JMA

AXEL TOWERS

An architectural marvel enriches the Copenhagen skyline and the cellular experience

23,000 sqm of space above ground

14,000 sqm of space below ground

CASE STUDY: AXEL TOWERS

Axel Towers Selects JMA Wireless for Cellular Connectivity

OVERVIEW
High-End High-Rise Deploys Innovative Wireless Solution

Axeltorv Square, located in the center of Copenhagen, has changed. The old Scala building has been replaced with a five-tower structure known as Axel Towers. This copper- An architectural marvel enriches the Copenhagen skyline and the cellular experience clad, multi-purpose building is home to well-appointed, modern offices on the upper floors while the first two levels offer distinctive dining and shopping options. Axel Towers includes 23,000 m2 of space above ground and 14,000 m2 below ground.

Axel Towers wanted to provide not only the best in inbuilding air quality and energy efficiency, but also the bestin mobile

communications. To ensure superior cellular connectivity, Denmark's largest technical installation company, Kemp & Lauritzen, deployed the multi-carrier, multi-band JMA DAS (distributed antenna system) platform from global wireless solutions innovator, JMA Wireless.has been deployed around the globe.

SITUATION
Unique Property Presents Many Wireless Challenges

Axel Towers were designed to meet Danish sustainability standards. The buildings are certified as "low building energy class 15" according to the Danish building standard BR 10. This standard defines a maximum energy consumption of 41 kHw/m2 of heated floor area per year to cover heat loss,

Case Study: Axel Towers

Axel Towers' copper-clad exterior shines brightly in the center of Copenhagen

> **"** We realized that this architectural phenomenon in Copenhagen would require powerful cellular connectivity; therefore, we turned to JMA Wireless. The JMA DAS platform easily fulfills the wireless demands of tenants and visitors now and in the future."
>
> **MICHAEL BALSLEV, SECTION MANAGER**
> **KEMP & LAURITZEN**

ventilation, cooling, domestic hot water and lighting. In order to be classified as an energy-efficient building, low emissivity or "low-e" glass was installed. This type of glass provides superior energy efficiency thanks to a special coating. However, this coating presents a challenge for in-building mobile communications because it impedes cellular signals to and from the macro network.

Copper, another material prevalent throughout Axel Towers, also presented an obstacle to mobile communications. This highly conductive material naturally blocks cell signals from entering or leaving buildings. Copper was used not only to create an extremely attractive exterior, but was also placed throughout the interior as a decorative wall covering.

Axel Towers are located right in the center of Copenhagen, near the world-famous Tivoli Gardens amusement park, the Circus Building, and the shopping district. This central location posed another issue known to mobile operators as "densification." Densification is a highly concentrated area of mobile subscribers with a high demand for cellular connectivity.

Being in the heart of Copenhagen meant that Axel Towers shops and restaurants would attract not only residents, but visitors from all over the globe; therefore, it was critical that the wireless network support a variety of bands and carriers. In addition, this capability was critical for the employees located in Axel Towers. Many employees use their mobile devices as their primary means of business communication. With BYOD (bring your own device) policies being implemented by businesses, coverage for multiple operators and multiple bands is also important for ensuring employee productivity.

SOLUTION

JMA DAS Delivers World-Class Mobile Communications

It was important for a cutting-edge facility like Axel Towers to offer powerful mobile communications to its tenants and visitors; therefore, Kemp & Lauritzen deployed the JMA DAS from JMA Wireless. This versatile platform currently supports four mobile operators (TDC, 3, Telia, and Telenor) and the 1800, 2100, and 2600

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bands. However, its future-proof design enables it to be upgraded easily to support the latest technologies in the market. The businesses at Axel Towers do not need to be concerned about excessive downtime because of system upgrades.

Along with the master unit (MU), three high-power remote units (RUs) were deployed onsite to enable robust mobile communications. The compact design of the MU minimizes the amount of in-building space required for the head-end room; therefore, valuable onsite real estate was used for revenue-generating office space, not housing large wireless network equipment.

In addition to saving space, the JMA DAS installation also saved time. Each RU uses only a single optical fiber to connect back to the master unit to transport all three bands. This minimal usage of fiber resulted in installation savings that were at least 50 percent less than competitive offerings.

Each JMA Wireless high-power remote unit supports multiple bands over a single optical fiber. A DAS is becoming a requirement in commercial properties such as Axel Towers. Many prospective tenants ask leasing agents if a property has a DAS already installed before signing a lease. With the JMA DAS, tenants at Axel Towers can operate their businesses more efficiently, and their BYOD strategies are supported to help guarantee employee productivity. Tenants satisfied with their in-building mobile communications are more likely to become long-term occupants, resulting in increased NOI (net operating income) and building profitability.

RESULT
The Promise of Success with JMA Wireless JMA DAS

AThe multi-carrier, multi-band JMA DAS is ready to cost-effectively provide cellular connectivity for the many highly mobile employees who will be working within the five towers, as well as the visitors soon to be frequenting the shops and restaurants on the lower levels. As technology advancements occur, and more and more tenants occupy Axel Towers, the future-proof JMA DAS will scale to support them easily with minimum disruption.

Each JMA Wireless high-power remote unit **supports multiple bands over a single optical fiber.**

JMA

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 Kemp & Lauritzen

Kemp & Lauritzen was founded in 1882 and has grown to become Denmark's largest technical installation company with over 2,000 employees. Our core competencies are within all technical fields, and we offer all types of technical solutions across disciplines. As your technical partner, we improve your business – and not only by solving technical challenges. We think big and have a broad scope. So you get a business partner with the widest range of technical expertise in Denmark, and avoid time-consuming coordination. We take responsibility for the whole process from A to Z and target our services to your specific needs, whether it's a one-off project, a unique technical specialty, or a comprehensive interdisciplinary technical enterprise. Our headquarters are based in Albertslund, near Copenhagen, but we have offices all over Denmark, so we can service your company wherever it is located. The principle is: one entrance, many possibilities.

FOR MORE INFORMATION:
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