



DEMAND OF SPECTRUM FOR MOBILE BROADBAND – SPECTRUM FOR FUTURE WIRELESS TECHNOLOGIES

MATS NILSSON, VP & HEAD EU AFFAIRS

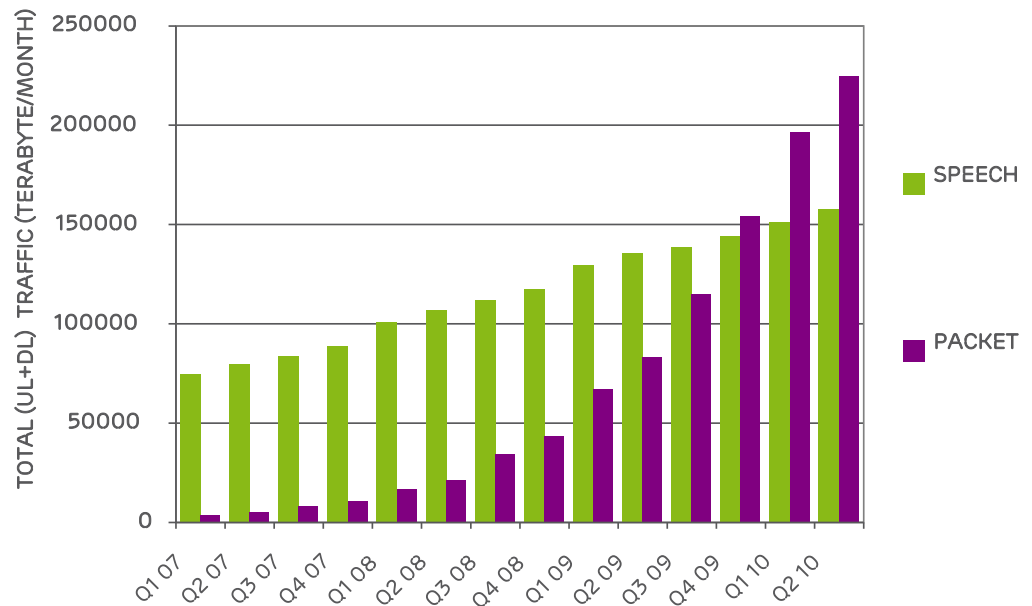
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STRONG GROWTH IN MOBILE BROADBAND

Rapid subscriber uptake

- › **625 million** WCDMA/HSPA subscribers
- › 15 million new HSPA subscribers per month, 330 million in total
- › **2579 HSPA devices** are launched from 235 suppliers
- › HSPA is deployed in 315 networks in 133 countries/ territories
- › **57 HSPA+ networks** launched
- › **92%** of the traffic in WCDMA/HSPA networks **is data**

Exceptional traffic growth



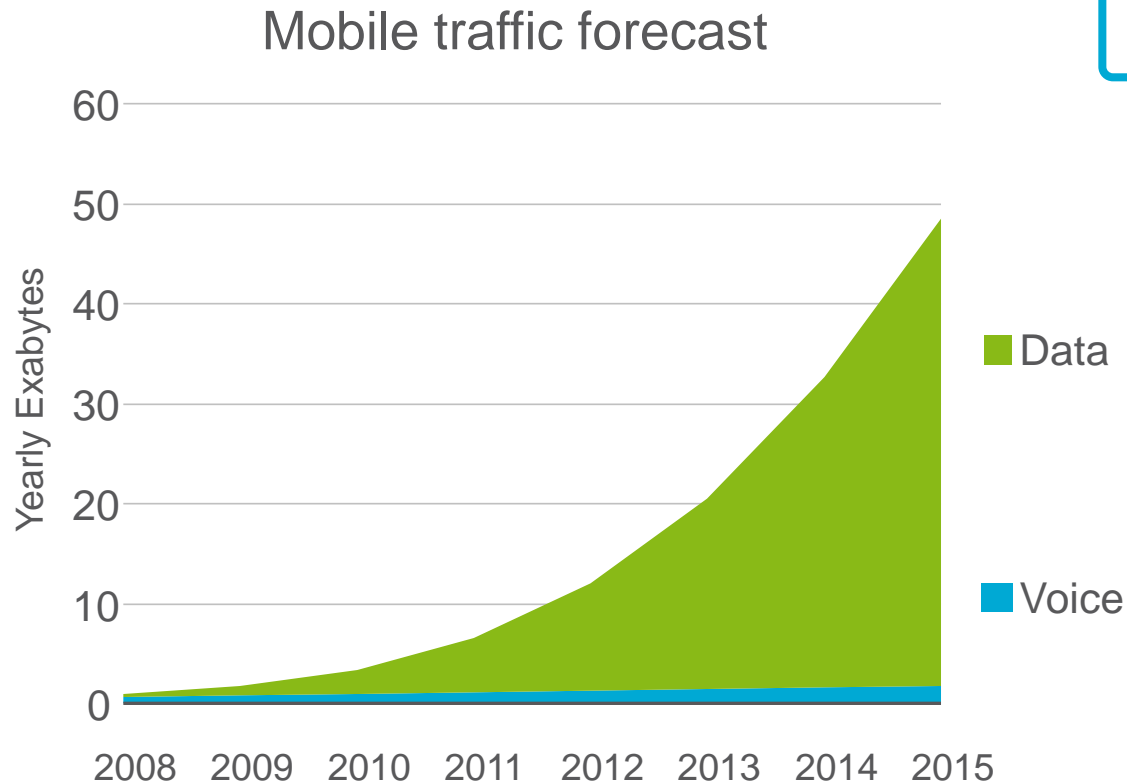
Source: UMTS, GSA and Ericsson NetQB, August-2010

