CDMA Data Network & Services of SK Telecom

16 October 2003

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SK Telecom, Pioneering CDMA Leader

Pioneering History

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar 1984</td>
<td>Established</td>
</tr>
<tr>
<td>Jan 1996</td>
<td><strong>World's first commercial CDMA cellular service launched</strong></td>
</tr>
<tr>
<td>Oct 1999</td>
<td>Handset-based wireless Internet service (n.Top) launched</td>
</tr>
<tr>
<td>Oct 2000</td>
<td><strong>World's first commercial CDMA2000 1X service launched</strong></td>
</tr>
<tr>
<td>Dec 2000</td>
<td>3G (W-CDMA) license awarded as the top winner</td>
</tr>
<tr>
<td>Oct 2001</td>
<td>Integrated multi-access Internet portal (NATE) launched</td>
</tr>
<tr>
<td>Feb 2002</td>
<td><strong>World's first CDMA2000 1xEV-DO service launched</strong></td>
</tr>
</tbody>
</table>

Rapid Subscriber Growth

<table>
<thead>
<tr>
<th>Year</th>
<th>Subs (thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>'96</td>
<td>2,299</td>
</tr>
<tr>
<td>'97</td>
<td>1,562</td>
</tr>
<tr>
<td>'98</td>
<td>566</td>
</tr>
<tr>
<td>'99</td>
<td>5,400</td>
</tr>
<tr>
<td>'00</td>
<td>10,110</td>
</tr>
<tr>
<td>'01</td>
<td>11,270</td>
</tr>
<tr>
<td>'03</td>
<td>15,179</td>
</tr>
<tr>
<td>'03 2Q</td>
<td>17,743</td>
</tr>
</tbody>
</table>

Strong Market Leadership

[SKT’s M/S in Korea cellular market]

<table>
<thead>
<tr>
<th>Year</th>
<th>Unit : %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun '01</td>
<td>49.7</td>
</tr>
<tr>
<td>Aug '01</td>
<td>50.6</td>
</tr>
<tr>
<td>Oct '01</td>
<td>51.0</td>
</tr>
<tr>
<td>Dec '01</td>
<td>52.3</td>
</tr>
<tr>
<td>Jan '02</td>
<td>52.5</td>
</tr>
<tr>
<td>Jun '02</td>
<td>53.0</td>
</tr>
<tr>
<td>Jun '03</td>
<td>53.6</td>
</tr>
</tbody>
</table>
SKT offers a variety of multimedia services through the most advanced network and plans to enhance service offerings in line with further network evolution.

<table>
<thead>
<tr>
<th>Date</th>
<th>Network Type</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>May `84</td>
<td>AMPS</td>
<td>Voice, Text, Voice Mail, Fax, E-Mail, Telephone (Voice)</td>
</tr>
<tr>
<td>Jan <code>96 : 95A, Aug </code>99 : 95B</td>
<td>CDMA IS-95</td>
<td>Audio Streaming, Still Image, Location-Based, Mobile TV, Mobile Advertising</td>
</tr>
<tr>
<td>October `00</td>
<td>CDMA2000 1X</td>
<td>Video Streaming, Video Telephony, VOD, Mobile Research</td>
</tr>
<tr>
<td>February `02</td>
<td>1xEV-DO</td>
<td>E-Mail, E-Book, E-Newspaper, Voice Mail, M-Coupon, M-Commerce</td>
</tr>
<tr>
<td>`03 onward</td>
<td>WCDMA</td>
<td>M-Coupon, M-Commerce, Video Mail</td>
</tr>
<tr>
<td>Type</td>
<td>Service Launching</td>
<td>Max Data Rate (bps)</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>1X</td>
<td>Oct ‘00</td>
<td>153.6K</td>
</tr>
<tr>
<td>1xEV-DO</td>
<td>Feb ‘02</td>
<td>2.4M</td>
</tr>
</tbody>
</table>
## Performance of 1X & 1xEV-DO

