

# **Create Healthy Homes**

## **Environmental Design and Inspection Services**

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### **Update of Oram Miller's 5G Article**

August 17, 2020

As we continue our efforts to slow the spread of 5G in our communities and in the skies above us, it is important to stay informed about the details of just what 5G entails and how it relates to existing 4G LTE technology. You have heard me mention in interviews and in my 5G article on my website that we may not have the full picture within the larger EMF safety community of what 5G really is.

It may therefore be useful for us to refine our understanding of how 5G works and consider using proper terms if our understanding is not quite correct, which I believe it is not. In my opinion, doing so would clear up misunderstandings within our community and have the added benefit of helping engineers and researchers outside of our community to better accept our point of view. I think we do ourselves a disservice when we appear to not know the true facts about the workings of 5G.

One resource that has helped me to really understand what is going on in the 5G industry is the writings of Doug Dawson, President of CCG Consulting (<http://www.ccgcomm.com/> ). Doug is a cellular industry watchdog who is a consultant for telecommunications carriers. He is a member of the "Fiber-To-The-Home Top 100" list of leaders, advising clients on how to bring fiber communication networks to homes, which we also support.

Doug writes a daily blog on the state of telecommunications in the U.S., "POTs and PANs, Broadband for All", found at <https://potsandpansbyccg.com> . I encourage you to sign up to receive his daily posts. Doug is a straight shooter who has been commenting upon the evolution of the cellular industry, particularly as it moves from 4G to 5G.

Doug is not a fan of how 5G is being rolled out and marketed, claiming that the business model for 5G is faltering and that investors are getting nervous that the use cases

touted a couple of years ago by industry are not materializing. Doug said in June 2020 that the cell industry had stopped growing over the preceding two years. (<https://potsandpansbyccg.com/2020/06/01/the-quiet-growth-of-the-quad-play/> ) In December 2019, he wrote, "The reality is that the big cellular companies are struggling to find a business case for 5G. They are starting to realize that a lot of people aren't willing to pay more for faster cellular data." (<https://potsandpansbyccg.com/2019/12/27/the-governments-role-in-5g/> ) In May 2020, Doug wrote, "They still have not built a business case for 5G that justifies the cost of deploying dense networks of small cells." (<https://potsandpansbyccg.com/2020/05/21/finding-a-business-case-for-5g/> )

Furthermore, Doug wrote in May 2020, "There is no business case for spending the money for dense fiber-fed networks since cellphones are not designed for big bandwidth applications...The FCC has approved new WiFi spectrum that when coupled with WiFi 6 technology promises a magnitude improvement in WiFi performance. Once people start using the new WiFi there is going to be little interest in paying a monthly subscription for something that can be done well with off-the-shelf routers." (<https://potsandpansbyccg.com/2020/05/21/finding-a-business-case-for-5g/> )

Doug points out many facts that can help us to more fully understand how this technology works and what we are truly dealing with at each step in the unfoldment in the technology. The benefit of that, in my opinion, is to have a clearer understanding of what we are really being exposed to in the deployment of this technology and how we can better shield ourselves from its effects.

Doug says that in reality, it takes a full decade for the cellular industry to fully implement all the features agreed to in its forums. He says it was not until 2018 that the first cell tower became operational that contained all the features of 4G LTE. Cell carriers had been implementing 4G features into their antennas and phones throughout the 2010s, but none of the antennas and phones fully adopted all 4G features until we began the decade of 5G in 2018.

