

IMT-2000 networks delivering BWA

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Outline

- IMT-2000 Broadband Wireless Access technologies and future evolution
- Applications enabled by IMT-2000 BWA technologies
- Examples of unique solutions, benefits and empowerment achieved (in Africa and other emerging markets) via BWA networks

IMT2000 Broadband Networks

ITU has approved five radio air interface standards (ITU-R Recommendation M.1457) and has identified multiple frequency bands for IMT-2000



IMT-2000 Terrestrial Radio Interfaces

**IMT-2000
CDMA
Direct Spread**

**WCDMA
(UMTS)**

**IMT-2000
CDMA
Multi-Carrier**

**CDMA2000
family**

**IMT-2000
CDMA
TDD**

**UTRA TDD &
TD-SCDMA**

**IMT-2000
TDMA
Single Carrier**

**UWC-136/
EDGE**

**IMT-2000
FDMA/
TDMA**

DECT

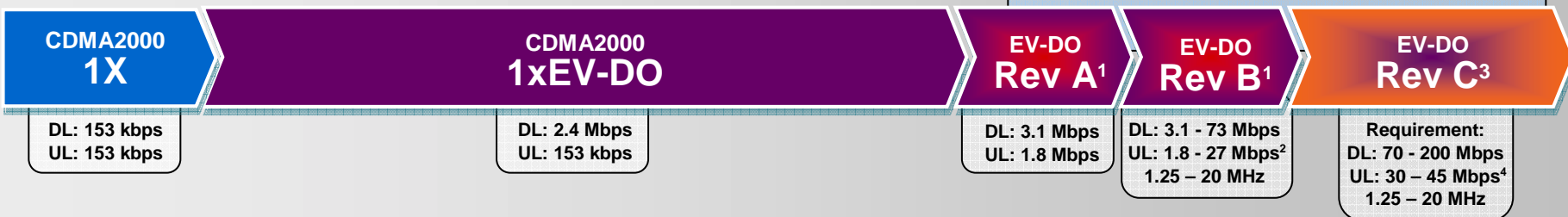
3G CDMA

*Although there are five terrestrial standards,
most meaningful broadband deployments have occurred in only the 3G CDMA family*

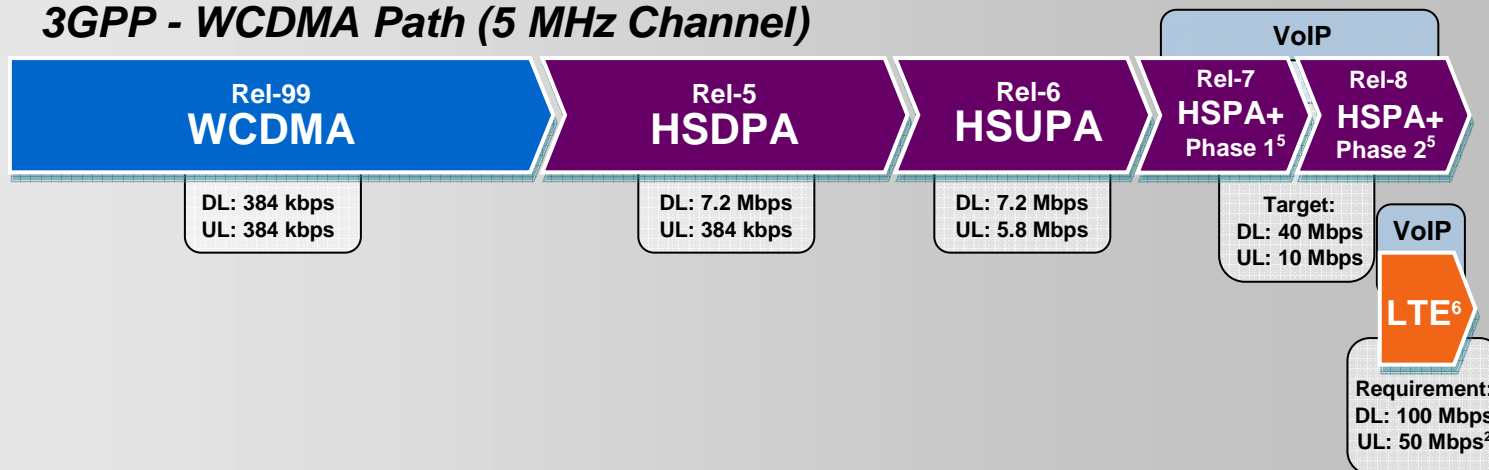
3G Broadband Technology Evolution

■ CDMA
 ■ CDMA/TDM
 ■ OFDM
 ■ OFDMA

3GPP2 - CDMA2000 EV-DO Path (1.25 MHz Channel)



