



HIRSCHMANN

A **BELDEN** BRAND

Application Note

AN00010

Wireless AGV communication proven successful in demanding manufacturing environment

Belden's dedicated Wireless solution enhances AGV manufacturer to provide highly available communication for increased productivity.



Copyright Daimler AG

Intelligent production at the Mercedes-Benz plant in Ludwigsfelde. Driverless transport vehicles supply fully-autonomous the employees on the conveyor belt with prepared shopping baskets from the logistics and picking zones.

The BAT867-R enables AGVs with reliable communication to provide customers cost savings, process optimization and error reduction in parts supply operation. Specific requirements, such as wireless network speed, are exceeded by the Hirschmann BAT867-R with data speed up to 867 Mbit/s – to enhance an AGV network.

Project Overview

A manufacturer of automated guided vehicle (AGV) logistic solutions in Europe selected Hirschmann WiFi clients to enhance the mobile machines with wireless connection. The manufacturer serves customers from several industries, including food & beverage, pharmaceutical, intralogistics and specifically in the automotive industry (including heavyweights such as Daimler, Ford, Opel, Renault, SEAT).

The Challenge

The manufacturer wanted to upgrade to a better solution compared to other AGV producers. Their stated goal was to enable their customers with the latest wireless technology to speed up software updates and optimize operational time of AGVs.

System Requirements

- Reliability and stability of roaming performance with low handover time in milliseconds
- Client device with 2.4 and 5 GHz ISM band to limit interference problems by using the same client for different customer requests
- High standard of security options with WiFi security algorithms like WPA
- Higher WiFi speed and stable performance of the overall wireless network to overcome common interferences such as industrial metal surfaces causing reflection of radio waves
- Overcoming the stress of constant vibrations that impact AGV components from basic WiFi clients up to complete failover
- Network Address Translation (NAT) functionality in Wifi client mode
- Prevent unexpected interferences caused by electrical charges of the AGV battery
- External antenna to mount on AGV

**Be certain.
Belden.**



HIRSCHMANN

A **BELDEN** BRAND

Why Belden?

Belden delivered a cost effective Wireless solution designed for the needs of mobile vehicles.

- Strong success record with several AGV manufacturers around the globe
- Superior designed Wireless device BAT867-R fulfills challenging environments of AGV usage
- Excellent roaming capabilities for uninterrupted communication
- Future proofed with latest IEEE 802.11n/ac wireless standard and MIMO antenna technology

The Belden Solution

The customer selected the Wireless Access Point/Client BAT867-R which was developed to enable reliable communication coverage for mobile vehicles.

The customer found several characteristics of the BAT867-R convincing. First, one of the major concerns expressed was how to secure the WiFi communication and still have very short roaming handover time. The Hirschmann device uses the latest WPA2 enterprise (IEEE 802.11i/IEEE 802.1x) in combination with OKC to provide both the highest wireless security and improved roaming handover time.

