



LTE PERSPECTIVE

ERICSSON INC.

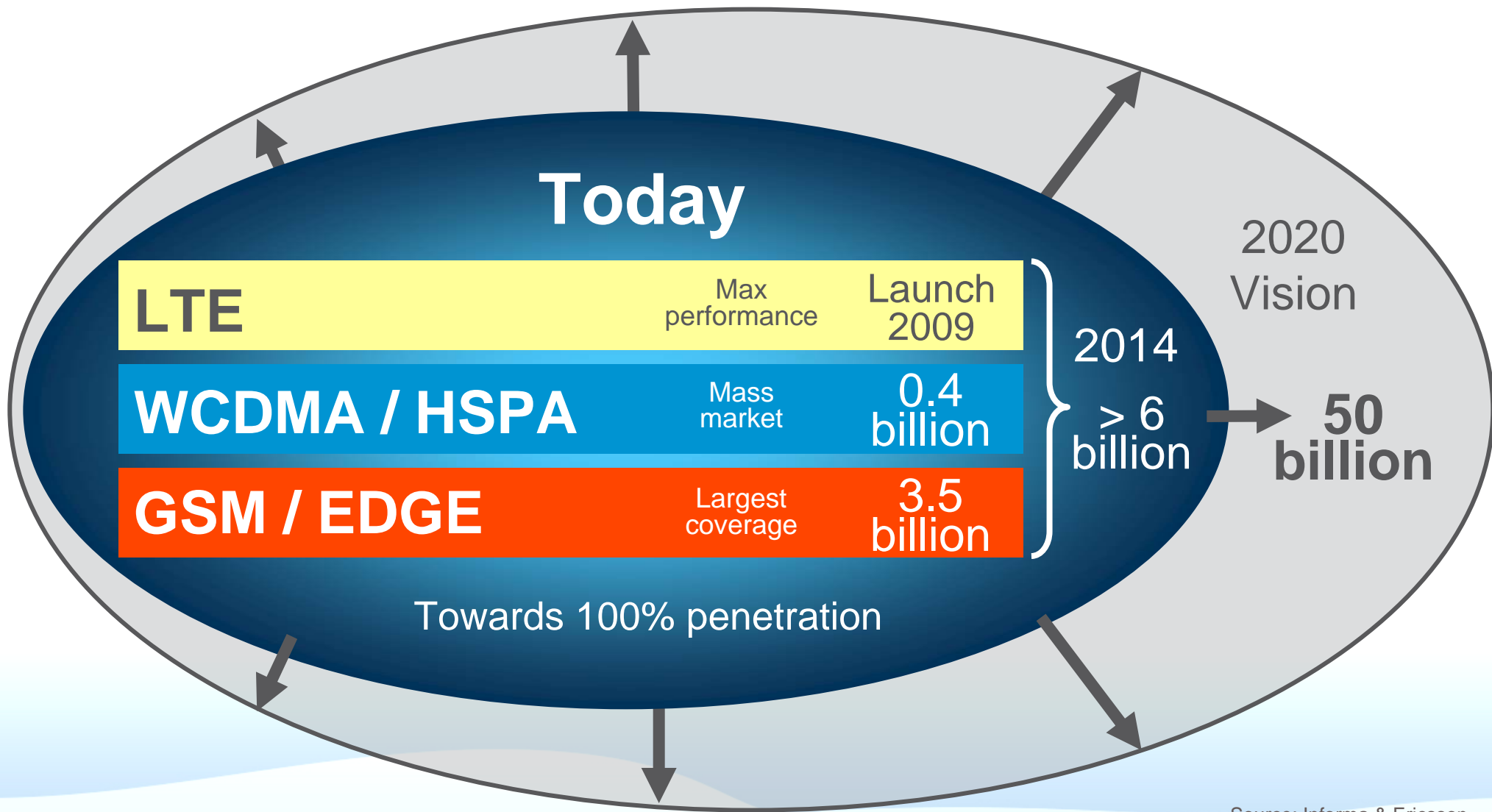
SRIDHAR VADLAMUDI
LTE HEAD, INDIA

TOPICS

- › Mobile Broadband growth
- › Why LTE?
- › Trials/Commercial deployments



A WIDER VISION: EVERYTHING CONNECTED



Source: Informa & Ericsson

MOBILE BROAD BAND: EVERYTHING WILL BE CONNECTED

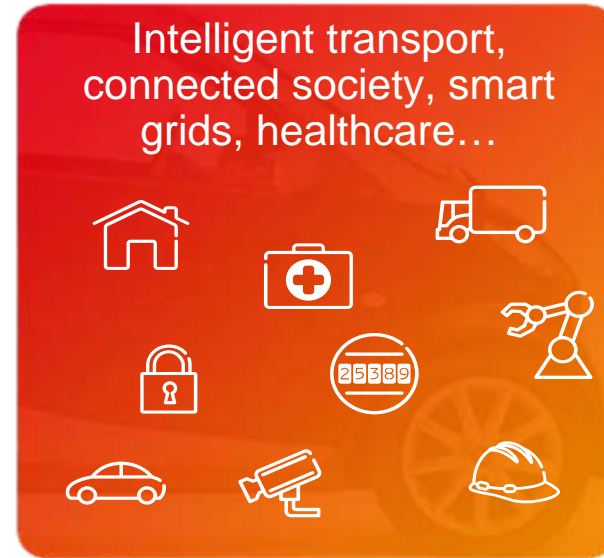
Drivers

- Safety, quality of life, entertainment
- Productivity, new revenues
- Sustainability, regulation

Connected consumer electronics



Intelligent transport, connected society, smart grids, healthcare...



- Broadband ubiquity
- Declining cost of connectivity

Enablers

TOPICS

› Mobile Broadband growth

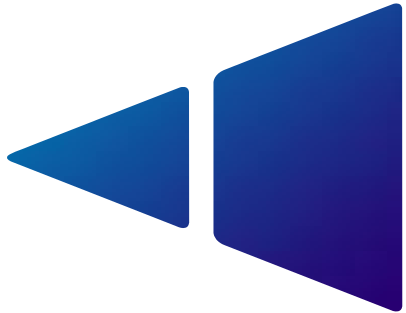
› Why LTE?

› Trials/Commercial
deployments

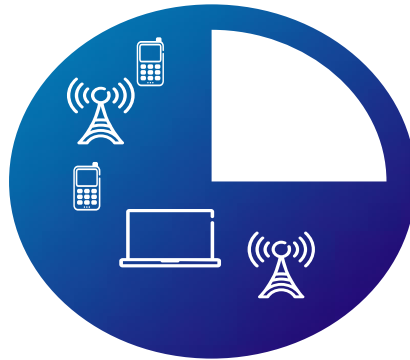


WHY LTE?

