



# **MILWAUKEE BUCKS FAN CONNECTIVITY**

Fiserv Forum Redefines the World Class Fan Experience



## Overview: A Wireless Network to Serve Multiple Generations

Fiserv Forum, the new home of the NBA's Milwaukee Bucks basketball team, is more than just an arena in the downtown Milwaukee area. This 730,000-square-foot sports and entertainment facility is a central recreation hub in Wisconsin's biggest city, which will gain even further relevance as the 30 acres surrounding it are developed with entertainment, residential and commercial spaces. It will be the largest development ever in downtown Milwaukee, changing the face of the city for generations to come.

Today's fan expectations are evolving, and Fiserv Forum wanted to guarantee a world class experience. To provide this superior experience for current and future generations, it was critical that the arena supply the best mobile communications. In order to ensure powerful wireless connectivity, the solution designer and network operator, ExteNet Systems, evaluated several technologies, but JMA Wireless, a global and proven leader of wireless communication solutions, topped the list. The JMA Wireless portfolio includes innovative offerings that fit Fiserv Forum's requirements.



Photo courtesy of the Milwaukee Bucks

## Situation: Complex Sports Venue Leads to Complex Challenges

Today's arenas are complex environments that require wireless connectivity for many reasons – from guaranteeing an excellent fan experience and ensuring safety and security for all to intelligently managing the facility and improving operations. It is critical that a wireless network is both reliable and robust enough to handle all these different use cases. And, with the introduction of 5G imminent, it must be future-proof to support this transition that will introduce even more applications and services to the network.

Congested wireless networks often can be a critical problem at a large venue such as Fiserv Forum. This issue is caused by a high volume of users concentrated across a limited area, all expecting wireless connectivity, pretty much from the moment they arrive at the entrance through their eventual departure. In addition, to better serve fans, major sports venues are increasingly going paperless, so the smartphone becomes the personal gateway for gaining entrance, finding your seat, ordering from and paying concessions, sharing event experiences, and even enabling your transportation home. Today 92 percent of Millennials and 77 percent of the overall US population use smartphones.<sup>1</sup> And, fans use these mobile devices to routinely share their onsite experiences, resulting in terabytes (1 TB = ~ 500 hours of video) of data being transported in a few short hours. This issue will soon be further amplified as 5G use cases become a reality.

Since Fiserv Forum is an entertainment hub for Wisconsin, the fans/mobile phone users who pass through its doors include subscribers to a variety of wireless carriers, using various frequency bands and technologies. It is critical that the wireless system transparently and seamlessly support all cellular operators and bands.

Furthermore, dedicated wireless coverage is necessary for public safety. In the unlikely event of an emergency, it

is critical that not only first responders, but also fans and employees have reliable access to mobile communications. This ultimately helps expedite the deployment of key resources to mitigate the emergency while also directing fans and staff where to exit. Without it, a situation can become highly chaotic and even lead to a larger crisis.

Providing reliable cellular coverage and the underlying network capacity for over 17,000 people in a single location is never a routine exercise. At virtually all venues, this challenge is further compounded by the tons of steel and concrete used in its construction. These materials naturally impede or reflect cellular signals from the existing macro towers outside. The in-building dedicated network eliminates the need to rely on the legacy outdoor network for indoor connectivity.

## Solution: JMA Wireless Brings Innovation and Much More

Similar to plumbing and electricity, Fiserv Forum considered the wireless system a foundational utility, and included it in the venue's architectural plans. From contract signing to an operational wireless system took a total of seven months. The JMA Wireless and ExteNet teams worked together to ensure

the network was operational for the venue's August 2018 opening. Multiple solutions from JMA Wireless were deployed to ensure powerful mobile communications throughout the forum.

The multi-band, multi-carrier TEK0® DAS (distributed antenna system) from JMA Wireless was deployed to provide wireless coverage and capacity for five cellular carriers. The system supports the following LTE bands: 700 MHz, 850 MHz, 1900 MHz, 2100 MHz, 2300 MHz and 2500 MHz. And, this future-proof offering will ensure Fiserv Forum is ready for 5G.

The cellular connectivity across the 730,000-square-foot arena is enabled by eight high power remote units (RUs) and 76 software defined remote units (SDRUs). Only a single fiber was used per RU to connect it with the system's master unit (MU), which reduces installation costs by up to 75 percent as compared to competitive offerings. And, the SDRUs provided additional time and cost savings. With the SDRU panel, the serial number of every remote unit, power classes and enabled bands are conveniently available. As 5G becomes mainstream, the SDRUs can be upgraded easily via software – no downtime, bucket trucks, additional cabling or onsite personnel are necessary.

***"We are all about the experience at Fiserv Forum and connectivity is hugely important. The DAS is the most important piece of technology in the arena, so that is why we deployed the JMA Wireless solution."***

**Robert Cordova**  
Chief Technology Officer  
Milwaukee Bucks



In addition, 215 antennas were installed at Fiserv Forum. The antennas include a combination of 119 omni-directional and 96 panels. Currently, they are supporting 34 sectors, with plans for expansion as the surrounding 30 acres are developed.

Finally, the FUZE™ platform from JMA Wireless was deployed to support the forum's heterogeneous network. It includes an integrated IDF mounting and cabling kit for DAS and Wi-Fi delivery. Plus, the platform's Digital Electricity™ feature is perfect for large venues and surrounding areas because it can supply power to equipment up to one mile away. Composite cable (fiber and copper in one sheath), which consolidates everything onto a single "pull" cable was used. And it meets IEC and UL safety requirements without running metal conduits, which is not only tedious, but also expensive.

## Result: A Wireless Victory

Thanks to JMA Wireless and ExteNet Systems, Fiserv Forum has been able to provide a world class experience to its fans from day one. And, as 5G becomes mainstream, Fiserv Forum's wireless network will be ready to support new and exciting capabilities.

***"We selected JMA Wireless for the cellular coverage needs at Fiserv Forum because they offer some of the most innovative yet cost-effective solutions in the industry today. Plus, we were fortunate to work with a team with extensive technical knowledge and expertise to deliver a world class solution in a challenging new-build environment."***

Tormod Larsen  
Chief Technology Officer  
ExteNet Systems



### About JMA Wireless

JMA Wireless designs and builds next generation in-building and outdoor mobile wireless systems, delivering the industry's most powerful technologies that enable LTE, 5G, and CBRS services on mobile operator networks worldwide. JMA Wireless' X-RAN™ leads the industry with the only 100 percent virtualized RAN platform, combined with its TEKO®, NWAV and line of RF distribution technologies. JMA Wireless is a U.S. based company with manufacturing, R&D, and sales operations in over 20 locations worldwide. For more information, see [jmawireless.com](http://jmawireless.com) or follow us on Twitter @JMAwireless.



### About ExteNet Systems

ExteNet Systems, Inc. designs, builds, owns and operates communications infrastructure solutions, for use by its customers across the United States. Customers include the service providers and wireless carriers, cities and communities, property owners, and enterprises. Network solutions include fiber infrastructure, distributed antenna systems (DAS), remote radio heads (RRH), small cells, Wi-Fi and LTE Evolved Packet Core (EPC). ExteNet's outdoor networks are deployed in a variety of urban, suburban and rural environments while indoor networks are typically deployed in property verticals such as commercial office buildings, sports and entertainment venues, hotels and convention centers, healthcare facilities and transit systems. For more information, please visit [www.extenetsystems.com](http://www.extenetsystems.com).

Source: "Mobile Fact Sheet", February 5, 2018, Pew Research Center

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