



Cel-Fi QUATRA Solves Cellular Coverage Problems for Premier Brooklyn Food Hall

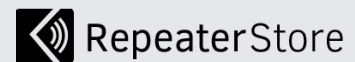


Showcasing 40 vendors that reflect the cultural and ethnic diversity of Brooklyn, NY, DeKalb Market Hall is a hub of innovative cooking and dining experiences for nearly 100,000 guests each week. While the large food hall brings cuisine from around the world to Brooklyn, poor cell reception was a problem in its below ground level location in the City Point Mall.

ABOUT THE PROBLEM

COMMERCIAL REAL ESTATE

- One of Brooklyn, NY's largest food halls with 27,000 sq. ft. one level below ground
- Needed coverage for all four major carriers at a reasonable cost
- Building's concrete shell blocked all cellular signals



RSRF, a division of RepeaterStore

- Founded in 2007
- Based in Laguna Hills, California
- Services include amplification solutions to improve wireless cell and data reception in buildings, homes, and vehicles

As a leading destination for locals and tourists alike, it was important that DeKalb Market Hall provide good cellular coverage for its patrons, many of whom are millennials who expect 24/7 access. RSRF, the systems integrator division of RepeaterStore, which specializes in providing cell phone coverage to buildings of all sizes, was engaged to provide a solution.

"They needed coverage for all four major carriers – AT&T, Verizon, Sprint and T-Mobile – throughout the space and they needed it at a reasonable cost as well," says Rick Bernas, director of engineering at RSRF. "Alternative solutions, like a DAS powered by small cells or an active DAS, where all the carriers bring in their equipment, were way out of the price range."

Instead, RSRF chose to implement Cel-Fi QUATRA, an active DAS hybrid that solves spotty in-building cellular coverage, poor voice quality, dropped calls, and dead zones for all major carriers in venues from 10,000 to 500,000 sq. ft. at a price point that fits virtually any middleprise budget.

Cel-Fi QUATRA delivers a cellular signal that is up to 1,000 times stronger than analog boosters and passive DAS technology with internal antennas that are intelligent and able to broadcast the strong signal amplification uniformly across all carriers, regardless of the varying power of the donor signals received. Because QUATRA uses Ethernet cabling and RF over Ethernet (RFoE), the signal does not attenuate the farther it travels from the system hub to the perimeter of the building as it would with other solutions that use coax cable. This was particularly important in the food hall because the site survey done by RSRF found that long cable runs were needed due to the layout of the building, explains Bernas.

"We chose to use QUATRA for several reasons," says Sina Khanifar, president of RSRF. "Firstly, it allows you to use Cat5e, which is normal Ethernet cable. That makes installing the system that much easier. Secondly, QUATRA is unique in that it has the ability to deal with a very common problem in dense urban areas, like Brooklyn, where signal levels vary between the different carriers. QUATRA has a unique ability to deal with that problem dynamically and made it perfect for this project."

BRINGING THE SIGNAL UNDERGROUND WHILE KEEPING COSTS DOWN

Dekalb Market Hall is a 27,000 sq. ft. food hall located below ground level at the City Point Mall. Setting up Cel-Fi QUATRA took only three days with a two-person crew, according to RSRF. A donor panel antenna was installed on an I-beam (a steel beam on the ceiling of the building) on the perimeter of the building. The donor antenna was then connected to two Cel-Fi QUATRA Network Units (NUs), the head ends of a QUATRA system. The NUs were installed inside a three-foot clearance in the hard ceilings; one of the NUs amplified AT&T and Verizon, while the other amplified T-Mobile and Sprint.

Using Cat5e cable, each NU was connected to four intelligent remote internal antennas (called Coverage Units or CUs) that broadcast the amplified signal throughout the common areas of the food hall. Because Cel-Fi QUATRA leverages Power-over-Ethernet (PoE), the eight CUs were conveniently placed at the optimum locations with no need to install additional power outlets.

