

A decorative graphic consisting of a series of white squares arranged in a diagonal line, resembling a staircase or a pixelated arrow, is located on the left side of the orange banner.

## Encouraging Wide Scale Deployment of Broadband Policy and Regulatory Considerations

**ITU-D Regional Development Forum for Africa Region**

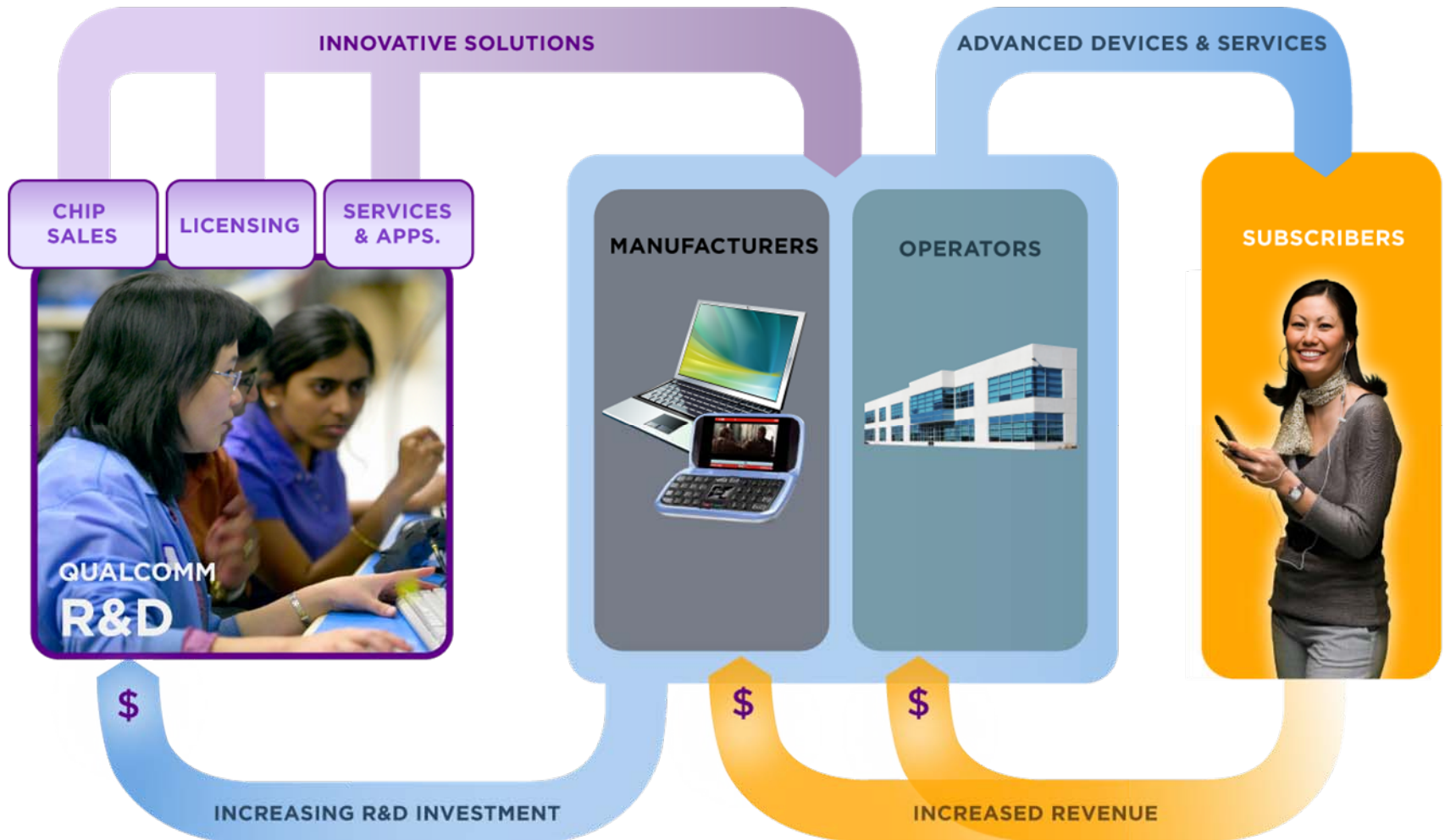


# Contents

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- Introduction
- 3G Mobile Broadband: Capabilities and Evolution Path
- Licensing and Frequency Spectrum Considerations
- Opportunities in Africa

