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# HOW TO MAKE YOUR WIRELESS NETWORKS INDUSTRIAL STRENGTH

# Are You Getting the Performance You Need From Your Industrial Wireless Network?

The reality is, too many enterprises have been content to use wireless communications technologies that are not designed to deal with the more demanding requirements of dynamic indoor and outdoor industrial environments. Reliance on working, but outdated wireless technology is proving to be a significant issue that can adversely affect enterprise connectivity, reliability, productivity, and profitability. It is easy to see why.

## More Demanding Requirements

Your industrial environments present a unique set of requirements not found in your carpeted spaces. Today's industrial networks face a volatile and evolving set of difficult communications challenges. They must ensure persistent mobile connectivity for workers, vehicles, and equipment. They must operate at peak efficiency in interference-riddled spaces. They must offer flexible, pervasive coverage indoors and outdoors. They must survive and excel in extreme temperatures and under the harshest weather conditions, and they need to provide integrated, proactive network management. Above all, industrial networks must deliver mission-critical reliability no matter how challenging the environment.

## Making the Right Decisions

The network decisions you make must take into account these demanding requirements as well as other challenges that are unique to difficult industrial environments like plants, warehouses, distribution centers, depots, yards, ports, and more.

You need a network that ensures maximum quality of service for the end users in your industrial spaces, providing the power and performance to make sure each line-of-business application and real-time conversation is supported with reliable, secure connectivity. You also know that this can be easier said than done.

## Actionable Answers

The time is right to take a closer look at your current industrial network strategies and technologies and determine if they are delivering the performance, security, and productivity you need from them. This guide is divided into seven sections, each examining one of the fundamental challenges to creating successful, hard-working industrial wireless networks. Each section highlights some of the most important ways wireless technology ensures that your WLAN is truly industrial strength.

# Eliminating Bottlenecks and Network Outages

**AS YOU BEGIN TO OPTIMIZE WIRELESS COMMUNICATIONS IN YOUR INDUSTRIAL ENVIRONMENTS, THE FIRST STEP IS CHOOSING THE RIGHT PLATFORM ARCHITECTURE.**

Your goal should be to minimize network congestion and bottlenecks. The optimal solution is a backbone architecture with distributed intelligence. In typical wireless LANs, all traffic is routed through a wireless controller. That can be a problem; when traffic increases or spikes there can be significant controller delays, causing performance levels to drop substantially. In industrial environments where latency, jitter, and packet-loss are at a premium, a new type of architecture is required.

The WING 5 WLAN architecture to solve these congestion issues. The architecture is purpose-built to accommodate the 10-fold increase in traffic, enabled by the 802.11n standard, as well as the 30-fold increase enabled by the new 802.11ac standard. It's also designed to easily and cost-effectively handle the complex demands of the evolving industrial environment.

The WiNG 5 distributed architecture helps you segment and route your traffic to eliminate system outages, avoid congestion and bottlenecks, as well as control and optimize bandwidth. Distributed intelligence is the key. By distributing controller intelligence to the access points, the architecture maximizes performance with low delay and latency, and improves network resilience by reducing or eliminating congestion and single points of failure.

WLAN solutions ensure business continuity while eliminating costly and painful downtime for industrial workers and staff. Reliable networking can be established virtually anywhere and almost instantly—even if the link to the controller should go down. This translates into greatly reduced administrative and maintenance costs and saves precious IT resources.

The result is substantially improved performance with applications that do not stall, audio that is crisp and clear, video that is not jittery, and mobile service that is highly reliable for your business-critical line of business applications. The architecture also maximizes end user Quality of Service (QoS) throughout the network with smart, network-aware access points that intelligently and automatically determine the best direct routing paths.

# Connecting in Chaotic Environments

**UNLIKE THE CARPETED SPACE, INDUSTRIAL WIRELESS ENVIRONMENTS ARE NOT RELATIVELY COOL, CALM, AND PREDICTABLE.**

They are just the opposite and always in a state of flux. With constantly moving merchandise, manpower, equipment, and vehicles, industrial environments can change their wireless characteristics hour-by-hour, or even minute-by-minute. These are dynamic spaces containing significant RF obstacles, ranging from rolling stock to tractor-trailers to cargo ships being loaded and unloaded to steel-walled containers stacked seven high. Your network must be able to automatically adapt to these changing requirements.