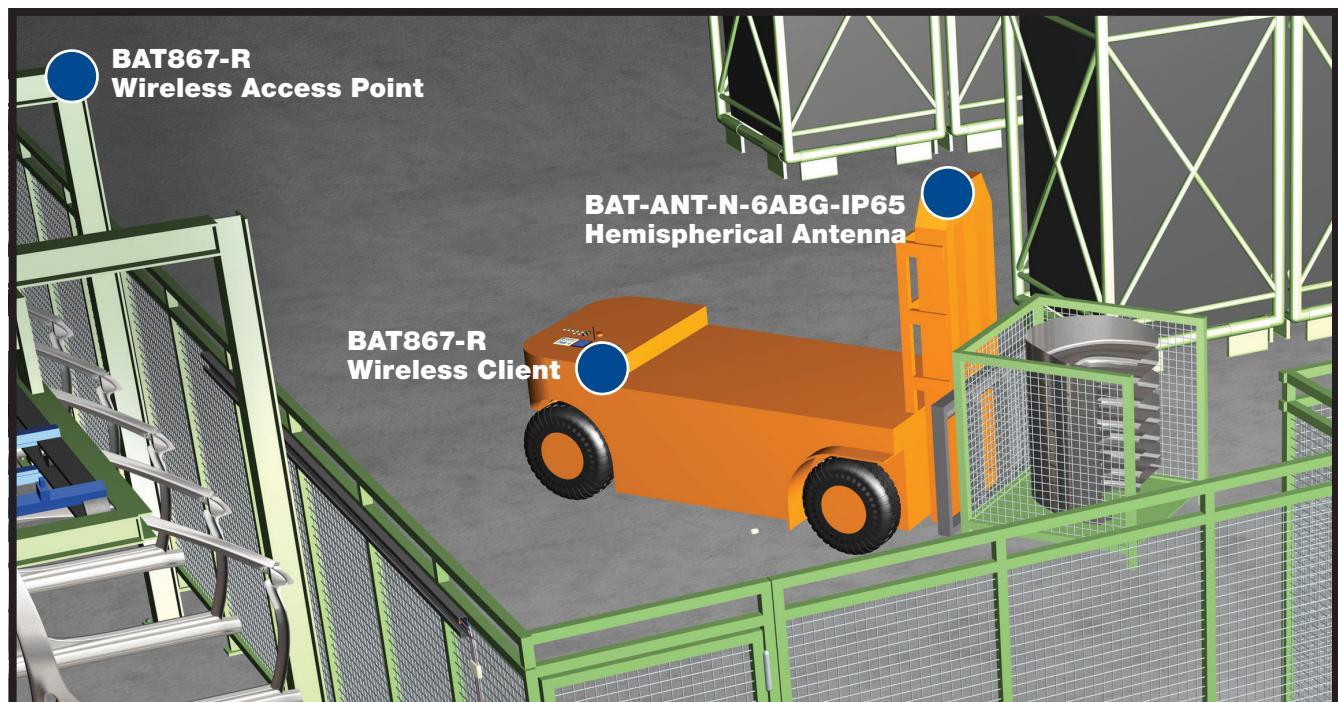
Plus, the Opportunistic Key Caching (OKC) feature, in combination with a central WLAN management, provides fast authentication between several access points in a network to ensure uninterrupted supply chain. The fast roaming capability, measured by the handover time between access points and clients, is minimized to milliseconds.

Also, in order to improve the installation time and lower complexity with less frequency planning of the AGVs, the BAT867-R comes with 2.4 and 5 GHz band, providing more non-overlapping channels.

The enablement for larger fleet expansion can be realized with improved WiFi density, especially under the change to Industrie 4.0 where real-time optimization value-added networks replace the classic value-added chains with their buffers.

The Hirschmann client device meets IEEE 802.11n/ac wireless standard to provide an aggregate speed of up to 867 Mbit/s. In combination with MIMO antenna output, a significant extension of WiFi coverage with fewer Access Points can be realized.

Customer was able to replicate the IP configuration from one AGV to all other AGVs by using the Network Address Translation (NAT) functionality on the Wireless client device. This drastically reduced the installation costs and complexity.



Wireless solution designed for the needs of mobile vehicles.



The compact form and robust design of the device comply with the IEC 60068-2 standard to withstand severe onboard shock and vibration. Plus, the device is protected against voltage fluctuations according to IEC 61000-4 EMC immunity to intercept fluctuations of the electric drives and the battery in a broad bandwidth.

Overall, the customer's network expansion will demand several new clients, antennas and connecting cables for their AGV systems annually to serve the increasing growth in the automotive industry and intralogistics market.



Automated Guided vehicle (AGV).

Product Details

To achieve secure, flexible and uninterrupted communication, the following Hirschmann products were chosen to set up a cost effective Wireless solution designed for the needs of mobile vehicles.



