



# Policy, Regulatory Framework for the Advancement of IMT

*Interoperability of IMT Advanced with Existing Wireless Systems and Networks*

7<sup>th</sup> June 2010

# Brief History of the GSMA

Founded in 1987 by 15 operators committed to the joint development of a cross border digital system for mobile communications.

Became the global trade group for the mobile industry, representing the vast majority of mobile phone networks across the world

Now encompassing commercial, public policy and technical initiatives, ensuring mobile services work globally

The Association's members now serve more than 3.5 billion customers:

More than 750 operator Members across 218 countries.

Over 200 Associate Members (manufacturers and suppliers)

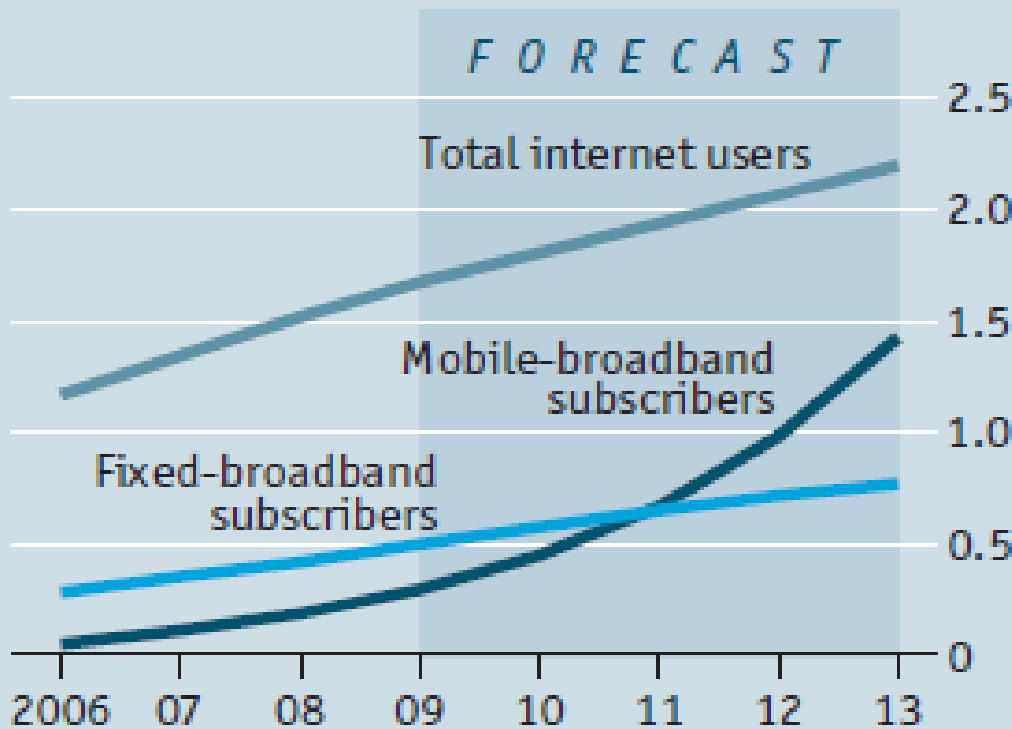


# Why ubiquitous broadband needs mobile

## Watch it take off

Internet users, bn

7



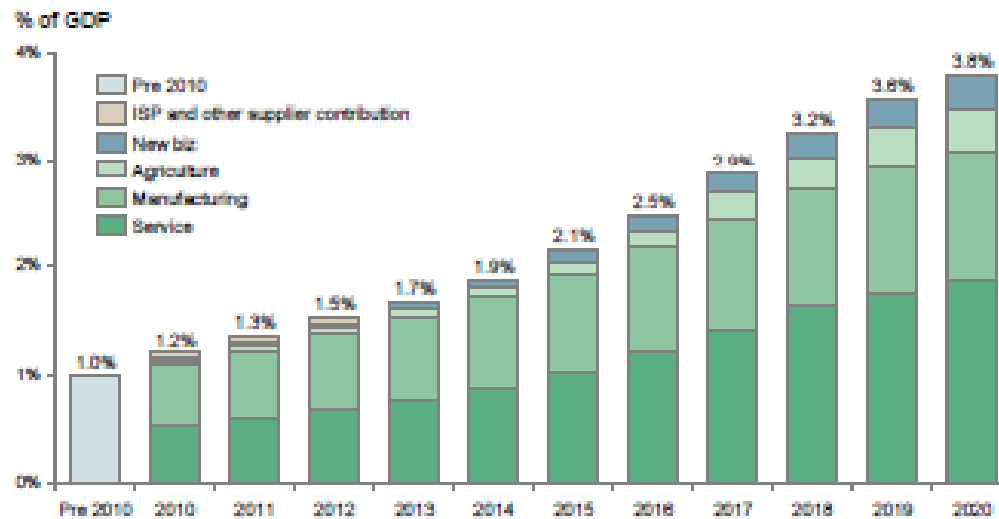
Sources: Informa Telecoms & Media; ITU; Forrester Research