## Intelligent Connectivity

AB&R® has embedded innovative wireless technologies into the WiNG 5 architecture that help you overcome your most challenging connectivity issues. The architecture's built-in SMART RF algorithm delivers outstanding interference mitigation, enabling the network to autonomously adjust its physical (e.g., power, channels, etc.) configuration to mitigate the impact of obstacles on wireless coverage and deliver exceptionally reliable service in real time. SMART RF is a multi-faceted technology that helps ensure connectivity in a number of critical ways.

## Self-Forming Networks

It begins with initial configuration. During network setup and deployment, Access Points (APs) empower the network to self-form and self-configure by automatically recognizing and learning from one another. SMART RF enables APs to accurately adjust power levels and channel assignments, eliminating gaps in coverage and minimizing co-channel interference. The result is simpler, faster network deployment, installation, and configuration.

## Persistent Connections

Today's complex industrial spaces tend to be prone to constant change that can wreak havoc on wireless communications. This includes changes such as new or relocated equipment, temporary walls or structures, and any other environmental changes within a facility that can drastically alter Wi-Fi propagation. The addition of new temporary wireless signals onsite, such as personal Wi-Fi hotspots with cellular backhaul, can also disrupt the flow of traffic. The network sees these changes as sources of interference. With the SMART RF algorithm searching for interference every two seconds, the APs can dynamically adjust their power levels and channel plans whenever necessary, ensuring strong coverage and connectivity throughout the facility.

## Self-Healing Reliability

AB&R®'s industrial WLAN networks are also self-healing, able to optimize resiliency and availability in the event of a physical failure, such as an AP losing power. SMART RF technology enables the network to immediately recognize that an access point has gone down and provide sustained backhaul of collected traffic via another AP or node. All neighboring APs automatically adjust their power levels and, if required, change their channel assignments to cover the RF space previously served by the downed AP.

## Fast, Seamless Roaming

Industrial communications environments are increasingly empowered by mobile connectivity for workers on foot and moving vehicles that need session persistence to roam throughout the facilities—indoors, outdoors, and to and from one environment to another. AB&R® technology supports continuous connectivity for mobile workers' devices, automatically forwarding credentials ahead to enable users to roam between APs without the need for reauthorization.

The network can also be configured to adjust its power levels dynamically so that a single specific device, a certain type of device, or any device running a particular high-priority application will maintain a minimum specified data rate as it moves throughout the site or facility.

With this SMART RF feature, the system automatically optimizes access point power to ensure signals will not fade as those devices move farther away from any single access point, thereby protecting the productivity and satisfaction of the mobile worker. In addition, SMART RF is application-aware; when it detects voice clients, it automatically stops scanning to ensure continued connectivity with low latency and minimum delay.

Connectivity for workers on vehicles roaming within and across your industrial facilities is also crucial in the industrial space. Many of these vehicles, such as forklifts, are equipped with vehicle-mounted computers and move at moderate speeds between indoor and outdoor environments. MeshConnex complements SMART RF, and the two work hand-in-hand to ensure physical and logical settings for the network are optimized to support mission-critical wireless connections. MeshConnex routing engine provides for low hop latency, high-speed handoffs, and proven scalability to support fast and seamless roaming from one AP to another.

## HOW IT WORKS

### INDUSTRIAL STRENGTH PORT

A large container port was experiencing difficulties in providing reliable, high-performance signals with its traditional Wi-Fi network. With signal-sapping obstacles like steel containers stacked high over a more than four square mile area and a dynamic environment of mobile equipment, vehicles, and workers, interference issues were rampant and productivity was suffering. The port decided to deploy a powerful network that used advanced meshing Wi-Fi technology to reduce and even eliminate interference issues and signal problems to complement their overlay narrowband network that provided pervasive, low data-rate coverage across the entire port. The result was seamless, more reliable mobile communications and significantly enhanced productivity and ROI.

