CDMA2000: Delivering on 3G

Tom Wasilewski, Telecommunications Management Group
On behalf of CDMA Development Group

ITU-BDT Subregional Seminal
On IMT-2000 for Arab Region
September 29 – October 1, 2003
Doha, Qatar

- ✓ CDMA Development Group
- ✓ CDMA Worldwide
- ✓ CDMA2000: Delivering on 3G

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Charter

To lead the rapid evolution and deployment of CDMA-based systems, based on open standards and encompassing all core architectures, to meet the needs of markets around the world in an emerging, information-intensive environment

Information Distribution
- Conferences
- Emails
- Website
- Etc.

Technical Service Development
- System Testing
- Advanced Systems Evolution
- Etc.

Deployment Assistance
- Time-to-Market
- Int'l Roaming
- Interoperability
- Etc.

Membership

The CDG is a consortium of 100 member companies from around the world. Members are involved in many aspects of CDMA system deployment and support.

- *Operators*
- *Subscriber Equipment*
- *Value-Added Services*
- *Network Infrastructure*
- *Network Enhancement/ Optimization*
- *Network Interface & Access*

CDG Members

- Agilent Technologies, Inc.
- Aicent, Inc.
- Airvana Inc.
- ALACEL Corp.
- ALLTEL Communications, Inc.
- Alpine Electronics, Inc.
- Angola Telecom
- Anritsu
- AnyDATA Corporation
- ArrayComm, Inc.
- Asia Pacific Broadband Wireless
- Audiovox Communications Corporation
- Axesstel
- Bell Mobility
- BellSouth International
- Berkana Wireless, Inc.
- Bermuda Digital Communications Ltd.
- Bitfone Corporation
- Celerica, Inc.
- Celletra Ltd.
- China Unicom
- CIBERNET Corporation
- Comverse
- CTIA
- CURITEL
- Denso International America, Inc.
- Dyaptive Systems Inc.
- Ericsson, Inc.
- Fair Isaac Corporation
- Gemplus Corporation
- Giga Telecom Inc.
- Grayson Wireless
- GTRAN, Inc.
- Himachal Futuristic Communications Ltd.
- Hitachi Telecom (USA), Inc.
- Huawei Tech. Co., Ltd.
- Hutchison CAT Wireless Multimedia Limited
- Hutchison Telecom (HK) Ltd.
- inCode Telecom Group
- KDDI
- Komunikasi Selular Indonesia (Komselindo)
- Korea Telecom Freetel, Inc. (KTF)
- Kyocera Corporation
- LG Electronics, Inc.
- LG Telecom, Ltd.
- Lightbridge, Inc.
- LogicaCMG
- Lucent Technologies, Inc.
- Mobile Satellite Ventures
- Monet Mobile Networks
- Motorola, Inc.
- NetNumber
- NEWS IQ Inc.
- Nextel Communications
- Nokia Corporation
- Nortel Networks
- Novatel Wireless, Inc.
- Openwave
- Pacific Bangladesh Telecom Ltd.
- Pele-Phone Communications Ltd.
- PT Wireless Indonesia
- QUALCOMM, Inc.
- QuickSilver Technology
- Qwest
- Racal Instruments
- Red Bend, Ltd.
- Reliance Infocom Limited
- Research In Motion
- RITT
- Rohde & Schwarz
- Samsung Electronics Co. Ltd.
- Sanyo Fisher Company
- SchlumbergerSema
- Sharp Laboratories of America
- Sierra Wireless, Inc.
- SK Telecom
- SmartCom PCS
- Solid Technologies, Inc.
- Sony Electronics
- Spirent Communications
- Sprint
- Starcomms Limited
- Starent Networks Corporation
- Tata Teleservices Limited
- Telecom Mobile Limited
- Telefonica Moviles S.A.
- Telespree Communications
- Telstra Corporation Ltd.
- Telus Mobility Cellular, Inc.
- Texas Instruments
- TSI
- UNEFON
- U.S. Cellular
- VeriSign Telecommunications
- Verizon Wireless
- VIA Telecom, Inc.
- Wavecom, Inc.
- Western Wireless
- Willtek
- Wireless Test Systems
- ZTE Corporation