LTE WILL ACCELERATE THIS TREND FURTHER – MORE SPECTRUM NEEDED!

TRAFFIC GROWTH IN MOBILE NETWORKS - FORECAST

This slide contains forward looking statements

M2M traffic to be added on top



Source: Ericsson

BEHAVIOR AS IN FIXED – HIGH DEFINITION VIDEO STREAMS – 50 B. DEVICES 2020

EVERYTHING WILL BE CONNECTED

Drivers

- Entertainment, security, health
- Productivity, new revenues
- Sustainability, regulation

Connected consumer electronics



Intelligent transport, industry and society, smart utilities

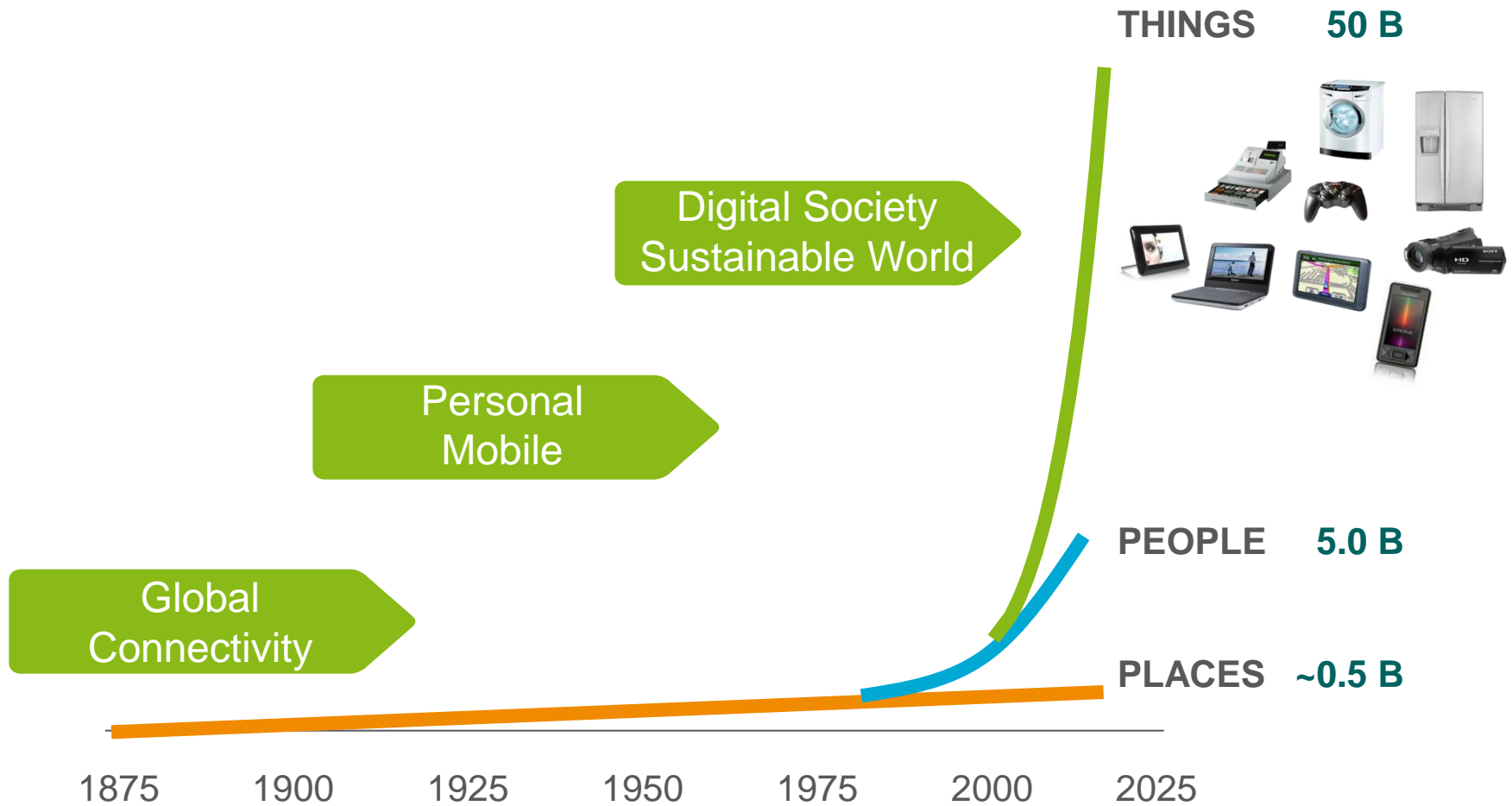


- Broadband ubiquity
- Declining cost of connectivity

Enablers

50 BILLION CONNECTED DEVICES

THE NEXT INDUSTRIAL REVOLUTION

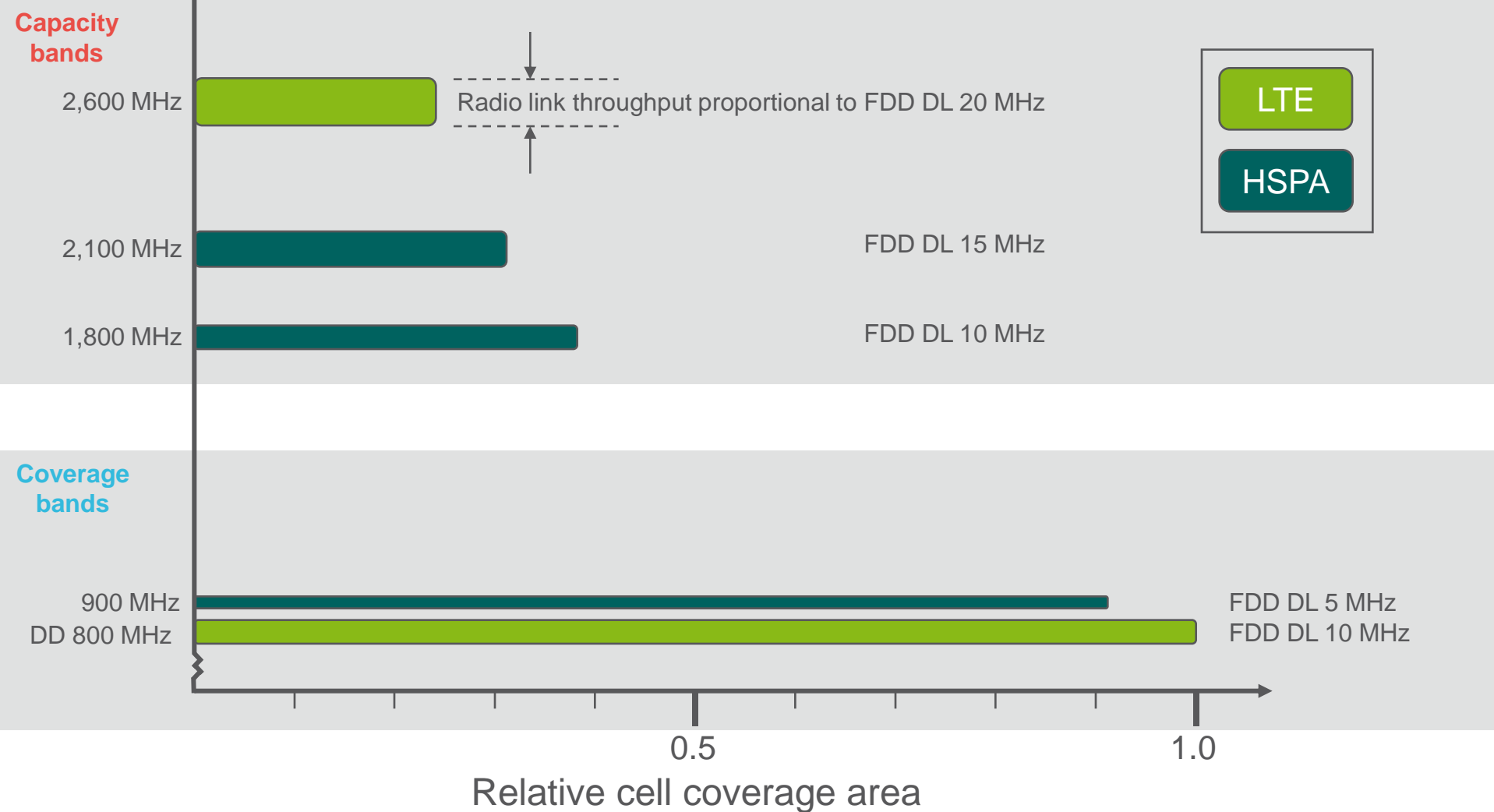


Source: Ericsson

BROADBAND CAPACITY & COVERAGE

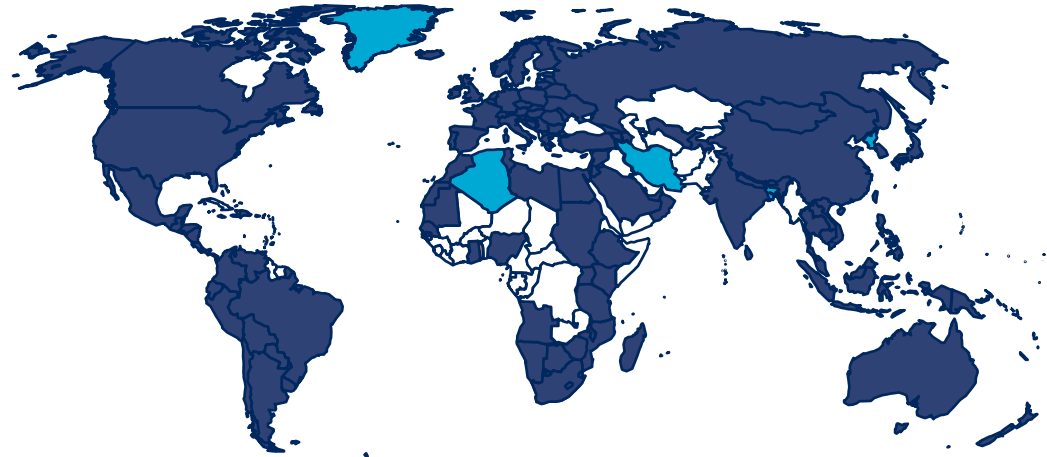
- TYPICAL DEPLOYMENT BY A EUROPEAN OPERATOR

Assumptions: Propagation based. Suburban environment. Reference frequency is 800 MHz.
 5 dB higher antenna gain at 2,100 MHz and 6 dB higher antenna gain at 2,600 MHz.
 LTE and HSPA: re-use 1