Wider pipe advantage



Self Organizing Networks



All-IP architecture



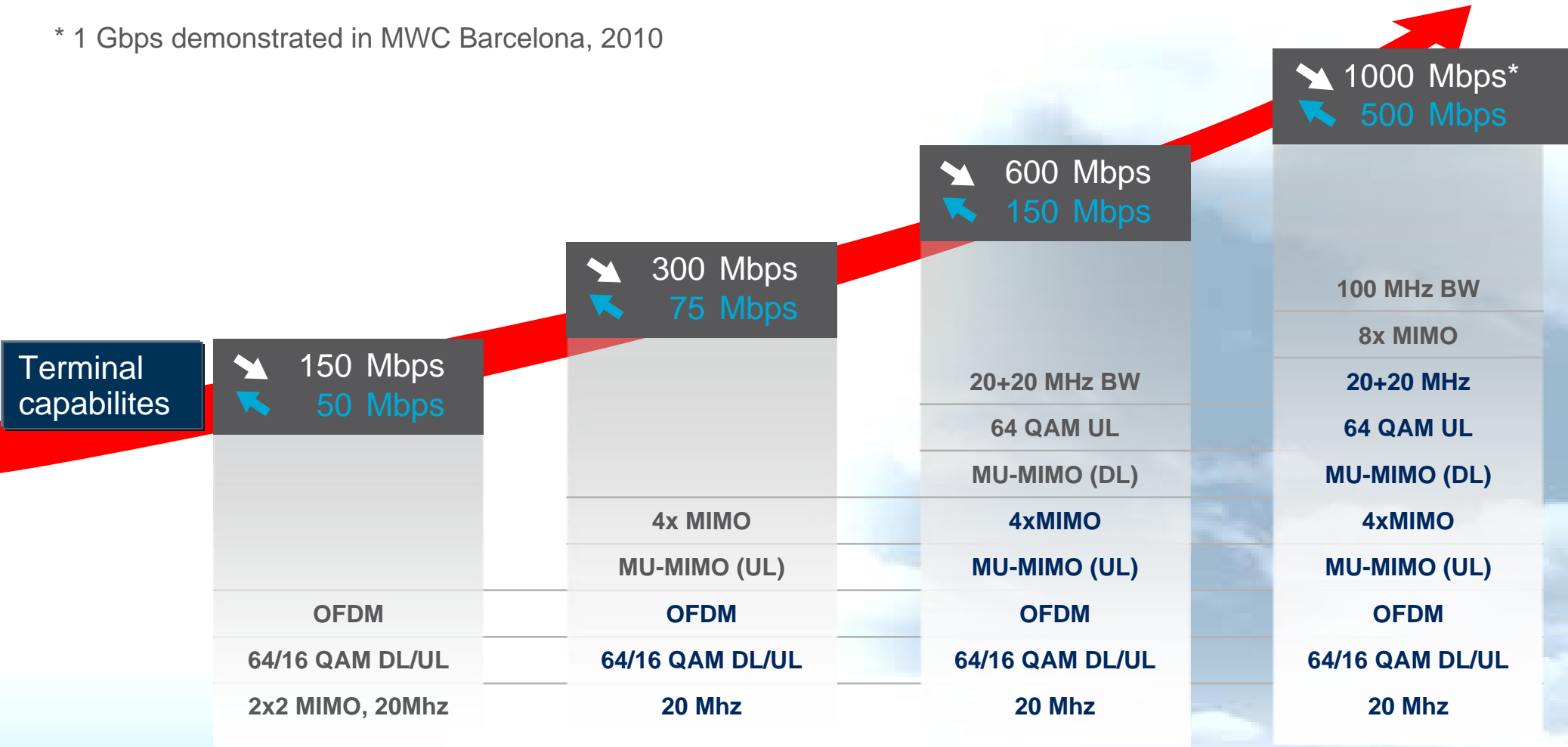
Economies of Scale



[LOW TOTAL COST OF OWNERSHIP]

