Digital Switch Over
Experiences across Europe

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What is DigiTAG

• DigiTAG is an association of stakeholders in the digital terrestrial TV industry

• Its members include: broadcasters, network operators, regulators, and professional equipment and consumer electronics manufacturing organisations.

• DigiTAG’s mission is to defend and promote digital television worldwide, regardless of the technical standard used on the DTT platform
**Vocabulary**

- **DTT**  Digital Terrestrial Television
  \[+\]
- **ASO**  Analogue Switch Off
  \[=\]
- **DSO**  Digital Switch Over
DTT & ASO situation in Europe
DTT status in Europe

DTT networks in Europe are based on the DVB family of standards. DVB-T2 is currently the state-of-the-art broadcasting technology.

- The most recent encoding standard, HEVC, has not been adopted yet. It is likely to be deployed along with DVB-T2 – e.g. deployment is expected in Germany in 2017.
- Broadcasters have already started showcasing HEVC during special events transmitted in UHD.

- Most countries in the world, including all European countries have adopted the DVB transmission standard as opposed to
  - ATSC, used in North America
  - ISDB-T, used in Japan, the Philippines and South America
  - DTMB, used in China

**Figure 7:** Encoding technology by country [Source: Analysys Mason, 2014]

**Figure 8:** Transmission standard by country [Source: Analysys Mason, DVB, 2014]
## Different strategies

<table>
<thead>
<tr>
<th>Terrestrial countries</th>
<th>Dominant business model is a free-to-air platform</th>
<th>France, UK, Italy, Spain,</th>
<th>Long simulcast period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Many new services are offered to viewers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>France, UK, Italy, Spain,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nordic countries</td>
<td>Mixture of free-to-air and pay services offered</td>
<td>Sweden, Norway, Finland,</td>
<td>Short simulcast</td>
</tr>
<tr>
<td></td>
<td>Aggressive ASO strategy</td>
<td>Denmark</td>
<td>period</td>
</tr>
<tr>
<td></td>
<td>Sweden, Norway, Finland, Denmark</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable countries</td>
<td>Limited new services offered( not all)</td>
<td>NL, CH, Belgium, Germany</td>
<td>Short simulcast</td>
</tr>
<tr>
<td></td>
<td>Emphasis on portable/mobile reception</td>
<td></td>
<td>period</td>
</tr>
<tr>
<td></td>
<td>NL, CH, Belgium, Germany</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DTT offer as it was by 2010

Note: countries such as Italy and Spain, alike France, have later used MPEG-4 for HD TV

