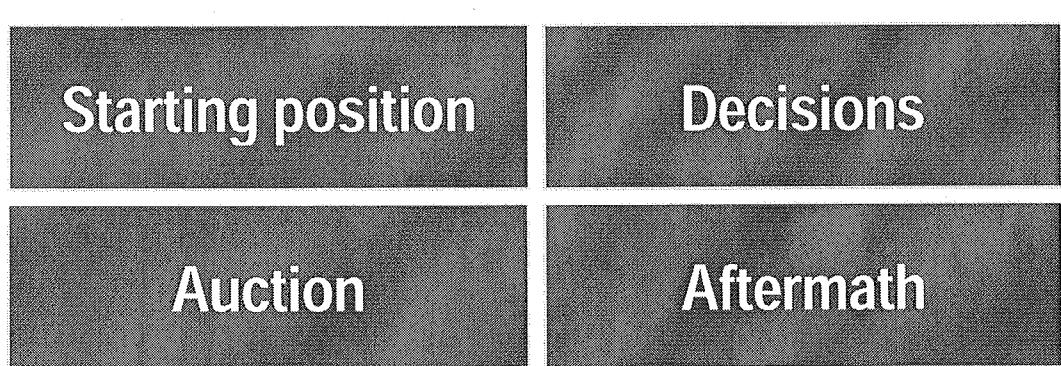
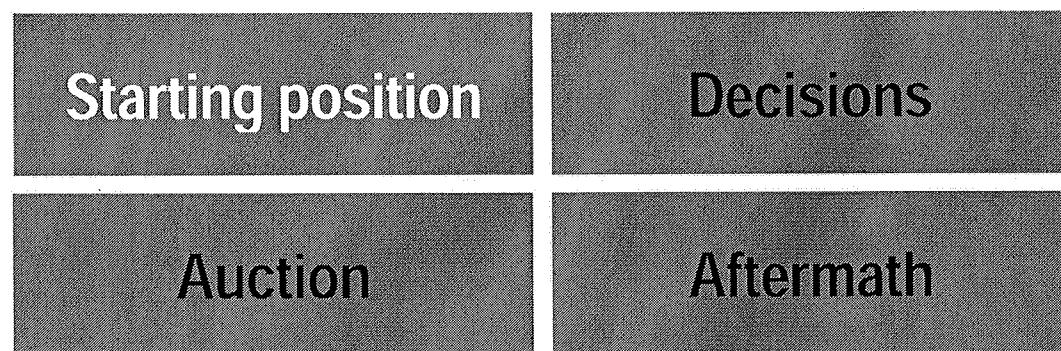


## Overview



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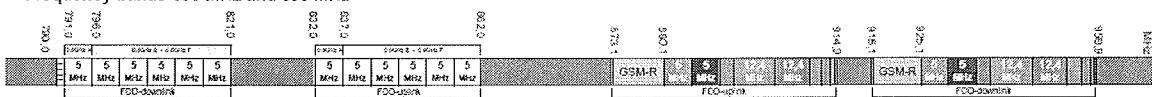
## Overview



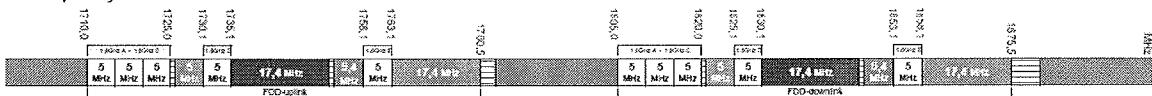
38

## Spectrum before Auction

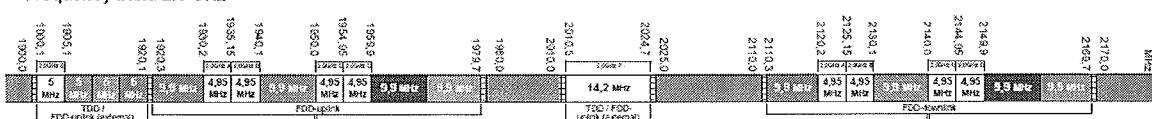
- Frequency bands 800 MHz and 900 MHz



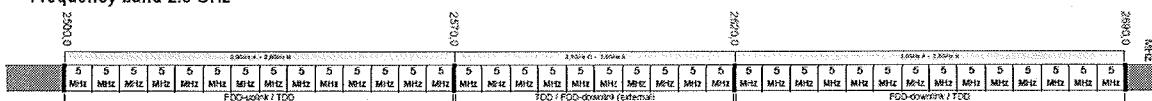
- Frequency band 1.8 GHz



- Frequency band 2.0 GHz



- Frequency band 2.6 GHz



Legend: █ Telekom Deutschland █ E-Plus-Gruppe █ Telefónica O2 Germany █ Vodafone █ 0.8GHz A concrete blocks █ 0.8GHz B - 0.8GHz F abstract blocks

