

What's going on in the World of VoIP Regulation

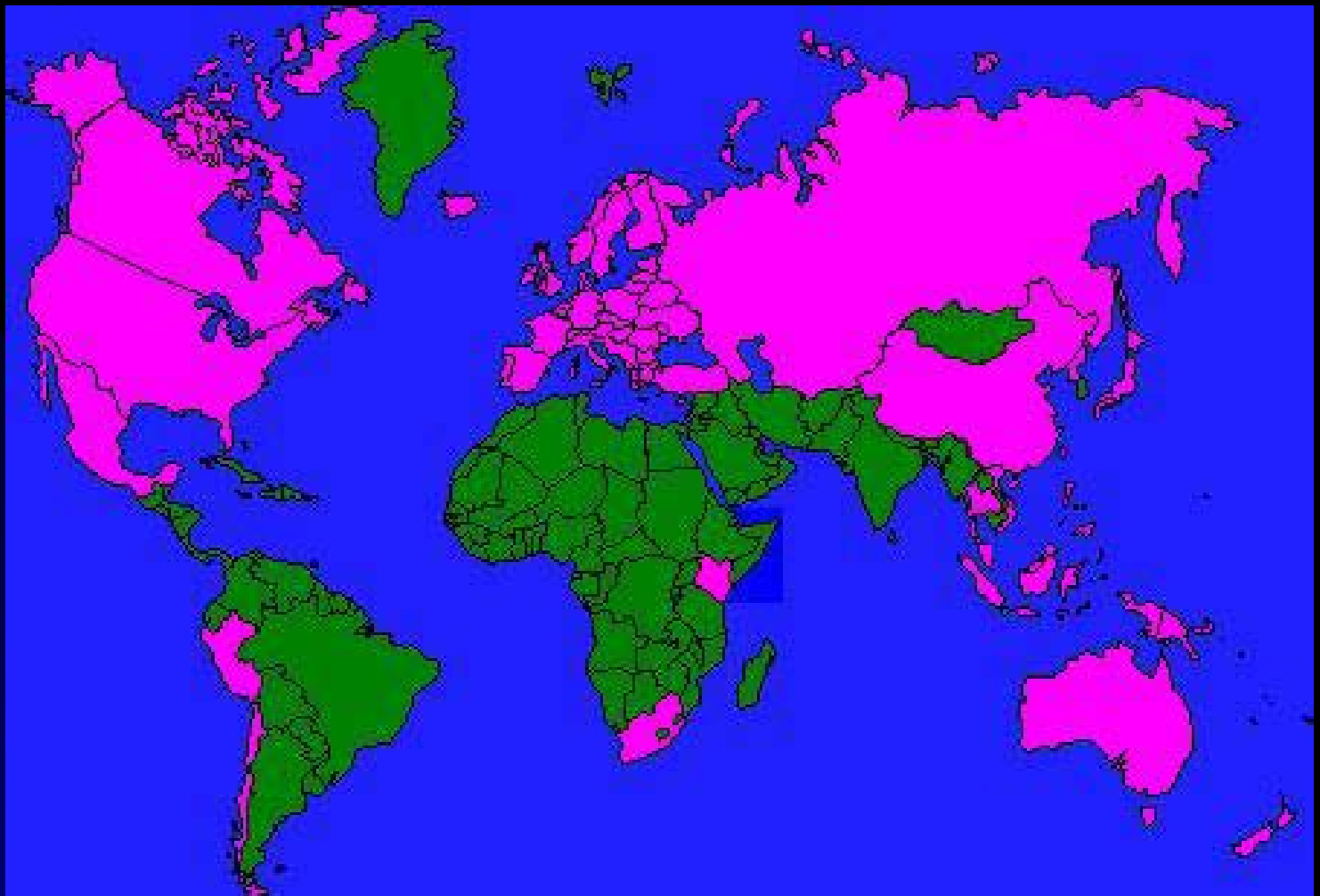
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Fall 2004 VON

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- Type I/Type II – infrastructure (Type I) or resale (Type II)
(e.g. Japan, Korea, Philippines)
- Value-added – not regulated (e.g. Peru)
- Quality of Service – (e.g. EU originally, Switzerland, Hungary)
- Non-voice Data v. Voice Data – phone-phone = regulated voice
(e.g. Canada)

