

LTE Primer

World Broadcasting Union - ISOG

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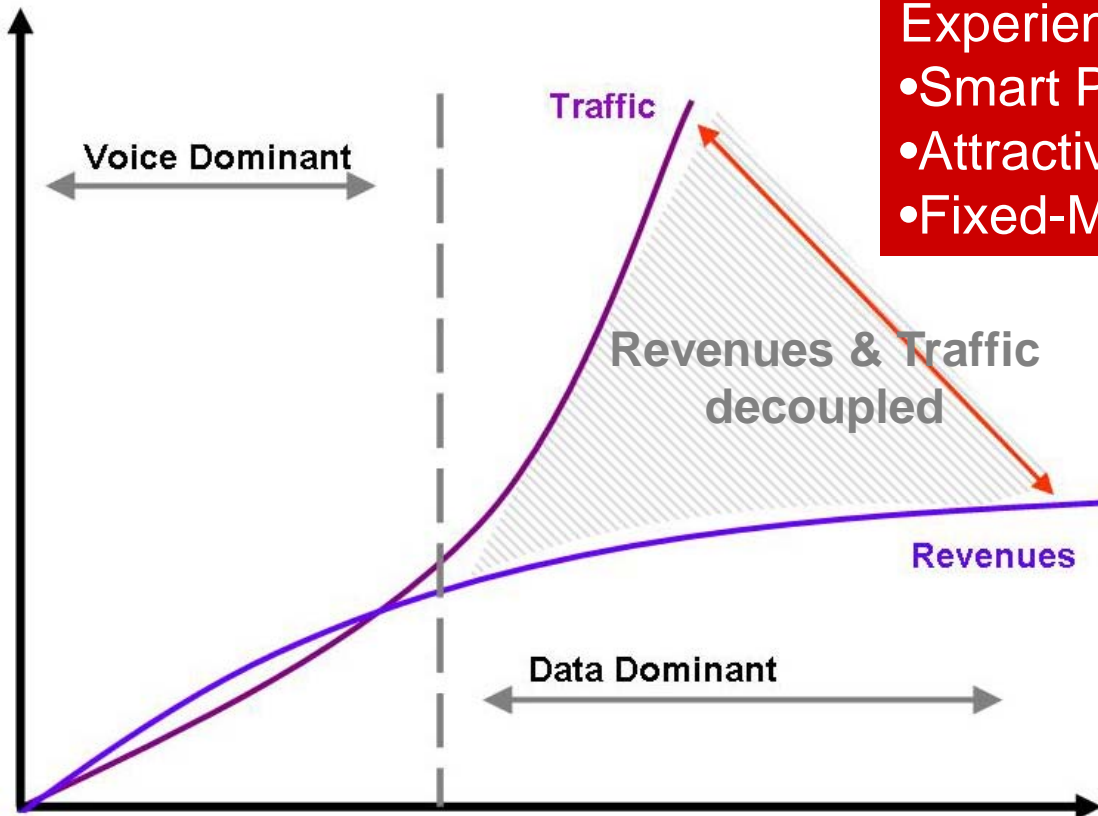
Agenda

- Main drivers for LTE
- What does LTE bring to the table?
- Who is committed to LTE?
- LTE Device Roadmap
- Rogers Path to LTE/4G

LTE Drivers: Need to accommodate huge traffic growth with a dramatic reduction in cost per bit

