Trends of the Radiocommunication regulatory framework

Spectrum Regulation for Broadband

SESSION 7: NGN and Broadband: Policy and Regulatory Issues

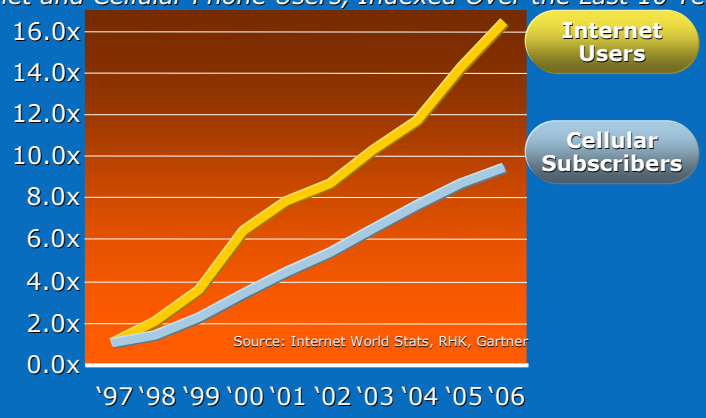
August 2009

Christoph Legutko
Global Public Policy
Intel Corporation

Legal Disclaimer

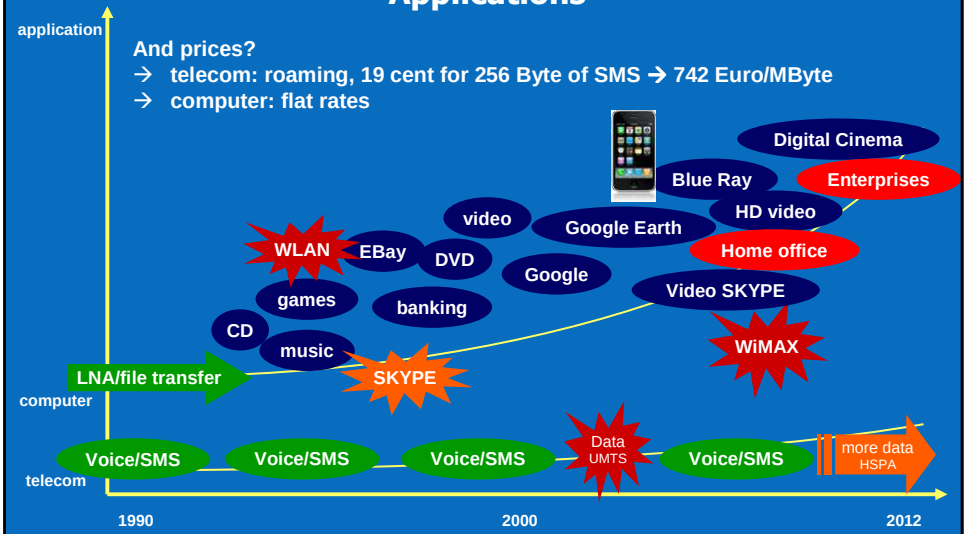
The Internet is the Great Growth Engine

Internet and Cellular Phone Users, Indexed Over the Last 10 Years

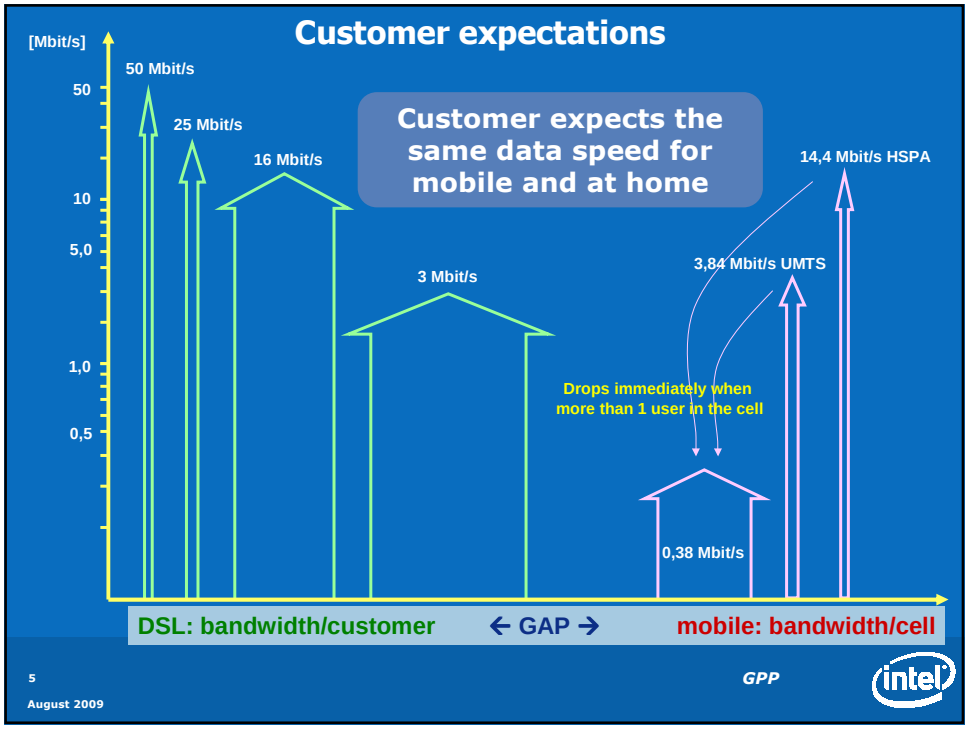


