



## CASE STUDY: ROSKILDE FESTIVAL

# JMA Wireless Antennas Enable Cellular Connectivity for 100,000 Fans

### OVERVIEW

## Unique Antenna Technology Delivers Robust Mobile Communications

The Roskilde Festival is one of the largest annual events in Europe every year. The 2016 celebration included 183 concerts with acts from over 30 countries across nine stages. In addition to listening to great music, attendees participated in workshops, listened to talks, and viewed works of art created just for Roskilde. At the 46th edition

of the festival over 100,000 fans converged, making this temporary celebration the fourth largest city in Denmark for one week. Every year all of the event's proceeds are given to charity. Roskilde 2016 is expected to donate over €2.3 million. During this celebration of the arts, mobile subscribers share their countless great experiences via text, video, social media postings and phone calls. In order to achieve powerful cellular connectivity for its users, wireless network operator, 3 Denmark, wanted to deploy the most robust antenna technology in the marketplace today; therefore, they turned to JMA Wireless and its antenna solutions with Fast Roll-Off (FRO) technology.

## Roskilde Festival

Roskilde Festival Delivers Amazing Talent and Outstanding Wireless Performance

**100,000 Fans**  
From 30 countries  
for 1 week event

**183 Concerts**  
Across 9 stages

**€2.3 Million**  
Donated to charities





**JMA Wireless' antennas with FRO technology enabled robust cellular coverage for thousands of fans enjoying a concert.**

“ JMA Wireless antennas with Fast Roll-Off technology made it possible to increase throughput by eliminating overlap between adjacent sectors. This was exactly what was needed to ensure mobile subscribers could share their experiences while enjoying the week-long event.”

**PETER BELTOFT, RF ENGINEER**  
3 DENMARK

## SITUATION

### Temporary City Presents Numerous Wireless Challenges

The Roskilde Fest site is complete with campgrounds, pharmacy, grocery store, laundromat, recycling station and so much more to make this an experience of not only great memories, but of convenience. People from all across Europe attend this truly unique fest. Only the most innovative antenna technology would be able to overcome the wireless challenges presented by this temporary city.

The first challenge involved the limited amount of access time the engineers had to the PA towers for the installation of the antennas. They had to be deployed and tuned during a very short timeframe. Once the festival started it would be impossible to make adjustments. The antennas had to be deployed correctly prior to the event opening.

Next, the issue of densification had to be taken into consideration. Densification is defined as a dense area of mobile subscribers with a high demand for cellular connectivity. Just the area around the Orange Stage alone at Roskilde provides a seating capacity for over 60,000 fans. In addition to the Orange Stage, there are eight other stages with surrounding seating capacities ranging from as little as 1,200 up to 17,000. During the concerts huge gatherings of fans were not only enjoying the music, but also sharing their experiences via their mobile devices.

The antennas not only had to provide robust connectivity, but they also had to be easily concealed and unobtrusive to the audience. Furthermore, these antennas had to be capable of withstanding adverse outdoor weather conditions.

Finally, with an event this large, public safety is a major concern. The wireless network had to be able to support the staff, volunteers, media, fans and first responders during a crisis. Lack of connectivity to public safety officials, in particular, is especially critical and can turn emergency situations into utter mayhem.