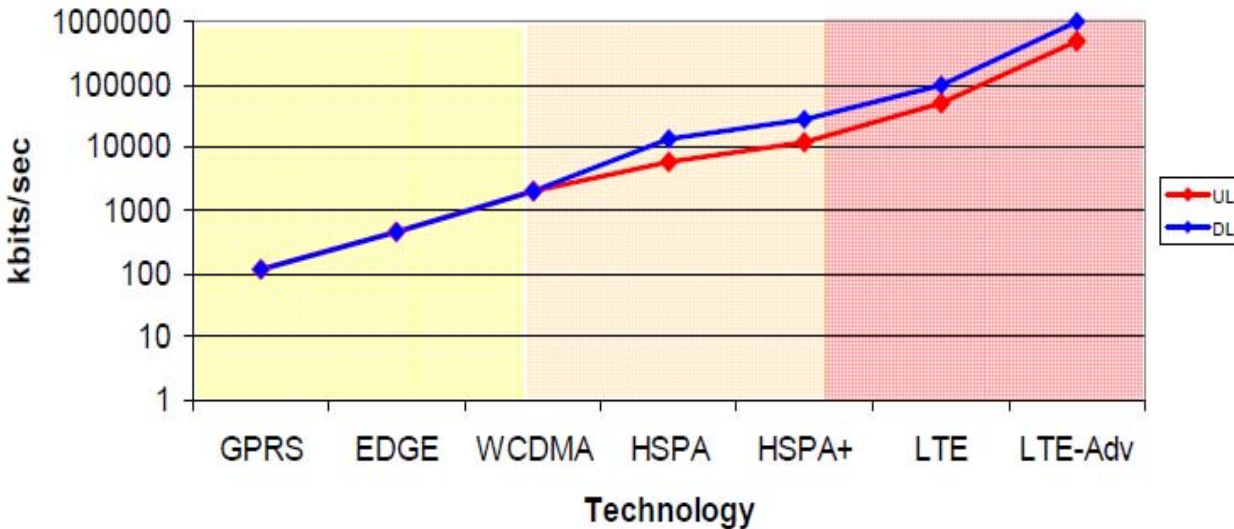
Mobile Broadband Traffic Drivers

- Critical Mass Market Adoption
- Compelling Data Applications
- Improving Mobile Broadband Experience
- Smart Phone Popularity
- Attractive Pricing
- Fixed-Mobile Substitution/Convergence

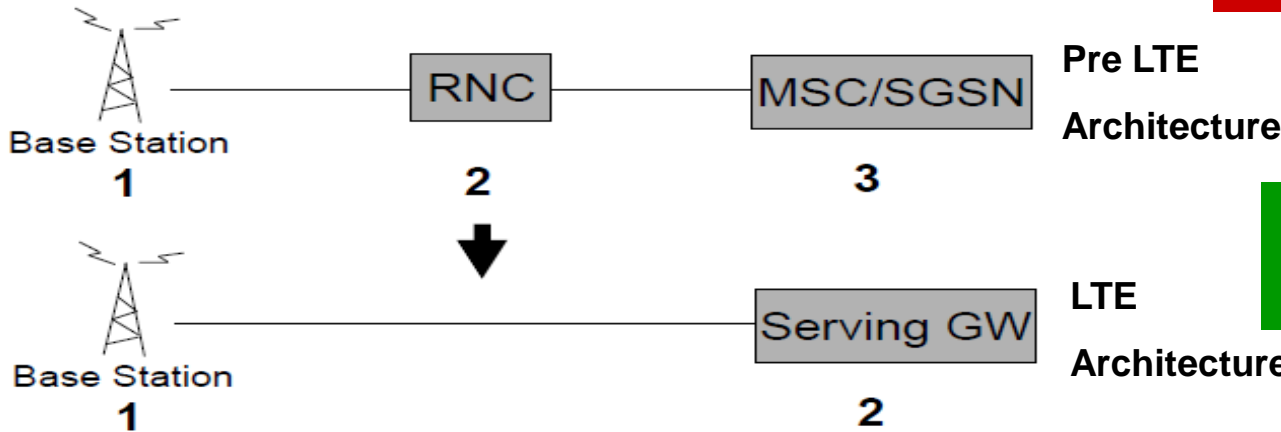


What does LTE bring to the table?

