



# Reliable Train-to-Ground Wireless Network for City Metro in Sweden

Location: **Stockholm, Sweden**

## Application:

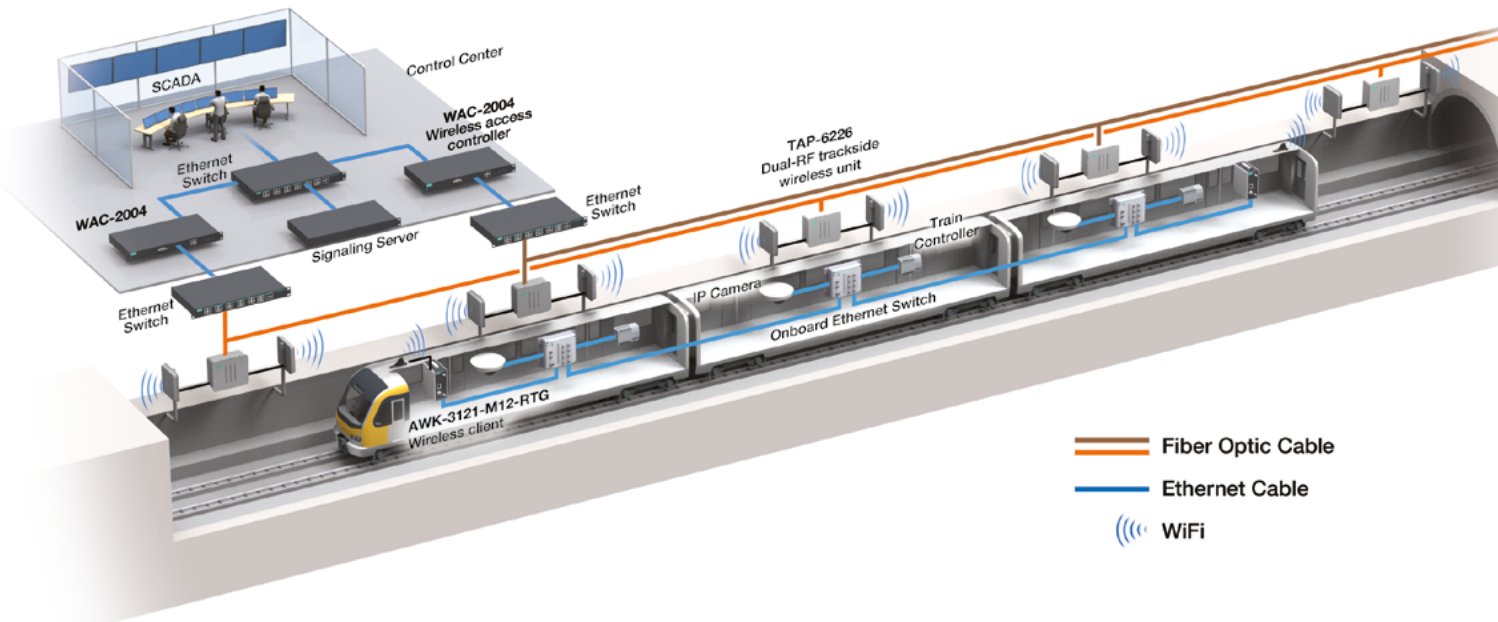
Train-to-Ground Communications

## Customer Needs

- A tailor-made WLAN solution to build a reliable wireless network backbone
- Fast roaming times of under 50 ms to ensure smooth train-to-ground communications
- Network configuration tool for easy configuration and maintenance of wireless units

## Moxa's Advantages

- All-in-one wireless units that include wireless radio, Ethernet switches, and multiple hardware interfaces to fulfill trackside requirements
- Controller-based Turbo Roaming™ technology that supports under 50 ms roaming handover.
- MXconfig™ software for 10-times faster configuration when deploying large numbers of units



## Project Background

The CBTC system makes communication easy between moving trains and trackside equipment by allowing train operators to receive real-time traffic conditions from the control center to prevent accidents and increase the efficiency of the railway system. The system integrator helped the Swedish government design and implement a train-to-ground wireless network that includes a CBTC system to provide seamless operation for their city metro system.

The railway industry requires products that are designed to meet strict industrial standards as well as offer fast and reliable wireless connectivity for nonstop operations. To make this happen, the wireless devices must be able to withstand harsh environments and support fast roaming communications between wayside and onboard devices.

## System Requirements

- Ready-to-mount trackside wireless units in one compact rugged box
- Radio handover times less than 50 ms to ensure high speed train-to-ground communications
- Easy configuration software that speeds up mass deployment of wireless devices and helps in network maintenance
- Compliant with the EN 50155 railway standard to be able to withstand harsh environments

## Moxa's Solution

This metro system required a wireless network that could facilitate communication between 13 metro stations and a control center across more than 40 km of track. To build a reliable wireless network backbone, the system integrator had to use two sets of trackside wireless units, Moxa's TAP-6226, to form two wireless networks and transmit redundant information back to the control center. When one of the wireless networks is down, the control center can still receive real-time information from the redundant trackside wireless network. In addition, the TAP-6226 wireless device has a built-in dual radio design to avoid packet loss due to unexpected RF interference caused by electronic disturbances or frequency interruptions. This design offers both network and device redundancy to ensure zero packet loss during train-to-ground communications. Moxa's TAP-6226 comes with multiple hardware interfaces including Ethernet, fiber, and wireless, making wayside installation easy. Also, our MXconfig™ software decreases the configuration time, making it even more convenient when you want to deploy hundreds of TAP-6226 wireless units and configure their settings, or perform trackside maintenance of the devices.

The onboard network utilizes two AWK-3121-M12-RTG wireless devices in the first and last carriages to communicate with two trackside backbone networks. This ensures that the control center can receive real-time surveillance images that can help boost passenger safety. To optimize roaming performance, two WAC-2004 wireless access controllers are used in the control center for each wireless network. The wireless access controllers feature Moxa's controller-based Turbo Roaming™ technology that allows our wireless client onboard to roam between APs in different IP subnets with less than 50 ms handover while upholding stringent data security in extremely demanding environments.

## Benefits

- All-in-one wireless units that include wireless radios, an Ethernet switch, and multiple hardware interfaces, to fulfill trackside requirements
- Controller-based Turbo Roaming™ technology that supports under 50 ms roaming handover
- MXconfig™ software for 10-times-faster configuration when deploying large numbers of units
- Wireless devices that meet the EN 50155 railway standard for harsh trackside and onboard environments



## Related Products



**TAP-6226**  
Railway trackside IEEE 802.11a/b/g IP68 wireless unit

<http://www.moxa.com/product/TAP-6226.htm>



**AWK-3121-M12-RTG**  
Industrial IEEE 802.11a/b/g wireless mobile client

<http://www.moxa.com/product/AWK-3121-RTG.htm>



**WAC-2004**  
Industrial wireless access controller

<http://www.moxa.com/product/WAC-2004.htm>



**MXconfig™**  
Industrial network configuration tool

<http://www.moxa.com/product/MXconfig.htm>