STEEL IN THE AIR

National Cell Tower Consultants

HOW WILL 5G AFFECT CELL TOWERS?

One of the more frequent questions we receive is whether 5G will impact towers or make them obsolete. Out of 10 clients, 7 of them ask us this question. (Perhaps the others are thinking of it and have failed to ask). What do we tell them? There is a short answer and a long answer.

Short Answer: For most landowners with cell tower leases or building owners with rooftop leases, there won't be much impact. In some urban areas, some towers or rooftop sites may no longer be needed.

For the **longer and more complete answer:** read on for more specific answers to more involved questions.

What Is 5G?

Simply put, 5G is the latest (and 5th) generation of wireless standards. It allows faster and more plentiful connections for wireless communications.

Generation of Technology	Start Date	Kilobits per second	Time to Download Song	Time to Download Movie	Technology
1G	1983	2	3 hours	Forever	
2G	1992	65	7 minutes	Days	GPRS/EDGE
3G	2001	2,000	10 seconds	1 hour 8 minutes	3G/HSPA/HPSA+
4G	2010	1,000,000	3 seconds	40 minutes	LTE, LTE-Advanced
5G	2020	1,000,000,000	1 second	35 seconds	5G

5G will enable new business models and better communication. It will allow for billions of devices to be connected via the Internet of Things (IOT). It will enable low latency and high-speed data throughput. However, 5G isn't completely proven yet from a business case scenario, so how far, how dense, and how widely 5G is deployed remains to be seen. At a minimum, though, you can expect the majority of macrocell sites to eventually have 5G installed.

Where Will 5G Be Installed?

There are three locations where 5G will be installed.

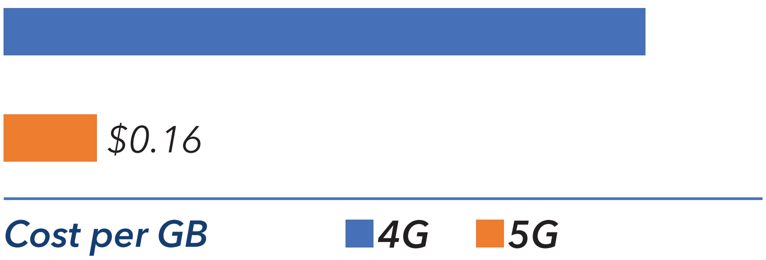
1. Small cells
2. Macrocells (including towers)
3. Indoors or via private networks

One of the things that many articles we see on 5G get wrong (including some by our competitors) is that 5G is not just about small cells. (Click on this link for small cells to learn more about them). 5G will be deployed in multiple places, on multiple structures, using multiple technologies. There is no single "right way" to do 5G. That is the point – the 5G standards allow for flexibility in deployment. Each of the wireless carriers is selecting its own optimal strategy. There will be some overlap and similarities, but, ultimately, they each have different business objectives that require different technology.

Will 5G Be Installed on Towers?

Absolutely. It is already occurring. We have reviewed applications from all four wireless carriers (AT&T, Sprint, Verizon, T-Mobile) for tower-based 5G equipment. While some wireless carriers (Verizon) are more active in deploying 5G on small cells, others (AT&T, T-Mobile) are using both small cells and tower sites. Sprint has been rolling out 5G using modifications to existing tower sites. 5G isn't replacing towers, it is replacing the 4G network. For wireless carriers, 5G is significantly cheaper on a cost per gigabyte of data. For the wireless carriers, this means that they can either generate more profit or they can increase the amount of data provided to the consumer without increasing costs.

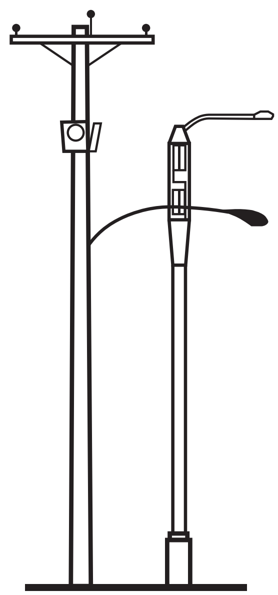
Cost per GB - 4G vs 5G



Will Small Cells Make My Cell Tower Obsolete?

For most existing macrocells, the answer is no. The key to remember is that small cells typically only cover ¼ mile or less in area. They allow much more concentrated pinpointing of wireless capacity. Think of macrocells (many of which are deployed on towers) as a wide area coverage layer and think of small cells as targeted capacity. For most rural, suburban, and some urban areas, 5G will be primarily provided by macrocells on towers and rooftops. For dense suburban, urban, and dense

urban areas, the population density is higher and the demands on wireless systems are greater. In the graphic below, we show the various types of wireless sites. Look for the macrocells installed on a tower and a rooftop, then look for the small cells. Note specifically that small cells cover far less distance and handle fewer users than macrocells. They "fit" in between existing macrocells to provide targeted coverage and capacity. Small cells are additive to the network, not alternatives to it.



Small Cell: **25-50'**

While small cells could theoretically be used to replace a tower or rooftop site, in most cases, it doesn't make economic sense to do so. On a replacement basis, it would take 15–30 small cells to replace one macrocell. Furthermore, the wireless carrier has sunk costs in the tower or rooftop site, and there is an interrelationship with adjacent cell sites. It doesn't make sense to remove macrocells except in limited circumstances.

When Does It Make Sense to Remove Macrocells?

There are a few scenarios where it makes sense to replace a macrocell with small cells. As in the past conversions from one G to the next G, some older cell sites become obsolete. For example, in the early days of cellular, wireless carriers preferred high sites that could cover wide areas. As time went by, carriers sought to add capacity to their networks by adding sites in between these tall sites. Eventually, the carriers realized that the taller sites were interfering with the denser shorter sites and removed some of these tall sites.