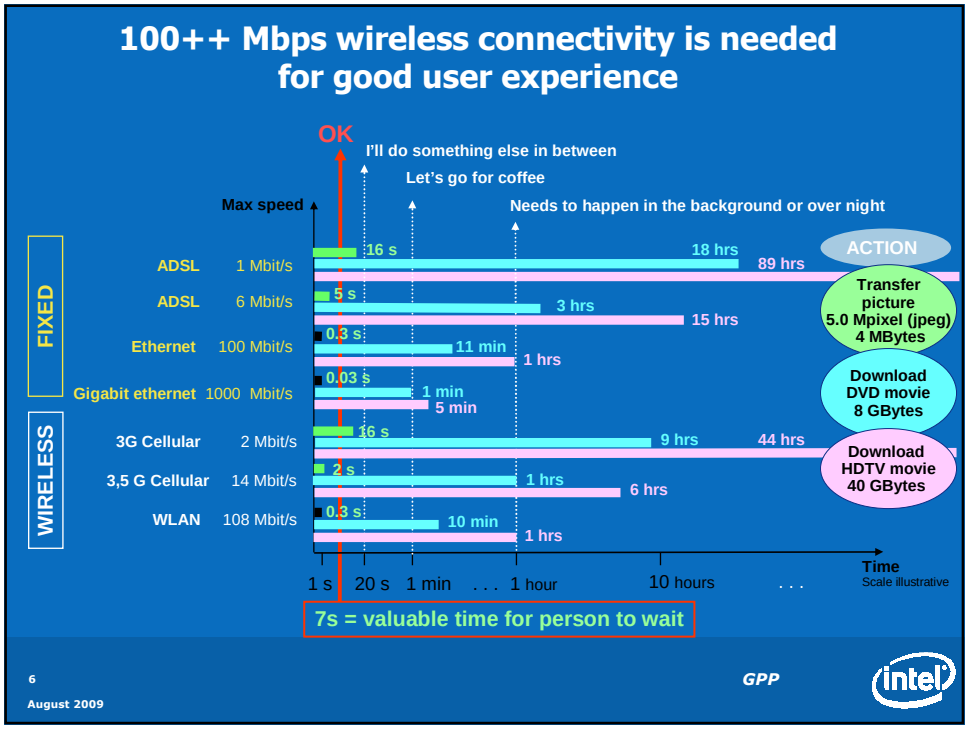
Regulatory focus changes –
from voice to data, from circuit switch to all IP

Applications



Applications drive data throughput requirements


Customer expectations
[Mbit/s]
50
10
5,0
1,0
0,5
50 Mbit/s
25 Mbit/s
16 Mbit/s
3 Mbit/s
Customer expects the same data speed for mobile and at home
14,4 Mbit/s HSPA
3,84 Mbit/s UMTS
Drops immediately when more than 1 user in the cell
0,38 Mbit/s
DSL: bandwidth/customer
← GAP →
mobile: bandwidth/cell
5
August 2009
GPP