- CDMA Development Group
- **CDMA Worldwide**
- CDMA2000: Delivering on 3G

CDMA is the present and future of advanced wireless services

Code Division Multiple Access (CDMA) is a spread spectrum technology used in second and third generation wireless networks

cdmaOne™ identifies 2G and 2.5G cellular, PCS and wireless local loop (WLL) services based on the IS-95A and IS-95B CDMA air interface standards. IS-95A supports data delivery up to 14.4 kbps while IS-95B offers up to 115 kbps.

CDMA2000 is an ITU-approved, IMT-2000 (3G) standard

CDMA2000 1X can double voice capacity and delivers data rates up to 307 kbps

CDMA2000 1xEV is optimized for high-speed data:

- CDMA2000 1xEV-DO uses a designated channel for data at speeds of up to 2.4 Mbps in a single carrier
- CDMA2000 1xEV-DV integrates voice and data on a single channel with speeds of up to 4.8 Mbps

CDMA Benefits

As the most advanced digital technology, CDMA offers significant benefits to operators and their subscribers

Operators

- Greater voice capacity
- Simplified system planning through the use of the same frequency in every sector
- Improved coverage characteristics resulting in fewer cell sites
- Data ready; uses standard IP commands and protocols
- The platform for 3G

Subscribers

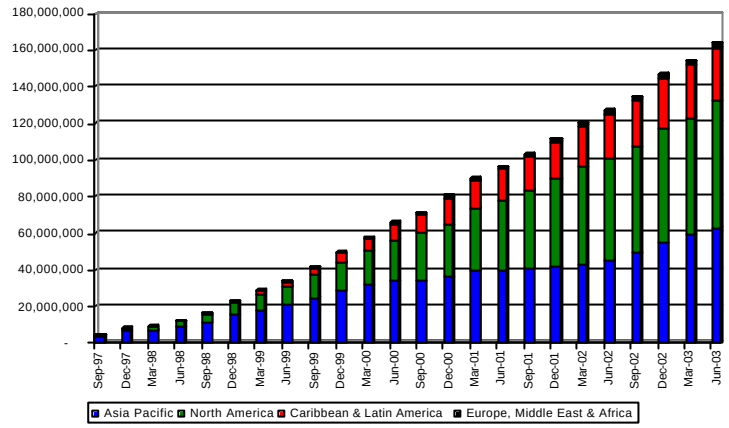
- Improved voice quality
- Longer talk time
- Enhanced privacy and security
- Advanced data services

The dominant 3G standards are based on CDMA

IMT-2000 Terrestrial Radio Interfaces

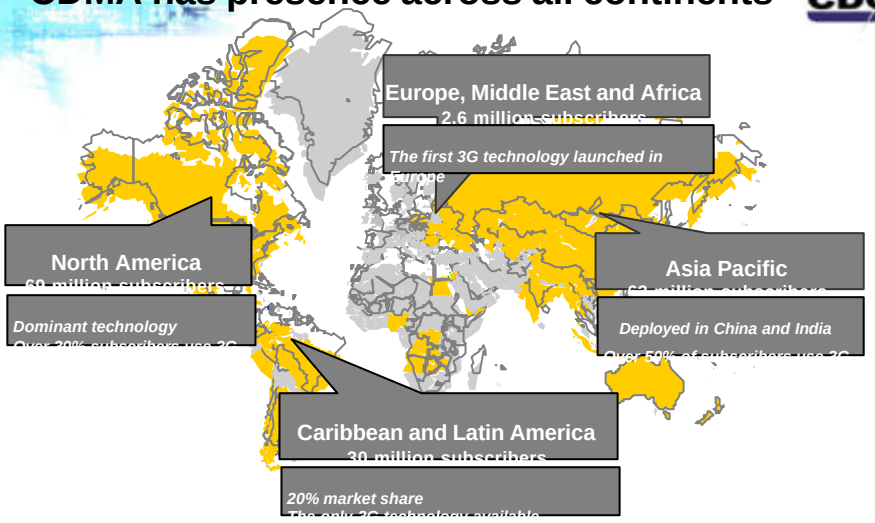
IMT-2000 CDMA Direct Spread	IMT-2000 CDMA Multi-Carrier	IMT-2000 CDMA TDD	IMT-2000 TDMA Single Carrier	IMT-2000 FDMA/ TDMA
WCDMA (UMTS)	CDMA2000 1X & 1xEV	UTRA TDD & TD-SCDMA	UWC-136/ EDGE	DECT
3G CDMA				

