MOXA®

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 30 years of industry experience, Moxa has connected more than 57 million devices worldwide and has a distribution and service network that reaches customers in more than 70 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.

Moxa Americas
USA
Toll Free: 1-888-MOXA-USA
Tel: +1-714-528-6777
Fax: +1-714-528-6778
usa@moxa.com

Brazil
Tel: +55-11-95261-6545
brazil@moxa.com

Moxa Europe
Germany
Tel: +49-89-37003-99-0
Fax: +49-89-37003-99-99
europe@moxa.com

France
Tel: +33-1-30-85-41-80
Fax: +33-1-30-47-35-91
france@moxa.com

UK
Tel: +44-1844-355-601
Fax: +44-1844-353-553
uk@moxa.com

Moxa Asia-Pacific and Taiwan
Asia/Japan/Taiwan
Tel: +886-2-8919-1230
Fax: +886-2-8919-1231
asia@moxa.com
japan@moxa.com
taiwan@moxa.com

India
Tel: +91-80-4172-9088
Fax: +91-80-4132-1045
india@moxa.com

Russia
Tel: +7-495-287-0929
Fax: +7-495-269-0929
russia@moxa.com

Korea
Tel: +82-2-6268-4048
Fax: +82-2-6268-4044
korea@moxa.com

Moxa China
Shanghai
Tel: +86-21-5258-9955
Fax: +86-21-5258-5505
china@moxa.com

Beijing
Tel: +86-10-5976-6123/24/25/26
Fax: +86-10-5976-6122
china@moxa.com

Shenzhen
Tel: +86-755-8368-4084/94
Fax: +86-755-8368-4148
china@moxa.com

MOXA®

Boost Productivity with Industrial Wireless Connectivity

www.moxa.com

P/N: 1900001901700

Boost Productivity with Industrial Wireless Connectivity

Wireless technology is an integral part of today's industrial network infrastructure, enabling flexibility in communication, manufacturing, and automation systems so that businesses can keep pace with rapid changes in the market.

Moxa's industrial Wi-Fi and cellular products are designed to boost productivity and flexibility in industrial applications by overcoming distance and coverage constraints while minimizing signal leakage, interference, and signal degradation. By combining innovative technologies, such as fast roaming, effortless Wi-Fi device deployment, wireless connection redundancy, and end-to-end security, Moxa's wireless solutions guarantee reliable and efficient Wi-Fi and cellular connectivity in any operating environment.

AWK Series 802.11n MIMO Advantage

Optimal Deployment and Easy Maintenance with AeroMag

One-step Setup for Multiple Wi-Fi Devices

You can configure basic AP settings, including SSID, password, WPA2 security, RF type, and operating channel, all in one step, saving you valuable time.

One-click Optimization of Wi-Fi Channels

Moxa's AeroMag technology features a channel optimization function, which searches for and sets up the best Wi-Fi channel for your devices based on your on-site environment.

One-Click Wi-Fi Channel Refresh to Avoid Interference

As the on-site environment changes, new sources of Wi-Fi interference are generated that make the current Wi-Fi channel settings ineffective. AeroMag's channel-refresh function help search for a new optimal channel and automatically refresh channel settings in just one click.

Zero Configuration Needed to Add New Devices to an Existing Network

Setting up a new device in a network is easy— just unlock the AeroMag topology and connect your AeroMag device to the network—no manual configuration is required.

AWK-4131A
Access Point

AWK-1137C
Wi-Fi Client

Add a new device

Maximum Availability with Turbo Roaming and AeroLink Protection

Client-based Turbo Roaming for Seamless Connections

Moxa's proprietary Turbo Roaming technology has a fast handover time of less than 150 ms, which helps wireless clients to adapt to constant mobility. This technology increases the roaming speed by predefining AP channels to reduce time wasted on channel-hopping during roaming.

AeroLink Protection for Redundant Network Links

AeroLink Protection technology provides smart failover with fast recovery time and scalability, making it easy to enable multiple layers of wireless connection protection to maximize the uptime of your mission-critical system and keep your entire network alive for continuous data transmission.

DFS for Stable Channel Links

In addition to using all the normally available frequencies, Moxa's AWK-A series is certified to operate on DFS (Dynamic Frequency Selection) channels, significantly increasing the total number of available channels.

2.4 GHz

Clients

Backup Client

2.4 GHz

APs

5 GHz

Device Reliability

500-volt Insulation on Power and Antenna Ports

Integrated RF isolation design provides 500-volt insulation protection and level-4 ESD protection on all antenna ports. In addition, integrated power isolation provides 500-volt insulation protection and stabilizes the system voltage when the power inputs are unstable.

Designed for Harsh Environments

Moxa's Wireless LAN devices can operate in a wide temperature range of -40 to 75°C. In addition, the IP30/IP68-rated housing provides additional protection in harsh outdoor environments.

Diverse Industry Certifications

The AWK series products have been certified for a diverse range of industrial certifications and can provide a reliable, scalable, and flexible network foundation for various on-site environments.

OnCell Series LTE Cellular Advantage

Secure Access with OnCell Central Manager

Private IP Connections Over the Internet

OnCell series products with OnCell Central Manager provide a cost-effective private IP solution to prevent attacks from malicious persons and applications. OnCell Central Manager provides an IP block list that allows administrators to block communication originating from specific IP addresses.

Account Classification Management

The OnCell Central Manager allows administrators to assign different roles, give each user account various access levels in different groups, and monitor their current status.

Device Group Management

By using the flexible device grouping function, operators can organize the OnCell devices into different groups for easy monitoring of device statuses for different applications.
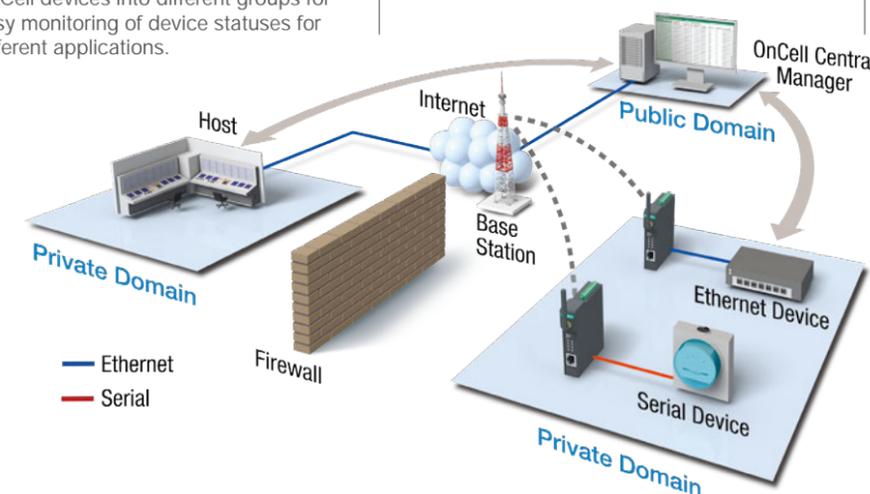
Solid Connectivity

Dual-SIM and Dual-WAN Support for Cellular Service Redundancy

Dual-SIM service eliminates the risks posed by unstable cellular connections by offering the ability to insert two SIM cards, each connected to a different carrier, and automatic switch between two different carriers based on the cellular connection quality. In addition, the dual-WAN routing backup service provides the ability to set up primary and secondary WAN connections.