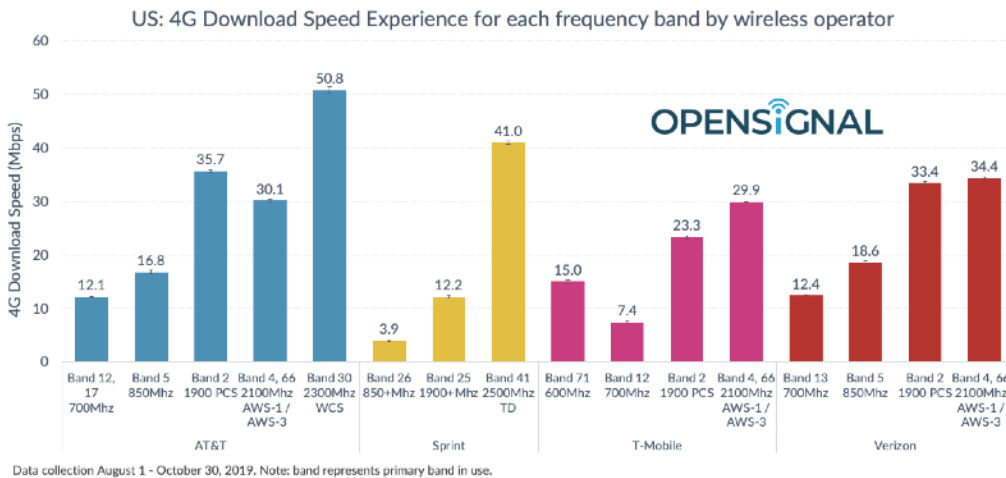
Doug says we are now two years into the era of 5G, and all four cell carriers in the U.S. are touting faster service using 5G, when in fact, no cell antenna or cell phone has any of the 13 features agreed to by the cell industry for true 5G service as defined by the 3rd Global Partnership Project (3GPP), a worldwide forum of cellular carriers. Only AT&T and Verizon are beta testing the first true 5G feature that is to be incorporated into phones, called Dynamic Spectrum Sharing, or DSS, in certain test sites (Northern Texas for AT&T and Minnesota for Verizon). Doug wrote in May 2019, "It might be a decade until we see a full 5G cellular installation. There are 13 major specifications for improvements between 4G and 5G and those will get implemented over the next decade." (<https://potsandpansbyccg.com/2019/05/31/prototyping-5g/> )

What do we have instead? Doug says that industry is misusing the 5G moniker when in fact they should be calling it 4.1 G. Current data speeds are only marginally faster than 4G in the vast majority of places. What we have, according to Doug, is somewhat faster 4G LTE service, deployed in new spectrum bands and being called, "5G". He wrote in

April 2020, "To date, each of the major carriers is in the process of implementing new spectrum bands they are labeling as 5G – but the technology being delivered is still 4G that happens to use different spectrum bands. The carriers are at least a few years away from deploying any features that can be said to be 5G, such as frequency slicing or dynamic spectrum sharing." (<https://potsandpansbyccg.com/2020/04/30/5g-integrated-access-and-backhaul/> )

In April 2020, Doug wrote, "To date, each of the major carriers is in the process of implementing new spectrum bands they are labeling as 5G – but the technology being delivered is still 4G that happens to use different spectrum bands." (<https://potsandpansbyccg.com/2020/04/30/5g-integrated-access-and-backhaul/> ) In February 2020, he wrote, "Most of what is being called 5G is the introduction of new bands of spectrum. New spectrum does not equal 5G – the 5G experience only comes with 5G features. Existing cellphones cannot receive the new spectrum bands, and so the carriers are selling new phones that can receive the new spectrum and labeling that as 5G." (<https://potsandpansbyccg.com/2020/02/05/the-5g-experience-in-2020/> )

