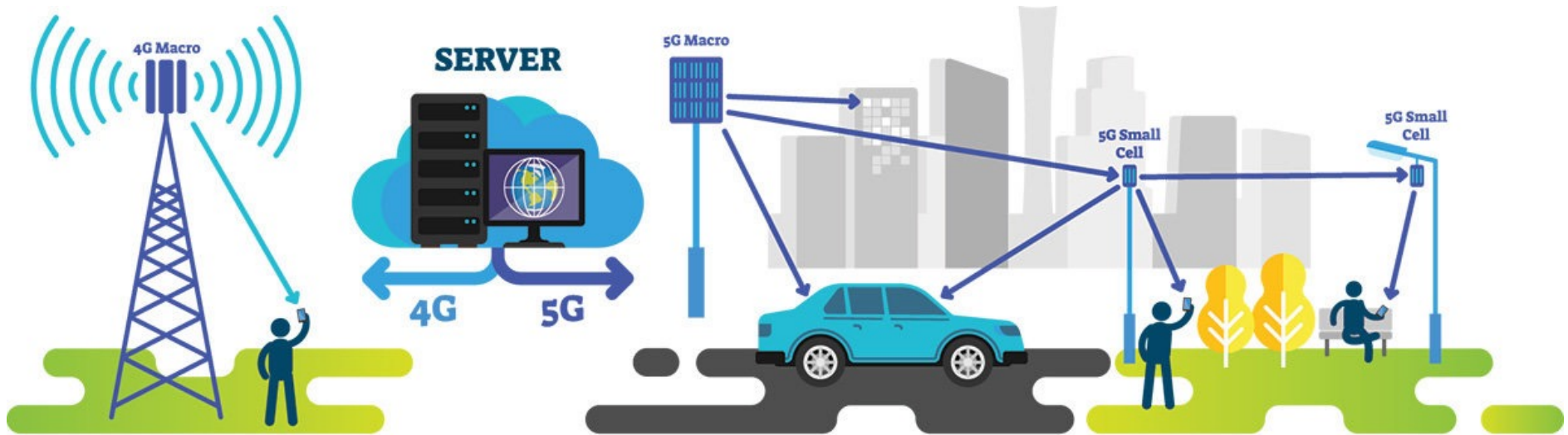


Small Cell Technology



4G

- SMS
- Internet
- Video
- Speed: 1Gb/Second
- Latency: 10 ms
- 1000 connections/Km²

VS

5G

- SMS
- Internet
- HD, 3D, Ultra video
- Vehicles, Home Appliances
- Speed: 20Gb/Second
- Latency: <1 ms
- 1 million connections/Km²

5G Network

Small Cell Technology



WHAT is small cell?



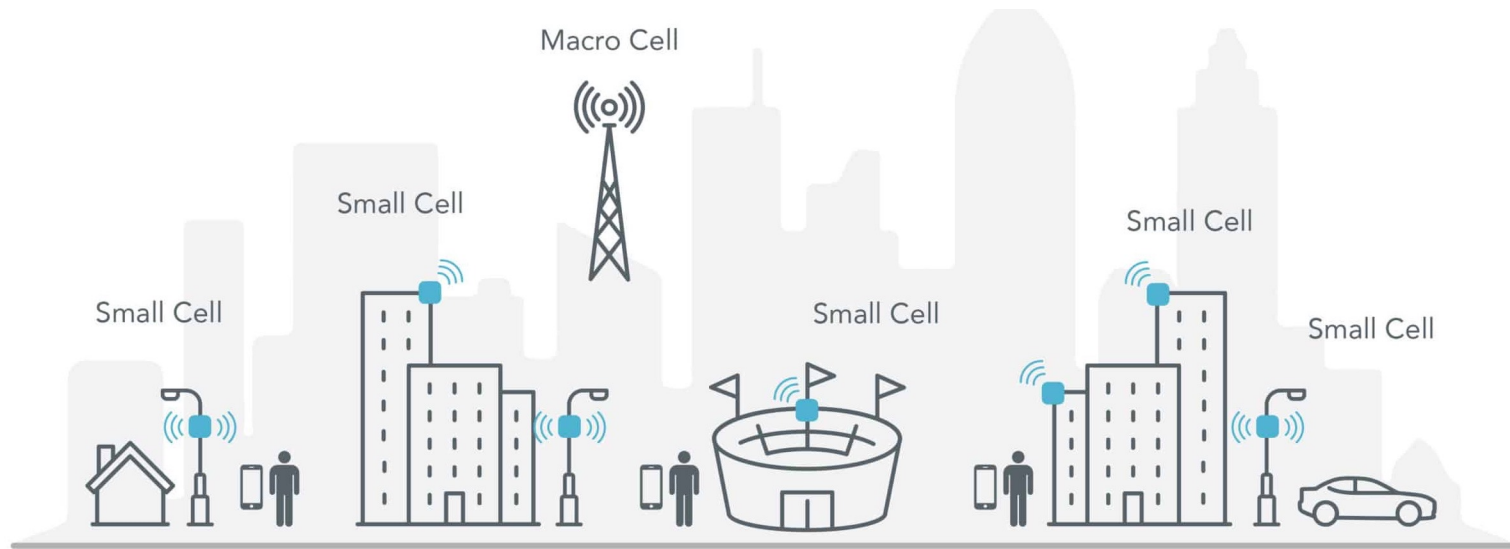
WHERE will the nodes be located?