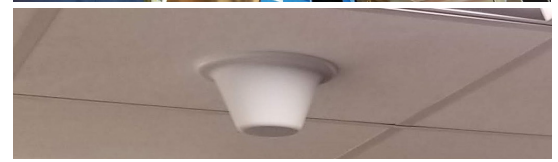
Typically, to get sufficient signal power from the outdoor cellular network, a donor antenna is installed on the roof of a building and connected by coax cable to the Cel-Fi QUATRA NU(s) inside the building. In this case, it would have required around 200 to 300 feet of coax cable to get to the outside donor antenna, which would have driven up the costs.

However, with Cel-Fi QUATRA, RSRF was able to save the client a considerable sum by installing the donor antenna on the ceiling inside the food hall, requiring only five feet of cabling between the donor antenna and NU.

"Cel-Fi QUATRA provides up to 100 dB of gain whereas other cellular amplification systems only have up to 72. With any other system, to get enough signal to power all the internal antennas, we would have had to put the donor antenna outside. But with QUATRA, because of that 100 dB of gain, the donor antenna could be placed indoors," explains Bernas. "The signal was much clearer on the lower levels of the building than on the roof, improving the performance of the system overall."

Coverage in the washrooms was also a necessity, but signal was spotty in these areas because the washroom walls were made of cinder block and tile. For further cost savings, RSRF extended the signal amplified by QUATRA by installing dome antennas in the washrooms.

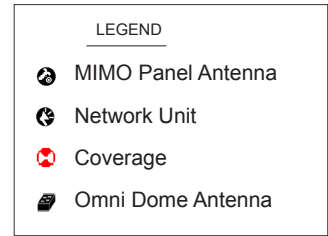
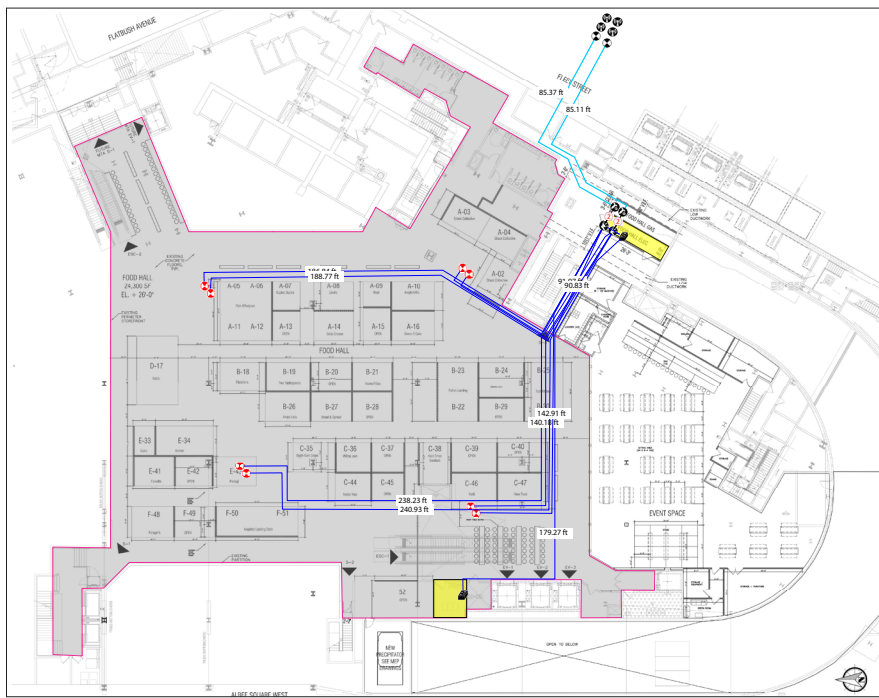
"Cel-Fi QUATRA has the ability to extend beyond the coverage units themselves," says Rick. "Using the Cel-Fi WAVE portal, the online user interface for QUATRA, you can disable the internal antennas of the CUs and tell them to pass the signal power to external ports. Then you connect the CUs with coax cable to dome antennas or panel antennas – just like a regular DAS."



