

# Wi-Fi 6E: EXPANDING CONNECTION POWER

## Optimizing Device Performance for the Next-Generation Wi-Fi Standard

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Until now, Wi-Fi has been operating under non-continuous frequency ranges with notable gaps in coverage that introduce limitations in speed and signal continuity. Wi-Fi 6E, the evolution of Wi-Fi 6, changes all of that with the delivery of a contiguous unlicensed spectrum with no breaks, allowing for faster data rates over the newly-available 6 GHz band. It's a major advance in wireless technology and expands performance for the enterprise. Where Wi-Fi 6 was really good, – helping alleviate and offload 5G wireless congestion in high traffic areas like public venues and work environments – Wi-Fi 6E will excel. With this new spectrum opened up, not only will Wi-Fi 6E and 5G play even nicer together (the relationship was already mutually beneficial), but many of those connection issues with PCs competing for signal space within crowded Wi-Fi bands will resolve, or at least get much, much better.

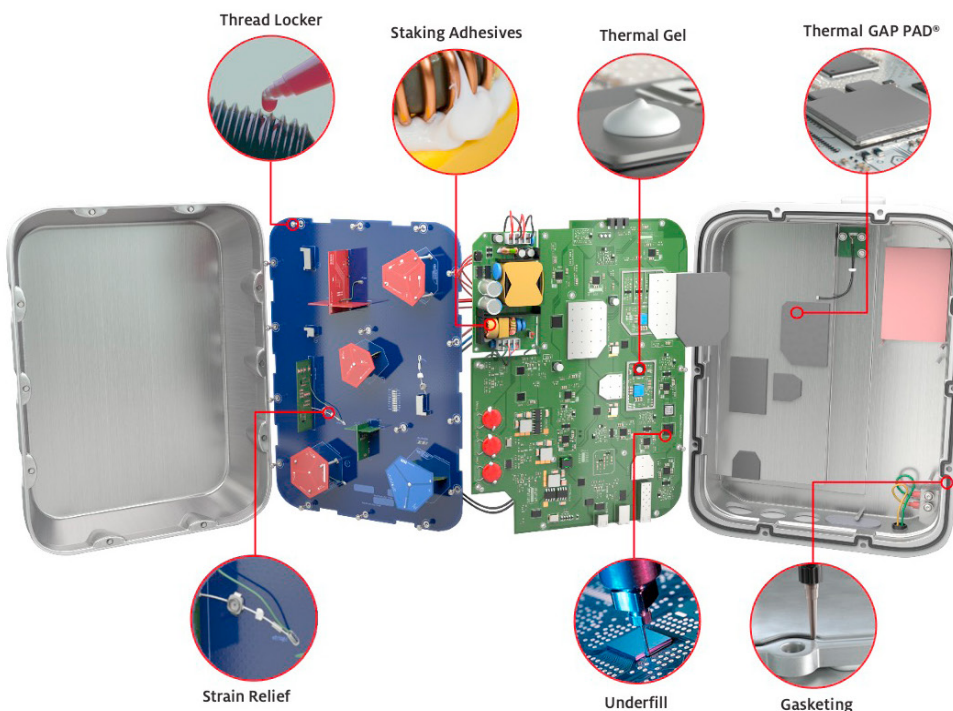
While the improvement in speed and signal strength is largely due to the breadth of the 6GHz band (which serves only Wi-Fi 6 and Wi-Fi 6E protocols), the ability to capitalize on the performance possibilities requires new components and more capable signal processors within Wi-Fi 6E devices. All the well-known chip makers are on-board, having delivered (or in the process of delivering) updated chipsets for Wi-Fi access point devices, PCs, routers, phones and anything wireless. As expected, the chips and electronic components within these new devices are high-performance and high-value. With the volume of new everything – indoor/outdoor access points, home Wi-Fi gear, mobile phones, etc., etc. – building long-lasting and reliable devices is key.



The excitement surrounding the technology has understandably garnered most of the attention, but a focus on building dependability and longevity into every single chip and device is essential for Wi-Fi 6E to deliver as it should. The number of new Wi-Fi 6/Wi-Fi 6E routers/access points produced and installed -- not to mention numerous other devices that will integrate new chips and capability -- is hard to predict, but no doubt will be in the billions. Not only do the systems need to be robust and reliable to ensure maximum performance in indoor and outdoor environments, but also to extend lifetimes and avoid preventable repair or replacement.

Providing enduring reliability and ensuring the 10-year life promised by many Wi-Fi 6E device manufacturers is, in part, enabled by the materials used to assemble, protect and remove operational heat from wireless access points. These include:

- **Environmental Protection** – Gasketing and sealing formulations – many of which can be highly automated – are applied to the housing perimeter to prevent ingress of moisture, dust and other contaminants which may impact operation. The gaskets allow device access and then re-conform to the structure when closed.
- **Heat Dissipation** – Removing operational heat from high-performance components such as ASICs and processors helps optimize their function, keeping them from failure or diminished efficiency due to overheating. Within Wi-Fi 6E access points, there are several areas where thermal GAP PAD and thermal gels are utilized to enable heat dissipation from heat-generating devices.
- **Component Mechanical Protection** – As advanced package component densities rise, protecting fine-pitch interconnects from stress, warpage and damage requires underfill materials that encapsulate connections, while also delivering manufacturability and safeguarding against high operating temperatures.
- **Mechanical and Structural Stability** – Strain relief for wires and cables, and securing mechanical parts such as screws and clips through the use of high-performance adhesives provide structural integrity for Wi-Fi 6E devices. This reinforcement is particularly important for systems positioned in outdoor locations where service is challenging.



**Access Point**



The collective investment – and return on – Wi-Fi 6E devices will be extraordinary, as businesses and consumers seek to make wireless connectivity even more robust and dependable. Electronic material selection and supplier partnership should be a primary consideration for Wi-Fi 6E system developers and manufacturers as they seek differentiation through maximized performance and durability.

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