

IMT-2000 Regulatory and Spectrum Issues for Broadband Applications

George Mansho
CDMA Development Group
Tunis, Tunisia
November 22, 2005



CDMA Development Group

The CDMA Development Group (CDG), founded in December 1993, is an international consortium of companies who have joined together to lead the adoption and evolution of 3G CDMA wireless systems around the world

The CDG is comprised of CDMA service providers and manufacturers, application developers and content providers

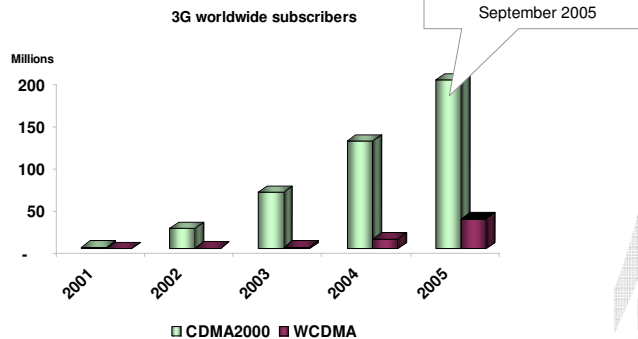
CDG's Mission: To lead the rapid evolution and deployment of 3G CDMA-based systems, based on open standards and encompassing all core architectures, to meet the needs of markets around the world

More info: www.cdg.org



CDMA2000 is the Leading 3G Technology

- 129 operators in 60 countries on six continents, including developing countries
- 200 million or 10% of all wireless subscribers use CDMA2000® today
- There will be nearly 500 million CDMA2000 subscribers serving 20% of total users in 2009*



*Source: The Yankee Group, June 2005



www.cdg.org

CDMA2000 1xEV-DO: The Leading Broadband Technology

- Data optimized delivers 300-800 kbps up to 2.4 Mbps in commercial networks, the fastest speeds of any wireless technology deployed today
- Applications:
 - Advanced mobile data applications such as video and audio downloads and TV broadcasts
 - Mobile broadband
 - DSL replacement
- Devices: 150 including handsets, PC cards, fixed terminals
- 24 networks deployed, 30 in deployment worldwide
- 18.5 million, or 9%, CDMA2000 subscribers access CDMA2000 1xEV-DO technologies today; over 250 million by 2009*



*Source: The Yankee Group, June 2005

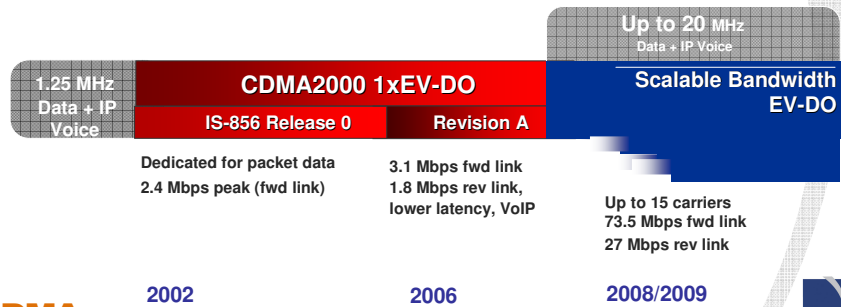


www.cdg.org

CDMA2000 Evolution Path to Broadband and All IP

CDMA2000 has at least 2 years' lead time over other technologies

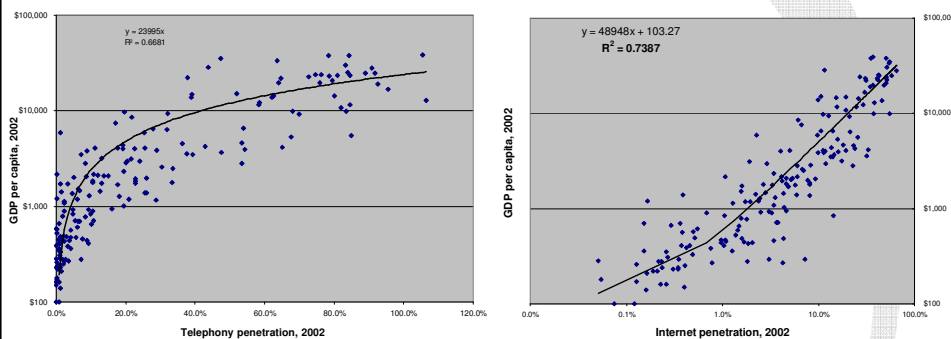
- CDMA2000 1xEV-DO Rel 0: Broadband commercial since 2002
- CDMA2000 1xEV-DO Rev A: Multimedia on all-IP deployed in 2006
 - SKT, KFT, KDDI, Verizon and Sprint have already announced their deployments
- CDMA2000 1xEV-DO Rev B: Up to 73.5 Mbps available in 2008