Economist special report : **“Mobile Marvels”** – Sept. 09

- Mobile broadband will overtake fixed in the year 2011

# Economic value of Broadband in Thailand

Overall impact expected to grow to ~3.8% of GDP in 2020



Note: Assumptions made in the model are part of the Economic Impact assumptions section.  
Source: NBS; EU; CIA World Factbook; Statsoft; UNCTAD; OECD; EU; Deloitte; MIT/OCW; Expert Interviews; ROI analysis  
The Boston Consulting Group

Source: **Towards A Connected World - Socio-Economic Impact of Internet in Emerging Economies** ~ by Boston Consulting Group for Telenor Group, 2009

# LTE Advanced – No impact on the core

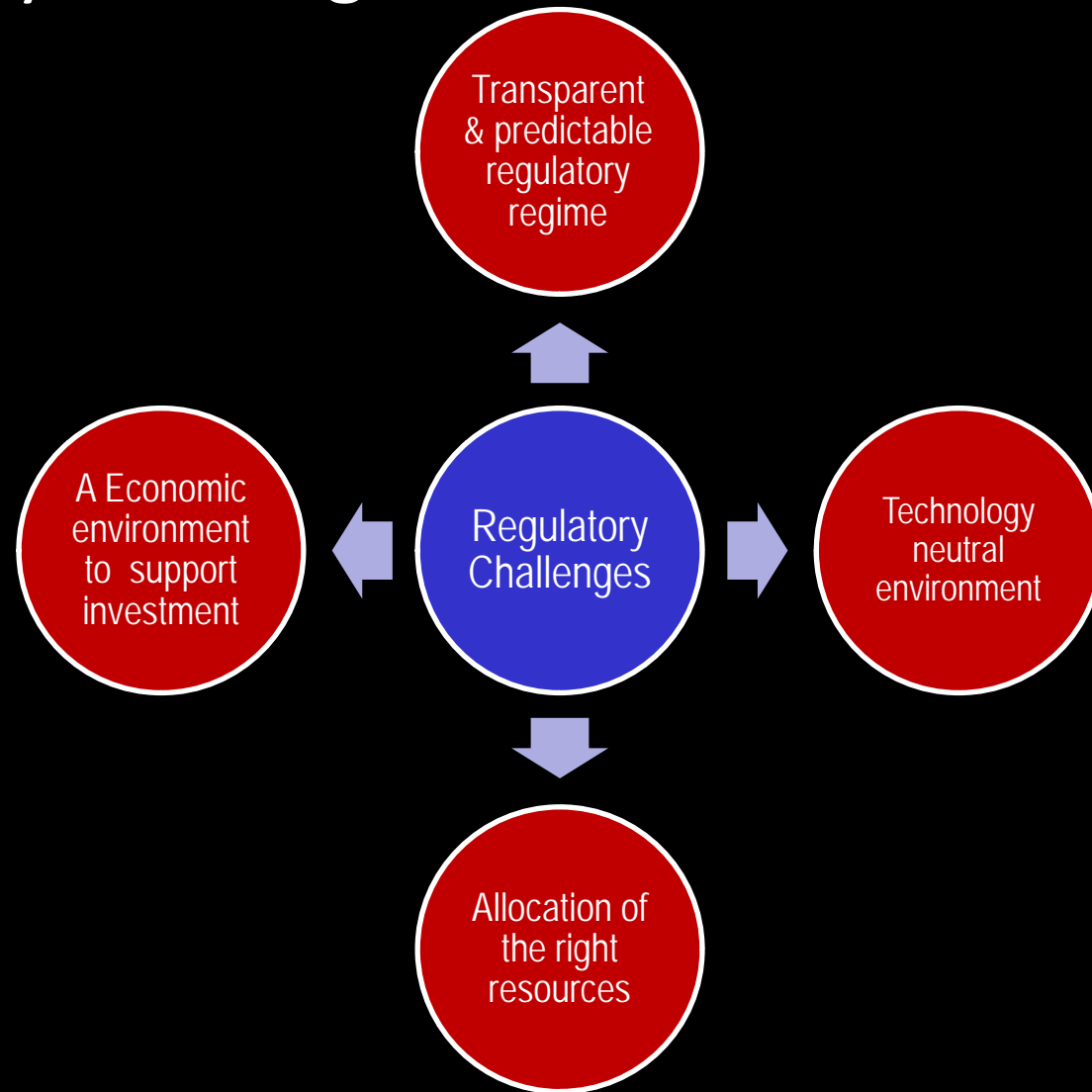
- The introduction of LTE Advanced will take advantage of the majority of the Mobile Core provided in the deployment of LTE
- Backward compatibility with GSM/UMTS/HSPA
- The significant changes will be in the radio network and the capabilities it offers:
  - Handover to Heterogeneous networks
  - Support of IPV6
  - QoS
  - Advanced Antenna's
  - Software Defined Radio (SDR)

