

Wireless AP Placement

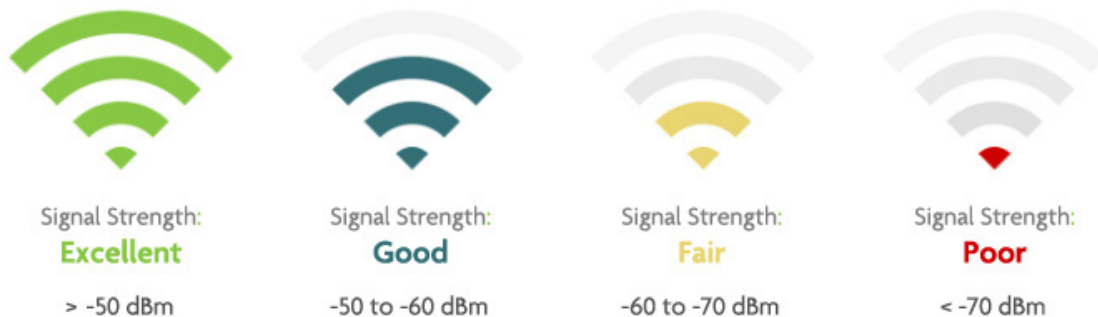
Overview

Wireless AP placement is as much art as it science. A good site survey and some planning is essential, but you may also need to experiment with AP placement to optimize the Wi-Fi network performance and the user's roaming experience. Understanding site conditions is important because construction materials, site layout, and RF interference from adjoining properties can all affect wireless network performance. Understanding how Wi-Fi works, how it interacts with construction materials, and how to optimize layout will make for a more efficient trouble-free installation and a better network for your customer.

Understanding Wi-Fi

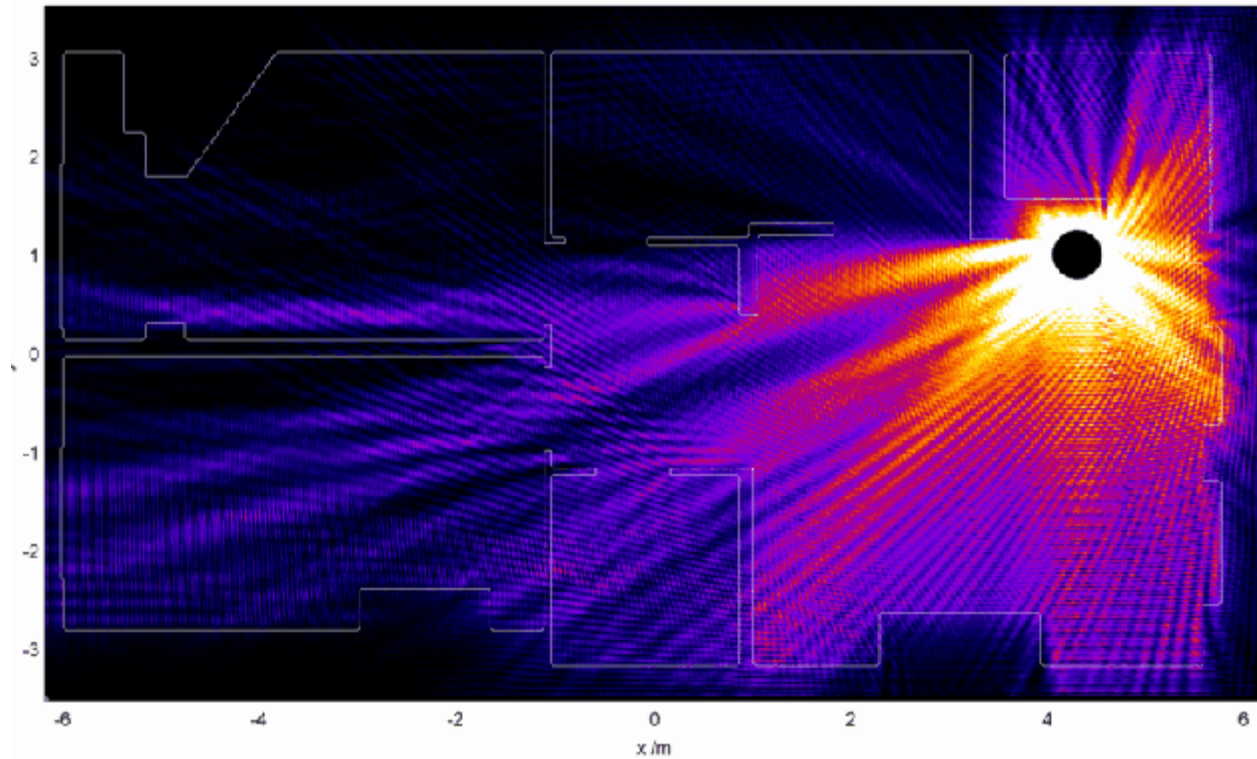
Fundamentally, Wi-Fi is simply radio frequency energy. As with RF signals like radio or cell phone, Wi-Fi signals travel through the air and can be absorbed or reflected by objects, and the strength of the signals decrease with distance.

