

## Addressing Spectrum for Mobile Broadband Challenges for Spectrum Management

Wladimir Bocquet

Deputy Director Strategy and International Planning

Group Spectrum Office, Orange

[wladimir.bocquet@orange.com](mailto:wladimir.bocquet@orange.com)

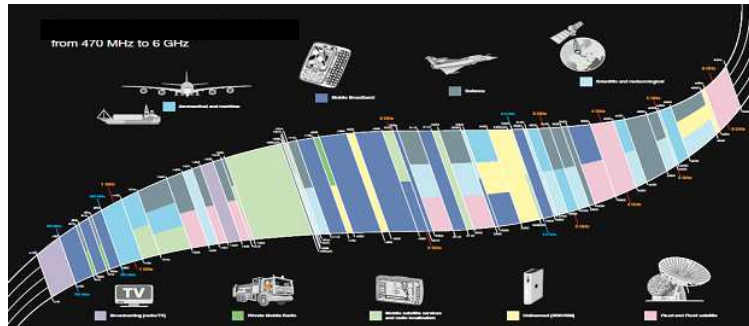
ITU workshop for the CIS countries - Thursday 7th June, 2012



### What's at Stake for Mobile Industry?

- **Data Explosion:** Rapid changes in mobile service provision such as usage trends and number of important social and behavioural changes have led to previously unpredicted patterns of data consumption amongst mobile users.
- **Outcome of WRC-12:** Recognition of the critical role that spectrum plays in enabling Mobile Broadband applications. Two agenda items for the next conference, scheduled at the end of 2015, will focus on identifying additional spectrum for mobile broadband.
- **Implementation of Mobile Broadband:** The evolution of mobile broadband is increasing expectations for speed, bandwidth, and global access. Market moves on to LTE.

## General Issue



- Spectrum is a **scarce resource** and public State property
- **Vital input** to many industries
- Radio waves do **not stop at national borders**
  - cross border issues have a significant role in spectrum management

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## Agenda

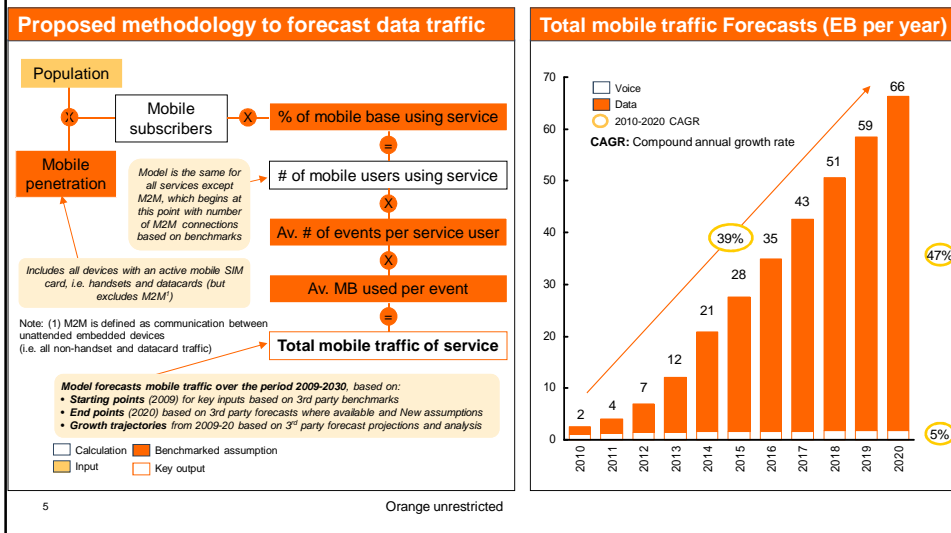
- section 1**      Entering in the Mobile Broadband Age
- section 2**      Facilitating implementation of Mobile Broadband
- section 3**      What are the bands for Mobile Broadband?
- section 4**      WRC-15 preparatory works – Agenda Item 1.2

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## Global Forecast 2010-2020

The growing adoption of data services has become the major source of traffic in 2010



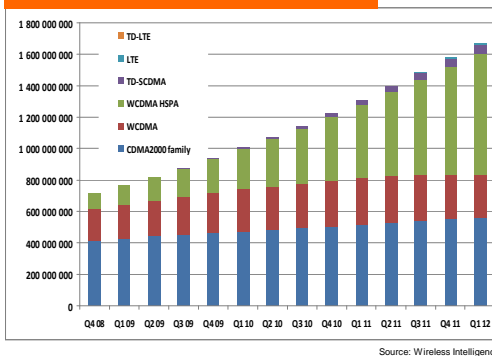
## New factors impacting traffic forecast

Numbers and diversity of IMT devices

### Numerous specific devices with IMT capabilities

- “Standard” 3G phones (pocket-sized feature phones capable of web access and some multimedia functions)
- “Smartphones” for mobile multimedia experience
- “Tablet devices” (devices with larger form-factors, high resolution screens and optimised for a PC-like experience)
- Mobile Broadband modems/“dongles” to allow mobile/nomadic laptop use, which is still a major contributor to data

### Global Mobile Broadband connectio



- In general, mobile data usage is heavily device-dependent
  - Smartphones generate, on average, around 30 times the usage of a basic feature phone
  - Average modem/dongle use, with laptop users generating as much as 1300 times that of a “standard” 3G phone.

