Is the Eastern and South-Eastern European market ready for the services provided based on the digital dividend?

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Summary

• TV and broadband are major markets to benefit from the digital dividend

• Harmonisation at European level is paramount (frequency bands and standards)

• Country-specific factors relevant for the uptake of services based on the digital dividend include:
  1. Market demand and penetration
  2. Extent of platform competition
  3. Release of spectrum
  4. Regulatory environment

• Is Eastern and South-Eastern Europe ready? No unique answer given the wide divergencies across countries
## TV and broadband services benefiting from the digital dividend

<table>
<thead>
<tr>
<th>Services:</th>
<th>Spectrum from 470 – 862 MHz band:</th>
<th>Additional or alternative spectrum:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital terrestrial television (DTT)</td>
<td>Large parts of band</td>
<td>None</td>
</tr>
<tr>
<td>Mobile TV broadcast</td>
<td>Below 750 MHz</td>
<td>e.g., L-Band (1452-1492 MHz)</td>
</tr>
<tr>
<td>Wireless broadband communications</td>
<td>800 MHz band</td>
<td>e.g. 900/1800 MHz &amp; 2.1/2.6 GHz bands</td>
</tr>
</tbody>
</table>
TV markets benefiting from the digital dividend

- Transmission of TV programmes & other audiovisual content to a stationary/portable device
  - Market for basic TV
  - Market for premium pay-TV (incl. interactive services)

- Transmission of TV programmes & other audiovisual content to a mobile device ("mobile TV")
  - Market for basic mobile TV
  - Market for premium mobile pay-TV (incl. interactive services)

- Cable TV, satellite TV, IPTV (xDSL, FTTH, WiMAX)

Digital dividend
Broadband markets benefiting from the digital dividend

- Provision of broadband Internet access at a fixed location (to a stationary/portable device)
  - Market for fixed broadband Internet access
  - Cable, xDSL, FTTH, WiMAX
  - Mobile broadband (cellular)
  - Digital dividend
  (Unlikely to be a substitute for very high bandwidth)

- Provision of broadband Internet access to a mobile device („mobile Internet“)
  - Market for mobile broadband Internet access
  - Mobile broadband (cellular)
  - Digital dividend
Factors relevant for the uptake of services based on the digital dividend

• Harmonisation at European level is paramount (frequency bands and standards)

• Country-specific factors relevant for the uptake of services based on the digital dividend include:
  1. Market demand and penetration
  2. Extent of platform competition
  3. Release of spectrum
  4. Regulatory environment

• Is Eastern and South-Eastern Europe ready for a quick uptake? No unique answer given the divergencies in national circumstances
Factor 1: Market demand and penetration

TV markets:

• Basic TV and premium Pay-TV
  - Established mass markets
  - Further growth with multiplication of TV channels, better viewing quality (HDTV) and interactive TV products (VoD, etc.)

• Mobile TV
  - Emerging market also in Eastern and South-Eastern Europe
  - Uptake uncertain, but may eventually come, along with multiplication of mobile TV channels and interactive TV products
Factor 1: Market demand and penetration

Broadband markets:

- Fixed broadband Internet access
  - Broadband penetration in many Eastern and South-Eastern European countries below EU average, will catch up in the longer run
  - Mobile broadband can improve "fixed“ broadband penetration, in particular, in rural areas
- Mobile Internet
  - Emerging market
  - High growth predicted, with lower prices, higher speeds, new applications and new mobile devices

<table>
<thead>
<tr>
<th>Fixed BB penetration (1)</th>
<th>Mobile BB penetration (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI 22,1</td>
<td>PL 4,7</td>
</tr>
<tr>
<td>CZ 17,8</td>
<td>SK 4,5</td>
</tr>
<tr>
<td>HU 17,2</td>
<td>HU 3,8</td>
</tr>
<tr>
<td>EL 15,6</td>
<td>CZ 3,2</td>
</tr>
<tr>
<td>SK 14,3</td>
<td>SI 2,5</td>
</tr>
<tr>
<td>PL 12,8</td>
<td>RO 2,1</td>
</tr>
<tr>
<td>RO 12,3</td>
<td>EL 1,6</td>
</tr>
<tr>
<td>BG 11,9</td>
<td>BG 1,0</td>
</tr>
</tbody>
</table>