CDMA is the fastest growing technology serving more than 164 million subscribers



Source: CDMA Development Group, June 2003

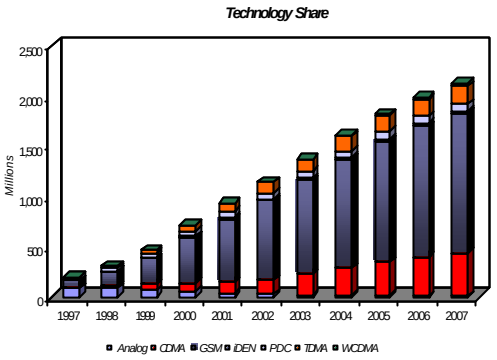
CDMA has presence across all continents



As of June 2003

CDMA will continue to be the fastest growing technology platform

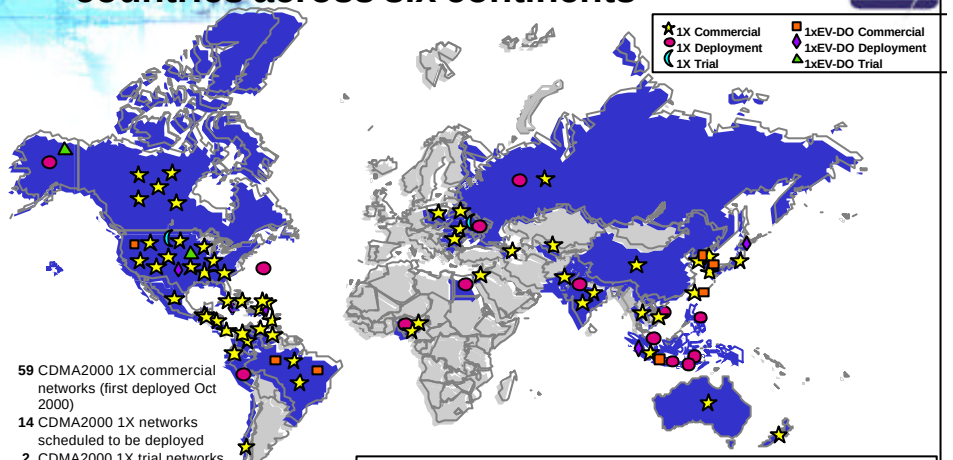
- **CDMA subscribers base will double between 2003 and 2007 to reach nearly 450 million**
- **CDMA market share will grow from 15% in 2003 to 20% by 2007**



Source: EMC, June 2003

- CDMA Development Group
- CDMA Worldwide
- **CDMA2000: Delivering on 3G**

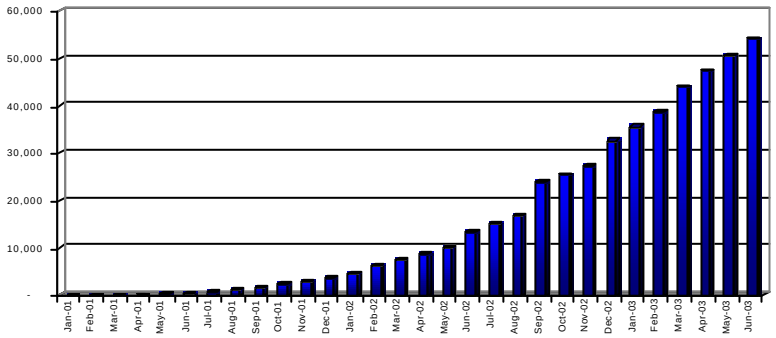
CDMA2000 is commercially available in 29 countries across six continents



