Spectrum issues for IMT-2000

Halina Uryga

Deputy Director Spectrum

Summary

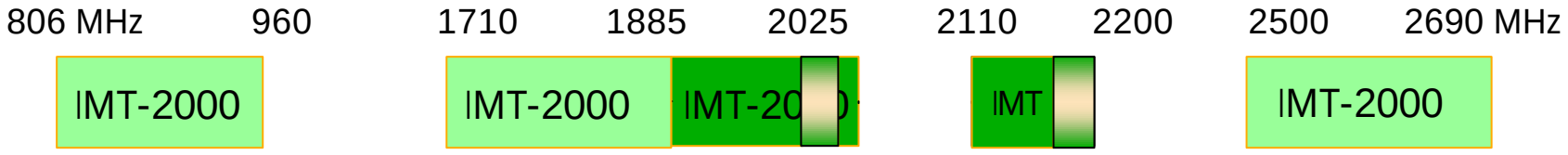
- Globally harmonised spectrum for the best development of mobile services
  - > Initial deployment of UMTS/IMT-2000 from year 2003-2004 in the WARC-92 bands
  - > Further development in the additional 2.5 GHz band identified by WRC-2000
- Protection of UMTS/IMT-2000 from BSS at 2.5 GHz band under WRC-03 Agenda Item 1.34
  - > Need for a regulatory and technical solution compatible with the long term planning of UMTS/IMT-2000 terrestrial systems
  - > A clear priority in this band for terrestrial services
- Evolution and future development of UMTS/IMT-2000 under WRC-03 Agenda Item 1.22
  - > Need for timely renaming of so known 'Systems Beyond IMT-2000'
  - > Adequate time schedule for the commercial introduction of IMT-2000 evolution

I - Globally harmonised spectrum

for the best development of mobile services

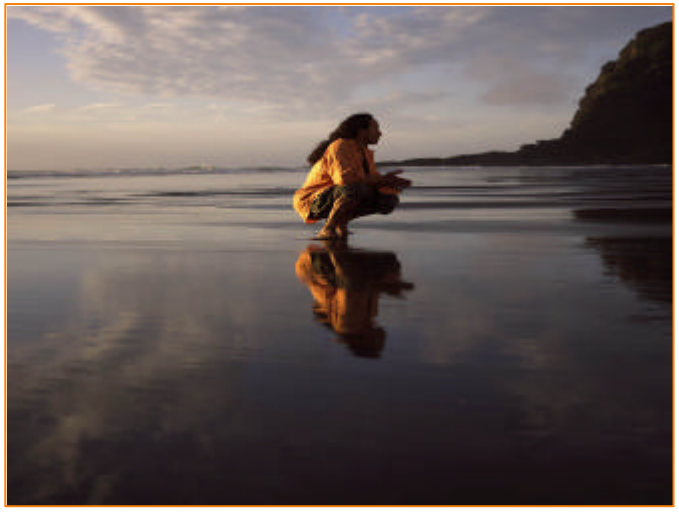
UMTS/IMT-2000 Spectrum

- **WARC-92** identified the **initial bands** for IMT-2000 deployment i.e. 1885-2025 MHz and 2110-2200 MHz
- **WRC-200** identified three **additional bands** for terrestrial IMT-2000 i.e. 2500-2690MHz, 806-960MHz and 1710-1885MHz



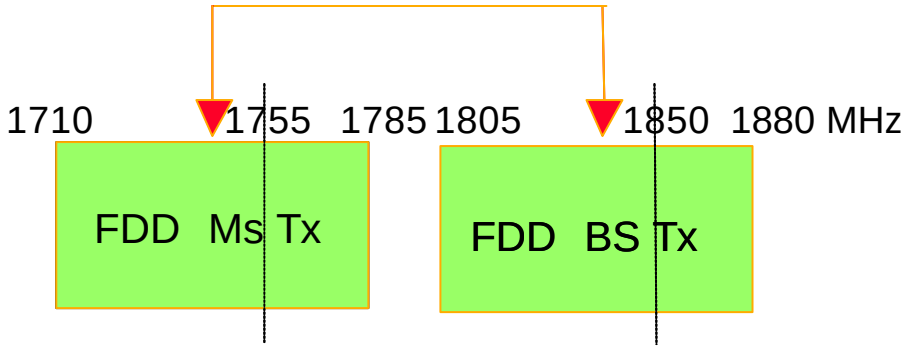
Spectrum for initial deployment of UMTS/IMT-2000 1/2

