

# Game-Changing 5G Stadium Antennas

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For major sporting events, it used to be enough for fans just to be in the stadium, cheer the wins and boo the losses. Today they want to do all that, but they also want to share the experience. Posting images or videos on social media, streaming the event to friends and family at home, texting, talking, listening to music and a whole host of new applications – fans want to do it all.

Sports fans come in all ages, and each generation brings a new wave of fans who want deeper experiences, many of them through technology. These increasingly sophisticated applications mean greater bandwidth demands that 4G can't handle.

Providing pervasive five-bar service throughout a stadium or venue is a huge challenge, especially when demand is sporadic. Yet that is what today's fans expect. Upgrading to 5G to embrace these new experiences means evolving to provide the ultimate fan experience that keeps the crowds coming back for more.

## New Use Cases Are Driving Bandwidth Demand

The overall goal for team and stadium owners is to engage viewers of all ages more deeply in the game experience. The in-stadium experience is important, of course, but so is the home or mobile experience outside the stadium. Here are a few interesting new use cases that are part of the rising demand for bandwidth:

- [Augmented and virtual reality](#) creates a more immersive experience for fans by combining real-world elements with virtual elements, putting fans in the middle of the action
- [Analyzing traffic and congestion-flow patterns](#) reduces wait times at key areas and provides wayfinding information to help guests better navigate the venue
- [Detailed real-time play analysis](#) improves team performance
- [360 videos, 3D or volumetric content](#) and multiple camera angles enrich the fan experience
- [New Applications](#) for broadcasting, fan engagement, remote coaching, athlete health and event management are in use or coming

## The 5G Stadium Antenna for Five Bars in Every Seat

[Alpha Wireless](#) developed our multi-band 5G stadium antenna platform specifically to meet the need for comprehensive stadium and venue coverage. In fact, mobile network operator Three recently deployed the Alpha Wireless AW3873 stadium antenna to enable seamless 5G coverage throughout Stamford Bridge stadium for their partner Chelsea FC in London — a first for the UK's Premier league.

Our stadium antenna technology features a rectangular radiation pattern with a flattop main beam and steep roll-offs. Through careful control of the electrical inputs to the antenna's array, our engineers precisely control and optimize the patterns for the stadium's layout. These high-capacity stadium antennas require a different buildout perspective that visualizes grid sections as sectors. Taking a page from the outdoor-network engineer playbook, the sector is tailored using carefully crafted antenna patterns to deliver maximum capacity in each grid section. Rinse and repeat across all sections and the result is a dense sectorization of the venue that will support the increased service demand.

Despite cell densification to levels unheard of in outdoor cellular networks, the focused beams from these stadium antennas enable frequency reuse in non-adjacent sectors. That means you can deliver higher throughput at high-capacity venues without using more spectrum. These stadium antennas support multiple channels – 4G and 5G networks – and provide maximum modulation and throughput with 4x4 MIMO.

We understand that venue owners are rightly concerned about the look of new equipment installed in their stadium. Therefore, our 5G stadium antennas are designed with attractive aesthetics that make them easy to integrate into the stadium design. They also have a compact form factor and weigh less than 28 kg (62 lbs.), which makes them easy to install.

## What About DAS?

Stadium venues rely on active or hybrid indoor distributed antenna systems (iDAS) to serve attendees with cellular or WiFi data streams. An external network's service would be distributed via fiber and coax to spatially separated antenna nodes. Each node provides coverage in its target area and the size is determined based on capacity and coverage tradeoffs. iDAS can be built as a single operator solution or as a neutral host system wherein multiple network operators using different spectrum can have services delivered through a common fiber backhaul and antenna nodes. Outdoor DAS (oDAS) is similar except the antenna nodes are driven directly by closely located remote radio heads (RRH) and use the base transceiver station (BTS) signal source at a much higher power than iDAS.

Regardless of the distribution scheme, the conducted power delivered to the antenna and its radiation performance will determine the signal strength, quality and interference into neighbor sections. In high capacity venues, directional DAS antennas are strategically placed under the seat, overhead, or on railings to create a picocell architecture. To address increased demand, the number of network cells needs to increase tenfold, which is costly and runs into issues with interference at the cell edge. The sector bleed-off translates to dropped calls during handoffs or a drop in streaming video quality to the attendee. Dialing down the power does reduce interference, but at a cost of network quality in the cells.

Achieving this cell density requires tightly focused antenna beams that precisely cover the seating area in the cell with a strong signal. The pattern must also drop off sharply outside the cell to avoid interference with a neighboring cell on the same channel.

The Alpha Wireless stadium antennas are designed to meet these density requirements and support multi-operator DAS deployments. Our high-capacity stadium antennas with their well-defined rectangular beam patterns are ideally suited for sectional grid seating and support multiple bands. Operators can reap the throughput benefits of 4x4 MIMO and efficiently utilize their entire spectrum using multiple stadium antennas without having to worry about interference between sections.

## **Alpha Wireless is Your Antenna Partner**

Alpha Wireless has more than 15 years of experience designing, manufacturing and delivering high-performance, quality antennas around the world. To date, we have more than 1.5 million antennas installed globally.

We deliver even custom designs in 90 days, about half the time of a standard antenna delivery. This can be vitally important if the project needs to be ready before the start of a new sports season or major event.

We achieve such fast delivery in several ways. Our engineering and manufacturing facilities are co-located in Ireland, which means close communication and no long shipping times from China or India. We believe in close collaboration with our clients, and we're an agile company with a focused team that goes above and beyond to meet customer needs.

Alpha Wireless engineers are all long-time antenna designers with a strong focus on innovation. The engineers who created the AW3873 5G stadium antenna also designed antennas for the 2000 Sydney Olympic stadium. They applied lessons learned to these antennas and upgraded for the 5G networks of today.

[Contact us today](#) to talk with our antenna experts.

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