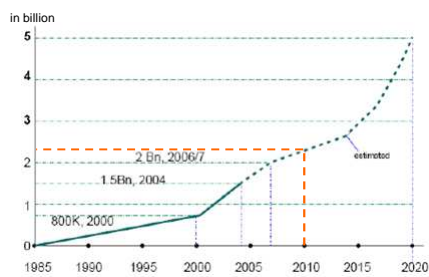
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Source: CISCO

## New factors impacting traffic forecast

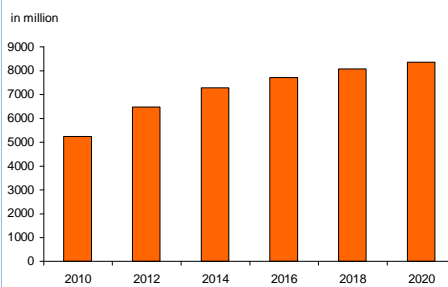
### Number of Mobile Service users

Mobile Service Forecast in 2007



Source: IPTS

Orange forecast based on different sources



Source: United Nations, WCIS, Value Partner Analysis

Mobile world has reached another milestone with Internet becoming increasingly mobile. Ericsson, based on industry information, estimates that the number of mobile subscription will reach 9 billion end of 2017

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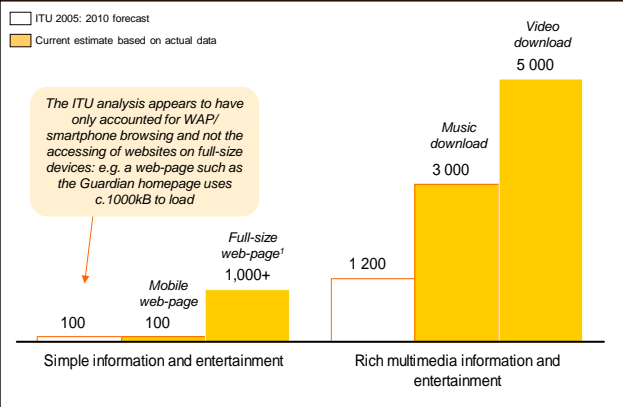
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Source: Ericsson, June 2012

## New factors impacting traffic forecast

### Average file sizes in some categories

Average traffic per event (kB):  
FT ITU 2010 forecast vs. current estimates



Note: (1) Estimate of data usage of a conventional web-page opened on a full-size device  
Source: "World mobile telecommunication market forecast" - ITU 2005, Informa, Value Partners analysis

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- The forecasts in the ITU report **significantly underestimated the average file size in 2010**

- This is likely to be **driven by**:
  - better quality/ "richer" content** and services
  - improvements in data speeds and device resolution enabling the **consumption of higher-bitrate content**
  - increased mobile network usage on full-size devices** (e.g. PCs) via dongles and internal datacards (this was not explicitly considered in the FT ITU forecasts)

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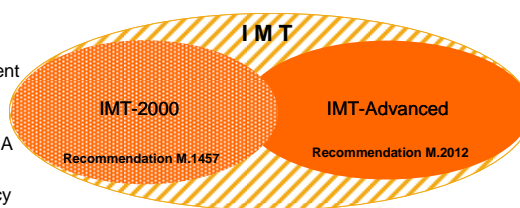
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## Mobile Broadband Applications

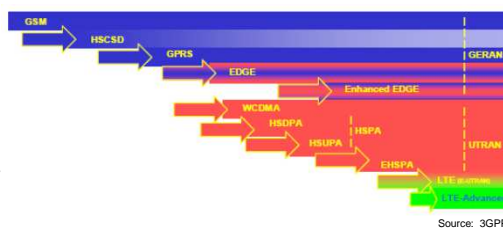
A global trend towards IMT systems, especially LTE

### Market moves on to LTE

- Provides a global ecosystem with inherent mobility
- Offers an evolution path not only for GSM/UMTS operators but also for CDMA operators
- Dramatically improves speed and latency