<table>
<thead>
<tr>
<th>Country</th>
<th>DTT launch</th>
<th>Free-to-air</th>
<th>Pay</th>
<th>Compression techno.</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>1998</td>
<td>8</td>
<td>22</td>
<td>MPEG-2</td>
</tr>
<tr>
<td>Spain</td>
<td>2000</td>
<td>6</td>
<td>15</td>
<td>MPEG-2</td>
</tr>
<tr>
<td>UK</td>
<td>2003</td>
<td>40</td>
<td>PushPVR</td>
<td>MPEG-2</td>
</tr>
<tr>
<td>Italy</td>
<td>2004</td>
<td>31</td>
<td>PPV</td>
<td>MPEG-2</td>
</tr>
<tr>
<td>Germany</td>
<td>2004</td>
<td>~24</td>
<td>0</td>
<td>MPEG-2</td>
</tr>
<tr>
<td>France</td>
<td>2005</td>
<td>18 (+3 HD)</td>
<td>9</td>
<td>MPEG-2/MPEG-4</td>
</tr>
<tr>
<td>Spain</td>
<td>2005</td>
<td>20</td>
<td>TBC</td>
<td>MPEG-2</td>
</tr>
<tr>
<td>Austria</td>
<td>2006</td>
<td>6</td>
<td>0</td>
<td>MPEG-2</td>
</tr>
<tr>
<td>Czech Rep</td>
<td>2006</td>
<td>12</td>
<td>0</td>
<td>MPEG-2</td>
</tr>
<tr>
<td>Denmark</td>
<td>2006</td>
<td>4</td>
<td>25</td>
<td>MPEG-2/MPEG-4</td>
</tr>
<tr>
<td>Estonia</td>
<td>2006</td>
<td>7</td>
<td>24</td>
<td>MPEG-4</td>
</tr>
<tr>
<td>Slovenia</td>
<td>2006</td>
<td>7</td>
<td>TBC</td>
<td>MPEG-4</td>
</tr>
<tr>
<td>Norway</td>
<td>2007</td>
<td>5</td>
<td>20</td>
<td>MPEG-4</td>
</tr>
<tr>
<td>Lithuania</td>
<td>2008</td>
<td>12</td>
<td>28</td>
<td>MPEG-4</td>
</tr>
<tr>
<td>Hungary</td>
<td>2008</td>
<td>3 (+3 HD)</td>
<td>2</td>
<td>MPEG-4</td>
</tr>
<tr>
<td>Portugal</td>
<td>2009</td>
<td>4</td>
<td>TBC</td>
<td>MPEG-4</td>
</tr>
<tr>
<td>Latvia</td>
<td>2009</td>
<td>5</td>
<td>30</td>
<td>MPEG-4</td>
</tr>
<tr>
<td>Country</td>
<td>Launch date</td>
<td>Free-to-air platform</td>
<td>Commercial platform</td>
<td>Compression format</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td>----------------------</td>
<td>---------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>2009</td>
<td>2 Muxes</td>
<td>3 Muxes</td>
<td>MPEG-4</td>
</tr>
<tr>
<td>Poland</td>
<td>2009</td>
<td>1 Mux</td>
<td>1 Mux</td>
<td>MPEG-4</td>
</tr>
<tr>
<td>Slovakia</td>
<td>2009</td>
<td>1 Mux</td>
<td>2 Muxes</td>
<td>TBC</td>
</tr>
<tr>
<td>Ireland</td>
<td>2010</td>
<td>1 Mux</td>
<td>3 Muxes</td>
<td>MPEG-4</td>
</tr>
<tr>
<td>Bosnia</td>
<td>2010</td>
<td>1 Mux</td>
<td>TBC</td>
<td>MPEG-4</td>
</tr>
<tr>
<td>Romania</td>
<td>2010</td>
<td>TBC</td>
<td>TBC</td>
<td>MPEG-4</td>
</tr>
<tr>
<td>Greece</td>
<td>2010</td>
<td>2 Muxes</td>
<td>TBC</td>
<td>MPEG-4</td>
</tr>
<tr>
<td>Cyprus</td>
<td>2010</td>
<td>1 Mux</td>
<td>2 Muxes (TBC)</td>
<td>MPEG-4 (TBC)</td>
</tr>
</tbody>
</table>
## ASO dates

<table>
<thead>
<tr>
<th>Country</th>
<th>DTT Launch</th>
<th>ASO real Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>1999</td>
<td>2007</td>
</tr>
<tr>
<td>Finland</td>
<td>2001</td>
<td>2007</td>
</tr>
<tr>
<td>Switzerland</td>
<td>2001</td>
<td>2008</td>
</tr>
<tr>
<td>Germany</td>
<td>2002</td>
<td>2008</td>
</tr>
<tr>
<td>Belgium</td>
<td>2002</td>
<td>2010</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2003</td>
<td>2006</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>2006</td>
<td>2006</td>
</tr>
<tr>
<td>Denmark</td>
<td>2006</td>
<td>2009</td>
</tr>
<tr>
<td>Austria</td>
<td>2006</td>
<td>2010</td>
</tr>
<tr>
<td>Norway</td>
<td>2007</td>
<td>2009</td>
</tr>
<tr>
<td>UK</td>
<td>1998</td>
<td>2012</td>
</tr>
<tr>
<td>Spain</td>
<td>2000/2005</td>
<td>2010</td>
</tr>
<tr>
<td>Italy</td>
<td>2003</td>
<td>2012</td>
</tr>
<tr>
<td>France</td>
<td>2005</td>
<td>2011</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>2005</td>
<td>2011</td>
</tr>
<tr>
<td>Portugal</td>
<td>2009</td>
<td>2012</td>
</tr>
</tbody>
</table>

### Mixed / Cable markets

### Terrestrial markets
But still difficult situations

A number of countries even in the North of Region 1 will not meet the 17th of June ITU deadline related to Analogue TV

Even more critical situations in the South of Region 1

Note that June 17th is not a deadline for switching off analogue TV:

