



ROMA TERMINI TRAIN STATION

Enhancing the Travel Experience for Rome's Train Passengers

CASE STUDY: ROMA TERMINI TRAIN STATION

The JMA Wireless JMA DAS Platform Ensures Robust Mobile Communications at Roma Termini Railway Station

OVERVIEW

Time for Transformation

For many years the cellular coverage in the Roma Termini Railway Station was very spotty and unreliable. However, nothing was done to improve it until recently. The catalyst for this change was the carriers' recent investment in LTE. Once LTE was implemented, the station operator realized consistent wireless coverage had to be provided in and around the facility; therefore, the JMA DAS (Distributed Antenna System) from JMA Wireless was installed. With this powerful and modular DAS solution robust cellular coverage is available everywhere and even during peak commuting times.

SITUATION

The Many Challenges of Supplying Powerful Cellular Communications

Everyday approximately a half million travelers use Rome's train system. The main railway station, Roma Termini, is one of the largest train stations in all of Europe providing not only travel to local destinations, but to international locations such as Munich, Paris, Geneva, and Vienna too. In addition, Roma Termini is home to more than 100 shops, a post office, travel agency and other types of businesses. With the advent of LTE, this bustling station knew it was more important than ever to ensure powerful cellular coverage for its passengers, businesses and railway staff.

500,000 People a Day Travel through Roma Termini Railway Station





The JMA Wireless antennas provide robust cellular coverage for passengers and the businesses located inside the station

“Once LTE gained traction, the Roma Termini Station knew they needed a system to support robust cellular coverage and they needed it now. We at TELEKTRA turned to JMA Wireless for its JMA DAS solution. Its very flexible and modular design enabled us to provide a cost efficient and robust system within two months.”

MIRKO BORGNA, OPERATIONS DIRECTOR
TELEKTRA S.R.L.

The JMA Wireless team and its integration partner, Telekra S.R.L., realized this would not be an easy task due to the many obstacles. To start with, Italy has very stringent limits in terms of the amount of electromagnetic radiation exposure for people, ranging from only .6 to 6.0 volts depending on the location. The team had to deploy many low power antennas in an effective manner throughout the facility to meet those limits.

Next, the construction of the facility and the numerous indoor and outdoor areas to be covered created further challenges. The station is constructed of steel and concrete, materials that naturally impede cellular signals from the outside. Powerful wireless coverage not only had to be achieved in above ground indoor areas, but also it needed to cover key underground areas such as baggage claim and platforms as well as the outside taxi stand.

Finally, the issue of densification, which is a term used to describe dense areas of mobile subscribers with a high demand for cellular connectivity, is present during peak travel hours. During their commute many travelers use their mobile devices for personal and business purposes. In addition, the many businesses in the station depend on cellular communications during these peak times.

SOLUTION

The Powerful JMA DAS

Since 2000 the Roma Termini Station was considering ways to ensure cellular coverage in-building and outdoors. However, it was not until LTE was officially launched by the operators that the station decided to deploy a DAS to guarantee wireless coverage and capacity for its millions of passengers every year. Once the decision was made to install a DAS, the team at the Roma Termini Station selected Telekra as their integration partner. Telekra knew it needed a very robust solution in order to overcome the many obstacles; therefore, they turned to the JMA Wireless JMA DAS platform.

The JMA DAS is a multi-band, multi-carrier modular solution, which easily provides cellular coverage and capacity for indoor and outdoor environments. One of its main components, the rack mounted Master Unit (MU), combines different high speed wireless technologies, such as LTE and UMTS, with multiple bands to serve the various needs of the environment. Furthermore, with its future proofed design, the JMA DAS can introduce new services or enhance existing technology without any major system upgrades. Existing infrastructure can be leveraged easily.

Only a single optical fiber cable is necessary to simultaneously distribute multiple frequency bands and multiple carriers from the Master Unit to one or more Remote Units (RUs) ranging in power from very high to low. These RUs can be located in-building or outdoors. The amount of optical fiber needed to support the JMA DAS is 50 percent to 75 percent less than competitive offerings in the market today, making it an extremely cost efficient solution.

Due to three different technologies developed by JMA Wireless, the JMA DAS is able to connect its Remote Units with a minimal number of fibers.

- WDM (Wavelength Division Multiplexing): WDM filters are integrated in optical modules, which allow a single fiber per Remote Unit to be used to support two different wavelengths for uplink and downlink transmissions.
- Point-to-Point Link: With a single fiber, up to 16 Remote Units belonging to a sector and one MIMO (multiple input multiple output) path can be connected. A star topology is used to connect all RU locations throughout a facility.
- DWDM (Dense Wavelength Division Multiplexing): DWDM mux/demux are integrated in the head-end rack at the BTS hotel and in the remote location to further minimize the number of fibers needed. With DWDM filters up to four sectors or 64 total Remote Units can be supported by a single fiber, as compared to the 64 separate fibers often required by the competition.