# Qualcomm Business Model: Technology and Value Chain Enabler



# 3G Offers Excellent Mobile Broadband Today



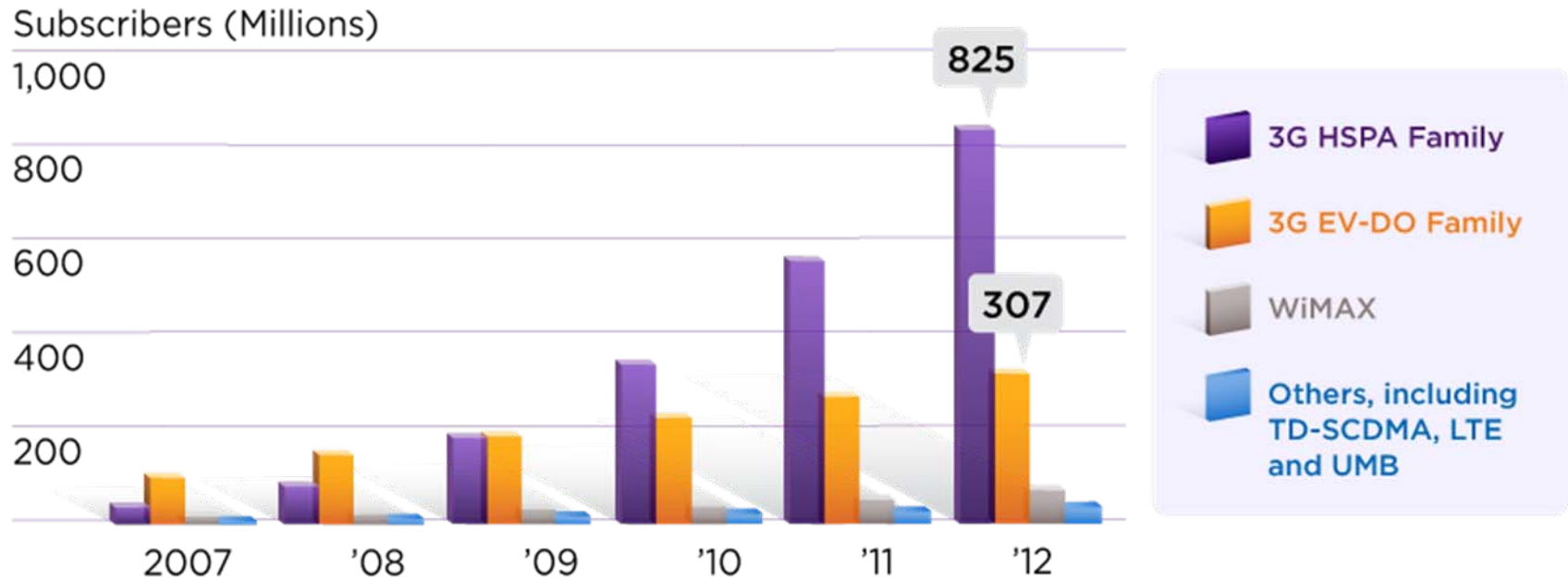
>525 Commercial Networks:

>106 EV-DO (59 Rev. A)  
>268 CDMA2000 1X

>247 HSDPA (>66 HSUPA)  
>264 WCDMA



# 3G Will Drive Mobile Broadband Connections Into the Next Decade



**3G** will command **92%** of the Mobile Broadband market in 2012

# Evolution of Mobile Services

*User trends shift from wired to wireless*

Simple  
Communication

  
Voice & Text

- Voice
- SMS/Email



Download

Streaming

- Music/Ringtones
- Video
- Web Browsing



Download  
& Upload

User Generated  
Content

- Mobile 2.0
- Social Networking
- Media Sharing
- Collaboration
- Mobile Advertising



Real-Time  
Delay Sensitivity

Rich  
Communication

- VoIP
- PTT/PTM
- Video Communication
- Multiplayer Gaming



Seamless Fixed  
Mobile Convergence

Seamless Connectivity

- IPTV
- Home Network
- Set Top Box
- Ubiquitous Broadband
- Consumer Electronics
- Video Surveillance