www.cdg.org

The Value of Improving Connectivity

It's not just about voice It's about voice and data



For each 1% increase in Mobile penetration, GDP per capita goes up by US\$240

For each 1% increase in Internet penetration, GDP per capita goes up by US\$593

Although mobile voice communications are bridging the digital divide, regulatory and spectrum policy should continue to encourage the penetration of mobile broadband data connectivity



www.cdg.org

Source: Michael Minges, TMG Telcom, and ITU World Telecommunications Database Statistics, 2003.

3G CDMA – Satisfying the Demand for Wireless Voice and Broadband Data Today!

- Toll-quality Voice communications (equal or better than landline)
- Broadband Data transmissions (multiples greater than ISDN speeds)
- Secure transmissions (including DRM, anti-spam, fraud control, etc.)
- Excellent coverage (with in-building, multimode & robust hand-off services)
- Commercially available devices (more than 735 devices from 50 vendors)
 - Small and attractive form factors
 - Data-enabled devices based on IEEE (TCP/IP) standards
 - WWAN connectivity embedded into laptops
 - Operating systems based on “open” execution environment standards
 - Low battery power consumption
- Commercial-grade infrastructure (switching, billing, authentication, etc.)
- Thousands of applications (multimedia, multicasting, messaging, etc.)
- Low cost per minute, megabyte or message (due to spectral efficiency)
- More than 200 million paying subscribers worldwide and growing (~4M/mo)!



7



www.cdg.org

3G CDMA for the Middle East and Africa

A large opportunity exists to increase voice & broadband penetrations

Majority of voice telephony will continue to be serviced by 2G GSM

3G CDMA will serve voice telephony and other key market segments:

- Low Cost Voice Telephony:
 - Spectral efficiency and capacity of 3G CDMA networks supports lower voice tariffs
 - Spectral efficiency leads to reduced costs per subscriber (Notable example: India)
 - Satisfies Universal Service Obligations for “under-served” areas and rural deployments
- Broadband Data:
 - High-speed, secure and cost-effective Internet connectivity
 - Available wherever wide area coverage exists: urban, suburban, rural and in-buildings
- Multimedia Services:
 - 3G CDMA networks support multicasting, multimedia streaming and on demand services

Challenges for 3G CDMA in the Middle East and Africa:

- Availability of the appropriate spectrum allocations (450, 800, 1900 & 2100 MHz)
- Ultra low-cost voice-centric handsets



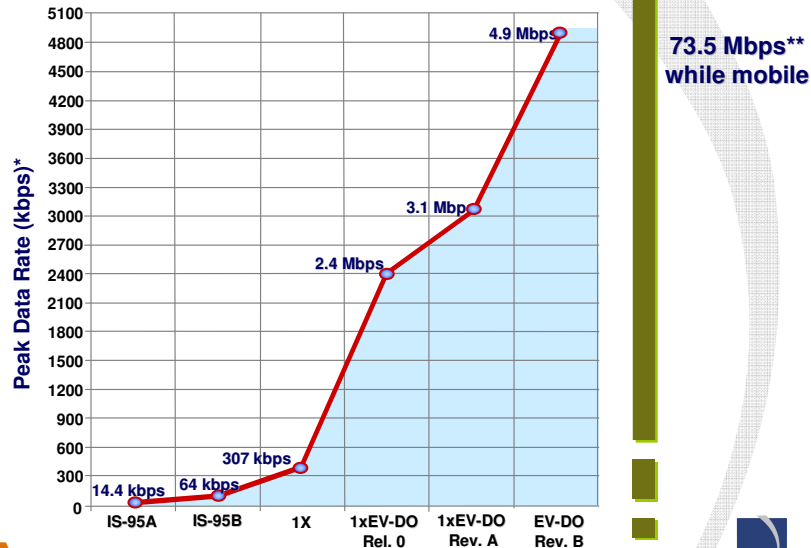
8



www.cdg.org

3G CDMA Broadband Connectivity

CDMA2000 EV-DO is delivering the highest broadband rates



CDMA
1995 Celebrating Ten Years of
Commercial Success and Innovation

* Forward link in a mobile environment using 1.25 MHz of spectrum
** Using 20 MHz of spectrum

