

IMPROVE INTERNET *SPEED* IN SENIOR LIVING SETTINGS



Being a “good Wi-Fi neighbor” is critical to maintaining consistent, fast internet speeds across your community. This can be difficult in a Senior Living setting where residents are oftentimes left to bring their own Wi-Fi connections.

Here’s the challenge operators face when it comes to Wi-Fi...

Left unchecked, multiple resident routers (usually one per room, operating independently of one another), can wreak havoc on your community network, where critical business systems, connected devices and visitor networks have become increasingly important. Even though you have plenty of bandwidth servicing the building, residents may still complain about slow speeds and intermittent connectivity. It all comes down to this fickle, invisible and unpredictable thing called **Radio Frequency, or RF.**



Instead of using wires to transmit a signal, wireless devices like your phone, laptop, and many Internet of Things (IoT) devices use wireless radio frequency signals. Unlike coax cables for TVs, these RF signals are not confined to a cable. Subsequently, the signal will often travel in an unpredictable manner. Sometimes, it moves cleanly through the room, from the access point to the wireless device, and you have a wonderfully seamless experience streaming the latest movies, programming or surfing the internet.

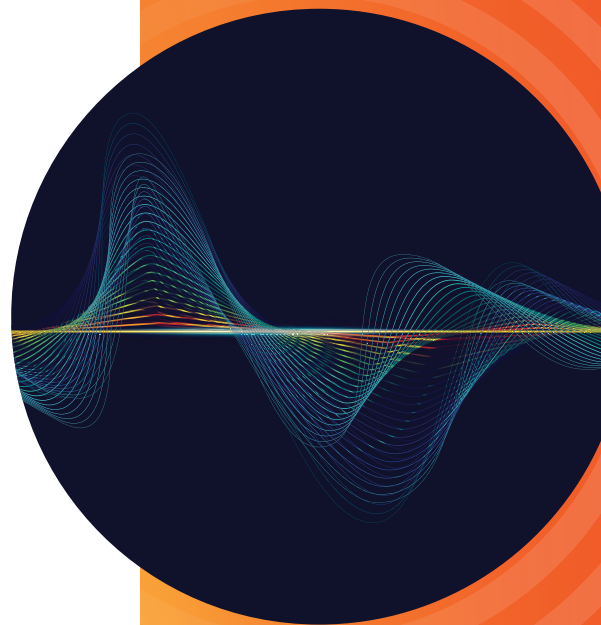
Other times, the signal encounters “noise,” and the experience is anything but seamless. Noise can originate from a variety of sources, the most obvious being other wireless devices in the unit-like kitchen appliances, washers or dryers, garage door openers, among others.

The less obvious – and more insidious culprit – is well-intended, resident-purchased neighboring wireless networks. These unique RF signals creep through the walls and ceilings and encroach on others’ Wi-Fi signals, inadvertently creating tremendous amounts of network noise.

Let’s look at two analogies to help paint the picture of how noise impacts RF.

Consider entering a large room and speaking to a friend. It is easy for the two of you to communicate since there are no other sounds in the room. After a few minutes, a couple of large groups enter (aka the neighbors’ RF), and you need to speak a little louder in order to hear each other. More people arrive, more noise. Now you have to speak even louder, and sometimes you cannot even hear what your friend is saying. The same happens with RF. With too many access points all trying to talk to their devices, they all end up shouting at each other. Parts of the conversations get missed and have to be repeated, and communication slows.

Another way to look at RF is to think of it like drops of water on a pond. A single drop sends out perfectly clean, symmetrical rings that flow out evenly until they encounter resistance like the ripples generated from another droplet nearby (aka your neighbors’ pesky RF again). The ripples from each of the droplets collide and they slow down. Add more drops, you get more collisions and everything slows.



In addition to these RF “collisions,” obstructions like walls, water pipes, mirrors and furniture also create various RF-impacting issues. These include RF signal absorption, refraction, reflection, scattering and diffraction. With this going on, it’s no wonder maintaining a consistent connection is difficult!