It is the date after which analogue TV will not be protected from interfering emissions from neighbouring countries and after which remaining analogue TV emissions will be forbidden to create interferences to neighbouring countries
Key factors of success
Legislative framework including ASO targets

Early involvement of Government and regulators is essential

- To define ASO strategy and roadmap
- To ensure sufficient financial resources
- To ensure adequate digital receivers are available at a reasonable price
Sufficient DTT coverage

French example

- Previous 85% population coverage was considered insufficient

- Law and Decrees (2008) require a 95% population terrestrial coverage

- Availability of the DTT services on a free satellite platform to complete
But you also need sufficient DTT penetration

French example, two years before ASO:

- 70% of households had access digital TV services on at least one television set
- while 39% had converted all of their television sets to digital
- But, still 17% only received television via analogue terrestrial TV!
# DTT penetration by early 2010

*EU SWO target: end of 2011*

<table>
<thead>
<tr>
<th>Country</th>
<th>Terrestrial dependency</th>
<th>DTT penetration</th>
<th>DTT coverage</th>
<th>Years since DTT launch</th>
<th>Years ASO process</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>49%</td>
<td>39%</td>
<td>80%</td>
<td>11 years</td>
<td>4 years</td>
</tr>
<tr>
<td>Spain</td>
<td>82%</td>
<td>67%</td>
<td>96%</td>
<td>9 years</td>
<td>2 years</td>
</tr>
<tr>
<td>Italy</td>
<td>78%</td>
<td>52%</td>
<td>80%</td>
<td>5 years</td>
<td>4 years</td>
</tr>
<tr>
<td>France</td>
<td>58%</td>
<td>43%</td>
<td>89%</td>
<td>4 years</td>
<td>2 years</td>
</tr>
<tr>
<td>Germany</td>
<td>9%</td>
<td>9%</td>
<td>90%</td>
<td>7 years</td>
<td>0-9 months</td>
</tr>
</tbody>
</table>

Penetration: number of homes relying on DTT for their main TV set
To be compared with terrestrial dependency for ASO
And today in the European Union (28)

“Terrestrials” - approx:
>100 million households
>250 million people
45-50% of Europeans
2000 TV Channels

Data from Eurobarometer 396, 2013 and Mavise. Adds to more than 100%. Households may use more than one platform.
## DTT coverage today*

<table>
<thead>
<tr>
<th>Country</th>
<th>PSB multiplex</th>
<th>Other multiplexes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Republic</td>
<td>100%</td>
<td>95-85%</td>
</tr>
<tr>
<td>Denmark</td>
<td>99%</td>
<td>97%</td>
</tr>
<tr>
<td>Finland</td>
<td>99.8%</td>
<td>99.8%</td>
</tr>
<tr>
<td>France</td>
<td>95%</td>
<td>95%</td>
</tr>
<tr>
<td>Germany</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>Italy</td>
<td>99%</td>
<td>95%, 90%, 85%</td>
</tr>
<tr>
<td>Norway</td>
<td>95% plus satellite shadow areas</td>
<td>95%</td>
</tr>
<tr>
<td>Portugal</td>
<td>92.7%</td>
<td>n/a</td>
</tr>
<tr>
<td>Spain</td>
<td>98%</td>
<td>96%</td>
</tr>
<tr>
<td>Sweden</td>
<td>99.8%</td>
<td>98%</td>
</tr>
<tr>
<td>Switzerland</td>
<td>99%</td>
<td>n/a</td>
</tr>
<tr>
<td>UK</td>
<td>98.5%</td>
<td>90%</td>
</tr>
</tbody>
</table>
A precise ASO roadmap

2008
Border

2009
Border / Granada / Wales / West Country

2010
STV North / STV Central / Wales / Channel Islands

2011
STV Central / Yorkshire / Central / Anglia / West

2012
Tyne Tees / London / Meridien
A precise ASO roadmap

- In Sept 2008, the Italian Government published its ASO timetable
- 16 technical areas have been switched-off in 4 years
Communication is key

- Viewers must understand what will happen, when, and, how to prepare?

