Spectrum Forecast for Mobile Broadband

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Agenda

1 General introduction

2 Concept of Mobile Broadband

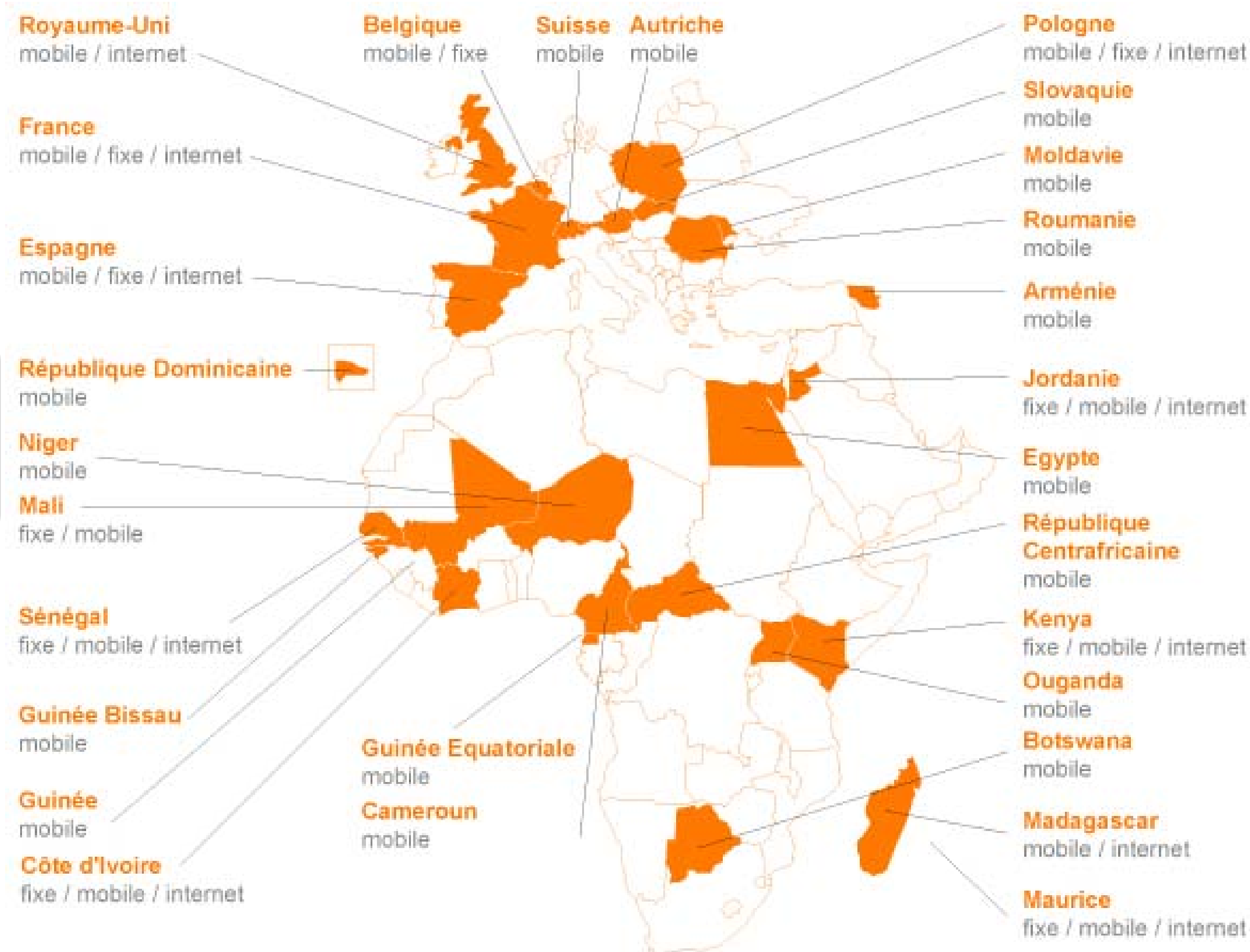
3 Importance of spectrum harmonisation

4 Next steps & Conclusion

Orange – FT Group: Where we are?

