



RADIO
FREQUENCY
SYSTEMS

Case Study Streamlining fronthaul connectivity in Italy

5G may be a wireless technology, but fiber is a critical element of its infrastructure. To deliver the promises on speed and latency, 5G needs fiber and lots of it.

In radio access networks, a typical cell site needs fiber connections for fronthaul, midhaul, and backhaul, and each comes with its own set of challenges. A tier one operator and OEM partner needed a solution that would deliver both a fronthaul fiber connection from the Baseband Unit (BBU) and a power connection to its Active Antenna Systems at Macro sites in Italy.

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The challenges

A bespoke solution was needed to address several requirements that the customer had for the immediate functionality of the base station and to ensure future-proofing:

- **The solution needed to be compact.** To cope with the demand for connectivity, cell sites are increasingly crowded, with space at a premium. A solution that allowed for a space-efficient deployment was essential.
- **The solution needed to deliver power and fiber** to serve the antennas on each base station site. It would also need to maintain the performance of both cables between the BBU and the antenna; depending on the height of the tower, this distance would range between 15m and 90m.
- Finally, **the cables needed to be simple for field teams** to deploy and also **be capable of adapting to meet future requirements** without needing to rip and replace.

The solution

RFS worked closely with the operator and OEM over several years to refine the **approach** that would be rolled out across various base station sites in Italy. The customer-centered R&D process looked at several approaches that have been implemented by operators around the world to determine the best approach for the operator's needs. **A full hybrid option that combined power and fiber into a single riser, multiple power and fiber feeds, and cables that connected directly to the active antenna** are a few examples. **This gave the customer full visibility of the possible options and allowed them to refine a custom final product.** As the Hong Kong market was one of the first to fully commit to 5G rollouts, much of the equipment for the project was specifically designed to meet the particular needs of the Hong Kong market. **RFS developed new broadband radiating cable RLKX114 which is a 1-1/4" size cable operational up to 3.8 GHz. Along with tailoring multiple indoor devices to address a wide variety of frequencies ranging from 617MHz up to 6000 MHz as required.**

Following trials and testing at RFS's Hannover site, it was determined that the best approach would be to use two discrete multi-riser trunks; one for DC Power and one for Optical Fiber. The cables were designed to **meet European CPR standards** and manufactured in line with Cca classification requirements. Additionally, to address the space challenges on-site, **the cables were terminated with a compact distributor. This removed the need for a dedicated cabinet at the top of the tower,** as cables could be connected via jumpers directly to the active antenna. It allowed for a more **streamlined site footprint and easier installation process.**

The result

The result was a cable configuration that completely addressed the needs of both the operator and OEM for this deployment scenario.

Compact: Firstly, by combining all DC power and all fiber requirements into two discrete trunks, the number of cables that needed to run up the tower was streamlined. Secondly, terminating the cable with compact distributors that connect via a jumper to the antenna removes the need for a dedicated distribution cabinet at the top of the tower, minimizing the space needed per antenna.

Easy installation: A second benefit of terminating the cable with compact distributors allows for simple and quick installation. The installer simply needs to join the cable to the antenna via a jumper, and the plug-and-play connectors remove the need for specialist installation tools.

Future-proofing: One of the big advantages of RFS cable is the focus on premium quality to ensure the