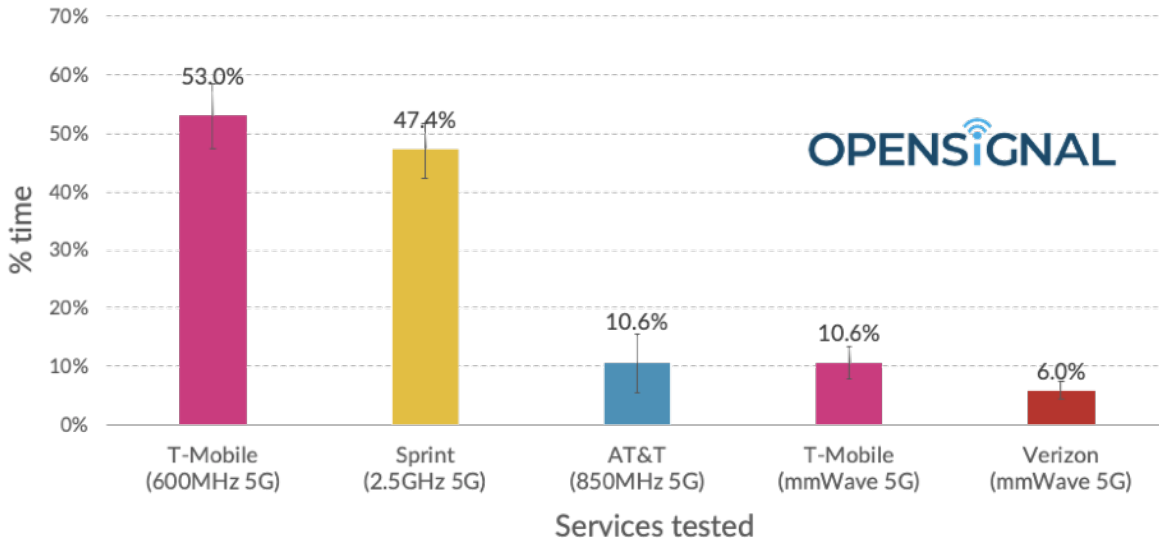
According to OpenLink, average 4G data speeds in the U.S. have hovered between 3 and 50 Megabits per second, or Mbps, during the past decade. (<https://www.opensignal.com/2019/12/06/why-us-carriers-have-an-insatiable-appetite-for-new-spectrum> ) See the chart below. The faster the 4G frequency, the faster the download speed. These are the speeds we are used to for our cell phone data transmission of streaming audio, streaming video and our apps.



According to testing conducted in December 2019 through January 2020, however, when we should be seeing blazing fast data download speeds from new "5G" service, speeds have only averaged 47 to 59 Mbps for T-Mobile and AT&T's low band "5G" service (called "5GE" by AT&T), respectively, and customers could find that service just over half the time (53%). Sprint's mid band "5G" service was somewhat faster at 183 Mbps and customers could find it 47% of the time. Verizon's 5G service in the mmWave band does deliver faster 722 Mbps download speeds, but that service could only be

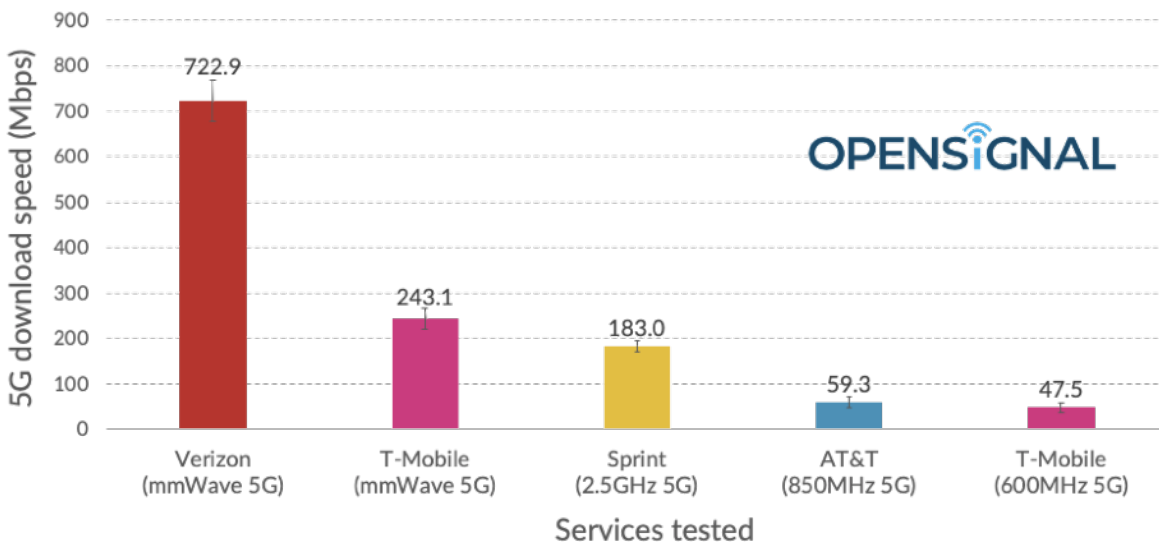
found 6% of the time and it is only available outdoors on a few downtown city streets. (<https://www.opensignal.com/2020/02/20/how-att-sprint-t-mobile-and-verizon-differ-in-their-early-5g-approach> ) See the charts below. Cisco predicts that average download speeds in the U.S. will only increase to around 70 Mbps overall by the year 2026. (<https://potsandpansbyccg.com/2020/05/04/the-evolution-of-5g/> )

