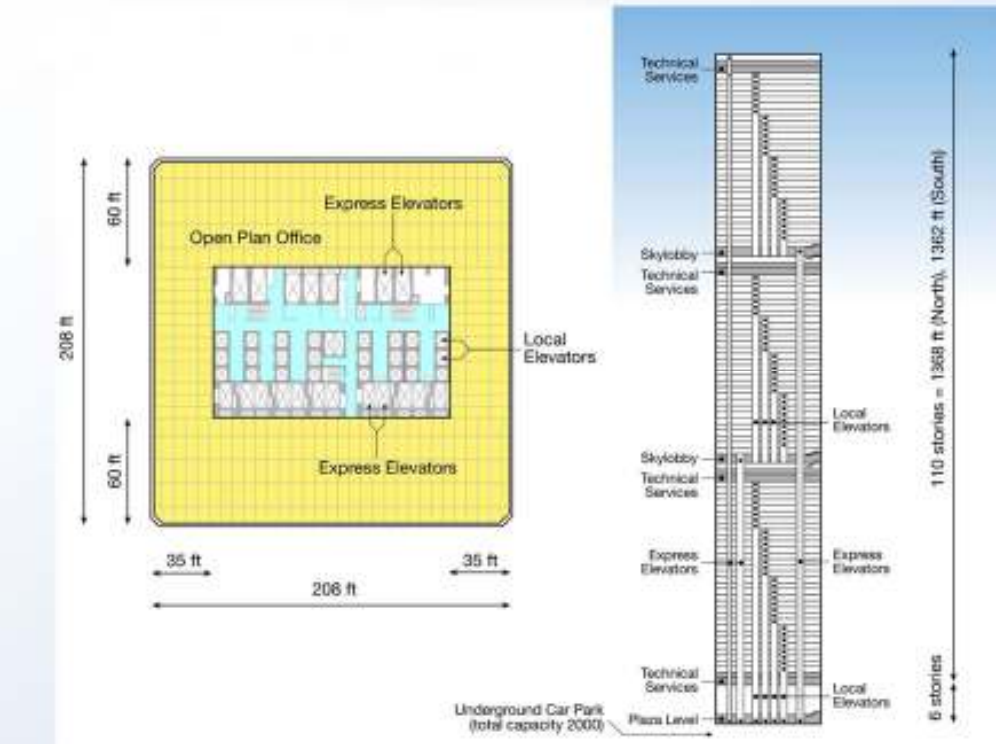
Enterprise – Lift Coverage



Providing Streamless Lift Coverage inside Elevators

In many wireless deployments for hotels and commercial buildings, access to the network from inside elevators is often necessary. Voice and data users would want to continue communicating over the phones while travelling between floors. It is important to understand the issues and implement a well-tested solution.

Many elevator shafts are surrounded by metal, which offers a high degree of attenuation to RF signals. Even elevators that appear to be constructed with wood may still have metal frames, which significantly attenuate radio waves. Of course the problem with high attenuation is that signal levels coming in and out of the elevator are relatively weak, requiring careful positioning of antennas to ensure that signal coverage is adequate.

Another problem is with handoffs as the wireless devices in the elevator must handoff to different sectors as the elevator moves between the floors. Two or three story buildings usually have relatively slow moving elevators, and they don't go very far. You'll likely experience more handoff problems in taller buildings, where elevators service many floors. A thirty story building, for instance, may have an elevator that travels much faster, with speeds similar to automobiles racing along a highway. Given the speed and distance, mobile devices will experience low RX Lev and unsuccessful handoffs, causing a disruption in the call and other applications to fail.

Traditional solutions

Typically, most lift coverage design is to place an omni antenna near the elevator door on each floor. Using various methods to determine the link budget, we can determine how much EIRP is required at the antenna end point. Given the antenna power is required to “penetrate” to the lift carriage, such method while it works, is an inefficient way to utilizing limited power resources of the base station.

However, in most tall commercial and hotel buildings, there are multiple lift carriages and these lift carriages may stop at different floors. A complex lift system in such buildings makes it difficult for one antenna to cover per floor. If this occurs, then consider using a “leaky coax” approach for providing signal coverage. This involves installing specially-designed cabling (coax cable with holes) along the interior of the entire elevator shaft. This may seem like an easy fix for the attenuation (and possibly roaming) problem, but there are many issues.

Many companies and organizations will not allow the installation of cable inside the elevator shaft due to safety regulations. This approach also requires specially-equipped installation crews (there are not many who can scale elevator shafts) and substantial coordination with facility owners.

New solutions

Modern lift carriages are now equipped with multi-media devices. The latest trend is the installation of LCD panels inside lift carriages for advertising and information objectives. Furthermore, due to safety and security concerns, many modern lifts are also equipped with CCTV cameras.

Systems installed inside the lift carriages basically use a CATV or CAT 5 based cabling infrastructure and this has allowed for the introduction of new methods of providing RF coverage for lifts. Using the same cabling infrastructure, antennas that work on CATV or CAT 5 cables are not suitable to be placed inside the lift carriages. With the antenna following the movement of lift carriage, users inside the lift will have a constant and stable RF receive and transmit signal, enabling all users to continue making a voice or video call at all times while the lift is moving.

Another new option is using mobile low powered pico repeaters for lift coverage. With the use of a donor antenna installed inside the lift shaft, a pico repeater can be placed inside the lift. The repeater is installed with an AGC feature that shall keep the receive signal from the donor antenna at a constant.

5 Bar Coverage is able to perform a complete survey, design and install of the right choice of system for you. Whether it is the traditional or the new method, 5 Bar Coverage shall study the conditions and complexity of the lift system and offer the best optimum and cost effective system for our customers.