



Ministerial  
Programme 2012

# Planning for Analogue Switchover – utilising the Digital Dividend

Monday 27<sup>th</sup> February 2012



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- **Importance of Digital Dividend band for delivering Mobile Broadband services**
  - Suvi Linden, ITU Special Envoy for the Broadband Commission for Digital Development
- **Planning for the Switchover**
  - Amit Nagpal, Consultant, Aetha Consulting
- **Case Study: Germany – from start to finish**
  - Dr Rüdiger Hahn , Head of Department, Bundesnetzagentur (Federal Network Agency)
- **Panel session:**  
**Overcoming challenges for analogue switchover around the world**
- **Moderator: Peter Lyons, MEA Spectrum Manager, GSMA**
- **Panelists:**
  - Bitange Ndemo, Permanent Secretary, Ministry of Communications, Kenya
  - Luis Lucatero, Head of Regulatory, Cofotel, Mexico
  - Dr JS Sarma, Chairman, Telecom Regulatory Authority of India, India





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## Overview of Digital Dividend to date

Herman Schepers, Head of Spectrum Interventions,  
Government & Regulatory Affairs, GSMA

STC  
Telecom  
Sri Lanka

ERICSSON

HUAWEI

Generalitat de Catalunya  
Government of Catalonia



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2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

**WRC 03:**  
Agenda Item  
7.2 proposes new  
bands to be  
recognised for IMT

**2003-2006:**  
ITU working party  
8F identifies 470-  
806/862MHz – ideal  
for low population  
density areas

**June 2006:**  
Geneva 06  
Agreement replaces  
analogue bands for  
digital TV

**Nov 2007:**  
WRC 07 identifies  
698-862 (Regions 1  
and 3)

**Jan 2009:**  
WRC 07 decisions  
come into force

**WRC 12:**  
Extra agenda item  
to extend Region 1  
band down to  
698MHz

STC  
Telecom  
Sri Lanka

ERICSSON

HUAWEI

Generalitat de Catalunya  
Government of Catalonia



## Ministerial Programme 2012

### Band plans:

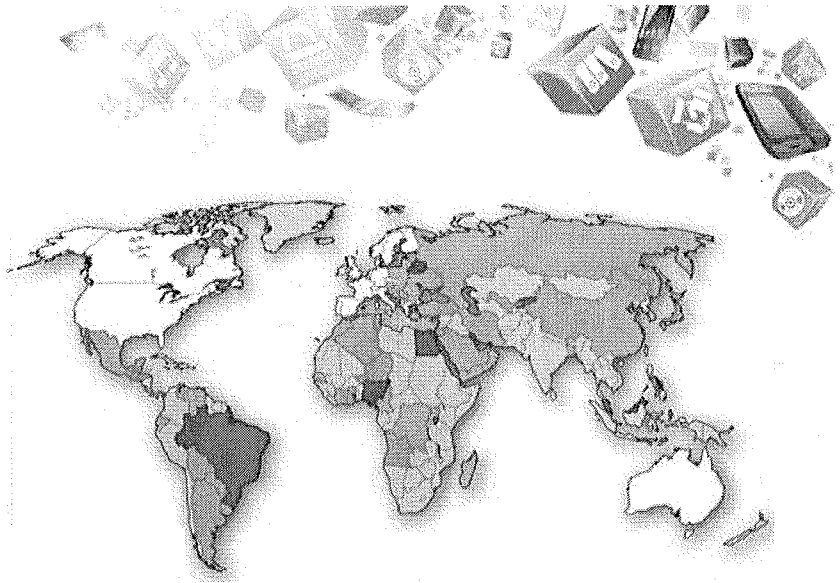
2 x 30MHz – CEPT / ATU

2 x 45MHz – APT / CITEL

2 x 22MHz – US band plan

### Licences issued:

- US (Mar 08)
- Germany (May 10)
- Sweden (Mar 11)
- Spain (Jul 11)
- Italy (Sept 11)
- Portugal (Nov 11)
- France (Dec 11)



- Positive and final outcome achieved
- Moving towards positive outcome, not yet finalised
- Moving slowly due to minor problems or internal challenges
- Major issues lie in way of allocation which may affect regional solutions
- No information yet