<table>
<thead>
<tr>
<th>Category</th>
<th>CDMA2000 1X</th>
<th>1xEV-DO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 User Max Speed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>153 kbps</td>
<td>2457 kbps</td>
</tr>
<tr>
<td>Application</td>
<td>105 kbps</td>
<td>1859 kbps</td>
</tr>
<tr>
<td><strong>Data Application Throughput</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Point</td>
<td>280 kbps</td>
<td>700 kbps</td>
</tr>
<tr>
<td>Moving</td>
<td>200 kbps</td>
<td>340 kbps</td>
</tr>
<tr>
<td>1xEV-DO User Devices</td>
<td>Jan ’02</td>
<td>PCMCIA Card</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
|                      |         | - 1xEV-DO wireless modem for Internet access  
|                      |         | - Standard PCMCIA Type II Form Factor and Interface  
|                      |         | - Supporting Windows 98, ME, 2000, XP, CE  
|                      |         | - Backward compatibility with CDMA2000 1X |
|                      | June ’02 | Dual-mode handset |
|                      |         | - High speed WAP services using 1xEV-DO network  
|                      |         | - Receiving Voice Call during WAP services  
|                      |         | - 65,000 Color LCD / 40 Poly Sound / 350,000 Pixel Camera |
|                      | Aug ’02 | VOD handset |
|                      |         | - Real time video streaming & downloading MPEG files  
|                      |         | - Recording still images & video clips  
|                      |         | - 265,000 Color LCD / 40 Poly Sound / 350,000 Pixel Camera |
Internet Access using 1xEV-DO

Enhanced speed Internet access has been possible at anytime, anywhere

- Insert into the PCMCIA card slot of the expansion pack of a PDA
- Insert directly into the PCMCIA card slot of a notebook PC
- Connect the 1xEV-DO handset to PC using a USB cable
CDMA2000 1X Market of Korea

- CDMA2000 1X Subscriber base is rapidly growing in Korea
- SKT is the dominant player in CDMA2000 1X market in Korea with 60% market share

CDMA2000 1X Market of Korea

- SKT's CDMA2000 1X Subscriber

Wireless Internet Trends
Source: SKT, as of July 2002
(1) User classification defined as the following:
  - Trial Users: Access wireless Internet 1 - 9x per month
  - Active Users: Access wireless Internet 10 - 29x per month
  - Heavy Users: Access wireless Internet over 30x per month
Major Contents: Picture Downloads/Messaging

- Based on SIS* (Simple Image Service) compression technology
- Moving images (3-5 frame/sec)
- Features
  - Picture downloads for screen saver (e.g., celebrity images, character images, graphical jokes, luck charms, etc.)
  - Picture messaging service
  - Archive for storing previously downloaded content
  - Drawing tool and bulletin board to make and upload self-made images
  - Available from both NATE.com and NATE on handset menu
- Fee
  - US$0.50 ~ $2.00 per download
- Number of content providers
  - 26 providers

SIS*: Encoding & decoding solution that enables moving images

Celebrity moving images

Animated moving images

Do-it-yourself images
Most Frequently Downloaded Songs (top 5)

- 하얀연인들-겨울연가
- 여우와 속사탕 테마
- 최지우테마-겨울연가
- a better day - JTL
- kiss me - 샘

**Features**
- Download ring tones from either NATE.com or NATE on handset portal
- Send ring tones to other people’s handsets as a present with message
- Diverse types of ring tones (songs, recorded voice, etc.)
- Supports Single, 4, 16, 32 and 40 poly (sounds)

**Fee**
- USD $0.50 ~ $1.50

**Number of content providers**
- 24 providers
MPEG4 Solution “June”

1xEV-DO High Quality Video using MPEG4

- Mobile Movie
- Music Video
- Video Mail
- Traffic Information
- Real Time News
CDMA2000 1X delivers superior Internet usage and ARPU performance
Color handsets are one of the key ARPU drivers in 3G environment

Data ARPU

Data usage by handset

(WI ARPU in Won)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>SMS-based</th>
<th>2G WAP</th>
<th>1X WAP Color (1X)</th>
<th>1Q 02</th>
<th>2Q 02</th>
<th>3Q 02</th>
<th>4Q 02</th>
<th>1Q 03</th>
<th>2003 (E)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8%</td>
<td>9%</td>
<td>10%</td>
<td>12%</td>
<td>13%</td>
<td>15%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data ARPU by handset

(As of Jun. 2003)

<table>
<thead>
<tr>
<th></th>
<th>WI ARPU in Won</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMS-based</td>
<td>US$ 1.2</td>
</tr>
<tr>
<td>2G WAP</td>
<td>US$ 5,462</td>
</tr>
<tr>
<td>1X WAP Color (1X)</td>
<td>US$ 9,726</td>
</tr>
</tbody>
</table>

* % of Total Revenues excluding interconnection revenues

* Wireless Internet Revenue by handset / # of active users (access Internet more than once per month)
Operators are adopting different migration paths by region and country for 3G deployment.