### Time on 5G in U.S. testing



Source: Opensignal 5G tests in U.S. city downtown areas, December 2019 - January 2020.

### Average 5G download speed in U.S. testing



Source: Opensignal 5G tests in U.S. city downtown areas, December 2019 - January 2020.

Some of the 13 5G features that Doug points out that are still in development in labs are:

- DSS (Dynamic Spectrum Sharing), which will connect cell phones to 4G LTE or 5G in a single data path
- Frequency slicing, where cell antennas will assign bandwidth based upon user's needs
- Ultra-low latency, providing almost instant transmission times between cell phone to server and back to cell phone, giving more "real time" experiences
- Integrated Access and Backhaul, where small cell antennas will simultaneously connect to phones and to other nearby small cell antennas
- Cell phones connecting to multiple cell sites simultaneously
- Carriers fully switched over to Standalone (SA) 5G technology, rather than the Non-Standalone (NSA) technology they currently use

None of these features are in any phones yet (except for the beta testing mentioned with DSS). These features are, however, expected to be deployed in the coming years until they are fully deployed by 2028 or so, when we will be talking about launching 6G. Doug says that as each feature is introduced, you will need to buy a new phone to make use of it. That means that existing phones that you just bought a year or two ago will become obsolete as each new feature is introduced.

Doug wrote in January 2020, "Most of the 5G features that will make 5G special are still three years or more into the future. For now, the carriers are selling 5G phones that don't include 5G features. The carriers are instead placing the supposed 5G customers into new spectrum bands to give them a good data experience. Over time, as 5G features are introduced, 5G should have better performance than 4G. What the carriers are not telling the public, though, is that the majority of cellular connections made for the next decade are going to be 4G.

"5G will be introduced in fits and starts. Carriers will release a 5G feature, but when first introduced almost no handsets will be able to use it. The first customers with phones enabled for a given feature will have a great experience. Over time, as more people use the new 5G features, the higher traffic volumes will lower the performance seen by the early adapters. We're going to go through this cycle over and over until a decade from now the handsets sold will include the full set of 5G features. The uneven performance for 5G will baffle customers when they don't get the same features and experience as others that own slightly newer phones." (<https://potsandpansbyccg.com/2020/01/10/dynamic-spectrum-sharing/> )

What Doug indicates the cell industry is primarily doing right now is three things: "introduce small cells, introduce new spectrum, and finally introduce 5G features". (<https://potsandpansbyccg.com/2020/05/21/finding-a-business-case-for-5g/> ) The reason is an explosion of data usage in the U.S. of 36% per year in recent years, according to Cisco, with a doubling of data usage every two years in certain U.S. urban areas. Cell carriers cannot keep up with the demand for data bandwidth, and downloads

and streaming are slowing in many areas. (<https://potsandpansbyccg.com/2020/05/04/the-evolution-of-5g/> )

To deal with this immediate bottleneck, cell carriers are trying to offload cellular service from their network of 300,000 existing macro 4G LTE cell antennas at traditional cell sites. These are spaced 1 to 1.5 miles apart and send out signals at up to 1,000 Watts of Effective Radiated Power, or ERP. Besides having cellular data service offloaded to WiFi in people's homes, the principle strategy is to install small cell antennas in residential and urban neighborhoods between existing macro antenna cell sites. Doug says, "The main goal of first-generation 5G is to increase network capacity to handle that growth." (<https://potsandpansbyccg.com/2020/05/04/the-evolution-of-5g/> )

These small cell antennas use 4G LTE, as I have reported for the past two years, even though the industry is calling some of them "5G". That is what activists are finding when they review permits for small cell sites at city halls submitted by vendors on behalf of cell carriers. They are permitted as 4G antennas, not 5G. However, this new equipment has the capability to be upgraded to 5G service with software upgrades when new features are introduced into cell phones and more of these phones with true 5G features are in circulation, which is planned for later this decade.

