

# **The Role of CDMA2000 in the Success of Wireless Broadband**

May 2006

By: CDMA Development Group





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With the commercial introduction of CDMA2000® 1xEV-DO in 2002, the CDMA community was the first to offer a truly high-speed wireless data offering. The 35 CDMA operators around the world who are now offering the service are the pioneers in wireless broadband and their success stories and experiences are excellent case studies from which we all can learn.

Most people feel the same way today about wireless broadband that they felt about pagers and cellular phones years back: it is an extravagance. Nobody really needs it. Until later, when we all do. Wireless services have proven to be somewhat addictive. Remember pagers? At first we couldn't imagine why anyone would need to use a pager. Eventually, businesses found that pagers were a great way to save time. If an expert was needed and wasn't in his or her office, the person could be reached – live – in just a few minutes. It's so obvious now. But then who would use a pager today when you can just call a person's cellular phone?

When cellular phones were introduced, people noticed those pigtail antennas on cars and thought it was a sign of arrogance, conspicuous consumption. Only a few years later, those same people made sure they had three things when they left their homes in the morning: their wallets, their keys and their cell phones.

Those same regular people (with the latest, greatest portable phones) had dinner with their technology enthusiast friends a few years ago and gave them an "okay, whatever," smile and said a bored, but polite, "oh, wow," when the geeky friend leaned toward them and showed off his new gadget named after a fruit. Now many of those regular people find themselves in traffic, their thumbs racing across their Blackberry keypad to get a quick e-mail sent to a colleague before the light turns green.

Wireless broadband service seems to be the offering on the market today that initiates eye rolling and "can't be necessary" comments when someone is seen surfing the web in an airport. So what happens in between the eye rolling and the adoption...and eventual life-changing dependence?

## **Marketing, Marketing, Marketing**

Marketing begins to be fun – and challenging – when you have more to market than a phone and a phone conversation. When it comes to winning customers for wireless broadband, service providers who selected CDMA technology back in the days when the first digital networks were rolling out are now in a very advantageous marketing position over their competitors who went with TDMA-based systems. The CDMA community was first to roll out commercial 3G capabilities with CDMA2000 1X, and first to offer wireless broadband with 1xEV-DO, which means CDMA2000 operators have had the opportunity to be first. And that – in the sales and marketing arenas – is a beautiful gift. The market is theirs to take.

Currently, 151 operators worldwide offer commercial data services with CDMA2000 1X, but operators such as SK Telecom in Korea, KDDI in Japan, Verizon Wireless and Sprint Nextel in the U.S., Telecom New Zealand, VIVO in Brazil and others have been the first in the world to commercially implement and market broadband wireless with CDMA2000 1xEV-DO. As of today, 35 operators have deployed 1xEV-DO and 37 more are deploying. CDMA2000 has more than 225 million users and the number keeps growing at 8 million adds per month. 1xEV-DO has 24 million users and the base is growing at 4 million per quarter.

With CDMA2000 1X speeds up to 153 kbps and 40-110 kbps in commercial networks, operators developed content and aligned with brand name content providers to offer their customers services such as picture messaging, location-based services, games and music downloads. As handsets supporting these applications became widely available and affordable for the mainstream user, the customers got hooked on wireless data. As users have become accustomed to viewing calendars on their handsets and e-mailing pictures taken on their camera phones, data has become the fastest growing business for CDMA2000 operators.



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With 1xEV-DO, which delivers average speeds that are similar to that of landline broadband – around 400-800 kbps – operators can take wireless data to the next level. Providing a truly broadband experience, 1xEV-DO enables faster access to information as well as new services. Operators who have launched 1xEV-DO and the marketing plans to accompany it have experienced fast take-up rates for data services, new customer adds to their network – particularly in the area of business and high-end users – and new sources of revenue. Wireless broadband has already boosted revenues and competitive position, particularly for the operators who were first to introduce the services.

## *The Right Apps for the Right Chaps*

Of course, we're talking about new technology, so being first isn't enough in itself if operators want to reach the mainstream population. So a strong marketing plan that identifies key audiences and the services that might appeal to them is necessary in order to introduce new services, drive usage, and attract new customers while keeping the current customers happy.

When it comes to marketing new advanced technology, enterprises can be the most important customers. Smart business people are always looking for increases in productivity, so services that put their employees to work when they are at home or on travel are attractive. For a small monthly user fee, employers can provide wireless broadband to their traveling employees and get hours of additional work time from them. These are some of the heaviest users of both voice and data services.

It's difficult to give up conveniences, once you're used to having them. Enterprise users are important not only because they drive usage, but also because they adopt those behaviors outside the realm of enterprise. The convenience of immediate information is something business users don't want to give up just because the information isn't work related. The "need" for data services will drive growth and adoption. And who wants to download an 8 MB pdf file at a rate of 4 kb per second? Wireless broadband will naturally follow the uptake of data, particularly for business users.