GSMA Wi-Fi Offload Whitepaper : <http://gsmworld.com/newsroom/document-library/index.htm#nav->

# Potential Regulatory challenges faced

- Technology specific regulations and licenses e.g. Wi-Fi, GSM, UMTS, WiMax
- Location information – various regulatory requirements which are not necessarily designed according to the near future technological reality
- Requirements on the installation of base stations (license conditions)
- QoS – on none 3GPP networks e.g. Wi-Fi
- QoS – performance on the 3GPP Network & Net Neutrality

# Regulatory Challenges

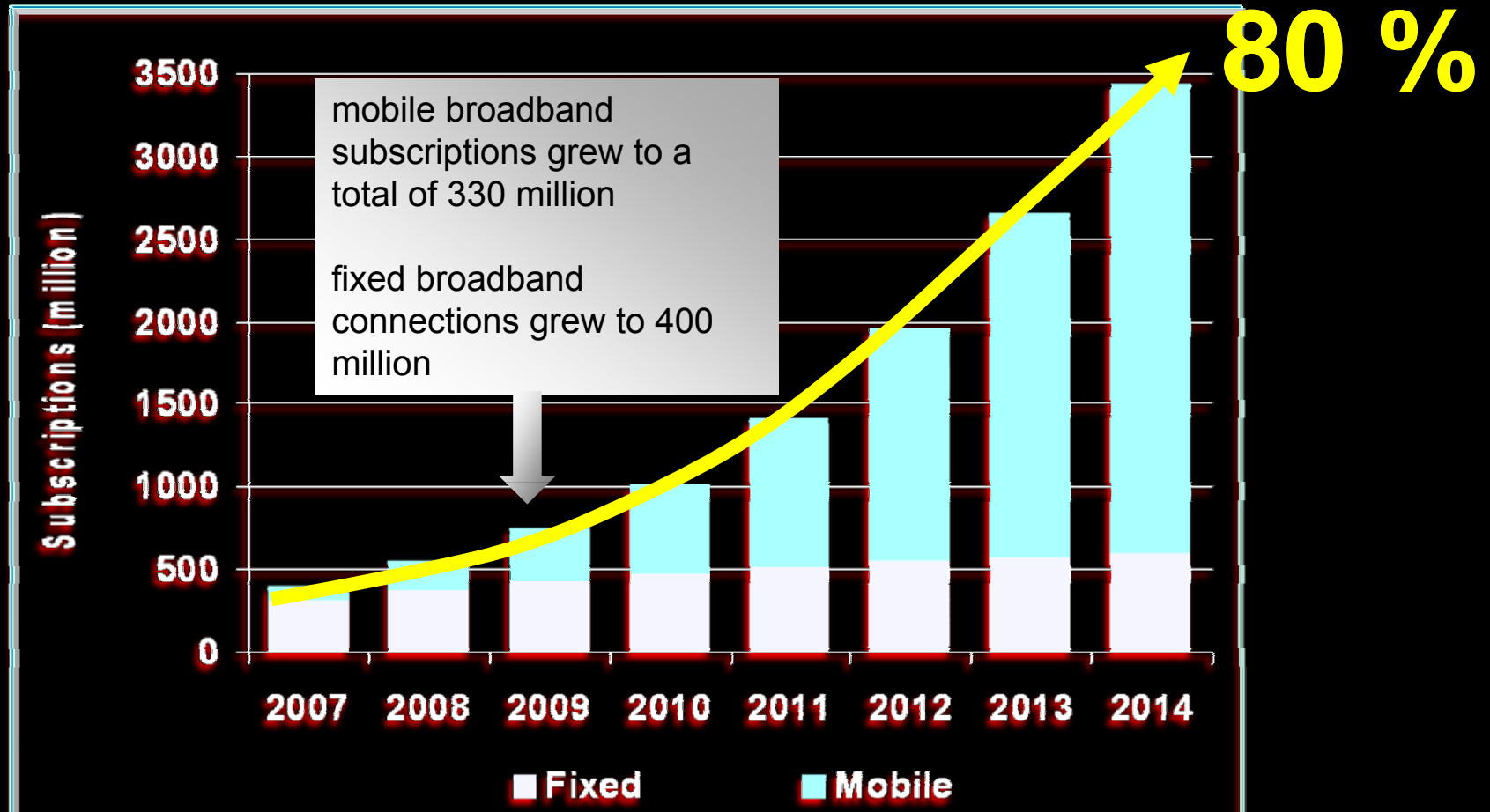


# A Economic environment to support investment

- Abolish (or at least reduce) sector specific taxation and duties to drive penetration
