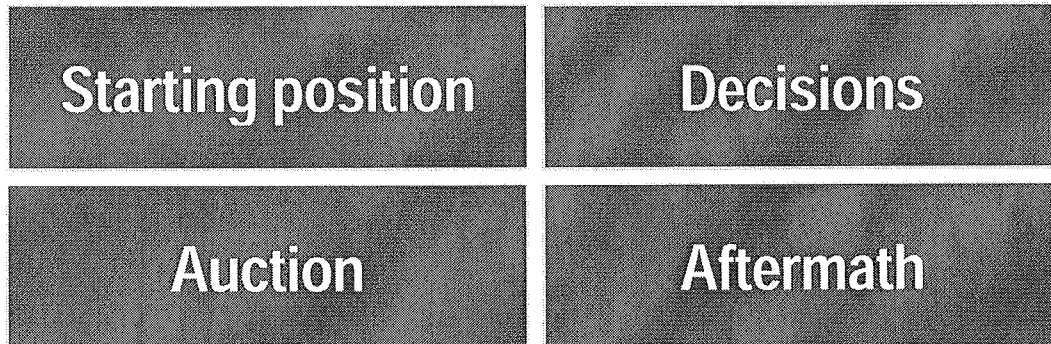
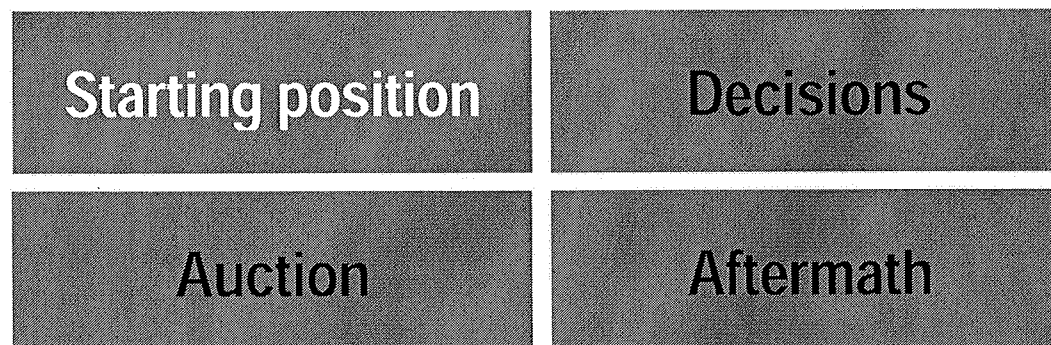


## Overview



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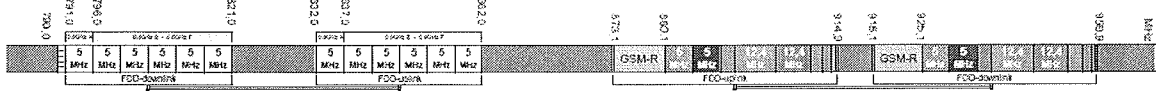
## Overview



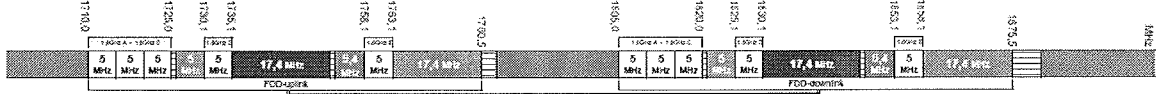
38

# Spectrum before Auction

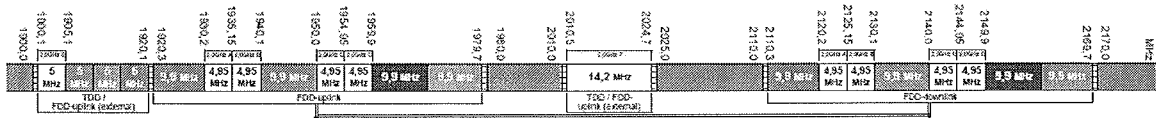
## • Frequency bands 800 MHz and 900 MHz