GuaranLink for Maximum Cellular Uptime

OnCell products come with GuaranLink, which enables reliable and consistent connectivity. GuaranLink achieves this in a number of ways: a) ISP initial check b) Transmission-level check c) Packet-level connection check d) Connection-alive check.

Robust Reliability

Dual-power Inputs

With dual-power inputs, the OnCell models support power redundancy to ensure uninterrupted connectivity.

ESD Level-4 Antenna Protection

The antenna isolation protection design in OnCell devices provides ESD level-4 protection at the rate of 8 kV for contact discharge and 15 kV for air discharge.

Power-isolation Design With High EMC

OnCell device features isolated power inputs, which together with high-level EMS and wide-temperature support make the OnCell devices suitable for any rugged environment.

ATEX and IECEx Certifications (OnCell 3120-LTE-1 and OnCell G3150A-LTE only)

A rugged design and strict adherence to ATEX and IECEx certification requirements, make the OnCell 3120-LTE-1 and OnCell G3150A-LTE device suitable for a variety of industrial applications.

Host

Internet

Base Station

OnCell Central Manager

Public Domain

Ethernet Device

Serial Device

Private Domain

Private Domain

Firewall

— Ethernet

— Serial

Smart Street Lighting Systems Over Wireless

As governments continue to embrace the smart city trend, street lights are connecting to networks with sensors, which allow them to adjust brightness and conserve energy while still maintaining public safety. The networks that are being deployed also support other devices such as surveillance cameras. Moxa simplifies the process of transforming legacy lighting systems into smart energy-conserving systems, by offering rugged wireless solutions that ensure seamless data communication for adaptive street lighting as well as supporting applications such as surveillance monitoring.

System Requirements

- Compact form factor for installation inside small wayside cabinets
- Stable data communication
- Device durability to withstand outdoor environments

Moxa's Solution

The AWK-1137C's palm-sized form factor makes it convenient to install the device as a wireless client in pole-mounted wayside cabinets. To create Wi-Fi hotspots along the way, multiple AWK-4131A units are installed on the rooftops of buildings around cities. The IP68-rated housing of the AWK-4131A makes it an ideal choice for outdoor installation.

The AWK-1137C 802.11n wireless clients use broadband to collect temperature and humidity readings, light conditions, and video streaming from street sensors and IP cameras to transmit to an AWK-4131A base station, which then backhauls the data and video through the Ethernet backbone to the data center.

The Wi-Fi network enables continuous access to all the street lights so that they can be monitored and controlled from a remote control center. The street lights can be switched on or off or dimmed according to a fixed schedule or based on current conditions such as weather, time of day, and even traffic.

To ensure uninterrupted network connectivity for the street lighting system, the AWK-4131A and AWK-1137C support a wide range of 5 GHz DFS channels to avoid interference from existing network infrastructures.
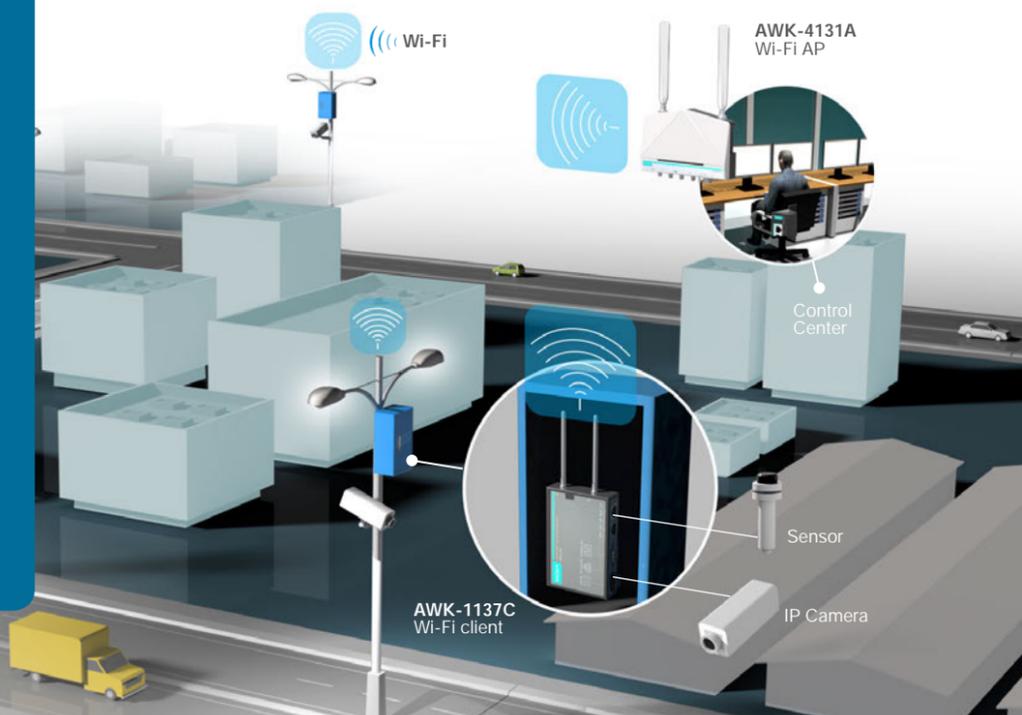
Why Moxa

- The products' small form factor enables easy installation inside pole-mounted wayside cabinets
- 5 GHz DFS channel support for better channel assignment
- Industrial-grade devices that can withstand harsh temperatures and strong vibrations

Moxa Products

AWK-1137C
802.11n wireless client

AWK-4131A
802.11n wireless AP/client with IP68-rated housing

Build Wi-Fi Into Your Machines Effortlessly

Wi-Fi

AWK-4131A
Wi-Fi AP

Control Center

Sensor

IP Camera

AWK-1137C
Wi-Fi client

Remote Monitoring of CNC Machines for Higher Equipment Efficiency

A leading metal parts manufacturer sought Ethernet solutions to increase the utilization of their CNC machines and reduce setup costs to meet increasing demands for a wide variety of products. The factory required an easy-to-run network infrastructure that could connect both serial and Ethernet CNC machines to the control network to support centralized monitoring and control of these machines to increase overall equipment efficiency (OEE) and also support future expansions of the system.

