetic Microwave Radiation (RF-EMR) 24/7** — and essentially function as cell towers. Radiation emitted from small cells is expected to typically travel from 10 feet up to 3,000 ft. Millions of small cells are to be installed in residential zones.
- 5G will add to — not replace — our current wireless technology. It will **not only utilize wireless frequencies already in use but also add in higher frequencies** — submillimeter and millimeter waves — in order to transmit data at superfast speeds.
- Designed to enable wireless transmission of HD TV and the internet of things (which few care about other than industry).

What 5G isn't:

- *Coverage* - 5G is unlikely to provide any more overall cellphone coverage than existing 3G/4G because it won't be worthwhile economically to cover every valley, canyon, or places with few houses.
- *Speed*: Fiber optic cable is 100x faster than 5G, while 5G is only 1-5x faster than 4G.
- *Fire safety*: Adding new equipment to already overloaded poles will increase risk of fire. Further, when a pole goes down in a fire or wind no wireless safety warnings will be possible but copper wired landlines would still work.
- *Proximity*: 5G antennas do not require line of sight to operate and have a range of 3,000 ft.
- *Cars and IOT*: 5G is not necessary for either IOT or autonomous cars.
- *Wi-Fi router*: Some people confuse the "5GHz" option on their phone with 5G. These are two separate technologies.

Proposed Rollout

- There will be many more towers and antennas than there are today for 3G/4G, installed in our neighborhoods, perhaps **every two to five poles**.
- The combined frequencies from 3G, 4G and 5G antennas will emit **powerful, high frequency, wireless radiation** in all directions, 24/7.
- With [24 existing towers](#) within 4 miles of Tam High today (2018), this would add hundreds of new towers/antennas throughout our neighborhoods.
- Are other towns facing this issue? Yes, these are a sampling of proposed 5G installations for [Napa](#), [Petaluma](#), [Palo Alto](#), [Oakland](#) and [Santa Cruz](#)
- Once a pole has one 5G Small Cell tower, we could potentially have the six or seven additional carriers each wanting their own pole, resulting in every pole used.

Why is This a Problem?

- **Health:** scientists worldwide are calling for a halt to the densified 4G and 5G antennas Roll-out: In 2017, over 180 scientists and doctors [issued a declaration](#) calling for a moratorium on the increase of 5G cell antennas citing human health effects and impacts to wildlife.

We recommend a moratorium on the roll-out of the fifth generation, 5G, for telecommunication until potential hazards for human health and the environment have been fully investigated by scientists independent from industry...RF-EMF has been proven to be harmful for humans and the environment.”

35 — 2017 5G Scientific Appeal (signed by more than 180 scientists and doctors from countries)

- **Consent:** residents will be **subjected to significant increases in wireless radiation** without their consent.
- **Community authority is overruled:** wireless companies are *attempting* to strip cities of their rights to make decisions about this new technology.
- **Decreased property values:** studies show property **values drop up to 20%** on homes near cell towers.

Health Hazards

- Wireless radiation is dangerous. . . **tens of thousands of scientific studies conclude a link between Radio-frequency Electromagnetic Microwave Radiation (RF-EMR) exposures and immediate cellular damage,** sperm damage, neurological damage, melatonin suppression, heart arrhythmias, blood abnormalities, oxidative stress DNA damage, mitochondrial damage and both heart (Schwannoma) and brain cancer (Glioblastoma)
- Small Cell Antennas . . . emit RF microwave radiation in variety of frequencies and wavelengths (600 MHz to 90,000 MHz, with wave lengths from 20 in. down to 0.1 in.). This mixture of frequencies/wavelengths will be far more potent than anything previously experienced from the Wireless industry This, coupled with the cumulative, round-the-clock exposure, intensifies the health effects. [Environmental Health Trust](#).
- Thousands of peer reviewed studies worldwide, including the National Institute of Health, show clear evidence of harm caused by wireless radiation exposure among **which include cancer, Parkinson's disease, Alzheimer's disease, heart failure, autism, ADHD, depression and a host of neurological disorders.**
- Links to detailed description and relevant links to studies in Appendix B.