<table>
<thead>
<tr>
<th>Consumer awareness plan in UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>3–Years</td>
</tr>
<tr>
<td>National Launch of SwitchCo</td>
</tr>
</tbody>
</table>
Why is Pink so popular?
Tuner availability

Ensuring that all television sets sold after a set date can receive DTT services

- In France, by law, all TV sets sold since 6 March 2008 had to include a DTT tuner
- In Italy, by law, all TV sets sold since June 09 had to include a DTT tuner
- In the UK, three major retailers (Currys, Dixons, PC World) took a self decision and announced in January 2008 that they would no longer sell analogue-only TV sets
And of course…

- Funding for ASO organisation
- Cost of information campaigns

- Financial support has proved to be necessary. Intended recipients of aid include low-income households, general public, or households with communal antennas.
## DSO Costs*

<table>
<thead>
<tr>
<th>Country</th>
<th>Purpose</th>
<th>Amount</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>ASO + Help Scheme</td>
<td>€ 397 million</td>
<td>Government/Broadcasters</td>
</tr>
<tr>
<td>UK</td>
<td>Help Scheme</td>
<td>€ 693 million</td>
<td>BBC</td>
</tr>
<tr>
<td></td>
<td>Marketing activities</td>
<td>€ 230 million</td>
<td>Digital UK</td>
</tr>
<tr>
<td></td>
<td>DSO total</td>
<td>€ 4.37 billion</td>
<td>Private/public</td>
</tr>
<tr>
<td>Italy</td>
<td>Help Scheme</td>
<td>€ 50 per qualifying HH</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>ASO pilots</td>
<td>€ 55 million</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>DTT roll-out</td>
<td>€ 33 million (2007)</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>DTT subsidy</td>
<td>€ 220 million (illegal?)</td>
<td>Government</td>
</tr>
<tr>
<td>Spain</td>
<td>DSO projects</td>
<td>€ 75 million</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>DSO as of March 09</td>
<td>€ 1.2 billion</td>
<td>Private/public</td>
</tr>
<tr>
<td>Finland</td>
<td>ASO</td>
<td>&lt; € 1 million</td>
<td>Increased license fee for YLE</td>
</tr>
<tr>
<td>Sweden</td>
<td>Help Scheme</td>
<td>No special budget</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td>Marketing activities</td>
<td>€ 2 million</td>
<td>Government</td>
</tr>
<tr>
<td>USA</td>
<td>DTV coupon program</td>
<td>$ 1.9 billion</td>
<td>Government</td>
</tr>
</tbody>
</table>
Network costs*

- Cost of 6 French multiplex networks estimated between 500 and 1000 M€ (Main transmitters)

- Quid of 95% coverage?

- Sate help for analogue TV necessary frequency changes during transition about 60 M€

Handbook available at www.digitag.org
Lessons to learn: Finland

- National ASO on 31 Aug 2007

**Issues that arose**

- Receivers (subtitles)
- Reception in some areas
- Date: coincided with the weekend
- Public Service Broadcaster on frontline: 20% of viewers stopped paying television license fee
Lessons to learn: Sweden

• Launch of DTT services in 1999 offering a largely pay DTT platform operated by Boxer
• Attractive programme offer combined with competitive pricing has allowed Boxer to effectively compete with other television operators
• Five phases to switch-off starting in September 2005 and completed in October 2007
• 40% of viewers waiting until last month to purchase DTT receivers
Lessons to learn: The Netherlands

- DTT platform launched in 2003 offering limited free-to-air services from the PSB and extensive pay services from Digitenne

- ASO completed on a single day on 10 December 2006

- Since then, DTT penetration has increased from 3-5% to 12% of the population
Lessons to learn: Italy (the Theory)

Coverage number in any point:
From 7 (clear blue) to 25 (dark blue)
Lessons to learn:
Italy (Real life) started with Sardinia

- MFN pre switch-off
- SFN post switch-off

**Switch-off benefits**

- 14 frequencies “switched-off” in the island
- 22 national MUXes - 20 local MUXes (some with partial coverage) - 4 radio MUXes
- DTT offering of 59 digital channels
  - 29 national
  - 30 local
Be prepared for evolution
Technical innovation is essential, but be careful and smart when using it!
Technical innovation provides opportunities, but be careful!