- Prohibited unless computer-computer – (e.g. India)
- Monopoly – (e.g. Egypt, Thailand)
- Outbound v. Inbound –
(e.g. Vietnam– outbound permitted; inbound prohibited)
- Licensed IP Telephony –
(e.g. Indonesia issued 5 licenses in 2002)

Key Issues

- Access to Numbers:
 - Geographic or non-geographic
 - Quality notification
- Social Obligations:
 - Hearing challenged
 - Emergency services
- Law Enforcement/Security

Global Investment

- Poised for Mobile VoIP
- 3G mobile networks can be used for VoIP at speeds of 200 Kbps and above

CDMA2000 1XEV-D0

- Optimized for Data
- VoIP in Development
- Peak network download speed: **2.4 Mbps**
- Avg. user throughputs for file downloads: **300-500 kbps**

EDGE

- GSM family
- Peak network download speed: **473 kbps**
- Avg. user throughputs for file downloads: **100-130 kbps**

EDGE Operators Worldwide *

**129 Operators,
76 Countries,
35 Commercial Launches**

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* as of Sept 2004

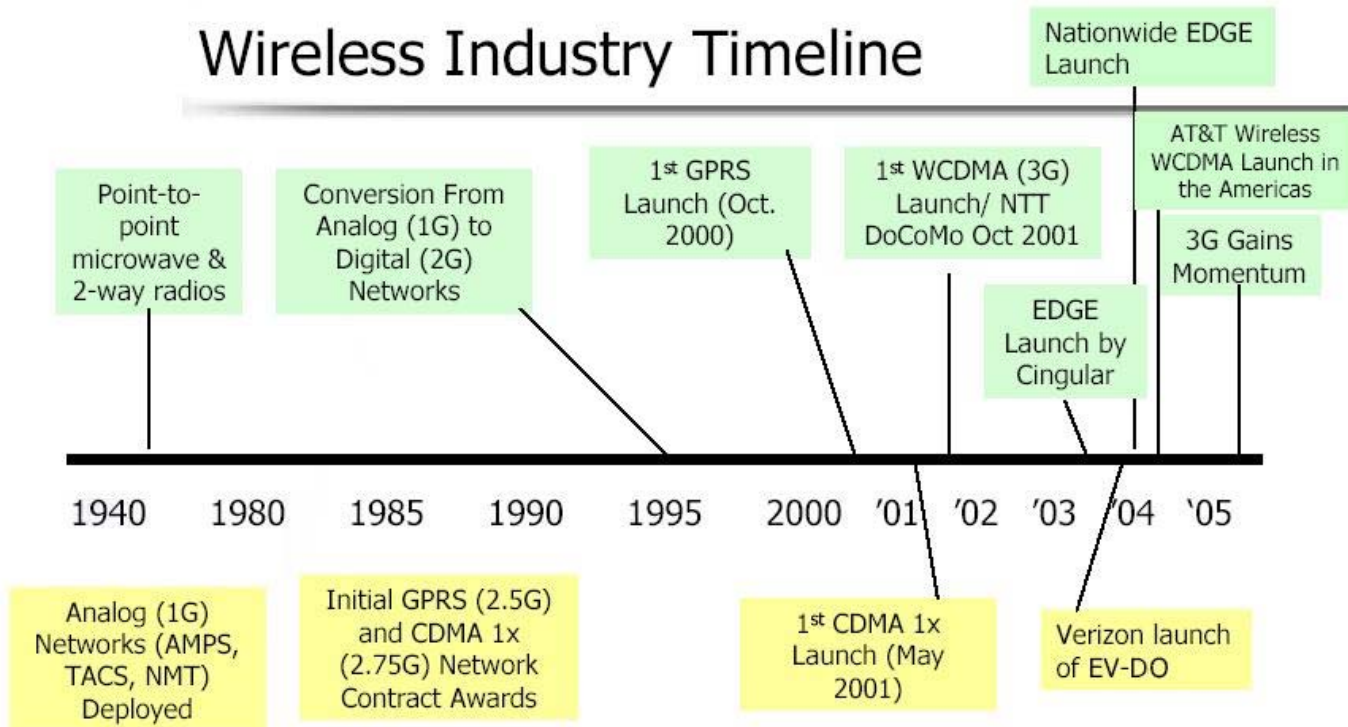
UMTS-WCDMA

- GSM family
- Peak network download speed: **2 Mbps**
- Avg. user throughputs for file downloads: **220-320 kbps**

