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STUDENT HOUSING
INTERNET DELIVERY DESIGN BEST PRACTICE:

WI-FI COVERAGE

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Topic Highlights

For Student Housing residents, ubiquitous WiFi access is an essential part of their lives. It's critical that Student Housing owners and operators provide a reliable, worry-free service to their residents, and getting their Wi-Fi coverage right is a great first step.

How to successfully deploy WiFi is not something Student Housing owners and operators tend to get directly involved with very often; most (understandably) leave it to their technology providers.

However, understanding the key components of WiFi deployment success can definitely help owners and operators make informed choices when selecting a partner to install, upgrade or operate a student housing WiFi system.

Broadly speaking, the key factors to Student Housing WiFi success are coverage (how much usable wireless signal is available, and where); density (how many resident devices are served by a single wireless Access Point, or 'AP'); and manageability (making sure that the whole property WiFi system acts as a single, coordinated system and not just a sea of unmanaged islands of WiFi). In this paper we are going to tackle the first aspect, coverage, and particularly SNR or signal to Noise Ratio.

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Coverage

The overall coverage objective for Student Housing WiFi systems is to have a usable WiFi signal anywhere on the property that residents will go. That seems self-evident, but the key here is 'usable'.

	**> 40dB SNR**	Excellent signal (5 bars); always associated; lightning fast
	**25dB to 40dB SNR**	Very good signal (3 - 4 bars); always associated; very fast
	**15dB to 25dB SNR**	Low signal (2 bars); always associated; usually fast
	**10dB - 15dB SNR**	Very low signal (1 bar); mostly associated; mostly slow
	**5dB to 10dB SNR**	No signal; not associated; no go

So – how strong the wireless WiFi signal determines how good the WiFi connection is, right? Unfortunately not. The quality of a WiFi connection depends on two factors: the signal strength, and the 'noise' or interference level. We normally refer to the two together as the Signal to Noise Ratio, or SNR.

What is Noise?

Noise is interference. Think of it like this: if you're standing on the main concourse of a railroad station, talking to somebody ten feet away, it would be relatively easy to hear them at 3 am when everything is quiet. At 8 am in the morning rush hour, with many people coming and going it could be difficult to hear your conversation partner.

The WiFi signal level, minus the noise level, is the amount of signal that you can actually use to transport information, and this usable signal is measured and referred to as the SNR* or Signal to Noise ratio. The more noise you have, the less usable signal you have.

SNR is expressed in dB**, which is hard to visualize unless you're used to it. Consequently manufacturers of end-user client devices such as smart phones use a 'bar' system instead, with one bar being slow/weak and five bars being fast/strong.

In an ideal WiFi world, we want everyone to have 4 or 5 bars. At all costs, we don't want any areas with lower than 2 bars (15dB SNR) Where does the noise come from? Noise mainly comes from devices operating on the same radio frequency*** as WiFi, although there is always some background noise just from the world around us.

If we have too much noise while we're trying to operate our WiFi system, it will become slow or unreliable, or in extreme cases will become unusable. The worst culprits for introducing noise into Student Housing WiFi networks are residents who bring in their own WiFi equipment and connect it.

*Confusingly, WiFi SNR is not a ratio, it's Signal minus Noise.
**decibels
***2.4GHz and 5GHz

This can be routers, access points, or any device that gives out a strong WiFi signal. It's really important that your WiFi management system can identify these sources of noise so that you can eliminate them.

There are many other electronic devices that operate in the same frequency as WiFi, and these can also cause noise.

How do I know if I have a noise problem that's making my SNR too low? There are two main ways (other than the undesirable one of waiting for your residents to complain).

Firstly, your WiFi management system that orchestrates all your AP's should be able to track and identify WiFi client SNR and report on it, and also identify interfering devices.

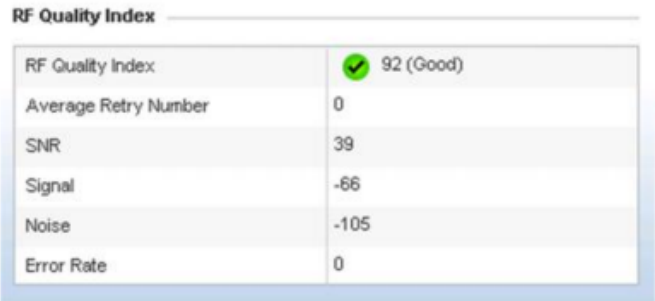

Figure 1: WiFi client SNR reported by a Zebra WiFi management platform. In this example(39dB SNR) the client would be receiving a solid 4 bars of usable signal.

Secondly, you can and should have your property 'heat mapped' periodically. This process, usually conducted by your network partner, will give you a physical map of coverage that shows you the legitimate WiFi signal, the noise, and the SNR right across your property so that you can take action to address problem areas if necessary.

Figure 2: Interfering devices reported by a Zebra WiFi management platform .

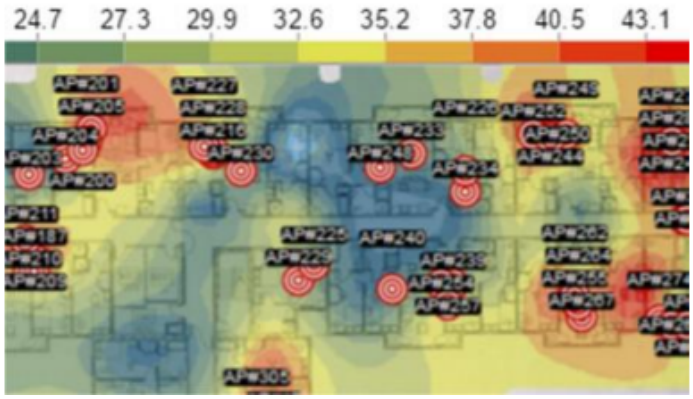

Figure 3: Sample part of an SNR heat map

SUMMARY

Your property WiFi needs to provide a good enough SNR (among other things) for your residents to experience always on, always fast WiFi. Your network partner can help you improve your residents WiFi experience by measuring and managing the sources of noise and interference at your property and taking remedial action, thus improving the SNR available to them.

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Meet the Team

We are a Student Housing wireless (Wi-Fi) and wired Internet provider. We have spent many years establishing our leadership in understanding, designing, and operating the technology that is so critical to success, students resident satisfaction, occupancy, and NOI. We work together with owners and operators to provide an unbeatable team with each partner working with their core competencies and making student housing smarter with our cutting-edge Wi-Fi so you get student housing apartment complete Wi-Fi.

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