System Requirements

- Data collection from serial and Ethernet CNC machines and PLCs
- Interoperability with third-party Wi-Fi devices
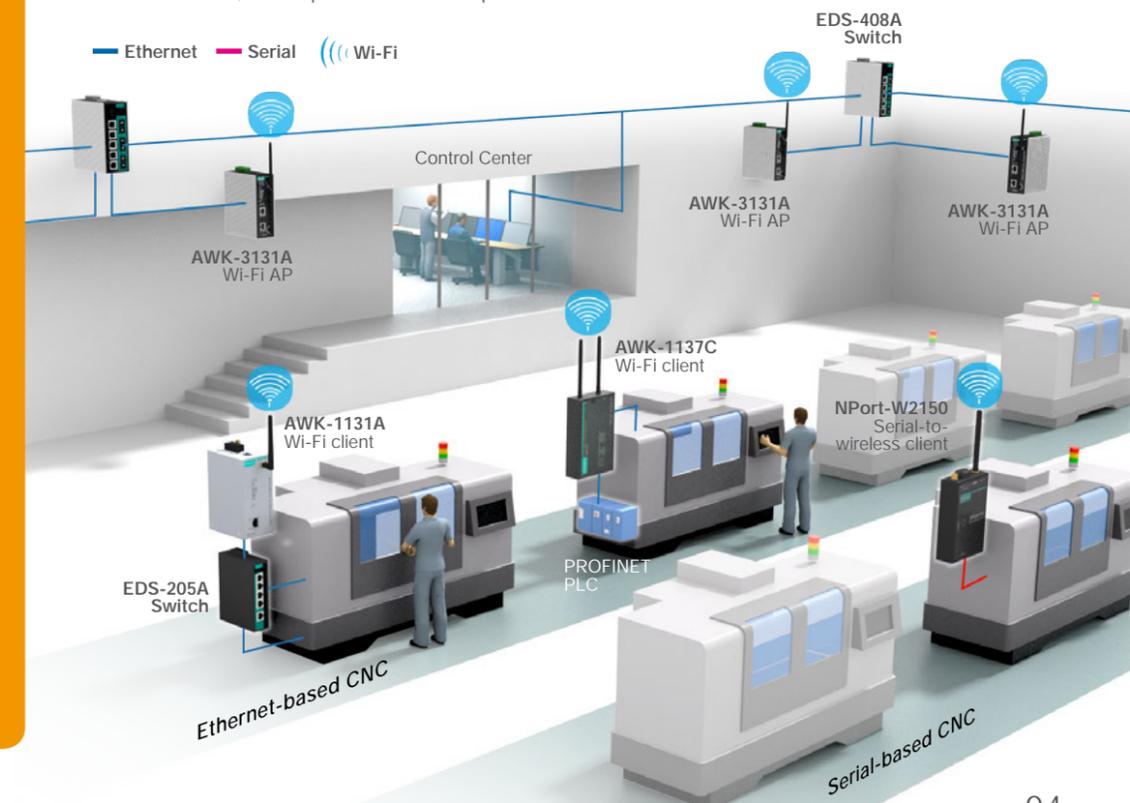- Reliable high-bandwidth communication in the shop floor environment

Moxa's Solution

Moxa's NPort-W2150A serial-to-wireless device servers are used to connect the serial-based CNC machines to the AWK-3131A access points.

Each AWK-3131A can connect up to 100 CNC machines to the factory's Ethernet backbone. The Wi-Fi certified AWK-3131A provides interoperability with multi-vendor Wi-Fi clients, facilitating communication with PLCs. The AWK-3131A AP master/slave mode provides transparent connections to PROFINET devices.

Both the NPort-W2150A and the AWK-3131A provide strong 802.11n MIMO radio connection and advanced surge protection to prevent electromagnetic interference on the factory floor.

The robust wireless infrastructure enables mass data exchange with the control center. The remote monitoring capability can facilitate access to both live and historical data on the performance of the CNC machines, which can then be analyzed to improve machine utilization, reduce idle time, and improve machine output.

Why Moxa

- Serial and Ethernet interfaces and multiple operation modes
- Advanced surge protection for antenna and power
- Interoperability with multi-vendor Wi-Fi clients

Moxa Products

AWK-3131A
802.11n wireless AP/client

AWK-1137C/AWK-1131A
802.11n wireless clients

NPort W2150A
Serial-to-802.11n wireless device server

Industry 4.0 for Smart Connectivity in Factories

Ethernet — Serial — Wi-Fi

EDS-408A Switch

Control Center

AWK-3131A Wi-Fi AP

AWK-3131A Wi-Fi AP

AWK-3131A Wi-Fi AP

AWK-1137C Wi-Fi client

AWK-1131A Wi-Fi client

NPort-W2150 Serial-to-wireless client

EDS-205A Switch

PROFINET PLC

Ethernet-based CNC

Serial-based CNC

Mobile AGVs for Flexible Manufacturing Systems

A motorcycle manufacturer intends to establish a flexible manufacturing system (FMS) to manufacture a variety of products to meet the increasing demand for their products in the market. Moxa was employed to integrate automated guided vehicles (AGVs) as mobile and flexible conveyors to enable automated material handling and processing of parts.
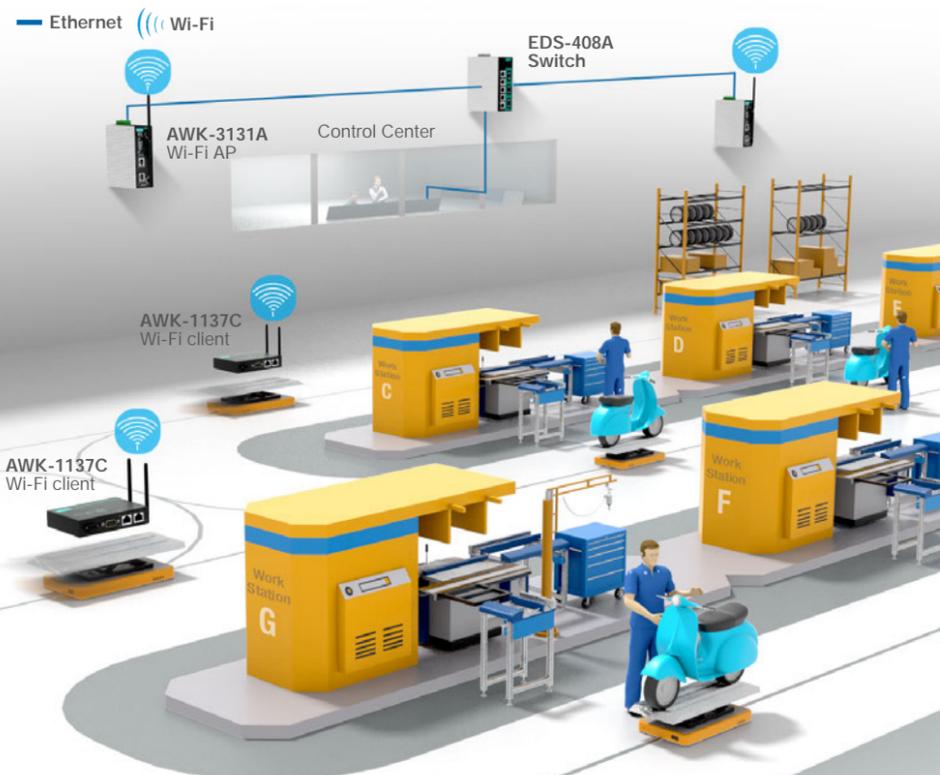
System Requirements

- Compact form factor that allows integration into machines
- Seamless connectivity
- Robust radio signals to protect against EMI

Moxa's Solution

Palm-sized AWK-1137C wireless clients were mounted inside the mobile AGV machines while AWK-3131A wireless APs installed on the shop floor provided 802.11n MIMO wireless coverage throughout the production floor, enabling efficient seamless navigation for the AGVs.

The FMS control center receives data from all AGVs dispersed around the shop floor, and dispatches commands to guide the AGVs to new positions and paths based on changes in the production-line schedule and plan. The performance data collected is then analyzed to make production improvements in the future.

Optimized device mobility is the key factor for AGV system efficiency. Both the AWK-1137C and the AWK-3131A support Turbo Roaming technology that enables millisecond-level handoff times to ensure reliable connection with AGV systems while they are on the move. Turbo Roaming capability enables the AWK-1137C client on the AGV machine to proactively search and switch to stronger access points before the wireless link goes down, which ensures better channel loading in the AWK-3131A APs leading to stronger Wi-Fi connections.