59 CDMA2000 1X commercial networks (first deployed Oct 2000)
14 CDMA2000 1X networks scheduled to be deployed
2 CDMA2000 1X trial networks
7 CDMA2000 1xEV -DO commercial networks (first deployed Jan 2002)
5 CDMA2000 1xEV-DO networks scheduled to be deployed
2 CDMA2000 1xEV-DO trial networks

- **CDMA2000 was the first 3G technology deployed commercially (October 2000)**
- **67 operators selected CDMA2000**
- **12 operators have introduced or are migrating to CDMA2000 1xEV-DO**

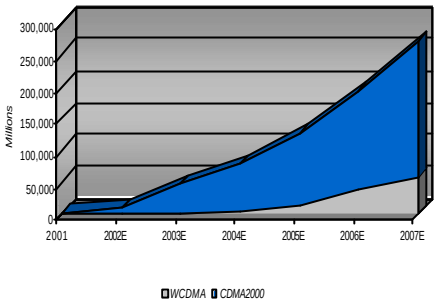
There are more than 54 million CDMA2000 subscribers



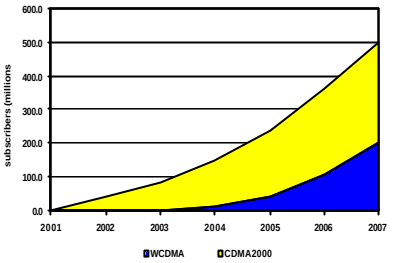
- **CDMA2000 holds nearly 99% of the 3G market share**
- **More than 30% of CDMA subscribers use 3G**
- **Nearly 4 million subscribers join every month**

Source: CDMA Development Group

CDMA2000 will continue to expand rapidly and dominate the 3G market throughout the decade



Source: Deutche Bank, April 2003



Source: Strategy Analytics, 2003

CDMA2000 key success factors

Enables rapid time-to-market

- Commercial since October 2000 and widely deployed worldwide
- Can be deployed rapidly
- Does not require new spectrum

Offers the most economical and flexible management of spectrum

- Requires only 1.25 MHz of spectrum and can be deployed in any frequency designated for wireless services
- Increases network capacity for voice and data traffic

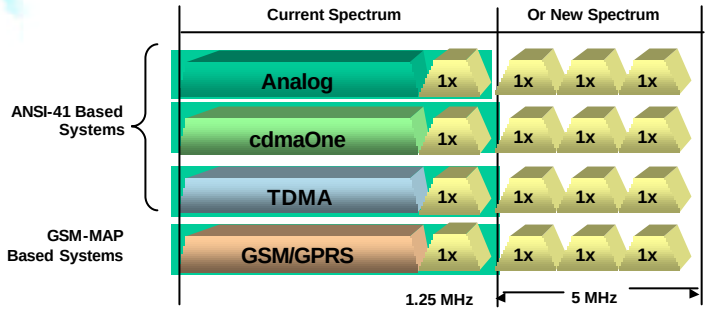
Offers cost-effective migration from existing systems

- Viable solution for any existing technology
- Minimizes capex and opex by leveraging investments in core networks and operating systems