WHY is small cell necessary in my area?



Is it **SAFE**?



What is Small Cell?

“Small cell” is a term used to describe a miniature radio access point or wireless network base station with a low radio frequency (RF) power output, footprint and range.



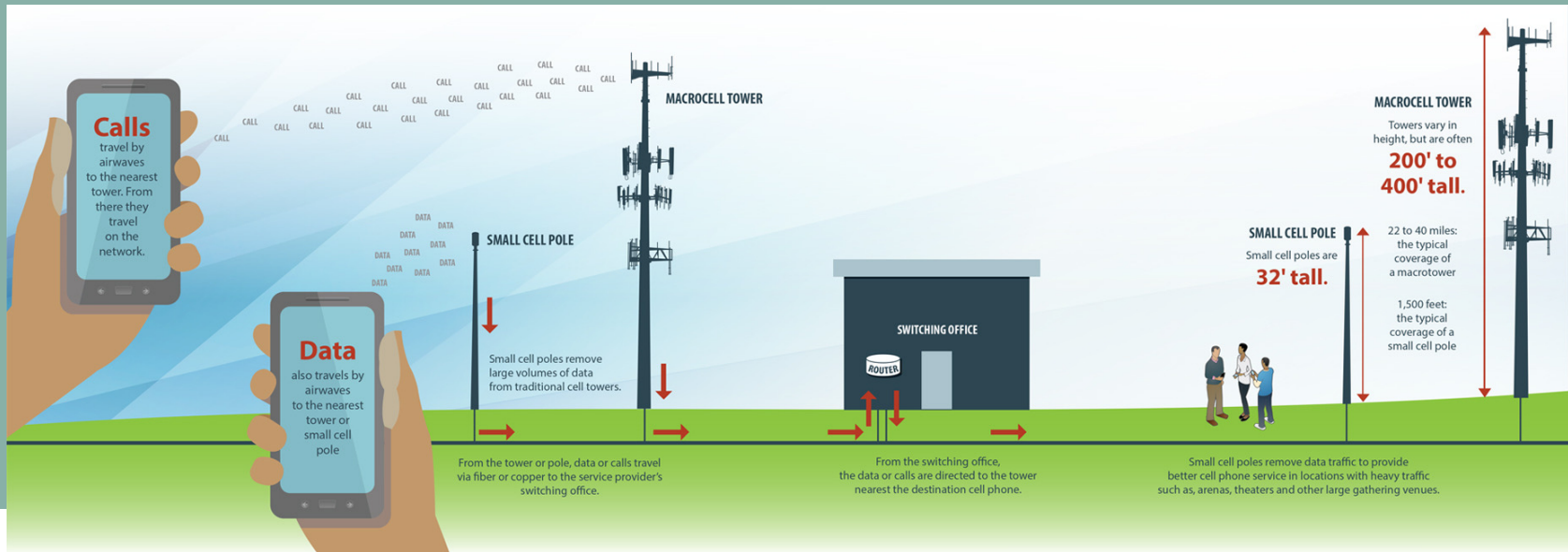
What is Small Cell?