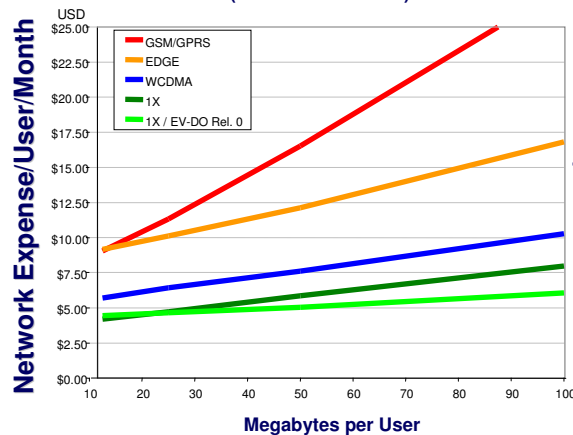


www.cdg.org

3G CDMA Enables Lower Tariffs

CDMA2000 1X and EV-DO enables the lowest cost per bit & Erlang

Combined Voice & Data Network Expense
(500 Minutes of Use)



The Lower
the better!



Operators Prefer Network Technologies that are Affordable & Evolutionary

CDMA
1995 Celebrating Ten Years of
Commercial Success and Innovation

Source: The Economics of Wireless Data, <http://www.qualcomm.com/main/whitespapers/WirelessMobileData.pdf>
Assumptions: On demand Traffic: a) 15% of traffic demand occurs at the busy hour, b) 7,600 kbps / sq km at busy hour, c) 5MHz
Multicast Traffic: a) 2,000 subscribers / cell, b) 30 live streaming minutes / day at 128kbps data rate, c) 1.25MHz



www.cdg.org

3G CDMA Capacity Advantage

Mobile Operators are able to profit from lower tariffs

Greater spectral efficiency leads to greater capacity

- Greater call capacity can lead to lower tariffs for voice service
- Greater data throughput can lead to reduced data tariffs

Mobile Voice



Bharat Sanchar Nigam Ltd.
India

Free incoming calls,
\$0.008 per minute (outgoing)

**Lowest
Mobile Voice Tariff
in the world**

Mobile Data



After a free 3-month trial period,
an **unlimited data** plan for cell phones
at \$10 a month

**Lowest
Mobile Data Tariff
in the world**

Affordable and evolutionary 3G CDMA networks are driving tariffs lower



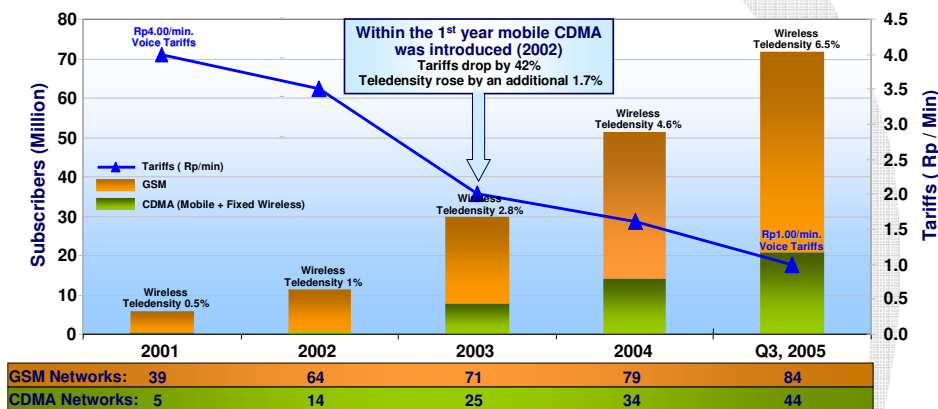
11



www.cdg.org

Impact of 3G CDMA on India

CDMA created a competitive landscape that made wireless affordable



Wireless Growth Since Introduction of Mobile CDMA (2002-2005)		
Tariffs Decrease	75%	
Teledensity Increase	6%	
Subscriber Growth (CAGR)	205% (CDMA)	74% (GSM)