Thus, true 5G service won't exist in the U.S. for 2-3 more years, at the earliest. We must ask, what does this knowledge mean to us in the EMF safety community? Here are my thoughts.

First, after following the deployment of this technology over the past two years, whatever it is called, attending 5G industry trade shows, reading 5G literature and websites, and talking with activists, I realize that what is being introduced into most neighborhoods right now is 4G, not true 5G. Doug Dawson is corroborating that. 5G features will come, but the industry is misusing that term right now. These are truly 4G antennas with only slightly faster speeds in most areas. These antennas are broadcasting in the same 4G frequencies we have been using for two or more decades, as well as in new spectrum bands that industry is mislabeling as "5G". As Doug pointed out above, since existing phones can't pick up signals in these new spectrum bands, customers are being sold new phones with what is being incorrectly called, "5G".

I therefore suggest that we be more correct in our terminology and at least call these new antennas "4G/5G", or better yet, use the term "small cell antenna" and leave any use of the letter "G" for generation out of the description. Rather than calling them "5G", I suggest we say, we don't want RF-transmitting small cell antennas in residential neighborhoods. Call them "4G/5G" if you must use the letter "G".

This also means we should realize that the dreaded beam-formed 5G transmitters that we fear will be put up in our suburban neighborhoods right in front of our homes blasting microwave signals into our bedrooms are actually only located close to urban centers, and they only transmit when a cell phone with millimeterWave 5G capability calls for a signal. That only happens when someone with a mmWave 5G-enabled phone is walking

or standing outdoors. MmWave 5G signals simply do not penetrate into buildings well, as I have written in my 5G article for some time. See coverage maps for the various cell carriers to see where the mmWave so-called "5G" antennas truly are, which is only near downtowns of certain cities. Go to coverage maps on the websites for Verizon, T-Mobile and AT&T (the three companies that have service in the mmWave band) to see if mmWave so-called "5G" antennas are anywhere near you. You will find they are only near downtown areas of certain cities. Go to [https://createhealthyhomes.com/five\\_g.php#5](https://createhealthyhomes.com/five_g.php#5) and then click on the websites for the various companies to find your city (if your city is even on the list). You will be surprised at how little mmWave 5G there truly is. Doug does not expect there will be much more of that particular deployment, certainly not into suburban or rural areas.

Doug wrote in June 2020, that he had recently seen a survey asking if the reader was satisfied with their 5G service. Doug wrote, "Question 6 was: 'A 5G connection is more reliable and reportedly 100 times faster than 4G.' There is nobody in the industry who thinks that 5G is going to be this fast for most people within 2 years, and perhaps not even within 10 years, or possibly ever. The cellular companies might never invest in the fiber needed to put a small cell site every 1,000 feet in city neighborhoods, suburbs, or anywhere rural.

"A more honest question would have been: The cellular carriers have introduced millimeter wave spectrum in small sections of big city downtowns. This technology is as much as 50 times faster than 4G cellular. It requires a user to buy an expensive new phone and it only works outdoors within perhaps 500 feet of a cell site. Do you think you would pay extra for a phone and a monthly fee to use this technology if it comes to the neighborhood where you live or work?" (<https://potsandpansbyccg.com/2020/06/11/9403/> )

In May 2020, Doug also wrote, "What the Chairman (of the FCC) and the carriers are never going to say out loud is that 5G is an urban technology. All of the coolest features of 5G only work when cell sites are close together." (<https://potsandpansbyccg.com/2020/05/13/the-proposed-5g-fund/> )

Doug also wrote in January 2020, "The big carriers are all deploying 5G hot spots with millimeter wave technology in dense urban centers. This technology broadcasts super-fast broadband for up to 1,000 feet. The spectrum is also super-squirrely in that it doesn't pass through anything, even a pane of glass. Try as I might, I can't find a profitable application for this technology in suburbs, let alone rural places." (<https://potsandpansbyccg.com/2020/01/27/5g-and-rural-america/> )