*Mobile Services becoming center of life*

# Peak Data Rates Scales with Bandwidth —Achievable in Optimal Conditions

## Peak Data Rate Enhancements

—Available to both CDMA and OFDMA

**Shared channel**  
(downlink and uplink)

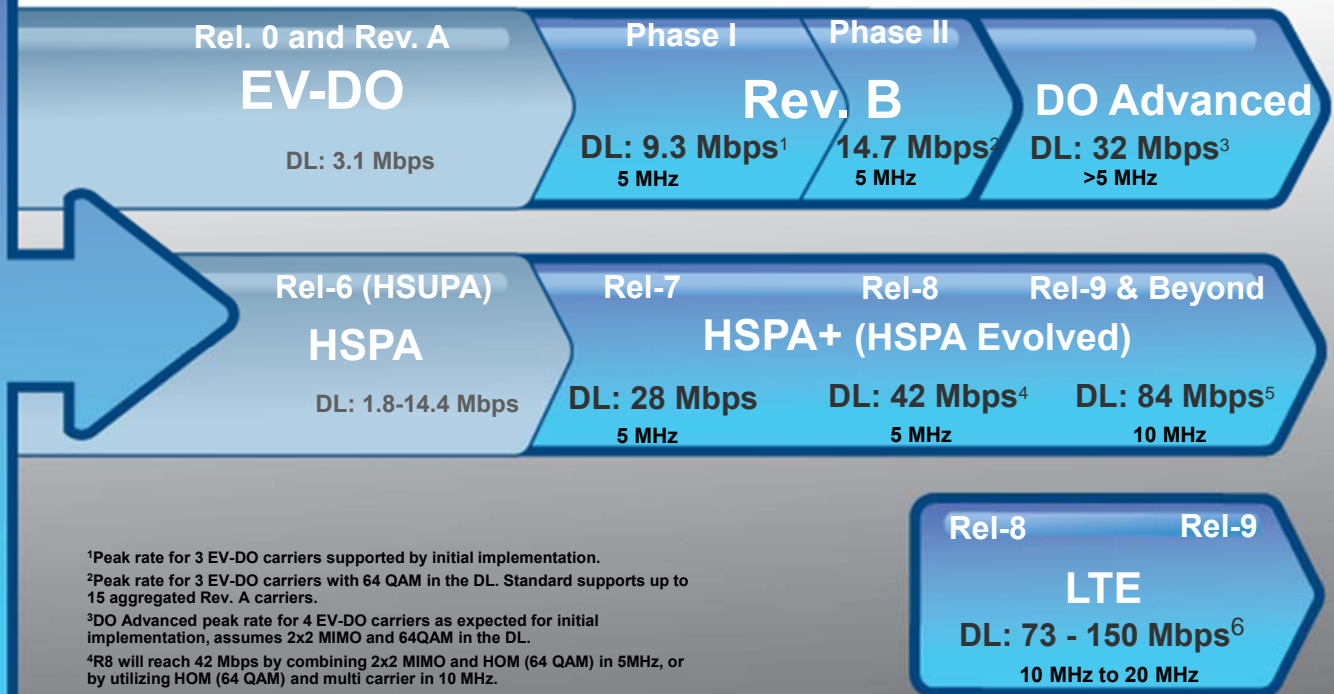
**16/64QAM**  
Higher order Modulation

**2x2 MIMO**  
Multiple Input Multiple Output

**Wider bandwidth**  
Multi carrier and/or OFDMA

**Combinations**  
of HOM, MIMO and Multi carrier

**Even Higher order**  
MIMO and HOM



<sup>1</sup>Peak rate for 3 EV-DO carriers supported by initial implementation.

<sup>2</sup>Peak rate for 3 EV-DO carriers with 64 QAM in the DL. Standard supports up to 15 aggregated Rev. A carriers.

<sup>3</sup>DO Advanced peak rate for 4 EV-DO carriers as expected for initial implementation, assumes 2x2 MIMO and 64QAM in the DL.

<sup>4</sup>R8 will reach 42 Mbps by combining 2x2 MIMO and HOM (64 QAM) in 5MHz, or by utilizing HOM (64 QAM) and multi carrier in 10 MHz.

<sup>5</sup>R9 and beyond may utilize combinations of multi carrier and MIMO to reach 84 Mbps peak rates.

