



AWK Series 802.11ax Industrial Wireless Solutions



Trusted Security

- Security features referencing IEC 62443-4-2 Security Level 2*
- Supports WPA3 encryption
- One-to-many NAT secures and simplifies outbound connections

Fast, Reliable Connectivity

- Turbo Roaming for handovers under 150 ms
- OFDMA technology for congestion-free transmissions in dense, noisy environments
- Data rates of up to 1.775 Gbps

Durable and Resilient

- AeroMesh self-healing Wi-Fi coverage that's easy to extend
- Industrial-grade EMC
- -40 to 75°C wide operating temperature



Learn More

*AWK-1161/1165/3262A/4262A Series devices are embedded with security features that meet IEC 62443-4-2 Security Level 2 functional requirements. Contact us for more details.

Your Trusted Partner in Automation

Moxa is a leading provider of edge connectivity, industrial computing, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things (IIoT). With over 35 years of industry experience, Moxa has connected more than 111 million devices worldwide and has a distribution and service network that reaches customers in more than 91 countries. Moxa delivers lasting business value by empowering industries with reliable networks and sincere service. Information about Moxa’s solutions is available at www.moxa.com.

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Boost Productivity and Resilience With Industrial Wireless LAN

As industries embrace digital transformation, the exponential increase in connected devices has led to significant challenges in wiring, especially in older facilities. Wireless LAN provides freedom to position machines, sensors, and devices exactly where they're needed without the hassle of wiring. This flexibility is the key to unlocking the full potential of Industry 4.0 and IIoT innovations.

However, as operations become increasingly digitized, requirements are changing too. The growing number of connected devices, real-time monitoring capabilities, and increasingly bandwidth-heavy applications are driving the need for higher throughput, lower latency, and maximum reliability. On top of that, robust device security has become non-negotiable for ensuring industrial integrity and protecting sensitive information. Businesses should have the best WLAN solutions at their disposal to guarantee optimal performance for today and tomorrow.

Moxa's WLAN solutions are designed to boost productivity and resilience for modern industrial operations. Built for demanding environments, our AWK's robust design minimizes downtime from environmental factors such as extreme temperatures, shock and vibration, and power and radio interference. For modern industrial applications, our latest AWK Wi-Fi 6 Series (802.11ax) offer speeds exceeding Gigabit, and more efficient data transmissions to ensure high-speed, low-latency wireless operations to futureproof your operations. Moxa's AWK WLAN solutions combine millisecond-fast roaming, AeroMesh-powered wireless resilience, WPA3 data encryption, and security features referencing IEC 62443-4-2 Security Level 2* to deliver reliable, secure, and effortless Wi-Fi connectivity for seamless mobility and stability-critical applications.



Trusted Security

with comprehensive built-in security features

- Security features referencing IEC 62443-4-2 Security Level 2*
- Supports the latest WPA3 encryption protocol



Reliable Connectivity

with high performance and maximized availability

- High bandwidth and data rates for more efficient data transmissions
- Turbo Roaming for handovers under 150 ms
- Industrial-grade design for demanding environments
- Scalable and self-healing Wi-Fi coverage with AeroMesh



Simplified Management

with a complete and user-friendly interface

- Rich feature set to achieve resilient Wi-Fi connectivity with more efficient monitoring and troubleshooting
- Streamline machine integration and reduce installation footprint
- Configurable universal (UN) models for regional RF compliance

Moxa Wi-Fi 6 (802.11ax)

Better Network Performance

- 2.4 + 5 GHz concurrent dual-band Wi-Fi with aggregated data rates up to 1.775Gbps
- OFDMA technology for low-latency and congestion-free wireless operations

Improved Network Reliability and Network Management

- Auto channel selection optimizes wireless connectivity and reliability, while reducing network management complexity

Seamless Roaming

- Millisecond-level Client-based Turbo Roaming

Seamless Machine Integration

- AWK-1161/1165 Series are some of the smallest standalone industrial Wi-Fi 6 AP/Clients on the market



Cable-free True Wireless AeroMesh

Cost-effective

- Eliminates the burden of Ethernet cabling, reducing installation and management costs

Effortless

- Autonomous self-forming connections save time and effort on Wi-Fi backhaul configurations
- Visualized web interface showing the wireless network status at a glance

Resilient

- Self-healing mesh to provide maximum reliability and redundancy



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Speeding Up Material Handling on the Move

A global machine manufacturer wanted to upgrade their AGVs/AMRs solutions to enable effortless handling of growing volumes of material in challenging operating environments.

Why Moxa

- Compact, robust design for easy machine integration and enhanced EMC and RF protection
- 802.11ax performance with integrated 5-port switch for cost efficiency
- UN model with multi-region RF certification compliance

AWK Products Used



System Requirements

- Compact devices that meet machine installation and network requirements
- Reliable operation with sufficient vibration and EMI noise resistance
- High-speed, low-latency wireless to ensure smooth navigation and coordination between robots