(1) Number of fixed BB connections / modems / keys in % of pop, 7/2009

Source: COCOM
Factor 2: Platform competition

TV markets:

- Basic TV and premium Pay-TV
  - DTT competes with cable, satellite, and xDSL/FTTH (IPTV)
    - Cable strong in many Eastern and South-Eastern European countries, cable overbuild in PL and BG
    - 2-5 satellite platform operators in a single country
    - Cable, satellite & xDSL/FTTH offer more channels, cable & xDSL/FTTH offer more interactivity
    - DTT, together with satellite, important for rural areas – and a complementary platform for free TV in urban areas
  - Mobile TV
    - Broadcast mobile TV not cost effective if demand is low – MNOs use streaming (over HSPA/LTE)

<table>
<thead>
<tr>
<th>Country</th>
<th>Terrestrial</th>
<th>Cable</th>
<th>Satellite</th>
<th>DSL</th>
</tr>
</thead>
<tbody>
<tr>
<td>RO</td>
<td>5</td>
<td>69</td>
<td>25</td>
<td>0,6</td>
</tr>
<tr>
<td>HU</td>
<td>14</td>
<td>61</td>
<td>21</td>
<td>-</td>
</tr>
<tr>
<td>SI</td>
<td>16</td>
<td>48</td>
<td>8</td>
<td>28</td>
</tr>
<tr>
<td>SK</td>
<td>22</td>
<td>36</td>
<td>39</td>
<td>2</td>
</tr>
<tr>
<td>BG</td>
<td>25</td>
<td>51</td>
<td>23</td>
<td>0,6</td>
</tr>
<tr>
<td>PL</td>
<td>33</td>
<td>34</td>
<td>32</td>
<td>1</td>
</tr>
<tr>
<td>RS</td>
<td>44</td>
<td>47</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>HR</td>
<td>43</td>
<td>17</td>
<td>29</td>
<td>10</td>
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<tr>
<td>CZ</td>
<td>48</td>
<td>26</td>
<td>22</td>
<td>2</td>
</tr>
<tr>
<td>EL</td>
<td>87</td>
<td>-</td>
<td>12</td>
<td>1</td>
</tr>
</tbody>
</table>

(1) Main reception device, in % of TV households, end 2009
Source: SES Astra
Factor 2: Platform competition

Broadband markets:

- Fixed broadband Internet access
  - In some Eastern and South-Eastern European countries, mobile broadband may become a substitute for, and a competing platform to, fixed broadband (except very high bandwidth)
  - In many rural areas, mobile broadband is the only platform

- Mobile Internet
  - Mobile cellular networks are unrivalled, where users are on the move

<table>
<thead>
<tr>
<th>Coverage (1)</th>
<th>UMTS</th>
<th>HSDPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL</td>
<td>89</td>
<td>89</td>
</tr>
<tr>
<td>SI</td>
<td>74</td>
<td>74</td>
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<tr>
<td>HU</td>
<td>73</td>
<td>73</td>
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<tr>
<td>SK</td>
<td>71</td>
<td>62</td>
</tr>
<tr>
<td>BG</td>
<td>65</td>
<td>50</td>
</tr>
<tr>
<td>CZ</td>
<td>60</td>
<td>na</td>
</tr>
<tr>
<td>RO</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>PL</td>
<td>31</td>
<td>19</td>
</tr>
</tbody>
</table>

(1) Coverage in % of population, end 2008

Source: IDATE
Factor 3: Release of spectrum

- Markets need certainty about ASO date
- Markets need certainty about clearance of digital dividend spectrum for uses other than DTT
  - Many Eastern and South-Eastern European undecided about 800 MHz band for wireless broadband
  - Many Eastern and South-Eastern European countries undecided about locating spectrum for mobile TV
Factor 4: Regulatory environment

- Markets need “open, transparent and non-discriminatory” spectrum assignment procedures
- Need to integrate assignment of spectrum to broadcast multiplexes within a broader approach that takes the programming into account
- Need to assign spectrum to wireless broadband networks within a broader approach that integrates assignment of other „fresh“ spectrum and migration of legacy spectrum
- Markets can cope with coverage obligations, but infrastructure sharing may be required
- One DTT multiplex usually sufficient to carry public service programmes, must-carry obligations for mobile TV not justified (nascent service)