Optimizing **802.11ax Wi-Fi** for Enterprise Networks

The 10 Gbps Wi-Fi network is finally here. In 2021, IEEE released the Wi-Fi standard 802.11ax, also called Wi-Fi 6. The standard introduces many improvements, such as **better performance in high density environments**, **increased throughput**, and **more efficient power consumption**. Organizations are deploying 802.11ax wireless access points faster than any other previous generation of Wi-Fi. However, achieving the full benefits of 802.11ax speed and capacity involves more than just a new wireless access point — it starts with properly designing your network infrastructure.

Improvements with 802.11ax:

Faster speed and more capacity
802.11ax offers significantly faster data rate and greater capacity from an increased number of channels and spatial streams. By adding 8 more spatial streams to 16 from 8 spatial streams in 802.11ac and improving the modulation from 256 QAM to 1024 QAM, the average client throughput can go up by 20%. Also, 802.11ax implemented a technology called OFDMA (Orthogonal Frequency Division Multiple Access) to improve communication efficiency by allocating optimal bandwidth for multiple clients.

Efficient Power Consumption
The new power saving mode technique called Target Wake Time in 802.11ax allows devices to communicate wake time schedule to conserve power. This results in significant power savings for battery powered devices. Especially for IoT applications where smart use of data and power is critical, Target Wake Time feature optimizes data and power use among users.

More frequency bands
802.11ax is also named Wi-Fi 6 and it can operate in both 2.4 GHz and 5GHz frequency bands. When 802.11ac was introduced, the 2.4 GHz band was completely removed but it was added back in 802.11ax to provide more flexibility. In addition to allowing both 2.4 GHz and 5 GHz bands, it has been expanded to support 6 GHz in some countries, which is referred to as Wi-Fi 6E. By operating in the less crowded 6 GHz band, users can experience even faster speed, especially in highly congested environments.

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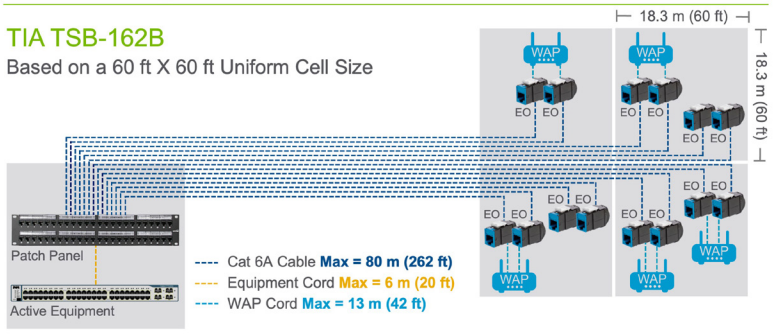
Key Recommendations for Cabling Infrastructure

Enterprise wireless access points (WAPs) and backbone cabling infrastructure will need to be properly designed and deployed to see the real benefits of 802.11ax. In late 2013, TIA published TSB-162-A, Telecommunications Cabling Guidelines for Wireless Access Points, which recommends mounting and routing cable between LAN equipment and WAPs. Later, TIA TSB-162-B was released with revised recommendations:

Install twisted-pair Cat 6A for horizontal cabling to WAPs. These high-bandwidth solutions optimize the network performance for current 802.11ac and 802.11ax devices and prepare for future wireless networks, as data rates continue to grow and will exceed 10 Gbps. By using a Cat 6A RJ-45 interface and twisted-pair structured cabling system, users get the added benefit of backwards compatibility and connection from the horizontal cabling all the way to the backbone and active gear.

Use grid-based zone cabling architectures, with each cell in the grid no greater than 60 feet (18.3 meters) wide. Many designs will likely use smaller grid cells — and in turn require additional WAPs — to improve data rates and allow for greater occupancy rates in each cell.



Run at least two Cat 6A cables to each WAP in the grid architecture. As 802.11ax WAPs allow for increased data and Power over Ethernet (PoE), it is recommended to run two Cat 6A cables to each WAP for link aggregation and backup power capabilities. Two cable runs will also prepare the infrastructure for future expansion and data requirements. Leviton also suggests installing shielded cabling for these PoE applications, as it reduces heat buildup in cable bundles that may contribute to performance issues.

Learn about Leviton infrastructure for wireless access points at Leviton.com/wireless.