Femtocells – Opportunities and Challenges

Chand Gundecha
CDG Technology Forum
Wednesday, May 2, 2007
Agenda

1. FMC, Seamless Mobility, Femtocell Overview
2. Market Drivers
3. Femtocell Evolution
4. Challenges and Opportunities
5. Summary
FMC, Seamless Mobility and Femtocell - Overview

- Femtocell - a disruptive technology that can create new business opportunities for Wireless Operators
- Motorola has a broad portfolio of solutions and services in FMC/Seamless Mobility areas
- UMA is the first FMC/Seamless Mobility application
  - Numerous UMA commercial systems and trials
- Other FMC applications enabled by Motorola IMS
  - IMS VCC trials underway
- Initial Femtocell focus with UMA with evolution to IMS/SIP
Agenda

1. FMC, Seamless Mobility, Femtocell Overview
2. Market Drivers
3. Femtocell Evolution
4. Challenges and Opportunities
5. Summary
Femtocell Market Drivers

Proliferation of Broadband Subs Services

Source: Infonetics - 3Q05

Millions of Subscribers

2003 2004 2005 2006 2007 2008

30 40 48 54 58 61

3 6 9 12 16 20

33 50 63 74 85 94

25 43 56 66 74 79

50 68 82 91 102 111

139 175 206 232 254

Asi  EMEA  NA  LAC

DSL and Cable Subscriber Growth By Region
Femtocell Market Drivers

Cellular Subscribers Keep Growing but there are coverage issues in certain places...Homes, Hotels, Basements

![Cellular Subscriber Growth By Region](chart)

Source: EMC February, 2008

MOTOROLA and the Stylized M Logo are registered in the US Patent & Trademark Office. All other product or service names are the property of their respective owners. © Motorola, Inc. 2007
**Femtocell Market Drivers**

~120M WiFi, Dual Mode Handsets by 2010

Femtocell technology allows user to keep the same handset as opposed to a Dual Mode Handsets
Femtocell Market Drivers
VoIP Over BBN technology is Exploding

VoIP Cumulative Subscriber Forecast

- Metro WiFi
- WiBB
- Parasitic VoIP on BB
- PON
- DSL
- Cable (Packet cable 2.0)

VoIP Cumulative Subscribers (M)

2006 | 2007 | 2008 | 2009
Convergence / Quad Play Has Begun

Competitive differentiation

Service Providers Are Evolving to Seamless Mobility, Triple and Quad Play

Global Momentum

- TeliaSonera
- TIM
- Orange
- Time Warner
- DoCoMo
- Comcast
- BT
- KT
- ATT
- StarHub
Service Provider Market Dynamics
Femtocell: Initial Interest from UMA Wireless Operators

<table>
<thead>
<tr>
<th>Greenfield ISPs</th>
<th>Wireline Service Providers</th>
<th>Cable MSOs</th>
<th>Wireless Service Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry into growing wireless market</td>
<td>Keep minutes on network</td>
<td>Triple-play evolution to quad play</td>
<td>Fixed mobile substitution</td>
</tr>
<tr>
<td>Increase minutes on IP network</td>
<td>Increase revenue</td>
<td>Increase revenue per subscriber</td>
<td>Revenue and market expansion</td>
</tr>
<tr>
<td>Reduce churn</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Service Provider/End User Challenges

End Users end up having multiple providers/services

- Circuit switched services are restrictive
- Services are specific to the cellular, wireline networks
- Competitive threat from other service providers
- Reduce churn, increase operational efficiency

Optimize with NGN services for both circuit & packet world
Serving diverse end users with NGN
Increase subscriber penetration in the places served today
Compete with new applications to gain differentiation

IP Multimedia Subsystem plays a key role in the core network evolution.
Agenda

1. FMC, Seamless Mobility, Femtocell Overview
2. Market Drivers
3. Femtocell Evolution
4. Challenges and Opportunities
5. Summary
**What is Seamless Mobility?**

Seamless Mobility increases reachability and productivity.