<sup>6</sup>Peak rates for 10 and 20 MHz FDD using 2x2 MIMO, the standard supports 4x4 MIMO enabling peak rates of 278 Mbps for LTE and 288 Mbps for UMB. TDD rates are a function of up/downlink asymmetry

# Licensing Considerations

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- **Enabling Policies & Regulations:**
  - **Investment opportunities- profitability**
    - Technology Neutrality
    - Service Neutrality ( fixed vs. mobility, voice, data, etc)
  - **Healthy competition**
    - Avoid fragmentation
  - **Consumer Protection**
  - **Universal access/services**
    - Appropriate solutions for all consumers
    - All market segments
    - All geographical regions( urban and rural)
  - **Management of Scarce Resources( Spectrum , Numbering etc)**



# Frequency Spectrum Considerations(1)

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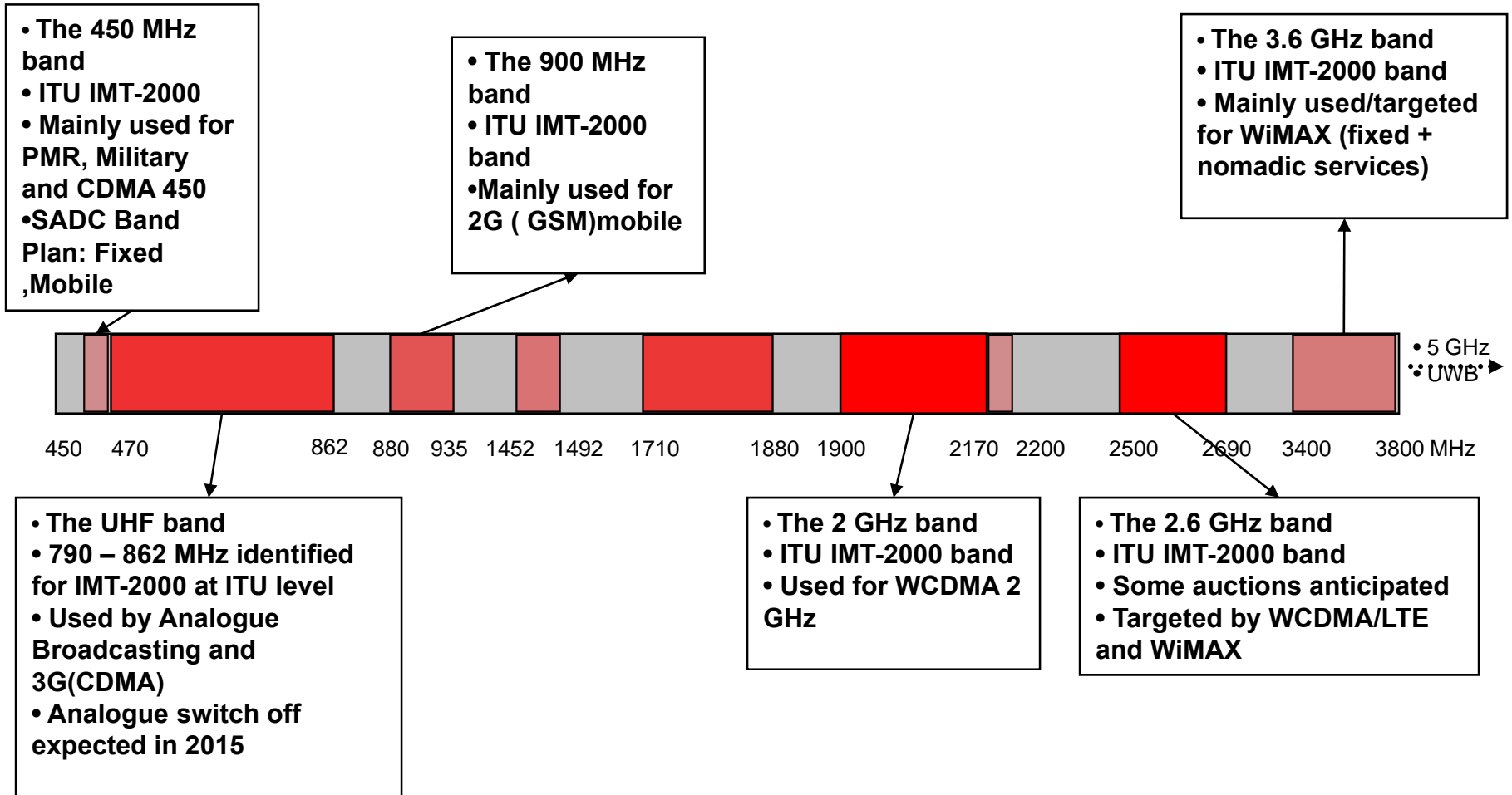
- **Frequency Arrangements in IMT Bands**
  - **Contained in Rec. ITU-R M.1036-3 :**
  - **806-960MHz**
    - 824-849/869-894 MHz (A1)
    - 880-915/925-960 MHz (A2)
  - **1710-2025MHz and 2110-2200 MHz**
    - 1920-1980/2110-2170 MHz (B1)
  - **2500- 2690 MHz**
    - 2500-2570/2620-2690(Centre Gap TDD( C1), FDD DL(C2)
    - 2500-2690 Flexible FDD/TDD (C3)

