



Purpose-driven Wi-Fi 7 stadium networks:

Why deployment
flexibility is the key to
performance and ROI

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As fan expectations evolve and data demands surge, modern stadiums face a growing challenge: how to deliver consistently high-performance Wi-Fi throughout massive, variable environments.

Competing philosophies dominate the conversation. Some favor overhead-only deployments, leveraging long-range antennas to simplify cabling and reduce OpEx. Others swear by underseat access points (APs) for unmatched proximity and client density performance.

But in the end there's no one-size-fits-all solution.

This paper explores how a flexible, purpose-built Wi-Fi® 7 strategy—embracing both overhead and underseat deployment options—offers the best path to optimizing fan experience, operational efficiency, and long-term ROI. With the RUCKUS® Wi-Fi 7 portfolio, including the hyper-directional T670SN and ruggedized underseat APs, venue operators no longer need to choose between simplicity and performance; they can have both.

The case for overhead Wi-Fi APs—when and where it works

Overhead APs have long been a staple of stadium wireless deployments, particularly in spaces with clear line of sight and moderate user density. When paired with modern high-gain, directional antennas, they can effectively cover large areas with fewer devices.

Ideal overhead use cases:

- **Concourse areas** where ceiling access is convenient
- **Clubs and luxury suites** with high ceilings and controlled density
- **Press and media zones** with structured seating and infrastructure
- **Sections with architectural access and minimal obstruction**
- **Perimeter or transitional areas** with modest bandwidth needs but large client counts

RUCKUS T670SN: Next-gen overhead performance

The RUCKUS T670SN Wi-Fi 7 AP redefines what overhead deployments can do. Purpose built for large public venues, this AP combines hyper-directionality with advanced RF intelligence to deliver precise, high-capacity coverage from above. Software selectable antennas allow this Access point to be deployed in different areas and adjust to different event types without the need for physical intervention, while simplifying maintenance and inventory.



Figure 1: RUCKUS T670SN

Key features:

- **Narrowest beamwidth available (as low as 15 degrees):** Pinpoints signal to target seating zones while minimizing bleed into neighboring areas.
- **Intent-AI™ optimization:** Continuously tunes RF settings in real time based on live user behavior, interference levels, and event-specific configurations, while allowing for substantial power savings when there are no events.
- **BeamFlex+® adaptive antennas:** Steers signal dynamically per client, optimizing connection quality and reducing co-channel interference.
- **Wi-Fi 7 enabled:** Supports cutting-edge features like multi-link operation (MLO), 320 MHz channels, and 4096-QAM for unprecedented client throughput and latency performance.

“The first true hyper-directional Wi-Fi 7 access point—engineered to reach further, adapt smarter, and deliver more from every deployment.”