**Opportunities**
- Spectrum is a scarce resource, but is needed for introducing new services, so that the DTT platform keeps its attractiveness in comparison with other platforms
- Use of T2 for countries not having yet DTT, or for introducing new services (i.e. HD) for countries not having it yet (UK, Sweden…) is the right thing to do

**But be careful!**
- The current context where there is pressure for finding additional spectrum for Wireless Broadband, leads to create pressure on the early DTT adopters for migrating towards the more efficient technology that is T2
- But introducing new technology at the occasion of launching new services (what France, Italy, Spain… did with MPEG4 for HD, and UK, Sweden… with T2) is one thing, to migrate existing services is a completely different thing, and is equivalent to a transition from Analogue to Digital, WITHOUT ANY BENEFIT FOR CONSUMERS!
Be flexible
French example
French legislation has played an important role in HD DTT success:

- All HD-ready television sets had to include a MPEG-4 AVC HD tuner as of 1 December 2008.
- Manufacturers had to include an MPEG-4 AVC HD tuner in all TV sets sized 26 inches and above, as of 1 December 2009.
- By 1 December 2012, all TV sets had to include an HD DTT tuner.
- By 1 December 2012, all new DTT receivers had to be able to receive both SD and HD content.
- This will be used to create a large enough basis of MPEG-4 enabled basis of receivers, for preparing a SWO of DVB-T/MPEG-2 emissions by May 2016.
Labelling is essential for consumer guidance

Launching HD services using DVB-T
- Sufficient capacity to provide 3 HD services per multiplex
- France, Hungary, Norway, Italy, Denmark
- France & Spain: All HD TV sets must include an HD MPEG-4 AVC decoder

Launching HD services using DVB-T2/MPEG 4
- Benefiting from a compression gain of over 60%
- United Kingdom, Sweden
WRC-07 started a new process*

ITU WRC-07 added an allocation to the Mobile Service in the 790-862 MHz sub-band as a co-primary service with Broadcasting
What has happened*

470 MHz

Broadcasting

790 MHz

Mobile Base stations

Guard band

Mobile terminals

<- 30MHz ->

<- 30MHz ->
Consequences for Broadcasting*

470 MHz

Broadcasting

790 MHz

862 MHz
Some very difficult situations*
Example of Spain

RRC06 situation:

Intense use of SFN
Impact on DTT resulting from LTE in 800 MHz band
How to avoid interferences:

Measure n°1: Guard Band

Measure n°2:
Base Stations
In the lower sub-band -> Easier control

Measure n°3: if this is insufficient take additional actions according to DigiTAG, EBU, BNE and ACT recommendation
Minimising the potential interference to Digital Terrestrial Television (DTT) broadcasting services from Mobile/Fixed Communications Networks (MFCN) operating in the 790-862 MHz frequency band

Joint recommendations from DigiTAG\textsuperscript{1}, EBU\textsuperscript{2}, BNE\textsuperscript{3}, ACT\textsuperscript{4}

See annex for details
Coexistence between LTE and DTT

- Frequency plan

- 2 issues
  - Protection ratio (PR): minimum C/I ratio needed
  - Overloading threshold (Oth): maximum level not to be exceeded

- 1 medicine: efficient and cost competitive domestic LTE mitigation filters are available on the European market today
And also issues with LTE User Equipments!

- Need to protect the consumer receiving conditions from interferences caused by nearby mobile phones (OOB emissions issues)
What is really experienced?

Here are already some elements related to what is experienced in France

• So far, the foremost (99%) source of complaints comes from aerial amplifier overloading

• Impact to DTT households is lower than anticipated, although significant, and appears to be manageable through swift provision of filters

• No impact on broadcast transmitters and gap fillers pilot reception so far
Conclusion
RRC-06 Plan has proved to be a good starting point for evolution

- It has already accommodated more networks and services than foreseen in 2006...

- Broadcasting DTT will need to have enough spectrum secured for the long term to protect its infrastructure investments and a very flexible **evolutionary** approach to be able further innovate (HDTV for all channels, UHDTV…), thanks to technology innovations, in spite of continuous pressure to release more spectrum for WBB!