# Frequency Spectrum Considerations (2)

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- **Additional Bands identified at WRC 07:**
  - 450-470 MHz ; 698-960 MHz; 2300-2400MHz; 3400-3600 MHz
- **Revision of Rec. ITU-R M.1036-3 on going in WP 5D**
  - **Next meeting June 2009**
  - **Regional harmonization discussions ongoing( 698-960MHz):**
    - USA completed 700 MHz Band Plan, most spectrum assigned via auction
    - Europe in advanced stages of harmonizing 790-862 MHz
    - Region 3 initiated discussions on options; completion 2H 2010
    - Which Way Africa?

# Opportunities in Africa(1)



# Opportunities in Africa (2)

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- **450 MHz Band**
  - **CDMA 450 gaining momentum, creating a global presence**
  - **Excellent propagation ; rural coverage**
  - **110 CDMA 450 devices in market**
- **The UHF Band ( 790-862 MHz)**
  - **WRC 07 MOBILE Allocation championed by Africa**
  - **Most African countries have allocation starting 2007 through footnotes**
    - **316;316A;**
  - **Spectrum may be released for wireless after analogue switch off**
    - **Relieve constraints on the 824-849/869-894 MHz band**
    - **Avail 72 MHz for IMT**
    - **JTG 5-6 Studies**

# WRC-11 Agenda item 1.17 (1)

- 1.17: to consider results of sharing studies between the mobile service and other services in the band 790-862 MHz in Regions 1 and 3, in accordance with Resolution 749 (WRC-07), to ensure the adequate protection of services to which this frequency band is allocated, and take appropriate action

- Resolution 749 (WRC-07)

- emphasizing*

- a) The use of 470-862 MHz by broadcasting and other primary services, covered by the GE06 Agreement
    - b) Requirements of other services including mobile and broadcasting services

- resolves*

- 1. Sharing studies for Region 1 & Region 3 in 790-862 MHz between mobile and other services
    - 2. ITU-R report of study results to WRC-11

→ To study this agenda, the 1<sup>st</sup> CPM meeting established JTG5-6 in ITU-R



# CDMA450: Optimizing Mobile Communications

*CDMA450 is gaining momentum while creating a global presence*

Up to 125 operators in over 65 countries have deployed or are planning to deploy CDMA450

