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**TELECOMMUNICATION
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SECOND MEETING OF STUDY GROUP 1: GENEVA, 2 - 5 SEPTEMBER 2003
SECOND MEETING OF STUDY GROUP 2: GENEVA, 8 - 11 SEPTEMBER 2003

FOR ACTION

Question 18/2: Strategy for migration of mobile networks to IMT-2000 and beyond

STUDY GROUP 2

SOURCE: KDDI (JAPAN)

TITLE: REVISED CONTRIBUTION ON CDMA2000 1X DEPLOYMENT AND
ASSOCIATED MULTIMEDIA SERVICES LAUNCHED IN JAPAN

Action required:

KDDI requests that the following revision of its contribution to ITU-D Study Group 2 from February of 2003 be incorporated as a case study into the Mid-term Guidelines (MTG) being developed by the Rapporteur's Group for Question 18/2 on evolution and migration of existing systems to IMT-2000.

Abstract:

CDMA2000 1x deployment and associated multimedia services launched by "au*" in Japan are described.

*: "au" is the brand name of KDDI's mobile service.

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1. Wireless Market Outlook in Japan

The total number of wireless subscribers in Japan at the end July 2003 was 77,795,800. The total number of mobile Internet subscribers in Japan jumped up from 12,720,000 (as of end June 2000) to 65,174,100 (as of end July 2003) – an increase of 512% just in 37 months. KDDI attributes much of this dramatic growth to the launch of its commercial CDMA2000 1x service, known as “au”.

2. CDMA2000 1x Launch by au

In July of 1998, au launched its second-generation cdmaOne system throughout Japan, offering new high-quality voice services to its existing TACS and PDC customers, while continuing to run those other networks. In April of 1999, au began offering its “Ezweb” service, which enabled the provision of Web-based applications to mobile devices. In April of 2000, au began offering international roaming with other cdmaOne operators, while in July of 2000, au launched IS-95B, the packet service upgrade to cdmaOne, which provides data rates of 64 kbps.

By November of 2001, only three years after deploying its cdmaOne network, au had reached a total of 10 million subscribers. In the same timeframe, au terminated its TACS operations and decided that to shut down its PDC operations by the end of March 2003.

In April of 2002, au upgraded its cdmaOne system to CDMA2000 1x, covering 54% of the Japanese population initially and expanding to cover 90% by December of 2002. Less than sixteen months after its initial commercial launch, there were 9 million CDMA2000 1x subscribers on the au network.

3. Secret of au's Success in CDMA2000 1x Launch

Due to CDMA2000 1x's inherent backward compatibility with cdmaOne, which enables cdmaOne terminals to operate on CDMA2000 systems and vice versa, service coverage for the CDMA2000 1x system was practically equivalent to the existing cdmaOne service coverage from day one. In addition, the straightforward upgrade path from cdmaOne enabled a rapid and low cost CDMA2000 1x roll-out. Moreover, the technology maturity inherited from cdmaOne, led to the development of CDMA2000 handsets that were the same size or smaller than cdmaOne handsets, had the same battery life and operational stability, with a minimal increase in cost.

In deciding how to rollout its CDMA2000 1x network, au considered two different options: 1) an upgrade approach; or 2) an overlay approach.

In an upgrade approach, a cdmaOne operator upgrades all of its existing infrastructure equipment and software to CDMA2000 1x in one step. This approach has the advantage of requiring less capital expenditure for the upgrade to CDMA2000, but results in some disruption of services while the cdmaOne software was modified.

In the overlay approach, a cdmaOne operator deploys a CDMA2000 network alongside its existing cdmaOne network, migrates customers over to the new network, and then upgrades the cdmaOne network equipment. This approach has the advantage of not requiring an initial modification to the cdmaOne network, enabling ongoing, uninterrupted services. However, this approach requires more capital expenditures.

After weighing these options, KDDI adopted the “upgrade” approach in its rollout of CDMA2000 1x.

4. Mobile Multi-media Services by au

With its fully commercial CDMA2000 1x system in place, au has been offering a variety of multimedia services to its customers, including:

- Ezweb - WAP2.0-based Internet Access and Browsing Platform
- EZweb@mail - IMAP4-based e-mail platform
- Ezplus – JavaTM application services, with support of mobile agent function using HTTP, and automatic application update from servers
- Eznavigation - Accurate position location-based services powered by gpsOne
- Ezmovie - Video distribution available nationwide, using industry standards, i.e. MPEG-4 for video coding and MP4 for video file format
- Photo-mail (including eznavigation associated with Photo-mail, which stores location information along with pictures to provide vivid memories for travellers, the ability to provide easy recommendations on locations, and a number of business applications)

5. Objectives and Goals for 3G Migration : au's Next Step

As au continues to expand its successful CDMA2000 1x services, it is looking down the road to determine what is driving customer demand. Based on its experience with IMT-2000 services, au has discovered, to no one's surprise, that customers want large-volume content with low prices. An obstacle to providing advanced applications with rich content is the cost per bit of data. Therefore, a low-cost infrastructure for data transactions is required. Reducing cost per bit is essential for the provision of content-rich services and applications.

In order to further reduce the cost per bit and offer its customers more content-rich applications, au plans to add CDMA2000 1x EV-DO later in 2003. CDMA2000 1x EV-DO is specifically tailored for asymmetric high data rate packet communication with mobility. It uses the same carrier width that cdmaOne and CDMA2000 1x occupy (1.25 MHz), and has similar RF characteristics and link budgets, allowing collocation of CDMA2000 1xEV-DO carriers and base stations with those of CDMA2000 1x network. The forward link (base station to mobile) sector throughput of CDMA2000 1x EV-DO is 600kbps or higher on average, with 2.4Mbps as the peak, which performs very much higher (bps/Hz) than CDMA2000 1x or W-CDMA.