A small cell network is a series of low-powered antennas (nodes) that enhance coverage and capacity.

Small cell networks are connected by underground fiber optic cable but placed in the right-of-way so that they are closer to the devices they support.



Old vs. New



OLD: Macrocell towers provided wireless voice and data coverage to an entire area. Generally, 200'-400' tall and provides service to all users within 22-40 miles.

NEW: Small cell poles remove data traffic from macrocell towers. Generally 32'-35' tall and provides service to all users within 300-500 feet.

Coverage, Capacity & Wireless Density

Coverage is the area that a particular type of communications infrastructure covers. In other words, it's how far the signal reaches.

--- A tower is able to send its signal across the entire town. There are a few areas with hills and tall buildings, which can cause the signal to drop in some cases. But the overall coverage hasn't changed.

Capacity is the space available for devices to access and connect to a network and transmit data.

--- Have you ever been at a concert or sporting event and had full bars on your device, but can't place a call or load a web page? If so, you had coverage – you were connected – but did not have capacity – your data could not get through.

Wireless density is the number of “slots” on the network that are available to carry data.

--- The more data people use on a public or private network, the slower everyone's connections become. To solve this problem, more wireless density, aka space, has to be added to the network.

Increased Capacity

A small cell network consists of a series of small low-powered antennas – called nodes – that provide coverage and capacity in a similar way to a tower, with a few distinctions.

Small cells are always connected by fiber optic cable, and are usually attached to infrastructure in the public right-of-way, i.e. utility poles or streetlights, with the goal of making them more discreet, while also bringing them closer to smartphones and other devices.

Similar to a tower, small cell nodes communicate wirelessly over radio waves, and then send the signals to the internet or phone system.

Small cells are connected with fiber so they are able to handle massive amounts of data at fast speeds.

Internet of Things

Small cell nodes increase capacity to power the “Internet of Things” – the network of physical objects (“things”) that are embedded with sensors, software and other technology that require public access to connect and exchange data with other devices/systems.

Vehicles



Communications



Cellular



Devices







Internet of Things

There are approximately **10 BILLION** connected “Internet of Things” devices today.

Experts expect this number to grow to **22 BILLION** by 2025.

Wireless vs. Fiber

Wireless Broadband

Allows for wireless connectivity using radio waves to send/receive data. Small cell networks enhance the capacity for wireless devices to connect and transmit data.

Fiber Optic

Connectivity dependent on being “plugged-in” to send/receive data; utilizes a router.

Small cell networks are connected by underground fiber optic cable but placed in the right-of-way so that they are closer to the devices they support.

Fiber connections allow small cells to handle massive amounts of data at fast speeds without being blocked by structures or dropped in low-lying areas.

Poles

How is placement determined?

The approximate range of a small cell pole tower is a 300-500' radius.

Therefore, to maximize capacity, poles are placed within a few blocks of one another, in the right-of-way and at ground level – closer to the devices they are serving.



Poles

Where will the poles be located in my neighborhood?



Poles

Where will the poles be located in my neighborhood?



Poles

What type of pole will be in my neighborhood?

There are two pole options: treated wood or metal.

Poles are selected to match the existing aesthetics of each individual neighborhood/community.