CAPACITY GROWTH (DL) POTENTIAL, FDD

* 1 Gbps demonstrated in MWC Barcelona, 2010

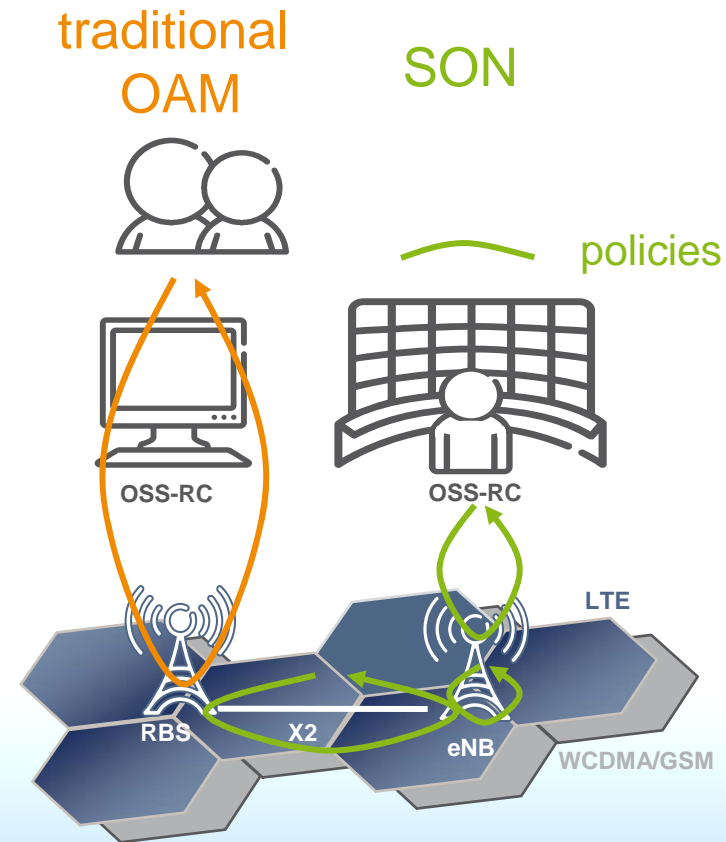


LTE brings excellent capacity and potential for higher capacities in future

SELF-ORGANIZING NETWORKS, SON

- › SON = Automation of:
 - › operations e.g.:
 - eNB integration
 - software upgrades
 - fault handling
 - › network performance optimization e.g.:
 - neighbour relationships
 - radio parameter optimization

SON = Simplification of operator tasks, leading to higher efficiency hence lower OpEx