Telecom New Zealand (TNZ) launched wireless broadband with 1xEV-DO a full year in advance of their competition. 1xEV-DO is a complementary technology for TNZ, adding mobility to their existing broadband service, which is mainly for the business market. The company is also considering 1xEV-DO to extend broadband coverage to areas where wireless is more economic than wired infrastructure. The service now covers all major towns and cities in New Zealand. TNZ's enterprise marketing includes success stories from their business users to show productivity gains and improved business results.



## **Weight Watchers**

### **Weight Watchers goes mobile in Tauranga**

Since the introduction of Mobile EFTPOS sales at the Tauranga meetings have increased by 10 percent, compared with the national average of 5 percent.

Source: [www.telecom.co.nz](http://www.telecom.co.nz)



Offering applications that link businesses with remote workers has enabled TNZ to gain an edge over its competitor. The operator announced in its second quarter results that the superior data performance of 1xEV-DO is driving strong uptake of data cards and PDA devices in the business market segments, which is having a positive effect on its mobile business.



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Verizon Wireless helped popularize mobile broadband Internet access in the U.S. when it launched its BroadbandAccess service (based on 1xEV-DO) in 2003, the country's first wide-area mobile broadband service, and built the first nationwide wireless broadband network. BroadbandAccess is targeted toward businesspersons who want to replicate their desktop when traveling. On its 1xEV-DO network, Verizon Wireless also launched, in January 2005, the first U.S. consumer multimedia wireless service, called *V CAST<sup>SM</sup>*, and one year later debuted *V CAST Music*, a comprehensive mobile music service.

Sprint Nextel in the U.S. is using its 1xEV-DO network, called *Sprint Power Vision*, to offer a variety of unique and advanced services to business customers. One example is Sprint's work with the **Associated Press** news service. Journalists can be creative and competitive in finding and reporting news using the nationwide *Sprint Power Vision<sup>SM</sup>* Network and SNAPfeed, a store and forward video application developed by the AP. Journalists use SNAPfeed, a laptop computer, a camera, and a Sprint Mobile Broadband Connection Card to send 60 seconds of breaking news video back to their broadcast newsroom in less than ten minutes. Photographs and audio clips can be transferred even faster. The solution allows journalists to cover breaking news in environments where traditional methods (trucks and/or satellite) are not practical or available.

Bell Mobility in Canada and VIVO in Brazil also target the "road-warriors" with their broadband offering. Whether these business users are waiting in an airport, sitting in a hotel, or riding in the back of a taxi, they can work on their computer as if they are in the office to create, send and receive (and easily open!) large files between coworkers or customers.

One important group that is always considered in successful operator marketing plans is a group often referred to as "high-end" users. These subscribers may be business people, early adopters or other consumers who utilize technology for their daily activities. Minutes of use for these subscribers – for both voice and data – are the highest in the customer base. Successful operators customize services to capture the interests of these key customers. In November of 2003, KDDI introduced its 1xEV-DO service *WIN*, and has steadily added services that are targeted toward different types of customers. The company estimates that approximately half of its subscribers to the *WIN* service are newly added customers – many of them are high-end users from their competition. This is an excellent example of how being first to market with a product – and marketing it the right way – can have a positive influence in market share and ultimately profitability.

Beyond the enterprise and high-end users, there is the majority of the operators' customers – the consumer market. Not all consumers are alike, so this segment is divided further – and differently by every operator in every market – to give current customers the services they will enjoy and use, while attracting new customers with services the competitive operators don't yet offer.

KDDI has marketed various applications to its consumer customers under its *WIN* service. The company's *EZweb* service offers high-speed access of up to 2.4 Mbps which allows for fast, fluid access to web content. *EZChannel* is a program distribution service, which means users receive a variety of concentrated multimedia content as if they were TV or magazines simply by setting up the information they want. *EZMovie* allows users to view video content of different types, including movies, music, animation or sports. Users can even get live video distribution with the service. *EZGame Street* is KDDI's game portal with 350 games by 43 game makers. *EZNavi* is the company's location-based services, such as pedestrian directions, car directions, and the ability for parents to track the location of their children. *EZFM* and *EZTV* are radio and television tuner services, offering direct links to users' favorite TV and radio stations. The variety of services meets the interests and variety of KDDI's customer base.



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To download music, KDDI subscribers can use *EZ Chaku-uta* for ringtones or *EZ Chaku-uta Full* to download full music sound tracks. (In Japanese, “chaku” means received and “uta” means song or music.) Users can also download and purchase music CDs or books on their *WIN* service.

## Introducing the new broadband cellular *WIN*



### Quicker access

High-speed communications make high-volume data transfer swift and secure.

