Deploying WiMAX in Taiwan

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1. WiMAX
Development in Taiwan
WiMAX Spectrum Allocation

North
- Reserved
- A1
- B1
- Reserved
- C1

190 MHz
65 MHz
30 MHz
30 MHz
35 MHz
30 MHz

South
- Reserved
- A2
- B2
- Reserved
- C2

190 MHz
65 MHz
30 MHz
30 MHz
35 MHz
30 MHz
## Our WiMAX Licenses

<table>
<thead>
<tr>
<th>Award Spectrum</th>
<th>License Winner</th>
<th>Special License Fee as % of Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>License A1: North; 30MHz(2565~2595MHz)</td>
<td>FITEL</td>
<td>12.89</td>
</tr>
<tr>
<td>License A2: South; 30MHz(2565~2595MHz)</td>
<td>FarEastone</td>
<td>4.18</td>
</tr>
<tr>
<td>License B1: North; 30MHz(2595~2625MHz)</td>
<td>Global Mobile</td>
<td>6.19</td>
</tr>
<tr>
<td>License B2: South; 30MHz(2595~2625MHz)</td>
<td>TaTung Telecom</td>
<td>7.25</td>
</tr>
<tr>
<td>License C1: North; 30MHz(2660~2690MHz)</td>
<td>VMAX Telecom</td>
<td>5.2</td>
</tr>
<tr>
<td>License C2: South; 30MHz(2660~2690MHz)</td>
<td>Vee Telecom</td>
<td>8.69</td>
</tr>
</tbody>
</table>
2. VMAX Telecom Co.
VMAX Company

- Founded in May 2007
- A mobile WiMAX network service operator
- 2.5GHz license for North Taiwan in July 2007
- NT$ 2 Billion invested capital in December 2008
- Major shareholders include:
  - VIBO Telecom
  - TECOM Co
  - TECO
  - Intel Capital
Vision and Goal

- **VISION**: Provide network infrastructure capable of delivering broadband wireless services to improve quality of life and productivity of work with performance at affordable price
- **GOAL**: Be a leading Mobile WiMAX service provider in Taiwan
Business Partners

- **Infrastructure:**
  - Samsung
  - Alvarion

- **Devices:**
  - Intel
  - ASUS
  - TECOM

- **Value added Service:**
  - Vibo
  - Asia Pacific Telecom
  - & Others

- **Channels:**
  - Vibo
  - Asia Pacific Telecom
Service Area

• Land Coverage: 9250 square km

• Population Coverage: 10.5 Millions
Strategy

- Form a strategic alliance with a mobile WiMAX operator in southern Taiwan region for a seamless, nationwide WiMAX service offering.
- Focus initially on “FIXED” and “Nomadic” broadband access
- Leverage VIBO for network & services deployment
- Align with APTG to deploy the backhaul network
- Collaborate with TECOM for WiMAX devices development
- Team with Intel to become a leading mobile WiMAX service operator in Taiwan
Network Architecture

Samsung

ASN-GW-Samsung

AAA + HA + DHCP-

Alvarion

ASN-GW-Alvarion

Multi-vendor Network
Network Deployment Plan

- Phase I (~25% coverage in population)
  - 250 BTS (contracted with Samsung & Alvarion)
  - 2009.Q3

- Phase II (~50% coverage in population)
  - 150 BTS (contracted with Samsung and Alvarion)
  - 2010.Q1

- Phase III (~85% coverage in population)
  - 600 BTS (Samsung and Alvarion)
  - Y2010.Q4

- Phase IV: (~90% coverage in population)
  - 100~300 BTS (as needed to improve coverage)
  - 2011~2012
Devices