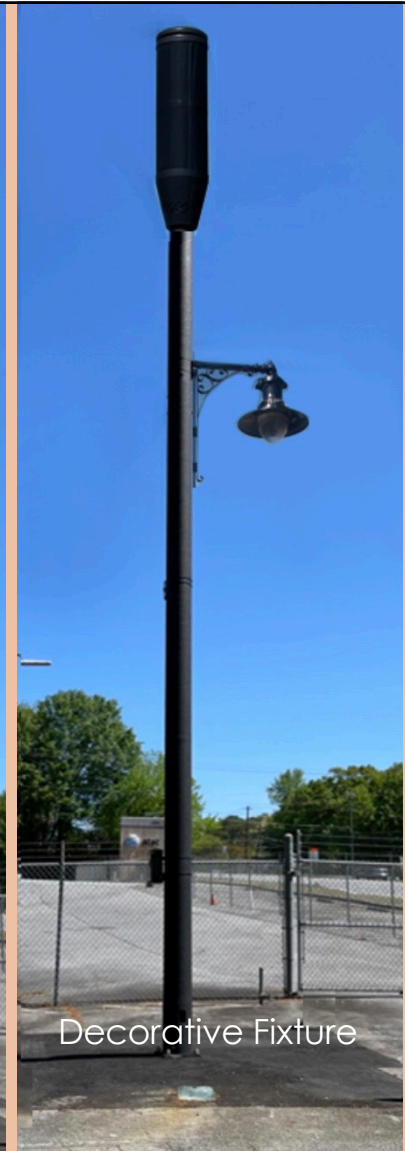


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Poles

Will my neighborhood become a “pole farm”?

No. Small cell networks are designed such that multiple carriers will “tap into” the technology. This allows the benefits to be spread to all users, regardless of your service carrier.

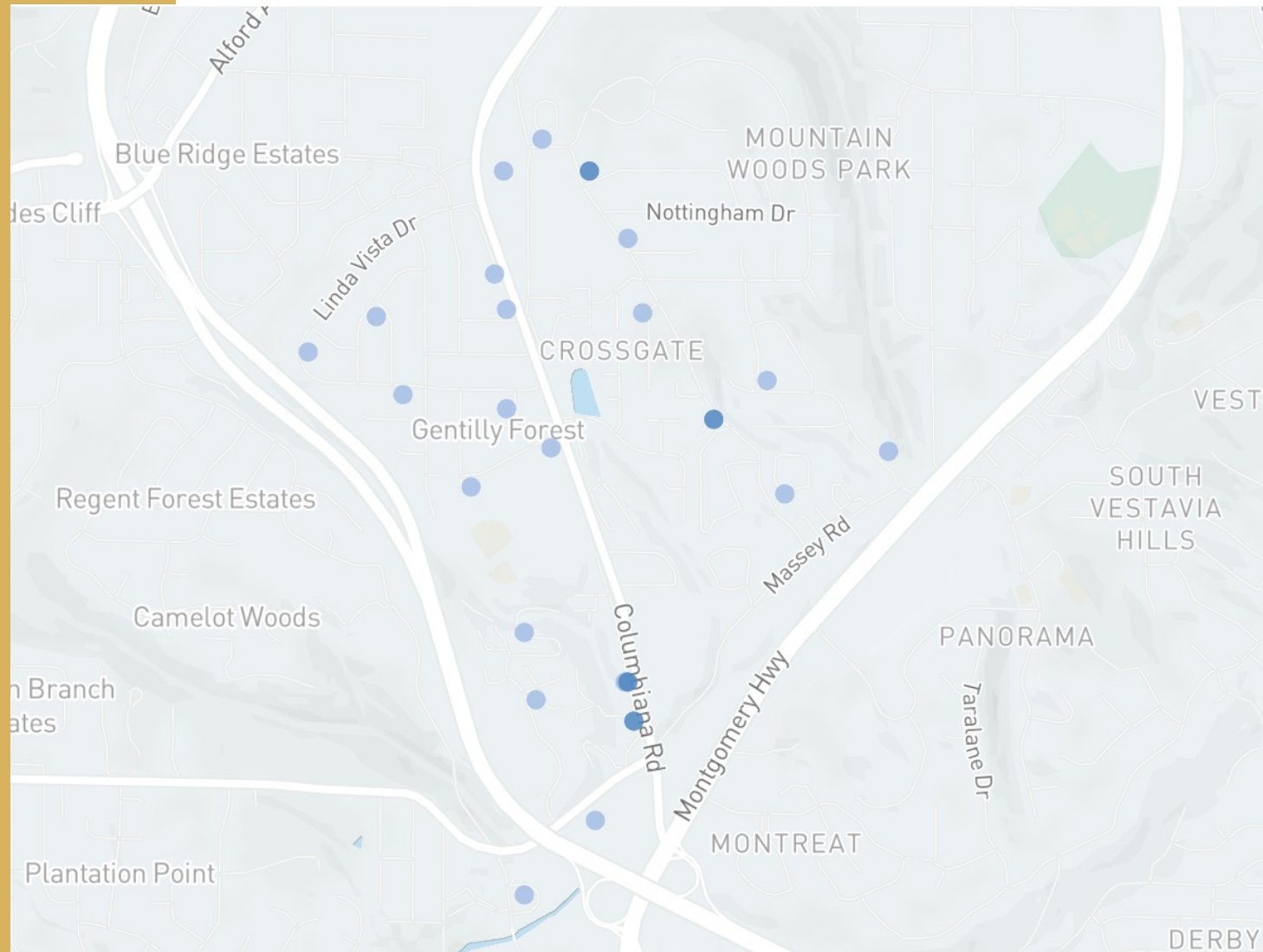
Future carriers can and will be required to work with an existing network provider.