### Greater enjoyment

Richly expressive contents of EZ Channel and other applications enable the phone to become your TV or magazine.

CDMA 1X **WIN**



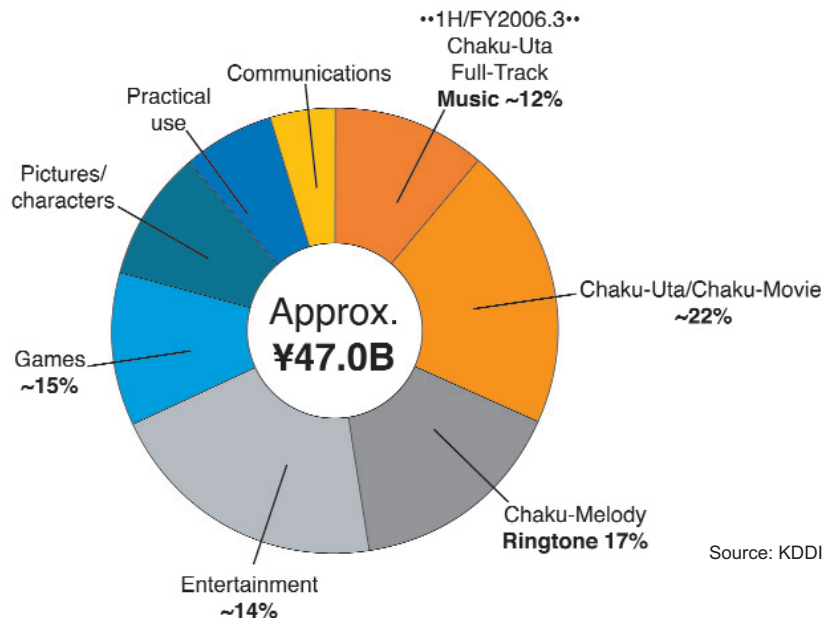
### Greater freedom

Using the Double Flat Rate Service eliminates worries about communications charges. Enjoy unlimited, hassle-free connection to the Internet and E-mail.

Source: www.kddi.com

So how successful have these services been? Users of the KDDI data service had made nearly 300 million short music downloads and over 30 million full music downloads at the end of 2005. The introduction of *WIN* nearly tripled subscriber spending on music and book content over what it was with CDMA2000 1X. During 2005, revenue from book sales reached about 20 million Yen (\$170,000US) and revenues from CD and DVD sales were approximately 45 million Yen (\$382,000US.)

## KDDI: Revenue by content providers





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Korea is a leading market for data services, being the first to launch 3G services with CDMA2000 1X as well as the first to launch mobile broadband with 1xEV-DO. Overall, in Korea, data has grown at a cumulative average rate of 85%, where three operators offer CDMA2000 1X and 1xEV-DO services.

SK Telecom has also been a leader when it comes to introducing new technology and creatively marketing that technology. In November of 2002, SK Telecom introduced multimedia services on its 1xEV-DO network under the service name *June*. The service offered Video-On-Demand (VOD), and Music-On-Demand (MOD) content that appealed to different consumer segments. Today, the *June* service offers regular TV programs in real-time and special features from cable TV broadcasting programs, such as news, music, and games, through a mobile handset. The service also supports MMS (Multimedia Messaging Service,) allowing users to send and receive streaming video, audio and text, via their cellular phones. The number of subscribers to the *June* service reached seven million as of January 2006. *MelOn* is SK Telecom's music portal site where songs can be downloaded and played through various devices. As of September 2005, the operator offered about 850,000 songs and now has nearly 5 million subscribers to this service.