Many vehicles may move at higher speeds of up to 50 mph or more. These are speeds that standard 802.11 WiFi networks typically cannot support. The MeshConnex algorithm combines with AB&R®'s predictive analytics to ensure persistent connectivity, even for fast-moving vehicles or remotely guided equipment equipped with vehicle-mounted modems (VMMs), such as AGVs, hostlers, and forklifts.

## Extending Coverage

MeshConnex also allows you to extend reliable, robust coverage and connectivity to places that are hard to reach or where it is cost-prohibitive to run cables to the LAN. With MeshConnex technology, one of the AP radios can be used for servicing clients, while the other is used to backhaul data to a neighboring AP or node that is connected to the LAN via Ethernet cable. The AP dynamically and proactively determines the best path to send and route traffic via adjacent nodes.

In the event of an external incident that alters the connection between a meshed AP and its primary node, or if the node goes down due to a malfunction, MeshConnex quickly establishes a connection with the next best node. MeshConnex and SMART RF work seamlessly together to ensure maximum uptime with minimal disruption to business operations. This is all accomplished automatically, without requiring IT resources to manually update or adjust settings.

# Hard Working Solutions for Hard Working Spaces

**INDUSTRIAL ENVIRONMENTS ARE HARDLY KNOWN FOR BEING NEAT AND TIDY**

They are hard-working areas where dust and dirt can degrade performance and shorten useful life. Temperature extremes can cause networking equipment to freeze or overheat, shutting down or disrupting service. Humid conditions can cause moisture to seep into radios, not only degrading performance but often causing permanent damage. Although third party NEMA enclosures can help solve these challenges, they are not the only viable solution to consider.

## Intelligent, Tough Technology

AB&R® offers a wide range of industrial-strength access points that can be deployed in any environment—indoors, outdoors, and everywhere in between. For example, in a typical cold storage application, APs must normally be situated outside the area due to their inability to withstand the extreme temperatures within the freezer or chiller environment. Organizations often resort to either trying to “blast in” Wi-Fi from just outside the freezer, or they bifurcate their cold chain operations and run them in “batch mode,” which provides no real time access, updates, or visibility.

AB&R® solves these issues with ruggedized APs that can be located inside a cold storage or freezer area. Purpose-built to work in severe cold or heat, AB&R® radios have the ability to provide coverage within the most extreme indoor and outdoor environments, resulting in more accurate, real-time communications to protect employee productivity and safety while also helping industrial customers ensure product safety.

## Plenum-Rated and Permissive-Change Flexibility

AB&R® offers APs that provide embedded self-contained environmental protection with ruggedized IP67 enclosures, eliminating the need to purchase third-party NEMA enclosures for use in harsh indoor or outdoor locations. Of course, using an AP that was designed for outdoor usage inside an industrial building is not as easy as simply hanging that AP in the ceiling. Two major considerations need to be accounted for when pursuing this approach.

First is the need for plenum-rated casings to guarantee materials used in constructing the units comply with all indoor safety and environmental regulations. Second, is the requirement for permissive-change functionality that ensures power levels and channel frequencies can be adjusted in software to comply with FCC guidelines for indoor APs, which differ significantly from outdoor APs. Without meeting both of these requirements, deploying APs in particularly harsh or extreme indoor industrial facilities can be a risky and expensive proposition.

**HOW IT WORKS**
**COLD STORAGE CONNECTIVITY**

A distribution center with an extensive cold storage facility finds that in their freezers, where temperatures can reach -30°C or lower, indoor-rated access points are simply unable to function properly in sub-zero environments, sometimes even with NEMA enclosures. By deploying select outdoor APs that carry plenum ratings, provide software-triggered permissive change functionality, and are inherently rated to operate to either -30° or -40°C, the DC is now able to deliver outstanding performance in a wide range of temperature-challenged applications.

# Ensuring Connectivity for Multiple Classes of Devices

**REGARDLESS OF THE NUMBER AND TYPES OF DEVICES YOU USE, WLANS HELP ENSURE PERSISTENT CONNECTIVITY.**

As the industrial space relies more and more on mobile communications, your network must be able to support the multitude of mobile communications devices already on the market, not to mention the new ones seemingly arriving every day.