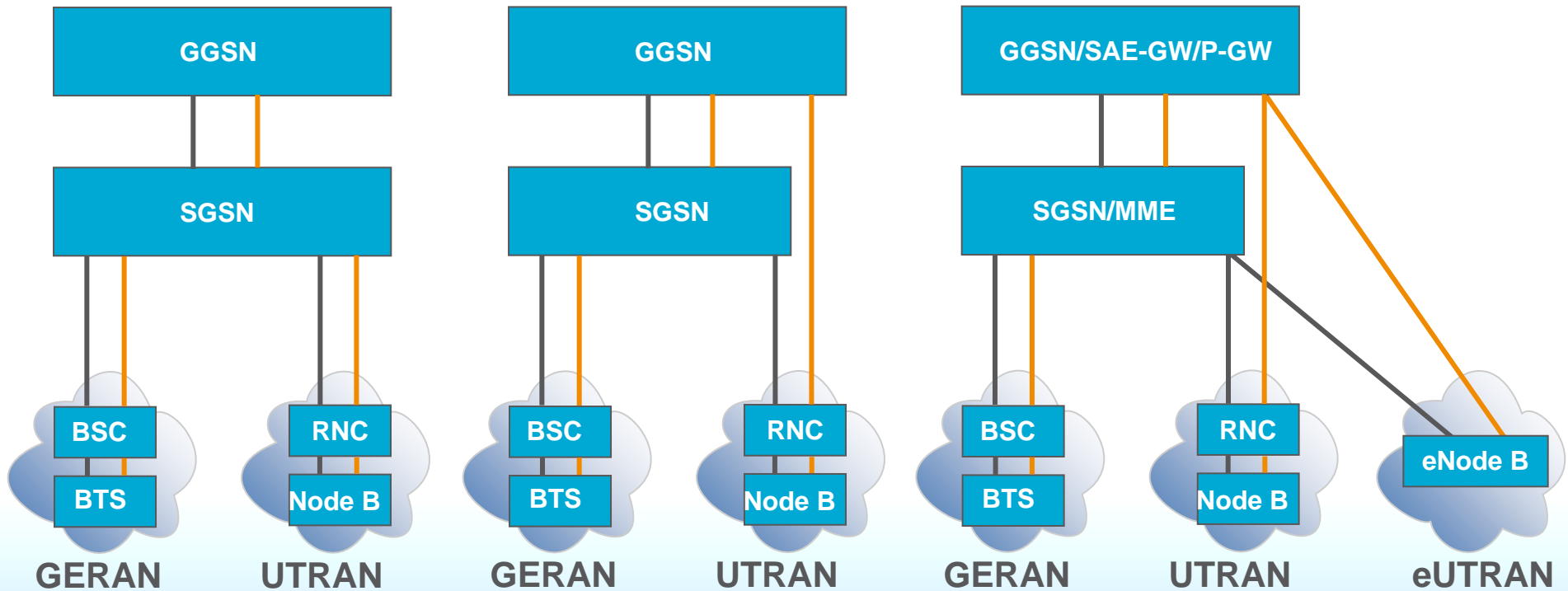
EVOLUTION PATH ARCHITECTURE

EVOLVING TOWARDS A FLAT ARCHITECTURE

3G-Traditional

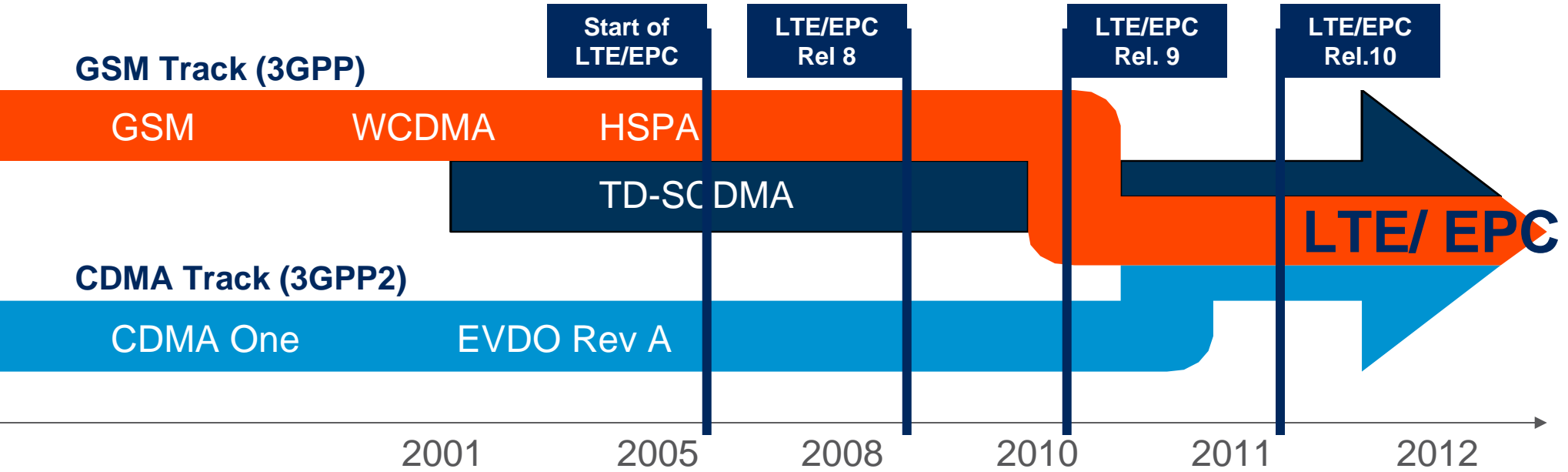
3G-Direct Tunnel

LTE



— Control plane
— User plane

LTE: MERGING TECHNOLOGIES



- Release 8 (Highlights)**
- LTE FDD & TDD Interfaces
 - LTE FDD&TDD Layer1,2,3 definitions
 - Security support
 - Mobility Features & IRAT
 - EPC Definition and support
 - EPC charging
 - Advanced Antenna: MIMO, FSS
 - CS Fall Back
 - SRVCC
 - SON Features
 - Home eNB
 - IMS Support

- Release 9**
- Positioning Support
 - LTE in 800 MHz
 - NW based Positioning
 - IMS Emergency
 - Public Warning System
 - Home eNB
 - eMBMS support in LTE
 - Enhanced DL Transmission
 - Vocoder rate adaptation
 - SON Features

- Release 10**
- Bandwidth aggregation
 - Relays and Repeaters
 - MIMO Enhancements
 - Multisite Cooperative Transmission