Why Moxa

- Palm-sized device for easy installation inside machines and equipment
- Power and RF isolation for reliability
- Turbo Roaming for millisecond-level secure handover

Moxa Products

AWK-1137C
802.11n wireless client

AWK-3131A
802.11n wireless AP/client

The Missing Piece for Your AGVs and AS/RS Systems

Control Center
- Ethernet
- Wi-Fi
- EDS-408A Switch
- AWK-3131A Wi-Fi AP
- AWK-1137C Wi-Fi client
- AWK-1137C Wi-Fi client
- Work Station C / D / F / G

Wireless Control of Overhead Hoists and AGVs Improves Material Handling Efficiency

An industrial glass manufacturer plans to automate factory operations to increase productivity and efficiency. The first step in the improvement process is to change the way material is transported through their Overhead Hoist Transfer System and AGVs. The manufacturer relies on wireless technology to connect overhead hoists and AGVs to the control center so that they can be monitored and controlled effectively.

System Requirements

- Wi-Fi devices that can be installed in space-constrained locations
- Fast and easy deployment
- Robust radio signals to protect against EMI
- Millisecond-level roaming handover times
- Wide temperature support

Moxa's Solution

To continuously monitor the temperature of melting tanks in the glass factory, AGVs installed with a thermal imager and an AWK-1137C client are used to get and transmit the temperature data to the control room.

The palm-sized AWK-1137C clients are installed on hoists onboard the vehicles to enable remote access, while AWK-3131A access points (APs) are installed on the wall along the rails to provide Wi-Fi coverage with strong signal strength so that the control center personnel can direct the next action of overhead hoists for material handling. To automate the movement of the finished goods to the final destination, forklifts with AWK-1137C devices installed are used.

The AWK-3131A APs can operate in a temperature range of -40 to 75°C, making them suitable for deployment in the hazardous environment of a factory. Both the AWK-1137C clients and AWK-3131A APs have an integrated isolation design that provides 500-V insulation protection for power and level-4 ESD protection for antennas.

In addition, the built-in AeroMag tool saves significant time and effort on basic device settings when deploying Moxa's APs and clients. The AeroMag lock function can prevent external devices from connecting to the factory APs and can help isolate the Wi-Fi network in each factory block for better protection against interference from external signals.

Turbo Roaming technology enables fast handover times of less than 150 ms, helping the wireless clients to adapt to constant mobility. The tool also increases the roaming speed by predefining AP channels and reducing time wasted on channel-hopping during roaming.

Why Moxa

- Palm-sized device for easy installation inside overhead hoists and AGVs
- Industrial-grade devices that can withstand high temperatures
- AeroMag for effortless network deployment

Moxa Products

AWK-1137C
802.11n wireless client

AWK-3131A
802.11n wireless AP/client

Tips for Deploying Wireless Networks for AS/RS and AGV Systems

Control Center
- Ethernet Switch
- AWK-3131A Wi-Fi AP
- Melting Tanks
- PLC
- Thermal Imager
- AWK-1137C Wi-Fi client
- Packing Area
- AWK-1137C Wi-Fi client

Redundant Wireless for Crane Slewing Control

Downtime in crane operations could spell disaster and lead to losses, especially if it occurs during a manufacturing operation or at busy ports. A crane manufacturer integrated Moxa's redundant wireless solutions into their heavy lift mast cranes that are used for offshore wind turbine installation to ensure maximum operational uptime.

System Requirements

• PROFINET communication for efficient PLC operations
• Network-level redundancy to ensure maximum uptime

Moxa's Solution

An end-to-end redundant wireless network was built to help the crane operator rotate the crane superstructure using a PROFINET-based slewing drive system located beneath the operator's cabin. The crane slewing system is monitored by a field CCTV surveillance system, and controlled by a PROFINET-based PLC system, both of which connect to an AWK-3131A wireless client to send real-time information to the control center. The master/slave mode setting on the AWK-3131A provides transparent transmission of PROFINET traffic to the control center.

At the control end, two AWK-3131A wireless APs were used to set up dual-band hot spots to transfer the video recording and data received to an upstream EDS-510E Ethernet switch, which in turn transferred the information to the control center to enable monitoring and control of the crane operations.

To ensure maximum network availability and system reliability, the AWK-3131A wireless clients use AeroLink Protection technology to build redundant wireless connections between the slewing drive systems and the control center. AeroLink Protection enables one of the AWK-3131A wireless clients to be on standby as a backup node in a different frequency (5 GHz) and take over within 300 ms if the primary device fails or if the link goes down.
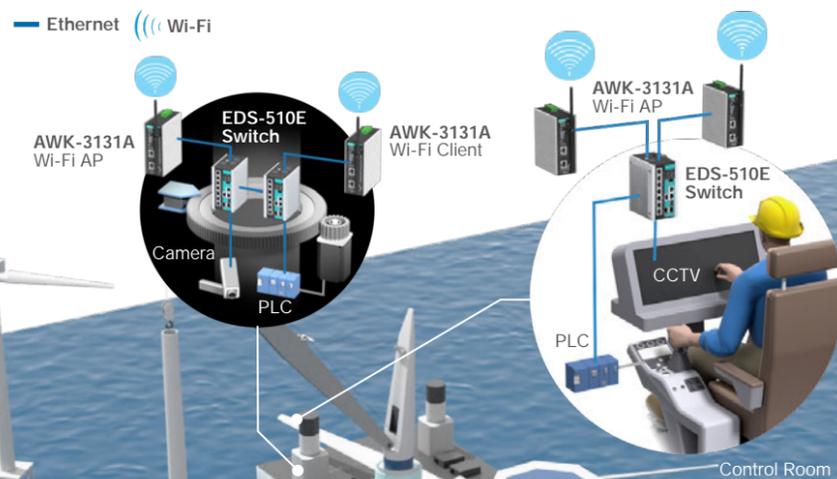
Why Moxa

• AeroLink Protection enables redundant network communication for maximum uptime
• Master/slave connection enables transparent PROFINET communication

Moxa Product

AWK-3131A
802.11n wireless AP/client

Uninterrupted Wireless Connectivity

— Ethernet ((• Wi-Fi

AWK-3131A Wi-Fi AP
EDS-510E Switch
AWK-3131A Wi-Fi Client
AWK-3131A Wi-Fi AP
EDS-510E Switch
Camera
PLC
CCTV
PLC
Control Room

Wireless Control and Monitoring for Driverless Mining Trucks and Loaders

A global provider of mining automation solutions partnered with Moxa to develop state-of-the-art solutions that allow operators to control and monitor driverless trucks and loaders in underground tunnels from the safety of their control rooms using highly reliable wireless communication.

System Requirements

• Seamless communication in underground mines
• Hardened devices for reliable performance in harsh environments
• Stable video streaming for live view of mine operations

Moxa's Solution

A reliable and robust communication network is crucial to enable machine operators to remotely control the mining trucks and loaders from the comfort of their control center. The communication network must facilitate reliable real-time video and data communication between the mobile vehicles and the operator station.