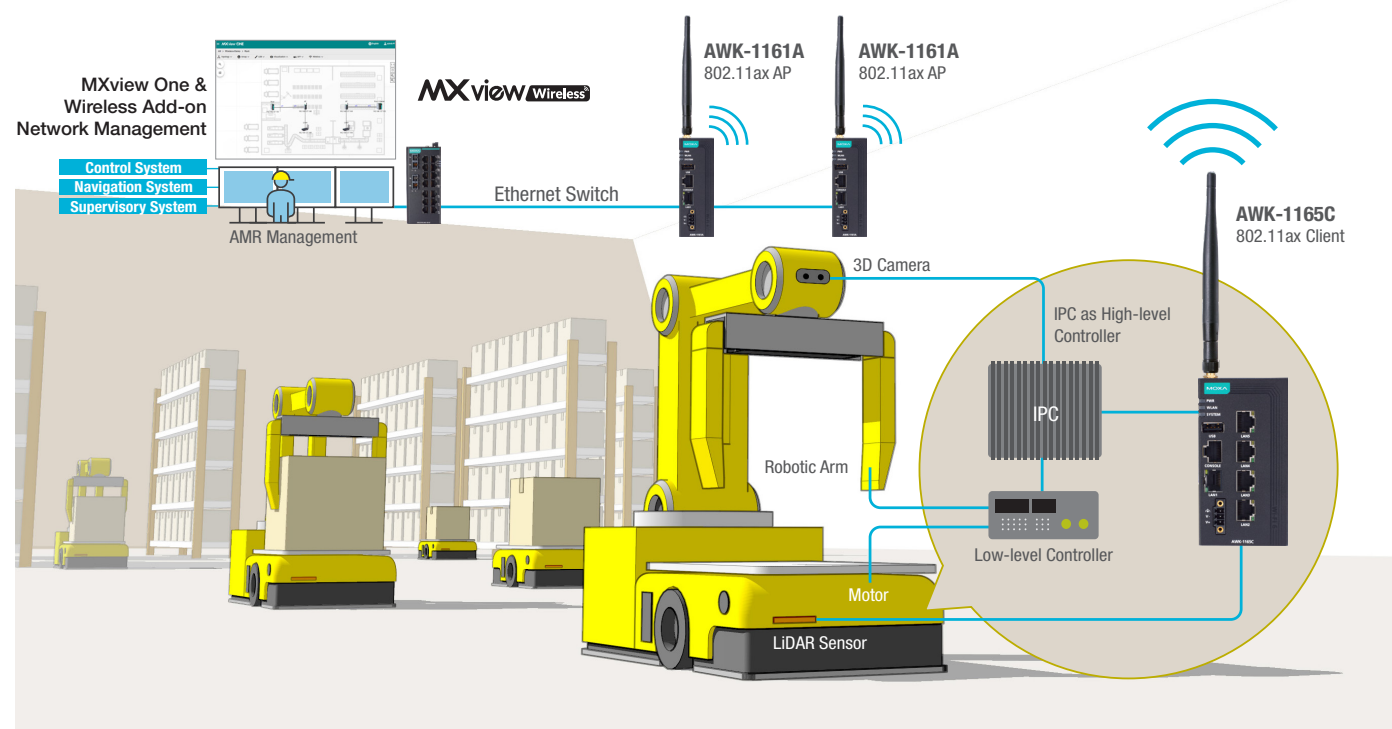
Moxa's Solution

Wireless connectivity is key to coordinating multiple autonomous AGVs/AMRs in busy operating environments. As the AGVs/AMRs scan their surroundings to choose the best route to their targets and perform pick-and-place tasks, they generate large amounts of data and video traffic on the network. High bandwidth and efficient data transmissions are essential to fulfill these growing wireless connectivity demands.

Moxa's AWK-1161A and AWK-1165C Series helps create a stable wireless experience for AGV and AMR operations. The AWK-1165C wireless client offers IEEE 802.11ax speeds up to 1,201 Mbps and sub-150 ms seamless roaming to provide uninterrupted wireless connectivity and sufficient bandwidth crowded operating environments.

To maximize uptime, the AWK Series meets industrial standards for protection against power surges, electromagnetic interference, ESD, shock, and vibration. The AWK also features WPA3 encryption and security features referencing IEC 62443-4-2 Security Level 2* to protect AGV/AMR operations against cyberthreats.

The compact AWK-1165C Series with built-in 5-port switch simplifies machine integration and reduces installation footprint. The AWK Series also features a universal (UN) model with RF approvals for major regional markets. This allows users to choose region-specific RF compliance via software configuration to simplify inventory and reduce costs.



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Unmanned Crane Operations for a Smart Steel Mill

A steel mill enhanced its overhead crane for unmanned remote-controlled material handling. The facility features a durable, heavy-duty crane construction that leverages real-time video streaming to perform material hauling and control tasks, improving operational safety and efficiency.

Why Moxa

- High-bandwidth wireless transmissions and seamless roaming
- Supports transparent PLC communication
- Industrial-grade reliability and security compliance

AWK Products Used



System Requirements

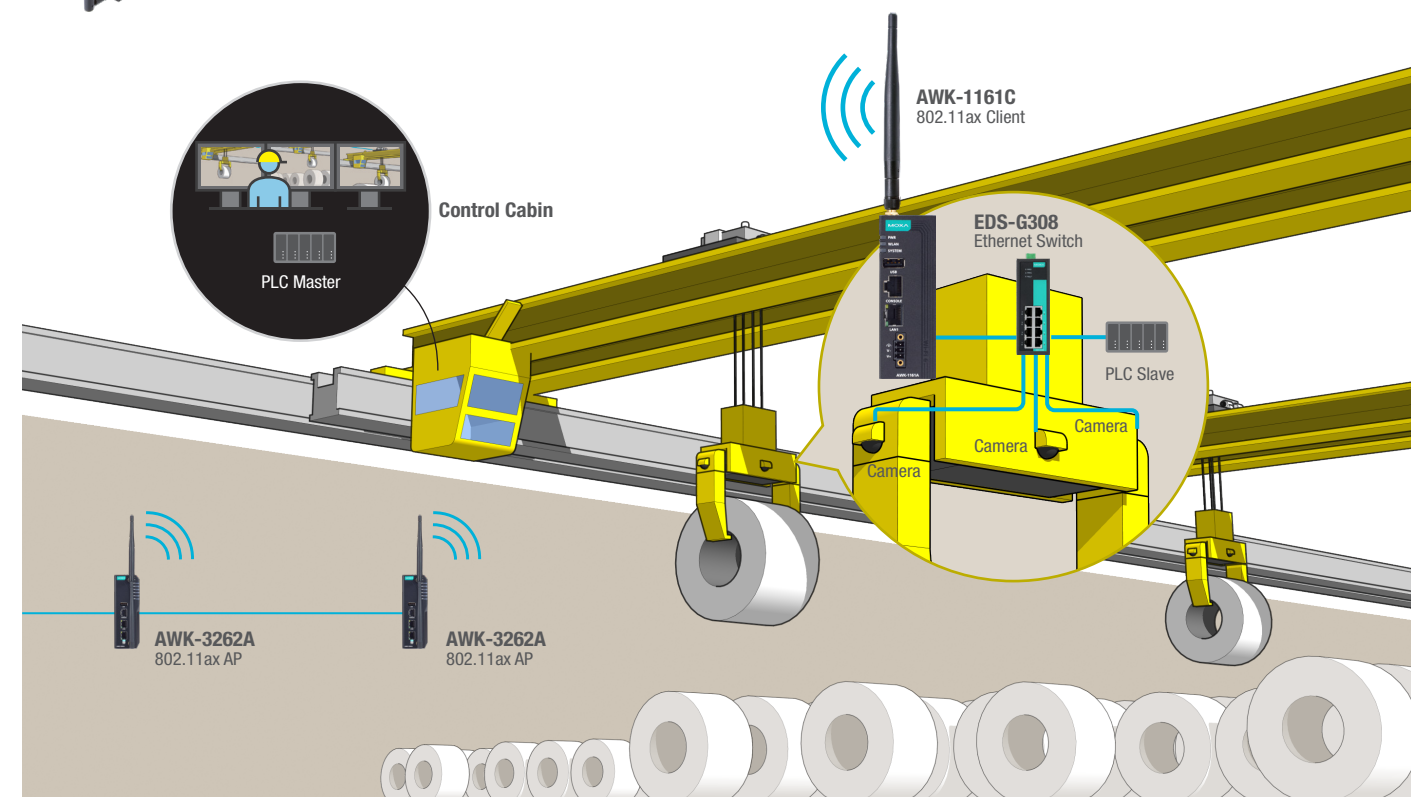
- Stable wireless transmissions to ensure operational safety and accuracy
- Support for high-volume IP video uplinks for process monitoring
- Support for industrial protocols to control the motor via wireless

Moxa's Solution

The overhead crane is maneuvered from a suspended control cabin, either by an operator or by an autonomous image recognition system. The heavy-duty crane is equipped with 4 HD IP cameras that capture live images from all angles and transmit these data and video streams to the control cabin through the AWK-1161C 802.11ax Wi-Fi client installed on the crane.

