

## Data Communication Solution

# Wireless data communication ensures reliable, stable operation of parking management systems

Parking spaces are regularly short due to worldwide vehicle growth and land scarcity, resulting in a growing demand for effective parking lot and garage management. The global parking management market, valued at USD 4.38 billion in 2022, is expected to expand at a compound annual growth rate (CAGR) of 12.1% from 2023 to 2030.

### Project challenges/goals

To maintain its competitive edge in the market, a Chinese System Integrator decided to integrate a wireless control system into its parking garage management system. A parking garage solution usually requires Ethernet switches to provide data communication bridges and WiFi Access Points (AP)/Clients to handle wireless signals, which facilitate communication between different control systems and logistics management.

One of the biggest challenges for the System Integrator was finding devices that could consistently provide stable wireless management. Due to the presence of unknown interference in the parking garage, such as signals operating on the same wireless frequency, high electromagnetic interference, as well as the metal-built structure of the building, it was necessary to use industrial-grade devices that could best suit the physical location. Furthermore, the rail-guided vehicle responsible for moving the cars required a DIN-Rail compact-size clip.

## Solution overview

Rail guided vehicles (RGVs) are commonly used in warehouses for fast, high-volume handling. In the parking garage, the RGVs can also be applied for car moving automation and to speed up the handling of parking space arrangements.

Beijer Electronics won the project by offering a complete network solution that ensures effective operation of parking garage management. Using industrial-grade devices for data transmission is critical, withstanding interference they may encounter in the parking garage site. By implementing Beijer's strong WiFi network, the site manager has ensured reliable communication and efficient data exchange between all components involved in the car park.

On the RGV physical layer, the JetNet 2205 Switch gathered the PLC data, signal, and digital controlling devices. A JetWave 2212X on-car WiFi Client communicated with the WiFi AP installed around the parking garage. The consequent parking and controlling status was forwarded by the AP continuously. Several WiFi APs were bridged on the control layer and connected to the management server in the central control room.

However, there might still be some limitations regarding the wireless network. The effectiveness of WiFi in a parking garage can be influenced by factors such as the construction materials used in the garage, the distance between APs and wireless clients, and interference from other wireless devices. The concrete walls and the metal interfaces may attenuate the WiFi signal, potentially reducing coverage or signal strength in some areas.

In order to strengthen the communication quality, users combined the JetWave 2460 and JetWave 2212G to enhance the WiFi AP coverage. The JetWave 2460 has the embedded directional antenna that could concentrate the signal in one direction. The JetWave 2212G had an omnidirectional antenna that could cover the WiFi signal 360 degrees. With these flexible installation types and the agile connection

ability on cars, users have built the communication network according to the environmental situation.

By implementing wireless control management, users have experienced improved auto-parking management, as it is unsuitable for manual operations. Replacing manual control with RGV cars can significantly reduce error rates, provide high positioning accuracy, and efficiently complete handling tasks. Wireless RGV solutions offer excellent compatibility and simplify the deployment effort.

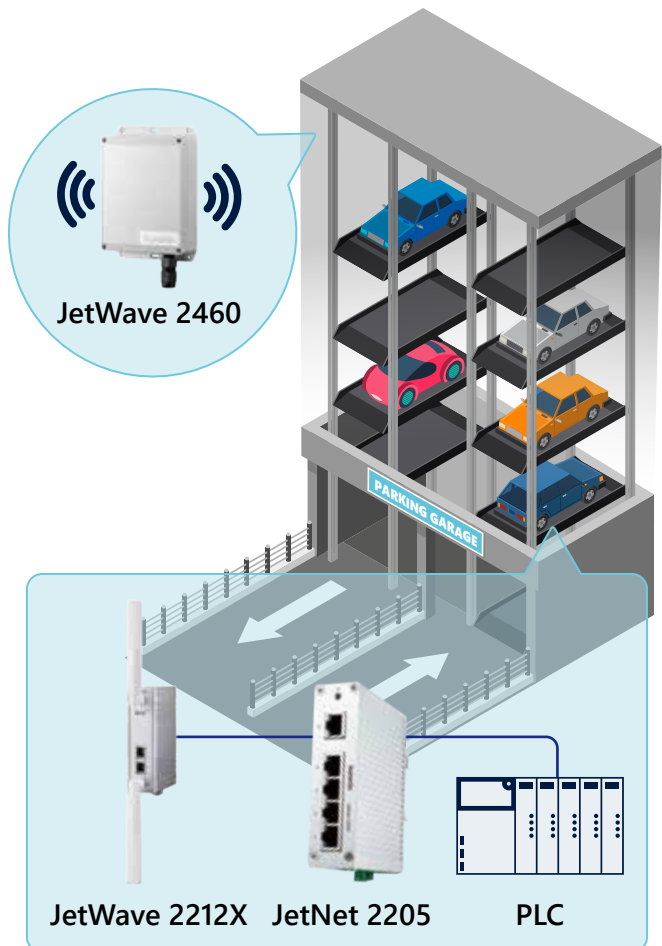


Figure 1

## Why Beijer Electronics

- **JetWave WiFi devices support fast roaming. The JetWave clients automatically switch to APs with better connection quality based on the signal status in an oversized parking garage. It ensures the uninterrupted management of the automatic space control.**
- **JSM (JetWave Smart Mapping) mode provides a simple and easy way to help users set up the WiFi environment.**
- **Compared with other suppliers, fewer Beijer Electronics APs are needed to cover the complete parking garage with various models and antenna types.**
- **JetWave WiFi devices support auto channel survey when executing WiFi channel selection, which can help users enhance the WIFI communication ability when building the wireless network.**

## About Beijer Electronics

Beijer Electronics is a multinational, cross-industry innovator that connects people and technologies to optimize processes for business-critical applications. Our offer includes operator communication, automation solutions, digitalization, display solutions and support. As experts in user-friendly software, hardware and services for the Industrial Internet of Things, we empower you to meet your challenges through leading-edge solutions.

Beijer Electronics is an Ependion company. Ependion (formerly Beijer Group) is listed on the NASDAQ OMX Nordic Stockholm MidCap list under the ticker EPEN. [www.ependion.com](http://www.ependion.com)

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