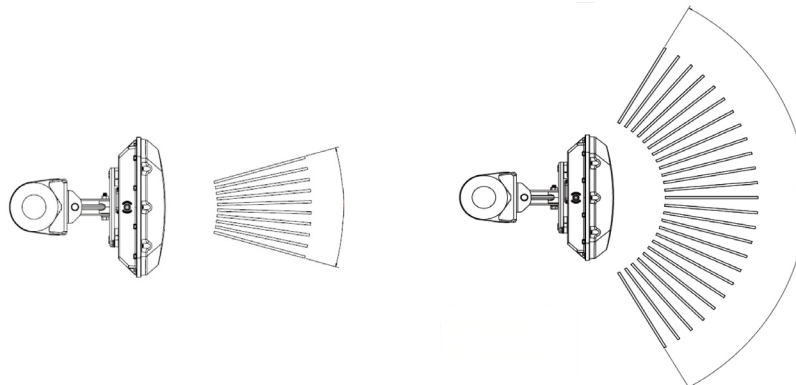
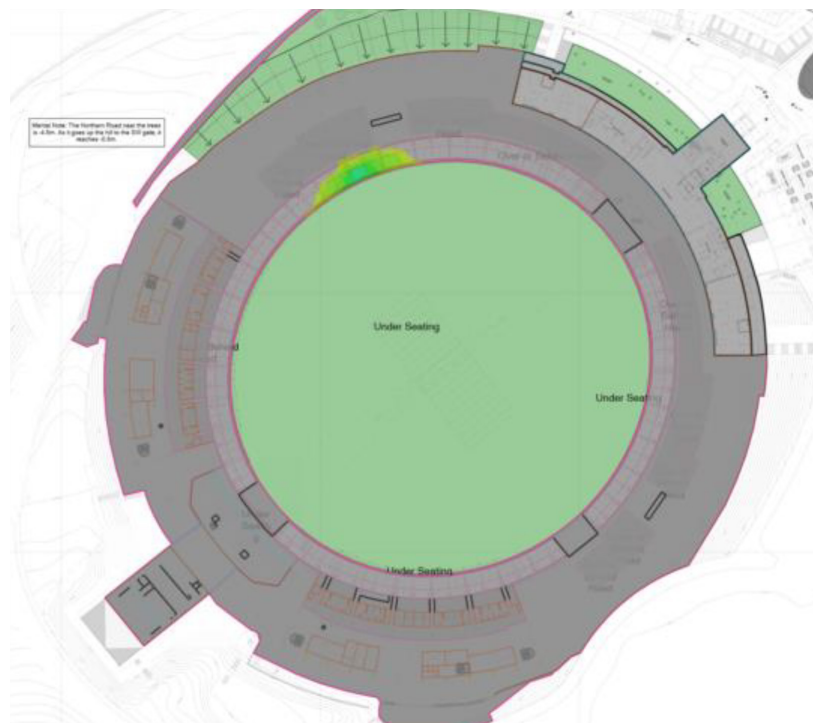
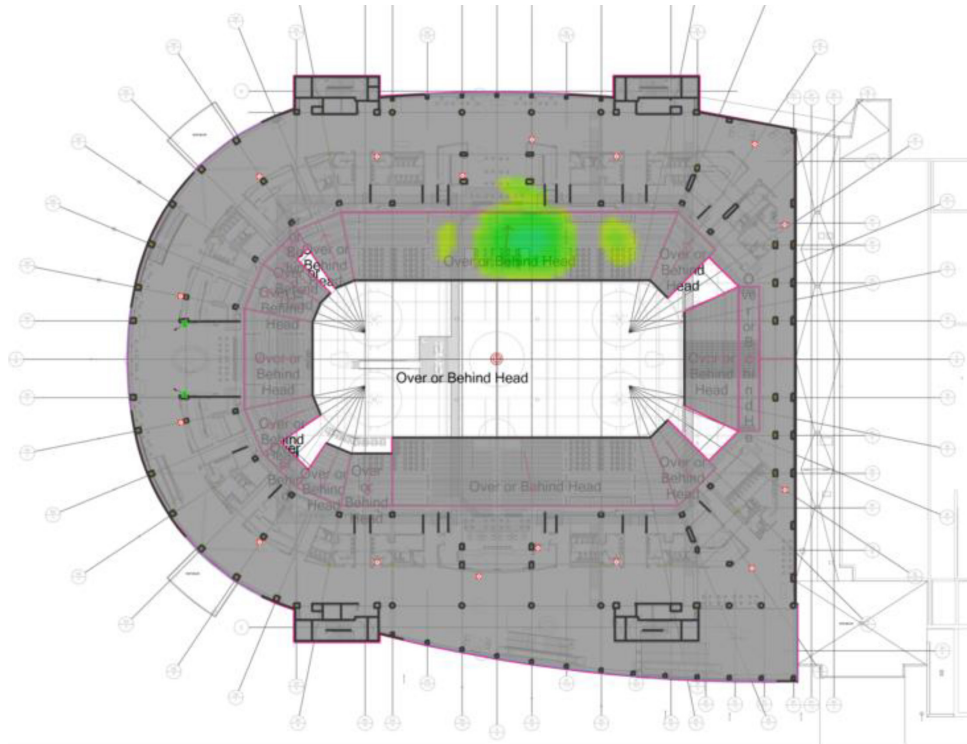


Figure 2: RUCKUS T670SN programmable coverage



Why underseat Wi-Fi still matters

While advanced overhead APs like the T670SN expand what's possible from above, they can't always overcome the physical realities of stadium design—especially in dense, lower-bowl sections packed with thousands of bodies.

RF propagation is still subject to physics, and even with Wi-Fi 7, mobile devices—constrained by size and battery—are often uplink limited. Underseat deployments reduce that distance and remove line-of-sight obstacles, improving performance where it matters most.



Figure 5: RUCKUS T670



Why underseat still reigns in key areas:

- **Human body attenuation:** Overhead signals degrade significantly as they pass through densely packed crowds.
- **Improved uplink performance:** Closer proximity to the device equals stronger SNR and higher uplink reliability.
- **Client density management:** Lower-bowl and field-level zones often exceed one device per person, necessitating per-seat AP density.
- **Application readiness:** Real-time apps like betting, replays, food ordering, and AR require fast, reliable uplink and downlink performance.

RUCKUS underseat Wi-Fi 7 APs: rugged, ready, reliable

RUCKUS offers weather-hardened, high-performance APs engineered specifically for the environmental and operational demands of underseat deployment. BeamFlex+ and Intent-AI ensure maximum per-client throughput and resiliency, even during the most crowded events, while protecting the AP and cabling from tampering, abuse and pressure washing.