GLOBAL COMMITMENT



- › 64 LTE Network Operator commitments
- › 31 countries
- › Multiple UMTS operators committed to LTE as evolution path

Source: GSA

LTE TDD AND LTE FDD – IN SHORT

	TDD	FDD
DL transmission scheme	OFDM	OFDM
UL transmission scheme	DFTS-OFDM	DFTS-OFDM
Bandwidth	1.4, 3, 5, 10, 15, 20MHz	1.4, 3, 5, 10, 15, 20MHz
Minimum TTI	1ms	1ms
Subcarrier spacing	15kHz	15kHz
Cyclic prefix lengths	4.77us,16.7us	4.77us,16.7us
Modulation	QPSK, 16QAM, 64QAM	QPSK, 16QAM, 64QAM
DL Reference signals	1,2, or 4 cell specific 1 or 2 UE-specific	1,2, or 4 cell specific 1 or 2 UE-specific
PRACH	PRACH format 0-3 PRACH format 4 in UpPTS	PRACH format 0-3
HARQ	DL:Asynchronous 4-15 processes UL: synchronous 1-7 processes	DL: Asynchronous, 8 processes UL: synchronous 8 processes
Sync signals	PSS in #1/#6, SSS in #0/#5	PSS in #0,#5, SSS in #0/#5
Sounding	In uplink subframes and/or UpPTS	In uplink subframes

High degree of commonality between TDD & FDD (>95%). Differences on L1 layer

TOPICS

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› **Trials/Commercial
deployments**



TELIASONERA – COMMERCIAL NET (STOCKHOLM)

- › 0.4 €/month to 2010, June 30th,
- › 60 €/month from 2010, July 1st
- › 30 GB/month

Central Stockholm City



 LTE coverage

12/14/2009 07:30:00 CET (TeliaSonera AB)

TeliaSonera first in the world with 4G services

Today, as the first operator in the world, TeliaSonera launches 4G services commercially to customers in Stockholm, Sweden and Oslo, Norway.

"We are very proud to be the first operator in the world to offer our customers 4G services. The use of mobile broadband in the Nordic countries is exploding and customers need higher speeds and capacity. This is why we launch 4G services in both Stockholm and Oslo," says Kenneth Karlberg, President and Head of Mobility Services.

4G/LTE will open up new possibilities for customers to use and enjoy services on their laptops, requiring high transmission speed and capacity, such as advanced web TV broadcasting, extensive online gaming and web conferences.

TeliaSonera survey after 100 days collected:

- 26 percent said they are working more on a mobile basis
- 23 percent said they are downloading larger files
- 19 percent said they watch online TV/stream movies
- 16 percent said they began surfing the web more

VERIZON LTE UPDATE

DICK LYNCH @ CTIA & OTHER FORUMS - 2010



- ❖ Deployment on 10 MHz FDD in 700 Band
- ❖ 2 Cities data only launch in Summer 2010
 - Boston and Seattle (Ericsson)
- ❖ 25-30 Cities data only launch in 2010 Covering 100M Pop
- ❖ Peak rate is 60 Mbps & Average throughput ~12 Mbps
- ❖ Data only launch first followed by voice + data in 2011
- ❖ First LTE smart-phones in mid-2011
- ❖ Several Initiatives in Place to Support LTE Uptake
 - *Open Development Forum* – LTE Device Testing
 - *Verizon Technology Innovation Centre* – Non Traditional Products
 - *Verizon Developer Conference* – 4000 Application Developers
 - *LTE Venture Forum* – Involving Venture Capital Funds