Moxa's industrial-grade AWK-4131A clients were installed on each of the mining trucks and loaders to enable remote access of the vehicles from the operator station while AWK-4131A access points were installed along the tunnel walls to provide maximum coverage. The devices are vibration-proof, moisture-proof, operate reliably in extreme temperatures, and come with an IP68-rated housing.

The AWK-4131A clients onboard the vehicles uplink large volumes of data and stream live video from each of these driverless vehicles to the operator station through the wireless access network. The AWK-4131A clients provide fast roaming with handoff times under 150 ms to ensure seamless connectivity while the load-carrying vehicles are in motion.

The AWK-4131A APs provide 802.11n MIMO coverage on standard 2.4 GHz/5 GHz and 5 GHz DFS channels to maximize radio performance and to reduce interference caused by the hard rock walls of the mines.

The AWK-4131A supports AeroMag technology that enables greater efficiency, reliability, and ease in wireless network deployment, and also optimizes channel maintenance so that machine operators can focus on operating the vehicles remotely rather than worrying about communication time lag.

Why Moxa

• IP68-rated enclosure for waterproof and dustproof protection
• Stable live video streaming coupled with 802.11n MIMO and 5 GHz DFS support
• Turbo Roaming for fast and secure data handover under 150 ms
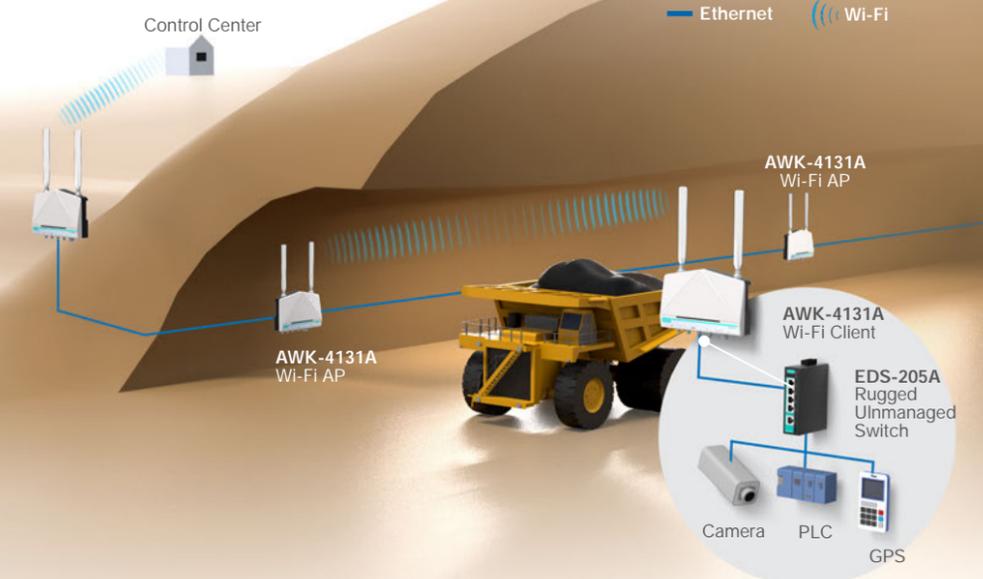• AeroMag for effortless network deployment

Moxa Product

AWK-4131A
802.11n wireless AP/client with IP68-rated housing

AeroMag Technology: Fast and Easy Wi-Fi Network Deployment

Control Center
— Ethernet ((• Wi-Fi
AWK-4131A Wi-Fi AP
AWK-4131A Wi-Fi AP
AWK-4131A Wi-Fi Client
EDS-205A Rugged Ulnmanaged Switch
Camera   PLC
GPS

Wireless Communication for Data and Control Signal Delivery to Fracturing Sites

In oil and gas applications, fracturing trucks are required to extract oil from shale. Traditionally, wires or cables were used to connect the fracturing trucks to on-site data vans to enable communications between them. But these cables often get damaged and are expensive to replace. A fracturing service company decided to look into wireless options to ensure reliable connectivity at fracturing sites.

System Requirements

• Equipment that can withstand hazardous conditions at fracturing sites
• A reliable yet flexible wireless network to ensure seamless connectivity
• Devices with Class I Division 2 certification

Moxa's Solution

The environment at a fracturing site can be hazardous if on-site devices do not have the required protection. Moxa's AWK-3131A wireless AP/client devices are compliant with UL/cUL Class I Division 2 and ATEX Zone 2 certifications and can function reliably in extreme temperatures between -40 and 75°C, making them well-suited for this environment.

The fracturing trucks communicate with a data van nearby to receive and transmit critical data. To streamline the transition from wired to wireless network, the company replaced their wired network with Moxa's AWK-3131A wireless APs and clients to form a reliable and flexible wireless network.

The wireless AP installed on the data van provides wireless access to several wireless clients on fracturing trucks. If the AP on the data van is down, one of the AWK-3131A clients installed on the fracturing trucks will switch to the wireless AP mode using the Auto AP function. The Auto Configuration function on the AWK-3131A wireless AP/client allows operators to continuously control and monitor the fracturing site over a wireless network.

Why Moxa

• Industrial-grade devices that can withstand extreme temperatures and strong vibrations
• AeroMag for effortless Wi-Fi network deployment
• Full compliance with C1D2 and ATEX Zone 2 certifications

Moxa Products

AWK-3131A
802.11n wireless AP/client

Uninterrupted Wireless Connectivity

Video Transmission for Bus Surveillance

An urban bus system adopted onboard IP surveillance to enhance passenger safety. Each bus was equipped with several cameras that were set to record 20-minute 720P footage in the event of an incident. Event video would be transmitted over wireless to the control center when the bus returned to the parking depot.

System Requirements

• Sufficient upstream bandwidth
• Wi-Fi access coverage at bus depot
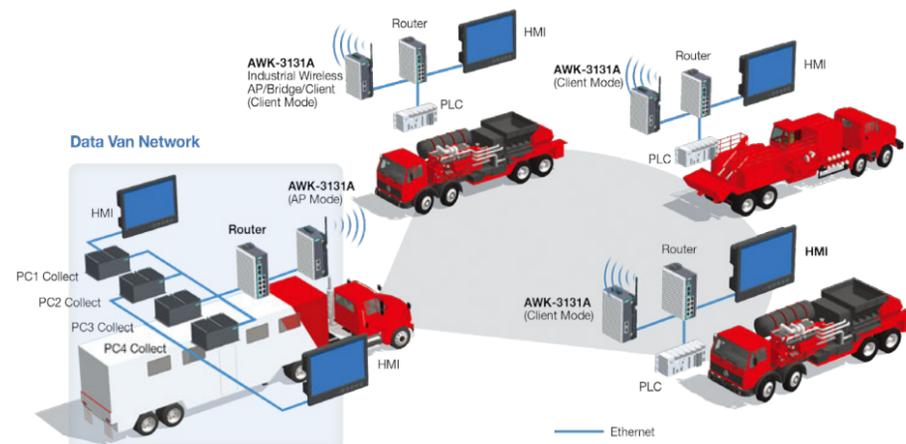• Weatherproofed wireless APs for outdoor applications

Moxa's Solution

Moxa utilized IEEE 802.11n broadband technology to deploy the network required to backhaul the large volume of HD video data from the buses over wireless.

One AWK-3131A wireless client was installed in each bus to upload video from the onboard cameras over 802.11n when the bus returned to the depot. The AWK-4131A wireless APs were mounted onto the outer wall of the depot building to provide 802.11n MIMO coverage and enable access to broadband frequencies.

