

Create Healthy Homes

Environmental Design and Inspection Services

Oram Miller, BBEC, EMRS
Certified Building Biology® Environmental Consultant
Electromagnetic Radiation Specialist
11693 San Vicente Blvd., #342
Los Angeles, California 90049

Phone 310.720.7686
info@createhealthyhomes.com
www.createhealthyhomes.com

Brief Summary of 5G by Oram Miller

2/23/20

This is a brief summary on the topic of 5G, as presented in an article on 5G Cellular Technology that I wrote on my website, createhealthyhomes.com. The direct link to the article is https://createhealthyhomes.com/five_g.php.

The 5G that everyone fears is in the high, millimeter Wave (mmWave) band (above 20 GHz) and it is beam-formed. That type of 5G is only being deployed on certain streets in downtowns and surrounding residential neighborhoods in select cities. It is also being deployed in sports stadiums, arenas, airports, college campuses, metro stops and other places where large numbers of people congregate.

That mmWave 5G signal is on-demand, meaning it is only transmitted when a smart phone enabled with 5G for mmWave service asks for a connection. The mmWave 5G cell signal sent out by that antenna is only 10 degrees or so wide. If you live next door to a house where that 5G-enabled phone is calling for service and you don't have one of those 5G-enabled phones yourself, that signal to your neighbor's 5G-enabled phone will not come into your house.

It is important to realize that mmWave 5G service is only expected to be successful as primarily an outdoor service in select areas within urban areas. It is not considered by industry to be a "coverage spectrum", as is the case with 4G and 5G service in the low and mid bands (see below). 5G service in the mmWave band is more limited and does not work well indoors. Customers of mmWave service, particularly with Verizon, will have their data service seamlessly switched back and forth between 5G and 4G,

because mmWave 5G service is still quite spotty—although cell carriers are hard at work expanding that mmWave 5G service in urban areas.

As of 2/23/20, the mmWave type of 5G service is only offered by Verizon on certain streets in select areas of 34 cities, by T-Mobile on certain streets in select areas of 6 cities, and by AT&T, known as 5G+, on certain streets in select areas of 35 cities (but only to business customers thus far). Sprint does not have 5G service in the mmWave band, but their pending merger with T-Mobile is looking like it will go through. All three cell carriers with 5G service in the mmWave band are planning to expand their 5G service in each city that they currently serve and to add new cities.

You lose the mmWave 5G connection on a 5G-enabled phone when you move the phone around. When you move the phone, it connects back to 4G LTE service. 5G is primarily for downloading data, not voice service.

The bulk of 5G service in the US, on the other hand, is being broadcast in the low and mid bands (600 MHz to 6 GHz) from 5G small cell radios and antennas. These are being placed at existing 4G LTE macro cell sites, which are located roughly 1-1.5 miles apart, and in residential neighborhoods as stand alone small cell antennas across the country. T-Mobile and AT&T have 5G holdings in the low band and are in the process of installing low band 5G radios and transmitters, which do not send out beam-formed signals (but are highly modulated—see below) over large areas. T-Mobile plans to cover up to two-thirds of the U.S. population with their low band 5G service, and AT&T wants to provide low band 5G service, called “5G Evolution” or “5GE” to all their customers nationwide by mid-2020.

Sprint's 5G holdings are exclusively in the mid band, at 2.5 GHz. They can use beam-formed signals, which, again, are only on-demand and narrow.

Existing 3G and 4G macro cell antennas transmit cell signals at up to 1,000 Watts. These macro cell antennas spray always-on RF signals out into a neighborhood in a cone that is roughly 120 degrees wide and high, stretching for miles. This is what we have had for a couple of decades. This 4G network is the foundation of 5G and will remain in place. New 4G macro antennas are being installed, and 5G antennas are being placed on existing 4G cell tower arrays. Existing 4G equipment at macro cell sites is also being upgraded.

Many more new small cell antennas are also being installed *between* macro cell sites on residential streets. These new 4G LTE-Advanced and 5G small cell radios and antennas broadcasting in the low and mid bands likewise send out RF signals that are always-on with a 120 degree-wide signal that passes deep into nearby houses and apartments.

These 4G and low and mid band 5G radios and antennas transmit signals that are lower power than macro cell sites, at 10 to 100+ Watts, but they are much closer to people's homes. As a result, we are now measuring higher RF levels in client's homes, especially

in second story bedrooms, up to tens to hundreds of thousands of microWatts/meter squared ($\mu\text{W}/\text{m}^2$) from these new antennas. The building biology profession and EMF experts around the world say 10 microWatts per meter squared or less is safe for sleeping areas (actually, $0.1 \mu\text{W}/\text{m}^2$ is our “No Anomaly” level for sleeping areas). See https://createhealthyhomes.com/bb_standards.php .

The real danger is that these 4G LTE-Advanced and low and mid band 5G cell signals are far more modulated than 3G and 4G signals were in the past. That means, more data is being sent into the same airspace at the same power density and frequency but at faster download speeds. 5G signals in the mmWave are also highly modulated. This modulation of 4G LTE-Advanced and 5G cell signals at all frequencies makes them more biologically active and potentially harmful for all biological life, including humans.

In addition to all that, your cell phone and the myriad wireless devices in your home and personal space emit RF signals close to you and your family that are also highly modulated. These devices include all the things people like to use these days, such as cell phones, tablets, WiFi-enabled routers, TV streaming devices, computers, printers, baby monitors, thermostats and many others. What people don't understand is that these signals are just as harmful to us as 4G and 5G cell signals coming in from outside, particularly because they are also now more modulated than in the past. WiFi is a heavily modulated signal, and therefore particularly harmful on a cellular level.

All RF signals are invisible, silent and odorless. You don't know they are there until you purchase an RF meter and measure them for yourself or hire an EMF professional to evaluate your home for EMFs. For most people, that is the only way they realize RF signals exist at high levels in their living and work space, and at schools.

We say, pay attention to wireless devices in your homes, offices and schools at the same time as you organize to oppose small cell antennas in your neighborhood.

Remember three strategies regarding the use of wireless devices: reduce use, increase distance, and favor hardwired connections whenever and wherever possible, such as when you are home.

© 2020 Create Healthy Homes. All rights reserved