The same is true with small cells. In some urban areas where the density of users is high or their capacity demands are really high, it may make sense to focus on small cell deployment while reducing or eliminating macrocells that may cause interference with the small cells.

In cases where existing macrocells are overly expensive due to high lease rates or landowner requests for unreasonable increases to the lease rate, wireless carriers may seek a small cell solution that has a lower total cost of ownership.

Generally, though, the lower the rent and the lower the density of people in an area, the less likely it is that your macrocell or tower site will be replaced by small cells.

Could Small Cell Deployment Reduce Future Need on My Tower?

Absolutely. There are three ways this occurs. First, small cells allow wireless carriers to avoid deploying new macrocells to address localized capacity issues. Instead of erecting a new tower and a macrocell at $300,000 or more, the carrier can install a small cell for $25,000 and resolve bad coverage or capacity at a particularly problematic intersection.

Secondly, it is difficult for a municipality to prevent a carrier from installing a small cell. The FCC issued regulations that prevent municipalities from charging much for small cells or from preventing carriers from building them in the public right of way (ROW). The annual maximum fee that the FCC allows for a small cell in the ROW is $270.

Third, the wireless carriers only have so much money to devote to capital expenditures (CapEx). In the past, most of that CapEx went to macrocells and modifications. Today, an increasing part of the CapEx is dedicated toward small cells. So, unless the carriers decide to increase their CapEx spending, as small cell spending goes up (and it will continue to do so), the portion dedicated to macrocell spending will decrease. That means fewer new macrocells.

Fewer new macrocells mean less growth for public tower companies. Ultimately, that will have an impact on tower lease valuations. Just like the reduction from seven to eight active wireless carriers to three to four active wireless carriers has a reduced upside to tower owners, so too will the push toward small cells. One thing to remember though is that the industry is cyclical, so the push toward small cells will likely be followed by a return to macrocell deployment. How quickly that happens will depend upon how the business model for 5G develops or doesn't.

Should I Be Worried About My Cell Tower Lease?

For most cell tower landowners, not much changes. Your cell tower lease isn't likely to be terminated due to 5G. Many towers will see older 4G equipment replaced or new 5G equipment added. For example, T-Mobile's low band 5G deployment is being deployed primarily on towers.

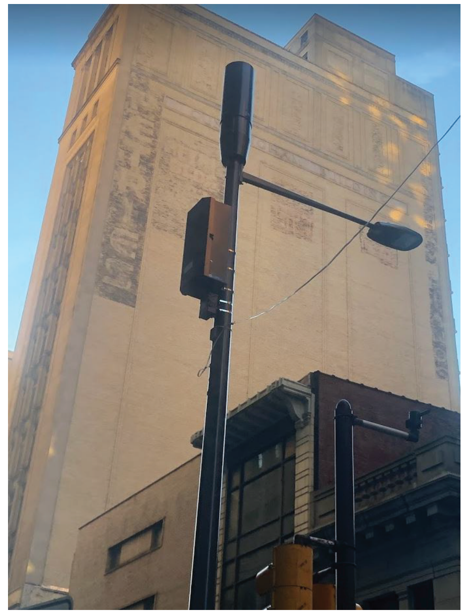
There are a few situations where it might make sense to contact us further about the risk.

- Your tower has only one carrier on it and it is in a dense urban or suburban area.
- You have a short cell tower (less than 50') with only one carrier and it is not on a hill.
- You have a cell tower lease has only one carrier and the rent is $3500/mo. or more.

How About My Rooftop Cell Site Lease?

For most building owners who have cell site leases, you will continue to receive requests for modifications from the carriers every year or two. 5G equipment is brand new and real-world performance is still being tested. As new equipment is researched and developed, the carriers will continue to modify their equipment. In some cases, this may mean larger or more antennas.

In most cases, it will mean additional remote radio units. Another very practical impact on rooftop owners is that new equipment often increases the need for radio frequency emissions barriers and protection areas. These are areas where the emissions from the antennas exceed the allowable limits for unprotected workers. This limits your ability to do maintenance on your roof and may constitute an expansion of the lease area. For example, see the image of rooftop plans – the yellow highlighted area is the new area that needs to have a barrier around it to preclude workers from entering it due to higher radio frequency emissions from the new larger antennas.



Will My Tower or Lease Be More Valuable Because of 5G?

Possibly for some locations. It is critical to remember that the Average Revenue Per User for wireless subscribers has been declining, which means overall revenue for wireless providers is staying flat or declining. Meanwhile, the amount of data we use is increasing. From the wireless carrier standpoint, 5G is first and foremost a way to keep up with the additional demands on the network. Some industry analysts and pundits don't believe that wireless carriers can charge more for wireless plans from subscribers. This, in turn, limits what wireless carriers will pay landowners or site owners to migrate to 5G. Furthermore, with small cells and other wireless technologies, cell site technology will become more efficient. As this occurs, the need for any singular cell site may decrease.

On the positive side, new uses and business models that rely upon 5G may open up new revenue opportunities. This could increase the need for 5G and increase the amount of equipment needed on the tower, which translates to increased revenue for the tower owner.

All in all, 5G is a transformational technology, but it is not likely to transform the tower industry or cell tower leases radically.

Care to Learn More?

Small Cell or Small Macrocell?
How the line between small cell and macrocell is blurring.

Top 10 Things the Wireless Industry Doesn't Tell You About Small Cells
What the wireless industry doesn't want you to know about small cells.

Winners and Losers of the FCC Small Cell Order
How various industry participants made out with the small cell order.

Have Further Questions?

Please contact us at
1 (877) 428-6937

OR

Ask Us at our Q&A Forum
Submit a Form Online