- Hence “no change for spectrum below 694MHz” at upcoming WRCs!
Many thanks for your attention

WWW.digitag.org
ANNEX*

Recommendations for protecting DTT from interferences of LTE base stations in 800 MHz band
Recommendations

In order to provide an appropriate level of protection to DTT services below 790 MHz with respect to emissions from mobile/fixed communications networks (MFCN) operating within the 790-862 MHz band, DigiTAG, EBU, BNE and ACT, recommend that prior to the award of licences for use of the spectrum, the following protection measures be applied:

a) the most protective level defined in EC decision 2010/267/EC (baseline requirement in case A) should be applied in all cases;

b) additional mitigation measures are required to be put in place, as necessary, by mobile/fixed communication network licence holders to ensure full protection of DTT broadcasting services. These services include also portable and mobile DTT when these reception modes are part of the national coverage concept. The basis for this protection should be careful network planning by the MFCN operator to avoid situations that may create interference to the reception of DTT. The associated costs of implementing remedies should not be borne by broadcasters, broadcast network operators or viewers. Depending on the actual situation, these measures may include but are not limited to:

• reducing the power of the MFCN transmitters and adjusting their antenna characteristics to reduce interference problems, taking into account local conditions, especially for the MFCN Base Stations using the first frequency block above 790 MHz;

• using a Base Station antenna polarisation that is opposite to that of the DTT transmitter, especially for Base Stations using the first frequency block above 790 MHz;

• use of additional RF filtering at MFCN Base Stations, especially for Base Stations using the first frequency block above 790 MHz;

• use of on-channel low-power DTT repeaters at the MFCN Base Stations to restore the degradation of signal to noise ratio at affected DTT receivers. Such remedies should be coordinated with the impacted broadcast multiplex operator, since it may not be easily applicable, such as in the case of DTT transmitters operating in a Single Frequency Network (SFN);
c) It is further recommended that when granting frequencies in the 800 MHz band the following additional measures be considered:

- to make appropriate information on the licences awarded available, for instance on regulators’ websites, so that consumers suffering from interference know why this is happening, to whom they can complain and what action can be taken;

- setting-up an Entity, independent of the MFCN licence holders, as a point of contact to which cases of interference or loss of DTT service can be reported, to ensure a prompt and effective resolution in a timely manner;

- ensuring that consumers experiencing loss of DTT service, even after mitigation measures mentioned above have been implemented, are promptly provided with adequate equipment to allow continued reception of DTT services. Such equipment may include filters connected in front of the DTT receiver or receiving antenna amplifier system to eliminate harmful interference stemming from emissions in the frequency band 790-862 MHz. Such measures must not unduly impair reception of channel 60. The associated costs of these necessary remedies should not be borne by broadcasters, broadcast network operators or the viewers;

- any other actions necessary for circumstances when the above measures have proven ineffective.

d) It is highly recommended that field trials be organised to observe the ‘real world’ impact of the deployment of mobile/fixed communications services versus the results of theoretical models utilised for prediction purposes. The results should be made available to interested parties in Europe.

The DigiTAG, EBU, BNE and ACT members are fully open for cooperation with Administrations, Regulators, and all parties interested in the use of the 800 MHz band, in the context of the above recommendations.
Minimising the potential interference to Digital Terrestrial Television (DTT) broadcasting services from Mobile/Fixed Communications Networks (MFCN) operating in the 790-862 MHz frequency band

2nd set of Recommendations from DigiTAG with regard to interference from User Terminals

Introduction

On 22 November 2010, DigiTAG, ACT, BNE and EBU issued a joint Recommendation\(^1\) on measures needed to provide adequate protection to DTT services from downlink interference from mobile/fixed communication networks (MFCNs).

In January 2011, DigiTAG issued a Recommendation\(^2\) on the revision of ETSI standard EN 301 908 v5.1.1 to align it with the EC Decision 2010/267/EU and the prescriptions of CEPT Report 30, in order to reduce the risk of interference from UMTS/LTE User Terminals operating in the band 790-862 MHz into DTT reception.

In the present document, DigiTAG recommends that additional measures should be implemented to protect DTT services from interference caused specifically by User Terminals (i.e. LTE/UMTS terminals). These terminals are likely to be portable or mobile and to transmit at random times, making them more difficult to trace as sources of interference.

The present document takes into account the current regulatory framework, as set in EC Decision/267/EU and based on the studies of CEPT Report 30, but this does not imply that DigiTAG necessarily agrees with all these provisions, in particular when restrictions are placed upon the broadcasting service.

The present document does not cover EMC issues.