HSPA AROUND THE WORLD

- › 365 networks
 - 150 countries
- › >2 579 devices
 - 235 suppliers

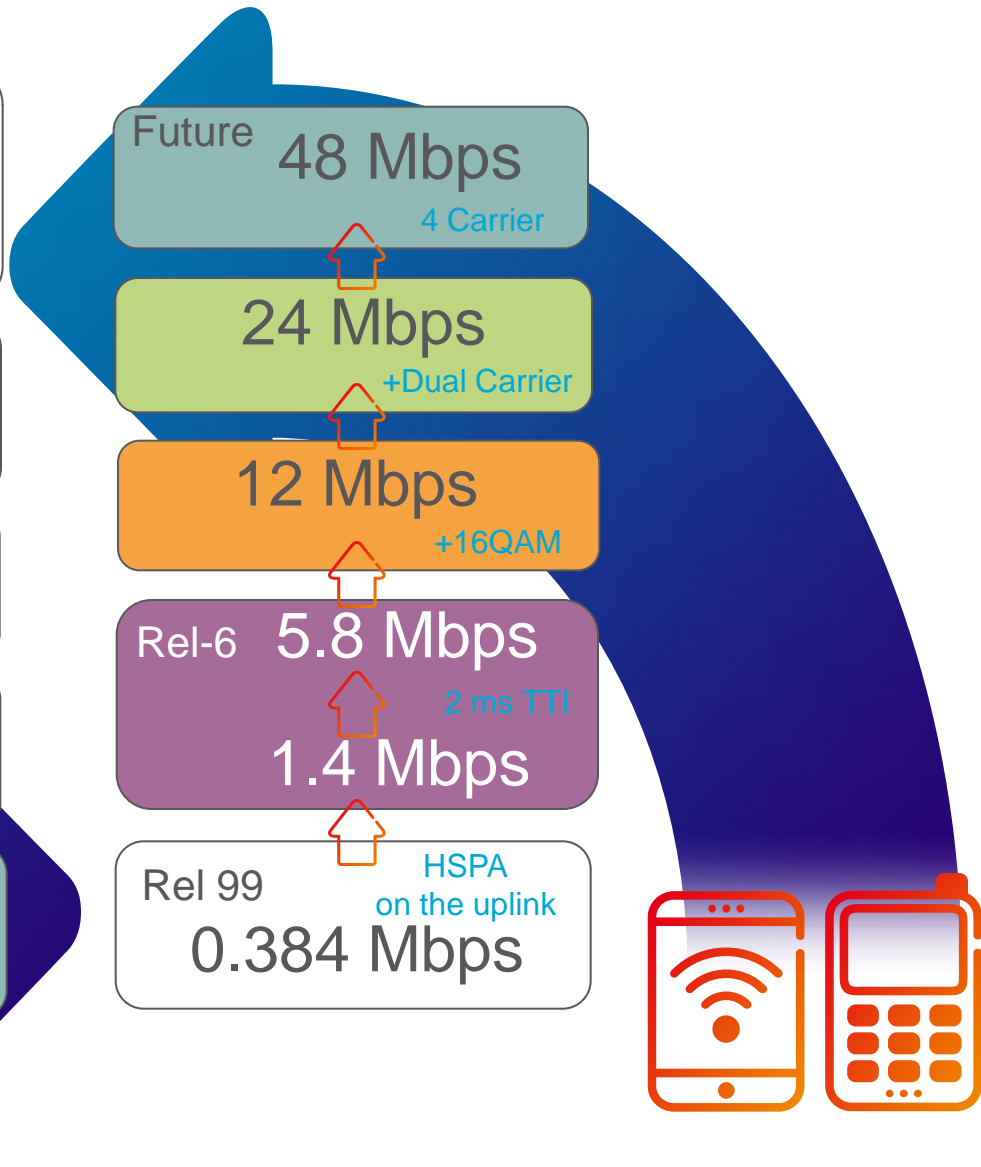
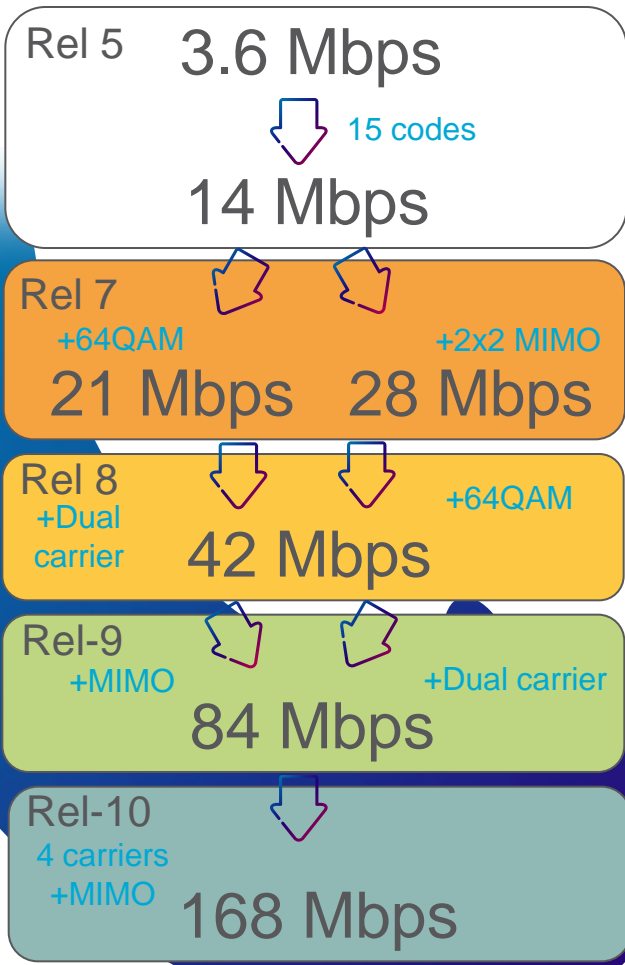


■ Commercial HSPA
■ HSPA Commitments



| | 2009 | 2010 | 2012 |
|----------------------------|-----------|-----------|--------------------|
| Peak rate | ~21 Mbps | ~42 Mbps | ~160 Mbps |
| Typical user rate downlink | 4-16 Mbps | 8-30 Mbps | Operator dependent |
| Typical user rate uplink | 1-4 Mbps | 2-5 Mbps | Operator dependent |
| Spectrum | 5 MHz | 10 MHz | 20 MHz |