Seamless services across user environments creates opportunities for service providers to increase revenues.
### FMC Solutions – Femtocell Evolution

<table>
<thead>
<tr>
<th>Residential</th>
<th>Residential / Enterprise</th>
<th>Advanced Services</th>
<th>Residential / Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Residential Image" /></td>
<td><img src="image2.png" alt="Residential / Enterprise Image" /></td>
<td><img src="image3.png" alt="Advanced Services Image" /></td>
<td><img src="image4.png" alt="Residential / Enterprise Image" /></td>
</tr>
</tbody>
</table>
| **UMA Hosted Solution** | **MOTOwi4 Hosted VoIP / Seamless Mobility Solution** | **GAMA Applications (Interactive Manager)** | **Hosted IMS Solution**  
  Mobility Manager, CDMA, GSM networks |

MOTOwi4 Hosted VoIP / Seamless Mobility Solution

GAMA Applications
(Interactive Manager)
UMA Today: Femtocell Opportunity Expanding

UMA moves to “Universal Mobile Access”

UMA: A standard, secure, scalable IP interface into the mobile core network

UMA Network Controller

Mobile Core Network (Circuit, Packet, IMS services)

Dual-Mode Handsets

Standard 3G Handset

UMTS

Wi-Fi

Wi-Fi Access Point

Femtocells

Terminal Adaptors

Broadband Access

Home Office

Public

Softmobiles
UMA Solves Femtocell Network Challenge

Standardized, secure IP access to mobile networks and services

Supports ad hoc service activation

Scalable architecture designed for millions of user-installed femtocells

UMA-enables Femtocell

Standard Mobile Handsets

GSM/UMTS

Private TDM Access

Mobile Core Network (Circuit, Packet, IMS Services)

UMA Network Controller

Broadband IP Access
IMS Voice Call Continuity Call routing & Handoff
VCC DMH >> Future Femtocell evolution with IMS

- Based on 3GPP 23.806 voice continuity draft
- Supports active call handoff for
  - Cellular Originated/Terminated calls into WLAN
  - Cellular Terminated calls into WLAN
  - WLAN Originated calls into Cellular
  - WLAN Terminated calls into Cellular

1. PSTN Originated Call to the DMH
2. MM Selects Cellular Network for Delivery
3. Handset moves into area of WLAN coverage
4. Handset establishes 2nd call via WLAN to MM
5. MM bridges WLAN and PSTN call legs
   Removes cellular leg
Agenda

1. FMC, Seamless Mobility, Femtocell Overview
2. Market Drivers
3. Femtocell Evolution
4. Challenges and Opportunities
5. Summary
# Femtocell - Opportunities and Challenges

## Opportunities / Benefits

### Residential 2G/3G Coverage

**Operator Benefits**
- Subscriber retention
- Macro network offload
- Increased revenue from new services

**Subscriber Benefits**
- Increased mobile performance at home,
  Better coverage
- Home zone pricing

## Challenges

### Femtocell Challenges

- Low-Cost Femtocells ~ $200
- Interference management with Macrocell network
- Core network integration
- Packaging and selling service to end users
Agenda

1. FMC, Seamless Mobility, Femtocell Overview
2. Market Drivers
3. Femtocell Evolution
4. Challenges and Opportunities
5. Summary
# Full Suite of Motorola Services

**Serving Public, Private, and Enterprise Customers**

<table>
<thead>
<tr>
<th>Support Services</th>
<th>Integration Services</th>
<th>Managed Services</th>
<th>Application Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support, Training</td>
<td>Planning &amp; Design</td>
<td>Out-Tasking</td>
<td>Services, Application</td>
</tr>
<tr>
<td>Operations, Maintenance</td>
<td>Installation, Commissioning</td>
<td>Out-Sourcing</td>
<td>Delivery Framework</td>
</tr>
<tr>
<td>Optimization</td>
<td>Turnkey Services</td>
<td>Build, Operate, Manage/Transfer</td>
<td>End-User Applications</td>
</tr>
<tr>
<td>Security</td>
<td>Program Management</td>
<td>Hosting Services</td>
<td>Hosting Services</td>
</tr>
<tr>
<td>Network Management</td>
<td></td>
<td></td>
<td>Mobile Virtual Network Operator (MVNO)</td>
</tr>
</tbody>
</table>

## Seamless Mobility Services

### 1. CONCEPTUALIZE Strategy
- Business Assessment
- Business Modeling
- Network Evaluation
- Solution Design
- Implementation Plan

### 2. REALIZE Implementation
- Network Preparation
- System Integration
- Program Management
- Trial – Controlled Introduction

### 3. EXTEND Support
- Go-to-Market – Volume Introduction
- New Service Uptake Monitoring
- Enhancements
- Training
The Motorola Difference

Proven Portfolio Of FMC Solutions

Flexible Mobility Management Solutions

End-to-End Framework

Dual Mode Devices

Full Suite of Motorola Services