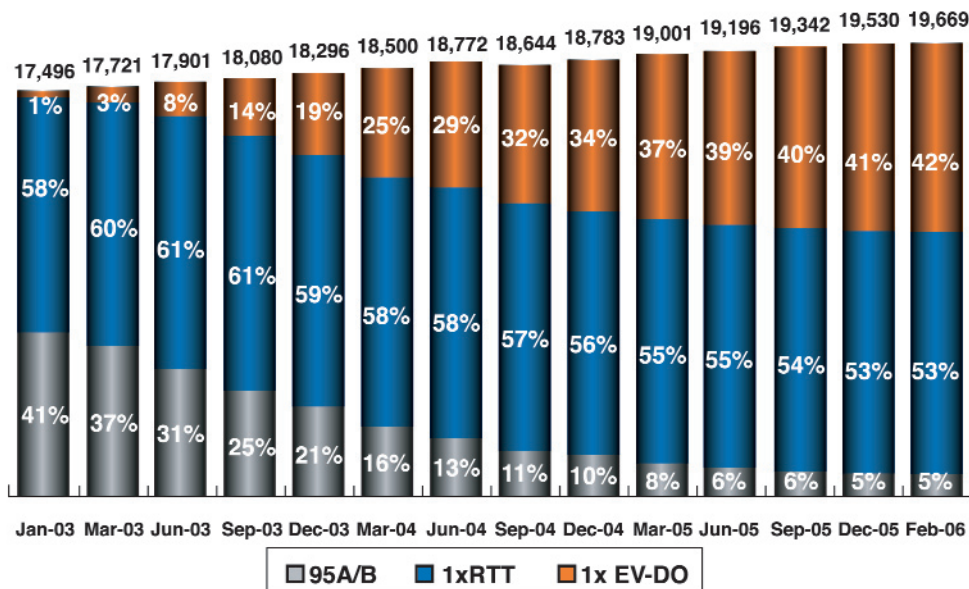


Source: www.sktelecom.com

GXG is SKT's game portal site for 3D video games. As of September 2005, more than 200,000 3D game phones were distributed into the market and 30 different types of 3D mobile games had been released. New mobile games are being launched each month and the company conducts a variety of activities that continue to increase the use of mobile devices for games, such as hosting mobile 3D game competitions designed to support the mobile game developers and strengthen their R&D capabilities.

As of January 2006, there were 8.2 million subscribers on SKT's 1xEV-DO network, which amounts to 40% of its total subscriber base, and seven million, or 30% of all users, subscribe to *June* services.

SK Telecom: Subscribers by handset type



- 8.2M 1xEV-DO subscribers signed up in first 3 years
- This is 42% of SKT subscriber base and 229% annual growth rate

Source: SK Telecom Monthly Fact Sheet, February 2006



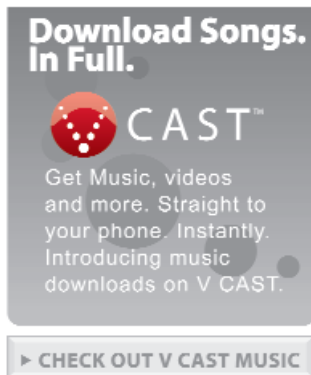
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KT Freetel, another operator in Korea, has been successful with its broadband offering. The company has achieved over 4.5 million subscribers to its 1xEV-DO service, called *FIMM*. The service enables high-quality streaming video, VOD, streaming audio, AOD, MP3 downloads and MMS with video and pictures.

When it comes to the consumer market in the U.S., Verizon Wireless has been first among major operators with mobile broadband services. The company launched a 1xEV-DO consumer offering called *VCAST*<sup>SM</sup> that provides 3D gaming, high-quality video and music downloads. *VCAST* users can download games, productivity tools, information services, ringtones, pictures, and more. The service offers a music store, where users can find music and download songs to their wireless *VCAST* music phone.



- |                |               |             |
|----------------|---------------|-------------|
| Alternative    | Folk          |             |
| Blues          | Holiday       | R&B/Soul    |
| Children       | Inspirational | Rap/Hip-Hop |
| Classical      | Jazz          | Rock        |
| Comedy         | Latin         | Soundtrack  |
| Country        | New Age       | Spoken      |
| Dance          | Oldies        | Vocal       |
| Easy Listening | Other         | World       |
| Electronica    | Pop           |             |

Source: <http://getitnow.vzwwshop.com>

At the end of first quarter 2006, Verizon Wireless had 26.1 million data customers, including 6.2 million 1xEV-DO users. To date, the company's network completed 9.6 billion text messages, 171 million picture messages, and 45 million "Get It Now<sup>SM</sup>" downloads which drove data revenue to 11.5% of total revenue, up from 9.8% at the end of 2005.

Sprint Nextel has also been successful at rolling out data applications to its U.S. consumer customers. As the first operator in the country to offer over-the-air music download service, Sprint has further enhanced its network capabilities with 1xEV-DO, offering some of the most creative applications of wireless data. The company offers live TV and exclusive video/audio of full-length rock concerts, streaming music, ringtones that sound like actual song recordings, and customer creation of their own original ring tones via a service called *ToneMaker DJ*. The company also offers *Sprint TV*<sup>SM</sup>, an Emmy Award-winning service that allows customers to watch live TV (more than 30 channels) on their *Sprint Power Vision*<sup>SM</sup> phones. At the end of 1Q 2006, Sprint Nextel reported that the uptake of these services is accelerating and that the *Sprint Music Store*<sup>SM</sup> surpassed 2 million downloads.