ENSURING COVERAGE EVERYWHERE

In total, the installation included one donor panel antenna, two NUs, eight coverage units and three dome antennas. Despite all the new units and cabling, the system blended well with the appearance of the public space.

"Since the Cel-Fi QUATRA system uses Ethernet cables and the client already had Ethernet cable running all around the basement, it was just a couple of extra internal cables and nobody actually noticed when the system was finished. It looked exactly like it did before," explains Rick.



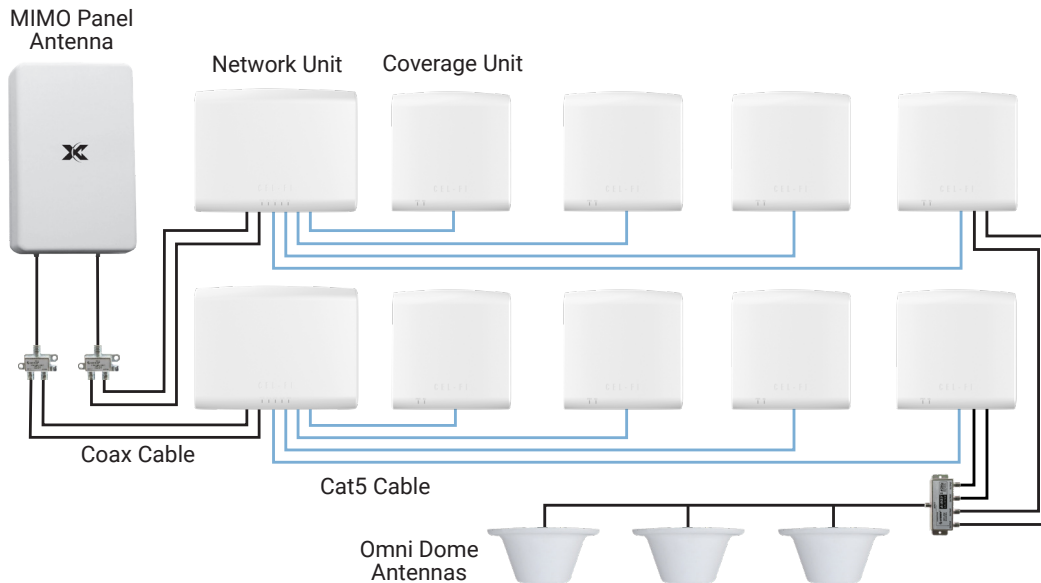
"We were also able to hide a lot of the cables and the antennas above the many vents throughout the space."

As in the case with most commercial spaces that service the public, the ease and aesthetics of the installation were concerns of Jason Feinstein, the general manager of Acadia Realty, who runs the day-to-day management of the building that houses City Point and the Dekalb Market Hall, helping to ensure everything runs smoothly and maintaining positive relations with the tenants.

"Everyone was happy. We picked access points with devices that you can't see or even tell they are there," says Feinstein. "My biggest concern is making sure we don't disrupt the tenants. The installers were very professional, knew what they were doing and were easy to work with."

Since completing the installation, Cel-Fi QUATRA is providing the cellular connectivity the flourishing food hall needs. Feinstein adds, "The basement was a dead zone but RSRF helped us to get access. We get cell phone reception down there now and it is fantastic."

CEL-FI QUATRA 2000 WITH PASSIVE DAS ANTENNAS



Cel-Fi QUATRA can be configured with an off-air donor signal, as in the diagram above, or it can be integrated with a carrier small cell for the donor signal, creating a Supercell.



CEL-FI
QUATRA

**BEYOND
BETTER
COVERAGE**

- High-quality solution for the middleprise
- Supports multi-carrier 3G/4G/LTE voice and data
- Carrier-approved and unconditionally network safe
- Can be monitored and managed using Cel-Fi WAVE