- UMTS/IMT-2000 **will first be implemented in WARC-92 bands** in a harmonised manner in most countries world-wide (Europe, Asia and some Region 2 countries)
  - > These systems will be complemented by GSM 900 and GSM 1800 allowing global roaming



Spectrum for initial deployment of UMTS/IMT-2000 2/2

- The GSM1800 bands (or parts) could be used for implementation of UMTS/IMT-2000 in those countries **where the WARC-92 bands are not available** i.e. PCS countries



This solution could **support global harmonisation** in the longer-term and should **not impose difficulties to existing and ongoing operation of 2G networks**

Spectrum for further development of UMTS/IMT-2000

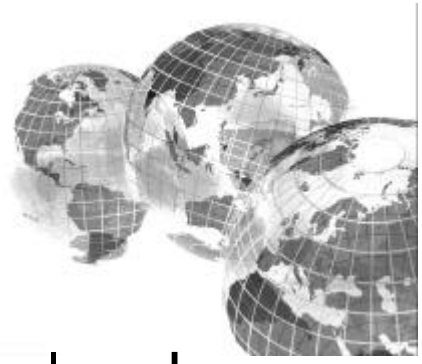
- The band 2500-2690 MHz is the **only additional spectrum** identified for IMT-2000 not yet used by 2G and 2.5G systems in Europe
- There is an opportunity to design common frequency arrangements
  - > with the potential to be harmonised world-wide since there are currently no mobile channelling arrangements in the band
- An early definition of a global frequency arrangement for terrestrial UMTS/IMT-2000 in the 2500-2690 MHz band is required
  - > **at the latest in 2004**
- A timely refarming of this band in Europe is required since it is currently being used for a wide range of services

Towards efficient and harmonised usage of the 2.5 GHz band 1/2

- 2500-2520/2670-2690 MHz are allocated to both terrestrial and satellite IMT-2000
- The important increase in number of subscribers and in traffic volumes of 2G and 2.5G mobile multimedia services through the world today
  is expected to continue on 3rd generation
  - > with the growth of voice services by existing and new customers and with the higher usage of new non-voice services
- The entire **2500-2690 MHz band will be needed for terrestrial** UMTS to cope with the expected saturation
  - > in high density populated areas
  - > in particular in Europe by 2008 for those areas

Towards efficient and harmonised usage of the 2.5 GHz band 2/2

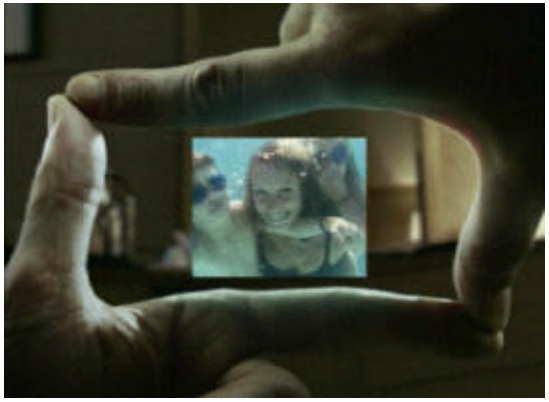
- Satellite UMTS services could **complement the coverage of Terrestrial UMTS** in remote areas
  - > offering business consumers high data rate broadband services such as handheld Internet access and videoconferencing
  - > extending the coverage of Terrestrial UMTS for niche market



- S- UMTS will have enough spectrum in the MSS bands already identified for IMT-2000 **below** 2.5 GHz
  - > in particular 2x30 MHz within WARC-92 bands (1980-2010 MHz/2170/2200 MHz) which could be easily implemented in dual mode terminals terrestrial/satellite
- 2x20 MHz in the band 2500-2520/2670-2690 MHz should be used **only for terrestrial UMTS/IMT-2000**