Reliable wireless connectivity is critical to ensure the availability and safety of the crane. Poor connectivity caused by insufficient bandwidth or heavy environmental interference could trigger the timeout protection and stop the crane from operating. To prevent this, AWK-3262A 802.11ax access points were installed on walls throughout the factory floor to create wireless infrastructure to support seamless roaming as the crane moves.

Tailor-made for industrial control, the AWK devices feature Layer 2 transparent wireless links that enable PLC communication between mobile cranes and the control room. Designed to ensure reliable operations, the AWK wireless devices include security features referencing IEC 62443-4-2 Security Level 2*, and combine field-proven features such as high-speed 802.11ax, sub-150 ms Turbo Roaming, and automatic Connection Check and Recovery with resilient hardware to handle the extreme working temperatures, power surges, ESD, and vibration in the steel mill.



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Driverless Trucks for Mining Safety and Productivity

A heavy machinery manufacturer used advanced SLAM (Simultaneous Localization and Mapping) scanner technology and high-definition video streaming to build driverless remote-controlled trucks for non-coal underground mining applications using rock-solid wireless communication.

Why Moxa

- 802.11ax, Turbo Roaming, and connection recovery technologies for fast, reliable, and seamless wireless connectivity
- Industrial hardened EMC and antenna protection to prevent downtime
- IP68 sealed waterproof design to withstand underground conditions

AWK Products Used



AWK-4262A
IP68 802.11ax Wireless AP/Client

System Requirements

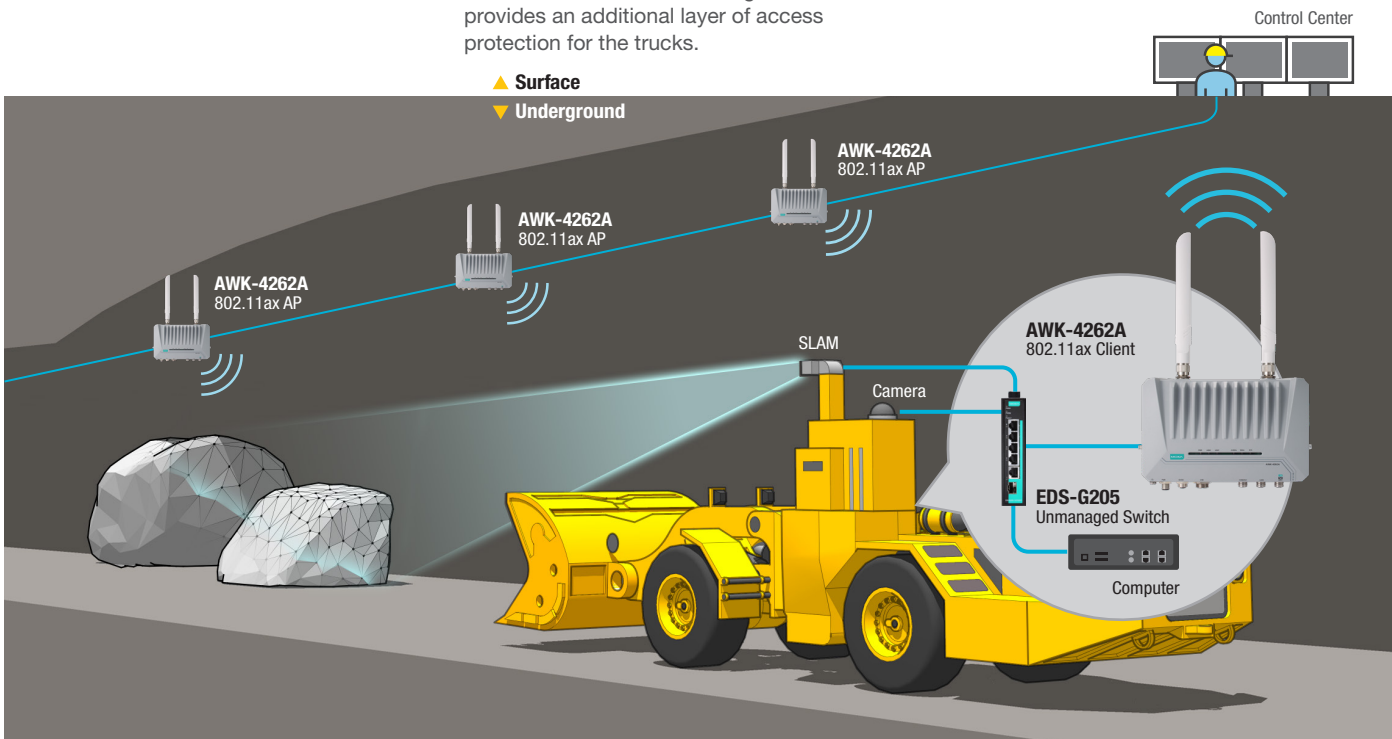
- Robust and high-speed wireless to support bandwidth-intensive HD video streaming
- Withstand harsh underground conditions, including EMI from nearby machines and motors
- Seamless connectivity while on the move

Moxa's Solution

The driverless trucks adopted SLAM technology with high-definition cameras to improve surroundings recognition and navigate to designated locations. Using live images from the onboard cameras, the trucks can calculate their distance and velocity in real time. High bandwidth and low latency wireless are key to enabling accurate mobility and coordination management from the control center.

Moxa's AWK-4262A 802.11ax devices double as Wi-Fi access points mounted on the tunnel walls and as Wi-Fi clients installed on the autonomous trucks. When acting as an onboard Wi-Fi client, the AWK-4262A leverages up to 1.775 Gbps wireless speeds, sub-150 ms roaming, and automatic Connection Check and Recovery functionality to transmit real-time video and telemetry collected from onboard computers, SLAM systems, and cameras to the surface control center.

Moxa's AAWK-4262A devices are built for durability in underground conditions with robust hardware features including IP68 waterproof rating, high EMC immunity, high shock and vibration resistance, and -40 to 75°C operating temperature. Built in security features referencing IEC 62443-4-2 Security Level 2* and WPA3 encryption further enhance WLAN security. Meanwhile, the embedded firewall's IP filtering function provides an additional layer of access protection for the trucks.