100++ Mbps wireless connectivity is needed for good user experience
OK
I'll do something else in between
Let's go for coffee
Needs to happen in the background or over night
Max speed
FIXED
WIRELESS
ADSL 1 Mbit/s
ADSL 6 Mbit/s
Ethernet 100 Mbit/s
Gigabit ethernet 1000 Mbit/s
3G Cellular 2 Mbit/s
3,5 G Cellular 14 Mbit/s
WLAN 108 Mbit/s
16 s
18 hrs
89 hrs
5 s
3 hrs
15 hrs
0.3 s
11 min
1 hrs
0.03 s
1 min
5 min
16 s
9 hrs
44 hrs
2 s
1 hrs
6 hrs
0.3 s
10 min
1 hrs
ACTION
Transfer picture 5.0 Mpixel (jpeg) 4 MBytes
Download DVD movie 8 GBytes
Download HDTV movie 40 GBytes
1 s
20 s
1 min
. . . 1 hour
10 hours
. . .
Time
Scale illustrative
7s = valuable time for person to wait
6
August 2009
GPP

Deployment Scenario Coverage

Promise to cover sparsely populated areas with BWA using DD
Missing broadband access hamper establishment of enterprises in rural areas

DD: 790-862 MHz as result of WRC-07 arranged with 2x30 MHz + 12 MHz

A radio cell with 10 km radius covers 314 km^2 area

Let's assume 300 enterprises in this cell requiring 10 Mbit/s transfer rate every

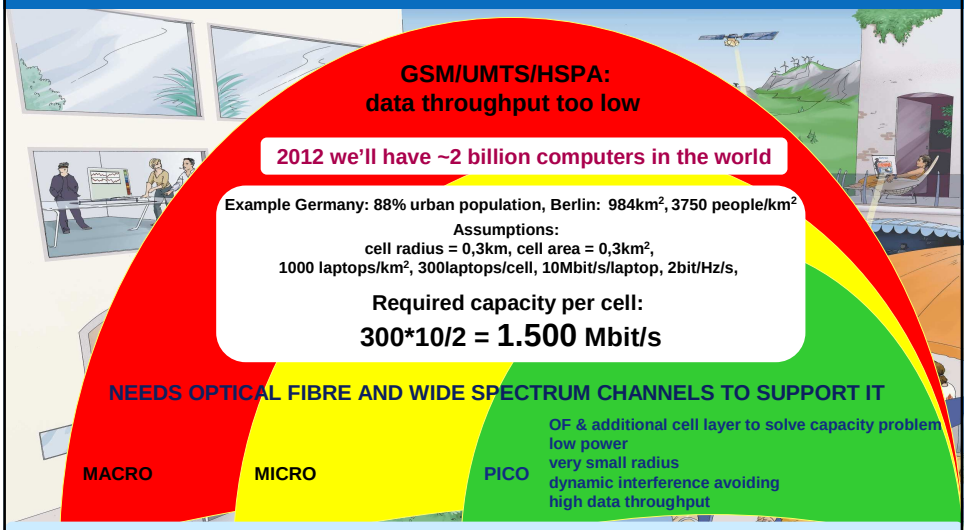
This cell must provide 3.000 Mbit/s of continuous transmit in 30 MHz bandwidth

State of the art – HSPA – offers ~15 Mbit/s in 5 MHz bandwidth in 500 m radius

Broadband Wireless Access is not coverage limited

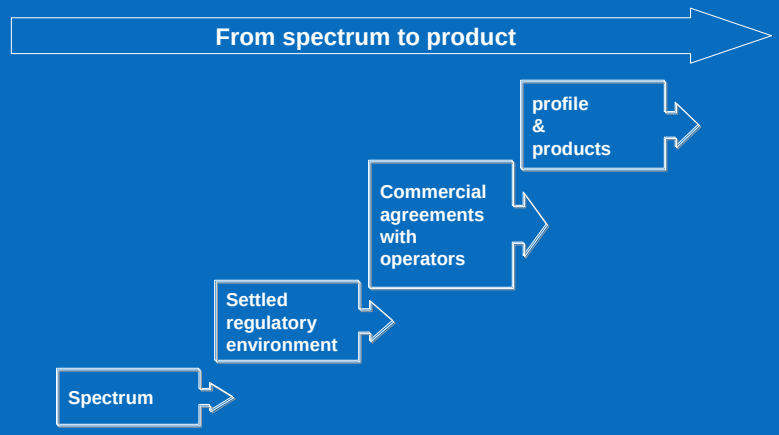
It is capacity limited!