end Q3 2008

- 118 M mobile
- 12 M fixed broadband

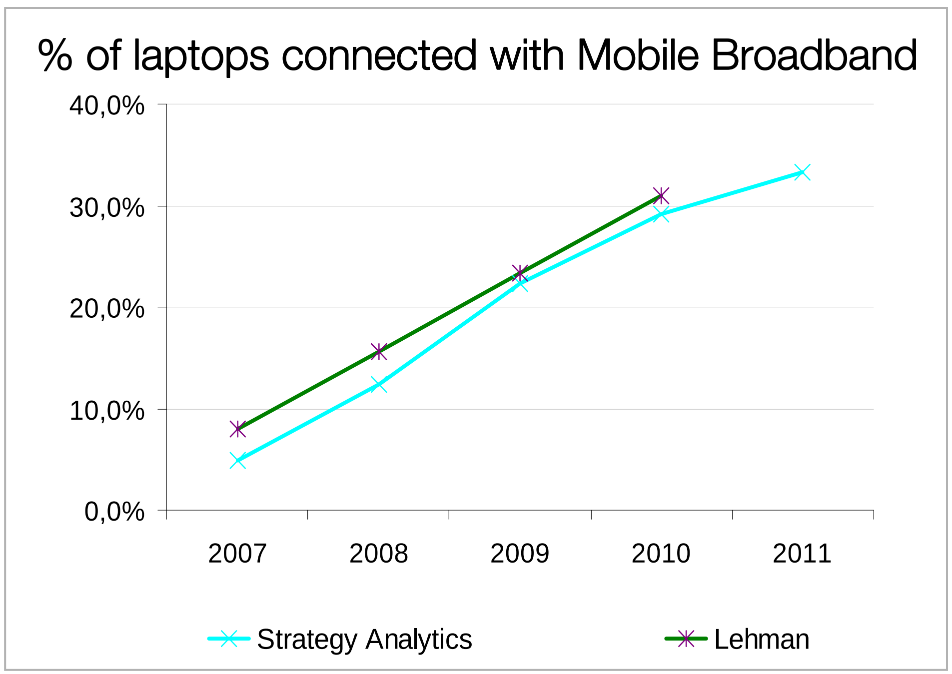


→ serving - consumers in 27 countries
- corporates in 220 countries and territories

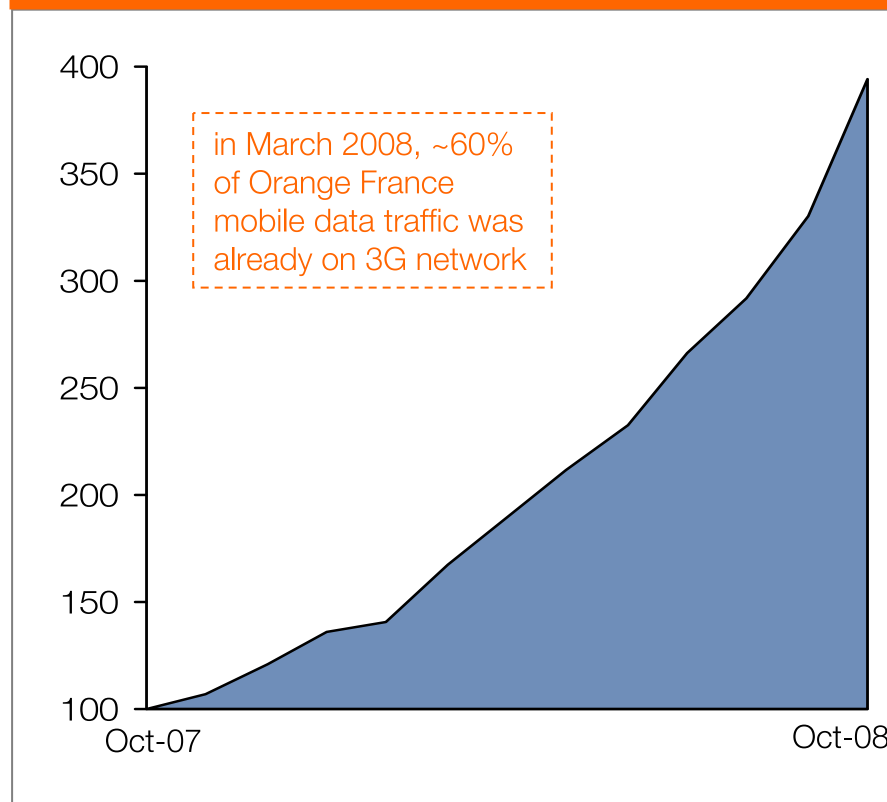
Background:
Better understanding of mobile data traffic in Europe