UMTS-HSDPA

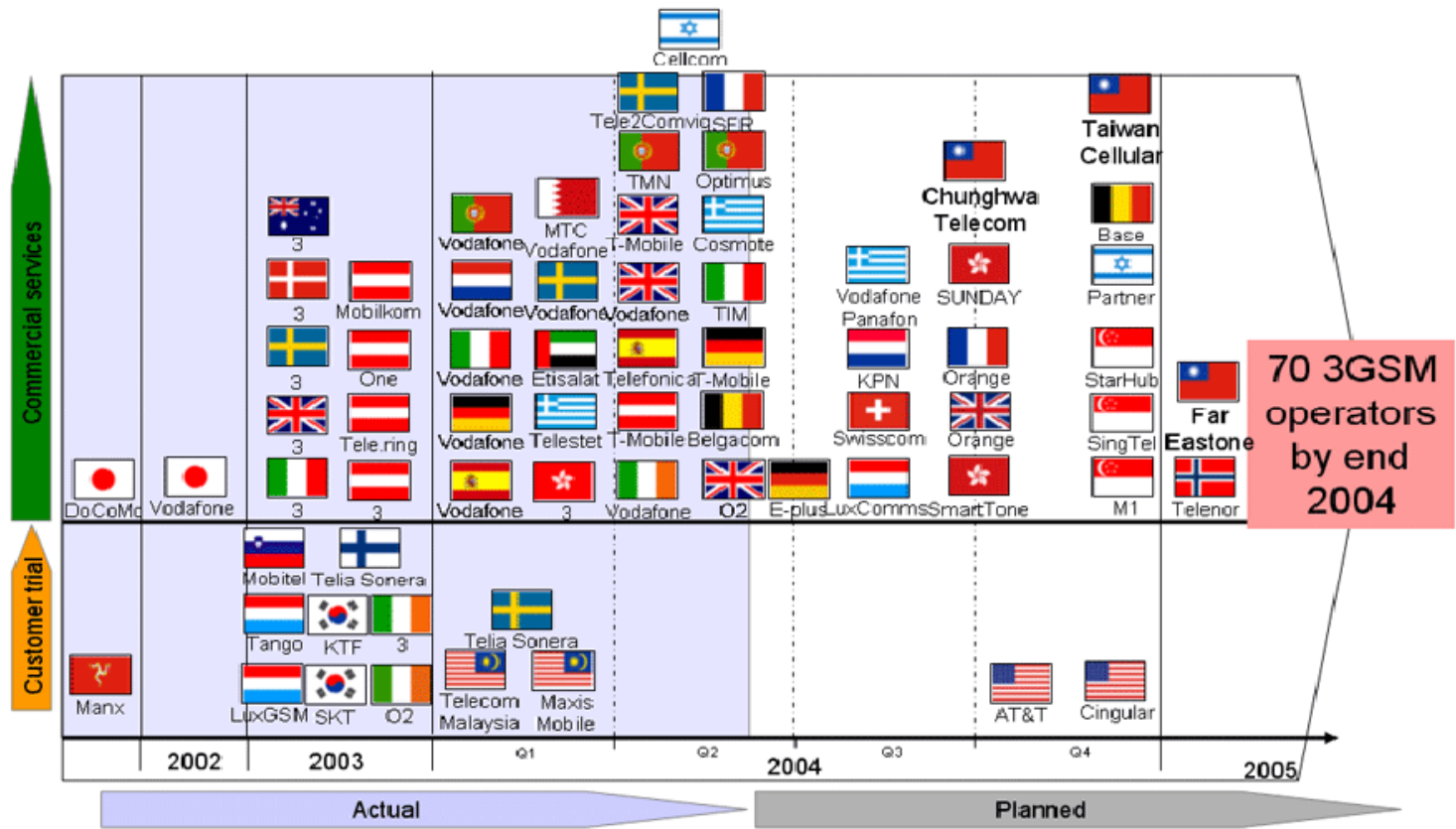
- GSM family
- Peak network download speed: **14 Mbps**
- Avg. user thru-puts for file downloads: **550-1100 kbps**

Wireless Industry Timeline



Source: U.S. Bancorp Piper Jaffray, 2002 and 3G Americas

Announced UMTS Launches



UMTS/WCDMA Deployments Worldwide



Networks In Service	46
License Awarded	5
License Tendered	2
Planned/In Deployment	55
Potential License	32
Pre-Commercial	11
Trial	12

Over 100 operators have chosen UMTS/WCDMA as their 3G technology