A sample of studies:

- [Experts Find "Clear Evidence" of Cancer from Cell Phone Radiation in NTP Study, April 10, 2018](#)
- [Ramazzini Institute Cell Phone Radiation Study Replicates NTP Study - - March 22, 2018](#)
- [The BioInitiative Report: 2017](#) which offers a comprehensive overview of studies that give a rationale for biologically based exposure standards for low intensity electromagnetic radiation.
- Additional studies can be found in this [crowd-sourced spreadsheet](#).

September 2, 2018 CBS News Segment: **Why Communities Are Resisting 5G (double click on video to watch)**



Fire Fighters Exemption

- California fire fighters are exempt from having cell towers built on fire stations based on a study where 100% of the fire fighters showed abnormal brain scans.
 - [Firefighters Exempt Selves from Calif. Bill to Save Others](#)
 - Why? Because [Firefighters Living Next to Cell Towers Suffer Neurological Damage](#)
- The [IAFF opposes](#) “the use of fire stations as base stations for towers and/or antennas for the conduction of cell phone transmissions until a study with the highest scientific merit and integrity on health effects of exposure to low-intensity RF/MW radiation is conducted *and it is proven that such sitings are not hazardous to the health of our members.*”

5G “Gaps” in Coverage and Fire Safety

- 5G is being heralded as filling gaps in coverage and so helping fire safety. This is not necessarily true.
- **5G transmitters will go down if the power goes out** - unlike the small number of 3G/4G cell towers which have backup power supplies in the case of a power outage, the 5G transmitters will not have backup power supplies. This means that when the power goes out in a section of town due to a fire, **all of the 5G antennas in that section will go down as well.**
- **5G will not increase cell phone coverage**
 - Cell phone coverage is purely a function of economics. The reason 3-5% of towns has poor cell coverage is because it's not worth the cell phone companies while to put in another cell tower. If you can get 95% coverage with 2 towers, why would you put in another tower and increase your cost by 50% to capture at most another 5% of the market?
 - 5G antenna placement will be governed by the same economics. They will place antennas where they are economically viable, and not place them where they aren't. There will be plenty of people (3-5%?) who live at the end of a canyon, where it won't be economically viable to install an antenna.
- Overloading light poles and PG&E poles with additional equipment from multiple telecommunication companies **adds weight and electronics to the poles, which will increase fire risks** in an already high fire risk area.
- The effects on vegetation by **wireless radiation includes desiccation**, increasing fire hazard.

5G Assessing “Gaps” in Coverage

- **Significant Gap in Coverage:** On a Federal level, significant gap needs to be shown to permit cell towers. Citizens can take their own measurements if done in a valid manner. See [Santa Rosa Fights “Cell Tower Placement.”](#)
- The “need” for 5G is the cell phone companies strategy to create demand to recapture market share in the residential and public spaces from Comcast.

Why Fiber Optic Cable Is a Better Option

More than 750 towns in the US are [running their own fiber](#)

- **Fastest, most secure, most reliable and most energy-efficient way to deliver data** - many thousands of times more energy-efficient than streaming video data wirelessly through the air as Verizon Wireless, AT&T Mobility and others intend to do.
- AT&T and Verizon are already stringing fiber to every telephone pole in towns across the county, it's merely a matter of taking the fiber cable to the home ([Fiber to Premises, FTTP](#)). It would cost less than \$100 (estimate) to run the last 100' of fiber into each home, precluding the need to install any 5G antennas.
- **Municipal fiber would also improve fire safety**, as fiber can be powered from the head end, and [doesn't require repeaters](#) between the head end and the home, so that if power were lost during a fire, fiber to the home would continue to work.
- This could be done by our city/ Marin County, either publically, or in a public/private partnership with a company like Sonic.net, a local player and privacy advocate (unlike companies such as AT&T and Verizon who are not [privacy focused](#)).
- **We strive to be green city**, as such, fiber optic to the home delivers a much [greener broadband solution](#).

Do We Have Any Legal Options to Deny Small Cell Tower Installations? Yes!