#### Sprint TV

- Sprint TV Plus CH 1
- Sprint TV Ultimate CH 50
- Sprint TV Live CH 9
- Fox Film Trailers CH 20
- NBC/Universal Trailers CH 21
- Warner Bros. Trailers CH 22
- Preview CH 49

#### News & Weather

- CNNtoGo CH 2
- The Weather Channel CH 4
- GoTV CH 5
- ABC News Now CH 54

#### Music Video

- Music Choice CH 6
- Altitude CH 28
- Pure Phat CH 38

#### Radio

- MSPot Radio CH 16
- Sirius CH 23
- Rhadsody Radio CH 39
- Sirius Hits CH 53

#### Entertainment

- Access Hollywood CH 17
- Varsity TV CH 29
- Swimsuit Model TV CH 30

#### Mobile Shorts

- MFlix CH 7

#### Cartoons

- Cartoon Network CH 10
- Adult Swim CH 11
- Looney Tunes CH 12

#### Stylez

- Diva CH 25
- The Street CH 27
- Twins TV CH 33



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VIVO in Brazil, Movilnet in Venezuela, Bell South in Guatemala, Eurotel in the Czech Republic, and various others, have launched 1xEV-DO services similar to those described above and are at the marketing forefront in their markets for wireless broadband.

Word of mouth is, with many products, an effective marketing tool. With technology, it's seeing and trying that are necessary. The more people see wireless broadband being used, the more likely they are to try it. This is especially true when it comes to young consumers. Over half of the sales for KDDI's mobile commerce *au Records* service were users under the age of 30. Young consumers are interested in new technology and today it is often the parents who learn from their children how to use new data services. Young consumers can become loyal, high-end users in the future.

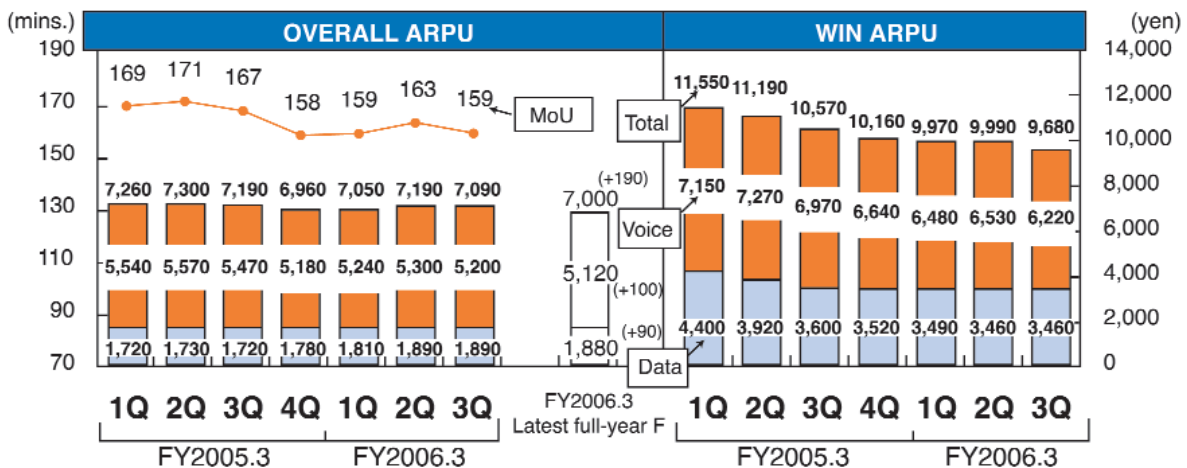
Amp'd Mobile, an MVNO using Verizon's 1xEV-DO network in the U.S., is an operator that specifically targets youths and young adults. The company launched its service using innovative, branded multimedia content to offer music, entertainment (movies, TV, comedy), sports, and games – both multi-user interactive and individual.

## Pricing for Infatuation

Pricing plans have traditionally proven to change behavior among wireless users. Offering free long distance calls on weekends moved users from their landline phones to their cellular phones. Offering "all you can eat" plans vastly increased mobile usage among the general populace.

Pricing is a tool being used by the 1xEV-DO providers today to speed up the adoption process and it is proving successful once again. KDDI introduced a flat rate for its *WIN* service on 1xEV-DO and found that usage remained high throughout each month, rather than falling toward the end of the month as it had on its earlier pricing plan. However, the initial effect of the flat-rate service was a decrease overall in monthly average revenue per user (ARPU), since many of its high-end users moved to a flat rate service. The company then adjusted and augmented plans based on volume and within 9 months they achieved positive, growing ARPU contribution. Total ARPU for *WIN* users is 37-60% higher than all other users on the network and data ARPU for *WIN* users is almost double that of all users. The data portion of total ARPU for *WIN* customers is 35-40%.

**KDDI: Total ARPU and 1xEV-DO ARPU**



Total ARPU for *WIN* users is 37-60% higher than all users  
 Data ARPU for *WIN* users is almost double that of all users: \$29.57 vs. \$16.15  
 Data fraction of Total ARPU is 35-40% for *WIN*

Source: KDDI's 3Q Financial Report: January 24, 2006 for Fiscal Year ending March, 2006. Exchange rate of US\$1 = ¥117 assumed.



