

## Evolution Strategies Towards IMT-2000

### IMT-2000 Seminar

#### Section 3.1.2

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## Addressing Real World Challenges...

### Challenges

- Combined cost of IMT-2000 licenses and infrastructure
- Competition for scarce financing
- Delayed promises
- Need to support sparsely populated areas with basic and advanced telephony
- eEurope compliance



## Certain factors are critical for making 3G a success

- ✓ Solutions that are Globally Recognized and Meet Adopted, International Standards
- ✓ Solutions that Work, Enable Quick Time-to-Market, and Meet Industry Expectations
- ✓ Cost Effective Deployment - Spectrum Flexibility, Efficiency, and Cost
- ✓ Evolution Path to Meet Future Capacity and Data Speeds
- ✓ Cost effective migration from today's systems
- ✓ Broad Range of Competitively-Priced Devices for End-Users (consumers, enterprises)
- ✓ Broad Range of Applications for End-Users

Successful IMT-2000 Service

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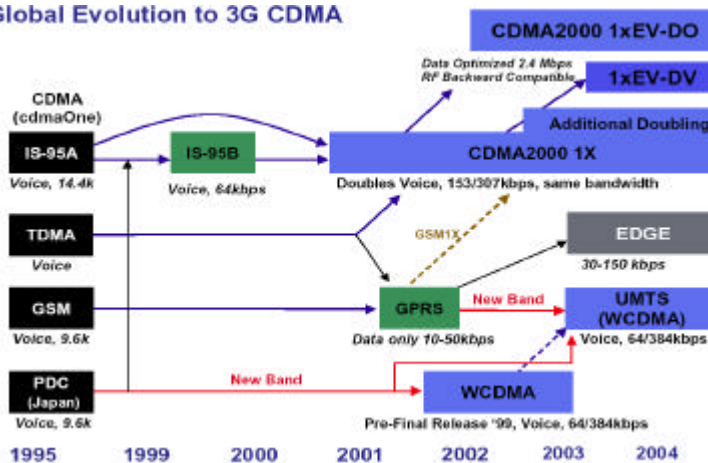
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## 2G Standards Evolution Paths

### Global Evolution to 3G CDMA



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# The Economics Of Propagation

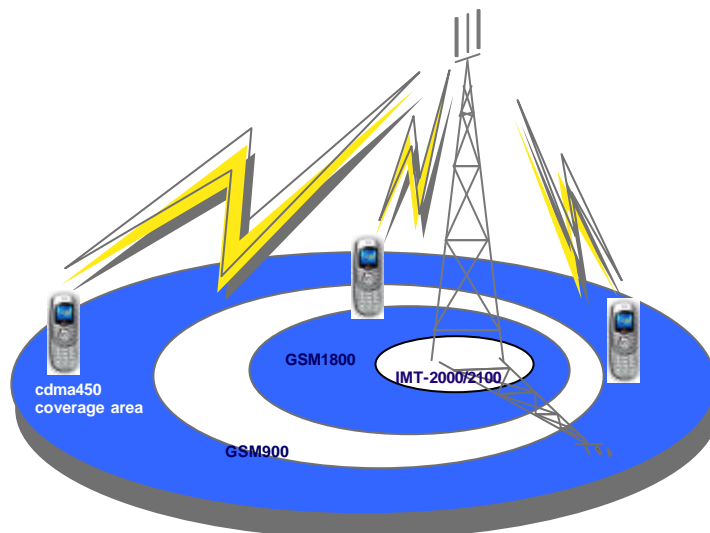
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## Using RF Propagation To Its Best Advantage To Serve Humanity



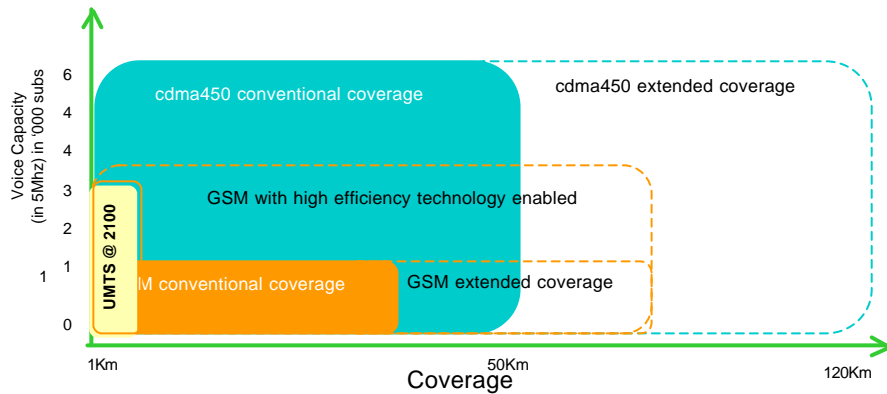
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## Fact: The lower the frequency the greater the cell range!



