CDMA2000 1X Femtocell
Challenges Associated w/ Underlay Deployments

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Introduction

- Successful deployment hinges on solving underlay challenges.
- Femtocell design must adapt to existing macro cellular network.
- Femtocell must realize seamless experience for Subscribers and Operators.
- Allow CDMA Operators to maximize investment in network infrastructure and mobile handsets.
- Efficient management of CDMA spectrum.
What are the challenges?

- CDMA Channel Selection
- CDMA PN Selection
- Precise CDMA Timing Accuracy
- Interference Mitigation
- Seamless Idle & Active Handoffs
- Private Home Designation
- Operation in Operator owned Spectrum

Several others items, but this session will focus on these.
Macro and Femtocells Overlay

Home Networks are overlaid under Macro Network

Home Network
PN Reuse = 2

Home Network
PN Offset = 44

Home Network
PN Offset = 48

Neighbor List for 44 in 396

Neighbor List
for 396

Neighbor List
for 44 in 396

Neighbor List
for 396
CDMA Channel Selection

- Dedicated FA selection
- Common FA selection
- Intra/Inter-FA & Inter-band handoff
- Auto selection
CDMA PN Selection

- Coherent Selection
- PN Collision/Confusion
- Auto Selection

Home Networks are overlaid under Macro Network

Home Network
PN Reuse = 2

PN Offset = 44
PN Offset = 48

Neighbor List for 396
Neighbor List for 44 in 396

Neighbor List
392
400
44
48

Neighbor List
396

Neighbor List
400
(PN Offset)

Neighbor List
(PN Offset)
CDMA Clocking Accuracy

- Idle and Active Handoffs
- PN Collision/Confusion
- Mobile lock to basestation

Frequency Tolerance = ±5 × 10⁻⁸
Pilot Time Tolerance = ±10 µSec
Time base alignment to CDMA System Time
Macro Network Interference

- Interference to Macro Users
- Capacity impact to macro network
Handoff w/ Macro Network

- Idle Handoff (Ping-Pong, Transient users)
- Selection of Active Handoff boundaries (Call drops, Ping-Pong)
- Intra/Inter-FA & Inter-band handoff
- Aliasing effects on incoming handoffs
- Auto Configuration
• **Foreign Users Access / Bill Paying Customers**
• **Exploitation of Access / Unknowingly Wandered**
• **Starvation of Home Users**
• **E911 Access**
Licensed Spectrum Operation

- Transmission in Operator owned spectrum (FCC)
- Restricted/Unrestricted PSAP boundaries
The UbiCell product has successfully addressed all these issues:

- Built on Samsung’s vast experience with Consumer electronic products
- Capitalizes on Samsung’s CDMA modem technology
- Skilled in manufacturing to produce consistent & quality products
- Target market: Residential and SOHO
- Product Availability: NOW

Samsung UbiCell is the solution for you!
Samsung UbiCell Highlights

- Macro Network Handoff
- Adapts To RF Environment
- Automatic Network Planning
- CDMA2000 1X
- Plug & Play and Remote management
- IP Transport
Thank you!