significant increase of voice + data traffic

- traffic growth driven by
  - new Mobile Broadband capable devices
  - increase in term of penetration



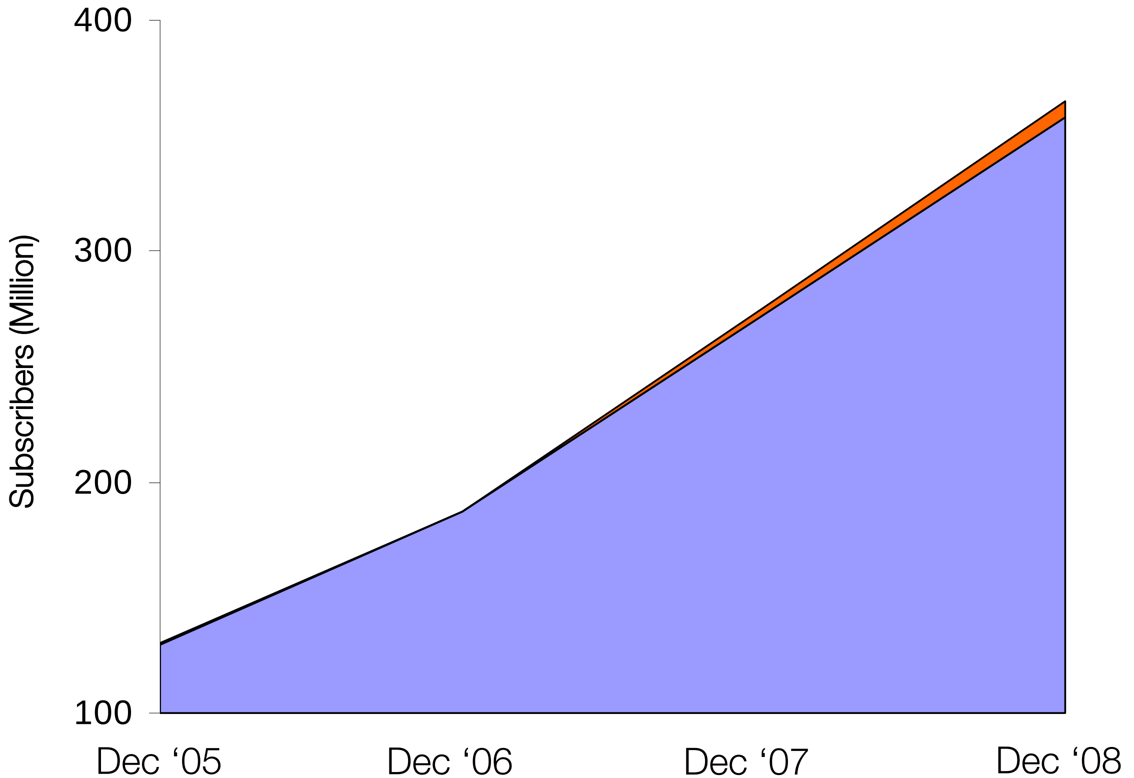
cumulated mobile data traffic in France, UK, Spain and Poland: 12 month evolution



Background:
Mobile broadband subscription growth in Africa

- 365 million GSM & WCDMA-HSPA
- Including over 6.8 million WCDMA-HSPA subscriptions