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Promotions that entice users to swap old phones for new ones are another way that operators can use pricing to change user behavior. VIVO in Brazil initiated a promotion in February called “chat master,” whereby users with high minute plans could swap their old phones for new ones, get attractive monthly usage plans and 100 free “photo torpedoes” (MMS). So the customer gets a new phone, an attractive plan, and an opportunity to try a new service for free, while VIVO updates the phones on its network and teaches users how to use data services on the network.

Pricing should be straight-forward – especially when it comes to a service that isn’t just about minutes of use, but is also about downloads and data bytes. For wireless broadband, most operators offer a flat rate for unlimited data usage. Others offer a rate based on something that’s easy to count and understand. Amp’d Mobile offers tiered bundles, “Amp’d Overload,” which is unlimited access to 20 video channels, such as ESPN, MTV, Comedy Central and others, in addition to unlimited data transfers and internet. The next tier is “Amp’d Overdose,” which is unlimited access to 30 video channels in addition to unlimited data transfers and internet use. Users can then pick and choose from other flat rate bundles, for an additional fee, for messaging, push-to-talk and other services. What’s important is that the choices are easy to understand and users are not surprised when they receive their bill.

## *The User Connection*

User devices are the customer’s connection to the operator’s network and services, so the devices themselves are an important part of making technology marketing successful. There are 1130 commercial CDMA2000 devices on the market, including 217 1xEV-DO devices that have been introduced to the market as of April 2006. These devices include mobile phones, smart phones, data cards/modules, PDAs, USB modems and notebook PCs. There are also cameras with up to 7 mega pixels, 5X optical zoom and 20X digital zoom capabilities. There are devices with video recording, playback and conferencing capability, MP3 players, and QVGA displays with 16M colors. There are phones with up to 512 MB embedded memory and 1.5 GB hard drives. There are devices with fingerprint recognition.



Source: [www.cdg.org](http://www.cdg.org)

Let’s face it. This is a lot of technology that many of us don’t fully understand. The point is, these are no longer simple phones, but multiple use devices that can handle a variety of services and capabilities – and that’s necessary in an environment where people are using the device to watch TV on the train, send video clips of the goal their daughter scored at her soccer game, and play video games with their friends.

What is equally important is that there are a variety of price points and the phones and devices are easy to use. Whether the broadband wireless device is for fixed broadband data at a remote oil rig or for downloading and storing favorite jazz tunes on MP3 players, there are low-end, mid-range and high-end products to support the applications. This takes time, and the CDMA2000 operators have had the luxury of more time over their competitors when it comes to commercial devices. CDMA2000 phones were the first to offer the capabilities listed above and introduce them commercially, which again gives them an advantage over their competitors with different technologies.



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## Technology Matters

Great marketing can be deadly to a product that doesn't work. People may be willing to try new products, but if it doesn't do quite what it's supposed to, they won't give it many chances. It's no easy feat to offer a good product when it comes to wireless, since an operator needs a technology with a future, the best possible implementation of the network, and the right handset/device products for customers to make use of it.

CDMA2000, the first 3G offering that came to market, has been the easiest rollout of new generation technology in the history of commercial wireless products. This is by and large due to the fact that the technology was designed for operators' ease of implementation. First, it was easy because it is forward and backward compatible, so operators could roll out new 3G services in the way that best served their customers and their own business case. Old phones worked on the new networks in places where the system was upgraded and new phones worked on the older network equipment in areas that operators weren't yet ready to upgrade. Second, the network upgrade was relatively easy, since much of the installed hardware could remain in place to support and drive the 3G technology updates. In addition, the technology was designed for improved spectral efficiency in every step of evolution, so operators with an existing, large customer base gained both higher voice capacity – the traditional way of generating revenue – and new data capabilities without the need to acquire new radio spectrum.

The CDMA community also made the right assumption that operators would surely have an easier time rolling out new generations of the technology if there was a supply of products that would make use of the network. Seems obvious, but history shows it hasn't always happened. When CDMA2000 was introduced, there were hundreds of phone and device models available from various manufacturers.

With its wireless broadband offering, 1xEV-DO, the CDMA community maintained its focus on ease of implementation for operators, and it allowed operators to take advantage of an all-IP network and maximize the performance of an all-data network without having to support circuit switched voice services. What is important, though, is that 1xEV-DO can seamlessly transfer from 1xEV-DO use to CDMA2000 1X, where both data and voice services are supported. In the near future, 1xEV-DO Revision A, Revision B and Revision C, all of which are backward and forward compatible with 1xEV-DO Release 0, will become commercialized. Some of the advancements operators will see with Revision A of the technology are modest improvements in the forward link capacity, vastly improved reverse link capacity, advanced QoS and improvements to multicast services. Revision B – targeted for 2007 – is expected to build on the efficiencies contained in Revision A and introduce the concept of dynamically scalable bandwidth, which could combine 1xEV-DO channels to achieve higher peak data rates. The maximum peak data rate, for example, could theoretically be 46.5 Mbps if fifteen channels were combined. This will pave the way for a whole new set of features and capabilities. Feeling like it's not necessary? Well, things will change. You can be sure of it.