Further recommendations

In order to provide an appropriate level of protection to DTT services below 790 MHz with respect to emissions from MFCN User Terminals operating within the 790-862 MHz band, DigiTAG recommends that the following protection measures be applied, when possible prior to the award of the license for spectrum use:

\( a)\) Administrations, within their scope of competence, ensure that UMTS/LTE User Terminals capable of operating in the band 790-862 MHz are compliant with the EIRP level defined in EC decision 2010/267/EU, and that their maximum out of band emission (OOF) limits are compliant with the prescriptions of CEPT Report 30 (maximum out of band emission level of -65 dBm/8 MHz, intended as EIRP);

\(^1\) Please see http://www.digitag.org/Recommendations_22Nov2010.pdf
\(^2\) Please see: http://www.digitag.org/Recommendations_ETSIPDF
b) It is further recommended that the following additional measures be considered by Administrations:

- The same Entity referred to in the previous joint Recommendation, and which should be independent of the MFCN licence holders, should act as a point of contact to which cases of interference or loss of DTT service can be reported, and should gather information useful for the study of appropriate measures.

- Considering the random nature of interference from User Terminals, the above-mentioned Entity should keep a record of cases of interference that are possibly caused by LTE/UMTS User Terminals, in order to gather meaningful statistics and liaise with the Body responsible for market surveillance and enforcement.

- As in the case of interference from base stations, consumers experiencing degradation of DTT service due to interference from User Terminals should be promptly provided with adequate equipment and assistance to allow continued reception of DTT services. Such equipment may include different types of filters connected between the receiving antenna and the DTT receiver to eliminate harmful interference stemming from emissions in the frequency band 790-862 MHz. Such measures must not unduly impair reception of any DTT channel in use, up to and including channel 60. The associated costs of these necessary remedies should not be borne by broadcasters, broadcast network operators, television reception equipment manufacturers or viewers.

c) In cases where the above measures have proven ineffective, in particular, but not limited to, cases where a significant number of complaints are recorded in a particular area, Administrations should ensure that any other relevant action to mitigate such interference is undertaken. The associated costs of these necessary remedies should not be borne by broadcasters, broadcast network operators, television reception equipment manufacturers or viewers.

d) As noted in the previous recommendation, it is highly recommended that field trials be organised to observe the ‘real world’ impact of the deployment of mobile/fixed communications services versus the results of theoretical models utilised for prediction purposes. The results should be made available to interested parties in Europe.

DigiTAG members remain fully open for cooperation with Administrations, Regulators, and all parties interested in the use of the 800 MHz band, in the context of the above recommendations.
Minimising the potential interference to Digital Terrestrial Television (DTT) broadcasting services from Mobile/Fixed Communications Networks (MFCN) operating in the 790-862 MHz frequency band

Joint recommendations from DigiTAG\(^1\), EBU\(^2\), BNE\(^3\) and ACT\(^4\)

Introduction

Terrestrial broadcasting has an important societal role and economic value. The analogue to digital television switchover, which requires considerable investments and commitments from broadcasters, network operators and viewers, will result in releasing a ‘Digital Dividend’ in frequency spectrum.

Several national Administrations have decided to allocate the 790-862 MHz frequency band (the 800 MHz band) to mobile/fixed communications networks (MFCN), following the switch off of analogue terrestrial television services.

The European Commission issued a Decision (2010/267/UE) on harmonized technical conditions of use of this frequency band in the European Union by MFCNs. This decision is based on studies carried out by the CEPT, the results of which are published in CEPT Reports 30 and 31.

These harmonised technical conditions have been derived aiming to reduce the risk of disturbance that the implementation of MFCN in the 790-862 MHz frequency band may cause to Digital Terrestrial Television (DTT) broadcasting services in the lower adjacent band. However, as expressed in the CEPT Report 30, the concept of ‘block edge masks’ used to define these conditions does not always provide the required level of protection for victim services and, in order to resolve these cases of interference, additional mitigation techniques would need to be applied.

The EC Decision (Article 2, second paragraph) also states that Member States shall ensure that the new systems in the frequency band 790-862 MHz provide appropriate levels of protection to systems in adjacent bands, e.g. DTT broadcasting services.

\(^1\) Digital Terrestrial Action group, www.digitag.org
\(^2\) European Broadcasting Union, www.ebu.ch
\(^3\) Broadcast Networks Europe, www.broadcast-networks.eu
\(^4\) Association of Commercial Television in Europe, www.acte.be