Considering All-IP network as the final migration path.

Technology Evolution Path

- **1995**
  - IS-95-A
  - Voice
  - 14.4 kbps circuit

- **1999**
  - IS-95-B
  - Voice
  - 64 kbps Data
  - IS-95A Compatible

- **2000**
  - CDMA2000 1X
  - (Korea, US, Japan)
  - Voice Capa (x1.5)
  - 153 kbps Data
  - IS-95A/B Compatible

- **2001**
  - 1xEV-DO (Phase 1)
  - • Higher Cap Voice/Data
  - • 2.4 Mbps Data
  - • IS-95A/B Compatible

- **2002**
  - CDMA2000 3X
  - • Voice Capa (x2)
  - • 384k – 2Mbps Data
  - • IS-95A/B Compatible

- **2003 +**
  - 1xEV-DV (Phase 2)

**IS-136** (Europe, US)

- Voice
- 9.6 kbps

**GSM**

- Voice
- 9.6 kbps

**GSM GPRS**

- • 30-40 kbps Packet
- • GSM Compatible

**W-CDMA** (Europe, Korea)

- • High Capacity Voice
- • 384+ kbps Packet

**PDC**

- Voice
- 9.6 kbps

**PDC+**

- Voice
- 28.8 kbps
- PDC Compatible

**W-CDMA** (Japan)

- • 384 kbps Packet

**EDGE** (Europe, US)

- • 384 kbps Packet

*EDGE: Enhanced Data for GSM Evolution
GPRS: General Packet Radio Service
Network Evolution

- Transparent migration path from 2G to 3G
- Network evolution with the Phase of next generation technology

**Phase 1 (2002~2003)**
- Circuit & Packet Network

**Phase 2 (2004~2005)**
- Voice over IP Network

**Phase 3 (2006~)**
- All-IP Network Integration

Evolution Perspective
### Terminal Evolution

#### Terminal improvement by development of peripheral device and related technology

- Digital camera/GPS/Smart card module/video communication/M-Commerce security solution/LBS
- Semiconductor: higher CPU capacity, larger storage
- Display: Wide LCD → Color LCD → TFT LCD
- Battery: Durable, lighter battery (next generation battery)

<table>
<thead>
<tr>
<th></th>
<th>2G</th>
<th>2.5G</th>
<th>3G</th>
<th>4G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B/W and small LCD</td>
<td>Wide-color LCD</td>
<td>USIM Module / TFT LCD</td>
<td>Virtual Reality</td>
</tr>
<tr>
<td></td>
<td>Low speed data</td>
<td>GPS equipped</td>
<td>OS installed terminal</td>
<td>Natural Language Recognition</td>
</tr>
<tr>
<td></td>
<td>Browser installed</td>
<td>Bluetooth installed</td>
<td>(WinCE, Linux)</td>
<td>Handwriting Recognition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Digital camera equipped</td>
<td>High capacity CPU/</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Java installed terminal</td>
<td>larger storage</td>
<td></td>
</tr>
</tbody>
</table>

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**Evolution Perspective**

**Terminal Evolution**
Need to know customer needs for developing new services

Focusing on Customer Segmentation, Targeting and Positioning

Service Mixing, Customizing & Personalizing will be the key factors for success

Successful Service
⇒ Develop High Tech and Secure Contents!

Cooperation

Partnership with related Mobile Operator, Terminal Manufacturer, Enabler Tech, to develop Killer Application and Services

New Revenue Sharpening Model

Open Access
Conclusion

SK Telecom

Global Leader in Wireless Technology & Product Innovation
Leading Position in Wireless Internet Market
Technology Evolution to 3G and next ...
Service Evolution to Multimedia
Thank you