Long term transition from 2G to 3G

- The 1710-1885 MHz band is intensively used by the most recent 2G and 2.5 G networks deployed
  - in 1710-1785/1805-1880 MHz
  - and also **partly** in 1850-1910/1930-1990 MHz
- The present and ongoing investments engaged for the pre-IMT-2000 systems are necessary to continue **to develop the mobile multimedia market**



- The **smooth transition** from pre-IMT-2000 systems to IMT-2000 in this band will be possible in the longer term and will be facilitated by having frequency arrangements in line with the existing usage
  - > maintaining the transmit directions and the duplex distance

Possible transition from 1G to 3G
The case of 450 MHz band

- The 450-470 MHz band is used in some European (North-East) countries for analogue systems
- In Western Europe analogue networks are closed
- Operators having NMT networks could use the 450-470 MHz band for FWA solutions in remote areas
- The 450-470 MHz band is not identified for IMT-2000
  - > Does not allow any harmonised introduction neither globally nor in Europe
  - > Does not allow neither global nor European roaming
- There is no long term evolution path for an isolated technology in a small band with no extension defined and does not allow competition

II - BSS in the 2.5 GHz IMT-2000 extension band under WRC-03 Agenda Item 1.34

BSS in the 2.5 GHz IMT-2000 extension band 1/4

- In nine Region 3 countries, the band 2 535 -2 655 MHz is allocated to Sound Broadcasting Satellite Service, in addition to the global identification for IMT-2000 in the band 2500-2690 MHz
  - > These Sound Broadcasting Satellite systems on highly elliptical orbits are in direct visibility with IMT-2000 / UMTS base stations in Europe at low elevation angles
  - > The provisional power flux density limits defined by WRC-2000 at low elevation angle is –128 dB(W/m2)/MHz
  - > The regulatory procedure adopted by WRC-2000 was the basis of large disagreement and misunderstanding between administrations supporting IMT-2000 and those supporting BSS

BSS in the 2.5 GHz IMT-2000 extension band

- The clarification and simplification of **spectrum sharing conditions** with satellites systems which development is envisaged in few countries in Asia is required
- The risk of **harmful interference** from these satellites systems into UMTS in the additional band has been proven to be important
  - > Thus it is necessary to ensure that **terrestrial services have a clear priority** in this band
  - > For example, the exclusion of the allocation of the **Broadcasting Satellite Service (BSS)** in the band in a footnote (similar to 5.412) covering the countries, intending to introduce IMT-2000 in future, with the power flux density limit of –132 dB(W/m^2)/MHz not to be exceeded by satellite systems for low elevation angles

BSS in the 2.5 GHz IMT-2000 extension band

- A regulatory and technical solution **compatible with the long term planning of UMTS/IMT-2000 terrestrial** systems in the band 2535 - 2655 MHz is required
  - > inclusion of hard pfd limits in Article 21, Table 21-4 for the satellite systems
  - > explicit agreement of administrations on the territory of which the pfd limit is exceeded
  - > no time limit for the putting into service of IMT-2000 stations which would risk to be affected
  - > if the agreement are not obtained, the satellite systems operate under N° 4.4, i.e. it shall not cause any interference, shall not claim protection, loose its rights and not be protected against interference from other systems

BSS in the 2.5 GHz IMT-2000 extension band

The pfd limits should be **4 dB lower** (-132 dBW/m2/MHz) than those provisionally defined at WRC-2000 in order not to considerably reduce the coverage of UMTS transmitters (key factor)

III - Evolution and future development of IMT-2000 under WRC-03 Agenda Item 1.22

Evolution and future development of IMT-2000 1/4

- It is expected that operators who deploy UMTS/IMT-2000 networks will continue to enhance their capabilities for at least the next 10 years
- This would then be followed by continued operation of the network for possibly an additional 10 years
- The ITU vision for the evolutions of IMT-2000 is now broadly defined

- Three major trends of IMT-2000 evolution are envisaged
  - > enhancement of IMT-2000
  - > interoperability with other radio systems
  - > development of new radio interfaces for high data rates in addition to IMT-2000 capacities

Evolution and future development of IMT-2000 2/4

- Systems beyond IMT-2000 will be formed **by IMT-2000** and **enhanced IMT-2000** complemented by the "**new capabilities**"
- Those "new capabilities" will offer higher bit-rates
  - > both in mobile environment and in nomadic environment
  - > will require high bandwidth channels
  - > therefore requiring new spectrum to be identified by a future conference **depending on market demand**