BAT867-R - Industrial Wireless Access Point

BAT867-R Access Point/Client from Hirschmann

The BAT867-R enables reliable wireless access for machine control and maintenance.

- Transmits data at high speeds, up to 867 Mbit/s – meets IEEE 802.11ac standard (also backward compatible to a/b/g/n standards)
- Complies with the challenging requirements of industrial markets and can withstand signal interference, vibrations and EMC
- Offers extensive management, redundancy and security functions with Hirschmann's operating system HiLCOS
- Makes warehouses more efficient by providing wireless connectivity for moving vehicles
- Improves machine uptime, prevents failures and reduces travel costs for service personnel

BAT Antennas

BAT-ANT-N-6G-IP65/BAT-ANT-N-5A-IP65/BAT-ANT-N-6ABG-IP65

Hirschmann offers a dedicated set of antennas to provide AGVs the full range of connectivity. As a high-quality accessory, the antennas effectively complement the innovative features of the BAT867-R product line to offer a complete WLAN installation in harsh industrial environments.



Omnidirectional Antenna

- Complies with the IP65 degree of protection for high industrial suitability
- Improves transmit-and-receive power through the homogenous emission behavior of the antennas during operation
- Features N sockets that allow you to connect the antennas easily and quickly with other cables and overvoltage protectors
- Operates reliably due to the vibration-resistant, weatherproof, sturdy design



HIRSCHMANN

A BELDEN BRAND

Belden Competence Center



As the complexity of communication and connectivity solutions has increased, so have the requirements for design, implementation and maintenance of these solutions. For users, acquiring and verifying the latest expert knowledge play a decisive role in this. As a reliable partner for end-to-end solutions, Belden offers expert consulting, design, technical support, as well as technology and product training courses, from a single source: Belden Competence Center. In addition, we offer you the right qualification for every area of expertise through the world's first certification program for industrial networks. Up-to-date manufacturer's expertise, an international service network and access to external specialists guarantee you the best possible support for products from Belden, GarrettCom, Hirschmann, Lumberg Automation and Tofino Security.

Irrespective of the technology you use, you can rely on our full support – from implementation to optimization of every aspect of daily operations.

Always Stay Ahead with Belden

In a highly competitive environment, it is crucial to have reliable partners who add value to your business. When it comes to signal transmissions, Belden is the No. 1 solutions provider. We know your business and want to understand your specific challenges and goals to show how effective signal transmission solutions can push you ahead of the competition. By combining the strengths of our five leading brands, Belden, GarrettCom, Hirschmann, Lumberg Automation and Tofino Security, we are able to offer the integrated solution you need. Today, it may be a single cable, switch or connector, to solve a specific issue; tomorrow, it can be a complex range of integrated applications, systems and solutions. With the rise in smart, connected devices brought on by the Industrial Internet of Things (IIoT), together, we can make sure your infrastructure is ready to handle and make sense of the influx of data. Transform your business now with instant access to information, and make your vision a reality. Visit info.belden.com/iiot to learn more.

About Belden

Belden Inc., a global leader in high quality, end-to-end signal transmission solutions, delivers a comprehensive product portfolio designed to meet the mission-critical network infrastructure needs of industrial, enterprise and broadcast markets. With innovative solutions targeted at reliable and secure transmission of rapidly growing amounts of data, audio and video needed for today's applications, Belden is at the center of the global transformation to a connected world. Founded in 1902, the company is headquartered in St. Louis, USA, and has manufacturing capabilities in North and South America, Europe and Asia.

For more information, visit us at www.belden.com and follow us on Twitter [@BeldenIND](https://twitter.com/BeldenIND).

Belden, Belden Sending All The Right Signals, GarrettCom, Hirschmann, Lumberg Automation, Tofino Security, Tripwire and the Belden logo are trademarks or registered trademarks of Belden Inc. or its affiliated companies in the United States and other jurisdictions. Belden and other parties may also have trademark rights in other terms used herein.