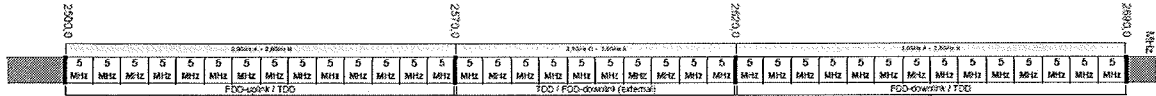
## • Frequency band 1.8 GHz



## • Frequency band 2.0 GHz







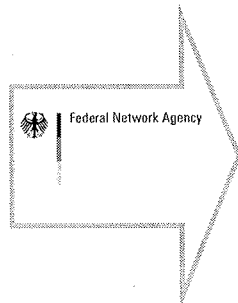
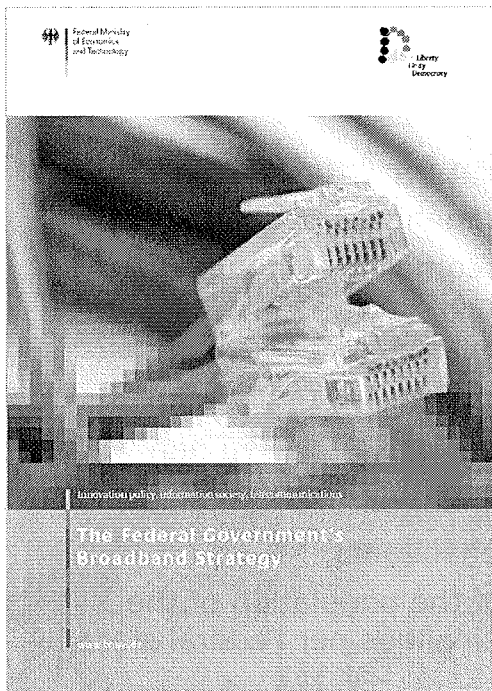
## • Frequency band 2.6 GHz



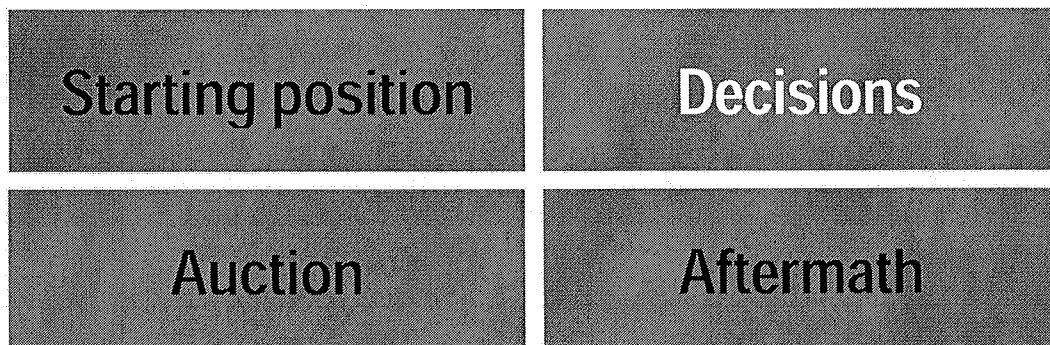
Telekom Deutschland
  E.Plus-Gruppe
  Telefónica O, Germany
  Vodafone
  2.6GHz A concrete blocks
  2.6GHz B - 2.6GHz F abstract blocks