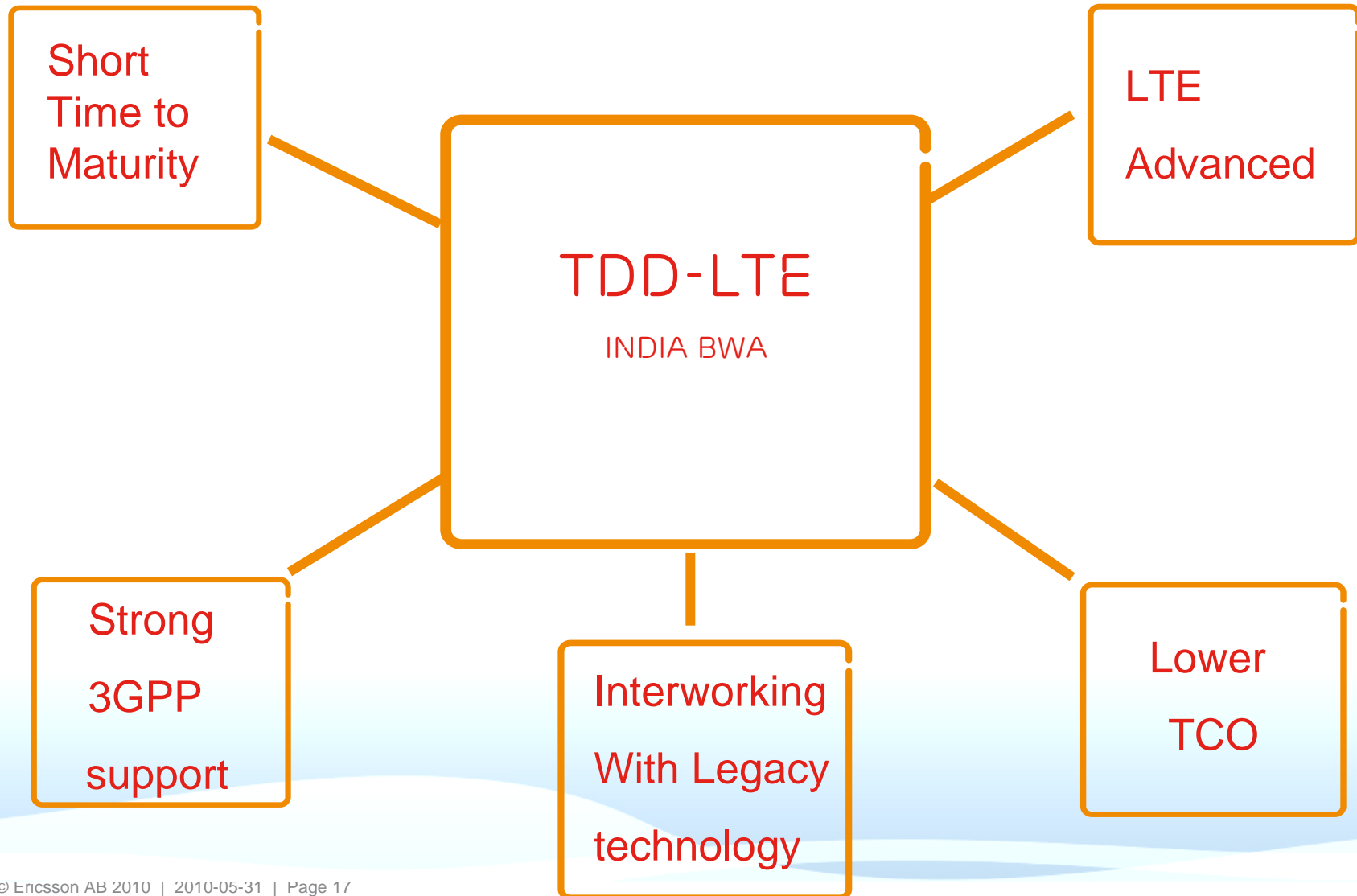
TDD-LTE TRIAL RESULTS OVERVIEW

- › TD-LTE Testing performed in 2009
 - Venue: Beijing, China

- › Field Test with one RBS and 3 UEs

Frequency	2.6GHz
Bandwidth	10MHz
Frame Structure	FS2 5ms
DL/UL Ratio	2:1:2
DwPTS:GP:UpPTS	10:2:2
MIMO Schemes	DL 2*2 Spatial Multiplexing and Tx Diversity UL 1*2

SUMMARY





ERICSSON