IMT is a key element for Mobile Broadband



Source: GSMA & GSA

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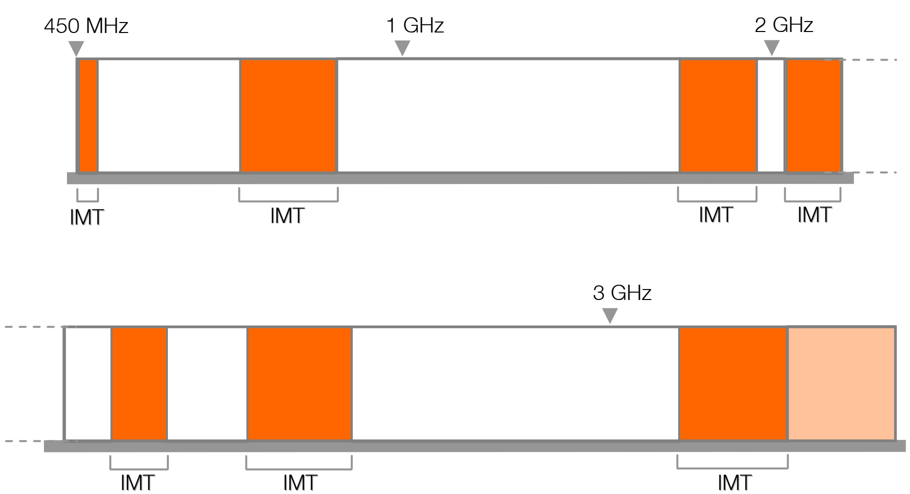
What is Broadband?
Importance of Spectrum & Technology

Throughput = bandwidth x spectrum efficiency

Spectrum Regulation
(ITU-R and regional organisations)