12

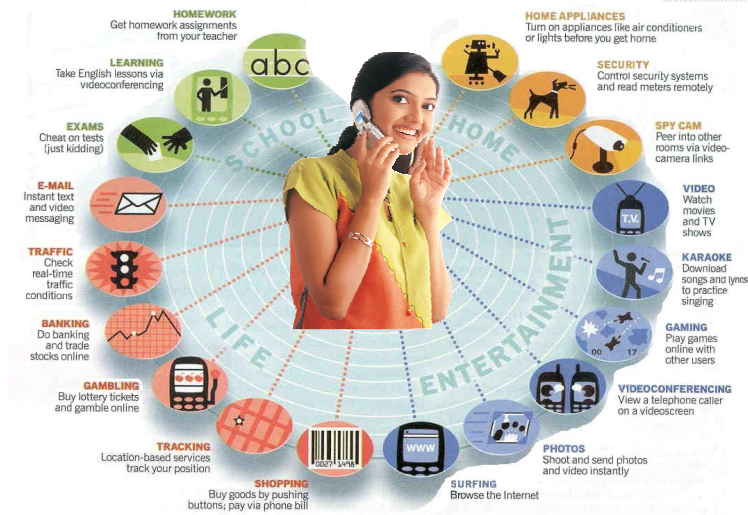
Sources: CDG, TelecomWatch, AUSPI, COAI and TRAI, October 2005



www.cdg.org

3G is Fulfilling the Demand for Mobile Services

Serving a large number of personalized mobile data services



CDMA
2007
Celebrating Ten Years of
Commercial Success and Innovation

Source: "Broadband Wonderland", Fortune Magazine, September 20, 2004

CDG
www.cdg.org

3G is Fulfilling Universal Service Obligations

Connecting citizens to voice & Internet services

In **India**, Reliance will meet universal service obligations by providing 3G service to 48,310 villages that don't have public phone facilities¹

In **India**, Shyam Telecom has equipped a fleet of around 200 self-employed rickshaw drivers with a mobile calling office, including fax²

In the **Dominican Republic**, Tricom deployed over 1,700 public pay phones in underserved rural areas. These phones will eventually be used for high-speed Internet access³

In **Brazil**, Anatel and Lucent provided universal broadband (800kbps @ 45km) access with 3G

In **Ecuador**, Edumasters installed 3G kiosks at several public schools to provide free Internet access. Panama is next.⁴

In **Chile**, BellSouth provided 3G broadband access to 667 schools nationwide⁵

Rainbow Chalta Firta PCO



1. <http://www.thehindubusinessline.com/2004/09/20/stories/2004092002090100.htm>
2. <http://www.hellorainbow.com/aboutus.asp>
3. BNAmericas.com, "GEO-Tel, Tricom Partner for wireless Network - Dominican Republic, November 20th, 2004"
4. <http://projetoescd.isat.com.br>
5. www.edumasters.net
6. http://www.subtel.cl/servlet/page?_pageId=57&_dad=portal308_schema=PORTAL308p_language=e, Sept. 3, 2003

CDMA
2007
Celebrating Ten Years of
Commercial Success and Innovation

CDG
www.cdg.org

3G is Fulfilling Public Safety Initiatives

Protecting and saving lives

In the **U.S.**, 3G carriers offer E911 services with accurate (5-30m) position location capabilities¹

In **Japan**, SECOM launched a nationwide location-based security service²

In **China**, Unicom donated 150 kid tracker devices to the Beijing School of the Blind³

In **Korea**, SK Telecom and the National Police Agency introduced a Missing Children Service⁴

In **Canada**, the Ontario Police quickly access vital information (including fingerprint IDs) and respond to emergencies instantly with position location dispatch⁵

In **Florida**, the Broward County Sheriff's Office uses 3G for child protection services⁵



www.cdg.org

1. www.fcc.gov/911/enhanced/
2. www.secom.co.jp
3. www.chinaunicom.com.hk
4. www.cnn.com, Friday October 1st, 2004
5. CDMA A-List Award Winners