To ensure constant data throughput and seamless roaming, both the AWK-3131A and AWK-4131A feature Turbo Roaming, which helps mobile clients seek and stay connected to APs that provide optimal radio coverage and stable network access.

The outdoor AWK-4131A APs are key to ensuring network reliability. The waterproof corrosion-resistant design of the AWK-4131A and the IP68-rated enclosure protect the device from harsh outdoor conditions.
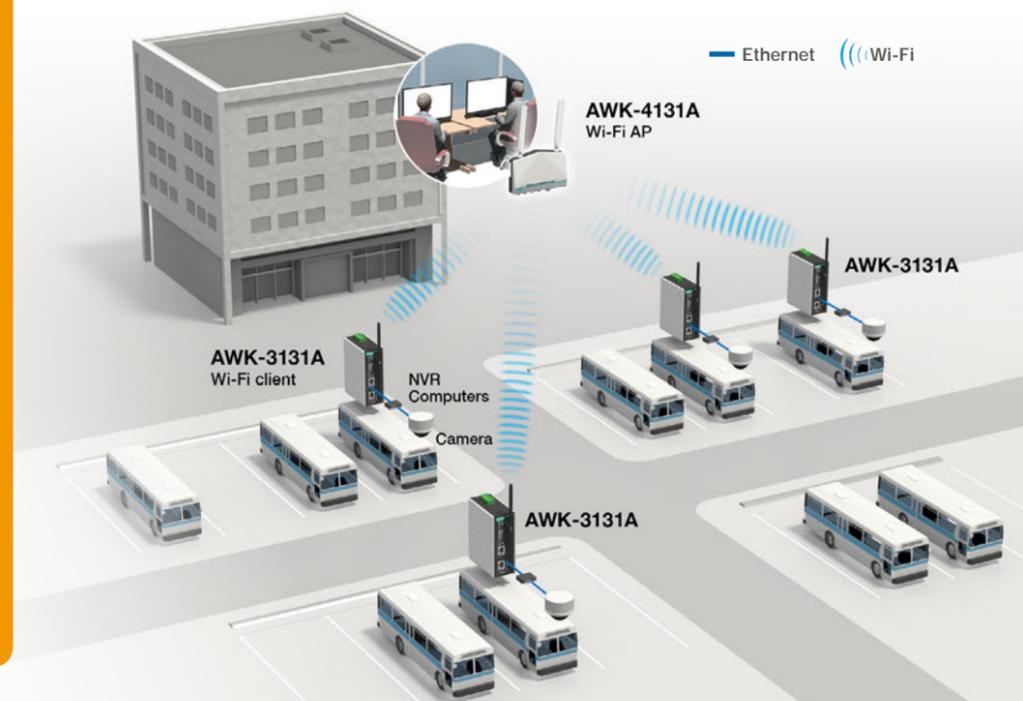
Why Moxa

• IEEE 802.11n MIMO technology for up to 300 Mbps data uplink and broadband access
• IP68-rated enclosure for outdoor protection to reduce maintenance efforts
• Turbo Roaming for stronger signal coverage and AP load balancing

Moxa Products

AWK-3131A
802.11n wireless AP/client

AWK-4131A
802.11n wireless AP/client with IP68-rated housing

How to Build Reliable, Responsive, Low-Cost Mobile Wi-Fi Networks for the Industrial Internet of Things

Router
HMI
AWK-3131A
Industrial Wireless AP/Bridge/Client (Client Mode)
PLC
AWK-3131A (Client Mode)
Router
HMI
PLC

Data Van Network
HMI
Router
AWK-3131A (AP Mode)
PC1 Collect
PC2 Collect
PC3 Collect
PC4 Collect
HMI
Router
HMI
AWK-3131A (Client Mode)
PLC
Ethernet

Ethernet
Wi-Fi
AWK-4131A Wi-Fi AP
AWK-3131A
AWK-3131A Wi-Fi client
NVR Computers
Camera
AWK-3131A

LTE Cellular Broadband for Intelligent Transportation Systems

High-speed transportation poses a challenge to traffic control systems. To cope with this challenge, high-speed data communications were deployed to improve traffic flow management and reduce accidents. Moxa's LTE cellular solutions were used to upgrade the long-distance communication capabilities of intelligent transportation systems with 4G broadband, providing enhanced availability, security, and effortless maintenance.

System Requirements

• Reliable 4G cellular connectivity for 24/7 data and video communication
• A single converged network solution used for all communication needs
• Uninterrupted connectivity with cybersecurity

Moxa's Solution

Moxa's LTE cellular solutions offer industrial-grade reliability and serial-over-cellular communication to streamline information collection and the complex integration required for intelligent transportation systems.

Moxa's OnCell G3150A-LTE cellular gateway was used to provide a serial-to-LTE connection to converge data, voice, and video collected from various road signs, signals, surveillance systems, and emergency systems into a single network. Alternatively, Moxa's OnCell G3470A-LTE cellular gateway can provide 4-port Gigabit and a 4G LTE cellular connection to combine additional data sources with high-volume video streaming, helping make traffic management more efficient.

Both the OnCell G3150A-LTE and the OnCell G3470A-LTE feature uninterrupted data transmission capabilities with dual SIM redundancy and GuaranLink connection checking to provide seamless cellular connectivity. OnCell G3150A-LTE also supports component-level security control and management based on IEC 62443 standards to secure data traffic and prevent hacking and unauthorized access to data.

The OnCell Central Manager (OCM) software enables easy and secure remote access to cellular devices and helped system administrators build cost-effective and secure private IP connectivity for end-to-end data exchange over the Internet.
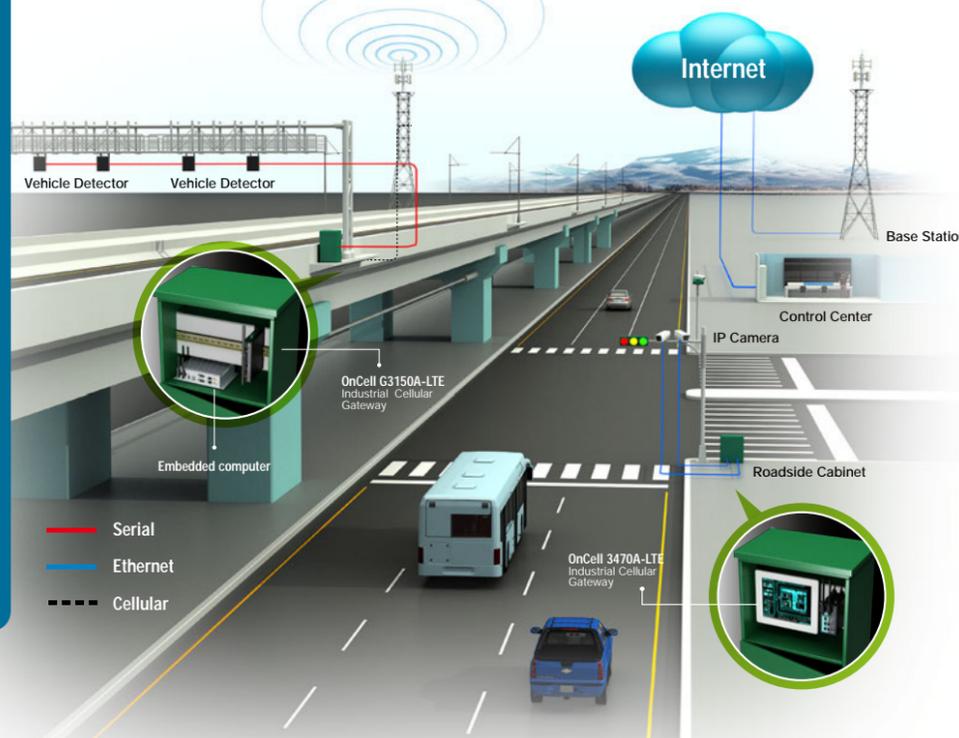
Why Moxa