- Incentive schemes to promote Universal service not USO funds
- The ability to provide consumers with QoS will mean that mobile operators will need manage the data on their networks (Net Neutrality)
- Ensure the right payment approach to promote sustainability and growth (IP regulation)
- The allocation of the right spectrum will lower the cost for the consumer (to optimize mobile operators need the right combination of harmonised coverage and capacity bands)

# Technology neutral environment

## Mobile broadband



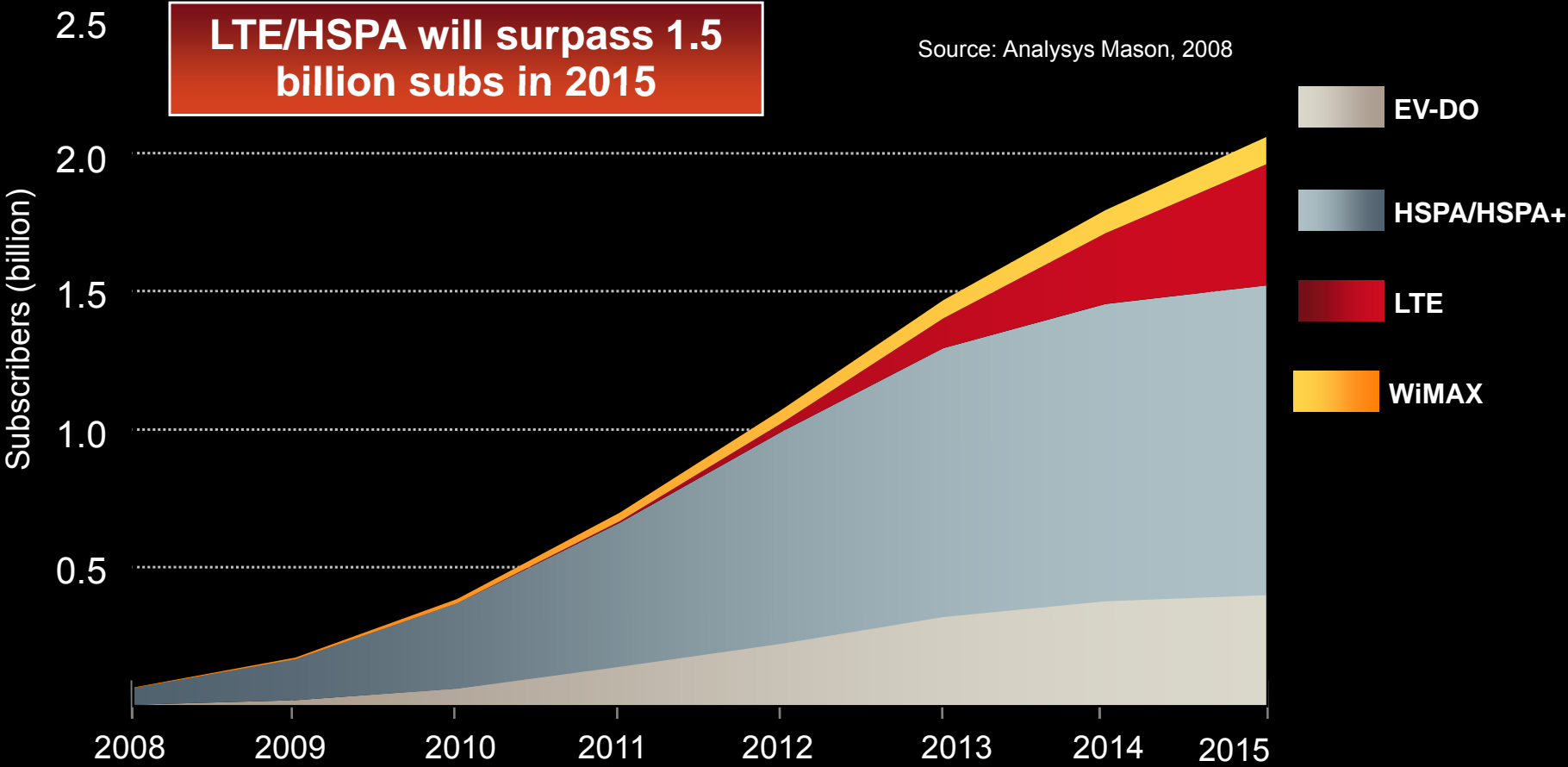
**80 % of broadband subscribers are mobile in 2014**