# Frequency holdings before Auction

Frequency Range				
<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>



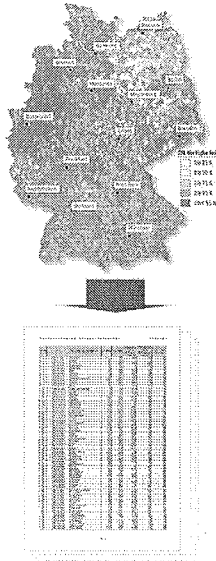
Overview





**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



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



## Overview

Starting position

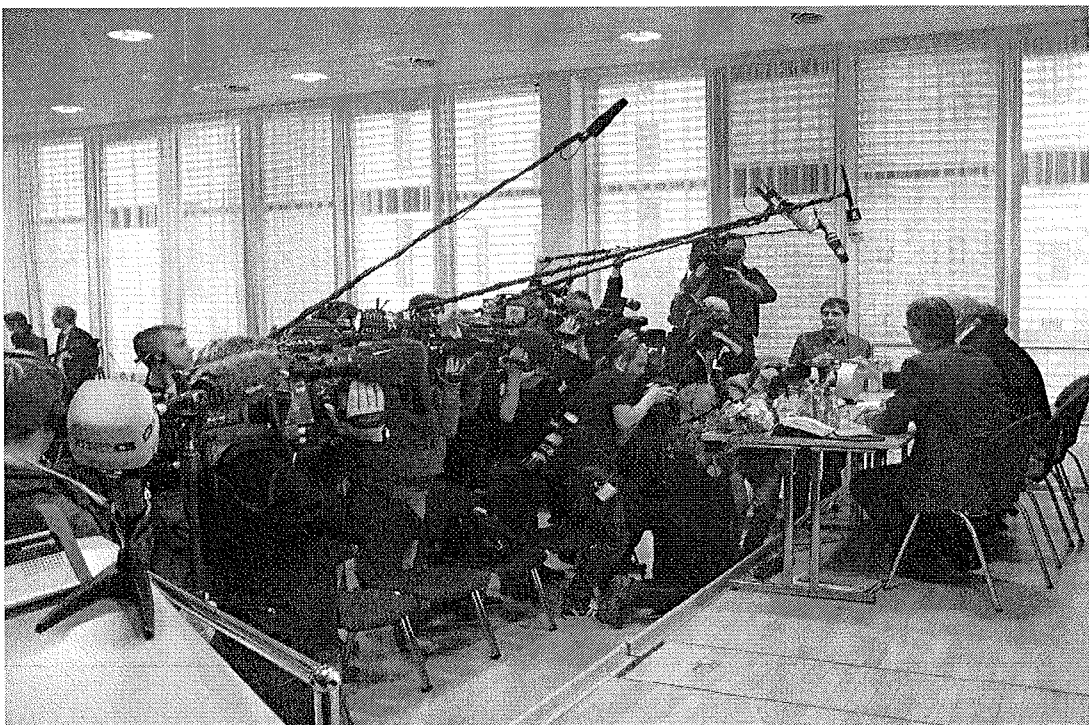
Decisions

Auction

Aftermath

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12 April 2010: Starting the clock



