The Shard

Working with Vodafone to push coverage to the dizzy heights of The Shard

Case Study

The most important thing will build is trust

Overview

Bringing cellular coverage inside one the UK's most iconic buildings. Working with Vodafone, we delivered a distributed antenna system (DAS) that supports the demands of those on all 72 storeys.

Challenge

This was a large project with the building reaching 244 metres high! With 80% of mobile phone usage now coming from within buildings, the requirement for a reliable mobile phone coverage system to meet the increased demand is essential.

The Challenge

We all know that being indoors and not being able to use your mobile phone can be hugely frustrating, but with 80% of mobile phone usage now coming from within buildings, wireless coverage is fast becoming known as the fourth utility. People no longer want it, they expect it – anytime, anywhere.

Vodafone and the team at The Shard – one of the UK's most iconic buildings – faced the challenge of providing reliable mobile reception within a multi-use environment reaching the dizzy height of 244 metres or 72 storeys. The building is home to a couple of top-flight restaurants, the 5-star Shangri-La Hotel, some high-end residential apartments and a busy office block. For a quick snapshot of how many people that means, picture this: The Shard gets narrower as it heads to the skies, but even on the 18,000 square foot viewing platforms there's room for 200 people at a time.

As networks are generally set up to provide signal to 'where people are' (usually on the ground) antennas alone can only send a signal upwards so far before it degrades and eventually fades out completely. So the team at The Shard needed an indoor coverage solution that could feed mobile phone signal up and across all the floors of the building in a consistent and reliable manner.

Vodafone UK approached Cobham Wireless to help provide a network that would achieve this objective, using the latest in RF-over-fibre technology.

The Solution

The team at Cobham Wireless provided a Distributed Antenna System (DAS) that utilised the existing backbone infrastructure of the building. The solution works by taking the signal from a local BTS Hotel in the basement and converting it into light, before feeding the RF, over fibre, to various remote units spread throughout the building.

Now for some detail…

Some of the equipment that feeds the system in The Shard

The radio services are provided by a number of base stations connected to an RF combiner. The RF combiner provides a Point of Interface (POI) for the radio services to the optical master system and has the capability to be expanded to carry further radio services, thus future-proofing the system.

The RF combiner is in turn connected to an Optical Master Unit (OMU) which converts the radio signals into light for onward transmission via fibre optic cables to remote units located on various levels of the building. The remote units convert the optical signals back into the original radio frequencies where a network of antennas then distributes the signal around the different floors.

In The Shard there is a total of 23 fibre-fed remote units covering a number of floors. The system has been divided into 17 sectors to ensure high capacity coverage and Quality of Service (QoS) to its users. Each remote unit is then connected to several antennas. The antennas are connected via a network of coaxial cables, splitters and couplers.

The Benefit

View from the top during installation

There are a number of benefits that an in-building installation such as the one in The Shard can bring.

In many instances outdoor cellular coverage is blocked by high penetration loss of modern buildings. The materials used to build such structures often shield wireless signals from outside so the in-building Fibre DAS used in The Shard helps the property owners to overcome this problem.

Dominant cell definitions are often disturbed by multiple cells from outside but by providing designated coverage within the building itself this problem is eliminated completely.

The radio coverage in The Shard was checked as part of the commissioning process and results showed that it was perfectly in line with the system performance specified in the original Cobham Wireless design.

Compared to other technologies in this space, an Cobham Wireless Fibre DAS is a multi-band, multi-operator system that works in any frequency combination that is required. This flexibility means systems are able to cope with growth as and when it is required. It also means less equipment needs to be deployed, resulting in a smaller footprint within the building and savings on both CAPEX and OPEX - as well as simplifying the network design, of course.

In the case of The Shard, the Cobham Wireless Fibre DAS means that it's one of the country's newest landmarks and the highest man-made point in the UK that Vodafone customers will be able to text, call and Tweet from.

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