Technology and Standards

Allocated IMT bands



GSM The wireless evolution

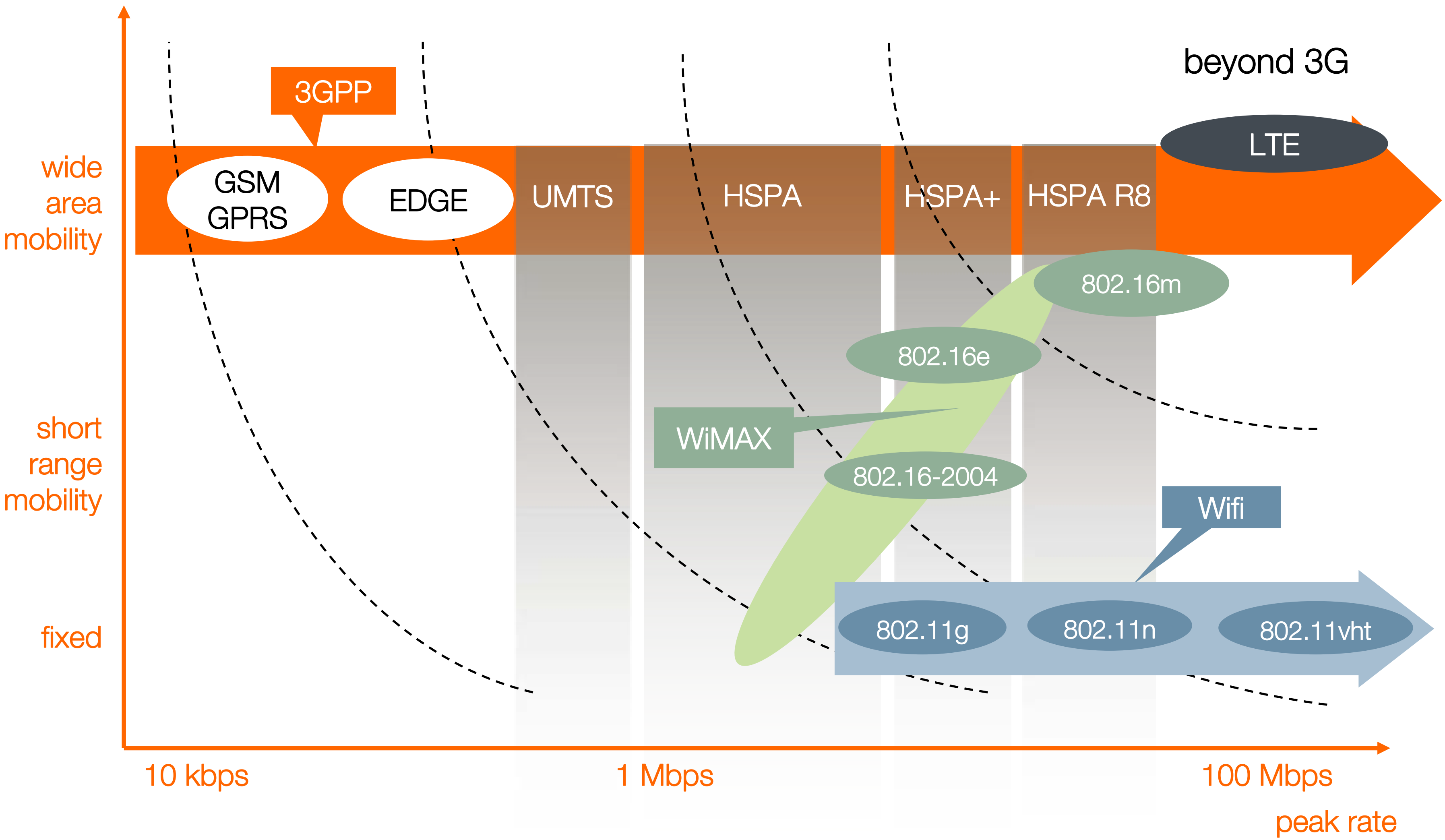
3GPP A GLOBAL INITIATIVE

HSDPA UMTS

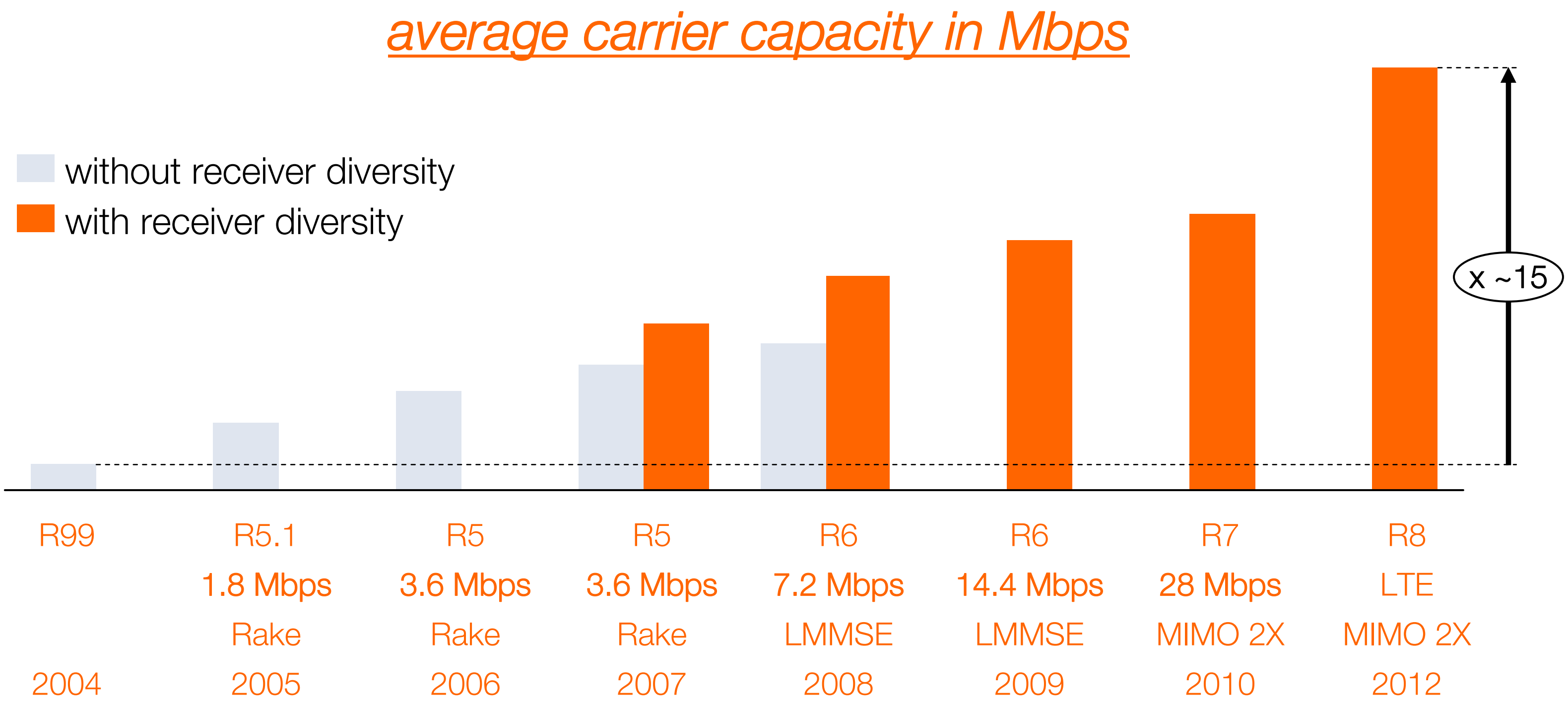
LTE Advanced

LTE

Mobile Broadband:
A global trend toward LTE



Mobile Broadband:
Radio efficiency improves regularly with new features



- Improvement requires devices at the same level of standard to achieve full capability
- Some devices features greatly influence capacity, notably receiver diversity and advanced receiver

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Why do we need harmonisation?

- Harmonisation is still key
  - Harmonising spectrum has been the bedrock of the success of technologies such as GSM by driving equipment & device economies of scale
  - The process of releasing more spectrum has, however, highlighted the difficulties of harmonising both spectrum allocation & band-plans across regions
  - Concerted efforts are needed by national & international regulators to limit any differences on spectrum licensing

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

Spectrum Harmonisation & Mobile Broadband:
The customer perspectives

customer benefit from the Spectrum Harmonisation

efficiency

- always connected / distant presence
- acceleration of transactions
- time ambivalence, hyper life
- network valuation

flexibility

- Access to common contents
- large device offer
- FMS/FMC
- facilitate roaming

customer behaviour with Mobile Broadband

serenity

- abundance promise
- peace of mind / simplicity
- security and privacy

entertainment

- on demand (content & services)
- me and my communities
- from mass media to my media

ethics and involvement

- responsible purchase
- CO_2 footprint lowering
- information transparency

Spectrum Harmonisation: A time consuming process

Time to achieve regional & international spectrum harmonization is about several years from start to commercial volumes

