8th Anniversary of National Communications Commission
International Communications Forum

Digital Convergence in Taiwan: Now and Future

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NCC, Taiwan

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The Roles of National Communications Commission in Taiwan

- The regulatory body for
  - Telecommunications Services
  - Terrestrial TV & Radio Broadcasting Services
  - Cable TV Services
  - Satellite Broadcasting Services
Outline

• Taiwan Profile
• Mobile and Fixed line markets in Taiwan
• Spectrum Auction for 4G Mobile Broadband Services
• Questions & Discussion
Taiwan Profile
## Facts

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Area</strong></td>
<td>36,200 sq km (13,970 sq miles)</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td>23.44 M</td>
</tr>
<tr>
<td><strong>Households</strong></td>
<td>8.21M</td>
</tr>
<tr>
<td><strong>2012 GDP Per Capita(nominal)</strong></td>
<td>US $20,386</td>
</tr>
</tbody>
</table>
### 2013 Taiwan Telecom Market Subscriptions

<table>
<thead>
<tr>
<th>Service</th>
<th>Subscriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed line subscription</td>
<td>12.2M</td>
</tr>
<tr>
<td>2G+3G subscription</td>
<td>29.8M</td>
</tr>
<tr>
<td>Mobile Broadband subscription</td>
<td>18.1M</td>
</tr>
</tbody>
</table>

- Mobile Broadband includes 3G data-enabled and WBA
Mobile and Fixed Broadband Subscription

<table>
<thead>
<tr>
<th>Year</th>
<th>Mobile (Millions)</th>
<th>Fixed (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>1.2</td>
<td>4.3</td>
</tr>
<tr>
<td>2006</td>
<td>3.3</td>
<td>4.5</td>
</tr>
<tr>
<td>2007</td>
<td>6.5</td>
<td>4.8</td>
</tr>
<tr>
<td>2008</td>
<td>10.0</td>
<td>5.0</td>
</tr>
<tr>
<td>2009</td>
<td>14.0</td>
<td>5.0</td>
</tr>
<tr>
<td>2010</td>
<td>16.0</td>
<td>5.3</td>
</tr>
<tr>
<td>2011</td>
<td>17.0</td>
<td>5.5</td>
</tr>
<tr>
<td>2012</td>
<td>17.0</td>
<td>6.4</td>
</tr>
<tr>
<td>2013</td>
<td>18.0</td>
<td>7.0</td>
</tr>
</tbody>
</table>

*Mobile broadband includes 3G data-enabled and WBA subscriptions*
Fixed Broadband Technologies

Total sub. : 5.59 millions
447,000 HHs have download speed of 100 Mb/s or more
Market Shares of Mobile Operators

Unit: Millions of Subscribers

- CHT: 10.64 (37%)
- FETnet: 7.15 (25%)
- TWN Mobile: 7.22 (25%)
- VIBO: 1.73 (6%)
- A+: 2.19 (7%)

Total sub. : 28.9 millions     Source: 2013, NCC
Mobile Services
Mobile Service Licenses

• 1997: Mobile Telephone Service (GSM)
• 2001: Third Generation Mobile Telecommunications Service (IMT-2000)
• 2007: Wireless Broadband Access Service (WiMAX)
• 2014: Mobile Broadband Service (LTE)
Taiwan’s Mobile Telecom Market

• Three 2G Operators:
  – 2012 Revenue: $0.88 bn US Dollars
  – No. of users: 5.6 million
  – No. of base stations: 26,000
  – Coverage: > 99%

• Five 3G Operators:
  – 2012 Revenue: $6.4 bn US Dollars
  – No. of users: 23 million
  – No. of base stations: 25,000
  – Coverage: > 90%

• WiFi Access Points: 47,000
Average 3G Data Rate

• Ave. Downlink Data Rate
  – 3.95 Mbps in 2013
  – 2.52 Mbps in 2012

• Ave. Uplink Data Rate
  – 0.99 Mbps in 2013
  – 0.45 Mbps in 2012
Taiwan’s 3G Subscribers

Millions

2005 2006 2007 2008 2009 2010 2011 2012 2013

1.3 3.4 6.9 11.3 15.8 18.7 20.9 22.7 23.1
4G Spectrum Auction
270 MHz was Auctioned

- **Spectrum** in the 700MHz, 900MHz, and 1800MHz bands is auctioned in 2013.

<table>
<thead>
<tr>
<th>Band</th>
<th>Reserve Price (approx.)</th>
<th>Unit: million US dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>700MHz</td>
<td>153 153 153 230</td>
<td></td>
</tr>
<tr>
<td>900MHz</td>
<td>53 70 70</td>
<td></td>
</tr>
<tr>
<td>1800MHz</td>
<td>73 46 46 46 100</td>
<td></td>
</tr>
</tbody>
</table>
Bidding Method

• Simultaneous

• Multiple round, and

• Ascending order
  - Price increment in each new round ranges from 3% to 7% on top of the highest price of the previous round.
# 4G Spectrum Cap for Any Bidder

<table>
<thead>
<tr>
<th>700 MHz Band</th>
<th>900 MHz Band</th>
<th>sub-1GHz Band (700MHz+900MHz)</th>
<th>1800 MHz Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>20x2 MHz</td>
<td>15x2 MHz</td>
<td>25x2 MHz</td>
<td>30x2 MHz</td>
</tr>
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<table>
<thead>
<tr>
<th>Total Spectrum Cap with respect to the number of Qualified Bidders</th>
</tr>
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<tbody>
<tr>
<td>$\geq 5$</td>
</tr>
<tr>
<td>35x2 MHz</td>
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</table>
Mobile Broadband Service Requirements

• The Mobile Broadband Service can be offered by heterogeneous networks (GSM, IMT-2000, WiMAX, LTE, LTE-A...)