Delivers high data rates and supports advanced applications

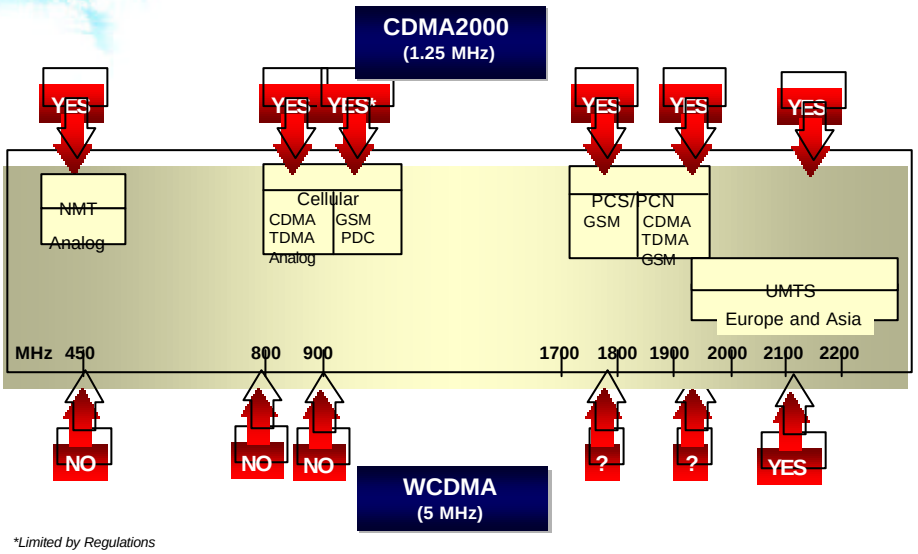
Offers the broadest range of devices at affordable prices

CDMA2000 affords flexible management of spectrum



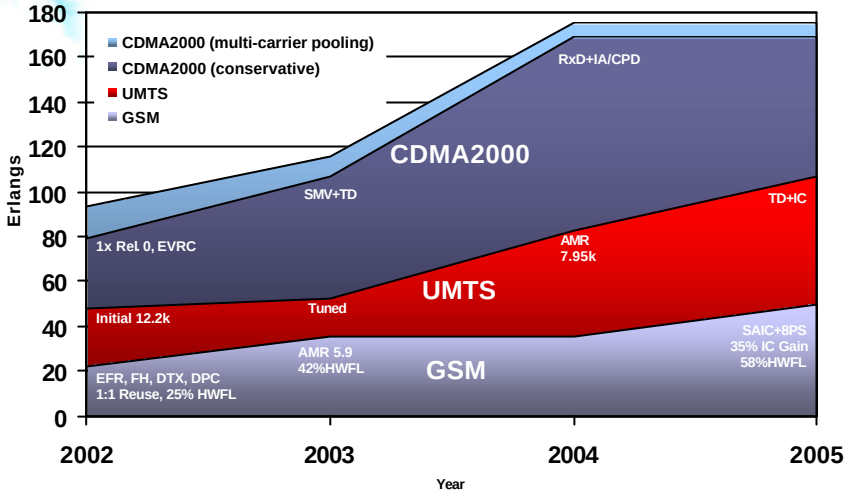
Because CDMA2000 requires only 1.25 MHz of spectrum, it allows an operator to introduce 3G data services gradually while preserving most of the spectrum to service voice customers

CDMA2000 can be deployed in any existing and new spectrum allocated for wireless services



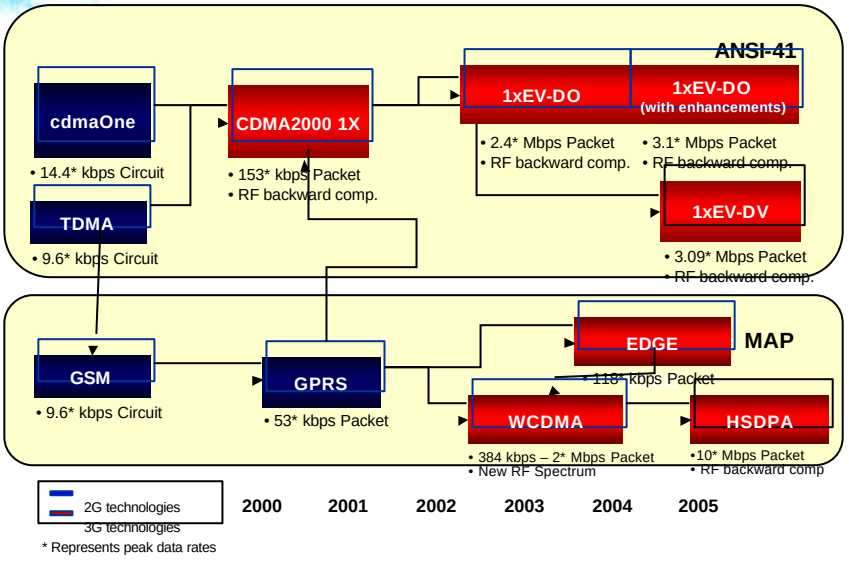
*Limited by Regulations

CDMA2000 delivers maximum voice capacity in available spectrum (5 MHz bandwidth)