Source: Ericsson

Mobile Broadband includes: CDMA2000 EV-DO, HSPA, LTE, Mobile WiMAX, TD-SCDMA  
 Fixed broadband includes: DSL, FTTx, Cable modem, Enterprise leased lines and Wireless Broadband

# Technology neutral environment

## Mobile BB Subscribers Projections

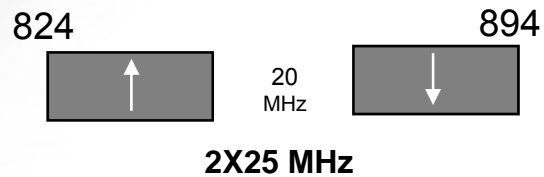
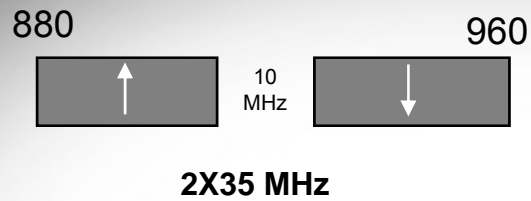
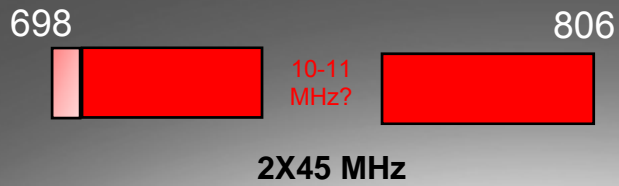


# Technology neutral environment

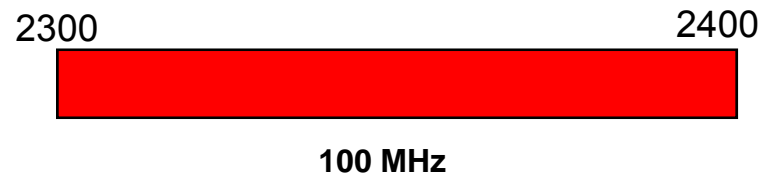
- Convergence of technologies will be required to support the future demand of Mobile Broadband
  - Wi-Fi off load
  - Femtocells
- Regulatory and policy: technology neutral approach to support innovation, not pick winners
- Ensure a level playing field when awarding licenses/spectrum usage rights
- Deliver spectrum with a mix of coverage and capacity bands and with a mix of FDD and TDD technology suitable spectrum
  - And the mobile industry will not stop demanding the existing mobile bands

# Candidate bands Asia Pacific

## The coverage bands



## The capacity bands



# Summary - Recommendations

LTE release 10 and beyond means continuing combining technologies to deliver high performance mobile broadband services to consumers

Regulatory frameworks, licensing regimes and policies that are designed to make delivery of GSM services or UMTS services or WiFi or WiMAX services etc to consumers are at the great risk of failing to deliver LTE advanced

Radio systems interworking with each other to deliver high performance mobile broadband requires governments and regulators to adopt regulatory regimes and licensing regimes for spectrum usage rights that are based on a technology neutral approach and which allows various radio technologies to come together to deliver jointly



THANK YOU! GSMA are here to help! Contact us! Visit [www.gsmworld.com](http://www.gsmworld.com)



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# Annex on harmonisation and mobile bandplans