- Orange is delivering **mobile broadband** thanks to the consistent utilisation of a single technology family: GSM, EDGE, W-CDMA, HSDPA/HSUPA to be followed by LTE and LTE-Advanced



- **3GPP technologies** account for a majority of the installed mobile cellular systems globally

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## Harmonised approach is key for the development of Mobile Broadband



ITU-R Region 1

- Crucial to **secure**, in the ITU-R Region 1, the **same allocation and band plan** to support **harmonisation**
- **Harmonisation** is key
  - Leverage from the existing deployment and maximise the economy of scale
  - Facilitate innovation and roaming
  - Reduce the device costs by
    - limiting the complexity of the radio design and the cost of mobile hardware
    - helping managing cross-border interference

Maximising technology **economies of scale** through spectrum harmonisation and ensuring effective **link between spectrum strategy & device availability** is key

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## Definition and protection of the property rights Exclusive usage rights & sharing

### Exclusive usage rights

- **individually licensed spectrum in harmonised bands** is the **preferred regime** for mobile operations to assure quality of service
- **facilitates investment** and promotes efficient use of the radio spectrum
- In opposition License-exempt with White Space type application is a major risk to sterilise spectrum for other uses such as ensuring that future changes in spectrum use not precluded or/and Difficulty to step back.
- Furthermore, license-exempt use is not an optimal use of spectrum for specific frequency range (e.g. below 1GHz) since license-exempt increases the need for regulation and technical specification such as power limit reduction.

### Spectrum & Infrastructure sharing

- Regulatory framework should facilitate operator's engagement in **voluntary infrastructure and/or spectrum sharing**.
- Regulatory framework should remove restrictions on operators negotiating and concluding agreements governed by private law on sharing in bands dedicated to Mobile Broadband.

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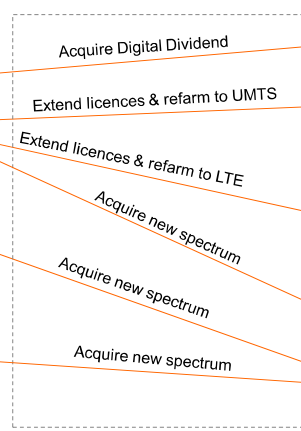
## Developing a long-term spectrum strategy is key



### Business drivers

- **Coverage** requires low frequency spectrum for rural and in-building
- **Capacity** requires more total spectrum
- **Speed** requires larger contiguous spectrum blocks

### Country objectives



### Region 1 options

#### Below 1 GHz

- 800MHz

- 900MHz

#### Above 1GHz

- 1800MHz

- 2100 MHz

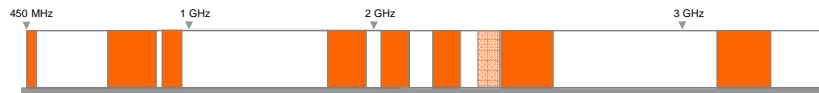
- 2600 MHz

*Operators should optimise their current and future spectrum holdings to achieve goals depending on their business strategy.*

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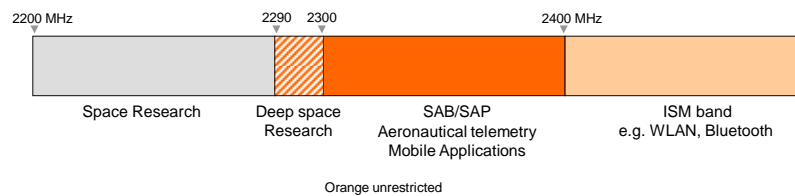
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## Additional IMT spectrum identified at the WRC-07 2.3 – 2.4 GHz band



- Identified for IMT globally
  - Some deployments in Region 3
  - In Europe currently used by other applications

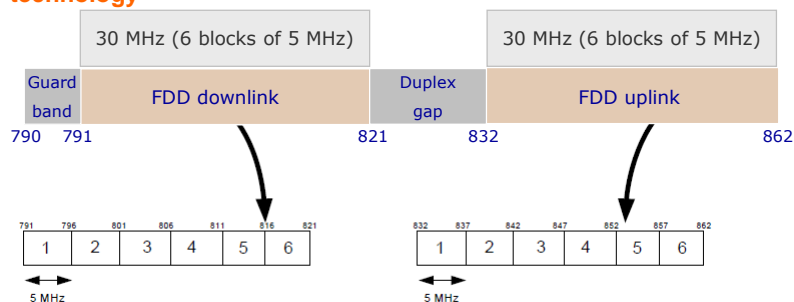
➔ Focus on TD-LTE in this specific band



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## IMT spectrum dedicated to LTE 800 MHz band

- Support the following band plan with **5MHz block size** for **LTE technology**
- Favour **contiguous 2x10 MHz per operator** to fully leverage on **LTE technology**