Networks support devices, such as powerful desktop and laptop computers, as well as ruggedized handheld and wearable computers, bar code scanners, RFID readers, and even consumer smartphones and tablets. Although the ideal situation from a management and configuration standpoint would be to provide all mobile workers with uniform, industrial grade handheld devices like AB&R®'s MC75 handheld computer or ET55 enterprise-grade tablet, in many cases the reality is considerably different, requiring a broad mix of device types for different workers, each optimized to its job function or task.

## Power and Intelligence

AB&R®'s thorough understanding of the intricacies of RF planning and connectivity enables its industrial networks to take into consideration the RF power and connectivity issues inherent in the mobile devices of today and tomorrow. Mobile devices other than laptops—such as handheld computers and workers' personal devices—often have considerably less transmit power and much lower receiver sensitivity, presenting significant roadblocks to connectivity. Most networks in place today were not designed specifically to support the different RF performance of these devices, and most wireless planning software today builds coverage and design recommendations not for these devices, but for higher-powered laptop computers. Your industrial network must be able to support a wide range of different mobile devices of differing receiver sensitivity and power levels, and that starts with the planning stage.

Claims about power performance of a network should relate not only to the strength of a wireless signal that will be seen by a device, but to the device's battery life as well. AB&R® ensures power performance by building extensive technological and networking knowledge and expertise into industrial wireless solutions across both the network and device elements. When you operate most mobile computers on a properly configured WLAN, you can achieve a battery life improvement of up to 20 percent on those devices.

## Smarter Sending and Receiving

SMART RF Autopower capabilities enable the network to automatically increase or decrease power from the AP. This enhances connectivity by compensating for different devices with different RF signatures, varying transmit power levels and disparate receiver sensitivities. Intelligent access points are purpose-built with higher output power, advanced antenna design, and robust receiver sensitivity They provide strong listening capabilities to recognize even weak device signals at the same time they mitigate the exceptionally high interference inherent in complex industrial environments.

# Managing Bandwidth Dynamically

**ONE OF THE MOST CRITICAL CONSIDERATIONS AS YOU DEVELOP A NEW OR UPGRADE AN EXISTING INDUSTRIAL NETWORK IS WHICH—AND HOW MANY— APPLICATIONS YOU PLAN TO USE.**

Data transmission. VoIP. Mobile streaming video and video surveillance. Perimeter security. As your applications portfolio grows, your need for bandwidth grows with it. With these common industrial applications—plus the growth of browser-based network access and cloud-based native applications—it is clear that your industrial network will soon experience a major increase in traffic, if it has not already. It is also quite clear that office-grade network solutions will most likely be unable to deliver the robust, reliable, and pervasive bandwidth you need, when and where you want it.

Because so many of today's applications are bandwidth-intensive—and because bandwidth is finite—it is important to be able to manage your throughput efficiently and effectively. WiNG 5 WLAN architecture helps you segment and route your traffic to help you dynamically manage bandwidth so you are able to deliver the right amount of throughput to the right application at the right time.

## Client Connectivity

More and more of today's applications, however, require larger amounts of bandwidth. AB&R®'s WLANs enable you to prioritize traffic and place the highest priority on devices and applications—such as VoIP and streaming video —that demand the highest levels of bandwidth. IT administrators can specify minimum data rates an AP should sustain for particular client devices sending particular types of traffic. This means an AP will increase power as one of these devices moves further away from it, automatically sustaining the minimum guaranteed data rate and providing consistent levels of throughput in support of bandwidth-intensive priority applications. Industrial wireless networks make certain your high-bandwidth applications avoid dropped packets by receiving the high levels of throughput they need precisely when and where they need it.

## Client Load Balancing

Whenever a large number of devices—such as handheld computers, VoIP devices, readers, and scanners— associate to the WLAN, one or more APs can choke from client overload unless there are algorithms in place to facilitate sharing the load among multiple radios. Competing vendors often set a hard limit to the number of devices supported by a single AP, regardless of what applications they are running. Video applications, for example, can demand anywhere from 5 to 10 Mbps, which can adversely impact other users associated with that access point.

