Making the Invisible Visible: Identifying and Managing Wi-Fi Interference



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Wi-Fi is everywhere, but so is interference.

For many organisations, the wireless network has become the primary means of connectivity, yet the challenges that affect performance are often invisible.

Interference is one of the most common causes of dropped calls, unstable connections, or inconsistent throughput and understanding it is key to building reliable wireless networks.

The Two Faces of Interference

Interference generally falls into two categories:

- **Wi-Fi Interference**: When access points operate on the same or overlapping channels, you get co-channel contention or adjacent channel interference. This wastes valuable airtime and reduces efficiency. In practice, this means slower speeds and a poor user experience.
- **Non-Wi-Fi Interference**: Devices that were never designed with Wi-Fi in mind can still wreak havoc on your network. Microwave ovens, cordless phones, Bluetooth peripherals, motion sensors, wireless cameras, and even poorly shielded equipment all transmit within the same unlicensed spectrum.

Both types are disruptive, but they require different approaches to identify and resolve.

Frequency Bands and Their Challenges

Each Wi-Fi frequency band has its own characteristics when it comes to interference:

- **2.4 GHz** : The most congested band, offering only three non-overlapping channels. It is heavily shared with Bluetooth, Zigbee and many IoT devices. Interference here is almost guaranteed, making careful channel planning essential.
- **5 GHz** : Provides more spectrum and less noise than 2.4 GHz, but Dynamic Frequency Selection (DFS) channels can overlap with radar systems. Mismanagement of channel width or power levels can also introduce contention.
- **6 GHz** : With Wi-Fi 6E and Wi-Fi 7, this band provides a clean slate with dozens of non-overlapping channels. Legacy device interference is reduced, but proper planning is still required to unlock its full potential.

Managing Interference Effectively

Interference cannot be eliminated entirely, but its impact can be controlled.

Key practices include:

- **Survey and Measure** : Spectrum analysis tools allow engineers to visualise the invisible, pinpointing interference sources and ensuring design decisions are based on data, not assumptions.

- **Channel Planning** : Always stick to non-overlapping channels where possible. Consistent channel allocation reduces co-channel contention and provides predictable performance.
- **Environmental Awareness** : Every environment introduces unique challenges.
- **Adopting Modern Standards** : Newer Wi-Fi generations bring tools such as OFDMA, BSS colouring and WPA3. These features enhance efficiency, but they can only deliver results if the RF environment is well-managed.

Final Thoughts

Interference is an unavoidable reality in shared spectrum, but it does not have to dictate performance.

By understanding where it comes from, using the right tools to measure it and designing networks with careful planning, organisations can deliver reliable, high-quality Wi-Fi in even the most challenging environments.

Making the invisible visible is the first step and once you can see interference, you can control it.

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