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## What are the alternatives?

Frequency (MHz)	Cell radius (km)	Cell area (km <sup>2</sup> )	Relative Cell Count
450	48.9	7521	1
850	29.4	2712	2.8
950	26.9	2269	3.3
1800	14.0	618	12.2
1900	13.3	553	13.6
2500	10.0	312	24.1

Source: Qualcomm ITU 8/F Submission, June 11, 2001, "COVERAGE COMPARISON OF IMT-2000 SYSTEMS AT VARIOUS FREQUENCY RANGES, INCLUDING 450 MHz"

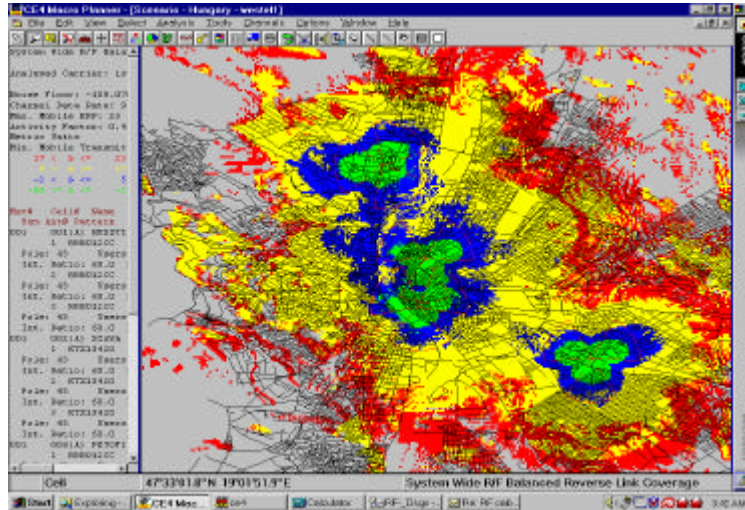
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## Example: Four Base Stations covered most of Budapest Including In-Building



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## Spectrum flexibility is a key consideration for any technology...

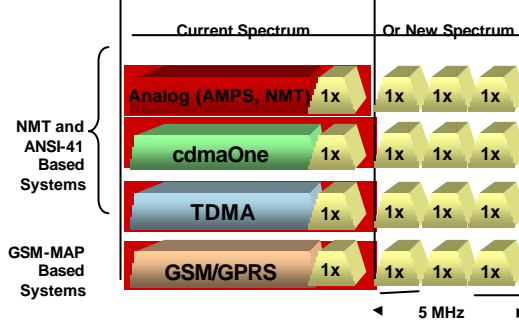
### CDMA2000 3G services in a small amount of spectrum

- Effective use of spectrum, significant to **ALL** operators
- Graceful Evolution from 2/2.5G
- Terminal Devices Forward and Backward Compatible!

### ➤ 3X More Flexible Than 5 MHz Bandwidth Technologies

CDMA2000 is not constrained to only the IMT-2000 2.1 GHz band. CDMA2000 is defined to operate in existing and IMT spectrum:

- 450 MHz
- 700 MHz
- 800 MHz
- 900 MHz
- 1700 MHz
- 1800 MHz
- 1900 MHz
- 2100 MHz



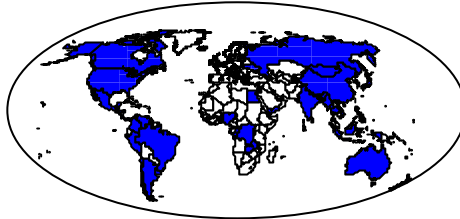
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## Going forward, addressable population will be a key driver of technology market share



Countries able to deploy CDMA2000 in existing CDMA networks represent **over 4.428 billion** pops.

Most CDMA Operators Have Already Migrated Their Networks to IMT-2000!

