

Spectrum for IMT in WRC-07

Higher bit-rates needed
for better mobile experience

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Alcatel-Lucent

Ericsson

Fujitsu

Huawei

Motorola

NEC

Nokia

Nortel



ZTE

Siemens

Samsung

Qualcomm

Panasonic





<http://standards.nortel.com/spectrum4IMT/>



Vision for a global mobile society



is inspired by the ITU vision for a global mobile society, where every person has mobile access and is connected wirelessly.

Global spectrum availability is the key to realizing this vision.

Spectrum for the global mobile society: what usage could be more valuable and more important ?



Content

- Mobile communications facilitate economic growth
- IMT-Advanced can provide new services for users
- High bit-rates enable faster mobile access and higher capacity
- Existing mobile bands will not be enough to support the growth and new services
- Conclusions

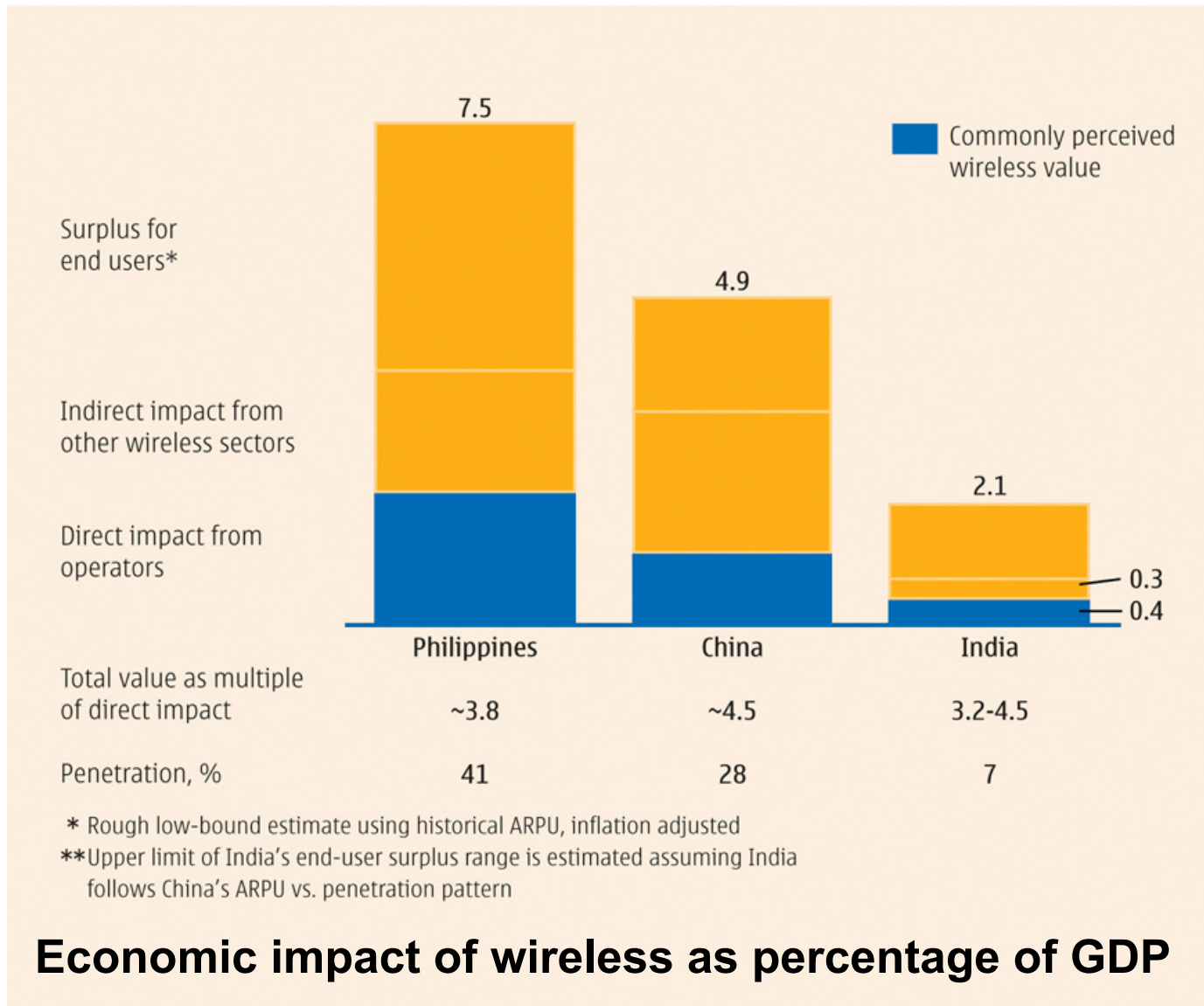
Mobile communications facilitate economic growth

- Mobile communications will facilitate economic growth and development and enable new jobs and new business creation
- Mobile communications will stimulate economic development, social inclusion, universal services, global interactions, government policies like police stations in network, hospitals in network, schools in network and so on