Smart Shovel for Real-time Mining Automation

A mining automation leader integrated industrial-grade Wi-Fi technology into its shovel content analysis solutions. The smart shovels combined advanced X-ray fluorescence (XRF) sensors for content analysis with wireless connectivity, accelerating the information flow for on-site ore identification and sorting.

Why Moxa

- IEEE 802.11ax high-speed wireless performance
- Seamless wireless combined with Turbo Roaming and connection recovery features
- IP68-rated hardware and industrial-grade design for long-lasting reliability

AWK Products Used



AWK-4262A
IP68 802.11ax Wireless AP/Client

AWK-3262A
802.11ax Wireless AP/Client

System Requirements

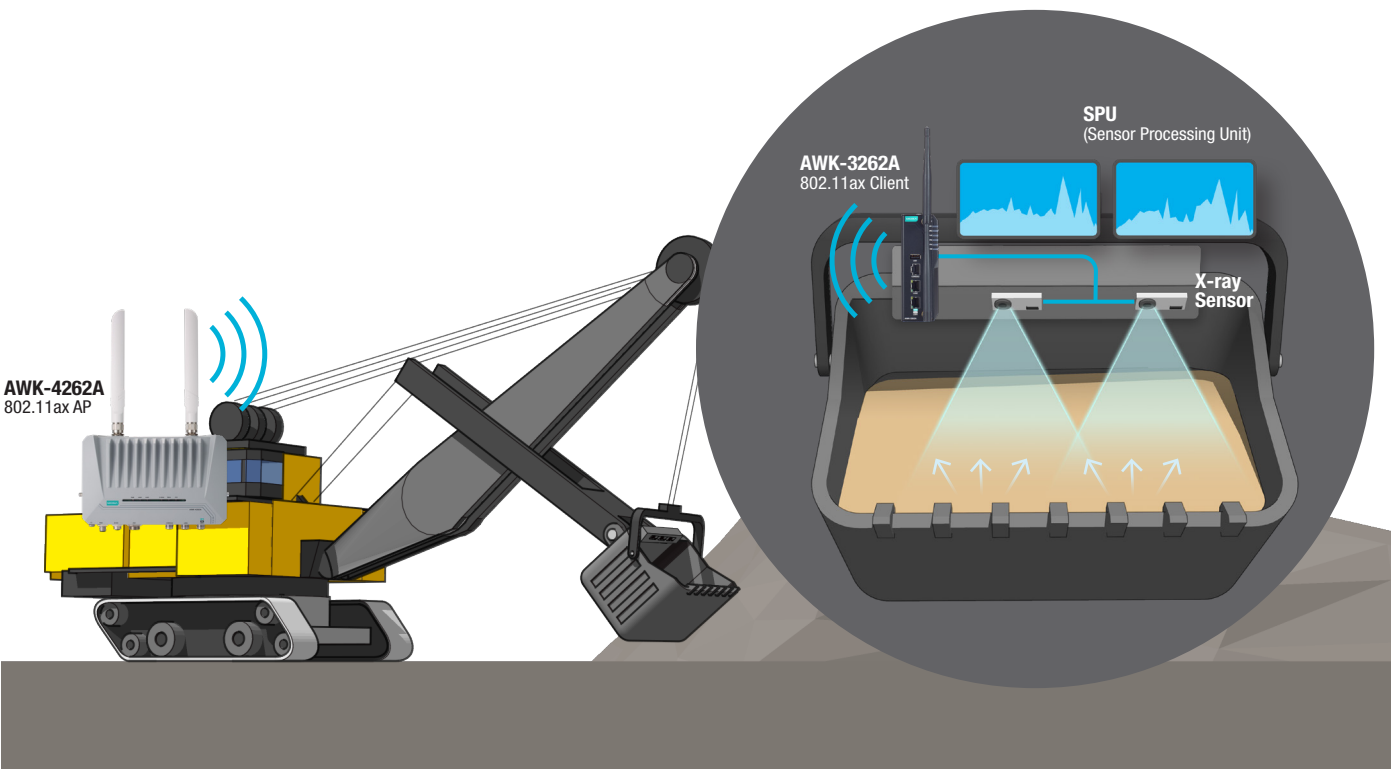
- High-speed wireless for on-the-spot ore analysis and sorting
- Uninterrupted wireless for real-time production accuracy
- Rugged designs to withstand harsh mining conditions

Moxa's Solution

The smart shovels can be placed into various mining machinery. It uses a set of advanced XRF sensors on the loader buckets of the mining shovels, which scan the excavated minerals, perform on-line ore analysis, and identify ore grades and ore waste to optimize real-time mining processes. Moxa's rugged AWK-3262A Wi-Fi devices are integrated into the shovel buckets, and are capable of withstanding the extreme operating conditions this entails. 802.11ax client speeds up to 1.775 Gbps, the AWK-3262A Series Wi-Fi device transmits ore information, analyzed results, and recommended decisions to the loader cab, cloud server, and fleet management system (FMS) to accelerate ore processing.

The AWK-3262A combines sub-150 ms Turbo Roaming with the field-proven Connection Check and Recovery functions to build seamless Wi-Fi connectivity to support uninterrupted shoveling operations. Placed outside the shovel operator cabin, IP68-rated AWK-4262A Wi-Fi access points connect the shovel to the remote control room.

The AWK Series provides industry-proven features to enhance device durability, reducing downtime caused by severe operating temperature deviations, ESD, EMI, surges, or shock and vibration. With built-in security features referencing IEC 62443-4-2 Security Level 2*, AWK Series devices also provide WPA3 encryption to protect the smart shovels from cyberthreats.



*AWK-1161/1165/3262A/4262A Series devices are embedded with security features that meet IEC 62443-4-2 Security Level 2 functional requirements. Contact us for more details.

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Robust Design for Hard-to-wire Environments

A mining machinery manufacturer needed a robust wireless solution to set up driverless truck operations for non-coal underground mining. The manufacturer needed the wireless coverage to be easily extendable to reduce installation and management costs.

Why Moxa

- 802.11ax speeds and resilience technologies such as Turbo Roaming and AeroMesh for reliable wireless connectivity
- Hardened devices with high EMC and built-in antenna protection to prevent interference
- IP68-rated waterproof design to withstand extreme underground conditions

System Requirements

- Robust and high-speed wireless to support bandwidth-heavy data and video streaming
- Ability to withstand harsh underground conditions
- Robust wireless coverage for mobile connectivity

Moxa's Solution

For non-coal underground mining, robust wireless connectivity is important for taking full advantage of the digital mining infrastructure. The final stretch of connectivity inside of the activate mining area is the most challenging.