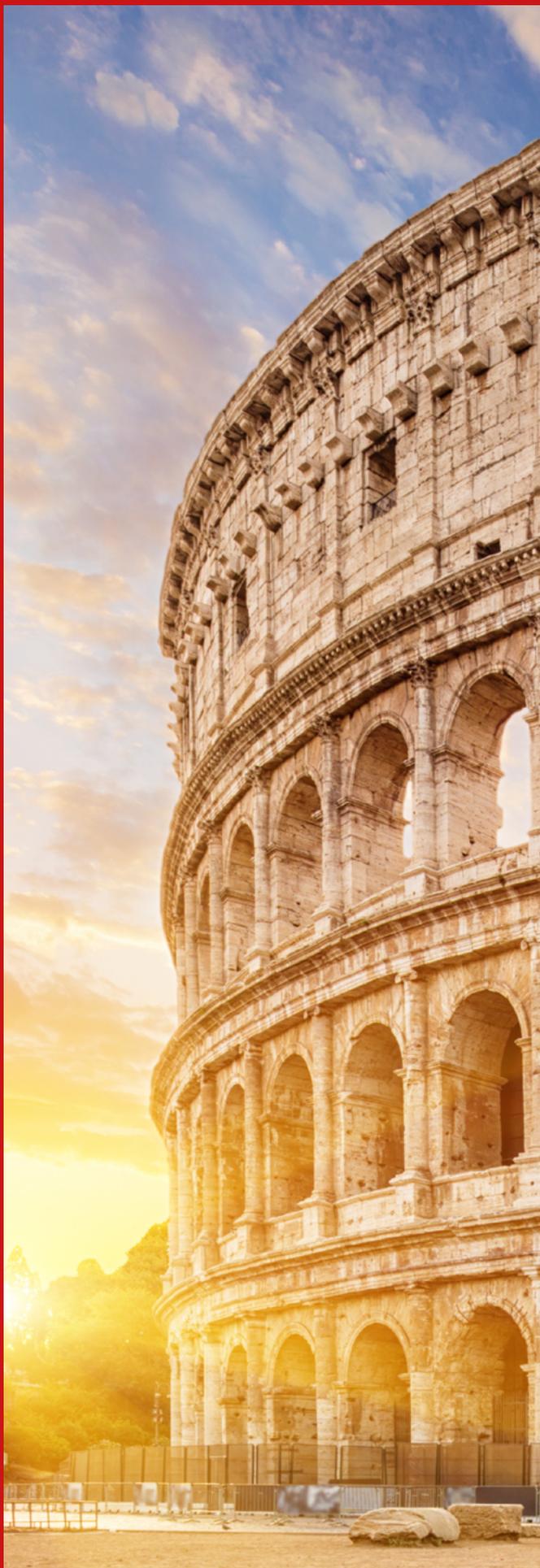
product life span is optimized – for a properly installed cable trunk, service life time can easily reach 10 to 20 years and more, with minimal degradation. Active equipment will need to be upgraded on a more regular basis and so it is important that the cable can adapt to support future technologies. By using a series of jumpers to connect to the active antenna, there is maximum flexibility to upgrade antennas. Jumper cables can be replaced as necessary, and the existing cable will support future equipment.

High performance: Particularly when designing fiber optic solutions, it is key that the product is robust enough not to be damaged during installation. The way RFS manufactures its cables ensures that cables do not become damaged during installation. The result was that the performance of the equipment supplied met the expectations of the customer consistently across multiple site rollouts.

“This project demonstrates RFS’s strength in taking a customer’s pain points, understanding how they want to tackle those challenges, and creating a solution that fully addresses them. RFS was able to streamline the process of active antenna installation and address some of the space challenges on macro sites, with a „compact solution that will continue to perform for decades to come.”

Nemo Galletti, RFS Site Leader and Regional Sales Manager





Lifetime Connectivity

At RFS we specialize in the design and manufacture of premium, future-ready cable solutions for customers across the globe. With over 120 years of heritage in the industry, we build reliable and long service life connectivity systems. **Because we care about our collective future.**

- We design innovative cable solutions that deliver best-in-class connectivity while tackling network pain points and offering a lower Total Cost of Ownership.
- We bring passion and expertise at every stage, from R&D to installation, to meet our business partners' expectations.
- We deliver the communications foundation for digital transformation across a range of industries including oil & gas, mining, and rail.
- We are changing the perception that all cable is created equal and demonstrating the potential of premium solutions.
- We offer a dynamic and stimulating working environment that promotes diversity and fosters personal and collective accomplishments.
- We are committed to sustainability with greener manufacturing processes and designing long-life equipment with low-energy consumption to support our customers' climate goals.