**Data**
- Q1, 2009
- USB Dongle
- Modem
- Laptop
- Net-book
- MID

**Data + Voice**
- Q1, 2009
- Indoor IAD (1D1V)
- Indoor IAD (4D2V)
- USB Dongle Phone

**Data + Voice + VAS**
- Q3, 2009
- WiMAX & Dual mode handset
Devices for Initial Offering

- **USB Dongle for Laptop/NB Users**
  - Most Focused Segment
- **Indoor WiMAX IAD**
  - WiMAX + Wi-Fi
- **NetBook/NB with WiMAX-Embedded**
  - Strategic Partner: Intel
- **MID for Vertical Applications**
  - A Powerful Platform for Value Added Services
  - GPS + WiMAX + 7” Touch Screen
  - Possible Targeted Segments includes:
    - Portable Vehicle On-Board Unit
Network for Service Delivery

Connectivity Service Network

Access Service Network

Subscriber Station

Business

Home

On-the-Go

NSP Core

(NMS, AAA, HA, CRM, DHCP, etc)

Connectivity (Network for Service Delivery)

Service Network

WiMAX BS

WiMAX Pico BS

WiMAX Femto BS

Gateway / IAD

Home Surveillance

USB

WiMAX Femto BS

WiMAX BS

WiMAX/3G Dual band Multimedia Terminals

Home Surveillance Camera

IP PBX

 surge

PSTN

Internet

Core

Surveillance Camera

IP PBX

Business

Home

On-the-Go

NSP Core

(NMS, AAA, HA, CRM, DHCP, etc)
Fun & Enriched Life via WiMAX

- Via WiMAX (Wireless、Mobility、Broadband)，VMAX is engaging in the creation of various VAS to enrich the life of our subscribers!

**Consumer**
- Information
- Home Delivery
- Superstore
- Ticketing

**Life**
- Game
- Video & Music
- Commerce
- Finance
- Learning

**Community**
- M internet
- H Surveillance
- C Security

**Health Care**
- Dist Care
- Home Care
- Home Security
- Emergency Health Care
Service Deployment Schedule

Q3, 2009
Data
Data + Voice

Q1, 2010
Data
Data + Voice
Data + Voice + VAS

IPTV
LBS
Music
Games
Stocks/Finance
UCC
3D Messaging
Some Lesson Learned

• Multi-Vendor IOT
  — Tested before actual network deployment

• Indoor Coverage
  — Critically important. Plan required!

• Site Acquisition
  — Country dependent, but start early!

• LTE vs Mobile WiMAX
  — Understand the difference and address this issue to your advantage!
Multi-Vendor IOT

• End-to-End Infrastructure Interoperability
  – Network Access
  – Connection Set-Up
  – Service Flow Creation with QoS
Indoor Coverage

• > 85% Access is expected from indoor
  – Good indoor coverage is Crucial

• Indoor coverage enhancements
  – Micro/Pico Base Station
  – Repeater
  – WiMAX/Wi-Fi IAD
  – Femto cell

• DSL Replacement Opportunities
  – Personal broadband can be used as the key differentiator
Site Acquisition

• Minimize the concerns over bio-medical impact on HEALTH
  – Government’s role
  – Vendor’s role
  – Operators’ role

• Co-locating site and sharing tower and transmission facilities
  – Significantly reduce the OPEX expenses and speed up network deployment
LTE vs Mobile WiMAX

- Upgrade 2G/3G to LTE or deploy a Mobile WiMAX requires comparable investment
  - Spectrum, BS, dual mode, backhaul
- Mobile WiMAX and LTE has comparable long-term performance and benefit
  - LTE is adopting technology & features already available with Mobile WiMAX
- Mobile WiMAX provides a simple, flat all-IP network
  - LTE network is a more complex multi-layer network burdened with 3G
- WiMAX has friendly Intellectual Property Environment
  - Lower costs for WiMAX devices
- Most importantly, Mobile WiMAX has significant time-to-market advantage
  - 2~5 years expected
Concluding Remarks

• Multi-vendor strategy is sound, but IOT must be ensured
• Sharing BTS sites, towers and transmission facilities is encouraged
• Cooperation and competition with incumbent mobile operators can be carefully considered and planned
• Service offerings to achieve differentiation and competitiveness in market
• Ushering “4G” era
Thanks