3GPP - WCDMA Path (5 MHz Channel)



2001 2002 2003 2004 2005 2006 2007 2008 →

Note: timeline depicts initial commercial availability of each technology. Those introduced beyond 2008 are under standardization and are subject to variability

¹ EV-DO Rev A and Rev B incorporate OFDM for multicasting

² Data rates of 73 Mbps for the DL and 27 Mbps for the UL figures are based on a 2 x 20 MHz allocation

³ May have multiple modes, with at least one mode being backwards compatible with EV-DO (all versions); will likely utilize CDMA/OFDM or a combination of OFDMA and CDMA; MIMO/SDMA; leverages EV-DO protocol stack

⁴ Data rate dependant on level of mobility. Data rates of 73 Mbps for the DL and 27 Mbps for the UL figures are based on a 2 x 20 MHz allocation

⁵ Release 7 and Release 8 introduce enhancements such as MIMO and VoIP

⁶ Utilizes OFDMA on the DL and SC-FDMA on the UL; MIMO



EV-DO (3GPP2) Evolution

EV-DO Continues to Evolve as the Leading IP WAN Standard

	<i>EV-DO</i>	<i>Rel 0</i> <i>2000</i>	<i>Rev A</i> <i>2004</i>	<i>Phase 1 Rev B</i> <i>2006</i>	<i>Phase 2 Rev C</i> <i>Est. 2007</i>			
<i>Year Standardized</i>								
Key Features		All-IP, High FL Data Rates	+	VoIP, QoS, low latency High RL Data Rates	+	Dynamic Multi Carrier allocations, Higher Performance per Carrier	+	Higher Spectral Efficiency OFDM/MIMO/ SDMA
Key Services		BE Downstream (http, VoD, MoD)	+	Low Latency Comm. (VT, VoIP, PTC, gaming)	+	Broadband Apps, concurrent services	+	Enhanced Broadband Apps

The evolution of EV-DO allows operators to continue to be the first to deliver advanced IP-based services affordably with the highest performance



WCDMA (3GPP) Evolution

WCDMA (UMTS)	HSDPA	HSUPA	Evolved 3G	
3GPP Release 99	Release 5	Release 6	Release 7	Release 8 +

- DL/UL:
 - 64 kbps CS
 - 384kbps (typical)
 - 2 Mbps (per std)
- MMS / LCS
- ATM Transport

- DL:
 - 14 Mbps (standard) -
 - 7.2Mbps (typical)
- IMS
- IP Transport
- WB-AMR

- UL: 1.4 - 5.8 Mbps
- MBMS
- WLAN-UMTS Inter-working
- IMS Services

- Enhanced support for real time services - IMS
- MIMO

- HSPA+
 - Further enhance WCDMA in 5MHz
- LTE
 - Higher peak rates
 - Flexible bandwidth

All UMTS releases can be deployed in any of 10 specified bands including 2.1GHz, 1.7, 1.8 & 1.9 GHz, 850 & 900 MHz

WCDMA – A well established evolution path to broadband capabilities, while maintaining backward compatibility

Broadband Wireless Application Areas



Applications converging on Wireless Device – Made possible by BWA



Wireless
Reach.

Empowering Citizens Globally Through Effective Partnerships





MTN@ccess with HSDPA

Alexandra Township : Partnering to Increase Connectivity to Underserved Communities

- QUALCOMM donated four HSDPA cards and laptops to a MTN-led program providing high speed Internet connectivity to entrepreneur-run “Internet cafes” in the Alexandra Township of northern Johannesburg
- The laptops and cards will be used in entrepreneur-run centers to promote Internet connectivity, featuring direct links to recruitment services, email services, university, government departments and many more useful Web sites.





MTN@ccess with HSDPA

Alexandra Township : Partnering to Increase Connectivity to Underserved Communities

- The MTN@ccess pilot project is focused on creating sustainable and profitable new entrepreneurs.
- MTN is focusing on developing communities in markets where MTN operates in South Africa and across Africa.
- The project will make 3G HSDPA a reality rather than a dream to disadvantaged communities.
- Users of MTN@ccess connect to the Internet via an MTN portal <http://www.mtnaccess.co.za/> - featuring direct links to recruitment services, email services, universities, government departments and many more useful Web sites.
- The MTN pilot is scheduled to run for six months and could be a precursor to a much wider rollout of shared Internet access services across South Africa using HSDPA.