# Spectrum needs for mobile broadband

The Mobile Industry is keen to develop mobile broadband services at lowest possible cost for consumers and boost Internet penetration. To achieve that goal it needs:

*Sufficient bandwidth* to accommodate subscriber growth and to accommodate the increasing traffic generated by new applications and ser

Right combination of *coverage* bands and *capacity* bands to allow mobile broadband technologies to unleash its potential and best answer market needs

*Economies of scale* in production of radio equipment and handsets means lower prices and can only be achieved by implementing *internationally harmonised mobile bandplans*

Timely award of licenses and spectrum roadmaps. Without regulatory certainty of spectrum availability, investment will be impeded

Previous success stories - the GSM story - proves we can do it again!

# Importance of harmonisation (1)



Economies of scale affects consumers

The more consumers that can use *exactly* the same handset the lower the price of the handset will be

Consumers can use the same handset for networks that are technically harmonised

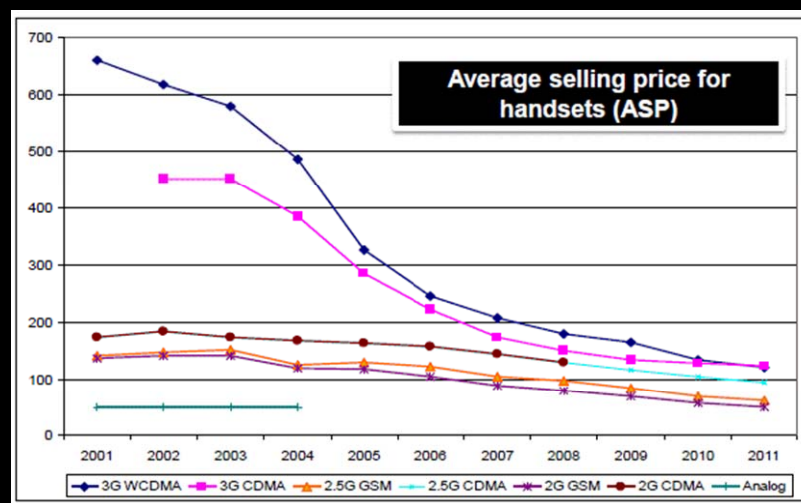
- Common band edges

- Common duplex gaps

- Common duplex directions

- Common filtering requirements because of adjacent services etc

### Handset Price Evolution by Technology



Source: LECG analysis based on Strategy Analytics and Yankee Group.

# Importance of harmonisation (2)



- Price on handsets affects up-take of services and society's welfare
- Mature markets / rich countries have higher up-take of high-priced terminals
- Emerging markets / poorer countries rely heavier on low-priced terminals → economies of scale more important
- Highest possible up-take of services potentially gains emerging market countries more than mature market countries
  - Marginal welfare improvement potentially larger when moving from no Internet connection to mobile Internet connection in a emerging market than additional or improved Internet connection in a mature market

# Importance of harmonisation (3)



Roaming : harmonised band plans makes ideal roaming conditions

Solution:

Allocate mobile bands in accordance with internationally harmonised bands:

- Inline with the ITU RR allocations

- Inline with the bands defined by 3GPP for standardization purposes

Design usage rights / licenses inline with internationally harmonised band plans

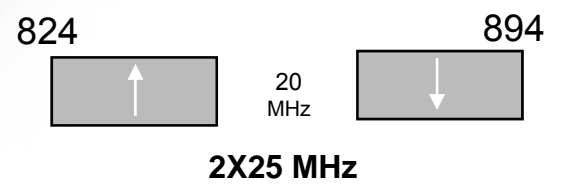
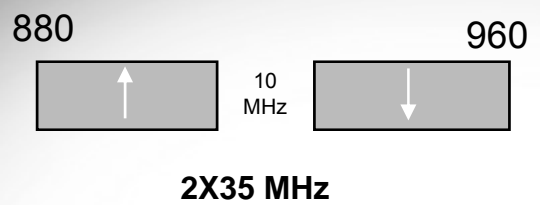
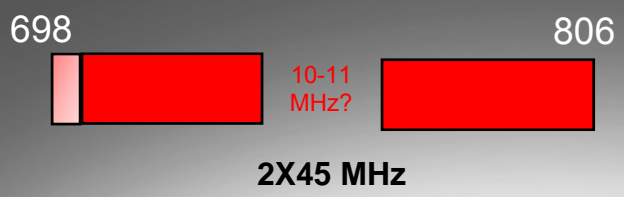
- Inline with APT/CEPT/EU/CITEL harmonised band plans