With Smart Load Balancing algorithm, industrial networks add intelligence that evaluates not only the number of devices, but also their data rates, the applications and bandwidth they are using, and available AP capacity. The goal is maximized RF spectrum use.

## Client Band Steering

WLAN networks also offer efficient client band steering, dynamically routing traffic to the best frequency, whether it be the 2.4 GHz or 5 GHz band. Because 2.4 GHz tends to be noisy, many networks automatically assign any device that supports 5 GHz to the 5 GHz band. That is not always the best answer. The fact is, whatever the frequency, too many people using the band can still cause congestion. Unlike many other systems, AB&R® APs can be configured to steer clients based on ratios, looking at usage and actual device utilization to automatically steer a device to the most appropriate band and/or channel. This can substantially increase performance and give network administrators complete control on segmenting the client base.

## Narrowband Applications

Not all applications are bandwidth-intensive. Many outdoor yard and port applications do not demand high data rates, but they do require reliable cost-effective connectivity over very wide areas. Narrowband wireless networks and mobile computing technologies provide long-distance coverage, and enable you to extend low-bandwidth applications—such as text-driven applications like work orders or Telnet sessions—to every corner of your most expansive industrial sites.

You can easily overlay narrowbanding solution to your Wi-Fi network. This allows you to have a highly reliable, exceptionally cost-effective solution for mission-critical, but low-data-rate applications to the edge of your facilities, while still enjoying a complementary robust, high-bandwidth network at the core of your hubs and terminals.

***APs can be configured to steer clients based on ratios, looking at usage and actual device utilization to automatically steer a device to the most appropriate band and/or channel. This can substantially increase performance and give network administrators complete control on segmenting the client base.***

# Managing Your Network Intelligently

**IF INDUSTRIAL WIRELESS ENVIRONMENTS CAN LEARN ONE THING FROM THE OFFICE SPACE, IT'S THE FACT THAT REAL-TIME WIRELESS NETWORK PLANNING AND MANAGEMENT ARE RESOURCE-INTENSIVE.**

To keep your industrial network running at peak capacity and performance, you need 24/7 visibility and control of your entire network. You also need to provide proactive problem detection, troubleshooting, intrusion protection, security, and network assurance.

## Multi-Tasking, Modular AP

Innovation is also on display in its access points themselves, offering you the ability to support multiple band-unlocked radios—including a third radio that can be dedicated to monitoring—in the same enclosure. You can dedicate one radio as a network sensor for intrusion protection and detection on both 2.4 GHz and 5 GHz bands, while using the two primary radios for client access.

Additionally, AB&R®'s AP 8132 is the industry's first modular access point, that enables you to plug different peripherals—such as video cameras, environmental sensors and more—directly into the AP, eliminating the need for running additional cabling or power cords or purchasing special wireless accessories for these devices.

## Gap-Free Security

Today's industrial environments are increasingly at risk. Many are vulnerable to serious security and reliability issues, including physical perimeter breaches, network intrusion by hackers using rogue devices, compliance/non-compliance issues, and more. AB&R®'s AirDefense Services platform is an industry leader in delivering gap-free security, network authentication and access control, sensor- and video-based monitoring, data encryption including FIPS-140, and compliance documentation.

## NSight Network Management

NSight is a powerful and feature-rich management module which greatly simplifies network assurance, monitoring, troubleshooting, and reporting. With NSight, AB&R® offers simplicity in management that is distributed across your entire network and viewable from a single-pane-of-glass. It provides you with the ability to build customized, role-based dashboards for every IT role in your organization, such as a helpdesk user, network administrator, and CIO. These dashboard views can be tailored for different decision makers, presenting each with relevant information to assist in executing the best action for your enterprise's network. NSight provides users with the unique, multi-dimensional capability to monitor and report based on time, network analytics, and user role, which can carry your investment far into the future.

NSight redefines the way IT administrators manage their network by providing real-time visibility and in-depth insight into every dimension of the network, including visibility into layer-7 applications, client devices, users, and types of operating systems and devices being utilized. At a glance, the administrator can discern the top applications by usage or by count, at every level of the network. You can also prioritize applications on the network, prevent non-productivity applications, and enforce policies with WiNG's firewall and quality of service (QoS) policies, which can leverage the application context.