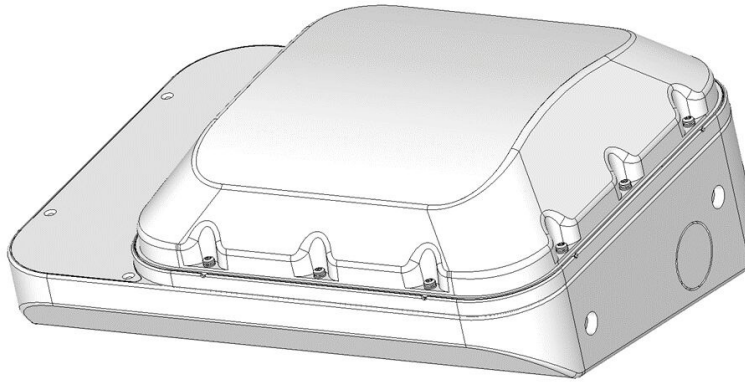


Figure 6: RUCKUS T670 underseat 10 degree tilt mounting bracket

Total cost of ownership: Debunking the underseat cost myth

Underseat Wi-Fi is often misunderstood as inherently more expensive due to perceived increases in concrete work, cabling, waterproofing, and maintenance. But while true in some cases, these assumptions are increasingly outdated.

Modern designs and AI-driven automation reduce long-term OpEx while dramatically improving user experience and revenue protection. While overhead has improved greatly in the last years, underseat still delivers higher performance and will be the preferred solution in some new builds and an easy upgrade path for existing underseat deployments.

With RUCKUS Wi-Fi 7 and Intent-AI, venues benefit from:

- **Minimized manual labor:** Intent-AI reduces time spent manually tuning or troubleshooting APs.
- **Fewer truck rolls:** Dynamic RF adjustment and purpose-built Access Points lowers the need for on-site configuration or fixes.
- **Higher reliability:** BeamFlex+ reduces co-channel interference, minimizing dropped connections and complaints.
- **Energy Efficiency:** More intelligent, targeted coverage ensures “right first time” deployments and real-time power adjustments save energy intelligently when venue is not in use.

And perhaps most importantly: *the cost of poor fan experience is far greater.*

Risk of poor Wi-Fi:

- VIP churn and reduced ticket renewals
- Lower bowl expensive seats usually are harder to reach from overhead
- Lost in-app revenue (food orders, seat upgrades, gamification)
- Negative social media sentiment during live events
- Damage to brand reputation among sponsors and fans

The power of flexibility: overhead + underseat + AI

Stadium Wi-Fi doesn't have to be an either/or decision. In fact, the highest-performing stadium networks are those that intelligently blend both deployment models—optimized by real-time analytics and adaptive RF steering.

RUCKUS delivers end-to-end stadium advantage:

- **Wi-Fi 7 performance across all deployment types:** Overhead, underseat, indoor, and outdoor.
- **Intent-AI optimization:** Continuously monitors and adapts the network, maximizing efficiency and minimizing downtime, providing venue specific Dashboards.
- **BeamFlex+ directionality:** Every client gets the best signal—wherever they sit.
- **Purpose-built APs:** Designed specifically for the demands of sports, entertainment, and high-density venues.

A flexible deployment strategy empowers operators to deliver five-star experiences, reduce support burden, and future-proof the stadium's connectivity infrastructure.

Wi-Fi 7: Built for today's fans—and tomorrow's applications

Wi-Fi 7 marks a seismic leap forward in wireless capabilities. It's not just faster—it's smarter, denser, and more reliable. With features like MLO and 320 MHz channels, venues gain a massive advantage in both user experience and future service expansion.

Wi-Fi 7 key stadium benefits:

- **Multi-link operation (MLO):** Increases connection reliability by allowing devices to simultaneously use multiple bands.
- **4096-QAM and 320 MHz channels:** Support higher data rates per AP, reducing the need for densification.
- **Low latency:** Supports delay-sensitive applications like AR/VR, interactive replays, and immersive content.
- **Spectrum puncturing:** More flexible use of fragmented spectrum, essential during congested events.

Purpose built. AI driven. Deployment flexible.

Today's venues can no longer afford to design wireless networks based on convenience or dogma. They must engineer excellence—with solutions that adapt to each section, each use case, and each game day.

RUCKUS Wi-Fi 7 solutions, powered by Intent-AI and BeamFlex+, give stadiums the freedom to deploy overhead, underseat, or both—confident that their network will deliver performance, reliability, and fan satisfaction at every level.

Whether you're outfitting a 70,000-seat outdoor stadium, an indoor arena, or a music venue, trust the wireless partner that's purpose built for your needs.

With RUCKUS, the future of stadium Wi-Fi isn't either/or. It's yes/and.



About RUCKUS Networks

RUCKUS Networks builds and delivers purpose-driven networks that perform in the demanding environments of the industries we serve. Together with our network of trusted go-to-market partners, we empower our customers to deliver exceptional experiences to the guests, students, residents, citizens and employees who count on them.

www.ruckusnetworks.com

Visit our website or contact your local RUCKUS representative for more information.

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