

# Cell Service and Wireless Remedies for Reception & Coverage

## Panel Host

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## Panel Participants

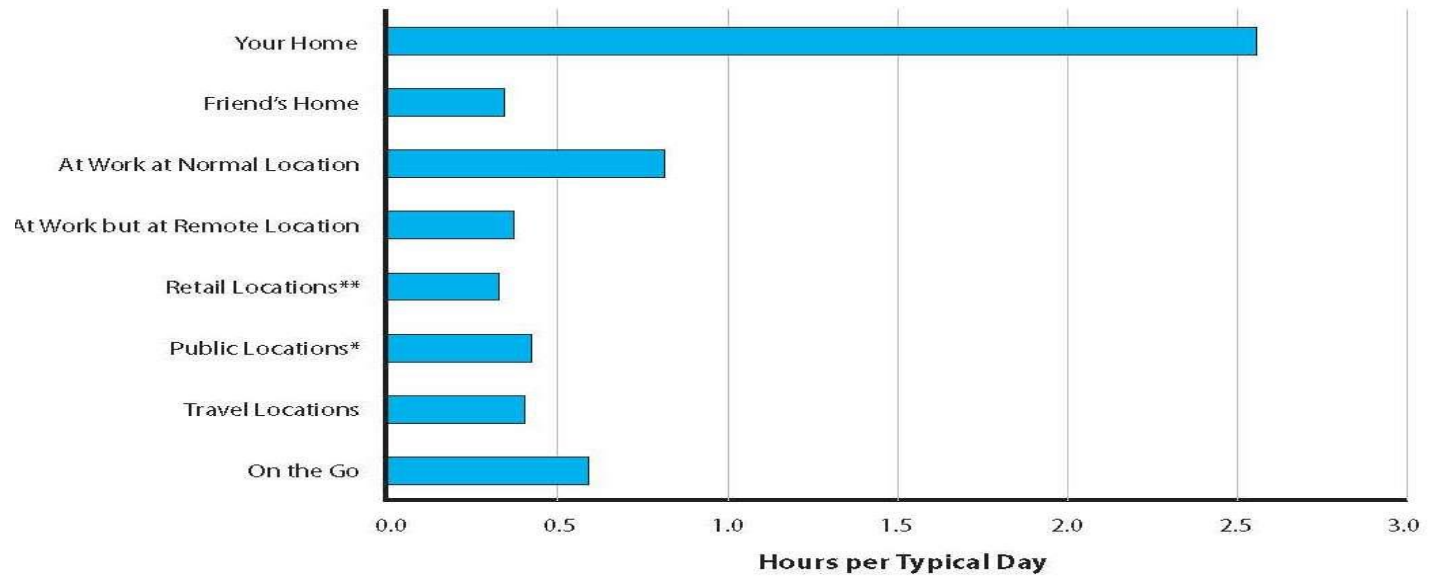
Dan Leaf

Gordon Mansfield

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# Why Is This Important?

Table 1. Average Daily Mobile Device Usage by Location



MDU attach rate is approximately **17%**

Q33. In a typical day, for how long do you use your mobile devices in each of the following locations?

N=varies  
\* Public – e.g., stadiums, parks, schools  
\*\* Retail – e.g., stores, restaurants

Source: Cisco IBSG, 2012

# When It Comes To In-building Coverage And Capacity “There Is No Such Thing As Plug & Play”\*

- To be effective, an in-building wireless solution needs to be architected specifically for the building it is covering including:
  - An exhaustive site survey that determines wireless coverage challenges and the wireless design that is needed to provide reliable signal throughout the building.
  - A coordinated approach to low voltage wiring to reduce cost while providing connectivity for the needed network components.

\*Paula Doublin, AT&T AVP for Antenna Solutions  
speaking at the 2014 HetNet Expo.