- Those "new capabilities" and evolutions will complement UMTS/IMT-2000 in some countries from around year 2015-20

Evolution and future development of IMT-2000 3/4

- Some contributions to the Conference Preparatory Meeting, Geneva,18-29 November 2002, (CPM) recommended to rename “systems beyond IMT-2000”
  - > in order to ensure that the ITU vision is correctly conveyed in coming work on IMT-2000 and its evolutions, both within ITU and towards external entities
- As the result of discussions CPM agreed that :
  - > “there is a need for appropriate naming to be developed in advance of WRC-07 for the future development of IMT-2000 and systems beyond IMT-2000”

Evolution and future development of IMT-2000 4/4

- The expression “systems beyond IMT-2000” can be understood as a disruption from IMT-2000
  - > a new generation of mobile systems that will replace IMT-2000
- It seems to be the right time for the ITU to replace the expression “systems beyond IMT-2000”
  - > by an appropriate name
- This name should reflect and vehicle the concept elaborated in the ITU vision using ‘IMT’ as the common root
  - > of the global system which is introduced now with IMT-2000
  - > will be enhanced with the introduction of new radio interfaces around year 2015-20

Recommendation on IMT-2000 vision

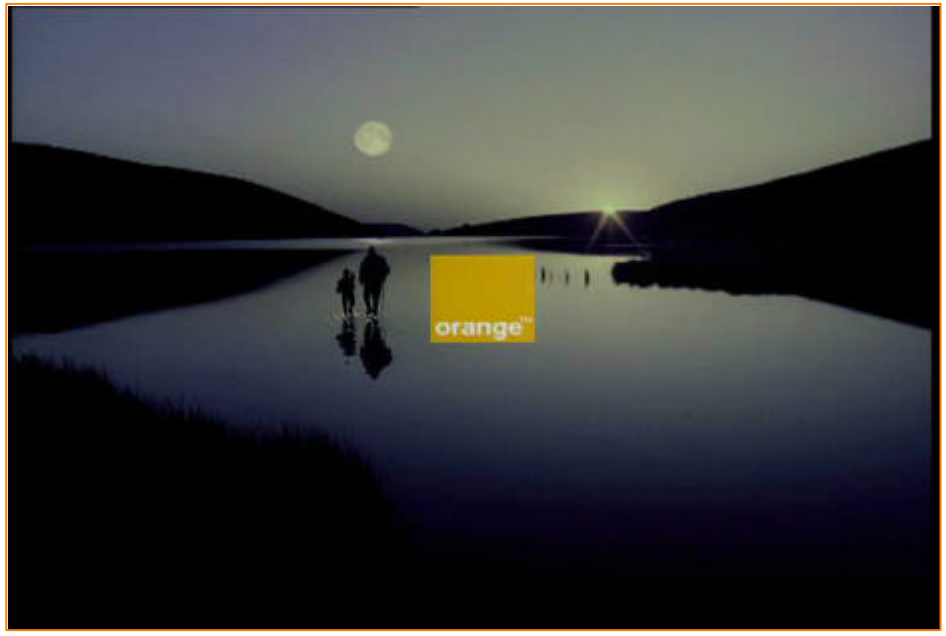
- Draft New Recommendation (DNR) related to the vision for the future enhancement of IMT-2000 and systems beyond IM-2000 is elaborated by ITU-R WP 8F
- This DNR is submitted to Study Group 8 for further consideration in its February 2003 meeting
- The Conference Preparatory Meeting results should be reflected in this DNR

Conclusion

- **IMT** - the **common root** for IMT-2000, enhanced IMT-2000 and its evolutions
  - > To build on today investments in IMT-2000
  - > To match business plans of mobile operators throughout the world

- Mobile multimedia services have a huge potential for further development
- To make it happen and spread through the world there is a need
  - > To secure timely availability of spectrum in the 2.5 GHz without any technical and regulatory constraints (WRC-03 Agenda Item 1.34)
  - > To build within ITU under WRC-03 Agenda Item 1.22 an harmonised framework compatible with the mobile market

Thank you



halina.uryga@orangefrance.com