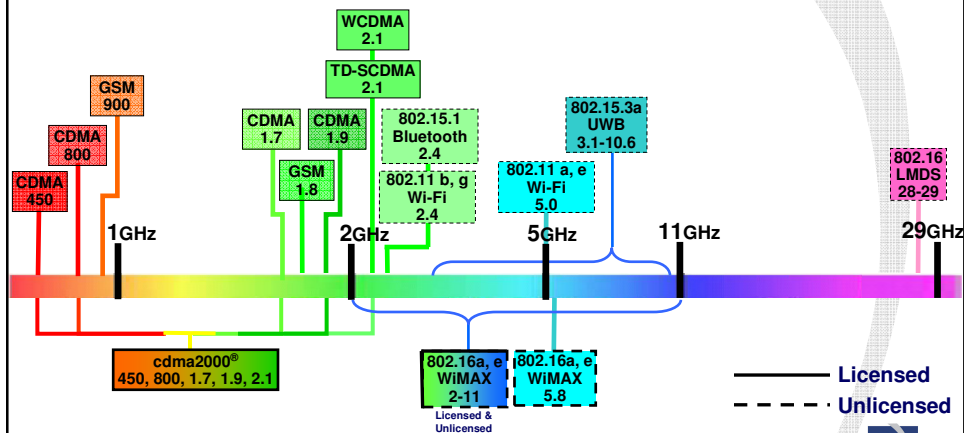


15

Spectrum Allocations

To deploy 3G requires the allocation of the appropriate spectrum

Providing affordable coverage is crucial in wireless telecommunications.
The warmer (lower) frequencies are best!



Licensed Spectrum vs Unlicensed Spectrum
The use of unlicensed spectrum creates interference issues



www.cdg.org

16

“When You Come to a Fork in the Road, Take It.”

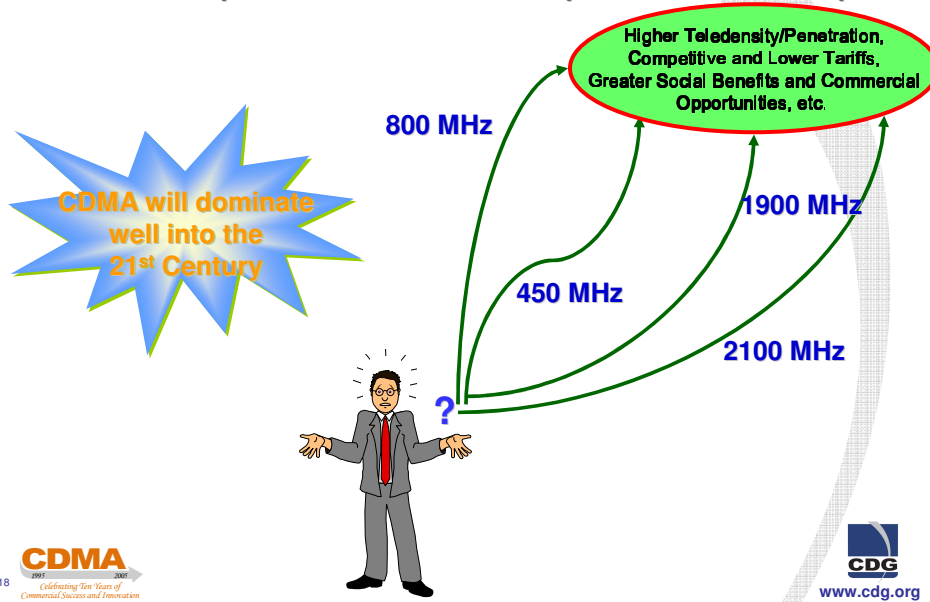
-Yogi Berra, American "Philosopher" and Sports Celebrity



www.cdg.org

Road to the Future

3G CDMA – A proven and robust road map to economic development



Conclusion

Regulatory and spectrum policies should support the option to deploy 3G CDMA

The Future is both voice telephony penetration and Internet connectivity

- The Middle East and Africa need *both* to accelerate economic growth.

The allocation of the “warmer (lower) radio frequencies” provides the best geographic coverage and network economic solution

- The 800 MHz and 450 MHz frequency allocations are the most valuable to own

A “technology neutral” licensing policy follows our industry’s “best practices”

When you come to the fork in the technology road, take it.

Thank you.



www.cdg.org