Finally, in February 2020, Doug wrote, "What about millimeter wave spectrum – is that 5G? No, it's just another new frequency band. The characteristics of millimeter wave spectrum are so different from traditional cellular frequencies that it's even hard to call this a cellular frequency. The frequency is 10-30 times faster than traditional cellular frequency. It only travels short distances, mostly under 1,000 feet from a cell site. It needs line-of-sight and can be easily blocked by any impediment in the environment. It's

not going to pass from outdoor transmitters into buildings. It's easier to understand millimeter wave spectrum if you think of it as a broadband hotspot that is mounted outside, and which can be received by special phones designed to use the frequency." (<https://potsandpansbyccg.com/2020/02/05/the-5g-experience-in-2020/> )

So, if mmWave "5G" antennas, which are beam-formed, are mostly deployed in downtown areas of certain cities, what are we seeing in front of our homes in residential neighborhoods throughout the country? These are new, always-on 4G small cell antennas that may send out 10 to 100 Watts or so, less than the 1,000 Watt power of existing 4G macro cell sites placed 1-1.5 miles apart, but the RF signal from these small cell antennas is much stronger to us because the antenna is so much closer to our homes. These small cell antennas and other localized antennas are the true danger that we face.

We need to continue to push for hardwired connections, both in neighborhoods to homes, and within homes. In August 2020, Doug wrote, "The vast majority of data traffic is still carried over wires and the gulf between the data carried by each technology is widening every year...In 2020, only a little more than 4% of all of the data traffic in North America is carried wirelessly. For wireless technology to be a pure substitute for wireline data, wireless networks would have to be capable of carrying a much bigger share of data – many times what they carry today. The laws of physics argue against that, particularly since landline data usage is growing at an exponential rate. It's hard to envision wireless networks in our lifetime that can handle the same volumes of data as fiber-based landline networks." (<https://potsandpansbyccg.com/2020/08/05/is-the-line-between-wireless-and-wireline-blurring/> )

In July 2020, Doug wrote, "Cellular networks today carry less than 5% of all US broadband. Even the majority of data passed through cellphones is handed off to landline networks through WiFi. In North America this year, Cisco predicts that in 2020 there will be 77 exabytes per month carried by landline networks compared to 3.4 exabytes carried by cellular networks. By 2022 that will grow to 109 exabytes for landline networks and 6 exabytes for cellular networks – the gap between the two technologies is rapidly widening. There is no scenario where cellular networks can somehow steal away a lot of the traffic carried by landlines." (<https://potsandpansbyccg.com/2020/07/15/can-5g-compete-with-cable-broadband/> )

Make no mistake about it. Cellular frequencies are harmful, no matter what generation they are. The new technologies being developed in labs today by the cell industry will bring more modulation, more pulsing, more polarization to the radio frequency (RF) signals that they transmit when they are deployed in coming years. We must insist on a halt to their deployment, particularly in residential neighborhoods, so that we can study the health effects on humans, animals and our biosphere. This includes the deployment of satellites into space. Regardless of what generation of cell technology we are dealing with, or when these technologies are supposed to be implemented, we need to inform people about their impact on health.



## Update of Oram Miller's 5G Article, August 17, 2020

We must also pay attention to the numerous wireless devices in our own homes and within our personal space. Read articles and watch interviews I have done on the harm of invisible, silent and odorless RF and other EMFs right in our homes and pockets. ([https://createhealthyhomes.com/articles\\_radio\\_frequencies.php](https://createhealthyhomes.com/articles_radio_frequencies.php) and <https://createhealthyhomes.com/safercomputers.php> ). We must find hardwired ways of communicating and follow three simple steps recommended by my profession, the Building Biology profession, and by others in the EMF community when it comes to the use of wireless devices, including cell phones, tablets, laptops and the like: reduce use, increase distance, and favor hardwired connections whenever and wherever possible.

Please read the rest of my 5G article, at [https://createhealthyhomes.com/five\\_g.php](https://createhealthyhomes.com/five_g.php) .