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Case Study /
EV Charging

Cellular Coverage is Essential for EV Charging Stations in Parking Lots and Indoor Structures

Case Study courtesy of
Konecta USA
Minneapolis, MN

Challenges
20,000-square-foot Underground garage with poor signal needed reliable cellular for EV charging and payments.

Solution
CEL-FI QUATRA system

Installation
Rapid deployment completed by a small team, installing CEL-FI QUATRA to quickly enable EV charging connectivity and payments.

Results
CEL-FI QUATRA provides a scalable solution that addresses current requirements while supporting future expansion.

Challenge

A large national builder required reliable cellular coverage throughout a 20,000-square-foot parking garage spanning lower and sub-ground levels of a mixed-use building with retail and residential spaces.

The need to improve connectivity in the garage was driven by the installation of ChargePoint EV charging stations for residents. Six stations were installed on the first level, with an additional six planned for the second-level parking area. These stations rely on cellular connectivity for remote management and payment processing. At the same time, the building's dense construction materials, urban surroundings, and underground location significantly limited cellular signal strength within the garage.

Beyond supporting basic connectivity, the EV charging stations must remain continuously connected to the network to enable remote monitoring through an online dashboard. Each unit is equipped with a SIM card and modem, transforming it from a standard electrical outlet into a smart charger capable of tracking usage and processing payments.

Without a reliable cellular connection, the stations cannot initiate or authorize payment sessions. This creates a direct impact on usability, preventing drivers from completing transactions and accessing charging when needed.

Within one week, two technicians completed the installation - enabling EV Charging and improving cellular coverage throughout the garage.

Konecta USA, a leading commercial in-building installation and service provider in North America, was tasked with bringing reliable cellular coverage to the EV charging stations and across all the major carrier networks to alleviate communications and safety concerns for residents and retail customers while in the garage.

Solution

To cost-effectively deliver cellular coverage from all major carriers to the EV charging stations in the parking garage, a solution was designed using CEL-FI QUATRA, an active DAS hybrid system that provides uniform in-building cellular coverage for 3G, 4G, and 5G voice and data. The system addresses common challenges in large commercial environments, including poor voice quality, dropped calls, and dead zones. Compared to analog boosters and traditional passive DAS systems, QUATRA delivers a signal up to 1000 times stronger, enabling a significantly larger coverage footprint.

The system leverages category cabling with Power over Ethernet, eliminating the need for additional power outlets at internal antenna locations. A single QUATRA Network Unit (NU), serving as the head-end of the system, was installed in the building's 10th-floor IDF closet. Four directional donor antennas—one for each carrier—were mounted on the rooftop, with coaxial cabling connecting them to the NU.

The NU captures and enhances the outdoor signal, then digitally distributes it with zero signal loss over CAT5 cabling to four QUATRA Coverage Units (CUs), which function as intelligent internal antennas. One CU was installed on the ground-level parking area. From these units, coverage was extended using coaxial cabling to passive antennas deployed across the garage.

Due to Low ceiling heights and limited signal propagation required a higher density of antennas. Six were installed on the sub-ground level, with two on each upper level to support the EV charging stations. A smart RF scanning tool was used to optimize donor antenna placement and orientation in the dense rooftop environment.

Installation

The project required rapid deployment to deliver reliable cellular coverage in the parking garage and support EV charging. A small team completed installation quickly with minimal disruption, deploying the CEL-FI QUATRA system to enable fast connectivity for monitoring and payment processing.

Results

Within one week, a team of two technicians completed the cabling and installed CEL-FI QUATRA to provide reliable cellular connectivity for the EV charging stations. The deployment also improved cellular coverage throughout the parking structure for all major carriers, supporting everyday communications as well as safety for residents and retail customers.

Demand for cellular connectivity to support EV charging infrastructure continues to grow. CEL-FI QUATRA provides a scalable solution that addresses current requirements while supporting future expansion.

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