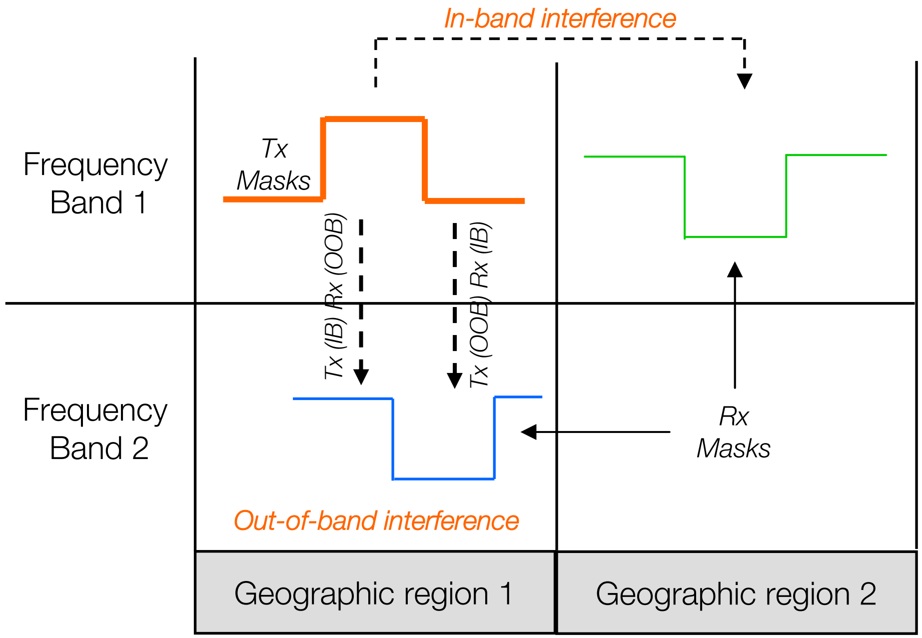
More than 20 years to harmonise IMT

Example of the IMT systems

- **1985**: SG8 IWP8/13 Established in ITU CCIR for initial study of FPLMTS
- **1992**: WARC'92 allocated 230MHz for IMT-2000 in 2GHz band:
  - 1885-2025 MHz
  - 2110-2200 MHz
- **1997**: FPLMTS renamed to IMT-2000 & Study of introduction of family concept started
- **2000**: IMT.RSPC (M.1457) detailed specification of five IMT-2000 families member and approved by RA'00
- **2000**: WRC'00 identified additional frequency bands for IMT-2000
  - 806-960 MHz
  - 1710-1885 MHz
  - 2500-2690 MHz
- **2007**: WRC'07 additional frequency for IMT Family
  - 450-470 MHz
  - 698/790-960MHz ➔ Digital dividend partially UHF band
  - 2300-2400 MHz
  - 3400-3600 MHz

Spectrum Harmonisation: Limit the interference risks

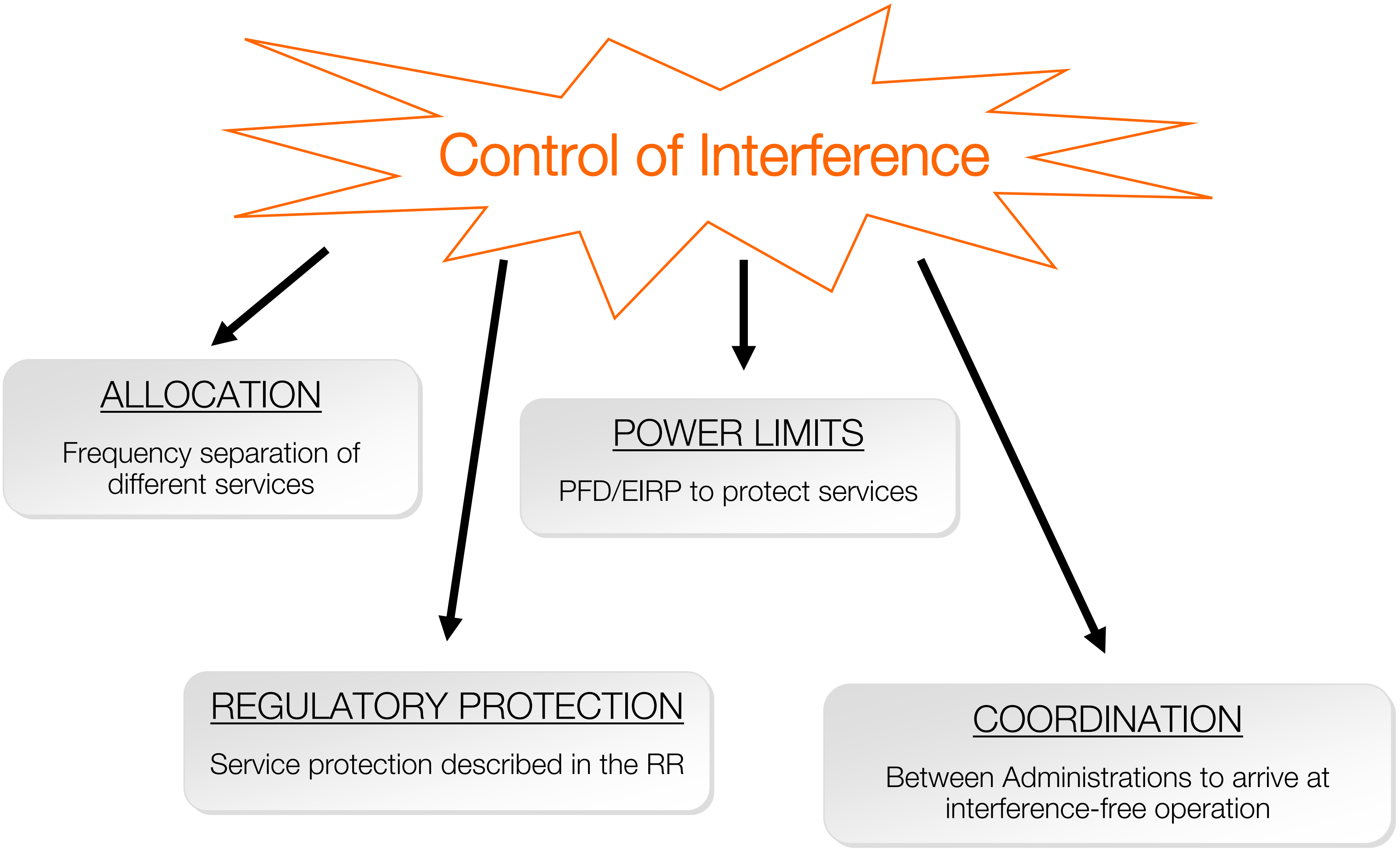
- Ensure availability of clean spectrum
  - Protect the rights of users
  - Keep the records of rights of use (assignments)
  - Control spectrum use (spectrum monitoring)