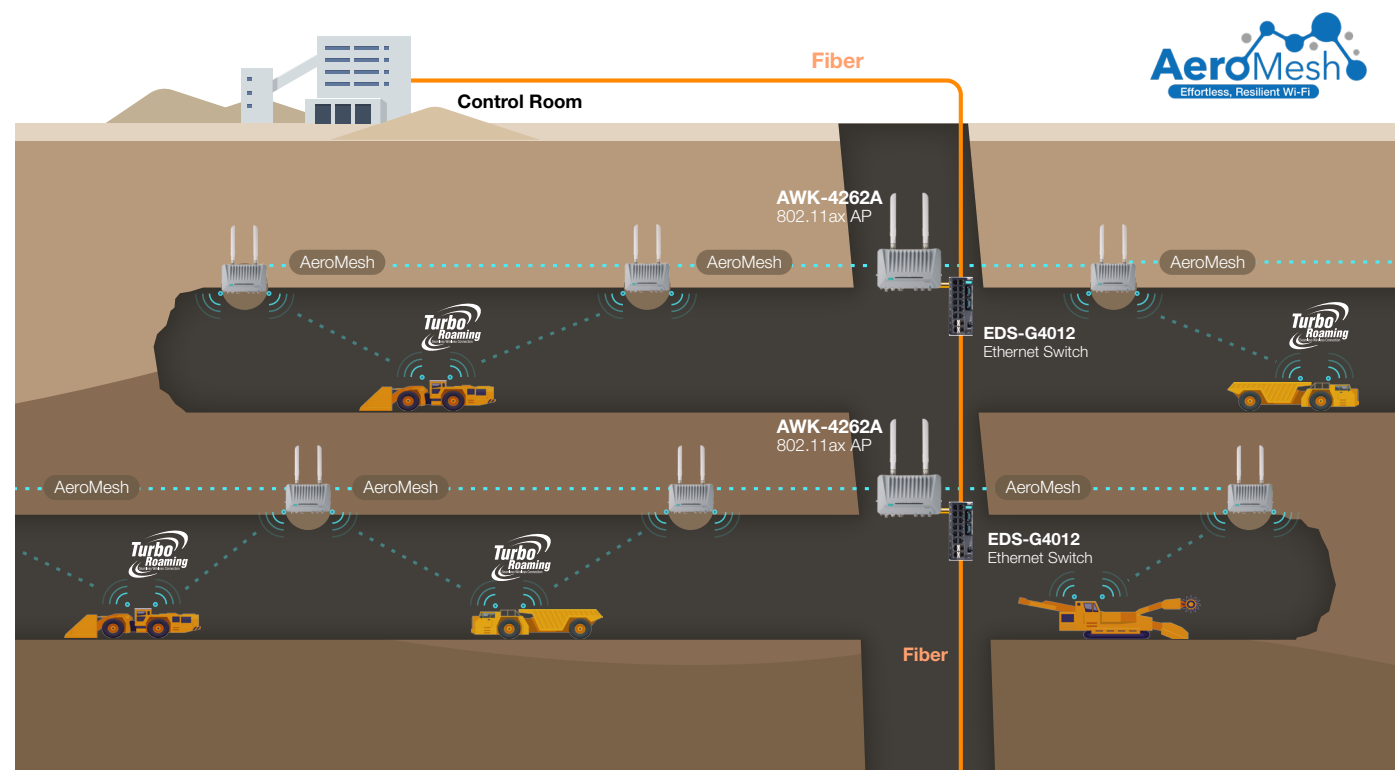
The AWK-4262A wireless AP/Client features an IP68-rated waterproof housing and a -40 to 75°C wide operating temperature range to ensure smooth wireless communication in harsh environments such as underground mines.

Controlled explosions deep inside mining tunnels can easily damage the sensitive fiber-optic lines. The AWK-4262A Series supports Moxa's AeroMesh to create a cable-free backhaul infrastructure that is easy to set up and extend, avoiding the restrictions of physical cabling. With AeroMesh, the AWK-4262A Series can create a self-healing mesh that enables fast recovery in case of an AP failure. The AWK's rugged IP68-rated design with high EMC enables these wireless devices to transmit real-time video and telemetry for better operational safety and efficiency in demanding environments.

AWK Products Used



AWK-4262A
802.11ax
Wireless AP/Client



Medical X-ray Machines Driving Up Medical Efficiency

A leading medical equipment supplier designed and manufactured a high-definition medical imaging system for X-ray inspection to perform medical diagnosis on patients. Wireless capabilities allow the X-ray machine to seamlessly synchronize X-ray imagery for physicians, resulting in improved medical assessments and treatment efficiency.

Why Moxa

- IEC 60601-1-2 medical level EMC for uninterrupted wireless reliability and resilience
- Selectable dual-band, high-bandwidth transmissions
- Comprehensive security to protect confidential patient information

System Requirements

- High-speed wireless for transmitting increasingly larger HD X-ray image files between the X-ray machine's IPC storage and the physician's diagnostics tablet
- Compact design to fit into the limited space inside the machine
- Reliable signal that can resist operational EMI and RFI noise

Moxa's Solution

Wireless networks facilitate the transmission of high-definition X-ray images and patient information for quick access to medical images and faster clinical assessment. With a demand for increasingly higher-resolution medical imaging, the equipment supplier opted for a 802.11ax solution to futureproof their wireless capabilities and accommodate future advancements in imaging technology.