- Inline with technical definitions of (3GPP) standards



# Candidate bands Asia Pacific

## The coverage bands



## The capacity bands



# The 700 band Asia Pacific



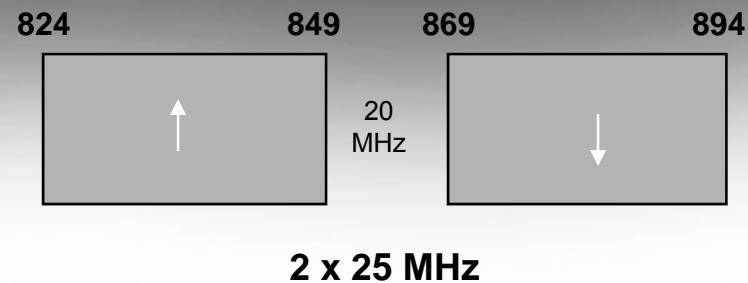
The optimised 2 x 45 MHz option



- Band edges at 698 MHz and 806 MHz but more work to be done before concluding on whether implementing guardbands are necessary (hence the lighter color at the 698 MHz band edge)
- Result of the APT Wireless Forum meetings in Tokyo in March 2010: FDD mobile bandplan of 2X45 MHz
- Final decision on duplex gap to be made when ongoing studies are finalized but it will most likely be 10-11 MHz (hence the red color and the question mark)
- Both duplex directions still discussed (hence the figure showing both opportunities)

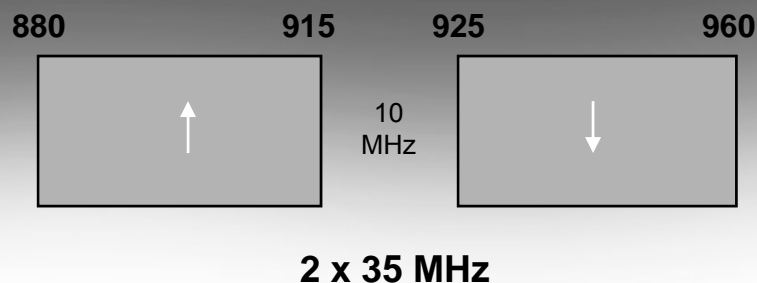
[http://www.gsmworld.com/digital\\_dividend/](http://www.gsmworld.com/digital_dividend/)

# The 850 band



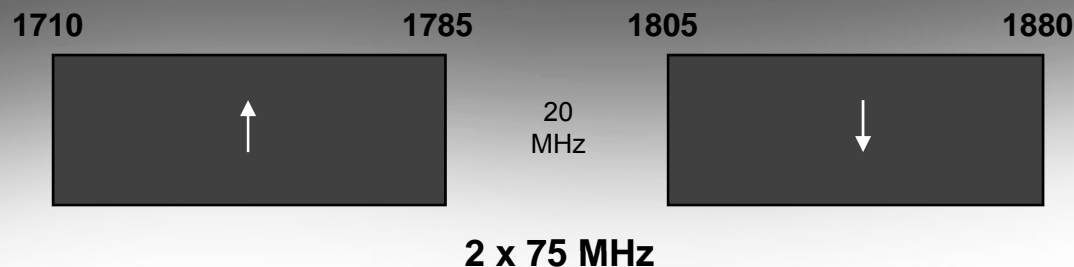
- The 824-849 / 869-894 MHz band
- Classic FDD mobile band plan of 2x25 MHz band width and 20 MHz duplex gap
- Used as basis for production of radio equipment by international vendors for HSPA, currently limited handset availability
- 850 bandplan overlaps with the 900 bandplan and the proposed 800 bandplan → mixing with 900 bandplan / proposed 800 bandplan require specific adjustments for interference management which reduces available bandwidth and increases cost

