

Wembley Stadium

Working with EE to deliver a high performance coverage solution to support the increased data demand

COBHAM

Case Study

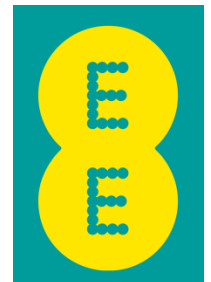
The most important thing we build is trust

Overview

Cobham Wireless teamed up with EE to deliver a flexible and reliable DAS solution to address the connectivity problems and significant increase in mobile traffic from fans sharing their experience with friends and family through calls, texts and social media.

Challenge

In this environment, the cellular network at the venue becomes strained as high volumes of spectators rush to use their mobile devices to communicate and share content online. The huge volume of uplink traffic posed a significant challenge, as did the structure of the stadium itself, which disrupted, and in some cases blocked, radio signals; preventing continuous signal propagation across the entire venue.



The Challenge

Wembley Stadium, with a capacity of 92,000, is the second largest stadium in Europe and regularly plays host to sell-out music concerts, as well as England football internationals and Rugby League Finals. In this environment, the cellular network at the venue becomes strained as high volumes of spectators rush to use their mobile devices to communicate and share content online. The huge volume of uplink traffic posed a significant challenge, as did the structure of the stadium itself, which disrupted, and in some cases blocked, radio signals; preventing continuous signal propagation across the entire venue.

EE, the UK's largest mobile operator, was selected by Wembley Stadium to boost mobile coverage at the venue. The incumbent cellular network didn't have the capacity to support the large volumes of mobile traffic. EE required a solution that could handle the massive demand for high bandwidth services and peaks during major events driven by voice calls, messaging and media uploaded to, and streamed from social media sites. Whatever system was chosen would also have to be configured to support 4G traffic for all the other major UK operators.

EE therefore required a system that could provide the requisite coverage and capacity to support a high concentration of users over specific time periods.

The Solution

EE approached Cobham Wireless, leaders in the provision of advanced wireless coverage, following the success of distributed antenna system (DAS) deployments in stadiums across the UK during the London Olympics 2012. A high performance specification, the ability to meet the detailed noise level requirements set by EE and low levels of heat dissipation also influenced the decision. Working with EE, Cobham Wireless implemented a DAS network which has allowed for a significant increase in mobile traffic at Wembley Stadium.

The DAS provided a flexible and reliable solution to Wembley Stadium's connectivity problems by dividing coverage into sectors. From multiple MNOs base stations inside the stadium, radio signal is sent to an Optical Master Unit (OMU), via a signal conditioning Active Point of Interface (APOI). At the OMU, the radio signal is converted into an optical signal and then distributed to several remote units within the stadium. A single fibre cable connects the OMU to the remote units.

The remote units deployed in the gantry for bowl coverage are paired quad-band, used in a multiple-input multiple-output (MIMO) fashion, supporting the full range of cellular



MBF-40 remote unit

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Dr Kin W Wan, Special Project and Events, EE

bands 800 MHz, 900 MHz, 1800MHz, 2100 MHz, 2600MHz (providing the multiple streams for the 800, 1800 and 2600 LTE bands). The indoor remotes consisted of mainly 5 band units, whereby all 5 cellular bands are distributed over a single fibre. They provision all cellular wireless technologies including GSM, WCDMA and LTE. At the remotes, the optical signal is converted back in to an RF signal, and coverage is distributed to DAS cells, across 25 sectors around the stadium, delivering connectivity across the entire site.

The Benefit

Cobham's DAS infrastructure has resulted in low signal loss, thanks to the sectorisation of capacity across the stadium, and by running individual repeaters to different sector areas. Focussing signals from different base stations and distributing these throughout the stadium also means that infrastructure is shared and less equipment is needed, reducing costs. The solution is easily scalable, allowing more sectors to be added as greater capacity and coverage is required.

"We decided to partner with Cobham Wireless because of the level of customisation they were able to provide for the deployment," said Dr Kin W Wan, special projects and events, EE. "The master equipment was tailored to the requirements of the project and the flexible solution allowed us to route the system to specific locations, reducing interference and increasing capacity across the network."

The benefits to stadium visitors have been significant. Within the space of 16 months of installation (between February 2012 and March 2015) 4G and 3G usage increased by 455%. Data speeds on the network have also increased considerably, offering an average upload speed of approximately 20.1Mbps in 2016, up from 8Mbps in early 2015. This means visitors can now potentially upload an image in less than two seconds.

The DAS has proved to be robust enough to cope with any large spikes in mobile usage, particularly music events at the venue that tend to generate significant amounts of 4G and 3G traffic. For example, a Beyoncé concert in July 2016 generated four times the 3G and 4G traffic than a One Direction show that took place in 2014, prior to the network installation. In June 2016, at the Capital Summertime Ball (a mini music festival), mobile traffic exceeded 2 terabytes, a record amount recorded on the network. This was also double the volume of traffic at the event the previous year.

The 4G experience is now seamless, users are able to make calls and share media without any restrictions, despite the fact 4G traffic has quadrupled during the 18 months since the DAS was installed.