Deployment Scenario Capacity



Are the current network and spectrum concepts sufficient to support broadband?

Typical product cycle



Settled regulatory environment enables product availability

European Decisions

- **2008/477/EC** - European Commission Decision from of 13 June 2008 on the harmonization of the 2 500-2 690 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community
  - To be implemented by the member states in 6 months after decision issue
  - Supports flexible band arrangement
  - Let operators decide about bandwidth per operator or number of operators
  - Supports competitiveness and innovation
  - Supports data and all IP
- **ECC Dec. (05)05** - ECC Decision of 18 March 2005 on harmonized utilization of spectrum for IMT-2000/UMTS systems operating within the band 2500 – 2690 MHz
  - Due for revision
  - Supports 2 x 70 + 50 MHz arrangement
  - Limits bandwidth per operator or number of operators
  - Limits competitiveness and innovation
  - Limits data and all IP
  - Addresses UMTS only

European Commission decision supports European economies in the race with Asia and America

International Spectrum Policy

- **The 2.5-2.69 GHz** band is the best world wide harmonized spectrum for broadband
  - Allocated by Radio Regulations (RR) to Mobile Service and to IMT in all 3 ITU Regions
  - Spectrum arrangement in this band is Recommended by ITU-R M.1036
  - Available in the most countries world wide
- **The 2.3-2.4 GHz** band is becoming more and more popular
  - Allocated by RR-07 to Mobile Service and to IMT in all 3 ITU Regions
  - Available or used for broadband in Asia (China, Korea, Malaysia, NZ, etc.), Latin America (Chile) and in CEE countries
- **The 3.4 - 3.6 - 3.8 - 4.2 GHz** band is fragmented
  - The allocation to Mobile Service and to IMT by RR-07 vary depending on ITU Region and sub-band
  - Not available in Region 2 and tropical countries due to radar and satellite services
  - In Europe 3.4-3.6 GHz is for mobile, broadband and IMT
  - Europe supports future allocation of 3.6-3.8-4.2 GHz for mobile, broadband and IMT

The 2.6 GHz band is the focus band for WiMAX

Intel Regulatory Policy General Principles

- Service and Technology neutrality
  - No restrictions on services, e.g. VoIP allowed
  - No preferential treatment for specific technologies
  - No restrictions on mobility
- Market can decide FDD/TDD split
- Auctions preferred; more transparent than other methods
- Timely access to spectrum needed

Create the conditions for a sustainable and competitive broadband market

Recommendations for WiMAX

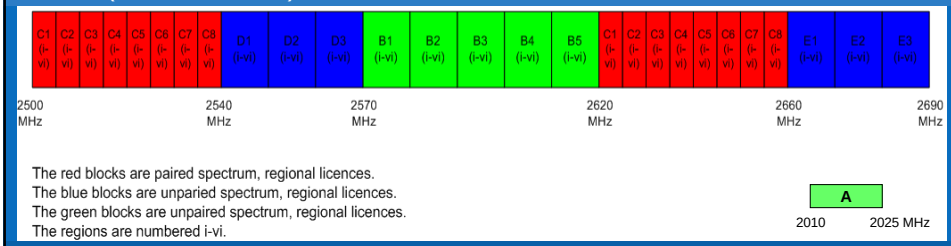
- Preferably 2.3 and/or 2.6 GHz bands to deploy all network layers
- IEEE 802.16e TDD preferred
- Minimum 30MHz of spectrum per license – guard bands excluded
- Nationwide licenses to avoid market fragmentation and weaken the operator business case
- Wholesale model can help reduce the digital divide in the rural areas and villages
- Cooperation with local governments and municipalities to subsidy service