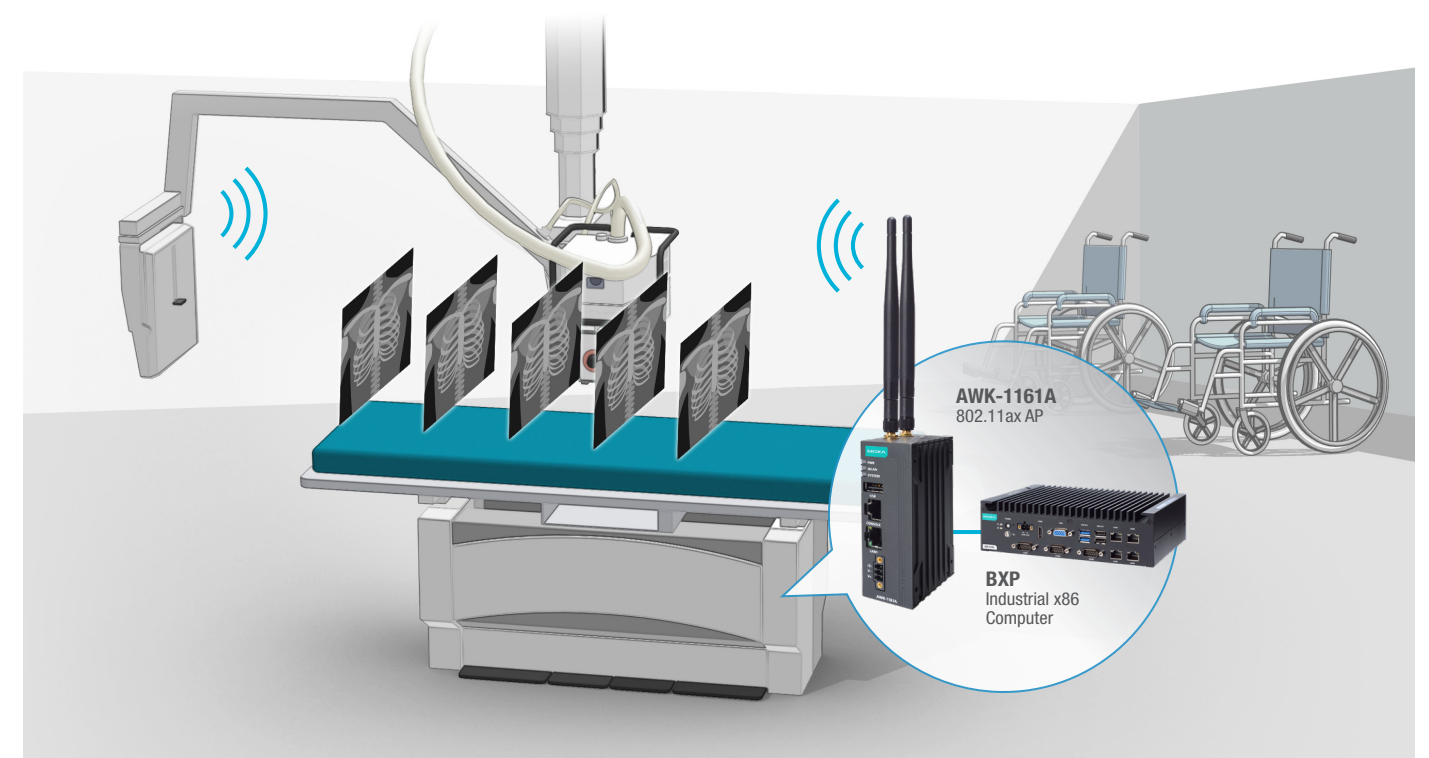
The AWK-1161A Series access point was selected and installed into the space-constrained mobile machine. The AWK-1161A Series supports up to 1,201 Mbps bandwidth, capable of handling bandwidth-intensive X-ray image transmissions with ease.

The AWK-1161A Series features medical-grade EMC compliance, providing stable and reliable wireless communication for the X-ray system, even in the presence of other high-power electrical components inside the machine. Additionally, a complete set of built-in security features including client isolation, firewall ACLs, and WPA3 encryption protect confidential patient information against cyberthreats.

AWK Products Used



AWK-1161A
802.11ax Wireless AP





Smart Gait Training Machines

A leading rehabilitation robotics company has developed an intelligent gait training machine that combines suspended mobility and wireless technology to help therapists easily formulate the most suitable rehabilitation plan for each patient through handheld devices such as mobile phones.

Why Moxa

- A perfect combination of 802.11ax AP functionality and a compact design for easy machine integration
- Built-in security features referencing IEC 62443-4-2 Security Level 2* and WPA3 encryption to protect data from unauthorized access
- Industrial-grade reliability to ensure stable performance and a long service life

AWK Products Used



AWK-3262A
802.11ax Wireless AP/Client

System Requirements

- High-performance Wi-Fi AP devices with a compact design for track-mounted overhead machines
- Wireless reliability and security to ensure authorized access for safe and secure configuration
- Long-lasting reliability to extend machine utilization and operational lifetime

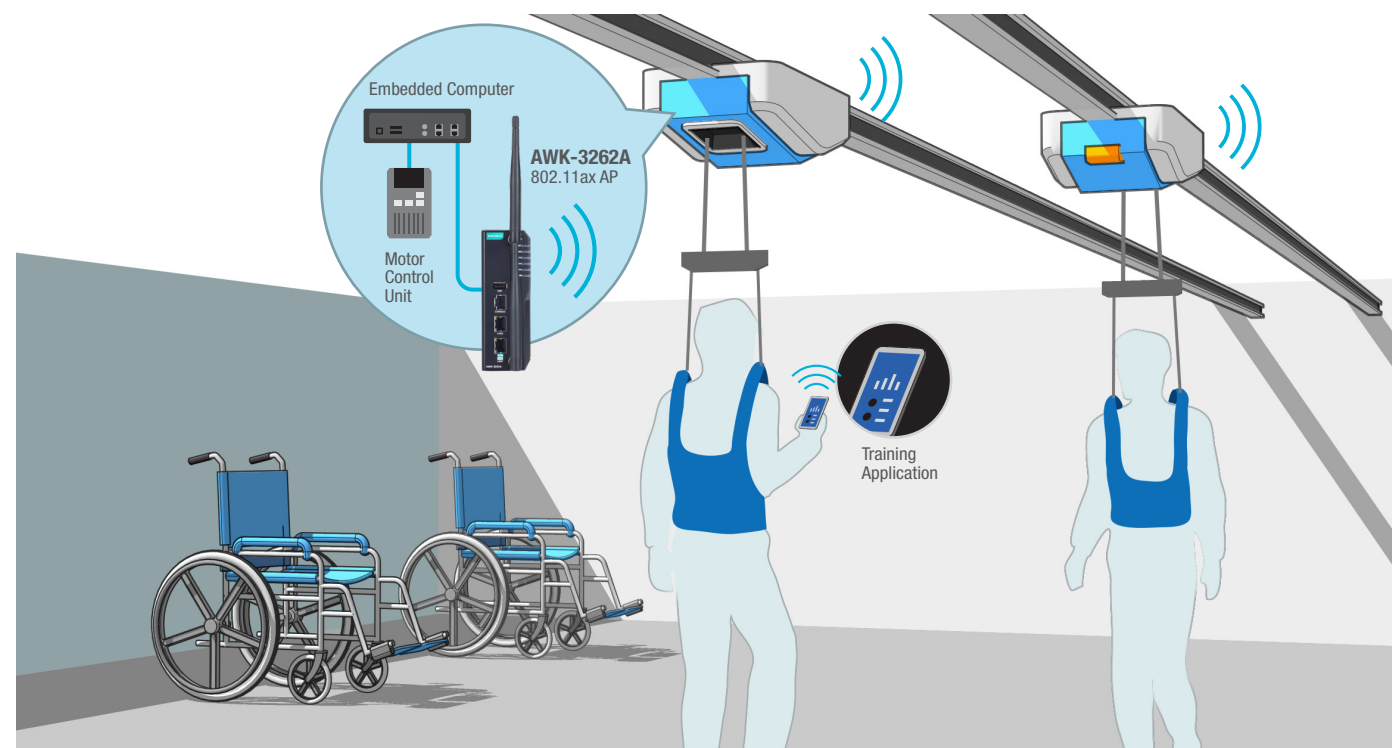
Moxa's Solution

The gait training system features an overhead trolley and body harness that provides variable bodyweight support while tracking countless data points during training. The system collects and records important training data including walking distance, training minutes, falls prevented, and the bodyweight support to a secure database over the wireless network.