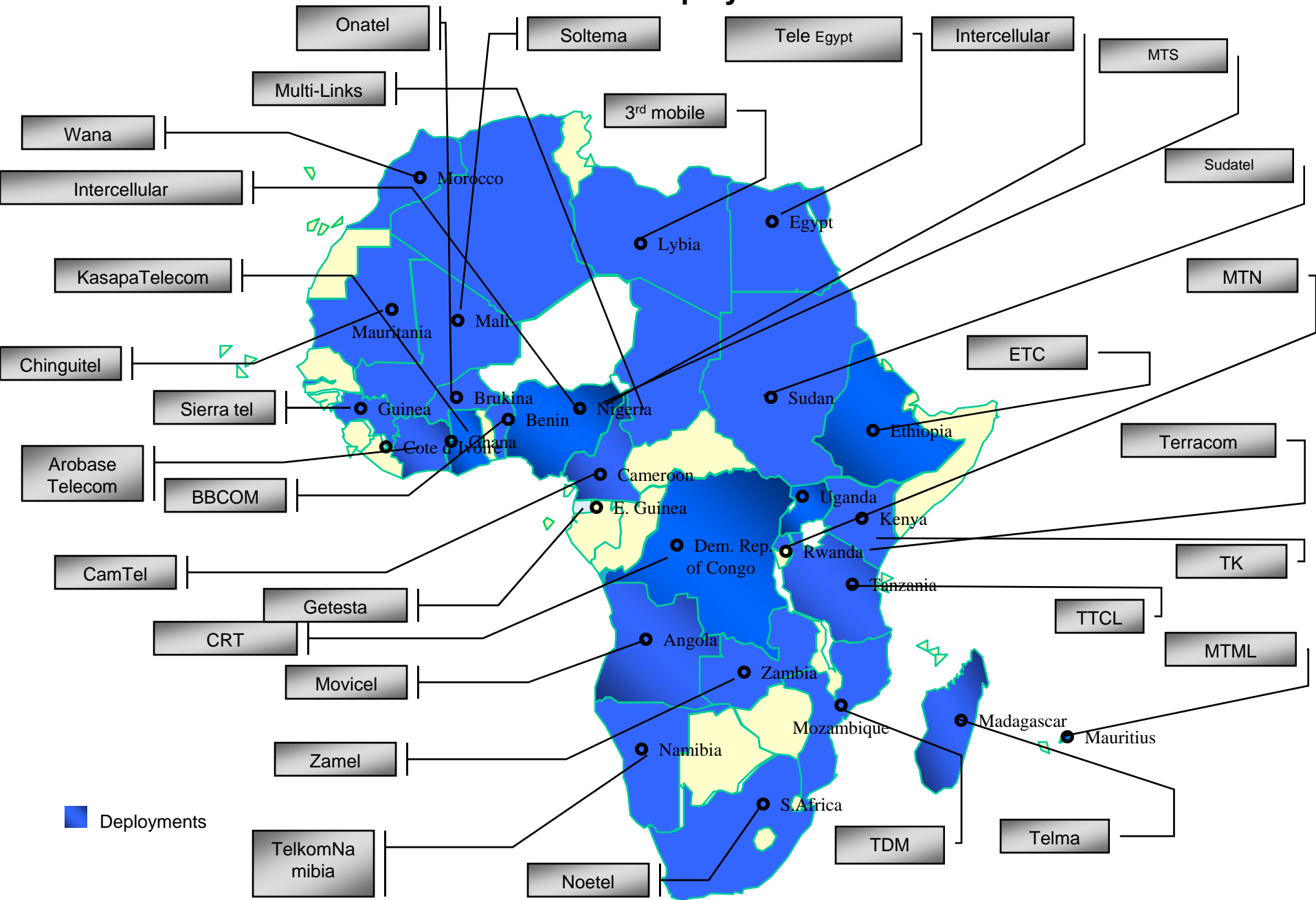
A world map with countries colored in orange to indicate CDMA450 deployment. The orange countries include Mexico, Central American nations, Colombia, Venezuela, Ecuador, Peru, Chile, Argentina, Brazil, and various countries across Africa, the Middle East, and Asia, including India, China, and Japan. A large blue rounded rectangle is overlaid on the map.

**20 million CDMA450 Subscribers**

	1X	EV-DO Rel. 0	EV-DO Rev. A
Commercial	94	42	16
In Deployment/Trial	16	19	17

**CDMA450 is the most mature and widespread solution for providing mobile and fixed telecommunication services economically to both urban and underserved rural markets**

# 800 MHz Current Deployments



# Opportunities in Africa(3)

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- **900 MHz Band**
  - Operators have shown interest in using the 900 MHz band to provide better coverage
  - 7 Commercial networks( Finland, Thailand, Australia, Iceland)
  - Cost savings for radio infrastructure
  - Wide portfolio of devices available today with interoperability with WCDMA 2100 and GSM 900/1800
  - Transition from 2G to 3G in the same bands allowed by ITU and most national regulators
  - UMTS900 complements UMTS Core band deployments and allows to use the same sites as for GSM

# Opportunities in Africa (4)

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- **2.6 GHz Band**
  - Auctions have started / anticipated in other regions
  - Selection of bandplan( C1, C2 or C3) should be cognisant of economies of scale.
  - Avoid technology specific assignments.
- **Digital Dividend Beyond Analogue Switch Off ?**
  - Will DTV utilize the entire 470-790 MHz in all countries?
  - Some countries have no/very few UHF TV assignments
  - Assessment of ACTUAL Broadcasting needs

# Summary

**3G offers Excellent Mobile Broadband Today**

**3G has a Strong Evolution Path**

**LTE is a parallel Evolution Path to 3G**

**Opportunities to maximize IMT spectrum**

**Wide scale broadband deployment achievable**





# Thank You!

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