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# Importance of Digital Dividend band for delivering Mobile Broadband services

**Suvi Linden**, ITU Special Envoy for the Broadband  
Commission for Digital Development



# Importance of Digital Dividend band for delivering Mobile Broadband

Suvi Lindén 27.2.2012

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FOR DIGITAL DEVELOPMENT



## **Broadband: Key economic driver for the next decades**

**BROADBAND COMMISSION**  
FOR DIGITAL DEVELOPMENT



# Average Traffic Per Mobile Device Type

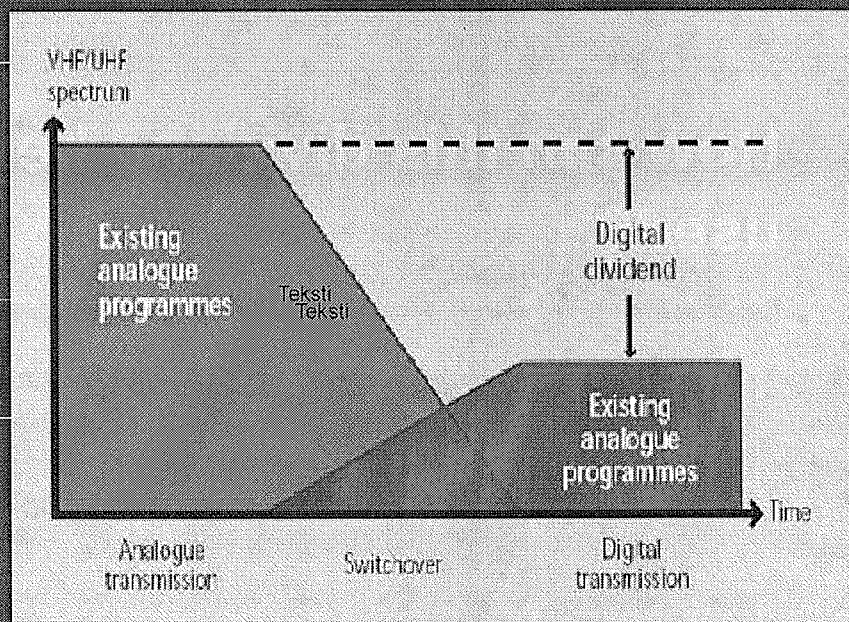
		2011	2016
		MBs per Month	MBs per Month
Non-Smartphone		4.3	108
M2M		71	266
Smartphone		150	2,576
E-Book Reader		750	2,880
Tablet		517	4,223
Laptop		2,131	6,942

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Figure 1 — Digital dividend spectrum

What is the digital dividend?



# Accessing the benefits of the digital dividend

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# How can this dividend be used?

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## WRC -12

1. The sharing issues in the 800 MHz band were successfully resolved

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## WRC -12

2. the 700 MHz band to the mobile services in Europe, Africa and Middle East, effective by the end of 2015

-> opens the way for worldwide harmonization of both 700MHz and 800 MHz bands for mobile

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## WRC -12

### 3. WRC-15 will consider additional spectrum allocations for mobile communication services

-> mobile services more affordable for end users and will help ITU towards its mandate of "connecting the world".

15

Moving forward to 2015

## Key Messages from Broadband Leadership Summit

- **MDGs:** Broadband accelerates progress
- **Access:** Ensuring universal access to information and the "right to communicate"
- **Economy:** Broadband is critical infrastructure
- **Development:** Broadband benefits all society
- **Partnership:** Public-private sector cooperation
- **Policy:** National broadband plans
- **Innovation:** Private sector has vital role to play



## Target 1: Making broadband policy universal

- By 2015, all countries should have a national broadband plan or strategy or include broadband in their Universal Access / Service Definitions

Action to enhance broadband access is more likely when there is a national broadband plan or strategy, or when broadband is included in countries' Universal Access / Service (UAS) definitions