# FEMTOCELLS

## Improved Wireless Coverage In Your Home

### Benefits

- Acts as a personal base station/cell tower—5,000 sq./ft.
- Range from \$100-\$250 --can be purchased at carrier retail locations

### What's Required

- Require broadband 1.5 mbps connection & power outlet
- Manage approved devices via whitelist (can add up to 50)
- Supports up to 6 devices at a time
- Able to successfully make 911 calls
- Improves coverage and signal for 3G Voice/ Data

### Potential Challenges

- Macro network handoff
- Whitelist management
- Potential for interference



# SMALL CELL

## Flexible Coverage Where You Need It

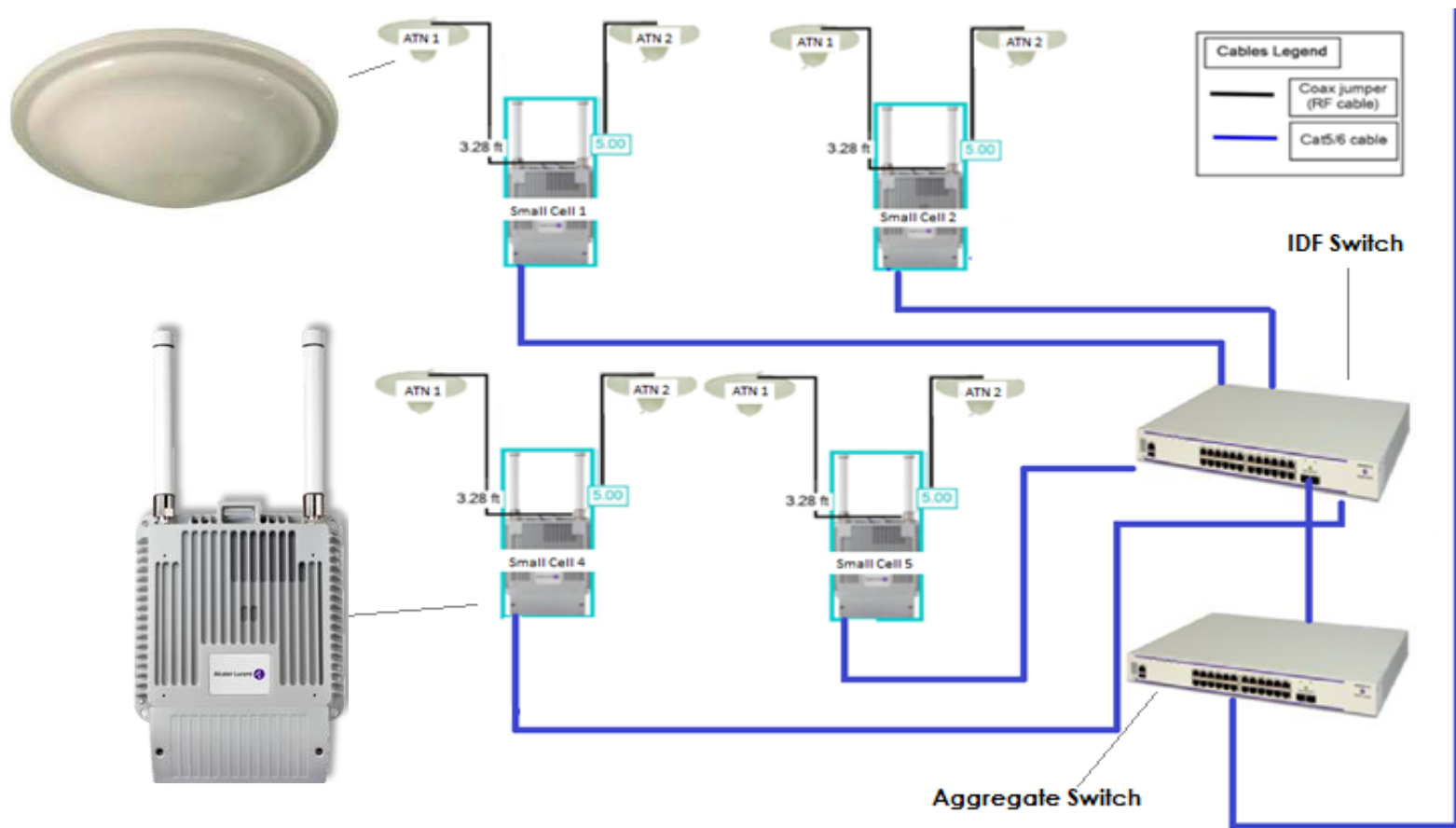
- Low power device that extends carrier (Voice) coverage, capacity, and wireless data access
- Small-scale antenna solution specific to carrier—seamless two way network handoff
- Combination of local equipment, network backbone equipment and IP Connectivity
- Differs from repeater solutions
  - Carrier owned call processing and spectrum
- Compatible with Wi-Fi & DAS
- Short Deployment timeline and non-intrusive install