Wi-Fi signal strength is expressed in dBm or decibel-milliwatt. Explaining the dBm scale thoroughly is beyond the scope of this document, but for practical purposes, you can consider the following signal strength guidelines:



Site Conditions and AP Placement

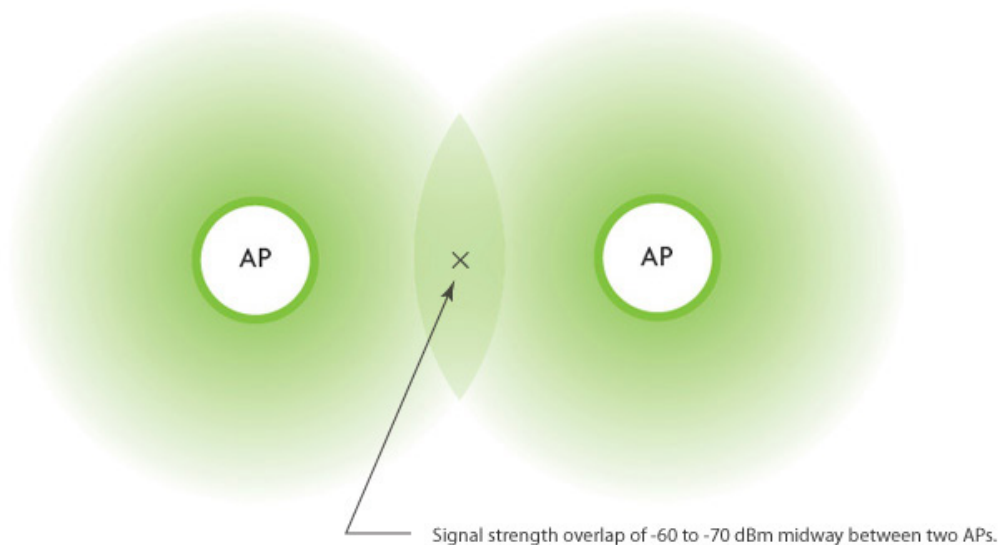
Any material can block a Wi-Fi signal, but some are worse than others. Wood, drywall, and glass don't affect the signal as much as brick, stone, or water. The worst materials for Wi-Fi transmission are ceramic, concrete, and metal. As you can imagine, a large concrete fireplace wrapped in metal lath and stone does a very good job of blocking Wi-Fi signals. In this simulated visualization of Wi-Fi, you can see how walls absorb and reflect Wi-Fi signals.



Note also how signals pass through walls better at perpendicular angles than they do at oblique angles. It's also easy to see that the signal is mostly gone at the end of the space opposite the Access Point. In this case, the AP should be located more centrally, or a second AP should be added for better coverage at opposite ends of the property.

AP Separation and Overlap

In general, you should place APs to ensure adequate coverage, but not so far apart that there is no signal overlap. Adjacent AP signals should overlap enough that a client device has a good connection to the AP to which it is currently attached, but also sees the next-nearest AP.



Ideally, roaming clients should see signal strength of two overlapping APs in the range of -60 to -70 dBm at the midway point between two APs.

Testing and Tools

There are several third-party software tools Luxul recommends to help evaluate site conditions and network performance. Luxul also offers informative "How-To" videos on all these tools at luxul.com/how-to-videos.

iPerf

Use iPerf to measure network throughput, bandwidth, packet loss, and other TCP/UDP performance factors.

Download iPerf from iperf.fr

SpeedTest

You can use Speedtest, the world's most popular internet speed test, to check Internet connection speed on wired and wireless LAN connections or to compare the two.

Use SpeedTest at www.speedtest.net

InSSIDer

inSSIDer allows you to visualize your wireless environment and test Wi-Fi signal strength so you can modify AP settings and placement for optimal Wi-Fi performance. Available for Windows or Mac.

Download InSSIDer from www.inssider.com

Ekahau HeatMapper

Use Ekahau HeatMapper to assist with the process of mapping and analyzing Wi-Fi coverage.

Download HeatMapper from www.ekahau.com

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