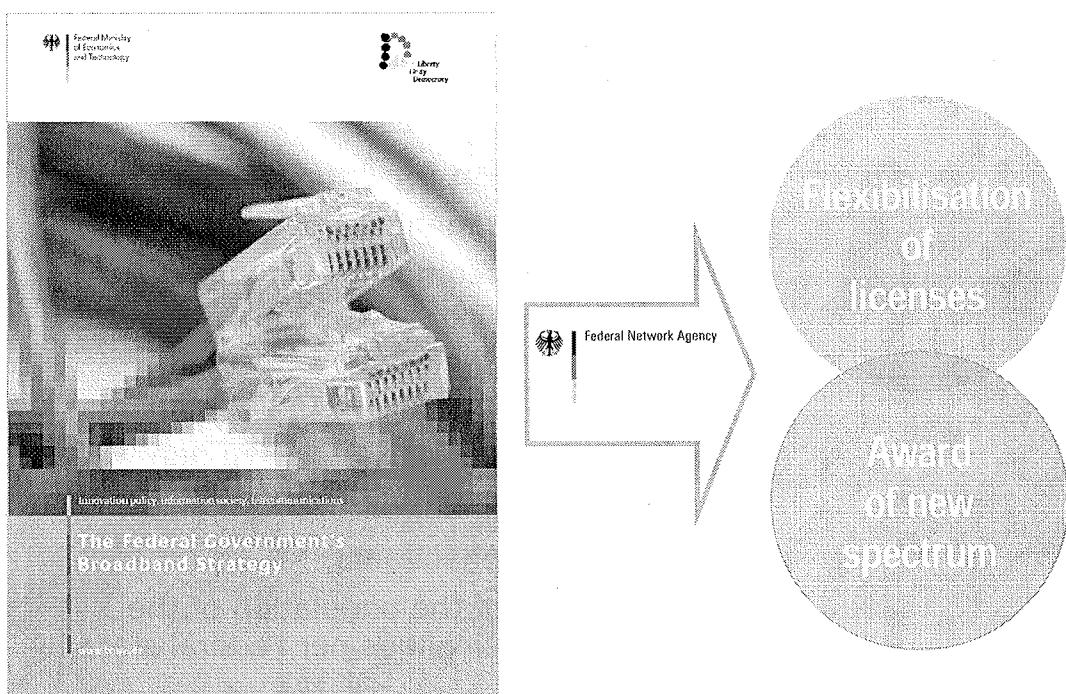
39

## Frequency holdings before Auction

Frequency Range	vodafone	e-plus <sup>+</sup>	Telefónica	
<b>900 MHz</b>	<b>2 × 12,4</b>	<b>2 × 12,4</b>	<b>2 × 5</b>	<b>2 × 5</b>
<b>1.8 GHz</b>	<b>2 × 5</b>	<b>2 × 5,4</b>	<b>2 × 17,4</b>	<b>2 × 17,4</b>
<b>2.1 GHz</b>	<b>2 × 9,9</b>	<b>2 × 9,9</b>	<b>2 × 9,9</b>	<b>2 × 9,9</b>
<b>Σ paired spectrum</b>	<b>2 × 27,3</b>	<b>2 × 27,7</b>	<b>2 × 32,3</b>	<b>2 × 32,3</b>
<b>2.1 GHz (unpaired)</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>0</b>
<b>Σ spectrum (in total)</b>	<b>59,6</b>	<b>60,4</b>	<b>69,6</b>	<b>64,6</b>

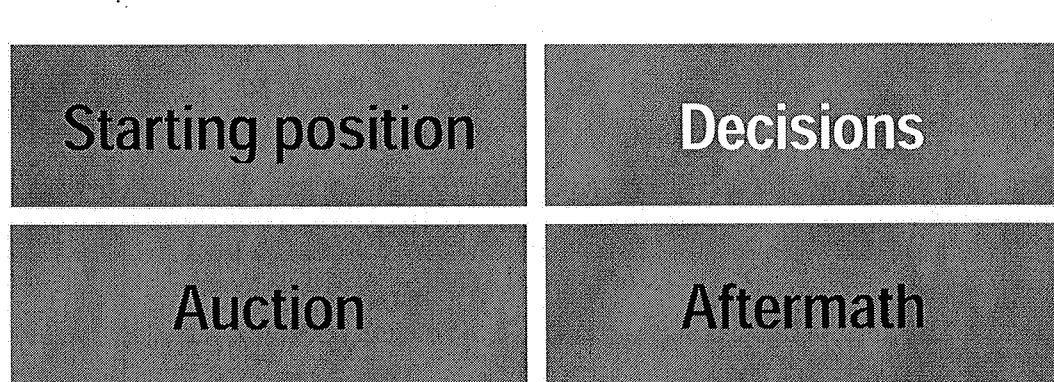
40

## German approach



41

## Overview

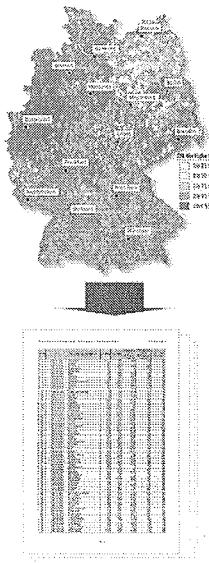


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## Coverage obligation

### **Principle obligation:**

- at least 25% of the population as from 1 January 2014
- at least 50% as from 1 January 2016



### **Special obligation for “digital dividend”:**

- Federal Government's Broadband Strategy
- Federal states compiled “white spaces” on municipality level
- Four priority stages:
  - (1) inhabitants < 5,000
  - (2) 5,000 < inhabitants < 20,000
  - (3) 20,000 < inhabitants < 50,000
  - (4) 50,000 < inhabitants
- at least 90% of the population of the relevant municipalities per Federal state by end of 2016

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## Minimum bid



Block	Minimum bid
<b>2 x 5 MHz (paired)</b>	<b>€ 2,500,000</b>
<b>1 x 5 MHz (unpaired)</b>	<b>€ 1,250,000</b>
<b>1 x 14.2 MHz (unpaired)</b>	<b>€ 3,550,000</b>

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## Overview

Starting position

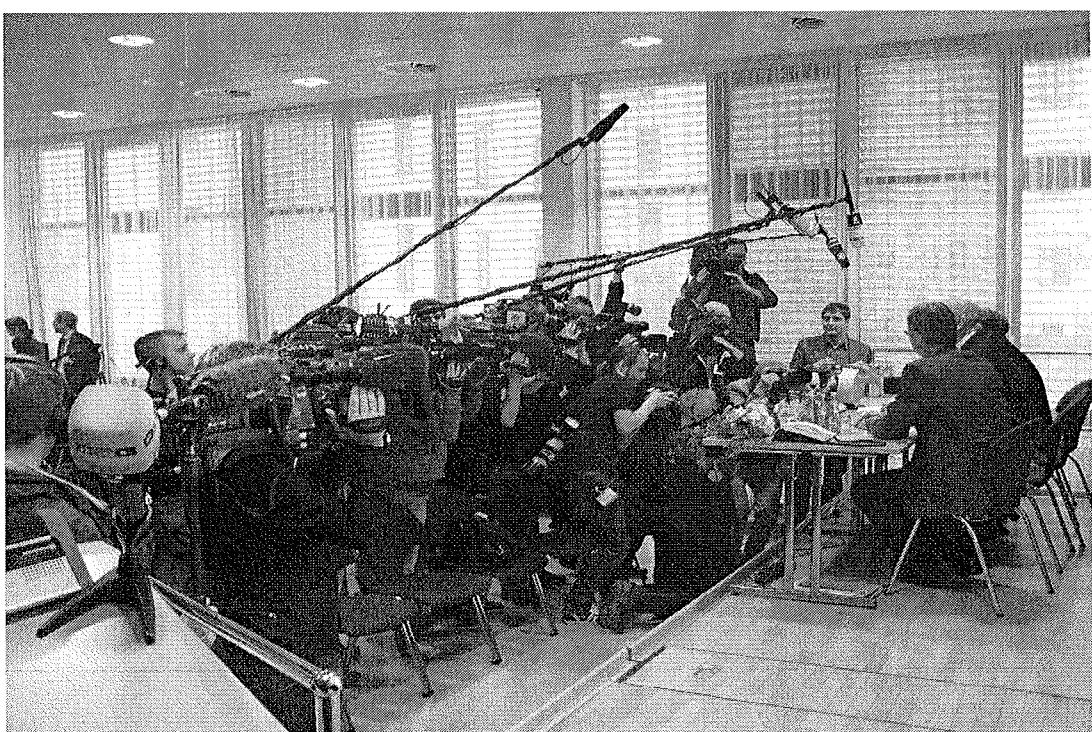
Decisions

Auction

Aftermath

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12 April 2010: Starting the clock



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## Results of the final bidding round