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### Challenge and targets

## Target 2: Making broadband affordable

- By 2015, entry-level broadband services should be made affordable in developing countries through adequate regulation and market forces (amounting to less than 5% of average monthly income)
- In 49 economies in the world – mostly rich-world economies – broadband access in 2010 cost less than 2% of average income
- This compares to 32 economies in the world in 2010 where broadband access cost more than half of average national income

## **Target 3: Connecting homes to broadband**

- By 2015, 40% of households in developing countries should have Internet access
- In developed countries, more than 2/3 of households already had Internet access at the end of 2010, compared to around 16% of households in the developing world. This is likely to increase significantly by 2015, especially with the rise of mobile Internet
- This target includes access via both fixed and mobile networks

## **Target 4: Getting people online**

- By 2015, Internet user penetration should reach 60% worldwide, 50% in developing countries and 15% in LDCs
- At the end of 2010, 30% of the global population was online. Internet penetration in 2010 stood at 21% in the developing world and at just under 5% in the LDCs



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## Planning for the Switchover

Amit Nagpal, Consultant, Aetha Consulting



## Planning for the switchover

Presentation for GSMA Government Ministerial Programme  
Mobile World Congress 2012

27 February 2012



## Introduction

- This presentation primarily draws upon research undertaken by Aetha Consulting for the GSM Association on case studies of the digital switchover process
- The objectives of the case studies are to highlight:
  - the major obstacles that each country has faced during the process
  - the steps that have been taken to find solutions
- Studied countries comprised Australia, Finland, Germany, Mexico and the UK
- We hope that stakeholders within countries that are currently in the process of developing and implementing plans for the 700MHz/800MHz band can learn from these experiences



## Barriers to enabling future shared use of the band

The challenges faced by regulators and governments in enabling future shared use of the 470-862MHz band between digital TV and mobile broadband are varied

### Justification of switchover/band clearance to facilitate mobile broadband use

#### *Economic justification for switchover*

- Solid economic evidence is often required before the digital dividend can be allocated to mobile broadband

#### *Structural challenges to band clearance*

- Complexities can arise from different bodies being responsible for broadcasting and mobile spectrum

### Obstacles faced in migrating the band to new uses and users

#### *Completion of analogue switch-off (ASO)*

- The timing of the ASO can be an obstacle to the 700/800MHz band being used for mobile

#### *Clearing DTT from the band*

- DTT multiplexes may require relocation from the 700/800MHz band

#### *Clearing PMSE<sup>(1)</sup> use from the band*

- PMSE is often an existing user of the band and may require relocation

#### *Clearing military users from the band*

- In many countries the 700/800MHz band is used by the military

### Ensuring mobile broadband in the 700MHz/800MHz band does not negatively impact other spectrum users

#### *DTT use beneath the 700MHz/800MHz band*

- Measures may need to be taken to prevent interference to continued DTT use

#### *Cable TV use within the 700MHz/800MHz band*

- Measures may need to be taken to prevent interference with cable TV equipment

#### *Uses in neighbouring countries*

- Ongoing DTT use in neighbouring countries may interfere with mobile use in the band
- Restrictions to prevent interference to military uses in neighbouring countries may also prevent mobile use in the band

(1) Programme-making and special events. The primary use in the 700MHz/800MHz band is for radio microphones, and in-ear monitors



## Obstacles faced by our case study countries

	Australia	Finland	Germany	Mexico	UK
<b>Justifying the switchover and clearance of the band</b>	Qualitative evidence sufficient to justify 700MHz band	Justification of the 800MHz band straightforward as was not used for TV	Split spectrum responsibility between national government and Länder meant 800MHz band adoption was complicated	Qualitative evidence sufficient to justify 700MHz band	Detailed quantitative assessment of benefits was undertaken
<b>Obstacles faced in migrating to new uses/ users</b>	Large number of DTT channels in the 700MHz band, which could only be relocated after ASO Large number of PMSE users	No DTT use in the 800MHz band PMSE use in the 800MHz requires relocation	DTT/mobile TV use in the 800MHz band, which could only be relocated after ASO Large number of PMSE users	Legacy analogue TV use prevents mobile use before ASO No planned DTT use in the band	Planned DTT use in Ch61& 62 requires relocation Large number of PMSE users in Ch69 require relocation
<b>Ensuring that other spectrum uses are not negatively impacted</b>	DTT use beneath the 700MHz band required protection No neighbouring countries	Agreement that protected Russian military use (ARNS) prevented mobile use in the 800MHz band nationally, in effect	DTT use beneath the 800MHz requires protection Concerns that mobile could interfere with cable TV	DTT use beneath the 700MHz may require protection Neighbours already / are expected to use 700MHz band for mobile	DTT use beneath the 800MHz requires protection