Debugging and troubleshooting tools can be accessed through the NSight browser interface, including packet capture, wireless debug log access, and TCP/IP ping and trace route. You can also obtain a summary of all events related to a particular device with appropriate filters applied. Moreover, you can create custom dashboard interfaces on the fly to monitor the network in real time and share all crucial parameters of an access point or client under suspicion.

NSight provides a view of device health, bandwidth usage, application usage, and more—offering a basis for monitoring and analyzing the most complex scenarios. NSight also makes it easy for IT professionals to compare current usage patterns to historic trends to better plan for future growth.

The AirDefense platform also offers historical data capabilities that include detailed forensics. It provides real-time network visibility and powerful management tools, such as remote monitoring and testing, performance and intrusion alarming, centralized live network view, spectrum analysis, and many more.

RadioShare technology improves the network assurance cost-to-performance ratio for WLAN networks. RadioShare allows a radio on the AP to perform double duty. Not only does it handle clients, but it also acts as a sensor for applications that typically do not require full time sensors. This minimizes the need— and cost—of having separate APs, supporting Powerover-Ethernet (PoE), while at the same time increasing network functionality and monitoring.

When RadioShare is enabled, the continuous stream of data collected by infrastructure radios is passed to the network assurance software module for processing and for accessing a powerful management toolset that includes remote, real-time, and historical troubleshooting, spectrum analysis, forensics, and testing. RadioShare software works at the AP level, improving efficiency while eliminating the need for—and expense of—deploying a separate sensor network or purchasing APs with extra radios dedicated solely to these management and troubleshooting tasks.

## HOW IT WORKS

**HIGH POWER.**
**LOW MAINTENANCE.**

A mid-size manufacturer with an older industrial wireless network wanted to boost productivity by deploying a new state-of-the-art wireless communications solution. The issue? The organization's IT staff was small and lacking in high-level wireless expertise. Rather than add expert personnel to their department, the company decided to take advantage of AB&R®'s managed services—first, to plan and deploy the new network and, second, to provide total network management services. The result was a flawlessly performing industrial network, obtained with significantly less CAPEX and OPEX—and with substantially higher performance—than if they had attempted to plan and manage the network internally. Savings from the project (both in terms of budget and resources) can now be deployed to add new capabilities and unlock value for the business and its customers.

## Complementary Services

Here is the big question: Do you have the internal IT resources you need to design, implement, and manage an industrial strength mobile wireless network that optimizes network productivity and value? If you are not sure of the answer, it may make sense to explore the wide range of flexible services options from AB&R® for your industrial wireless network. Combining leadership in mobile technology with deep knowledge of the industrial wireless space, AB&R® is an industry leader in providing efficient, cost-effective services that ensure maximum WLAN value while allowing you to concentrate your internal resources on strategic business initiatives and management.

You can choose to use AB&R® services individually or in a comprehensive total network management solution. AB&R®'s wide range of industrial wireless network services include WLAN planning and design, network security, mobile application integration, wired/WLAN network integration, and a portfolio of robust managed services, such as network assurance, mobile device and application management, regulation compliance, troubleshooting, network evolution, and many more.

# Reducing Complexity with a Unified Corporate WLAN

**IT IS EVIDENT THAT INDUSTRIAL ENVIRONMENTS REQUIRE TOUGHER, MORE RELIABLE, HIGHER-PERFORMANCE WIRELESS NETWORKS THAN THE CARPETED SPACE.**

So, is the answer simply to have a bifurcated network, with one system for office space and a different system for industrial environments? Some organizations may choose to go that route, but separate networks like these generally only add cost and complexity. A better, more efficient solution is to create a powerful single network you can optimize for both locations.

## Split Personality

Basically, you need a network with something of a split personality. First, it must excel in the more predictable, less volatile carpeted world of business-driven applications, such as high-speed data for e-mail and teleconferencing via VoIP. Second, it must be hardened and powerful enough to function flawlessly and reliably in the complex, RF-challenged, indoor/outdoor world of today's industrial spaces. The truth is, industrial wireless expertise is about much more than simply enclosing office-grade equipment in NEMA enclosures. It is also about providing pervasive coverage and mobile connectivity that delivers faster roaming, stronger security, and more cost-efficient redundancy to ensure connectivity, reliability, and availability.