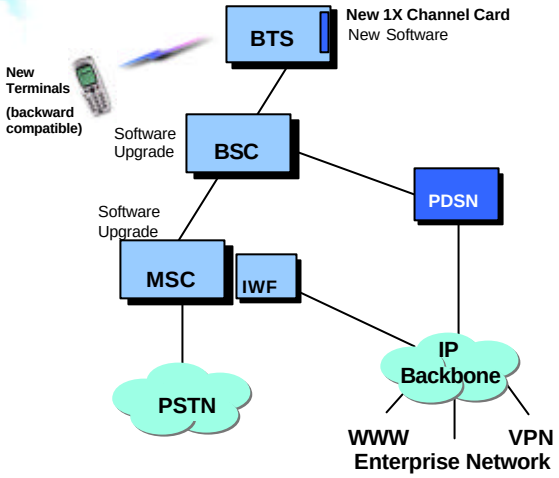
Gains assume 100% of users using latest technology. Actual gains would depend on handsets penetration
Assumes 100% loading of voice traffic. Assumes 2% Blocking

CDMA2000 offers a direct path to 3G for any existing technology



* Represents peak data rates

CDMA2000 is a natural evolution path for cdmaOne operators…



CDMA2000 ADVANTAGE

- Preserves existing AMPS and ANSI-41 network
- Handsets backwards compatible with cdmaOne system

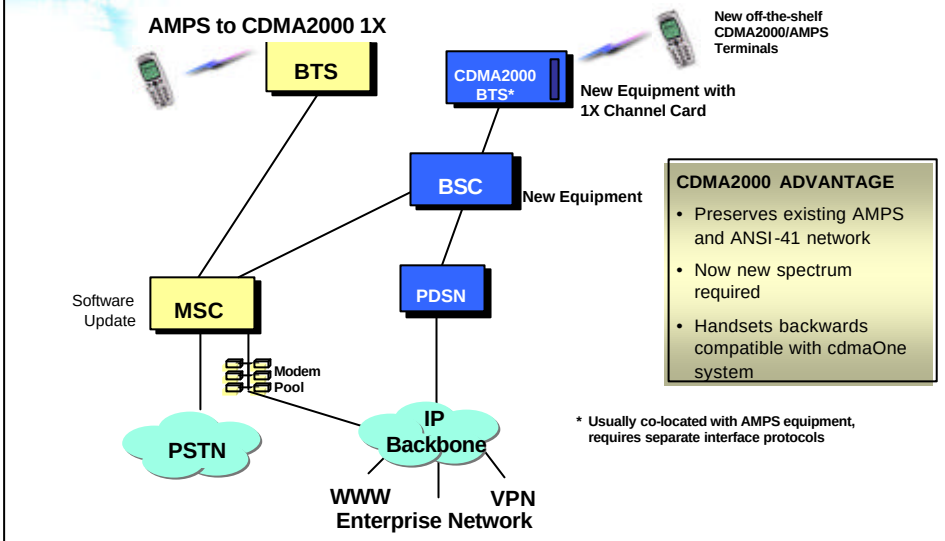
… and requires relatively small capital investment

		Total CapEx (US$ billion)
Japan	KDDI (CDMA2000 1X and 1xEV-DO)	2.5
	DoCoMo (WCDMA)	10.9
U.S.	Sprint PCS (CDMA2000 1X)	0.8
	AT&T Wireless (GSM/GPRS/EDGE)	5.0