HSPA EVOLUTION – PEAK DATA RATES



LTE AROUND THE WORLD

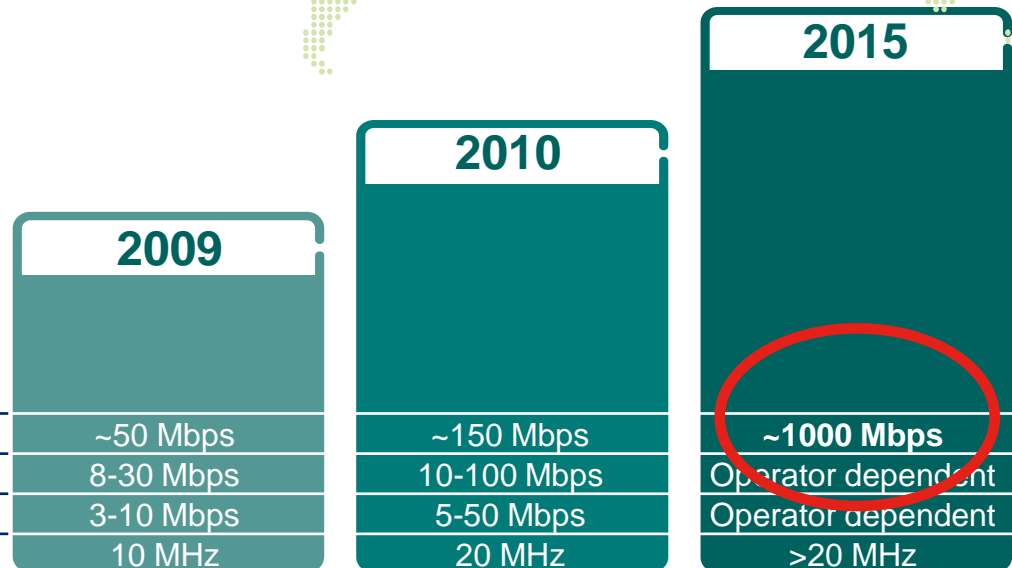
> 101 operators in 41 countries committed to deploy LTE



Dongles now

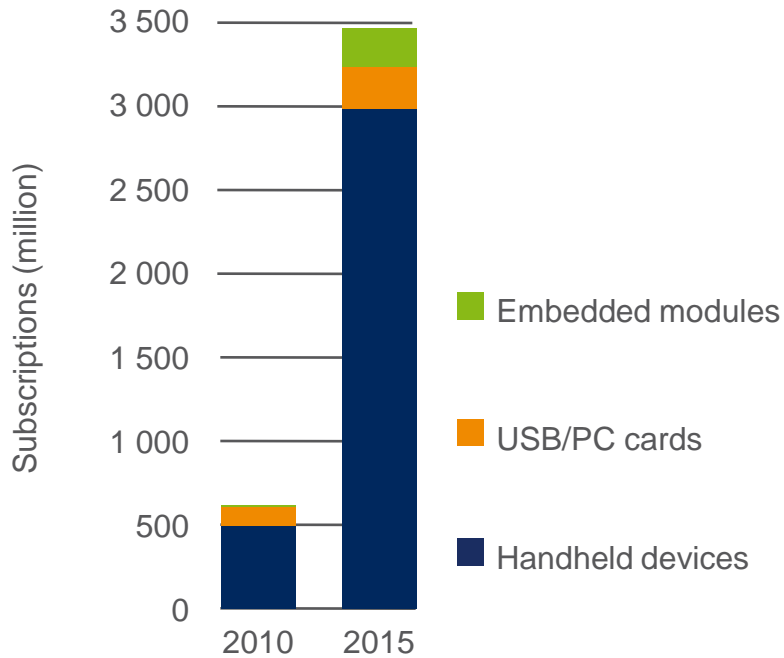


Smartphones starting now

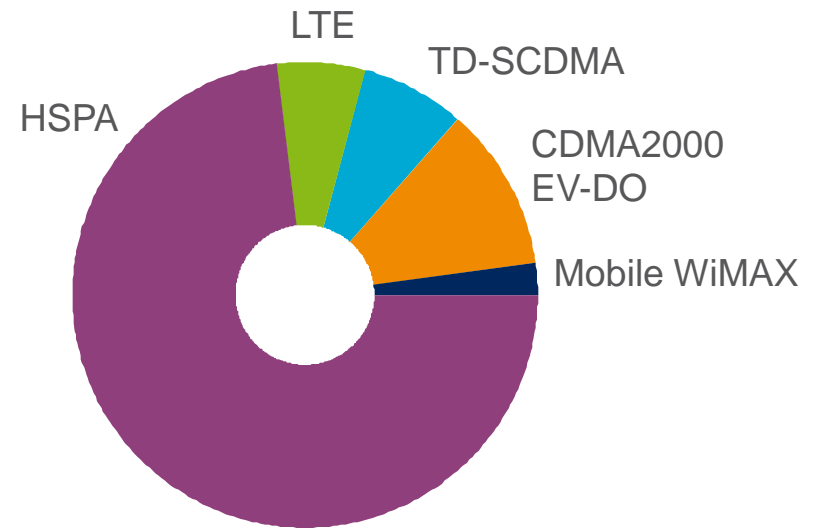


Source: GSA August, 2010

SMARTPHONES DOMINATE



Subscription types



Technology share 2015

HANDHELD DEVICES DOMINATE MOBILE BROADBAND

"MAIN MENU" - COVERAGE AND CAPACITY BANDS

› Coverage

- 900 MHz
- 850 or 800 MHz
- 700 MHz

› Possible combinations

- 900 and 800 MHz
- 850 and 700 MHz

› Capacity

- 1710–1755(1770) / 2110-2155(70) AWS(3G Americas) or GSM1800
- PCS1900 or IMT Core band (1920-1980 / 2110-2170)
- 2.6 GHz (IMT Extension)