Countries that have awarded UMTS spectrum represent only 617 Million pops



Countries with UMTS Licensed Spectrum at 2.1 GHz

Source: CIA World Factbook: July 2000, CDG: 2001, Ovum: June 2001, BIS: 2001

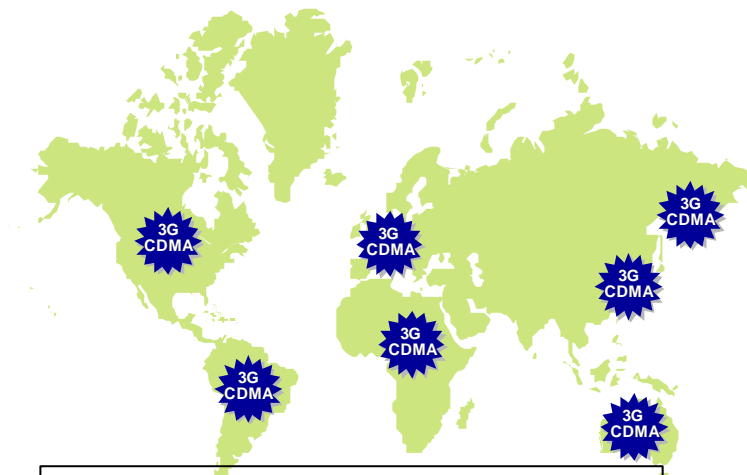
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## Regions worldwide have outlined migration paths for getting to CDMA2000



Although 2G systems may be coming from different starting points, future systems will largely be based on CDMA

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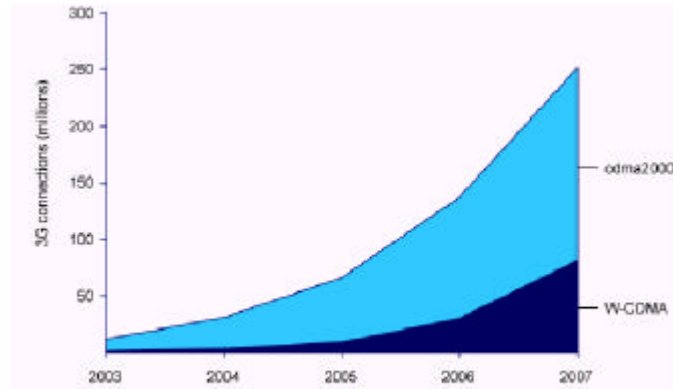
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## 3G Connections Worldwide (2003-2007) – Ovum Study



Source: Mobile@Ovum

**Ovum Research shows the potential growth of CDMA2000**  
**Current CDMA2000 Subscriber Base Already Well Exceeds Ovum's Forecast!**

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## Advantages of CDMA2000 @ any Frequency

1. CDMA2000 1x allows for Unparalleled Voice Capacity of Up to 80 Erlangs per 5 MHz Sector
2. CDMA2000 1x Allows for Current Realized Peak Data Speeds of 153Kbps Increasing to 307 Kbps
3. CDMA2000 1xEV-DO is a Dedicated 1.25 MHz Carrier Which Supports Peak Speeds of 2.4 Mbps and Average Per User Speeds of 300-600 Kbps
4. The upgrade to 1xEV-DO Does Not Require New Spectrum or New Base Stations
  - Rather, It Can Be Implemented by Adding Channel Cards and Software to Existing Base Stations
  - It is the most cost effective solution available
5. CDMA2000 1X EV/DV Will Allow for Easy Migration to Higher Data Speeds on a Combined Voice/Data Channel up to 3 Mbps (peak) on 1.25 MHz Carrier

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## Affordable IMT-2000/3G The case for 450 MHz