- **In-band interference:** frequency overlap between the transmitter and receiver operating bandwidths.
➔Typically for both to be able to operate without excessive interference this implies a degree of geographic separation or coordinated time/code sharing.

- **Out-of-band interference:** no overlap in frequency between the transmitter and receiver's bandwidth, but the geographic separation is sufficiently small that there can be appreciable interfering signal.
two sub-types of this path:
  - o In-band emissions received out-of-band
    - - due to imperfections in the filtering of the receiver
  - o Out-of-band emissions received in-band
    - - due to imperfections in the filtering of the transmitter

Spectrum Harmonisation: How to prevent interference?



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Key topics for WRC 2011: Importance of the Backhauling

- Risk of interference
  - Long term impact on the ICT regional development
  - Importance of the harmonisation
- Some Agenda Items of the WRC11 may impact Fixed Services
  - Need specific attention

Agenda Item	Resolution
1.11	consider a primary allocation to the SRS (Earth-to-space) within the band 22.55-23.15 GHz Res. **753 (WRC-07)**
1.12	protect the primary services in the band 37-38 GHz from interference resulting from AMS operations Res. **754 (WRC-07)**
1.13	studies on spectrum usage of the 21.4-22 GHz band for the BSS and the associated feeder-link bands in Regions 1 and 3 Res. **551 (WRC-07)**
1.14	consider requirements for new applications in the RLS qnd review allocations or regulatory provisions for implementations of RLS in the range 30-300 MHz Res.**611 (WRC-07)**
1.20	studies on spectrum iden-tification for gateway links for HAPS in range 5850-7075 MHz to support operations in the FS and MS Res.**734 (WRC-07)**
1.21	consider a primary allocation to the RLS in the band 15.4-15.7 GHz Res.**614 (WRC-07)**

Spectrum Harmonisation: Summary

- Critical Resource
  - Spectrum is not infinite for mobile broadband
    - Importance of ITU activity and WRC-11
  - Long term vision is necessary for spectrum allocation

- Regional & International harmonization of spectrum
  - Access to common services
  - Ecosystem to perform interoperability
  - International roaming
  - Economy of scale ➔ availability of affordable products

Harmonised approach required across Region 1 to secure affordable mobile broadband with high performance at reasonable cost thank you