› Possible combinations

- AWS(3G Americas) and PCS1900
- GSM1800 and IMT Core Band

- 2.6 GHz - Universally

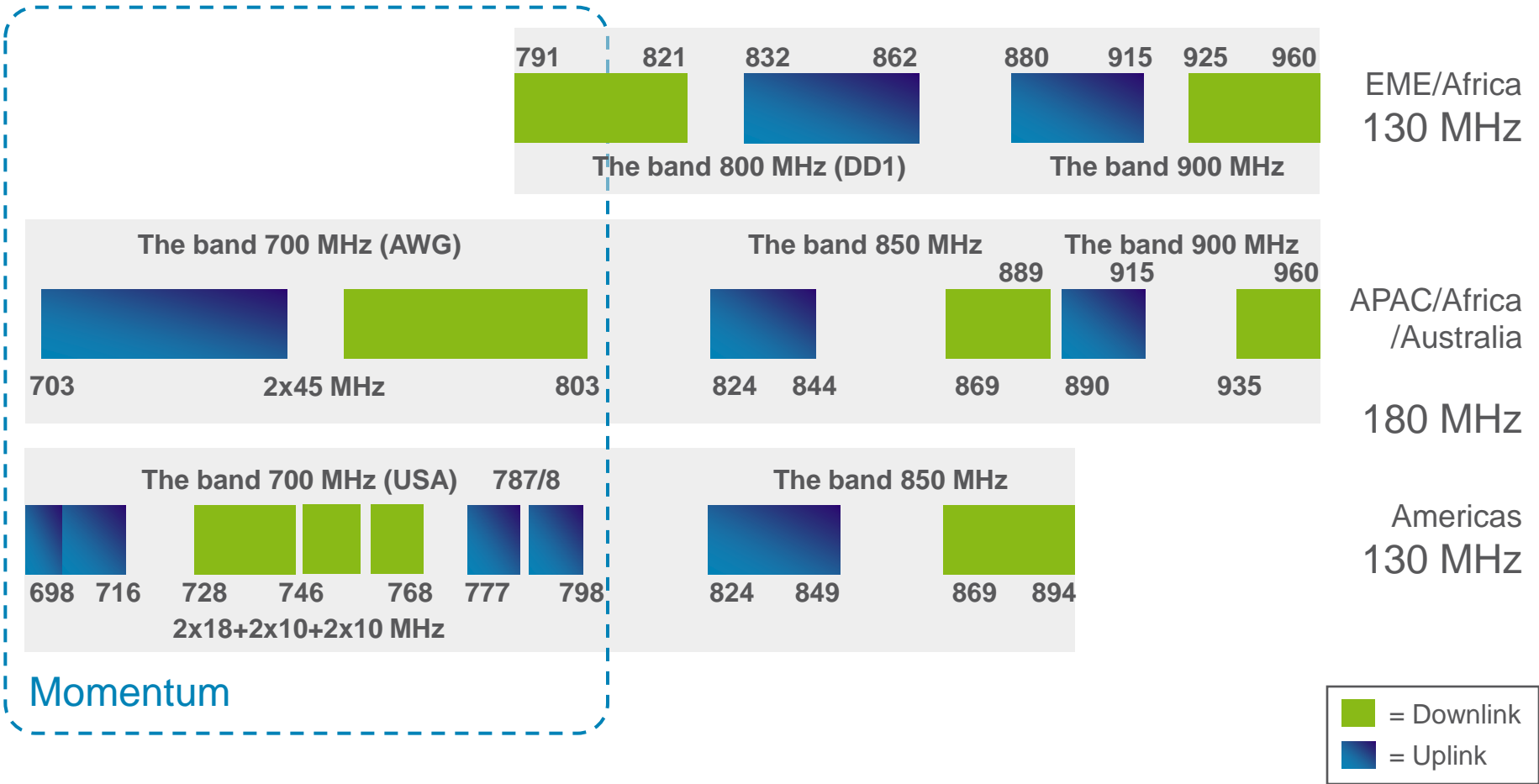
HARMONIZED SPECTRUM

– EXAMPLE IN THE “2.6 GHZ BAND”