## SOLUTION

# Innovative Antenna Provides the Answer

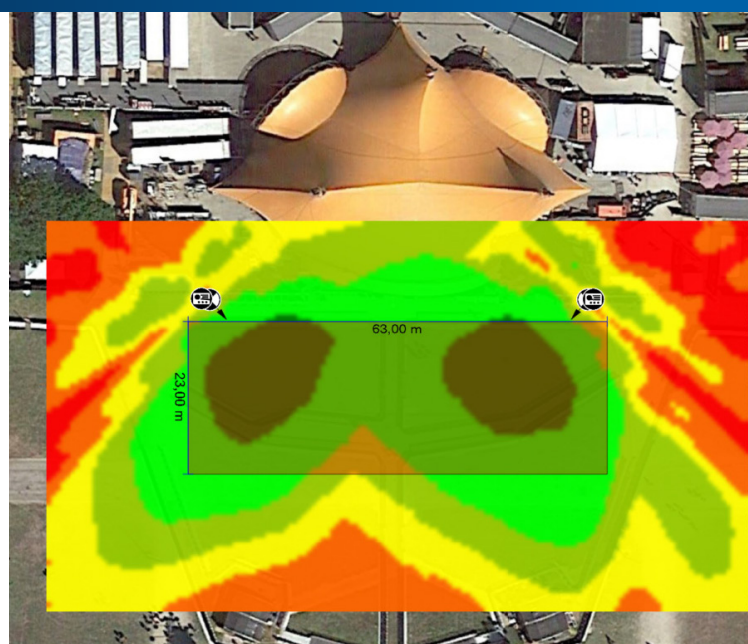
Supplying wireless connectivity to tens of thousands of fans at Roskilde required very powerful and innovative antennas; therefore, two XGU-FRO-230 antennas from JMA Wireless were deployed around the Orange Stage. These antennas include FRO technology, which enables increased data throughput without compromising coverage. The horizontal beam produced by this technology increases the Signal to Interference and Noise Ratio (SINR) by eliminating overlap between sectors. This increased SINR results in higher throughput, which is particularly critical at events such as Roskilde. Furthermore, the horizontal beam produced by Fast Roll-Off technology reduces harmful interference between adjacent cells, making them especially useful in dense environments. The innovative dual band XGU-FRO-230 antenna supports LTE/CDMA/UMTS/GSM technologies. The antennas deployed at Roskilde enabled the LTE2600 band and robust mobile communications for 3 Denmark.

This map illustrates the robust signal power surrounding the Orange Stage thanks to the JMA Wireless XGU-FRO-230 antennas.

The XGU-FRO-230 antenna is the perfect outdoor solution for festivals not only because of its throughput capabilities, but also thanks to its size. With a footprint of only 61 centimeters wide by 61 centimeters long by 22 centimeters deep and weighing a little over 9 kilograms it is unobtrusive and can be concealed easily. At Roskilde the two antennas were covered readily by the Tuborg banners next to the Orange Stage. Furthermore, the antenna's size made it easy to deploy on the PA towers.

With a limited window of time to access the PA towers, a team of two engineers from system integration partner, SVR-Technology, was able to install and tune the two antennas within three hours. The installation and tuning were completed per the recommended angle and tilt provided by the iBwave simulation, which the JMA Wireless team in Italy developed. It was critical that the recommended angle and tilt were correct because the team did not have access to the antennas once the festival started.

In previous years, Roskilde has been known to have experienced its share of bad weather. The XGU-FRO-230 antenna is the perfect solution to deal with harsh weather conditions when necessary. It can withstand winds over 193 km/h, making it extremely durable and ideal for outdoor events.



**This map illustrates the robust signal power surrounding the Orange Stage thanks to the JMA Wireless XGU-FRO-230 antennas.**

## RESULT

# The Perfect Antenna for Large Outdoor Events

The Roskilde Festival was a huge success in many ways. Numerous music acts, unique, world class works of art, and interesting workshops and talks were available for everyone's enjoyment. Over two million euros were donated to charity. Thousands of mobile users were able to share their special moments during the week-long event thanks to the XGU-FRO-230 antennas from JMA Wireless. The antennas' proven success surely will lead to many more appearances, not only at Roskilde 2017, but at other upcoming events around the globe.

## 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 Syracuse, NY, with manufacturing, R&D, and sales operations in over 20 locations worldwide.

**FOR MORE INFORMATION:**

[jmawireless.com](http://jmawireless.com)

## About 3 Denmark

3 Denmark offers mobile voice and data connections via 3G, 4G and 4G+ mobile networks. The company's customers are active users of data and has for years been the largest consumer of data in Denmark. With an offer of free roaming in 28 countries via the concept, 3LikeHome, we want 3 Denmark to be the preferred telecommunications company of the seafaring Danes. 3 Denmark has offices in a renovated warehouse in Scandiagade in the southwest district of Copenhagen. We employ about 650 employees. Currently, 3 Denmark has over 1.1 million customers in Denmark.

**FOR MORE INFORMATION:**

[3.dk](http://3.dk)

## About SVR-Technology A/S

SVR-Technology is a telecom services company with a broad base of customers in Denmark. The company works with DAS solutions, from design to installation. In addition, it consults with telecom and fiber operators regarding indoor and outdoor coverage for 3G, 4G and Wi-Fi networks. Its portfolio is rounded out by control, inspection and SAT (site acceptance test) services as well as site surveys, site acquisitions and TSSR (technical site survey reports).

**FOR MORE INFORMATION:**

[svrtec.dk](http://svrtec.dk)

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