The Problem – Provide seamless wireless communication coverage capacity for both the patrons and employees at a shopping mall

Shopping malls today have become more than a collection of stores where consumers can purchase the latest clothing or electronic gadgets. Many cover millions of square feet of space providing the consumer with shopping, various types of entertainment, dining, spa services and childcare. Whether designed as a multi-story mall in a large city anywhere in the world or as a sprawling complex in the suburbs, shopping malls have unique wireless communications challenges.

The Challenges

• Coverage challenges in large indoor areas with the potential for underground structures
• Capacity challenges with thousands of visitors on a daily basis
• New construction materials that limit the penetration of RF signals
• Providing coverage for all operators, all frequency bands and communication types

Large Indoor Coverage Areas

Many of today’s shopping malls are attempting to re-brand themselves as day long leisure experiences. The wireless communications design must take into consideration large stores, small boutique stores, restaurants, entertainment facilities (movies theaters, video arcades and even an amusement park) and parking facilities. Underground parking and basements don’t propagate RF signals well and large open areas create opportunities for interference from macro base stations.

Capacity for Thousands of Visitors

Our wireless networks today are more about providing data services than voice communications. We want to receive our emails and text messages everywhere, including the mall. Additionally, we want to use our smart phones to find the best possible bargain with many of us using the Internet to comparison shop the prices at the mall with those available from online retailers.
The Challenges continued......

New Construction Materials

Steel and aluminum are common building materials that limit the reach of RF signals due to reflections that occur when RF signals hit these materials. This problem is exacerbated by local ordinances and consumer preferences that are driving the use of new “green” building practices that introduce metal coatings to windows and insulation. Together these materials can limit the effective range of communications systems and lead to communication “dead zones.”

All Operators and All Bands

The local shopping mall communication system needs to be designed to provide consumer wireless coverage for all providers and all frequency bands. In addition the system must be designed with Ethernet, Wi-Fi, CCTV and public safety communications as integral parts of the overall solution. The mall will have its own security forces who need to communicate with both the mall office and the local emergency services personnel when there is an accident or police incident. This means potentially handling RF signals from VHF to 2700 MHz.

The Bird Solution

Fortunately, Distributed Antenna Systems (DAS) are an ideal solution for meeting all of the challenges identified above. The DAS solution from Bird has been designed to provide a high degree of flexibility in the frequency bands and types of signals transmitted over the system. Bird’s “Single-Net” DAS solution can provide coverage for consumer smart phones (for all wireless operators and frequency bands), emergency personnel radios, maintenance communications systems, closed circuit television, Wi-Fi and even Gigabit Ethernet services.

DAS System Architecture

The Bird solution involves installing a single Master Unit to feed the Remotes for both above ground and underground facilities as well as outdoor parking areas from a single Base Station Hotel. The flexibility of the Bird solution allows alternative methods for running the fiber optic cabling and arranging the connections to create the best sectorization and coverage model.

The Bird solution has an industry leading noise figure of 3dB allowing more remotes per sector and improved uplink performance. Additionally, the systems 15dB optical link budget allows large areas to be covered with a single head-end location as well as the versatility to handle the potential fiber losses of existing fiber infrastructure.

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Master Unit

The DAS network utilizes a flexible Master Unit that can be equipped with Base Station Interfaces for each operator, sector and frequency band allowing the system to be fully optimized for each operator. This approach also allows all services to be supplied to the Remote unit on a single fiber link. Additionally, the Bird approach is MIMO ready for future LTE deployments. Emergency services can be supplied from an off-air antenna or a direct fiber or coax link allowing the indoor safety system to be balanced with the outdoor macro system.

- Coverage for individual frequency bands from 88-2700 MHz
- All frequency bands, operators and sectors together in a single master rack
- Easy to add new services in existing frequency bands, connect and go
- Compact 19” rack design
- Web based UI for monitoring and control
- Alarm options include SNMP traps and local connections
- VPN tunnel to your Network Operations Center

Remote Unit

All Bird remotes are configured for multi-band, multi-operator operation with separate amplifiers for each frequency band to provide the best possible coverage. The Remote design and color allow them to blend in to the environment and provide the coverage and capacity required for wireless voice and data with a low visual impact.

The Remotes are designed for both indoor and outdoor applications. The IP65 rating means they resist the effects of weather when installed to provide coverage in outside locations.

- IP65, -25°C to +55°C, no fans, minimal maintenance
- Wall mount or pole mount as needed
- Up to 4 frequency bands in a single unit
- Compact and discreetly colored
- Up to 4 Remote Units on single fiber
- Output power up to 43 dBm per band

The Coverage Results

When designed and installed correctly, the Bird solution will provide all wireless communications users with seamless coverage and sufficient capacity to meet their needs. Additionally, the Bird System will provide mall personnel and first responders with the peace of mind that when needed in an emergency their communication system will be up to the challenge regardless of the size of the emergency or the location within the mall structure.

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