- › Well specified frequencies for FDD Up/Downlink, TDD and guard band for interference free operation
- › The 2.6 GHz arrangement is defined by CEPT for Europe and CITELE for Latin America with 2 x 70 MHz FDD and 50 MHz TDD
- › 3GPP has specified the arrangement for the development of standardized products
- › Global harmonization and maximum economies of scale benefits can be achieved by adherence to the CEPT/CITELE approach

THE UHF BAND FOR MOBILE BROADBAND



OPPORTUNITY TO ENABLE BROADBAND FOR ALL

CURRENT 3GPP FREQUENCY BANDS

| FDD | | |
|-------------------------|--------------------|--|
| Band | "Identifier" | Frequencies (MHz) |
| 1 | IMT Core Band | 1920-1980/2110-2170 |
| 2 | PCS 1900 | 1850-1910/1930-1990 |
| 3 | GSM 1800 | 1710-1785/1805-1880 |
| 4 | AWS | 1710-1755/2110-2155 |
| 5 | 850 | 824-849/869-894 |
| 6 | 850 (Japan) | 830-840/875-885 |
| 7 | IMT Extension | 2500-2570/2620-2690 |
| 8 | GSM 900 | 880-915/925-960 |
| 9 | 1700 (Japan) | 1750-1785/1845-1880 |
| 10 | 3G Americas | 1710-1770/2110-2170 |
| 11 | 1500 (Japan) | 1428-1453/1476-1501 |
| 12, 13, 14, 17 | US 700 | 698-716/728-746 777-787/746-756 788-798/758-768 704-716/734-746 |
| 18 | 850 (Japan #2) | 815-830/860-875 |
| 19 | 850 (Japan #3) | 830-845/875-890 |
| 20 | 800 (Europe) | 791-821/832-862 |
| 21 | 1500 (Japan #2) | 1447.9-1462.9/1495.9-1510.9 |
| TBD | L-Band | 1626.5-1660.5/1525-1559 |
| TBD | 2 GHz NorthAmerica | 2000-2020/2180-2200 |

| TDD | | |
|-------|--------------------------|------------------------|
| Band | "Identifier" | Frequencies (MHz) |
| 33,34 | TDD 2000 | 1900-1920 2010-2025 |
| 35,36 | TDD 1900 | 1850-1910 1930-1990 |
| 37 | PCS Center Gap | (1915)1910-1930 |
| 38 | IMT Extension Center Gap | 2570-2620 |
| 39 | China TDD | 1880-1920 |
| 40 | 2.3 TDD | 2300-2400 |
| 41 | 2600 for US | 2496-2690 |

| Work in progress (FDD&TDD) | | |
|----------------------------|-------------------|-----------|
| TBD | 3.5 GHz (FDD/TDD) | 3400-3600 |
| TBD | 3.7 GHz (FDD/TDD) | 3600-3800 |

| Study in progress (FDD) | | |
|-------------------------|---------------|-----------------|
| TBD | 850 extension | 806-849/851-894 |

4G/LTE DEPLOYMENTS IN 4 BANDS IN 2010

2600 MHz in Europe – LTE FDD

Commercial service in 2010

- TeliaSonera (Sweden) launched in December 2009 and CSL (Hong-Kong) will launch in November 2010
- Several major countries in Europe and Latin America plan to auction spectrum during 2010
- Over time this band will be a global band for LTE (FDD & TDD)

AWS in North and Latin America – LTE FDD

- MetroPCS (United States) launched in September 2010
- Several countries in Latin America are expected to issue licenses in the near future

700 MHz in the US – LTE FDD

- Verizon launched on December 5, 2010

2100 MHz in Japan – LTE FDD

- NTT DoCoMo committed to start LTE service in December 2010

800 MHz in Europe – LTE FDD

Commercial service in 2011

- First spectrum auctions concluded - Germany
- Deployments have started

2300 MHz in APAC – TD-LTE

- India BWA auction opens up for TD-LTE. Potential large deployment and business synergies with 3G.
- MIIT tests have started in China, strong push for TD-LTE as an evolution of TD-SCDMA, deployments may start ~2011.
- Over time this band will be a global band for LTE (TDD)

SPECTRUM FOR MOBILE BROADBAND

- REGIONAL MAINSTREAM HSPA & LTE DEPLOYMENTS

[MHz]

North America
Base: 850, AWS & 1900
New: **US700**
2011+: re-farming/LTE

Europe
Base: 2100
New: **900 & 2600**
2011+: 800 & 1800

Japan
Base: 2100, 1700 & JP850
New: **1500 & re-farm/LTE**
2011+: re-farming/LTE

Latin America
Base: 850 & 1900
New: **AWS & 2600**
2011+: AP700

MEA
Base: 2100
New: **900 & 850**
2011+: 2600, AP700 & 800

APAC
Base: 2100
New: **900 & 850**
2011+: 2300, 2600, 1800 & AP700



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