Moody estimates that cdmaOne carriers could upgrade to CDMA2000 1X for $3 to $5 per POP

Source: Morgan Stanley, June 2002; Yankee Group, July 2003; Moody; operator reports

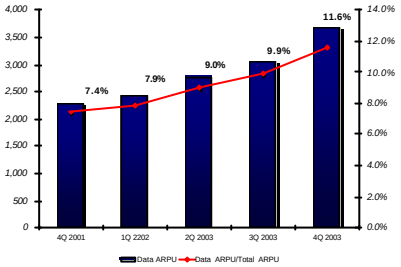
TDMA/AMPS to CDMA2000: One step evolution to 3G



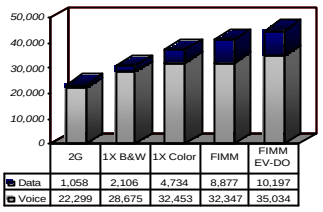
CDMA2000 delivers a broad range of applications to the end user. . .

…and greater revenue to operators

With CDMA2000 operators, data ARPU increases by 62% to contribute 11.6% of total ARPU

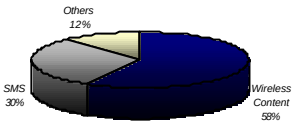


CDMA2000 subscribers generate 5 times more data ARPU and 57% more in total ARPU than 2G subscribers



	2G	1X B&W	1X Color	FIMM	FIMM EV-DO
Data	1,058	2,106	4,734	8,877	10,197
Voice	22,299	28,675	32,453	32,347	35,034

CDMA2000 allows operators to offer richer content (beyond SMS) that drives data usage



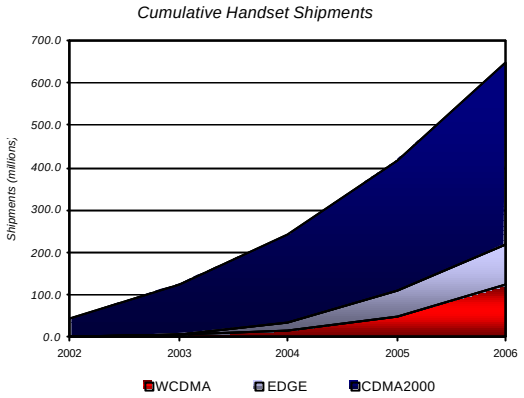
Source: KTF, December 2002

More than 400 CDMA2000 terminals are available in the market today...

- Color displays and cameras
- Streaming Video
- Real-Time VOV/AOD
- Voice Recognition
- GPS

…and CDMA2000 volume advantage drives the prices down

- **CDMA2000 is already coming down the cost curve due to volume shipments today and in the future**
- **CDMA2000 economies of scale are leveraged from cdmaOne**
- **Rapid manufacturing transition to CDMA2000 will result from:**
  - Pin compatibility
  - Leverages common design and components with cdmaOne



Source: Gartner Group, January 2003

CDMA2000 – Operators' Perspectives

KTF

"*CDMA2000 is designed to build a simple and cost-effective network evolution…the first phase of CDMA2000, known as 1X, is already in commercial operation,* ***offering double the voice capacity*** *of second-generation (2G) networks."*

verizonwireless

SEC Filing S1-A 11/28/01 – "Our CDMA network positions us to meet the growing voice and data needs of our customers… Upon full deployment of our 1XRTT network and 1XRTT handsets, we expect that this technology **will effectively double our network's voice capacity** compared to the current version of CDMA."

Sprint

William Esrey, Chairman – **"Essentially, we're spending zero additional dollars to convert our network to 3G."**

CDMA2000 – Analysts' perspectives

"The power of the platform is unlike anything the wireless industry has ever seen. The handset is no longer a simple device for voice communications as it is throughout most of the world, but is a multimedia platform in the truest sense of the word." - **ABN AMRO**

"…only CDMA 1X comes with affordable and attractive handsets and applications, matched with half the capex per pop of W-CDMA." –

Morgan Stanley