Poles

Are there other installations in Vestavia Hills? If so, where?

Yes. Installation locations are available online at <https://bit.ly/vh-small-cell>.



Safety

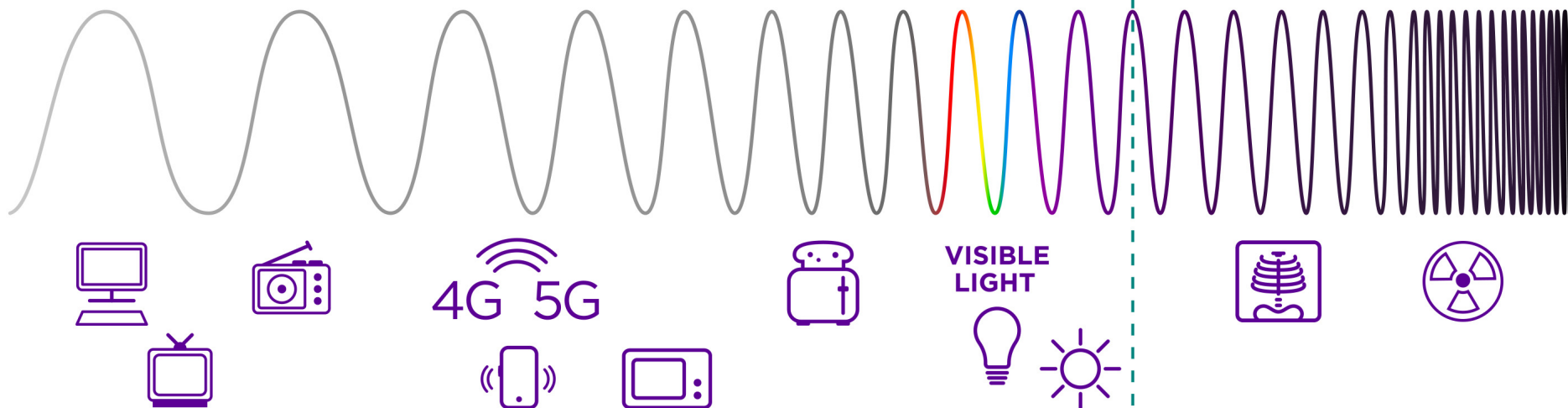
The consensus of nearly seven decades of research by many of the top scientific and health communities, including the FDA, is that electromagnetic emissions at the levels allowed by FCC regulations are safe.

For more information, visit
<https://www.crowncastle.com/pdfs/understanding-the-safety-of-5g.pdf> and/or
<https://www.fcc.gov/general/radio-frequency-safety-0>.

Where 5G fits on the electromagnetic spectrum.

Long Wavelengths
Low Energy
Low Frequency

Short Wavelengths
High Energy
High Frequency



NON-IONIZING SPECTRUM

These wavelengths do not have enough energy to break DNA bonds and are considered safe.

5G, like 4G, is well within the non-ionizing zone.

IONIZING SPECTRUM

These wavelengths have more energy and can damage cells. You should limit your exposure.

5G builds on 4G.

5G is the next generation of wireless technology, but it works pretty much the same as current 4G networks. To expand 5G throughout the country, carriers are working hard to expand small cells and fiber. The good news is that over **154,000 small cells are already deployed**¹ throughout the US—powering many of the 4G and LTE networks in use today.