- Requirements for specific set backs from homes
- No commercial/ industrial application of towers in a residential zone
- Historic preservation considerations
- Placement along a scenic road
- Aesthetic requirements
- Excessive Noise [Mini Cell Towers A Maxi Threat. Sept 2016](#)
- Exceeds county height limit
- Use the "least intrusive means" to close any alleged significant gap in coverage, which is to co-locate antennas on existing macro towers. (Telecom Act 1996)
- Decrease in property values [Greenwood Meadows NJ](#)
- Monitoring requirements for radio frequency radiation levels
- Placement of cellular communication equipment that is only currently commercially available and specifically not for planned or future equipment
- Placement of accessory equipment underground
- Requirements and limits on power density radiation levels that can be broadcast from the equipment.
- **Significant Gap in Coverage:** On a Federal level significant gap needs to be shown to permit cell towers. Citizens can take their own measurements if done in a valid manner. See [Santa Rosa Fights Cell Tower Placement.](#)

Three Additions Needed in September 6, 2018 Mill Valley Emergency Wireless Ordinance

1. We must actually protect residential zones – with **no loopholes for installing Wireless Telecommunications Facilities (WTFs) in public rights-of-way that are in residential zones.** Mill Valley can prohibit the installation of any WTF in residential zones, consistent with current existing Mill Valley Municipal code.

2. Establish Setbacks from WTFs to residences – for all zones, **adopt a setback of at least 200 feet** from any WTF to any residence.

3. Establish WTF Maximum Power Output Limit – **set an upper limit on the maximum power output for any WTF where people live, work, go to school, relax or recreate.** The recommendation is to ensure that any radios, antennas and other ancillary equipment have **no chance to transmit RF microwave radiation at levels higher than**

A. -75 dBm for any individual pair of frequencies (-75 dBm in industry standard for strong cell phone signal):

-75 dBm for upload and download for 600 MHz,

-75 dBm for upload and download for 700 MHz,

-75 dBm for upload and download for 850 MHz,

-75 dBm for upload and download for 1700 MHz,

-75 dBm for upload and download for 1900 MHz,

-75 dBm for upload and download for 2100 MHz,

and -75 dBm for upload and download for any future pair of upload and download frequencies

and

B. Power flux Density of no higher than 100 microWatts per square meter of peak RF microwave radiation for all frequencies from 30 MHz to 300,000 MHz.

Appendices

Appendix A: How 5G Took a Page From the Big Tobacco Playbook

“

The playbook's key insight is that an industry doesn't have to win the scientific argument about safety; it only has to keep the argument going. ”

- The Nation, [“How Big Wireless Made Us Think That Cell Phones Are Safe”](#): A Special Investigation
- The wireless industry is aware of the dangers and rather than try to convince us that wireless is safe, they are using “doubt” to confuse and perpetuate the debate. The [industry funded studies](#) are in marked contrast to independent studies which show strong evidence of harm.
- We can't ignore the fact that we've seen this play out before: **Tobacco, DDT, lead paint, Thalidomide, Agent Orange, and Dioxins**, are just some of the most well-known and egregious examples of proponents claiming there was no danger to human health.

Appendix B: 5G As a Marketing Tool

- AT&T and Verizon are keen to win back market share lost to Comcast in the wireless race to “own” the public and private space.
- Cell phone companies are creating a sense of “need” so they can compete with Comcast by bringing Small Cell Towers into our neighborhoods. [Related Article, Wireless Radiation Coming to a Lamppost Near You, December, 2017.](#)
- **Verizon’s own CEO and Engineer said in 2018 that 28,000 MHz and 39,000 MHz signal can go 2,000 to 3,000 feet** with 1,000 Mbps speeds even through foliage.
- [Related Articles: Environmental Health Trust Fact Sheet on 5G and Environmental Health Trust Research on 5G and Health](#)

Appendix C: A Quick Review of the Relevant Literature

- The following six slides provide a quick taste of the relevant literature for disease mechanisms which can be impacted by over exposure to high frequency radiation
 - Oxidative Stress
 - Sperm Health
 - Pregnancy and Embryos
 - Sleep Disturbance
 - Alzheimer's
- Additional studies can be found in this [crowd-sourced spreadsheet](#).