## The Measure of Success

If the products (and vendors) supporting the technology considered ease of implementation for operators and the operators have put the right marketing in place to acquire customers and grow usage, then the operators should benefit. And many of the operators who have introduced 1xEV-DO have experienced outstanding business results after implementing the technology with the marketing plans to go with it. Businesses are complex and each of the operators discussed has a different market, a different history and a different set of business issues. However, there are some consistencies across them. They all highlight growth in data usage and its positive affect on revenue and on competitive position – both in net subscriber adds and in churn.

Verizon Wireless in the U.S. reported that it gained 1.7 million new subscribers in the first quarter of 2006, which marked the company's 15th consecutive quarter of double-digit year to year growth. The total revenue for the quarter was \$8.8 billion, which is an increase of 18.8% over the previous year. Data revenue grew at 110% and reached \$872 million



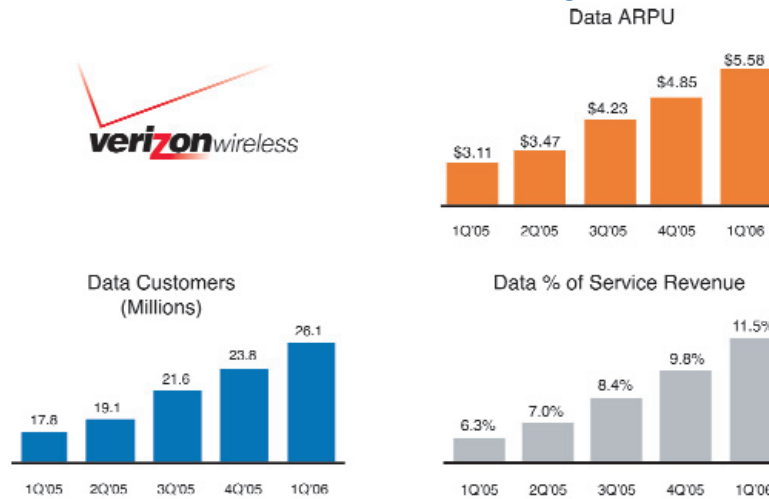
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during the same period. Data ARPU reached \$5.58, compared to \$4.85 in fourth quarter 2005 and \$3.11 one year ago. The company also prides itself on its very low churn rate (loss of customers to a competitor) of 1.18 percent, which is the lowest for the company and the lowest in the wireless industry.

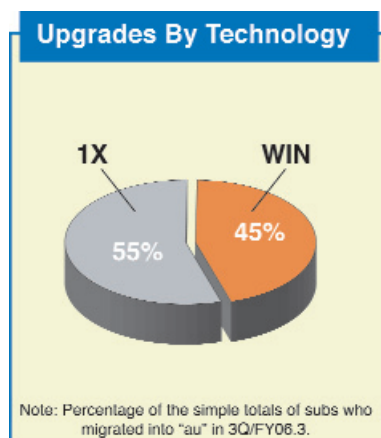
## Metrics of Verizon Wireless data growth



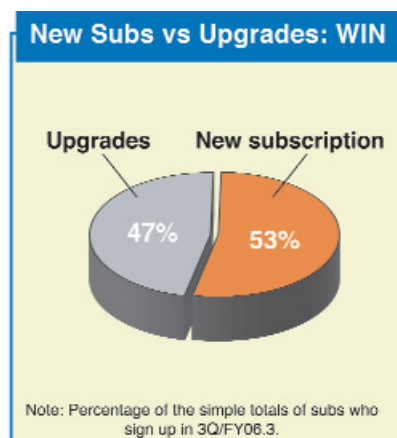
Source: Verizon Wireless 1Q 2006 Results

KDDI in Japan is smaller than its main competitor, NTT DoCoMo, with 25 million subscribers and a market share of total subscribers at 27.4%. However, it is the leader in share of net adds, which was 49.2% as of the end of 2005. The company, first with its CDMA2000 1X offering and later with its 1xEV-DO offering, has been successful at attracting its competitor's customers. In addition, the company's churn rate was down to 1.11% as of its first quarter of fiscal 2006. The number of *WIN* subscribers continues to increase and reached 6.75 million at the end of last year. ARPU from its *WIN* customers is about 37% higher than ARPU overall and the company continues to take its competitor's high-end subscribers, who will no doubt help the company maintain its quality customer base into the future.