“ Mobile phones have become indispensable in the rich world. But they are even more useful in the developing world, where the availability of other forms of communication—roads, postal systems or fixed-line phones—is often limited. Phones let fishermen and farmers check prices in different markets before selling produce, make it easier for people to find work, allow quick and easy transfers of funds and boost entrepreneurship. Phones can be shared by a village. Pre-paid calling plans reduce the need for a bank account or credit check. A recent study by London Business School found that, in a typical developing country, a rise of ten mobile phones per 100 people boosts GDP growth by 0.6 percentage points. Mobile phones are, in short, a classic example of technology that helps people help themselves. ”

Source: The Economist, Jul 7th 2005, “Calling an end to poverty “

Mobile communications facilitate economic growth



Editors note:
 Previous page 0.6% is direct impact with 10% penetration.
 By adding indirect impact, then the impact could be almost 8% (with 40% penetration, like in Philip.)

Source: Wireless Unbound, McKinsey&Company, 2006



Mobile communications facilitate economic growth

Table 1.1: Estimated net economic benefits to the UK economy

Sector	2006		2002	
	Value (£ billion)	Percentage (%)	Value (£ billion)	Percentage (%)
Total	42.4	100	28.2	100
<i>of which:</i>				
Public mobile	21.8	51	14.4	51
Broadcasting	12.3	29	5.9	21
Satellite links	2.8	7	2.9	10
Fixed links	3.9	9	3.8	14
Wireless broadband	0.3	1	-	-
Private mobile radio	1.2	3	1.1	4
Other	0.1	0	0.1	0

Note: 2002 results expressed in 2006 prices

"Other" is defined to include: amateur, citizens' band, non-commercial aviation, maritime and other equipment and services

Source: EE

Source: "Economic impact of the use of radio spectrum in the UK", report by Europe Economics

Mobile communications facilitate economic growth

Table 12.1: Direct GDP and employment effects

Sectors	Turnover 2006 prices (£M)	Employment
Broadcasting	7,520.1	21,654
Public Mobile	1,452.1	1,886
Cellular	37,528.2	79,575
Satellite Links	0.3	479
Wireless broadband	0.7	33
Total Direct contribution	to GDP 46,501.4	to employment 103,627

Editors note:

This is also to UK economy as in previous page

Source: "Economic impact of the use of radio spectrum in the UK", report by Europe Economics

IMT-Advanced can provide new services for users

- With widespread and ubiquitous mobile deployment, high bit-rate IMT-Advanced will facilitate new services and better user experience
- With more IMT spectrum, fewer services and busy hours are limited by delay, deployment or capacity. IMT-Advanced will enabled higher network efficiencies and hence lower prices for the end users

Macro trends driving growth for high bit-rate IMT-Advanced

- Demand for high bit-rate IMT-Advanced services increases with quality. Good quality makes high bit-rate services more attractive (-> positive spiral). However, limited spectrum would lead to compromised quality and service resistance.
- As time goes by, more and more people work and play with new digital devices (mobiles, computers, cameras, TVs, music-players etc)
- Future mobile handsets are becoming multi-purpose easy-to-use devices, lowering the barrier to use high bit rate mobile services

High bit-rates enable faster mobile access and higher capacity

IMT-Advanced is

intended to offer high bit-rate
mobile services with targeted bitrates of
100 Mbit/s (wide area, high mobility) and
1 Gbit/s (hot-spot, limited mobility)

High bit-rates enable faster mobile access and higher capacity

- High bit rate services experienced in cable and fixed (DSL) networks will be expected from mobile networks
 - New mobile technologies will enable performance comparable to the fixed broadband solutions
 - Mobility adds value to the user, hence the demand for mobile broadband will be high
 - End-to-end transfer delay of mobile experience has to be minimized
 - Peak data rates and controlled delay at busy hour dictate highest spectrum need
- ⇒ New high bit-rate mobile technologies will emerge to make this feasible. It is very likely that there will be new mobile/wide area technologies and new nomadic technologies capable of required very high peak bit rates.

Technological enablers for high performance mobile devices

Memory:

100 GBytes minimum in 2015

Processing power:

4x compared to today's PC power in 2010, having optimized architecture per application

Display:

foldable PC size colour displays available in 2011

Battery:

fuel-cells in 2010, hybrid architecture increases overall usage time and energy capacity

Size and weight:

same, optimized by usefulness

Usability:

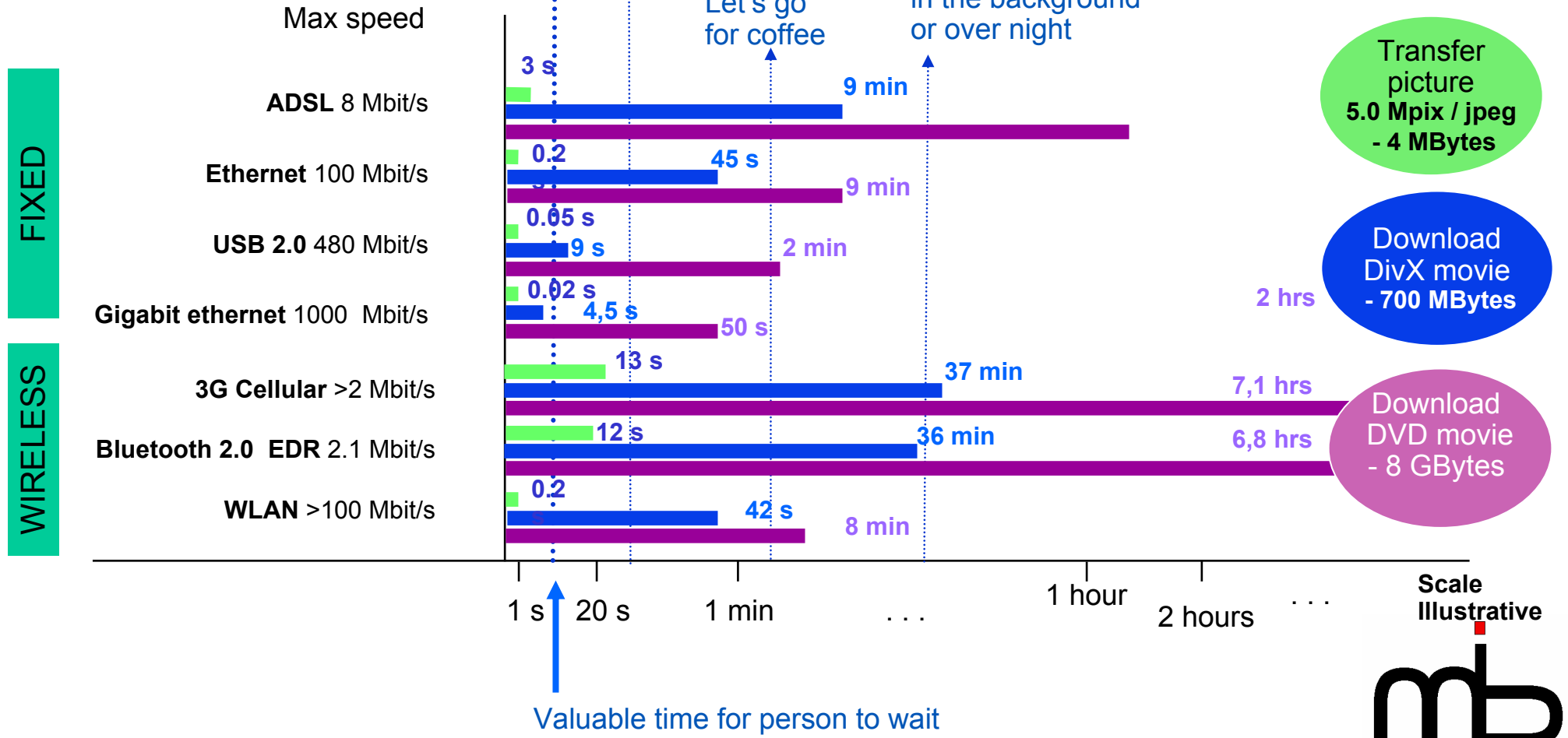
new type of user interaction will better support dedicated applications

Cost:

reduced cost will open up new markets for people earlier having not afford for such device usage

100++ Mbps wireless connectivity is needed for good user experience

80% efficiency from peak data rate assumed



Source: Nokia

Existing bands will not be enough for IMT services after the year 2015

High bit-rate mobile services which IMT-Advanced can deliver (with predicted data volumes and 100Mbps/1Gbps peak bit rates) cannot be feasibly delivered using today's mobile spectrum bands

Due to increased traffic: Traffic increases → More base stations → limit, how many sites can be added feasibly:

- In theory site density can be always increased to meet the capacity need
- However, for continuous coverage, guaranteed quality of service and full mobility with reasonable cost (CAPEX and OPEX), macro and micro cells is an attractive solution
- There is also a deployment issue as towers & antennas cannot be built in all places.
- Current spectrum allocations do not allow a cost efficient offering of mobile broadband services with reasonable site density

Due to new technologies: High bit-rates require new radio technology → need wider bandwidths (e.g. 100MHz) than available today (like 1.25 and 5MHz)

- IMT-2000 and its evolution will not be able to support such high bit-rates (100M/1G)
- WLAN offers high bit rates, but does not support wide-area coverage and mobility

Key Messages

Mobile Industry Backing
terrestrial spectrum for IMT

1. Mobile communications facilitate economic growth
2. High bit-rate services experienced in cable and fixed (DSL) networks will be expected from mobile networks as users demand the same services and same quality
3. High bit-rates enable faster mobile access and higher system capacity
 - big data transfer in today's mobile networks is too slow
 - new technologies will offer sufficient performance
4. Existing spectrum bands will not be sufficient to carry the predicted traffic for IMT services after the year 2015
5. IMT-Advanced can deliver the new high bit-rate services for users