A snapshot of LTE 800 in Europe
Legal framework and interference cases
(short public version)

Michel Gascoin, NRK, Norway
Digitag General Assembly 17.12.2014
Introducing TRUE 4G...
Process for the release of the 800 MHz band to IMT

Co-primary assignment of 790-862 MHz

Co-existence studies, recommendations...

Commission decision 2010/267/EU

National spectrum licensing (LTE)
Arguments for assigning the spectrum to IMT services

* Face the increasing need for mobile broadband
* Reduce the digital divide within a country
* New source of income for MNO’s
* Generate revenue for governments

Prerequisite:
Safeguard existing DTT services below 790 MHz
Countries with LTE800 in Europe

Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greenland, Iceland, Italy, Macedonia, Moldova, Monaco, Netherlands, Norway, Portugal, Romania, Russia, Slovakia, Slovenia

Time for evaluation!
Why a survey?

What legal framework/licensing conditions were chosen by each administration?
Are there best practices?
Any lessons to learn for future spectrum release?
Is DTT below 790 MHz safe?
Participating countries

- Finland (YLE)
- Ireland (2rn)
- Spain (Abertis Telecom)
- Germany (Media Broadcast)
- France (RIELE, TDF)
- Italy (Rai, EIT Towers)
- Sweden (TERACOM)
- Norway (NRK)
- Poland (Emitel)
- United Kingdom (Arqiva)
1. What 800 MHz spectrum is currently licensed and used in your country?
2. What are the protection requirements for LTE-DTT co-existence?
3. How interference cases are dealt with?
4. Economical aspects (who pays for what?)
5. What is the current situation concerning LTE800 interferences?
1. What spectrum is licensed and used for LTE800?

When was LTE800 launched?
What is the coverage requirement?
(...)

1. What spectrum is licensed and used for LTE800?
Little requirement to use all the released spectrum

Some “Priority areas” defined. But limited in extent and in offered bandwidth

Current deployment mainly in populated areas, densely in cities in some countries

Is the released spectrum actually used efficiently?
Is there a real intention to bridge the “digital divide”?
Is LTE800 used for capacity rather than for coverage, e.g. As a replacement for Wifi in cities?
2. What are the protection requirements for LTE-DTT co-existence?

Level of protection, considering EC decision 2010/267/EU?
User installations entitled to protection?
LTE deployment subject to authority approval?
(…)

DigitAG
www.digitag.org

NRK
Findings

* There WAS a clear intention to protect DTT
* Mainly fixed outdoor rooftop installations in primary homes
* Two countries have systematic procedures for approval of base stations deployment
* A majority of MNOs are free to roll-out base stations without approval or conformity check prior to launch

**MNOs have a responsibility to avoid or mitigate interference**
3. How interference cases are dealt with?

Existence of mitigation organisation and call centre?
Information available to stakeholders and the public?
Fault finding procedures and mitigation techniques?
(...)

DigITAG www.digitag.org

NRK
Findings

* Mitigation organisations exist in 7 out of 10 countries
* MNOs plans are usually not revealed to DTT stakeholders, let alone the public
* Assessing the existence of a LTE problem is difficult for a call centre or the public, even for professionals!
* Filters is a preferred means of mitigation.
* Unclear mechanisms to make sure that adequate filters are actually sent and fitted properly

**Who could/would DTT users call when TV reception is bad?**

**How feasible and economically rational is it to check:**

- *if LTE is the cause?*
- *if a filter actually solved the problem?*
4. Who pays for mitigation?

Who is meant to bear the costs for: mitigation, filters, call centers, fault finding, installation, antenna replacement (…)

Findings

* Cost covered by the MNOs:
  * Filters (6 countries out of 10)
  * Installation (4 countries)
  * A new antenna (2 countries)
  * No costs officially covered or unclear situation (4 countries)

What is the real protection of rooftop antennas when antennas with integrated LNA cannot be replaced? What if a filter does not solve the problem? What would a viewer choose to do?
5. What is the current situation concerning LTE800 interferences?

Amount and main cause of interference?
Unrecorded cases?
Effective mitigation techniques?
(...)

DigitAG www.digitag.org

NRK
Findings

* No available information in a majority of countries
* Very few publications and official statements
* Cases are usually reported by the mitigation organisation in the respective country

<table>
<thead>
<tr>
<th></th>
<th>Reported cases</th>
<th>Period covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>20 cases</td>
<td>2012</td>
</tr>
<tr>
<td>Norway</td>
<td>713 cases</td>
<td>2014</td>
</tr>
<tr>
<td>UK</td>
<td>3225 cases</td>
<td>2013</td>
</tr>
<tr>
<td>France</td>
<td>Next slide</td>
<td></td>
</tr>
<tr>
<td>Other countries</td>
<td>No data</td>
<td></td>
</tr>
</tbody>
</table>
The situation in France as in CEPT report SE7(14)110* (oktober 2014)

Mainly overloading and receiver blocking

*Information consistent with the announcement from ANFR about 32000 cases (Spectre & innovation, 27th November 2014)
Findings

* A majority of identified LTE problems are reported solved with a filter
* Very little information available
* Very large discrepancy: Germany vs. France
* Rumours, discontent, bad feeling...

Few interference cases?
Unidentified cases?
Hidden figures/deliberate opacity?
Or just no feedback from DTT users etc.?
Some lessons learned...

(a flavour)
It all started with a good intention...

* Administrations showed a intention to protect DTT
* MNOs are (in theory) expected not to cause interference, to solve problems if any, and bear mitigation costs
* All fixed (outdoor) aerials installations are to be protected
* Filters should solve most interference problems
Existence of a mitigation organisation:
Ranging from none… to call centres with limited abilities… to the telecom authority itself as a call centre… to drilled call centres in close cooperation with DTT

Protection of antennas and different types of households:
From outdoor antenna on primary TV and primary households only… to all TV, primary and secondary households AND indoor aerials

Availability of information to the public and other stakeholders:
From no info… to postcards to the public… to detailed base station location information to all stakeholders

Certification of MNOs LTE network:
From none… to approval regime and field measurements
Is DTT below 790 MHz safe?

YES!
* Very few reported interference cases
* Filters seem to solve most problems

MAYBE NOT...
* FDD 1 not in use on a large scale yet
* Real technical challenge to assess LTE problems in practice
* Uncertainty that problems are reported by DTT users
* Opacity regarding real disturbance

We fear a silent migration from DTT to other platforms
Success factors

- A skilled mitigation organisation to handle interference cases
- Certified filters protecting DTT from all frequencies above 791 MHz
- Mechanisms to assess possible LTE issues and low threshold to send a filter
- Other defined mitigation methods on top of filters and how they should be financed
- Requirement that DTT stakeholders and MNOs cooperate about mitigation, information exchange, reporting
- Clarification on economical aspects (costs to be borne)
- ...

But all this has to be defined in the license requirements!
Securing the future of DTT towards WRC-15

- Good co-existence conditions for IMT services and DTT requires sufficient technical recommendations
- Working upfront (ahead of decision from WRC, EC, national administrations) is essential

➢ EBU, BNE, Digitag shall get credits for all the efforts that are made on a technical and political level!
LTE... Don’t plug and pray!