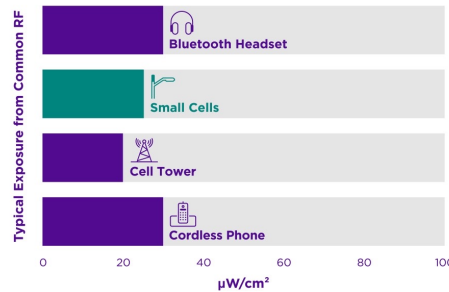


Small cells are low-powered, fiber-connected nodes that are usually located on existing structures like streetlights and utility poles.

[Read More →](#)

Low power minimizes exposure.

We're constantly surrounded by electromagnetic energy. Whether you're talking about 5G, 4G or your Bluetooth headset, the physics are the same, and the body's response is essentially identical. You can see in this chart how emission levels from small cells compare to other common radio frequencies (RF)—all many times below what the FCC considers safe.



Source: © 2018 Andrew H. Thatcher, Board Certified Health Physicist.

The research is clear.

The consensus of nearly seven decades of research by many of the top scientific and health communities, including the FDA, is that electromagnetic emissions at the levels allowed by FCC regulations are safe.

We encourage you to take a deeper dive if you'd like to know more.

The 5G Health Hazard That Isn't.

The *New York Times* shows how misinformation about wireless technologies has spread. [Read More →](#)

5G and Your Health.

A scientist who sets global guidelines for 5G explains how we know it's safe. [Read More →](#)

Key takeaways.

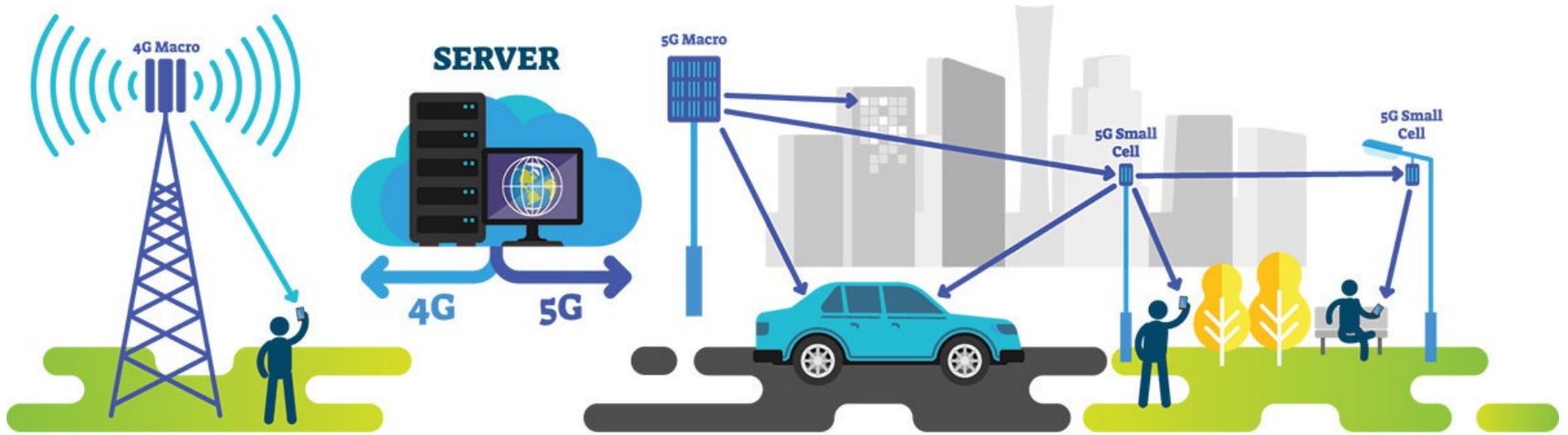
- 1 Studies show that cellular signals—including 5G—are safe.
- 2 5G is the next generation of cellular networks and builds on 4G.
- 3 5G emissions are similar to those from everyday technologies like TV, radio, wi-fi—even your toaster.

“The light produced by a light bulb is a form of electromagnetic radiation with energy and frequency that is approximately 17,000 greater than that of the highest frequencies used by 5G.”

Dr. Jerrold Bushberg,
Vice Chair of COMAR and Clinical Professor,
Radiology & Radiation Oncology, University
of California, Davis School of Medicine

¹<https://www.ctia.org/infrastructure-channel>

Questions?



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