• 4G-LTE broadband connectivity
• Connection redundancy with dual SIM and GuaranLink technology
• Flexible serial/Ethernet-to-cellular links for ITS network integration
• Web-based OCM tool for easy and secure remote management

Moxa Products

OnCell G3150A-LTE Series
Cellular gateway with serial connectivity

OnCell G3470A-LTE Series
Cellular router with 4-port Ethernet switch connectivity

The Top 3 Considerations to Choosing an Industrial LTE Solution

Vehicle Detector   Vehicle Detector

Internet

Base Station

Control Center

IP Camera

OnCell G3150A-LTE
Industrial Cellular Gateway

Embedded computer

Roadside Cabinet

OnCell 3470A-LTE
Industrial Cellular Gateway

Serial
Ethernet
Cellular

Serial Over LTE for Scalable Power Distribution Monitoring

Feeder terminal units (FTU) are crucial for power distribution automation and can help provide instant notification about the location of a fault in a critical power distribution system. Moxa's LTE-based cellular solutions provide high-speed and reliable communication between FTUs and FRTUs (Feeder Remote Terminal Units) located at a remote control center to prevent the power grid from failing due to a fault in the FTUs.
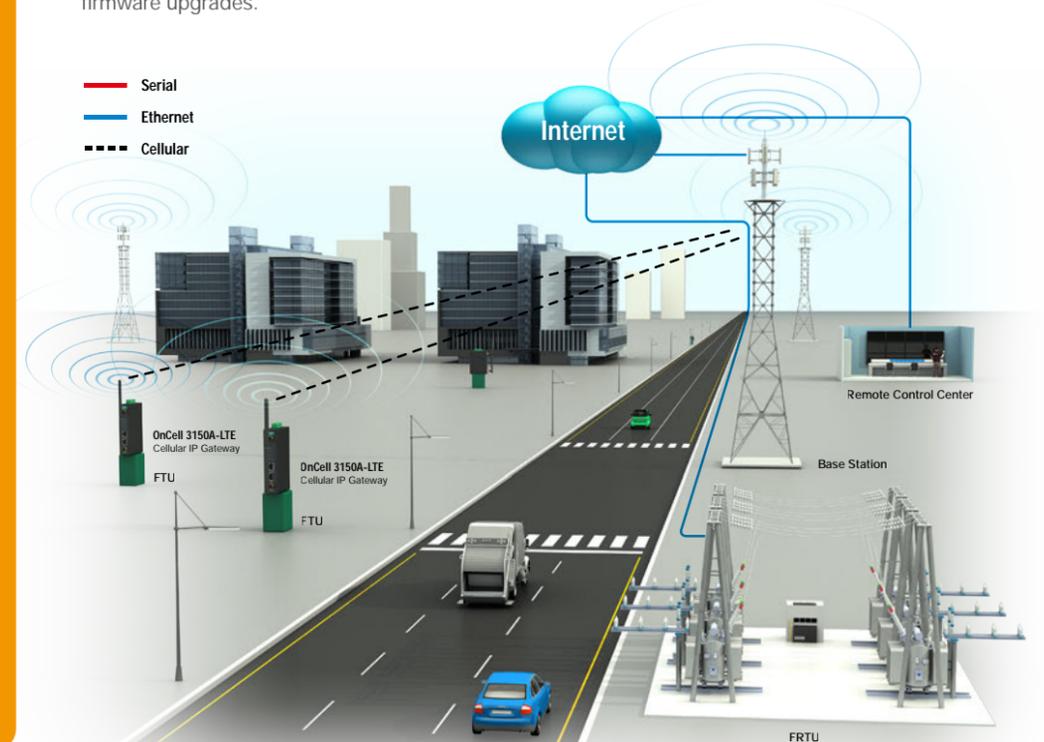
System Requirements

• A scalable IP-based solution for data communication between the FRTUs and the FTUs
• Maximum uptime with self-healing redundancy
• Serial and Ethernet interfaces for integration of legacy equipment

Moxa's Solution

Electric power distribution networks are expanding to keep pace with growth in urban areas. Moxa's LTE cellular solutions provide reliable and secure connectivity with global LTE coverage to facilitate future scalability. Featuring a compact form factor, dual power inputs, and a high level of EMS immunity, OnCell G3150A-LTE cellular gateways are perfect for installing at FTUs to establish solid LTE cellular connections to and from the control center.

OnCell G3150A-LTE gateways provide serial and Ethernet ports, making it easy to accommodate both serial-based and Ethernet-based equipment into a broadband cellular network for centralized data control and monitoring. Their serial-to-cellular IP connectivity simplifies collaboration with legacy systems at no extra cost.

To ensure cellular reliability and maximum uptime, the OnCell G3150A-LTE comes with dual SIM slots for redundant cellular service, and a GuaranLink that enables a four-tier connection check and real-time alerts in the event of link failures. The OnCell G3150A-LTE can also accept SMS commands sent by users via the OnCell Central Manager for remote reboot, reconnection, and firmware upgrades.

Why Moxa

• IP-based cellular architecture for scalable network expansion
• Transparent serial and Ethernet connections for flexible device integration at the FTUs
• Supports SMS commands for remote reboot, reconnect, and firmware upgrades

Moxa Product

OnCell G3150A-LTE Series
Cellular gateway with serial connectivity

Remote Access
Made Secure and Easy

Serial
Ethernet
Cellular

Internet

OnCell 3150A-LTE
Cellular IP Gateway

FTU

OnCell 3150A-LTE
Cellular IP Gateway

FTU

Remote Control Center

Base Station

FRTU

Secure Cellular Communication for Water-treatment Applications

Water treatment systems require constant monitoring to ensure the safety and quality of drinking water. The network coverage for these systems must span a wide area so that city authorities can monitor the treatment and distribution processes, collect data from the devices, and analyze the data collected. The results of the analysis can be used to manage the quality of water and improve system operations. Moxa's LTE solutions provide high network capacity and coverage for efficient control and monitoring of water treatment plants and help protect the utility network from cyberattacks.

System Requirements

• Secure connectivity for critical water safety
• Internet access for centralized management and control
• Easy troubleshooting for connectivity

Moxa's Solution

In a water treatment system, thousands of water quality parameters have to be measured and monitored as raw water goes through the treatment/purification process. OnCell G3150A-LTE gateways provide excellent LTE coverage and versatile serial and Ethernet connections to collect data over LTE cellular networks.

On the hardware side, the OnCell G3150A-LTE complies with the IEC 62443-4-2 cybersecurity standards defined for Industrial Automation and Control Systems (IACS) and has built-in security functions that facilitate protection of critical industrial control systems such as water-treatment systems.