• It is characterized by the High Speed Base Stations (HSBs).
  – Downlink data rate reaches 100Mbps @ 15MHz x 2
4G Service Deployment Requirements

• Number of HSB Requirements
  – At least 250 High-Speed Base Stations (HSBs) to start offering service.
  – 80% of all base stations should be HSBs, or at least 1000 HSBs within 5 years of system installation.

• Coverage Requirements
  – 4G coverage shall achieve at least 50% of the total population within 5 years of system installation.
Transfer of 4G Spectrum Right

• Spectrum currently owned by 2G operators can be swapped between 4G license holders.

• 4G spectrum may be transferred, if
  – 250 HSBs have been installed
  – Transferor paid off balance of bid price.
  – Transferor maintains at least 10 MHz 4G Spectrum.
  – Recipient possesses not exceeding 1/3 of the total 4G spectrum
  – Approved by NCC
Mobile License Expiration Dates

- 4G Licenses: 2013.10.30
- GSM Licenses: 2017.6
- 3G Licenses: 2018.12
- 4G Licenses: 2030.12

Auction Completed
Annual Spectrum Usage Fees

- Annual Spectrum Usage Fees:
  
  $0.36 \text{ m US Dollars/MHz}$

- Discounts of Spectrum Usage Fees in early years.

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0%</td>
<td>10%</td>
<td>60%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Obligation of Public Warning System

• Cell Broadcast Service (CBS)
  – Mandatory
  – Government authorities can broadcast warning messages at times of emergency or natural disaster.
Seven Potential bidders Filed Applications on July 1, 2013

- 4 of the 5 existing 3G operators in Taiwan.
- 3 new entrants
  - A leader in the global EMS industry (Foxconn)
  - A leader in the food industry in China (Ting Hsin)
  - A major player in Taiwan’s banking and Textile business (Shinkong)
Auction Progress

• Bidding commenced on Sep. 3, 2013.
• 10 rounds per day.
• Shinkong dropped out on Sep. 10.
• The six remaining bidders pushed the total 4G auction price to $3.96 b US on Oct. 30, in the 393th round.
• It is equivalent to $15 m US per MHz.
• 3G auction price was $9.6 m US per MHz. ($1.63 b US @ 170 MHz)
4G Auction Results – Oct. 30, 2013

• Chunghwa Telecom, 70 MHz, $ 1.3 b US.
• Far Eastone Telecom, 60 MHz, 1.04 b US.
• Taiwan Mobile, 60 MHz, 0.97 b US.
• Foxconn, 40 MHz, 0.31 b US.
• Asia Pacific Telecom, 20 MHz, 0.21 b US.
• Ting Hing, 20 MHz, 0.12 b US.
Questions & Discussions
Regulator’s Role on 4G Network Deployment

• Market competition drives operators’ network investment and service performance.

vs.

• Regulator mandates operator’s network investment and service performance.
Regulations On Mobile Operators

• coverage requirement?
• Uplink/Downlink speed requirement?
• Tariff cap?
• Network security requirement?
• Consumer protection requirement?
• Cell Broadcasting System (CBS) requirement?
Too Much / Too Little Competition

- Too much competition reduces operators’ profitability.
- Reduces operators’ willingness to invest in new technologies.

vs.

- In-sufficient competition results in poor service quality and high tariff.
Location Based Services (LBS)

• Protection of consumer privacy ?
  vs.

• Promotion of new business opportunities ?
Co-Radio Access Network

• Reduce operator costs
• Increase efficiency
  vs.
• Operators’ network deployment obligations
• Operators’ performance commitments
Is SMP Still an Issue in the Fixed Line Network?

• How to encourage competition in the Fixed Line Network?

• How to encourage fixed operators to deploy FTTH?
  – Facility unbundling
  – Threat from VOIP
  – Substitution by broadband wireless network.
  – Competition from digital CATV network

• Dispute on IP peering charges paid to the SMP.
Challenges Faced by Telecom Operators

• Digital cable TV network becomes an alternative broadband access to HHs.
• VoIP, e.g. LINE, erodes telecom operator revenues.
• Can monthly flat-rate tariff, allowing unlimited date transmission, sustain in 4G?
• BS sites are hard to come by due to consumer doubt of impact of radio magnetic wave.
• The number of BS will increase. So will the backhaul leased line expenses.
Broadband Policy

• Sweden
  – 100Mb/s to 90% HHs and Businesses by 2020
• Australia
  – 100Mb/s to 93% of HHs
• Does broadband infrastructure include both fixed and wireless technologies?
• What incentives can government provide to operators?
Tariff of Broadband Services

• Are the tariff of broadband services deregulated?
Regulation on Web TV

• CATV and IPTV are regulated.
• Web TV is not regulated.
• What should be the evolution of future regulation?
Government Ownership

• Does the incumbent operators in Sweden and Australia still have government ownership?
• Are they subject to any restriction on competition against other operators?
Conclusion

• We are very grateful for PTS Director-General Mr. Marby and ACMA Deputy Chairman Mr. Bean for sharing with us your experience and vision in convergent telecommunications regulation.

• We look forward to enhancing collaboration with PTS and ACMA to bring the potentials and benefits of fixed and mobile broadband services to people.