### End of Auction

Frequenzbereich	Block	Ausstattung	Höchstbieter	Höchstgebot (€ in Tsd)	Frequenzbereich	Block	Ausstattung	Höchstbieter	Höchstgebot (€ in Tsd)
0,8 GHz (gepaart)	0,8 GHz A	2x5 MHz konkret	To2 GER	618.595	2,6 GHz (gepaart)	2,6 GHz A	2x5 MHz abstrakt	Telekom D	19.095
	0,8 GHz B	2x5 MHz abstrakt	To2 GER	698.760		2,6 GHz B	2x5 MHz abstrakt	Telekom D	19.025
	0,8 GHz C	2x5 MHz abstrakt	Telekom D	570.849		2,6 GHz C	2x5 MHz abstrakt	To2 GER	17.364
	0,8 GHz D	2x5 MHz abstrakt	Telekom D	692.949		2,6 GHz D	2x5 MHz abstrakt	To2 GER	17.364
	0,8 GHz E	2x5 MHz abstrakt	Vodafone	583.005		2,6 GHz E	2x5 MHz abstrakt	Vodafone	18.948
	0,8 GHz F	2x5 MHz abstrakt	Vodafone	627.317		2,6 GHz F	2x5 MHz abstrakt	Vodafone	19.026
1,8 GHz (gepaart)	1,8 GHz A	2x5 MHz abstrakt	Telekom D	20.700		2,6 GHz G	2x5 MHz abstrakt	Telekom D	19.069
	1,8 GHz B	2x5 MHz abstrakt	Telekom D	20.700		2,6 GHz H	2x5 MHz abstrakt	Telekom D	19.038
	1,8 GHz C	2x5 MHz abstrakt	Telekom D	19.869		2,6 GHz I	2x5 MHz abstrakt	To2 GER	18.948
	1,8 GHz D	2x5 MHz konkret	E-Plus Grp	21.650		2,6 GHz J	2x5 MHz abstrakt	E-Plus Grp	18.931
	1,8 GHz E	2x5 MHz konkret	E-Plus Grp	21.536		2,6 GHz L	2x5 MHz abstrakt	E-Plus Grp	17.739
2,0 GHz (gepaart)	2,0 GHz A	2x4,95 MHz konkret	Vodafone	93.757		2,6 GHz M	2x5 MHz abstrakt	Vodafone	17.739
	2,0 GHz B	2x4,95 MHz konkret	E-Plus Grp	103.323		2,6 GHz N	2x5 MHz abstrakt	Vodafone	17.762
	2,0 GHz C	2x4,95 MHz konkret	E-Plus Grp	84.064		2,6 GHz O	1x5 MHz abstrakt	Vodafone	9.130
	2,0 GHz D	2x4,95 MHz konkret	To2 GER	66.931		2,6 GHz P	1x5 MHz abstrakt	Vodafone	9.130
2,0 GHz (ungepaart)	2,0 GHz E	1x5 MHz konkret	To2 GER	5.731		2,6 GHz Q	1x5 MHz abstrakt	Telekom D	8.598
	2,0 GHz F	1x14,2 MHz konkret	To2 GER	5.716		2,6 GHz R	1x5 MHz abstrakt	Vodafone	8.598

Ausgeschiedene Bieter:

**4.384.646.000 €**

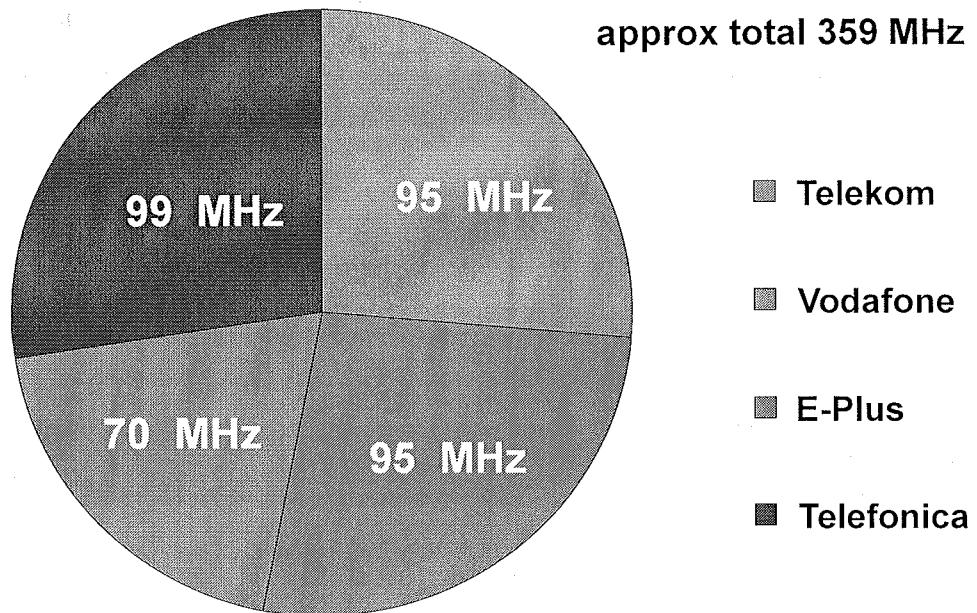
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## German auction 2010

- **360 MHz**
- **41 frequency blocks**
- **4 frequency bands (800 MHz, 1.8 GHz, 2.1 GHz, 2.6 GHz)**
- **1 auction**
- **6 applicants**
- **4 bidders**
- **6 weeks**
- **224 rounds**