The slim and compact AWK-3262A saves valuable space, allowing easy integration into the mobile gait training systems. These 802.11ax access points maintain fast and secure data transmissions between the overhead machine and handheld management interface.

The AWK-3262A device supports the latest WPA3 encryption as well as built-in security features referencing IEC 62443-4-2 Security Level 2* to prevent unauthorized access to the rehabilitation gait machine. These security features help prevent training processes from being compromised and confidential patient data from leaking.

The rugged AWK wireless solution is outfitted with industrial reliability features, such as industrial EMC up to Level 4 ESD protection, antenna isolation, and shock and vibration resistance based on the IEC 60068-2-6 standard to ensure operational stability and lasting durability.



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UV-C Disinfection Robots for Public Health

A global manufacturer sought a robust wireless solution to develop their hospital-grade disinfection robots, which integrate AI (artificial intelligence), UV-C (ultraviolet type-C irradiation), and mobile operations to help minimize the spread of infectious pathogens in hospitals and other public spaces.

Why Moxa

- High bandwidth and fast Turbo Roaming for seamless data transmissions
- Industrial-grade design to ensure reliable connectivity and fleet efficiency
- Broad regional RF compliance to develop major global markets

AWK Products Used



AWK-1165C
802.11ax Wireless Client

System Requirements

- Compact footprint for installation into highly integrated machines
- Reliable operation with high resistance to vibration and radio interference
- High bandwidth and seamless roaming for uninterrupted networking

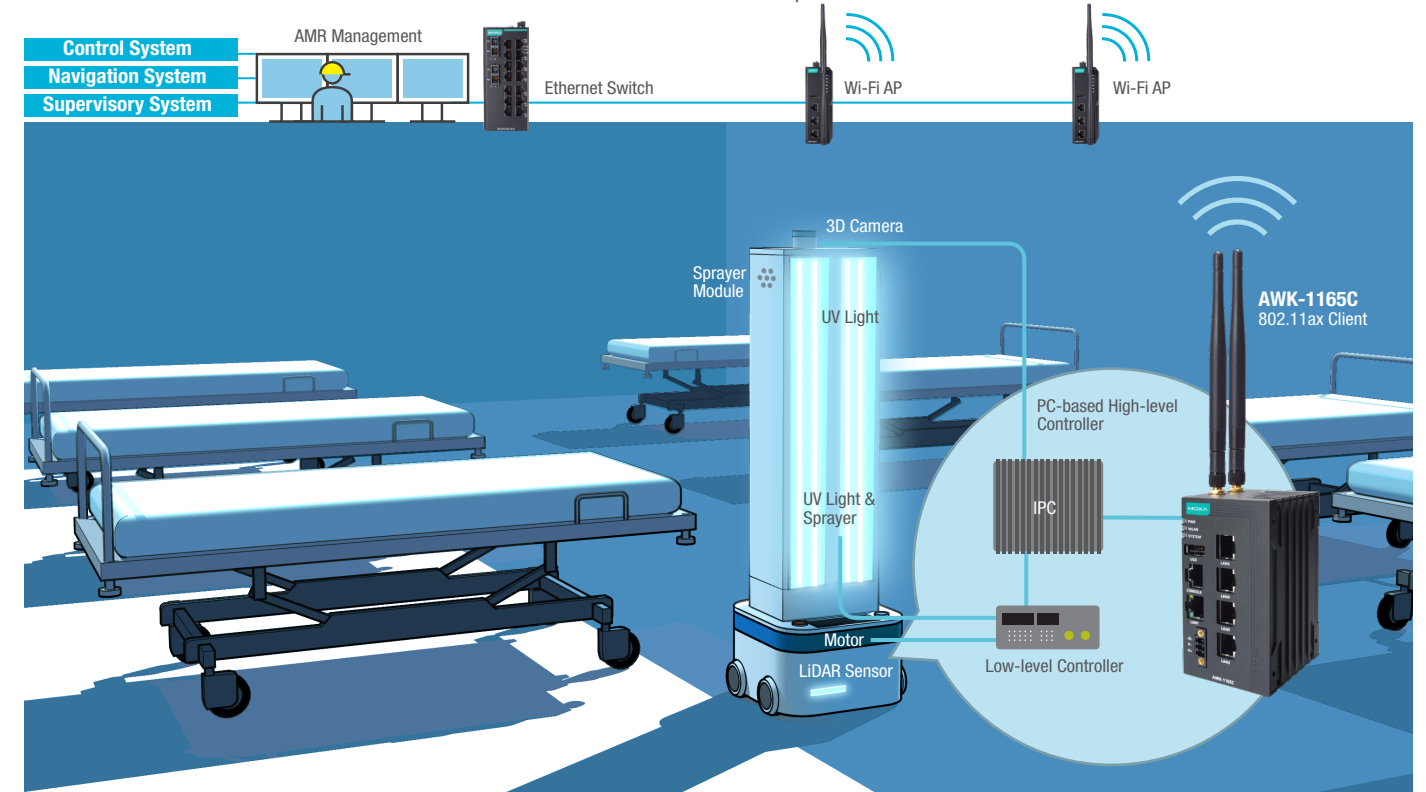
Moxa's Solution

Disinfection robots pack complex computing and sensing capabilities into a small-footprint machine designed to roam healthcare environments. These robots can adjust their speed and route to navigate one or multiple floor plans, while relying on wireless communication to transmit large volumes of data, such as video records, locations, and trajectory progress to the robot fleet control center.

To ensure mobile stability and reliability, the AWK-1165C supports IEC 60068-2-6 compliant vibration resistance and durable hardware to withstand EMC noise, ESD, sudden motor discharges, and radio interference.

The AWK-1165C Series' 802.11ax high-speed wireless capabilities facilitate efficient communication between robots and the control center, and enable fast roaming under 150 ms between access points to ensure seamless coordination.

The machine builder adopted the AWK-1165C Series UN model for easy RF configuration and compliance in major global markets to simplify inventory management. The AWK-1165C also features comprehensive built-in security features and the latest WPA3 encryption to protect WLAN connections and secure operations.





Seamless Vehicle Data Offloading at Depots

A public transport operator needed an economical solution to efficiently offload the surveillance video recordings from each trip. The operator looked for compact Wi-Fi clients to act as the wireless interface for the onboard NVR to offload the video recordings while the vehicle is docked at the depot.