Peak Network Data Rates



- More Spectrum efficiency
- More spectrum flexibility
- FDD&TDD Support
- Latency reduced
- Network flattened from 3 to 2 nodes
- Self organizing network used for O&M

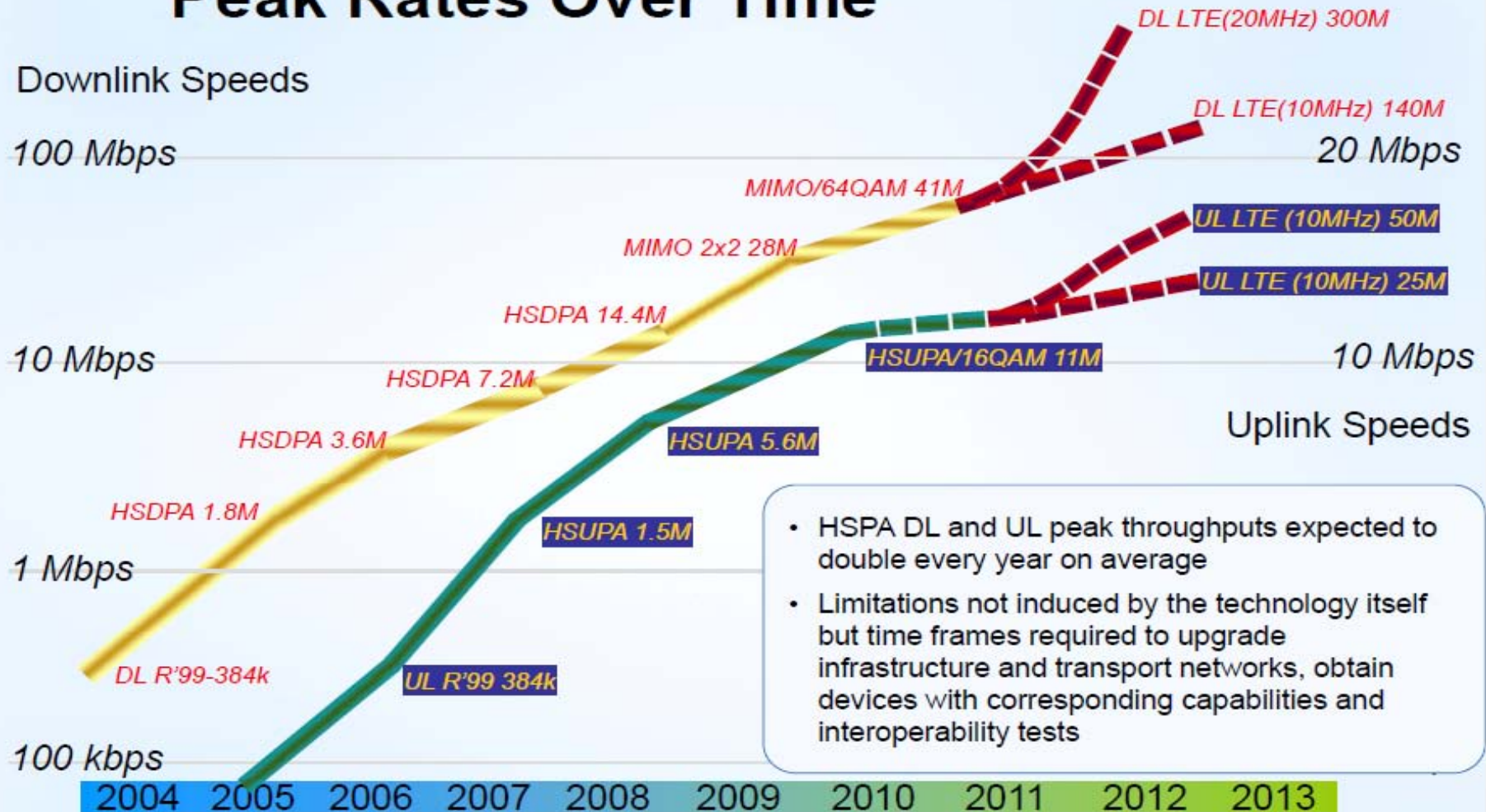


Higher data rates and lower cost per bit



Data Rates

Peak Rates Over Time



Who is committed to LTE?