Biamba Marie Mutombo Hospital and Research Center

Democratic Republic of the Congo: Empowering Citizens with Access to Advanced Healthcare



- This is the first new medical facility to be built in the Congo in 40 years with 300 beds and a pharmacy to serve the needs of the poorest residents of the outskirts of Kinshasa.
- EV-DO high-speed wireless technology will allow doctors to have quick access to patient information such as x-rays, vital signs and CAT scans, as well as notify doctors immediately in case of an emergency.
- In addition, EV-DO offers the ability to diagnose patients remotely and instantly through electronic access to patient information.



Biamba Marie Mutombo Hospital and Research Center Democratic Republic of the Congo : Empowering Citizens with Access to Advanced Healthcare



- QUALCOMM is providing 50 CDMA EV-DO devices, such as PDAs, embedded laptops and data cards for use by the hospital staff.
- In addition, QUALCOMM will donate funds to the Dikembe Mutombo Foundation for the purchase of medical software, Information Technology Training and service for the devices.



Working in India to Bring Connectivity to Rural Areas “Every Village a Knowledge Center”



- QUALCOMM has joined NASSCOM Foundation to provide CDMA2000 wireless connectivity solutions to 65 Village Resource Centers in India.
- The program supports India's larger national initiative, Mission 2007, to establish 600,000 Village Resource Centers by August 15, 2007, coinciding with India's celebration of 60 years of independence.



Working in India to Bring Connectivity to Rural Areas

"Every Village a Knowledge Center"



- NASSCOM and QUALCOMM will provide connectivity and content to Village Resource Centers in the states of West Bengal, Orissa, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu, Goa, Gujarat, and Kerala.





Increasing Teledensity and Internet Penetration in Indonesia

Empowering Citizens Globally by Providing Wireless Connectivity to Rural Areas



- QUALCOMM, the local 3G CDMA operator, Sampoerna Telekom (STI), IndoNet, Axesstel Inc., the Ministry of Information and Communications Technology and the State Ministry for the Accelerated Development of Disadvantaged Regions are placing cellular kiosks in 59 villages to provide telecommunications access to citizens.
- Handsets will be supplied to each village chief to improve governance.





Increasing Teledensity and Internet Penetration in Indonesia

Empowering Citizens Globally by Providing Wireless Connectivity to Rural Areas



- Five High Schools are being transformed with computer labs connected to the Internet via the EV-DO network, broadening IT skills and enhancing education opportunities for the youth in the Lampung area.

BEFORE



AFTER





Increasing Teledensity and Internet Penetration in Indonesia

Empowering Citizens Globally by Providing Wireless Connectivity to Rural Areas

- In Pacitan, East Java, QUALCOMM supplied a Community Access Point (CAP) which provides high-speed Internet access to the public.





Transforming Libraries in Thailand into Telecenters Complementing the NTC's Universal Service Obligation Goals



■ Partners

- CAT Telecom (Operator)
- National Telecommunications Commission (NTC)
- The Thai Ministries of ICT, Education and Public Health





The TOPIC64 Project, Vietnam

Partnering to Empower Citizens Globally by Strengthening Information Technology Skills and Connectivity



- The objective is to provide IT skills training and improved communications to underserved portions of the country by equipping 64 community technology and learning centers (CLTC) throughout Vietnam with computers, software, Vietnamese textbooks and, wireless CDMA2000 1x and 1xEV-DO service for Internet access (in 450 MHz).
- Partners
 - Microsoft Corporation
 - Hanoi Polytechnic University's Center for Research and Consulting on Management (CRC)
 - EVN Telecom
 - United States Agency for International Development (USAID)



Beijing School of the Blind, China

Kid Tracker Application: 3G and Position Location is Fulfilling Public Safety Initiatives



- QUALCOMM and China Unicom donated 150 Kid Tracker devices to the Beijing School for the Blind.
- The Kid Tracker devices, using QPoint location based services, enable the visually impaired students to seek help in the case of an emergency, and provide a safer environment for the school, family and society in general.
- The Device is equipped with three preset keys: which dial the parent's cell phone, the home number and emergency services.