C.1 Oxidative Stress

- There are many studies which link cell phone frequencies to [oxidative stress](#)
- Why is this important?
- Because oxidative stress is thought to be involved in the development of [ADHD](#),^[2] [cancer](#),^[3] [Parkinson's disease](#),^[4] [Lafora disease](#),^[5] [Alzheimer's disease](#),^[6] [atherosclerosis](#),^[7] [heart failure](#),^[8] [myocardial infarction](#),^[9]^[10] [fragile X syndrome](#),^[11] [sickle-cell disease](#),^[12] [lichen planus](#),^[13] [vitiligo](#),^[14] [autism](#),^[15] [infection](#), [chronic fatigue syndrome](#),^[16] and [depression](#)^[17] and seems to be characteristic of individuals with [Asperger syndrome](#).^[18]

C.2 Oxidative Stress Studies

- Effects of electromagnetic fields exposure on the antioxidant defense system
 - Oxidative stress occurs if the antioxidant defense system is unable to prevent the harmful effects of free radicals. **Several studies have reported that exposure to EMF results in oxidative stress in many tissues of the body.** Exposure to EMF is known to increase free radical concentrations and traceability and can affect the radical couple recombination. The purpose of this review was to highlight the impact of oxidative stress on antioxidant systems.
- Rats exposed to 2.45 GHz of non-ionizing radiation exhibit behavioral changes with increased brain expression of apoptotic caspase 3
 - The present study evaluated the impact of 2.45 GHz radiation exposure for 4h/day for 45 days on behavioral and oxidative stress parameters in female Sprague Dawley rats. Behavioral tests of anxiety, learning and memory were started from day 38. Oxidative stress parameters were estimated in brain homogenates after sacrificing the rats on day 45. In morris water maze, elevated plus maze and light dark box test, **the 2.45 GHz radiation exposed rats elicited memory decline and anxiety behavior.**

C.3 Impact on Sperm Health

- Electromagnetic radiation at 900 MHz induces sperm apoptosis through bcl-2, bax and caspase-3 signaling pathways in rats
 - RF-EMR increases the ROS level and decreases TAC in rat sperm. **Excessive oxidative stress alters the expression levels of apoptosis-related genes and triggers sperm apoptosis** through bcl-2, bax, cytochrome c and caspase-3 signaling pathways.
- What is adverse effect of Wireless Local Area Network, using 2.45 GHz, on the reproductive system?
 - It may be concluded that **low level EMF at 2.45 GHz increases inflammation and testicular damage and negative impact on male reproductive system function.**

C.4 Impact on Pregnancy/Embryos

- Exposure to Magnetic Field Non-Ionizing Radiation and the Risk of Miscarriage: A Prospective Cohort Study
 - This prospective cohort study of 913 pregnant women examined the association between high MF exposure and miscarriage risk. Cox (proportional hazards) regression was used to examine the association. After controlling for multiple other factors, **women who were exposed to higher MF levels had 2.72 times the risk of miscarriage** (hazard ratio = 2.72, 95% CI: 1.42–5.19) than those with lower MF exposure.
- Effect of 2G and 3G cell phone radiation on developing liver of chick embryo – A comparative study
 - **The chronic exposure of chick embryo liver to RFR emitted from 2G and 3G cell phone resulted in various structural changes and DNA damage.** The changes were more pronounced in 3G experimental group. Based on these findings it is necessary to create awareness among public about the possible ill effects of RFR exposure from cell phone.

C.5 Impact on Sleep

- [The Effects of 884 MHz GSM Wireless Communication Signals on Self-reported Symptoms and Sleep — An Experimental Provocation Study](#)
 - The study indicates that **during laboratory exposure to 884 MHz wireless signals, components of sleep, believed to be important for recovery from daily wear and tear, are adversely affected.** Moreover, participants that otherwise have no self-reported symptoms related to mobile phone use, appear to have more headaches during actual radio frequency exposure as compared to sham exposure.
- [Occupational Electromagnetic Field Exposures Associated with Sleep Quality: A Cross-Sectional Study](#)
 - Subjects with **long daily exposure time had a significantly higher risk of poor sleep quality** in comparison to those with short daily exposure time

C.6 Alzheimer's / Dementia

There is no viable research yet on Alzheimer's and high frequency waves, as it would require a very long term (30+ years). This study describes mechanisms for how EMF-RF exposure might contribute to Alzheimer's.

- [Searching for the Perfect Wave: The Effect of Radiofrequency Electromagnetic Fields on Cells](#)
 - One of the most frequent findings of in vitro models after EMF-RF exposure is the increase of oxidative stress-related events that lead to cell damage. **This event is causally related to neurodegeneration that underlie severe pathologies such as Alzheimer's disease or Parkinson's.**
 - (Also: search for the word "Alzheimer" in the text of this article)

Contact

Please direct questions, comments and concerns crowdsource5gdocs@gmail.com

THANK YOU!