Why Moxa

- 802.11ax bandwidth to quickly offload large video recording files
- AP-agnostic Turbo Roaming ensuring seamless connectivity
- E1 mark certification and industrial-grade shock and vibration resistance

AWK Products Used



System Requirements

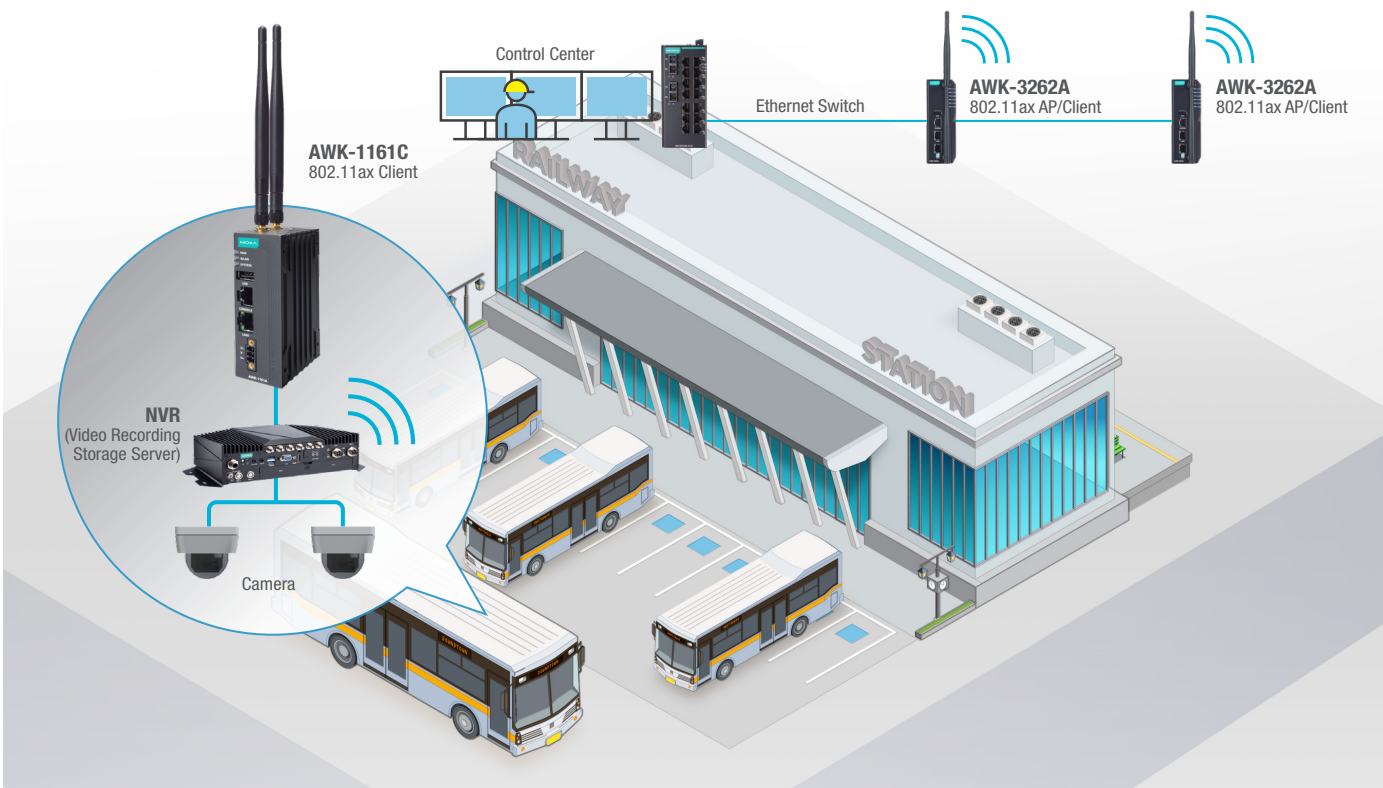
- Compact form factor that can withstand the shock and vibration of moving vehicles
- High bandwidth with fast roaming to quickly offload video data as the vehicle returns to the hub
- Seamless roaming for smooth data transmissions while navigating the depot

Moxa's Solution

Video surveillance is becoming more important in public transportation to improve passenger and driver safety. This video data is offloaded and kept for a certain period of time. For optimal efficiency, the data is automatically offloaded wirelessly, which also helps the operator avoid unnecessary cellular carrier data costs. The AWK-3262A and AWK-1161C Series wireless clients—which feature WPA3 encryption—provide secure, reliable wireless connectivity to seamlessly offload high-resolution video data while stationed at the depot.

The AWK-1161C Series wireless client is compact enough to fit into space-constrained onboard cabinets. 802.11ax technology supports up to 1,201 Mbps bandwidth, making these client devices an economical yet reliable choice to quickly offload the onboard NVR's data over wireless as the vehicle returns to the hub. With an AP-agnostic design, operators can expect seamless roaming regardless of the brand of APs already deployed, ensuring constant connectivity for smooth and fast video offloading.

To ensure reliable operations, Moxa's AWK products combine field-proven features such as sub-150 ms Turbo Roaming and automatic Connection Check and Recovery with resilient hardware to withstand extreme temperatures, power surges, and vibrations inside the vehicle.



Retrofitting a Landscape Ferris Wheel Network

The operator of a landscape Ferris wheel with 28 cabins for guests to enjoy 360-degree panoramic tours wanted to upgrade the facility's network infrastructure to improve security and bandwidth to support in-cabin HD IP surveillance and provide a better passenger Wi-Fi experience during the ride.

Why Moxa

- 802.11ax bandwidth to improve IP video streaming and passenger Wi-Fi services
- Optimized wireless connectivity with Moxa's connection recovery features
- Wireless PTP bridging for connections between moving cabins

AWK Products Used



System Requirements

- High bandwidth for real-time cabin monitoring through HD IP surveillance
- Reliable point-to-point (PTP) wireless connections from the cabins to the wired network for backhaul
- Ruggedized design suitable for demanding operating environments

Moxa's Solution

The massive system relies on a complex integrated wired and wireless network infrastructure connecting the individual cabins, rim, and ground center to allow long, continuous operations in harsh outdoor conditions. For better safety and entertainment, part of the network infrastructure was upgraded to wired Gigabit and 802.11ax wireless to integrate IP surveillance and improve the passenger Wi-Fi service in each cabin.

Each cabin uses two AWK-3262A 802.11ax units to replace the original Wi-Fi equipment. Each set provides dual-band wireless speeds of up to 1.775 Gbps to transmit IP video streams to the ground center and provide Internet service for passengers.

Outside of the cabins, IP68-rated waterproof AWK-4262A Wi-Fi access points provide PTP bridge connections between the wired uplink of the rim shaft and the moving cabins. In addition, the sub-150 ms Turbo Roaming and automatic Connection Check and Recovery features ensure non-stop connectivity.

Meanwhile, the robust hardware design of the AWK Series supports wide operating temperatures to ensure solid reliability in challenging outdoor environments.

