

The Berlin U-Bahn

Overview

Cobham Wireless worked with operator Telefónica to deliver wireless broadband on Berlin's U-Bahn for subscribers of all three of Germany's major mobile operators. Cobham's idDAS (intelligent digital distributed antenna system) is now providing reliable, high-quality connectivity services for millions of passengers, following a project that involved minimal disruption and that reduces OPEX.

Challenge

The historic underground transport network presented a challenging environment in which to lay fibre cabling and house equipment. The legacy systems supported just one operator each, with limited options to expand or configure the architecture.

The Tech

- Multiband/multi-operator remote units supporting up to 43dBm per band
- Full digital DAS system enabling cascading of up to six remote units without signal degradation and link budget limitations
- Digital DAS system supporting LTE-A features (Carrier Aggregation, 256QAM)



The Challenge

Berlin's U-Bahn is an underground railway network and, at over 100 years old, is one of the world's most historic. The network serves 173 stations spread across ten lines, with a total track length of over 151.km, about 80% of which is underground. Hundreds of millions of passengers use the U-Bahn every year, yet delivering reliable, effective cellular connectivity for all remained a challenge.

The U-Bahn got its first wireless connectivity solution back in 1995, with a digital antenna system (DAS) from E-Plus (a mobile operator which was later acquired by Telefónica). This was followed by the deployments of two additional DAS. However, each system only supported a single operator and, due to the legacy equipment in use, it was not possible to bundle the three into a unified, multi-operator solution.

Replacing the legacy systems would have typically required installing lots of fibre. This would have been a significant cost for Berlin's metro authorities and would have caused significant disruption to the U-Bahn's users. What was needed was a cost- and energy-efficient wireless coverage solution which provided reliable connectivity for multiple operators. Due to the challenging underground environment, the solution would also have to take up minimal space.

The U-Bahn may have first opened in 1902, but as it's now serving a busy metropolis, the passenger experience and its coverage technology definitely needed to be brought into the 21st century.

The Solution

Cobham Wireless was selected to replace and update the legacy system and deliver a much-needed upgrade to the U-Bahn. With its experience connecting Berlin's Fan Mile and providing an extensive smart city coverage solution for the capital, Cobham Wireless was the ideal partner for Telefónica, the lead operator on the project.

Cobham Wireless worked with Telefónica to phase out old equipment and replace this with an intelligent digital DAS (idDAS). The multi-operator, multi-frequency idDAS provides secure, reliable, high-bandwidth 4G cellular connectivity for subscribers of Vodafone and Deutsche Telekom, as well as continuing to support Telefónica subscribers.

The architecture of the solution includes a number of base transceiver station (BTS) hotels located outside of the U-Bahn. Housing these in a separate technical room allowed stakeholders involved to overcome the limited amount of physical space in the problematic underground environment.

Finally, using idDAS meant it was possible to reduce the number of BTS hotels used.

The Benefit

"The idDAS wireless coverage solution is now delivering the high data throughput and capacity required to support the hundreds of millions of passengers who use the U-Bahn every year," commented Ingo Flömer, CTO, Sales, Marketing and Business Development, Cobham Wireless.

By reducing the number of BTS hotels required, the use of idDAS also significantly reduced operational costs as well as those associated with site rental. Long-term costs have also been minimised, as the idDAS is accompanied by Cobham Wireless' Active Element Manager, a management, operations and support centre. This facilitates system upgrades and network configuration changes, meaning the solution can be quickly and easily adapted to support additional operators and bandwidths, as well as facilitating 5G connectivity further down the line.

"We've developed idDAS to help solve the challenges many venue owners – or those overseeing transport projects – typically face: they need to support multiple operators on multiple frequencies, and to deliver connectivity to a high volume of connected devices. We've achieved this for a significant number of underground transport routes across the world, reducing the CAPEX and OPEX for those involved in the project, and guaranteeing a future-proof solution to connectivity challenges," added Flömer.

Thanks to Cobham Wireless's technology, 4G coverage is now available to all subscribers on almost half of the U-Bahn network, with other areas being phased in over the coming months.