## KDDI: WIN Subscriber Addition



Almost half of customers upgraded from 2G to 3G chose *WIN* (1xEV-DO)



Over half of *WIN* customers are new subscriptions

Source: KDDI's 3Q Financial Report: January 24, 2006

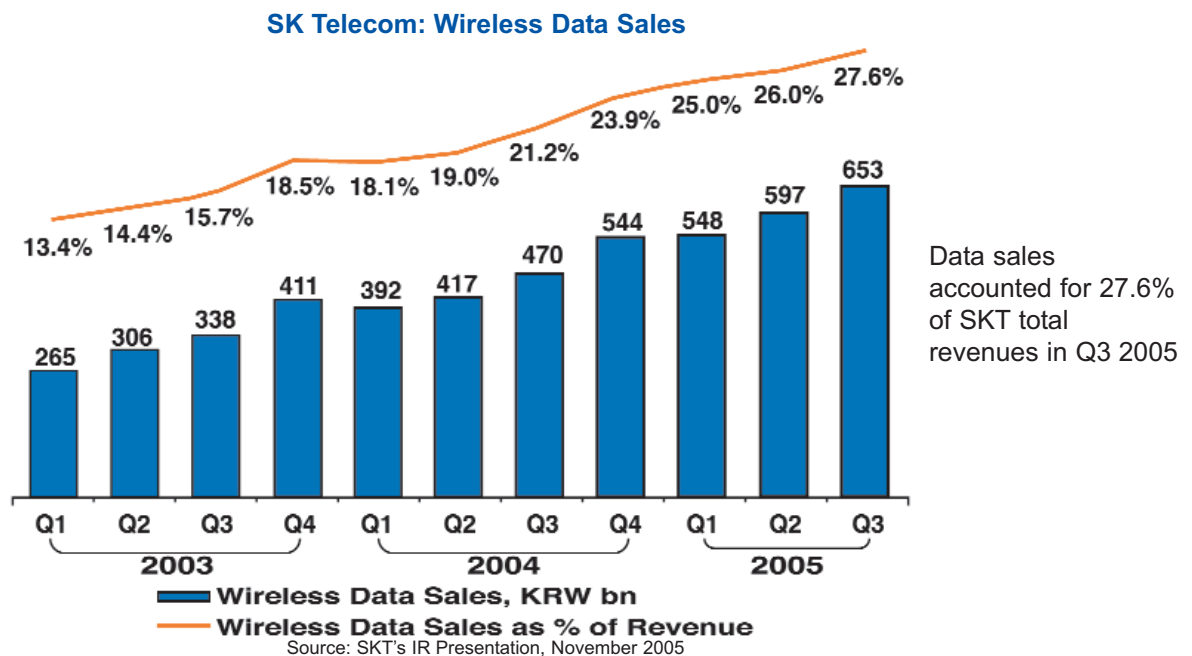


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SK Telecom is the leading operator in Korea and continues to add users to its *June* service. At the end of third quarter 2005, wireless data sales made up 27.6 percent of total wireless revenues – up from 21.2 percent in third quarter 2004 and 15.7% in third quarter 2003. Like other operators who have introduced 1xEV-DO, SK Telecom has found that ARPU goes up for both voice and data when the new capabilities are introduced. Data ARPU for *June* users has been as much as 4 times higher than that of 1X users on SK Telecom's network. And this is meaningful when 1xEV-DO users have become 42% of one's total subscriber base.



Sprint Nextel in the U.S. achieved data ARPU of \$7 in the first quarter of 2006, which represents 11% of total ARPU. Wireless data revenues surpassed \$800 million for the quarter and \$3.2 billion annualized. This represents an increase of 77% compared to a year earlier. Sprint Nextel plans to continue expanding its Power Vision Network into more markets this year and to offer 1xEV-DO Rev A starting 1Q 2007.

TNZ's results in its mobile business have also been strong. During the fourth quarter 2005, the company added 135,000 new customers. This was its best quarter in several years when it came to new adds and brought its total mobile connections to over 1.8 million. The company points out that its mobile data growth, which was 64% over the previous corresponding quarter, remains very strong and reflects the adoption of new services. TNZ attributes the strong performance and growth of its business and consumer segments to the capabilities of its 1xEV-DO network and the services it supports. The company expects the momentum to continue with double-digit voice and data revenue growth.

Technology businesses move quickly. And the operator's role is not an easy one. They must stay abreast of complex technology advancements – many of which sound impressive when an excited electrical engineer is describing their merits, but don't translate easily to market dynamics and "needs." The operators that can match advancements to applications that become habits to their customers will win. And if you're going to win, it's nice to get a head start. The CDMA2000 community has had that head start; and with the combination of a strong technology roadmap and excellent marketing programs, they are in a good position to maintain that advantage for some time.