## Justifying digital switchover and band clearance

The UK and Germany needed to overcome obstacles to the justify the digital switchover and clearance of the 800MHz band

### UK

- Together with branches of the UK government, the regulator Ofcom carried out numerous, extensive and detailed studies into the costs and benefits of awarding the digital dividend for telecoms use, including:
  - A case for digital switchover, primarily made on the cost savings from the switch-off of the analogue infrastructure compared to maintaining dual transmission systems
  - A "Digital Dividend Review" estimated that the value of the digital dividend to be within GBP5–10 billion,<sup>(1)</sup> based on a wide range of potential alternative uses of the released spectrum, including use for mobile broadband and additional television channels
  - a further analysis was undertaken, specifically on the additional benefits/costs of adopting the 800MHz band in the UK, which resulted in an NPV in the range GBP2 to 3 billion, after accounting for the costs of migrating existing users

### Germany

- The process to designate the 800MHz band for mobile use was complicated by the fact that the national government is responsible for mobile services spectrum licensing whereas each of the 16 federal states (Bundesländer) is responsible for the licensing of broadcast spectrum
- The government based the case for reallocating the 800MHz band to mobile use on the ability to provide wireless broadband in rural areas
- Parliament put forward proposals to remove the power of the Bundesländer to restrict the use of the UHF band to broadcasting
- Ultimately, the Bundesrat finally adopted the national government's proposals

(1) Net present value over 20 years

## Clearing DTT from the 700MHz/800MHz band

Our case study countries have employed a range of solutions to clear DTT from the band

### *Actions to accelerate analogue switch-off*

- **Australia:** A comprehensive switchover programme was put in place to accelerate ASO. Its initiatives included: a programme of training of retail advisors in electronics stores, labelling of goods into categories of "digital readiness", a programme of training of TV and antenna installers, and a programme of "endorsed" installers. It also organised a series of targeted subsidies, such as a free decoder for vulnerable collectives, and subsidies for households located outside of coverage areas to receive TV via satellite
- **Mexico:** The regulator COFETEL recently called for financial resources to accelerate ASO, estimating the subsidies required to provide decoders, antennas and related costs to be of the order of USD200 million. COFETEL recommended that this be financed by the public.
- **UK:** A fund of GBP600 million was secured to provide free/subsidised set-top boxes to older people and people with disabilities

The availability of low cost DTT set-top boxes will be key for accelerating digital switchover in emerging markets; this may arise through local/regional manufacturing

### *Actions to relocate historic uses from the 700MHz/800MHz band*

- **Germany:** A compensation scheme was put in place for PMSE users affected by interference from mobile and needed to be relocated to channels 51 to 60 (which required the purchasing of new equipment)
- **UK:** DTT assignments in channels 61 and 62 were relocated primarily to channels 39 and 40. The cost of this was estimated at between GBP85 million and GBP185 million, which was to be funded by the government



## Protecting users in adjacent bands from interference

Our case study countries have employed a range of solutions to protect users in neighbouring bands and in neighbouring countries from harmful levels of interference from mobile broadband services

### *Actions to protect DTT use below the 700MHz/800MHz band*

- **Australia:** The regulator ACMA has implemented an additional 4MHz of guard band (9MHz in total) between the 700MHz band and DTT in order to reduce any risk of interference
- **Germany:** The 800MHz licence conditions specified that licensees are responsible for ensuring there is no interference with users in neighbouring bands
- **UK:** The regulator Ofcom undertook research into the potential for mobile use in the 800MHz band to interfere with DTT. These stated that mitigation measures could include the deployment of filters for DTT receivers, filters at mobile base stations, reorientation of aerials, reduction in the power levels and migrating users to other TV platforms. Ofcom estimated that these measures could total around GBP100 million, and proposed that they should be borne by the licensees of the 800MHz band. Ofcom's most recent research has indicated approximately 900 000 DTT-only households could be affected by interference in the absence of the above mitigation measures