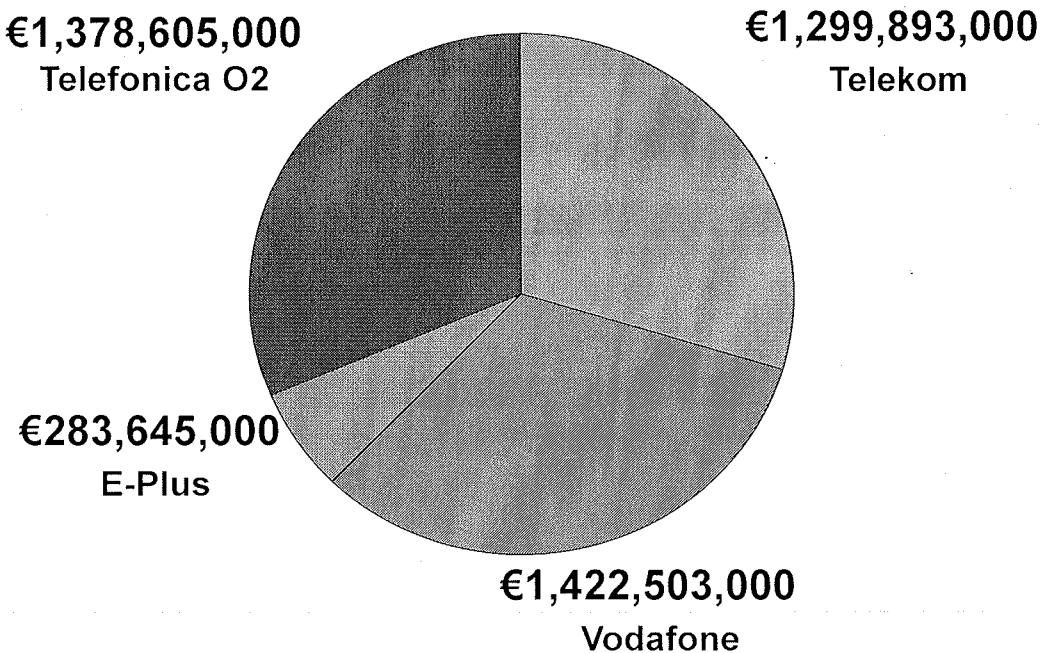
48

## Outcome of the auction



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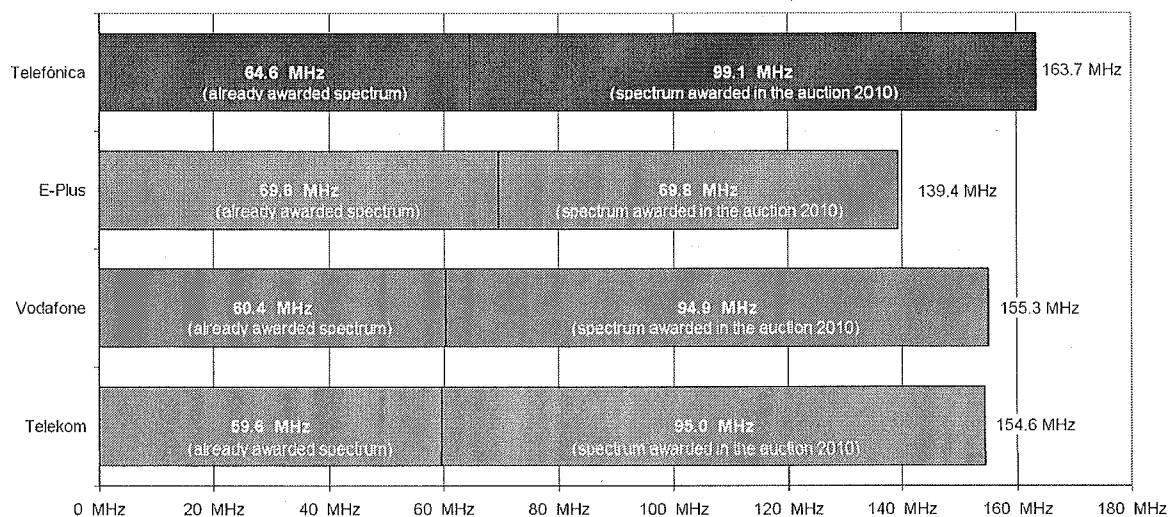
## Highest bids per operator



50

## Spectrum holdings

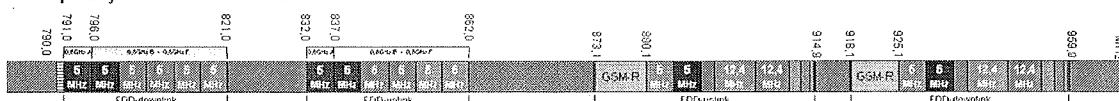
### Spectrum of the mobile network operators after the auction



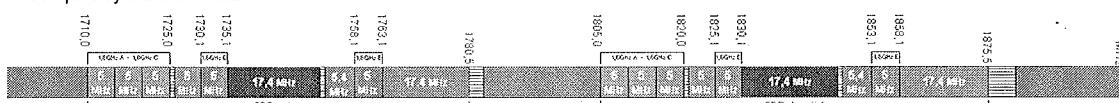
51

## Current spectrum distribution

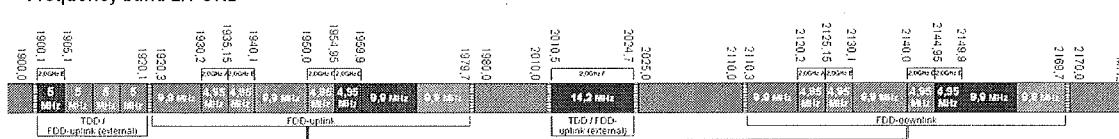
- Frequency bands 800 MHz and 900 MHz



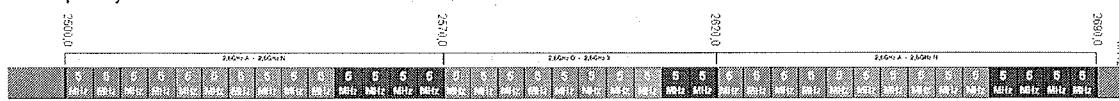
- Frequency band 1.8 GHz



- Frequency band 2.1 GHz



- Frequency band 2.6 GHz



■ Telekom Deutschland ■ E-Plus-Gruppe

■ Telefonica O2 Germany

■ Vodafone

■ 0.8GHz ■ concrete awarded

■ 0.8GHz ■ abstract awarded

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## Overview

Starting position

Decisions

Auction

Aftermath

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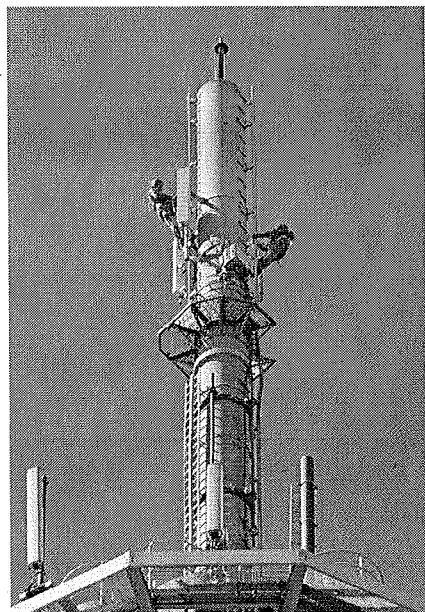
## Co-existence of DVB-T and LTE



Site-specific parameters

Transparent procedure

No interference yet



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## 800 MHz Coverage

10 of 16 Federal states covered

7448\* LTE-800 sites approved

2332\* sites in commercial operation



\* as of January 2012

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## Site-specific parameters

LTE at 800 MHz

7,448 sites

LTE at 1.8 GHz

1,254 sites

LTE at 2.6 GHz

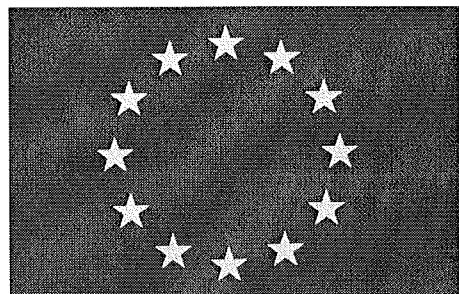
203 sites



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## Examination of existing assignments

2. Member States shall, when implementing this Directive, examine whether the existing assignment of the 900 MHz band to the competing mobile operators in their territory is likely to distort competition in the mobile markets concerned and, where justified and proportionate, they shall address such distortions in accordance with Article 14 of Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and services (Authorisation Directive) (\*\*).



