When a Wireless Network Hits Its Limit: A Real-World Redesign Story

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Every now and then you walk into a site and realise straight away that the wireless issues people are dealing with aren't caused by a single fault.

They're the result of years of small decisions, legacy configurations and a design that simply hasn't kept up with what the organisation needs today.

That was exactly the situation at a training and education headquarters I was asked to assess recently.

Their Wi-Fi had slowly become a daily frustration for staff:

- Dropped voice calls.
- Unstable roaming.
- Poor coverage in office areas.
- Even worse performance in archive spaces packed with dense shelving and stored materials.

On paper, the deployment seemed reasonable - modern dual-band access points, cloud-managed.

But the reality told a very different story.

Starting Point: A Network Health Check Done Properly

My first step was a full discovery exercise, not a quick walk-around.

I used my wireless survey tools to build a detailed picture of how the network behaved across both floors.

The aim wasn't just to check coverage; it was to understand *why* devices were struggling day to day.

Patterns appeared almost immediately:

• Primary and secondary coverage failed to meet the customer's -67 dBm target across large parts of the building.

• The archive floor performed exactly like a warehouse - signal absorbed by dense materials, reflections off metal racking and uneven SNR.

• Interference wasn't the main culprit.

The design was.

Even before diving into power settings or channel plans, it was clear the existing WLAN simply wasn't built for the way the organisation now works.

Where the Original Design Fell Apart

A few issues stood out straight away:

1. Transmit power levels were far too high

The access points were effectively shouting at maximum volume.

Most radios were pushing 20–26 dBm, which is a red flag indoors.

This created a classic near-far problem: clients could hear the APs, but the APs couldn’t reliably hear the return transmissions from lower-powered devices.

The result was failed roaming, sticky behaviour and unpredictable performance.

2. Sticky clients and low data rates left enabled

With 1 Mbps and similar legacy rates still active, clients clung to distant access points instead of moving to stronger ones.

Airtime efficiency suffered and roaming became unreliable.

3. Non-standard channel use

One AP was using channel 7 in 2.4 GHz - something you never want to see.

In 5 GHz, 80 MHz wide channels were deployed in a building that didn’t justify them.

With only 25 usable 20 MHz channels in 5 GHz, and a dense indoor space, 20 MHz is almost always the better choice.

Collectively, these issues weren’t something you fix with small tweaks.

This needed a proper redesign.

Building a Modern WLAN: What the New Design Looked Like

After walking the customer through the findings, it became clear they were already approaching a natural hardware refresh cycle.

That made it the right moment to look at a modern Wi-Fi 7 tri-band design built on solid RF principles, realistic client behaviour and an architecture designed to support them for years rather than patch what was already failing.

Key design decisions:

• Move to a platform with strong RF performance and adaptive antennas

Intelligent antenna systems give cleaner RF patterns, reduce vertical bleed-through and help minimise co-channel interference. BeamFlex+-style antenna adaptation became a key part of the strategy.

• Rebuild the 5 GHz plan using 20 MHz channels

This immediately improved channel reuse and gave both floors a far more consistent RF environment.

• Strictly control 2.4 GHz

It was limited to low-density, low-power devices. All roaming-sensitive traffic such as voice, Teams calls and other latency-sensitive applications were moved entirely to 5 GHz.

• Disable low data rates for cleaner roaming decisions

Removing legacy rates stopped clients clinging to access points they shouldn’t.

• Carefully redistribute and reposition APs

APoS (AP-on-a-stick) surveys were essential.

Temporary test placements allowed me to validate coverage, SNR and roaming behaviour before committing to final mounting positions.

Validation: Proving the New Design Works

Post-deployment validation showed exactly what we wanted:

- Primary coverage comfortably above -67 dBm across both floors
- Secondary coverage around -70 dBm for stable roaming
- SNR consistently above 25 dB, even in the archive spaces
- Sticky client behaviour eliminated through correct power and rate tuning
- Channel reuse dramatically improved through proper 20 MHz planning

The new WLAN behaved like a modern, high-performance system should.

A Few Lessons Worth Sharing

This project reinforces several core truths we see time and time again in the field:

High power doesn’t fix bad coverage

If anything, it makes it worse, especially indoors.

Proper design fixes coverage.

High power breaks it.

2.4 GHz is not a capacity band

Use it carefully, or avoid it entirely for sensitive workloads.

Your network will thank you.

Floor-to-floor bleed-through is real

If APs “see” too much between floors, roaming becomes chaotic.

Warehousing principles apply in office archives

Dense shelving behaves like warehouse racking.

Design for it accordingly.

Validation isn’t optional

Predictive models give you guidance.

Validation proves the result.

Data wins.

Final Thoughts

This redesign turned a frustrating user experience into a stable, high-performing WLAN ready for the next several years.

More importantly, it’s a reminder that good wireless isn’t accidental.

It comes from proper RF design, realistic expectations and a willingness to revisit older deployments rather than endlessly patch them.

If you’re facing similar symptoms such as sticky clients, poor roaming, unstable calls, inconsistent coverage, there’s almost always an underlying design issue and the fix almost always starts with going back to fundamentals.

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