- Maximise the **harmonisation** across the **ITU-R Region 1**
- Leverage on the **economy of scale** (facilitate the access)
- Facilitate the **cross-border coordination**

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## IMT spectrum dedicated to LTE 2.6 GHz band

### ▪ Fixed vs. flexible band plans

- Adopting a fixed band plan is best and lead to global harmonization in the use of the band
- Clear from both prior auctions and operator announcements that the ITU Option 1 band plan is preferred



### ▪ In addition,

- Emerging markets should preferably adopt global band plans
- The adoption of ITU Option 1 for 2.6 GHz will yield large economies of scale in both network equipment and handsets

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## Extension of the Digital Dividend

### Additional provision to allow Mobile Service after WRC-15

#### Extension of Digital Dividend

The band 694-790 MHz is allocated to the mobile, except aeronautical mobile, service **after WRC-15** subject to the provisions of Resolution 232 (WRC-12). See also Resolution 224 (Rev.WRC-12).

#### Radio Regulation

##### Region 1

**470-790 MHz**  
BROADCASTING

5.149	5.291A	5.294	MOD
5.296	5.300	5.302	5.304
5.306	5.311A	5.312	

**ADD 5.3XX**

#### Analysis

- No country footnote for an additional allocation
- No change in the allocation Table
- Allocation of the band 694-790 MHz to the mobile service on a co-primary basis with other services and identification to IMT effective after WRC-15

#### Agenda Item for the WRC-15 on UHF spectrum

to examine the results of ITU-R studies, in accordance with Resolution 232 (WRC-12), on the use of the frequency band 694-790 MHz by the mobile, except aeronautical mobile, service in Region 1 and take the appropriate measures

- Study the spectrum requirement for the mobile service and for the broadcasting service in this frequency band to determine the lower edge
- Study the channelling arrangements for the mobile service, adapted to the frequency band below 790 MHz, taking into account the existing arrangements in Region 1 in the bands between 790 and 862 MHz

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## Explanation of the Resolution 232 (WRC-12)

#### Resolves Part of the Resolution

- Allocate the frequency band 694-790 MHz in Region 1 to the mobile service on a primary basis and to identify it for IMT with effective immediately after WRC-15
- The lower edge of the allocation is subject to refinement at WRC-15
- Technical and regulatory conditions applicable to the mobile service allocation will be decided at the WRC-15

#### Study to be performed before WRC-15

- Study the spectrum requirement for the mobile service and for the broadcasting service in this frequency band to determine the lower edge
- Study the channelling arrangements for the mobile service, adapted to the frequency band below 790 MHz, taking into account the existing arrangements in Region 1 in the bands between 790 and 862 MHz

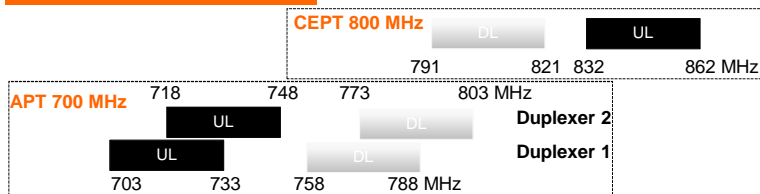
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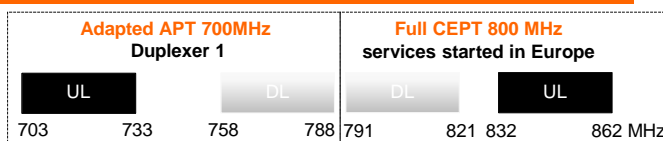
## Extension of the Digital Dividend

Additional provision to Mobile Service after WRC-15

### CEPT and APT Band Plan



### Preferred Band Plan for the Extension of the Digital Dividend



**CEPT plan should be preferred for entire Region 1**, with possibility to use Region 3 Band plan

- Maximise the economy of scale (leverage on existing ecosystem)
- Limit the modification on each band plan and facilitate roaming as well as integration.
- Appropriate Coexistence with current Region 1 FDD with same duplex direction

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## Conclusion

Future spectrum needs for Mobile Broadband

We encourage **harmonisation of spectrum usage** worldwide

- to optimise **economies of scale**
- to ensure timely **availability of equipment**
- to facilitate **cross border coordination**
- to respond quickly to **market needs** and bridge the Digital Divide

**Harmonised deployments** of LTE for the Mobile Broadband in the spectrum identified for IMT will be facilitated by

- technical studies at the ITU-R to **ensure no interference**
- Adequate balance between **Capacity and Coverage** bands, with particular attention to the bands below 1GHz

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[wladimir.bocquet@orange.com](mailto:wladimir.bocquet@orange.com)