Create the conditions to accelerate broadband adoption and reduce the Digital Divide

Best Practices: The Norway 2.6 GHz Allocation

The five sub-bands are:

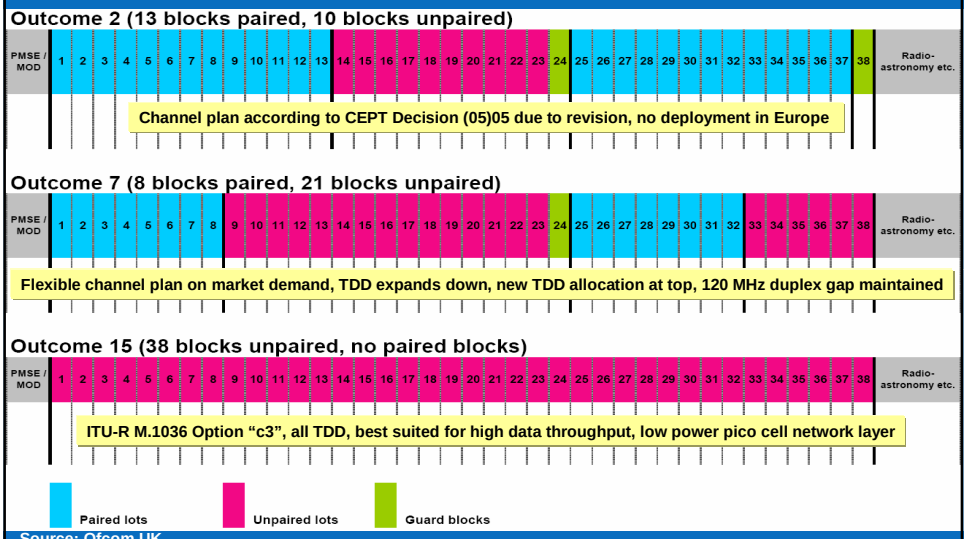
A. The 2010 MHz band, consisting of a single 15MHz A block.
B. Five unpaired blocks of 10MHz at the centre of the 2.6GHz band (2570 MHz to 2620 MHz).
C. Eight paired blocks of 2x5 MHz in the 2.6 GHz band (2500-2540 MHz paired with 2620-2660 MHz).
D. Three unpaired blocks of 10 MHz below sub-band B in the 2.6 GHz band (2540-2570 MHz).
E. Three unpaired blocks of 10 MHz at the top end of the 2.6 GHz band (2660-2690 MHz).



Best Practices: The Norway 2.6 GHz Allocation

- **FDD/TDD split determined by market forces**
  - Only 80 MHz of FDD spectrum issued; CEPT Decision indicates 140 MHz
  - 110 MHz TDD spectrum issued; more than 50 MHz in CEPT Decision
- Licences are technology and service neutral.
- License are tradable and have 15 years duration.
- Licenses can be used for fixed, nomadic and mobile wireless broadband services.
- Eight companies participated; total revenue raised NOK 228.881.000 (€ 25.863.553)
- Five companies acquired frequencies:
  - Arctic Wireless AS
  - Craig Wireless Systems Ltd.
  - Hafslund Telekom AS
  - NetCom AS
  - Telenor ASA
- Alvarion started to deploy networks for Hafslund Telekom AS
- 2010-2025 MHz also auctioned at same time; acquired by Inquam Broadband GmbH for NOK 1.000.000 (€ 113.000)
  - can be used for nomadic and mobile broadband services

Best Practices: UK 2.6 GHz Auction – TDD/FDD Flexibility



Source: Ofcom UK

Conclusions

- Ubiquitous and fast Internet access is a current customers requirement
- Urban and rural citizens must have the same Internet access
- Applications drive data throughput requirements
- Stable regulatory environment first then products on the market
- The 2.6 and 2.3 GHz bands are best suited for broadband service
- Conditions for a sustainable and competitive broadband market are necessary
- Broadband is a fundamental enabler for European economies being in the race with Asia and Americas

Thank You!

Christoph Legutko
Global Public Policy
Intel Corporation
T: +49 171 55 202 43
christoph.legutko@intel.com