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telecommunications



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From our point of view a combination of spectrum costs and networks costs is the most suitable indicator to objectively determine competitive distortions. [...] We do not see indicators for distortions of competition stemming from spectrum distribution and the flexibilization of the 900 MHz band.

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## Identification of demand for spectrum

**Expiry of GSM licences  
by the end of 2016**

**Statements of interest in  
usage by January 2012**

Project 2016 Page 1 of 26

Translation<sup>1</sup>

Demand identification proceedings  
for the frequency bands at 900 MHz and 1800 MHz

(BK - 1-11/003)

Also the Bundesnetzagentur's Official Gazette No. 23/2011

<sup>1</sup> In case of divergence in translation only the German text shall prevail

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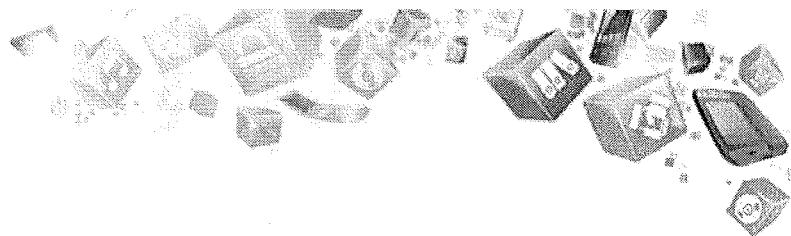
Dr. Rüdiger Hahn  
Head of Department 2  
Legal Aspects of Telecommunications Regulation, Frequency Regulation

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

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Ministerial  
Programme 2012



**Panel session:**

**Overcoming challenges for analogue switchover around the world**

**Moderator:**

**Peter Lyons, MEA Spectrum Manager, GSMA**

**Panelists:**

**Bitange Ndumo, Permanent Secretary, Ministry of Communications, Kenya**

**Luis Lucatero, Head of Regulatory, Cofetel, Mexico**

**Dr JS Sarma, Chairman, Telecom Regulatory Authority of India, India**

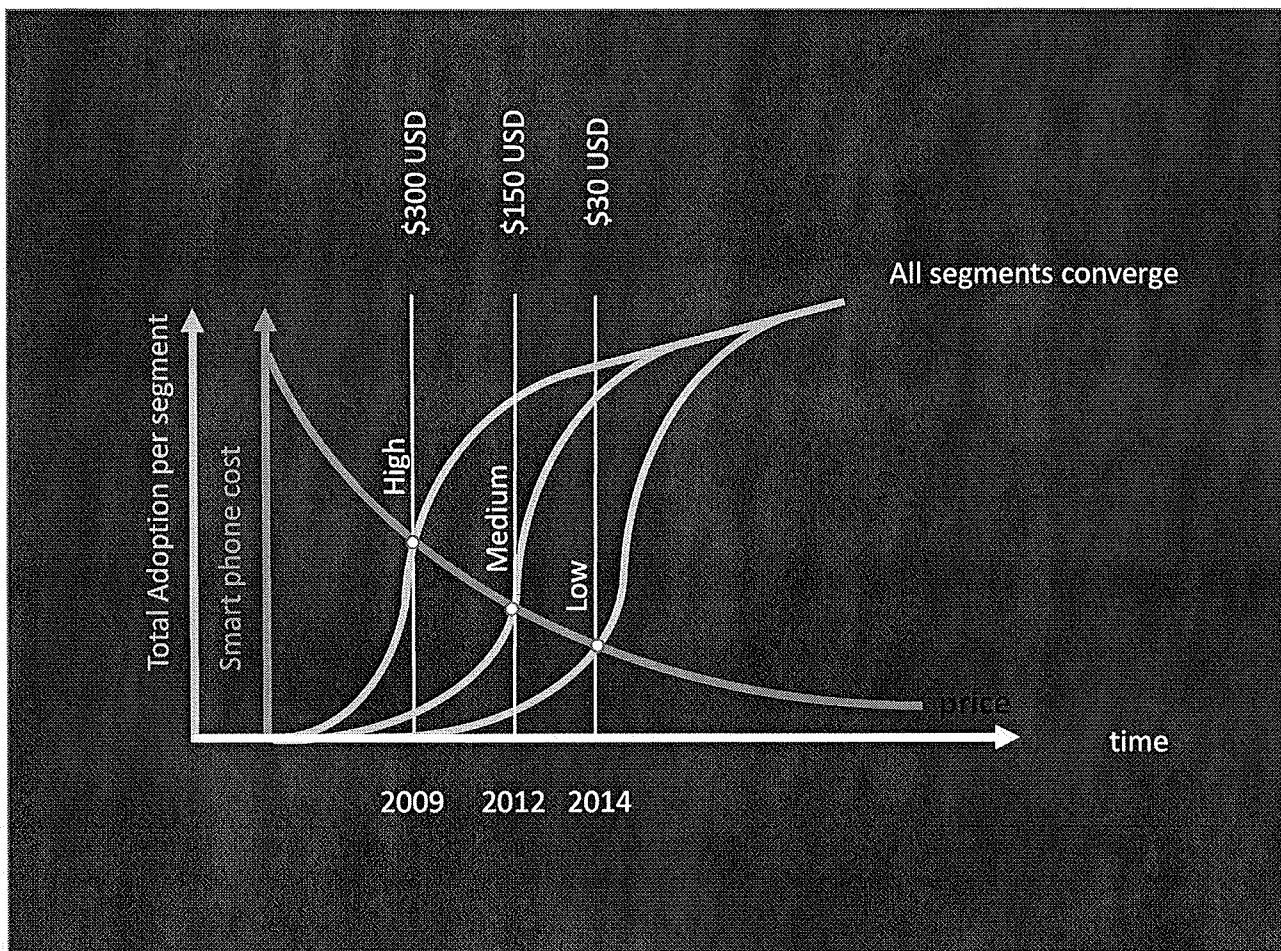
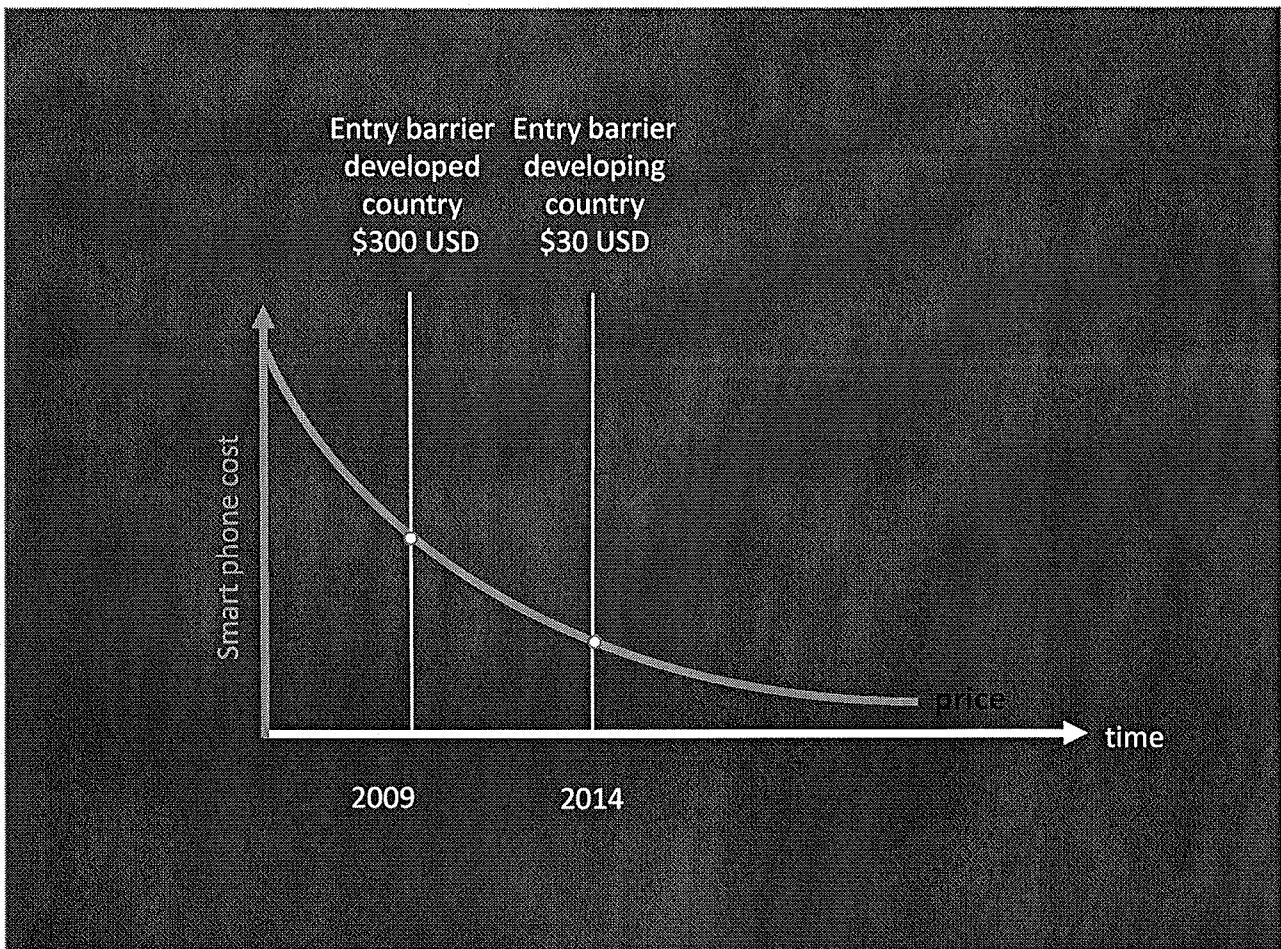
# Mobile Internet for the poorest: Making the most of the 700MHz band