This type of deployment not only results in reduced cost and complexity, but in better performance as well. Both in the Point-to-Point modules and in the Remote Units the DAS solution acts on ad-hoc settings in order to find the optimal trade-off between system noise and robustness (i.e. intermodulation performance).

The JMA DAS automatically supports the various power levels of the RUs and brings the proper level to the BTS (Base Transceiver Station), which is located in a wiring room or data center on premise or offsite. The off-premise option known as C-DAS or Centralized Distributed Antenna System centralizes resources and enables deployments to reclaim up to 85 percent of valuable onsite real estate. With the C-DAS solution capacity can be moved into different areas as needed during peak times resulting in better utilization of the spectrum. C-DAS deployments are optimal for metro areas or large campus environments.



A single fiber connects the 22 Remote Units throughout the station.



With a very small footprint, the JMA DAS enables powerful cellular coverage for the taxi stand outside.



500,000 people a day travel through Roma Termini Railway Station

22 PAIRS of Remote Units

5.5 KILOMETERS of Fiber

65 Antennas

12 SECTORS

- 3 GSM 1800 MHz
- 6 UMTS 2100 MHz
- 3 LTE 2600 MHz

Solution Specifics

In order to achieve the station's desired goal of uniform coverage Telektra deployed the JMA DAS from JMA Wireless. A rack mounted Master Unit (MU) was installed in a technical room situated near the station. From the MU a single fiber cable trunk was deployed with several branches spreading to 22 pairs of Remote Units – 10 high power and 12 low power. A star topology was implemented with a single fiber per RU. In total only 5.5 kilometers of fiber were installed to support the entire system, which is substantially less than competitive offerings. Each pair of Remote Units includes one on 1800 MHz / 2600 MHz and the other RU on 2100 MHz / 2600 MHz. The dual RU at 2600 MHz enables MIMO (multiple input multiple output) service for nine Omni MIMO antennas on the lower level of the station. In addition, the system consists of 12 sectors covering GSM, UMTS and LTE technologies. Within two months Telektra had the new DAS functional and supporting the wireless communication needs of many subscribers.

RESULT

Wireless Communications Anytime, Anywhere

Even during peak commuter times the JMA DAS has been able to meet densification demands not only attributed to its half million daily passengers, but by businesses and onsite staff as well. Macro antennas are no longer the sole sources of wireless connectivity. The JMA Wireless antennas can be redirected remotely to better provide coverage and capacity needed in densely populated areas of the station or during peak commuting hours. This feature already has proven to be a huge success.

The need for a single optical fiber per RU has resulted in an extremely cost effective and efficient solution for Roma Termini. Furthermore, the modular JMA DAS experience at leading companies in the industry. They have provided human and technological resources for the construction and maintenance of microwave links and indoor coverage in central Italy. Over the years Telektra has developed expertise and experience by extending its area of operation to all parts of the country. The company's offices and warehouse facilities are located in a beautiful green area of the Roman Country near Appia Antica Park.

About JMA Wireless

JMA Wireless is the leading global innovator in mobile wireless connectivity solutions that ensure infrastructure reliability, streamline service operations, and maximize wireless performance. Employing powerful, patented innovations their solutions portfolio is proven to lower the cost of operations while ensuring lifetime quality levels in equipment and unrivaled performance for coverage and high-speed mobile data.

JMA Wireless solutions cover macro infrastructure, outdoor and indoor distributed antenna systems and small cell solutions. JMA Wireless corporate headquarters are located in Liverpool, NY, with manufacturing, R&D, and sales operations in over 20 locations worldwide.

FOR MORE INFORMATION:

jmawireless.com

About Telektra S.R.L.

Telektra was founded in 2009 by Mr. Borgna and Mr. Torregiani. Their main objective was to provide specialized services to mobile operators. Mr. Borgna (CEO) and Mr. Torregiani (CTO) bring over 20 years of management experience at leading companies in the industry. They have provided human and technological resources for the construction and maintenance of microwave links and indoor coverage in central Italy. Over the years Telektra has developed expertise and experience by extending its area of operation to all parts of the country. The company's offices and warehouse facilities are located in a beautiful green area of the Roman Country near Appia Antica Park.

FOR MORE INFORMATION:

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JMA Corporate Headquarters

📍 7645 Henry Clay Boulevard
Liverpool, New York 1308

☎ +1 315.431.7100

☎ +1 888.201.6073

✉ customerservice@jmawireless.com

🌐 www.jmawireless.com