Commitments globally

- 101 LTE network commitments in 41 countries
- Up to 22 LTE networks in service by end 2010
- Around 50 LTE networks in service by end 2012
- 31 additional pre-commitment LTE trials



Source of data: GSA Information Paper "Evolution to LTE" – August 26, 2010

LTE Devices Roadmap

Source: IDATE, from chipset vendors and terminal manufacturers

HSPA data dominance
HSPA dominates Mobile Broadband
GSM Voice

Multi mode LTE chipset
LTE / HSPA / EDGE / EVDO-RevB
FDD / TDD
Multi bands



LTE data expansion
First commercial LTE deployments
GSM Voice

LTE Volume creation
Nationwide coverage
LTE VoIP

Laptops / Modems
Embedded chipsets
PC cards / dongles
Fixed modems



High end phones
Handset optimized chipsets
CS Fallback



Large volume production
Multi mode / multi bands
Low power consumption
CS Fallback + IMS VoIP

2G / 3G replacement
Refarming of 2G / 3G bands

Device availability is key to LTE take-off, first through laptops then high-end phones and on to the mass market

LTE handsets diffusion
In Western Europe

2010

2012

2014

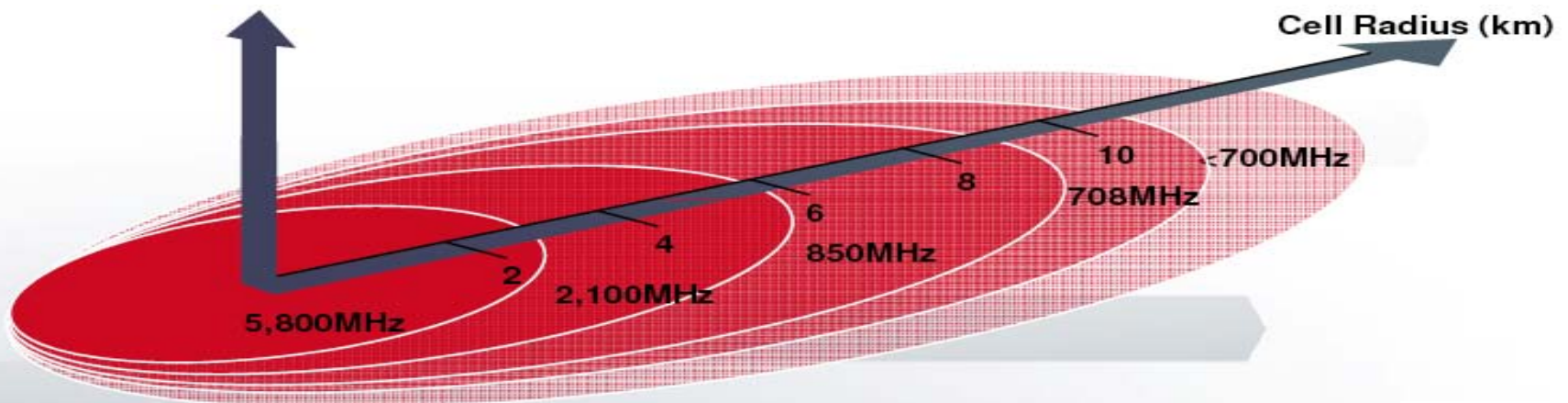
2016

2018

2020

LTE Spectrum

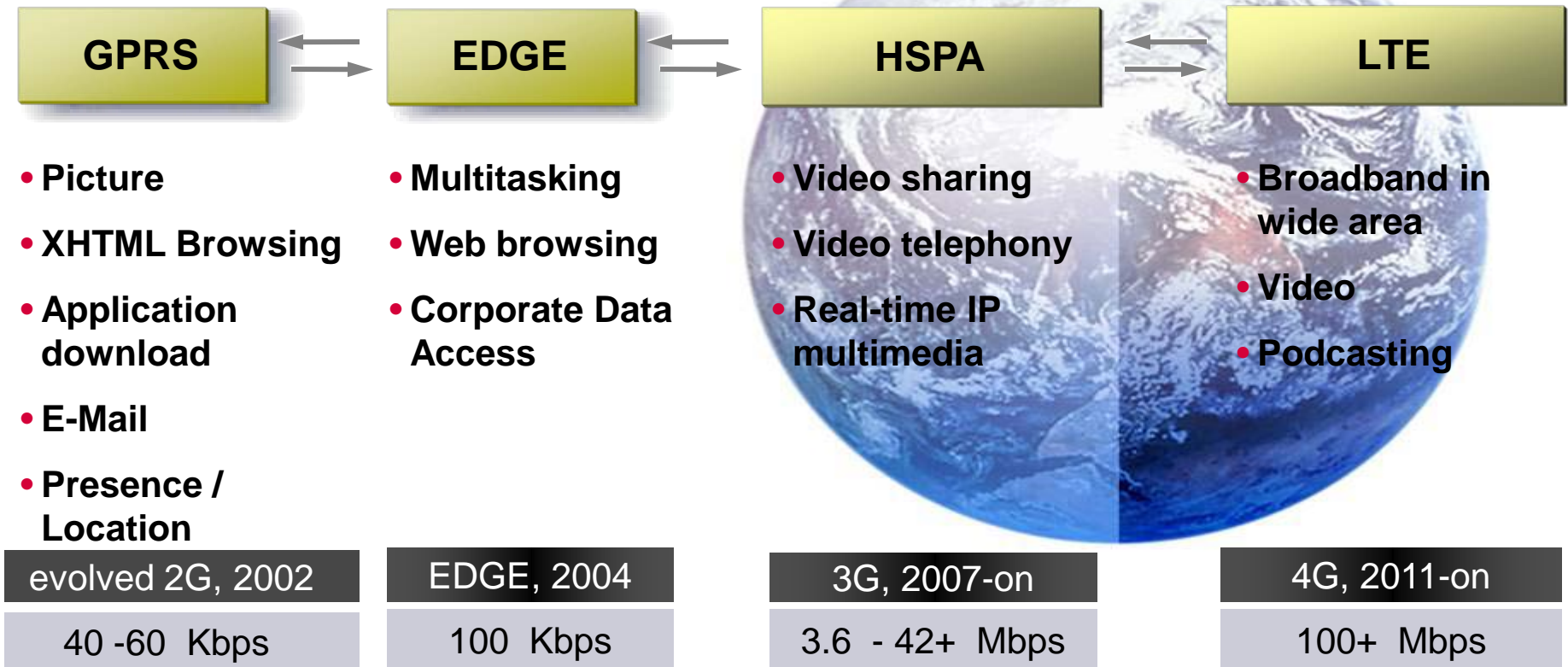
- An operator may introduce LTE in 'new' bands where it is easier to deploy 10 MHz or 20 MHz carriers for maximum benefits of using LTE
 - 2.6 GHz band(*IMT Extension band*)
 - *Digital Dividend spectrum* 700, 800 MHz
 - or in *re-farmed existing mobile bands* e.g. 850, 900, 1700, 1800, 1900, 2100 MHz
- 2.6 GHz (for capacity) and DD 700/800 MHz (wider coverage, improved in-building) is a good combination
- LTE offers a choice of carrier bandwidths: 1.4 MHz to 20 MHz



The propagation characteristics of spectrum

Rogers has a clear path to 4G technology

Improved performance, decreasing cost of delivery



Thank you !