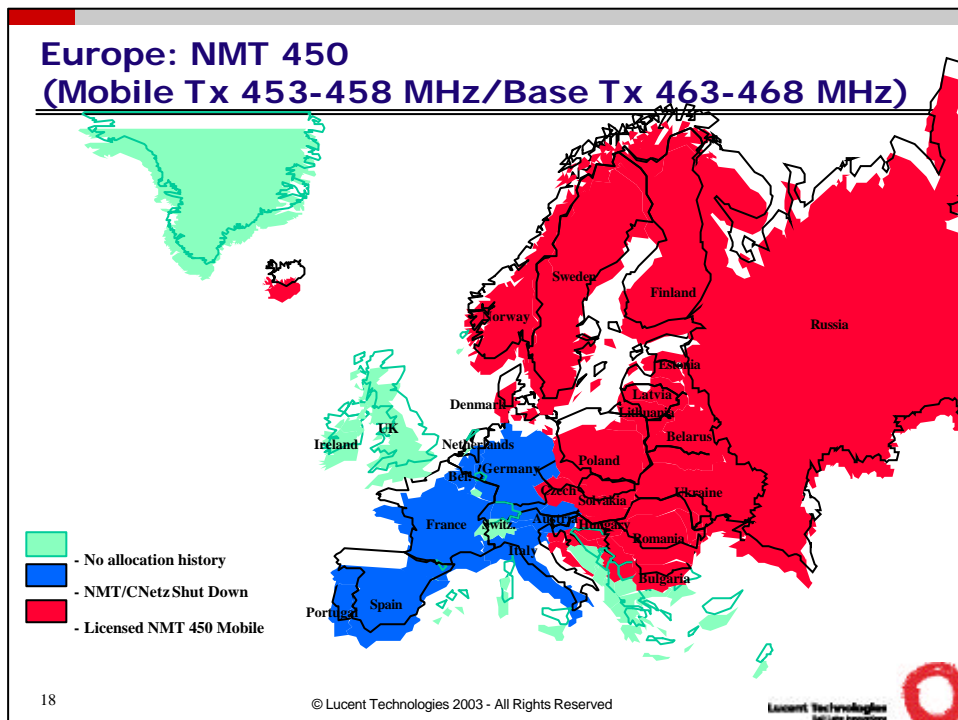
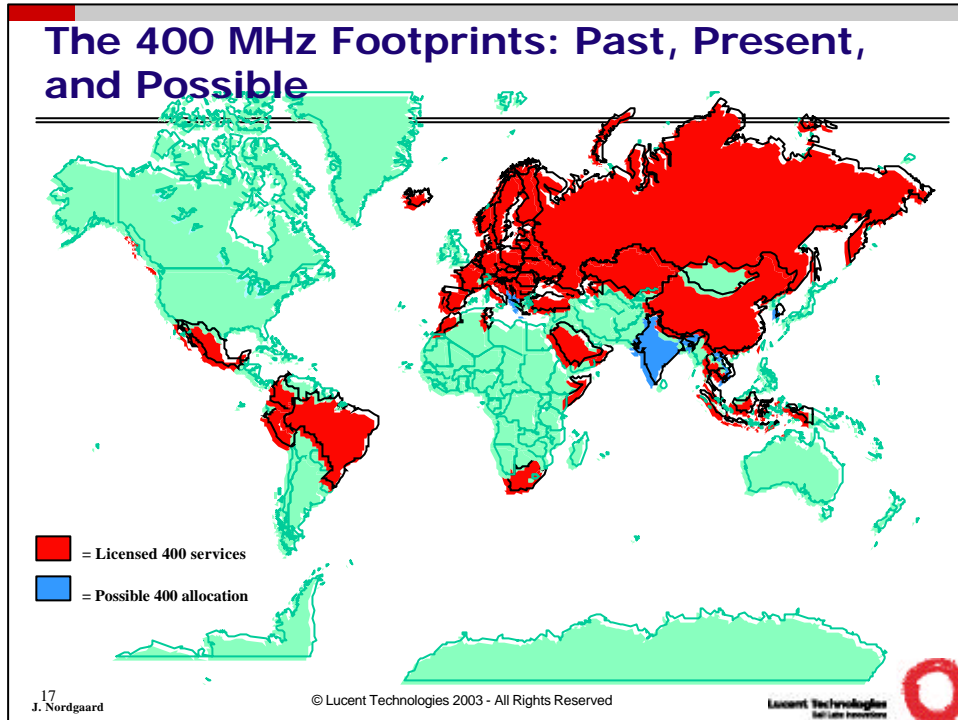


### Implementing IMT-2000 in the 450 MHz band ...CDMA450

- 450 MHz is good spectral "real estate"
  - *better propagation = fewer base stations*
- Many Countries have 450MHz Band Licensed for Mobile Applications or Available for Licensing
- Timing Coincides with 3G Availability
- About CDMA450
  - CDMA450 =>CDMA-MC operating in the 450 MHz band
  - *cdma450 fully complies with ITU-R IMT-2000 Recommendations and detailed specifications*
- CDMA2000 is the only IMT-2000 radio interface that fits into the NMT450 Allocation







## What are we to conclude?

1. The World Needs a More “Economical” 3G Solution for Wide Area Coverage
2. Lower frequencies Are The Key to Reducing Cost
3. The Lower Frequency Range (400-900 MHz) has Multiple Bands Available in Most Countries.
4. The Most Successful 3G Technologies Will Be Those That Are Able to Cover The Most People With The Greatest Cost Efficiency.

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