Luis Lucatero  
Chief of Regulatory Policy  
COFETEL, Mexico

THIS DOCUMENT DOES NOT REPRESENT  
THE POSITION OF COFETEL OR ITS MEMBERS.

## Regulatory Policy: What guides us?

- Reduce transactional costs (including tools)
- Defragmentation of supply and demand
- Induction of social cohesion
- Neutralize undesirable market effects



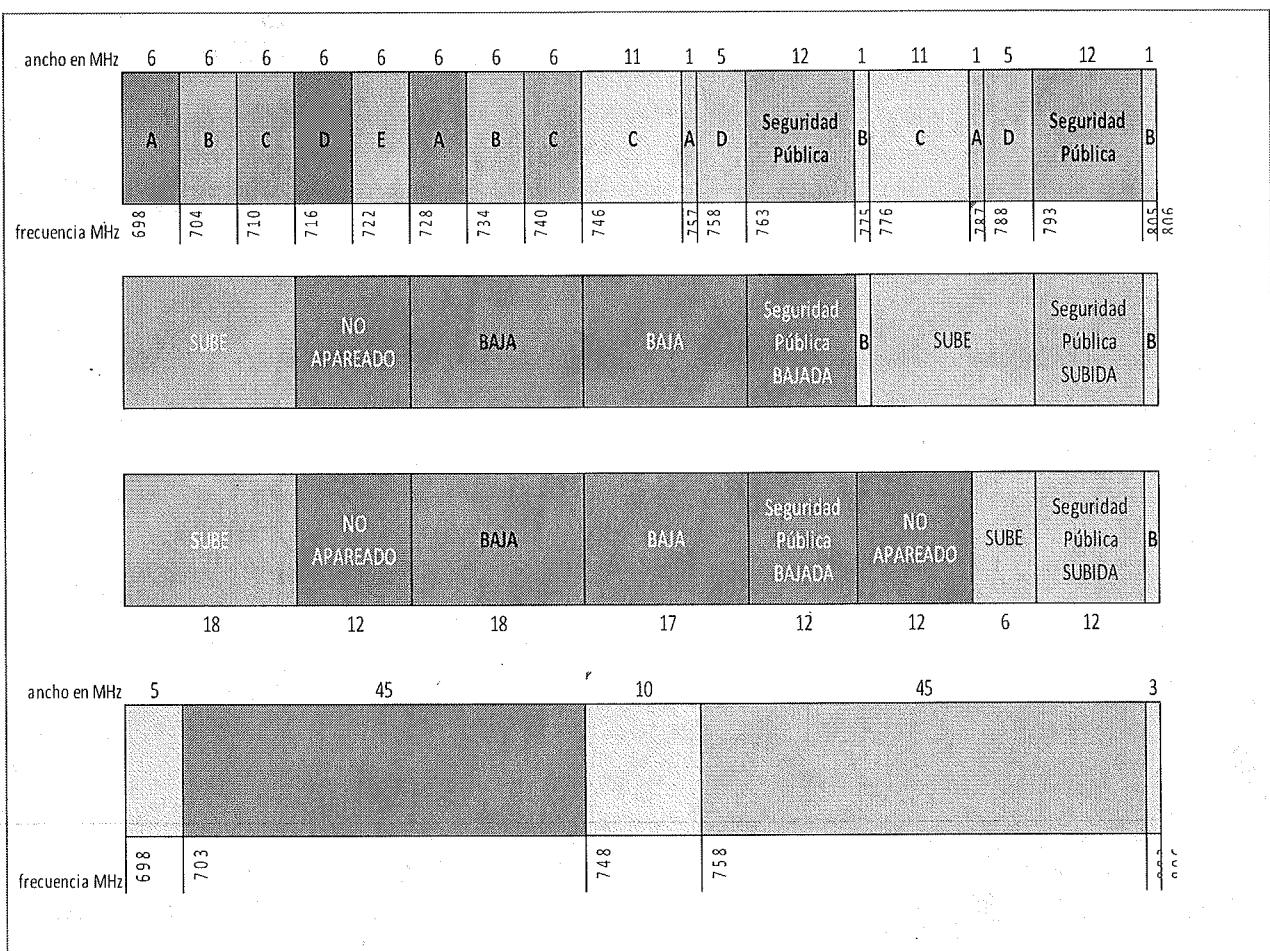
The 700MHz band

Large channels: low latency high throughput

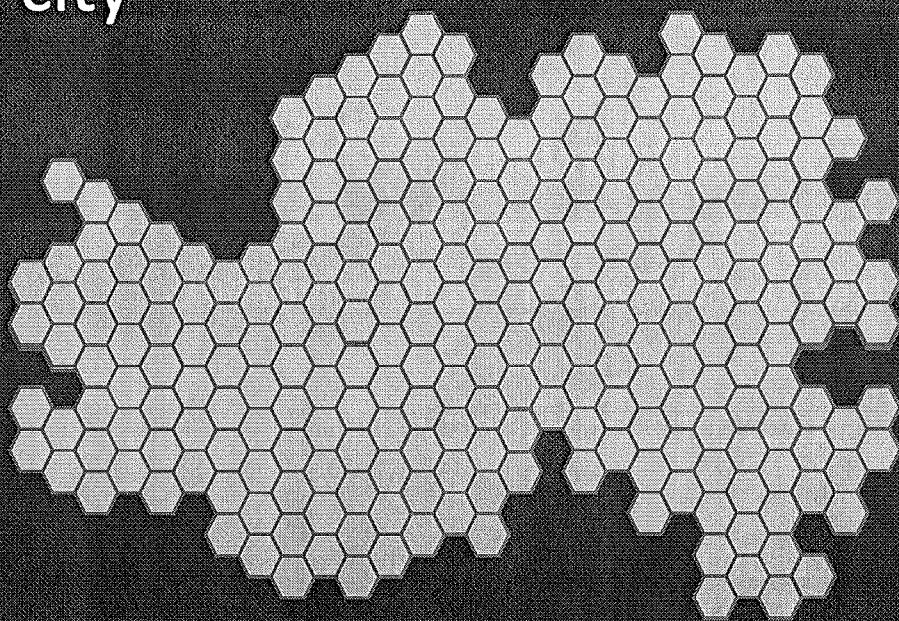
Low frequency: Affordable coverage

High spectrum efficiency: LTE

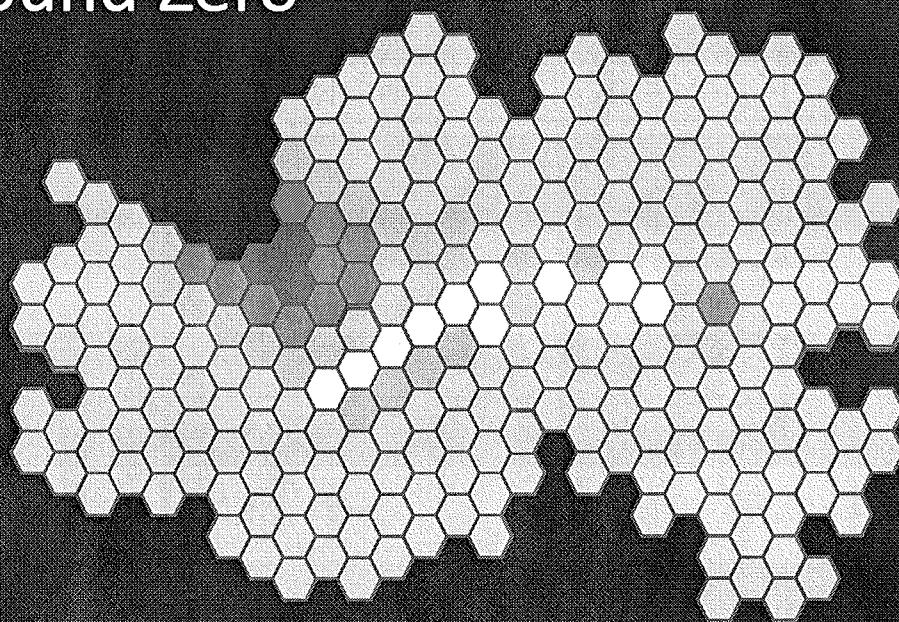
No spectrum for official use: capacity models