# The 900 band (880-915 / 925-960 MHz)



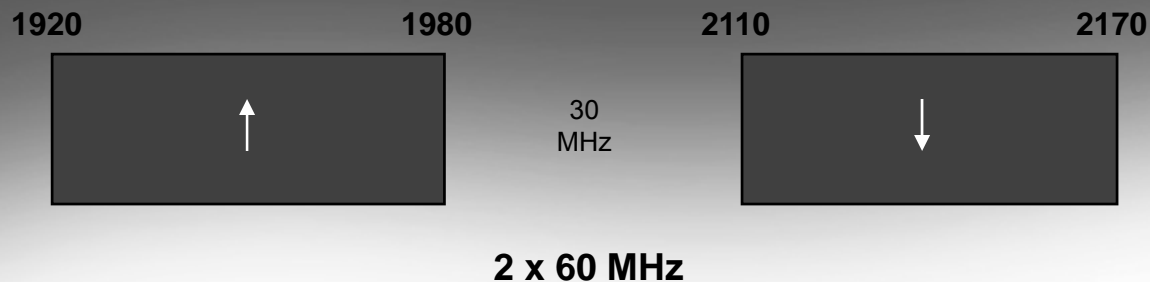
- The 880-915 / 925-960 MHz band
- Internationally harmonized band plan
- Classic FDD mobile band plan of 2X35 MHz bandwidth and 10 MHz gap
- Used as basis for production of radio equipment and handsets by all major vendors for GSM/EDGE/GPRS and UMTS (LTE in the future)
- Currently refarming is the hottest 900 band topic
- Overlaps with the 850 MHz bandplan → full 900 band implementation and full 800 band implementation mutually exclude each other

# The 1800 band (1710-1785 / 1805-1880)



- The 1710-1785 / 1805-1880 MHz band
- Internationally harmonized band plan
- Classic FDD mobile band plan of 2X75 MHz band width and 20 MHz duplex gap
- Used as basis for production of radio equipment and handsets by all major vendors for GSM/EDGE/GPRS (and possibly LTE in the future)
- First 1800 refarming decisions are accomplished and we see increasing interest in refarming of this band
- Overlaps with the 1900 bandplan (“US bandplan”) → the 1800 and the 1900 bandplans mutually excludes each other

# The 2100 band (1920-1980 / 2110-2170)



- The 1920-1980 / 2110-2170 MHz band
- Internationally harmonized band plan
- Classic FDD mobile band plan of 2X60 MHz band width and 30 MHz duplex gap
- Used as basis for production of radio equipment and handsets by all major vendors for UMTS and HSPA
- Today's 3G voice and 3.5G data band (UMTS/HSPA)

# The 2300 band



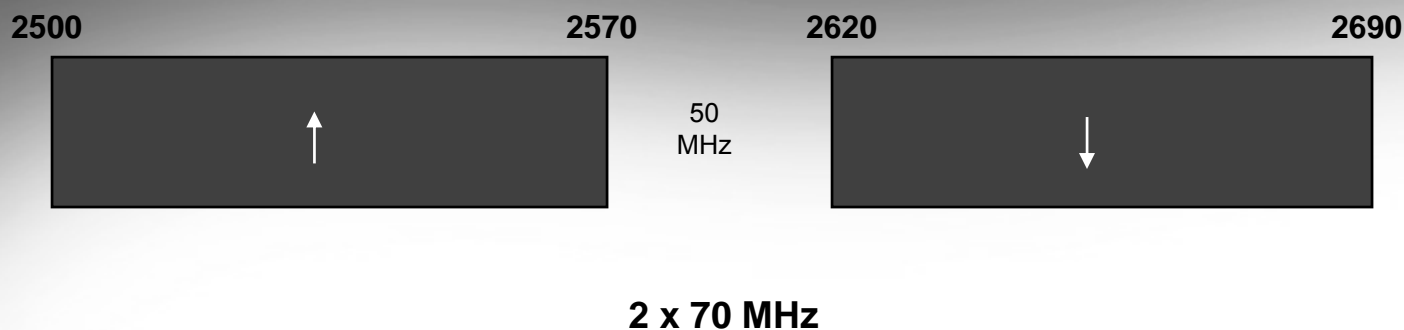
2300

2400



- The 2300-2400 MHz band
- Basically considered to become a TDD band for mobile so far
- Previously believed to be a “Chinese technology band” / a “WiMAX band”
- Currently we see increased interest in future use of this band which may lead to development of equipment standards and bandplan
- No reason to not see it as a mobile band on a technology neutral approach (e.g. TDD LTE and WiMAX band)

# The 2600 band



- The 2500-2570 / 2620-2690 MHz band
- Internationally harmonized band plan
- Classic FDD mobile bandplan of 2X70 MHz bandwidth and 50 MHz gap but with TDD operations in the gap
- Used as basis for production of radio equipment and handsets by all major vendors when preparing for commercial LTE launch
- LTE is deployed in this band in Oslo (Dec 2009 launch) and Stockholm