## Industrial Innovation

The AB&R® portfolio—including ruggedized APs and controllers—is purpose-built to deliver the performance and reliability you need to enable bandwidth-rich applications even under extreme industrial conditions. Innovation is the common denominator. Currently delivering high-performance solutions in environments ranging from automated plant floors to large-scale distribution centers to the unpredictable outdoor spaces of yards and ports.

## Unified Network Management

One of the most important considerations to understand as you contemplate a unified network is the ability to manage the entire network from a single, centralized control center. NSight management software gives you real-time, 24/7 visibility into your entire network, enabling you to proactively monitor, troubleshoot, repair, secure, and streamline network assurance and performance. NSight helps you maximize uptime and productivity while lowering your Total Cost of Ownership (TCO).

## Wireless Leadership

As this report makes clear, planning and implementing truly industrial strength networks is a complex undertaking that requires leadership and experience and demands a history of delivering excellent results. Of course, finding a proven network solution that is equally strong in the office and out in the yard can be a difficult task.

There are many wireless network providers whose expertise is focused on the carpeted space. There are even fewer who offer expertise in complex, RF-challenged industrial networks for both indoor and outdoor locations. There is only one who can truly do both. AB&R® is an industry leader in offering in-depth expertise, advanced technology, and a proven track record in both office-grade and industrial strength wireless solutions. This allows AB&R® to provide you with advanced and comprehensive unified networks across your entire enterprise.

## Industrial Strength Partner

As you look to enhance the efficiency and agility of workers across your industrial sites and facilities through the deployment of wireless mobility solutions, it is critical to have a trusted partner with the portfolio and demonstrated performance that can make it all a reality. AB&R® is ready to help you with the expertise, the technology, and the innovative solutions that will ensure that your industrial and unified wireless networks are fundamentally sound, empowering them to deliver the value you need throughout your enterprise.

# Transform Your Operations with WiNG WLAN

## High-Performance Wireless Networking for Warehousing & Logistics

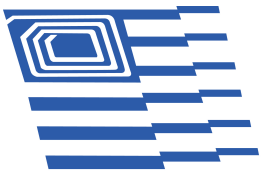
With WiNG WLAN, you can transform your warehousing and logistics operations with uninterrupted, enterprise-wide service featuring unbeatable reliability, connectivity, and data security. Using the latest 802.11ac wireless standard and an entirely new approach to network infrastructure, WiNG provides an intelligent, self-optimizing, and self-healing network that avoids the headaches of network slowdowns, disconnects, and service outages. This next generation technology delivers world-class wireless performance across all computers and mobile devices in your operations, giving you a competitive edge in achieving learner, more automated processes that maximize productivity and accuracy while minimizing errors and returns and lowering overall operating costs. Best of all, with an ultra-fast and zero-touch installation process, your wireless network can be up and running in no time—at up to 50% lower cost than other solutions.

## Industrial Wireless Expertise from AB&R®

At AB&R® (American Barcode and RFID), we are industry-leading experts in wireless networking and mobility solutions for manufacturing, warehousing, logistics, and supply chain operations. We help our clients meet rapidly increasing demands for efficiency, accuracy, real-time visibility, and cost-effectiveness by providing expert systems design, installation, services, and support. We are a trusted partner of leading companies throughout the U.S., including Boeing, Intel, and Costco. As part of our mission, we are offering an exclusive program to help companies solve their biggest wireless challenges by upgrading to affordable, next generation wireless networking and devices. Our experts will provide free consultation to help you evaluate the best options to get high-speed wireless connectivity and performance and meet your critical business needs. Contact us today to schedule an appointment. We would love to help your business!

## Schedule Your Free Consultation

Our experts at AB&R® are happy to answer your questions and share more information about our wireless trade-in program. Call or email us today to learn more and start getting the wireless performance you need in your warehousing and logistics operations.



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