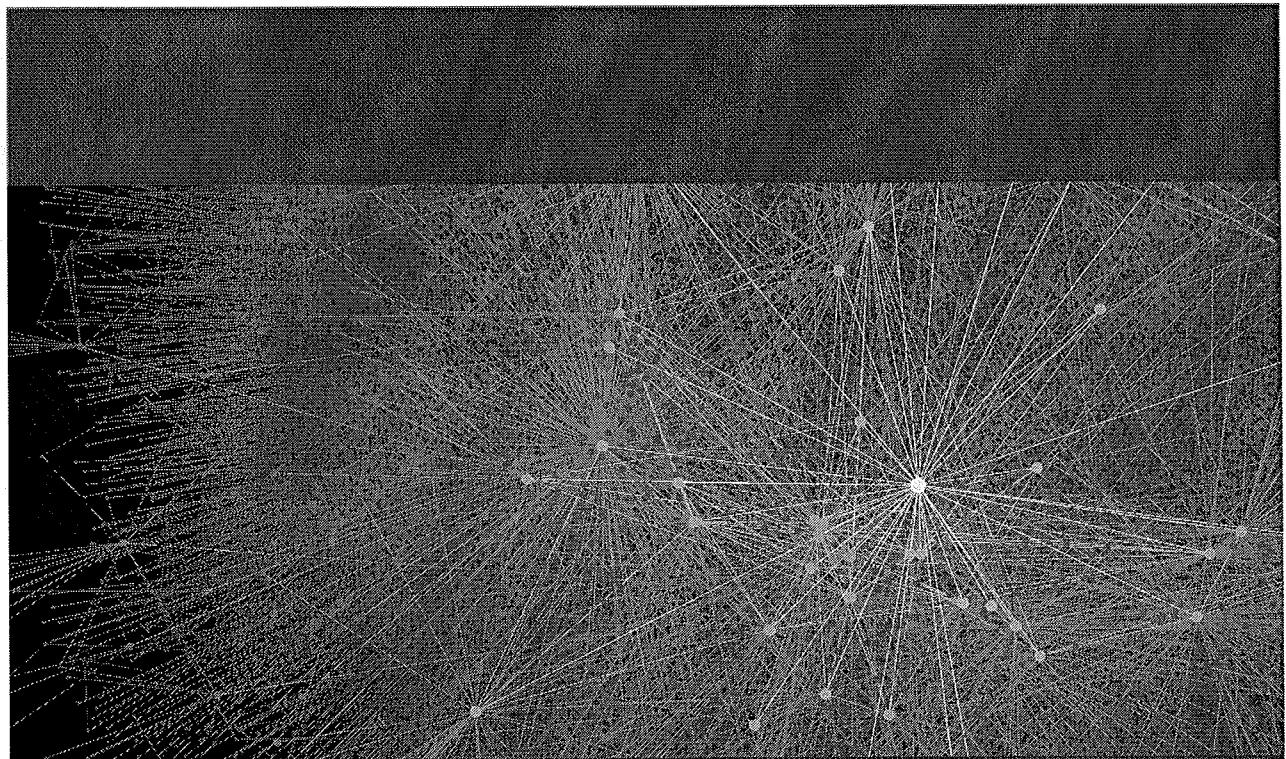
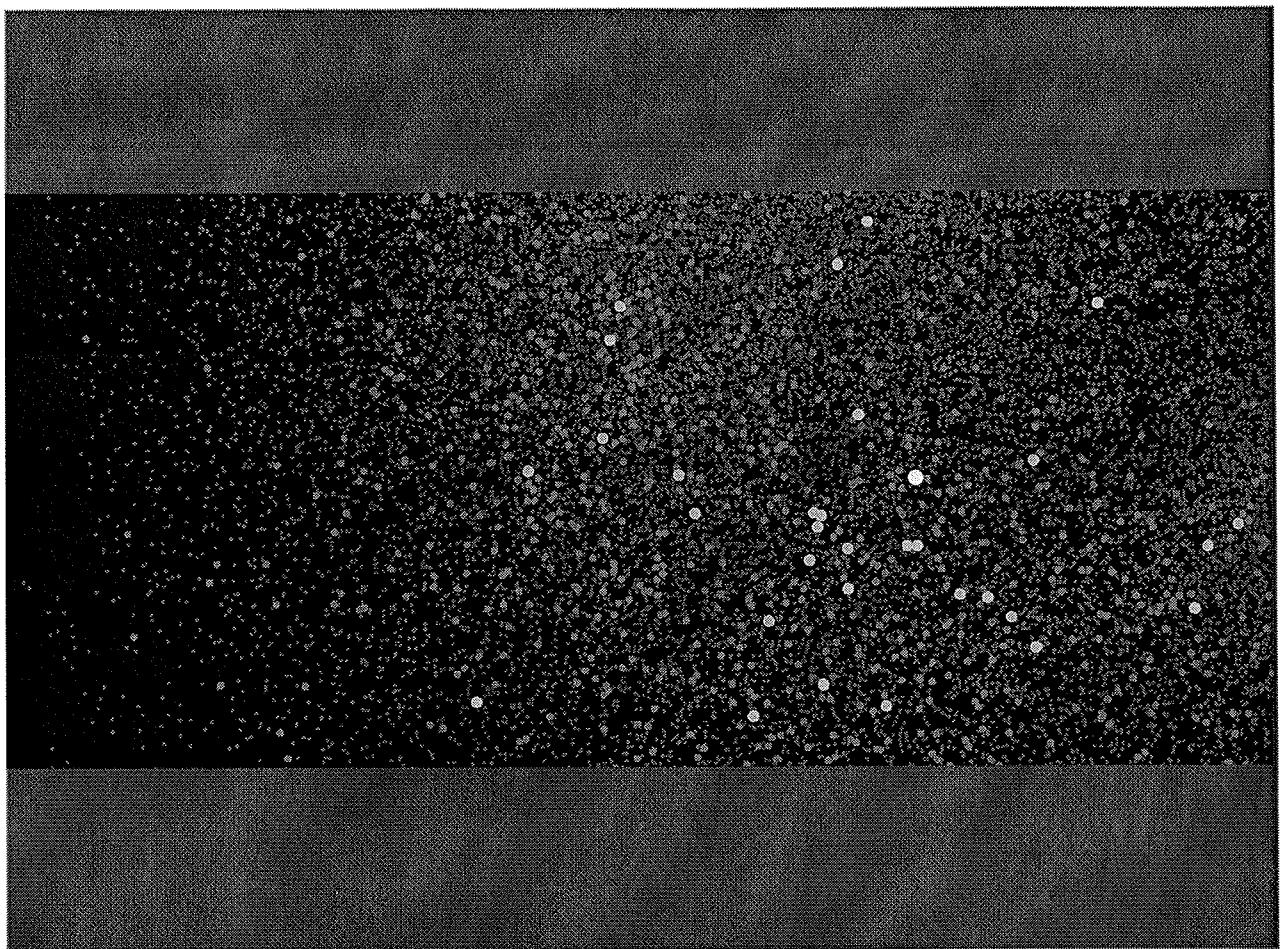


My city

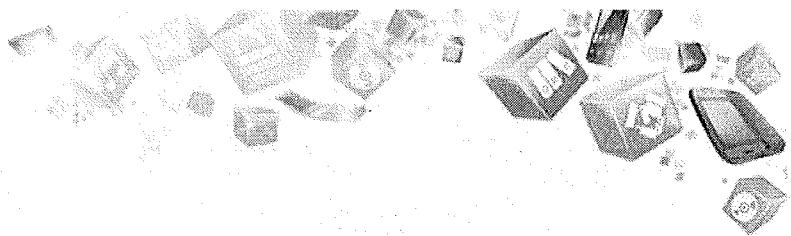


Ground Zero





**Reduced transactional costs  
Defragmented supply and demand  
Enhanced social cohesion  
Neutralized undesirable market effects**



Thank You

Please visit [www.gsma.com/DDtoolkit](http://www.gsma.com/DDtoolkit) for  
detailed information

The image shows four pages from the GSMA Digital Dividend Toolkit, arranged in a grid-like fashion. The top row contains two pages: the left one is titled 'Introduction to the Toolkit' and the right one is titled 'Networks and Devices for Mobile Broadband'. The bottom row contains two pages: the left one is titled 'EU Processes' and the right one is partially visible. Each page features the GSMA logo at the top left.

**Introduction to the Toolkit**

This section provides an overview of the toolkit's purpose, which is to support the development of digital dividend policies and actions in the mobile broadband space. It highlights the toolkit's role in addressing challenges such as spectrum scarcity, the need for more spectrum, and the impact of digital dividends on society. The toolkit is designed to be a practical resource for policymakers, industry stakeholders, and other interested parties.

**Networks and Devices for Mobile Broadband**

This section focuses on the technologies and infrastructure required for mobile broadband networks. It covers topics such as spectrum allocation, device standards, and network architecture. It also includes a table of key terms and acronyms used in the toolkit.

**EU Processes**

This section provides an overview of the EU's regulatory framework for mobile broadband. It covers the process of spectrum auctioning, the role of the European Commission, and the impact of EU regulations on the mobile broadband industry. It also includes a table of key EU processes and a timeline of key milestones.