Microfinance in Shaanxi and Ningxia, China

Enabling Rural Innovation & Entrepreneurship



- QUALCOMM is donating 1,000 CDMA handsets pre-charged with a China Unicom-donated service voucher of RMB20 per month valid up to two years, to PlaNet Finance's network of microfinance workers and loan recipients.
- The program provides the benefits of mobile communications to rural microfinance initiatives in China, helping entrepreneurs boost their economic activity using CDMA handsets.



Microfinance in Shaanxi and Ningxia, China

Enabling Rural Innovation & Entrepreneurship



- Microfinance loan-officers and borrowers who have successful track-records in PlaNet Finance's training programs receive the handsets.

- The cellular service, which includes weekly SMS group delivery, will enable PlaNet Finance to regularly provide key price and loan information to its microfinance partners and recipients.





AMBER Alert Highway Network (AAHN) Assisting in the Search for Abducted Children



- AMBER stands for **A**merica's **M**issing: **B**roadcast **E**mergency **R**esponse, since the program's inception in 1997, AMBER Alerts have helped with the successful recovery of more than 280 children.
- The AMBER Alert Highway Network (AAHN) leverages location based mobile communications services to determine which of the approx. 65,000 trucks of participating carriers are located in relevant geographical areas to receive the AMBER Alerts.



BREW and Wireless Reach

Inspiring BREW Developers to Create Applications
Enhancing Social and Economic Development

- BREW has the power to unleash 3G wireless applications which will transform communities.
- Therefore, QUALCOMM will award five grants totaling up to \$500,000 dollars for the development of the most innovative proposal for a BREW community application in the following five areas:
 - Healthcare
 - Education
 - Public safety
 - Governance
 - Environment
- These grants will be part of a one million dollar Wireless Reach program fund.
- The remaining \$500,000 will be used to launch the winning developer's BREW application into action through a new or existing Wireless Reach project.





Thank You!

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Increasing Teledensity and Internet Penetration in Egypt

Empowering Future Citizens by Providing Broadband Wireless to Schools in Rural Areas



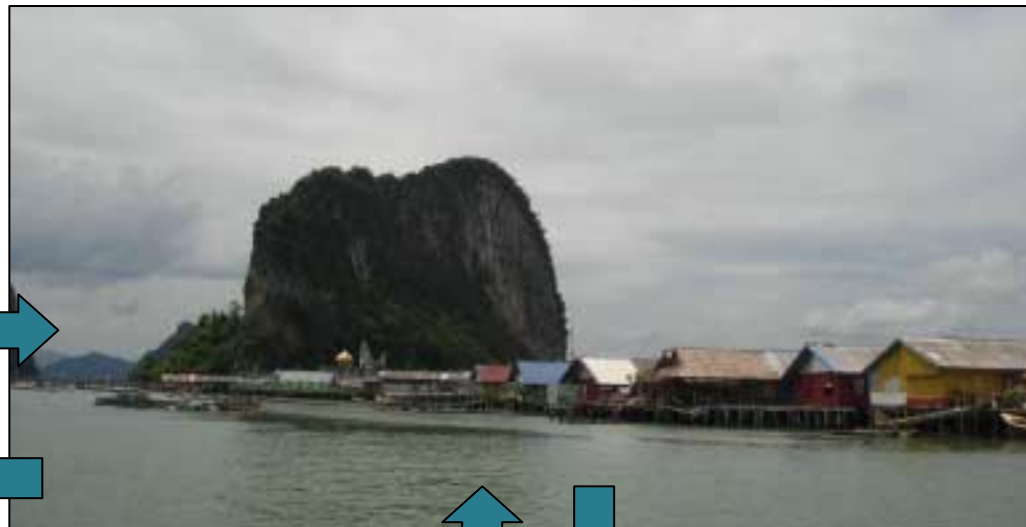
- QUALCOMM to partner with the local 3G CDMA operator, Telecom Egypt, and vendors TeleTech and Lucent to enable high-speed internet access at Egypt's schools
- Students and teachers will be able to access the network via desktop or laptop computers. While WiFi provides connections within the confines of a building, it is the CDMA2000 1xEV-DO network that transports the data to and from the Internet.





Transforming Public Health Centers in Thailand

Enabling Telemedicine Connecting Citizens with Access to Advanced Healthcare



- Thai citizens in rural regions will now have improved well-being through access to high speed mobile communication, computers, and the Internet.