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### End of Auction

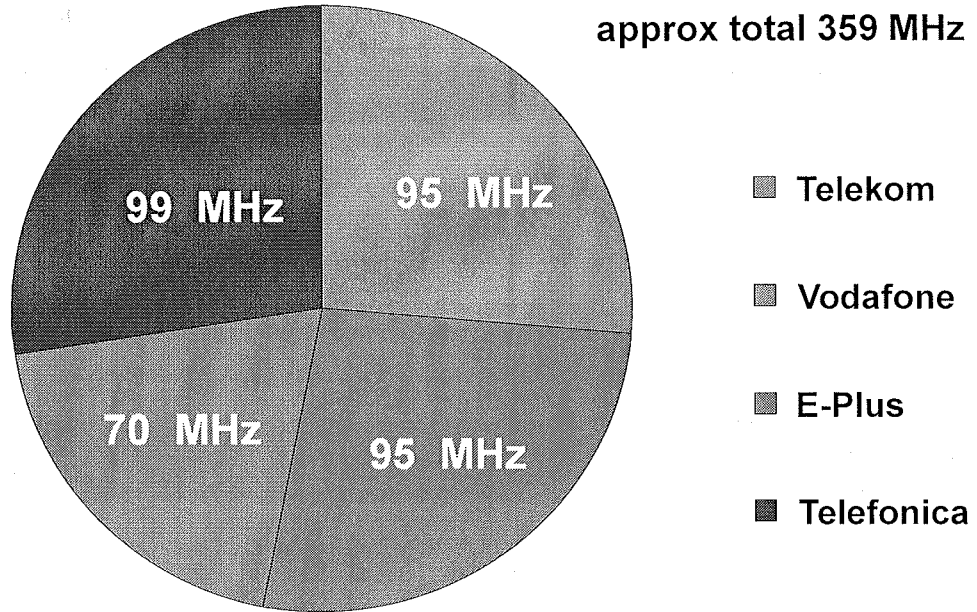
Frequenzbereich	Block	Ausstattung	Höchstbieter	Höchstgebot (€ in Tsd)	Frequenzbereich	Block	Ausstattung	Höchstbieter	Höchstgebot (€ in Tsd)			
0,8 GHz (gepaart)	0,8 GHz A	2x5 MHz konkret	To2 GER	616.595	2,6 GHz (gepaart)	2,6 GHz A	2x5 MHz abstrakt	Telekom D	19.096			
	0,8 GHz B	2x5 MHz abstrakt	To2 GER	595.760		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	582.949		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	19.025			
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 K	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 L	2x5 MHz abstrakt	To2 GER	17.739			
	2,0 GHz B	2x4,95 MHz konkret	E-Plus Grp	103.323		2,6 GHz M	2x5 MHz abstrakt	Vodafone	17.739			
	2,0 GHz C	2x4,95 MHz konkret	E-Plus Grp	84.064		2,6 GHz N	2x5 MHz abstrakt	Vodafone	17.762			
	2,0 GHz D	2x4,95 MHz konkret	To2 GER	66.931	2,6 GHz (ungepaart)	2,6 GHz O	1x5 MHz abstrakt	Vodafone	9.130			
2,0 GHz (ungepaart)	2,0 GHz E	1x5 MHz konkret	To2 GER	5.731		2,6 GHz P	1x5 MHz abstrakt	Vodafone	9.130			
	2,0 GHz F	1x14,2 MHz konkret	To2 GER	5.716		2,6 GHz Q	1x5 MHz abstrakt	Telekom D	8.598			
								2,6 GHz R	1x5 MHz abstrakt	Vodafone	8.598	
								2,6 GHz S	1x5 MHz abstrakt	Vodafone	9.051	
								2,6 GHz T	1x5 MHz abstrakt	Vodafone	9.051	
								2,6 GHz U	1x5 MHz abstrakt	E-Plus Grp	8.273	
								2,6 GHz V	1x5 MHz abstrakt	To2 GER	8.229	
								2,6 GHz W	1x5 MHz abstrakt	To2 GER	8.229	

Ausgeschiedene Bieter:



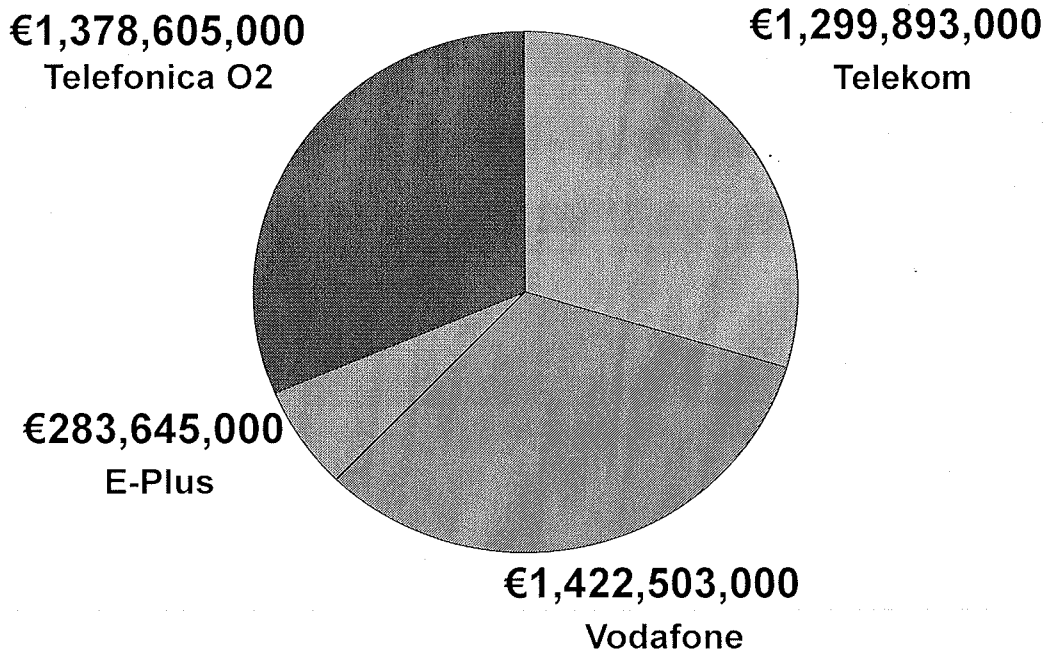
- **360** MHz
- **41** frequency blocks
- **4** frequency bands (800 MHz, 1.8 GHz, 2.1 GHz, 2.6 GHz)
- **1** auction
- **6** applicants
- **4** bidders
- **6** weeks
- **224** rounds

