

Use of the Digital Dividend for Mobile Broadband access

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Available studies show significant economic value-add through mobile broadband services

SCF Study

- GDP growth contribution by 0.6% until 2020 ¹⁾
- Millions of **extra** jobs created in Europe

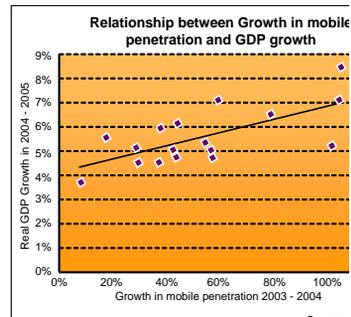
SVP study

- Allocation of some UHF spectrum to mobile operators would generate between **€ 63bn and € 165bn extra NPV** to Europe over 20 years
- Considerably more spectrum than 92 MHz could also be justified under a range of demand scenarios

ARCEP Study

- **7.1bn Euro GDP add-on** between 2012 to 2024 (only 2.3bn Euro add-on for TV)
- One year delay leads to reductions of ~230 Mil GDP add-on

Study of EC on economic impact under work (by Analysis Mason etal)



¹⁾ This was before the economic crisis! As of now, this figure is expected to be much higher.

The Digital Dividend is a very interesting for mobile usage due to its high economic potential

Valuable spectrum

- Optimal propagation conditions for mobile solutions
- Economically viable coverage of lower populated areas
- Better indoor cell throughput for data services in urban areas

Large economic potential

- Enlarging the Internet access footprint in Europe and globally
- Providing significant economic value add to GDP

Harmonized regulatory approach needed

- Full exploitation of economies-of-scale
- Broad envisaged spectrum availability
- Large mobile ecosystem
- Optimally used in combination with other bands by mobile operators

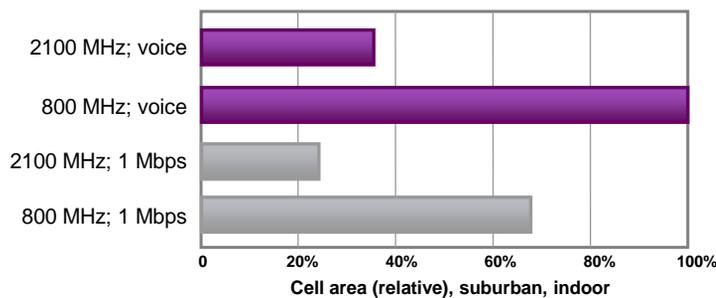
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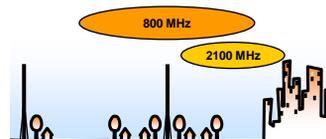


The Digital Dividend is needed for mobile broadband to bridge the Digital Divide



- Radio signal range @ 800 MHz significantly larger than @ 2100 MHz
- Less cell sites required to achieve area coverage
- Radio networks @ 800 MHz require significantly less investment

Note: figures based on WCDMA as an example



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Several European countries have already made their decisions, others will follow ...

Country	790 – 862 MHz
Finland	Allocated to mobile broadband communication Still used for wireless audio devices (790-822 MHz, 854-862 MHz) until new spectrum available; The difficulties with ARNS use in this band in Russia need to be solved
France	Allocated to mobile Internet access for 100% of population Bidding for service deployment until 2009
Sweden	Allocated to non-broadcast services For differentiation and completion of 3G services
Switzerland	Allocated to mobile broadband communication after 2012 especially for rural coverage
Germany	Currently used for broadcast services, but not many channels actually in use Government has decided to use 790-862 MHz for wireless broadband; agreement of counties pending, but likely
Slovenia	Expected allocation to mobile services
UK	Revision of current assignment announced for April 2009 in order to harmonize with major European countries

Source: Policy Tracker et al

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There is a benefit for Europe to act in a coordinated way

Common European approach will facilitate

- Harmonized spectrum usage
- Economies of scale
- Exploitation of consumer benefits and manufacturing efficiencies

Regulatory clarity is a pre-requisite

- No product developments as long as regulation, band plan and other conditions are not sufficiently defined and agreed upon

Regulatory “roadmap” may be helpful

- Based on common medium-to-long term targets
- Indicating spectrum availability in any given EU Member State
- Including guidelines for national Regulators
- Consolidating time schedules and frequency allocations

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Let's talk a bit technology

Mobile broadband communication

- Focus: full mobile services integrated with available mobile networks
- Technologies: HSPA, iHSPA, HSPA+, LTE / SAE

Prime technology candidate for this band is LTE / SAE

- Fully mobile broadband dedicated
- Highest spectral efficiency
- Lowest cost-to-performance ratio

Wireless broadband access

- Focus: nomadic or stationary (optional extension to mobility)
- Technologies: WiMAX, LTE / SAE

FDD band plan optimally fits for the 790-862 MHz band

- All future mobile technologies have FDD-mode
- Provides technology neutrality

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Two FDD band plan options are currently discussed within ECC PT1

Option 1: 30 MHz paired with a duplex gap of 12 MHz, fixed duplex spacing of 42 MHz

61	62	63	64	65	66	67	68	69
790-798	798-806	806-814	814-822	822-830	830-838	838-846	846-854	854-862
Downlink				Duplex gap	Uplink			
10 MHz					10 MHz			
30 MHz (6 blocks of 5 MHz)				12 MHz	30 MHz (6 blocks of 5 MHz)			

Option 2: 30 MHz paired with a duplex gap of 10 MHz, fixed duplex spacing of 40 MHz, 2 MHz guard band

61	62	63	64	65	66	67	68	69
790-798	798-806	806-814	814-822	822-830	830-838	838-846	846-854	854-862
Downlink				Duplex gap	Uplink			
10 MHz					10 MHz			
30 MHz (6 blocks of 5 MHz)				10 MHz	30 MHz (6 blocks of 5 MHz)			

Nokia Siemens Networks supports Option 2, because ...

... a guard band is required to avoid interference into below 790 MHz

... explicit guard band will avoid loss of usable bandwidth in the lowest block

... 10 MHz duplex gap is regarded feasible at reasonable conditions

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Summarizing ...

The Digital Dividend represents valuable spectrum for wide area mobile applications

- High social benefits and economic value
(Viviane Reding: “The incremental value of using the digital dividend spectrum for wireless broadband across the EU is estimated to be between €150 – €200 billion”)
- Allocation of 790-862 MHz band is an important step
- Allows harmonized spectrum usage needed for optimal efficiency
- Further spectrum allocation options should remain open

Therefore we recommend

- European regulatory framework for the Digital Dividend
- Adoption of a single FDD band plan of 2x30MHz for 790-862 MHz
- Speedy spectrum provision enabling realization of full potentials
- Achieve early certainty about the regulatory situation in every European country to enable early product availability

**Thank you very much
for your attention**