OS6450-24/P24



# SMALL CELL System Design Overview



# New FCC Rules on Signal Boosters

- Industrial Signal Boosters
- Consumer Signal Boosters
- Public Safety In-Building Signal Boosters
- Concatenation of Consumer Boosters permitted if configuration has been certificated and Network Protection Standard has been followed.



# Concatenated Consumer Cell Booster Approach

- Cost of system is 1/3 to 1/5 of DAS.
- Requires adequate outdoor signal from carriers
- Equipment must adhere to the new FCC Order Network Protection Standard and be FCC certificated.
- Can install a section at a time, so is pilot projectable
- Is easily expandable to add building areas
- Requires Registration with each carrier, but no carrier approval required.
- If interference is created, must conform to the FCC Report & Order.





# Managed WiFi Service

- WiFi Calling on the horizon – seamless roaming with cellular
  - Apple and Android Support
  - T-Mobile and Sprint enabled
  - ATT and Verizon announced 2015 implementation
- Extremely Cost Effective – 1/5th the cost of DAS
- Remediates most interference and utilizes QOS to provide Voice service.
- Seamless service throughout community, including corridors, amenity areas, subterranean locations, etc.
- With new protocol (ac) will support multiple video streams in each apartment
- Requires NO carrier approval or cooperation other than support of WiFi Calling
- Supports OTT applications – Skype, WhatsApp, etc.



# DAS System Implementation

- Comprehensive coverage in energy efficient buildings
- Increased data capacity with microcells
- Fully coordinated and designed with carriers
- Better service to all carrier subscribers in the building
- Managed network
- Ownership of equipment
  - Base Stations—options



# Wireless Carrier Perspective In-Building Coverage

## Carrier In-building Wireless Solution Considerations

- Property owner Solution type
- Size, nature of property, and estimated number of users
- Integration with local macro cell network design
- Carrier closest Macro site, Macro capacity

## Distributed Antenna Solutions

- All DAS designs are NOT created equal
- The RF signal source is crucial
- Suggest carrier engagement 1 year+ from when system is desired to be operational
- Get carrier specifications/requirements before you design the DAS

### 1) BDA (Bidirectional Amplifier RF Source)

- Takes existing carrier frequencies and amplifies them
- Does not resolve existing macro site problems or macro sites that are at maximum capacity.

*Note—be familiar with FCC report that governs these in terms of carrier consent.*

### 2) BTS (Base Transceiver Station RF Source)

- Dedicated capacity

# CONCLUSIONS

## Plan In Advance.

- A low voltage review, MDF/IDF design and cable pre-design plan is necessary to determine the most effective technology and cost effective solution for your property.
  - Timing is the issue – as close to Occupancy but far enough out to run cabling
- Prepare for a detailed radio frequency site survey once the walls are up and the windows are installed.
- Whichever coverage approach is selected, ensure it follows the rules (FCC Report & Order, CALEA Compliance, etc.)