The OnCell G3150A-LTE facilitates secure remote access through OnCell Central Manager (OCM) for efficient system operation. The OCM tool also provides centralized private IP connections that enable easy device management, secure data exchange, and device access control over the Internet.

The OnCell G3150A-LTE is easy to maintain in the field with LED indicators on the front panel showing the current signal strength and cellular mode status. System operators in a control center can use SMS commands to reset the device via the OCM platform.
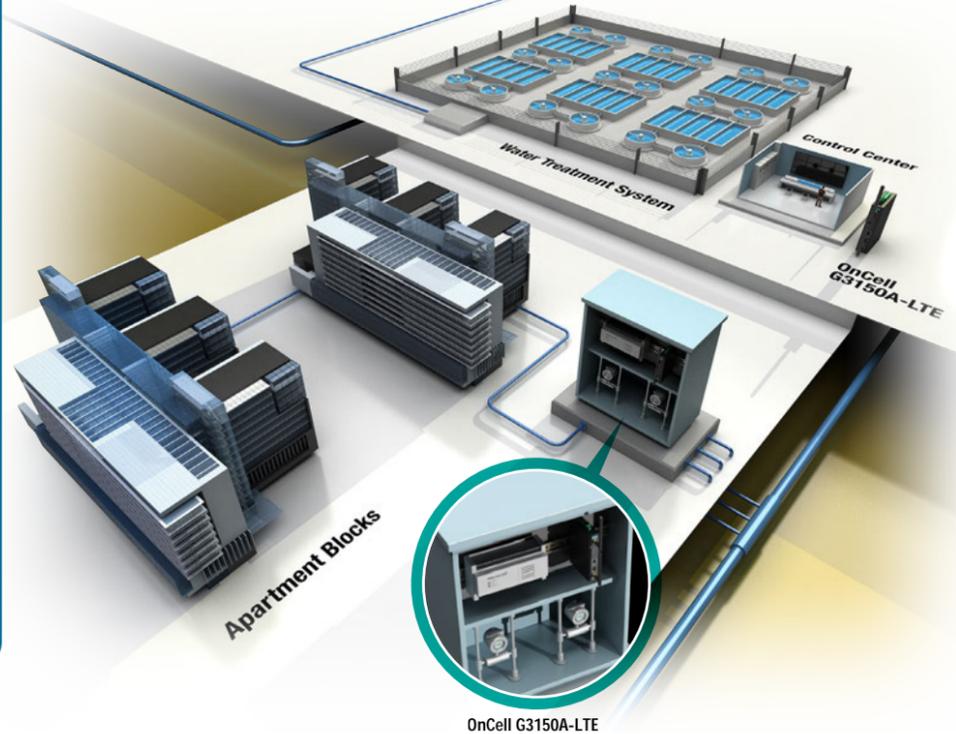
Why Moxa

• Device-embedded security capability and private IP management via OCM utility
• Transparent serial and Ethernet connections for versatile data collection
• Easy maintenance with LED indicators for local check and web-based remote monitoring through the OCM interface

Moxa Product

OnCell G3150A-LTE Series
LTE cellular gateway
with serial connectivity

Choosing a Cellular Network Management Solution that Works for You

OnCell G3150A-LTE

Water Treatment System
Control Center
OnCell G3150A-LTE
Apartment Blocks

	AWK-4131A Series	AWK-3131A Series	AWK-1131A Series	AWK-1137C Series
WLAN Standards	802.11a/b/g/n			
Operation Mode	AP, Client, Master, Slave, Client-Router, Sniffer	AP, Client, Master, Slave, Client-Router, Sniffer	AP, Client, Sniffer	Client, Slave, Client-Router, Sniffer
Antenna	2, N-type female	2, RP-SMA female		
Antenna Isolation	√	√	√	√
Ethernet Ports	1 x PoE port, 10/100/1000BaseT(X) (RJ45 connector)		1 x 10/100/1000BaseT(X) port (RJ45 connector)	2 x 10/100BaseT(X) ports (RJ45 connector)
Serial Port	–	–	–	RS-232/422/485, DB9 male
AeroMag Mode	AeroMag AP, AeroMag Client	AeroMag AP, AeroMag Client	–	AeroMag Client
AeroLink Protection	√	√	–	–
Max. No. of Clients per AP Device	100 connections, 60 concurrent streams	100 connections, 60 concurrent streams	30 connections, 30 concurrent streams	–
PoE	802.3af PoE	802.3af PoE	–	–
Power	12 to 48 VDC, redundant dual inputs, 48 VDC PoE		12 to 48 VDC, redundant dual inputs	9 to 30 VDC
Power Isolation	√	√	√	√
Operating Temperature	-40 to 75°C (-40 to 167°F)	Standard Models: -25 to 60°C (-13 to 140°F) Wide Temp. Models: -40 to 75°C (-40 to 167°F)	Standard Models: 0 to 60°C (32 to 140°F) Wide Temp. Models: -40 to 75°C (-40 to 167°F)	
IP Rating	IP68	IP30	IP30	IP30
Radio Certifications	FCC, CE, MIC, ANATEL, WPC, SRRC, KC, RCM			
Industry Certifications	–	UL/cUL Class 1 Division 2, ATEX Zone 2, IECEx	–	eMark

Preliminary

LTE Solutions	OnCell 3120-LTE-1 Series*	OnCell G3150A-LTE Series	OnCell G3470A-LTE Series
Key Features	• Low power consumption for battery powered applications • European, US, and AU LTE band support • Dual SIM for cellular operator backup • GuaranLink for reliable cellular connectivity • OnCell Central Manager tool support for remote device deployment, device management, and system scalability	• European and US LTE band support • Dual SIM for cellular operator backup • GuaranLink for reliable cellular connectivity • Dual power inputs and built-in DI/DOs • OnCell Central Manager tool support for remote device deployment, device management, and system scalability	
Cellular Standards	GSM, UMTS, HSPA, LTE CAT-1	GSM, GPRS, EDGE, UMTS, HSPA, LTE CAT-3	
No. of SIMs	2	2	2
Interfaces	2-port Ethernet, 1-port RS-232/422/485	–	–
VPN	GRE, IPsec, and OpenVPN	GRE, IPsec, and OpenVPN	IPsec
Routing/Firewall	NAT, port forwarding, IP/MAC/port filtering	NAT, port forwarding, IP/MAC/port filtering	NAT, port forwarding, IP/MAC/port filtering
Input Voltage	9 to 36 VDC	Redundant dual inputs, 12 to 48 VDC	
Input Current	0.5 A @ 9 VDC	0.7 A @ 12 VDC, 0.2 A @ 48 VDC	
Operating Temperature	Standard Models: 0 to 55°C (32 to 131°F) Wide Temp. Models: -30 to 70°C (-22 to 158°F)		Standard Models: -30 to 55°C (-22 to 131°F) Wide Temp. Models: -30 to 70°C (-22 to 158°F)
Interference Protection	ESD Level 4 antenna protection with isolation design		
Radio Certifications	FCC, CE,PTCRB,AS/NZS	FCC, CE	
Industry Certifications	UL/cUL Class 1 Division 2, ATEX Zone 2, IECEx	ATEX Zone 2, IECEx	UL/cUL Class 1 Division 2, ATEX Zone 2, IECEx

*OnCell 3120-LTE-1 Series available around Q1, 2020