### *Actions to resolve interference issues with neighbouring countries*

- **Finland:** Russia currently uses the 800MHz band for ARNS.<sup>(1)</sup> Existing coordination interference agreements with Russia effectively prevented neighbouring countries (including Finland) from using these frequencies for any other use. Finland, along with several of Russia's other neighbours, entered into negotiations with Russia regarding the 800MHz band, as well as other issues. In the second half of 2011, FICORA reached an agreement with Russia which allowed a full coverage mobile 800MHz network to be placed 55km from the Russian border

(1) Aeronautical radio navigation services





## Aetha Consulting

*Trusted advisor to the telecoms industry, undertaking data-driven and quantitative assessments to support strategic and regulatory decisions*

Aetha Consulting helps players in the telecommunications industry to develop creative and sustainable solutions to the challenges facing them in a constantly changing environment

We specialise in undertaking rigorous, data-driven and quantitative assessments to support major strategic and regulatory decisions. We work with our clients to develop the tools and methodologies appropriate to solve each new business problem as it arises

Our staff have been contracted to advise on key industry issues, including: market strategy development, radio spectrum policy, spectrum valuation and auction support

We are committed to quality and exceeding our client's expectations. We have a strong track record of successful assignments with operators, regulators, and manufacturers, as well as financial and legal institutions



## Spectrum management experience

**We help operators and regulators to analyse the opportunities and threats arising out of changes in their radio spectrum holdings**

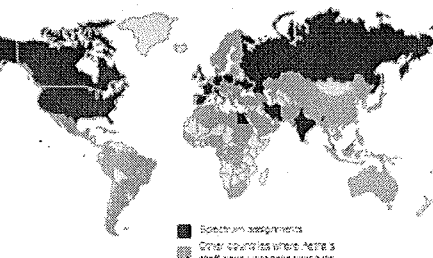
### Recent spectrum assignments and reference projects \*

Netherlands: Valuation and auction strategy for an operator ahead of 2.6GHz auction.

UK: Study for Ofcom regarding the liberalisation of 2G spectrum.

USA: Valuation of 220MHz spectrum for two railroad companies.

France: Study for ARCEP to quantify the economic benefits of uses of the digital dividend.



Germany: Spectrum valuation support for an operator ahead of the 'big bang' auction

UAE: Advised the regulator regarding digital TV switchover.

Denmark: Support to NITA to award spectrum in the 2.1GHz, 2.6GHz and 800MHz bands

Poland: Valuation support to a mobile operator ahead of the 2008 800MHz auction.

Hong Kong: Advised OFTA to implement a spectrum trading regime.

Singapore: Supported IDA to develop a strategy for the digital dividend.

\* A significant amount of the experience shown was gained by our team members prior to joining Aetha

Our staff have supported operators in over 25 spectrum auctions worldwide in the last 10 years including:

- 800MHz and 2.6GHz (4G) auctions in Europe including Austria, Germany, Italy, the Netherlands and Switzerland
- 2.1GHz (3G) auctions in Asia including India, Hong Kong, Singapore and Taiwan
- New entrant licence acquisition opportunities in countries such as the AWS auction in Canada and 2G/3G auctions in Egypt, Iran, Kuwait, Libya and Qatar.

Our consultants have assisted regulators to award spectrum including supporting the UK and Danish Governments with awards of 420MHz, 800MHz, 1.5GHz, 2.1GHz and 2.6GHz spectrum





## Contact details

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## Case Study: Germany – from start to finish

Dr Rüdiger Hahn , Head of Department,  
Bundesnetzagentur (Federal Network Agency)



[www.bundesnetzagentur.de](http://www.bundesnetzagentur.de)



## Thematic Workshop Case Study: Germany – from start to finish

Dr. Rüdiger Hahn  
Barcelona, 27th February 2012