So how does one go about ensuring residents, visitors and staff have a clean, fast connection at all times?

We have to keep in mind that it is all physics. As much as we may want it to just work, RF signals will always bounce off things and off each other. The only way to manage them is to understand RF behavior and design accordingly. Hope, in this case, is not a strategy.

One of the tools used by Wi-Fi and network design professionals to manage RF will measure Signal to Noise Ratio (SNR), which really is the key metric used to reduce these noise-producing collisions. Simply put, SNR measures the level of a desired signal against the unwanted level of background noise.

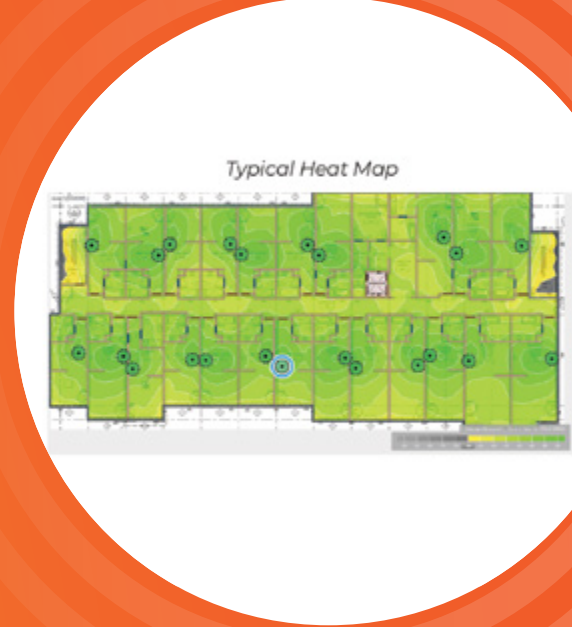
Think about the two people mentioned earlier, trying to have a conversation in a large room. The loud groups of people are the background noise, increasing the SNR. A high SNR reading can seriously impact the performance of all devices on a wireless network, including video throughput. When designing a network, an SNR assessment and an SNR map created by someone trained in RF is essential. Allowing this individual to adjust the AP placement, power and channeling will help ensure a high level of performance.

Building construction is another factor that impacts RF. For example, concrete walls will almost completely block RF signals, whereas wood frames allow for some bleed-through. Stucco and wire on the outside of a building creates significant interference, and being close to water can create refraction that can interfere with overall coverage. In fact, even placing access points too close to water pipes can result in reduced performance when water is flowing. These things have to be considered and designed around.



Heat mapping is another useful tool where it will show the signal “reach” for each access point.

In our droplet example above, this reach is essentially how far the rings will travel before they become too weak to notice. On the right is a typical heat map, indicating where the coverage is good (-65dbm or better, as indicated by the green and yellow areas), contrasted by the areas in gray which will have reduced performance. Interestingly, the limited coverage in the gray areas is due to the fact that the stairwells and electrical rooms are encased in concrete where coverage was not needed.



Understanding how SNR, building construction and signal propagation (via heat maps) impact RF is critical when designing or upgrading a Senior Living network. Intermittent connectivity, unexpected disconnections, delays in connection, slow network speeds and poor signal strength can all be avoided with a little proactive design done by a knowledgeable, experienced RF engineer. Doing so will help ensure all residents in your community are not only good, but fantastic Wi-Fi neighbors!

There's a lot to consider when installing or enhancing Wi-Fi, especially to meet the unique needs of senior care. A properly designed, commercial-grade network is the best starting point for your community's connectivity goals, whether for resident engagement use, building system use or a combination of the two.

With more than 35 years of Senior Living expertise, 24/7 customer and technical support, and ongoing maintenance and management for optimal Wi-Fi performance, we'll be there every step of the way. From upfront education and consultation to long-term support, we'll help ensure your community has Wi-Fi that makes your operations strong and residents happy.



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