Outcome of the auction



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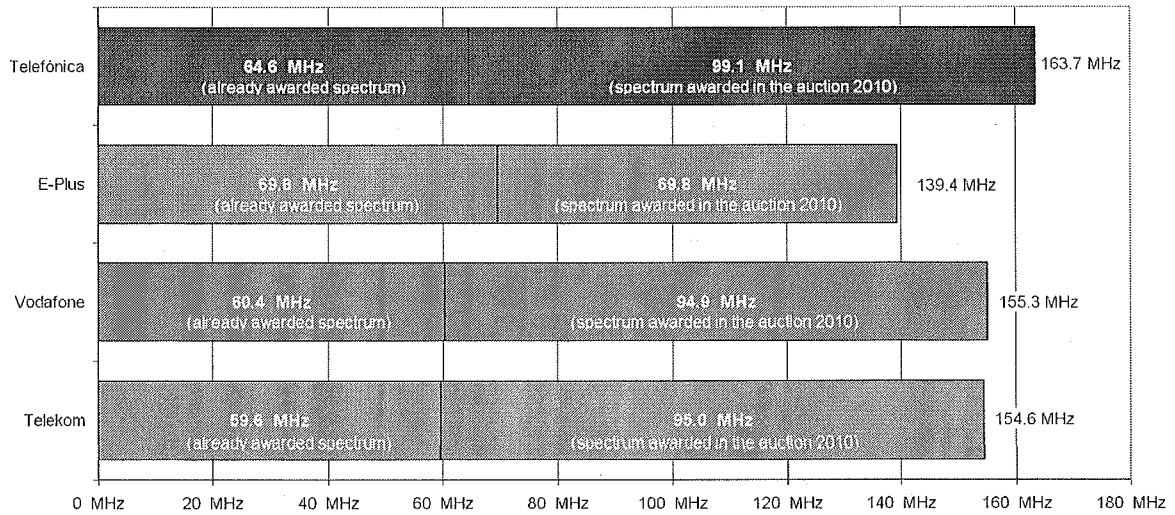
Highest bids per operator



50



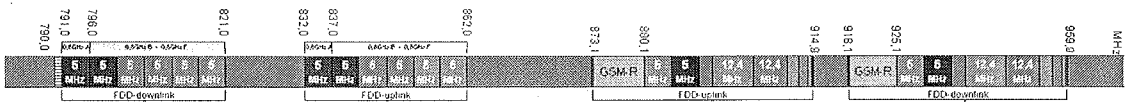
### Spectrum of the mobile network operators after the auction



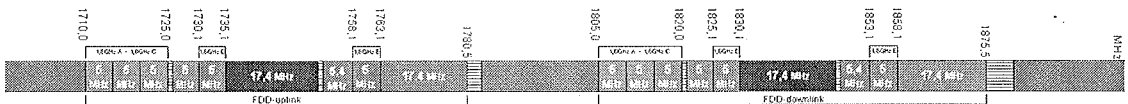
### Current spectrum distribution



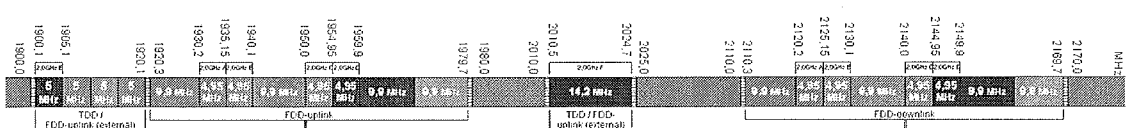
• Frequency bands 800 MHz and 900 MHz



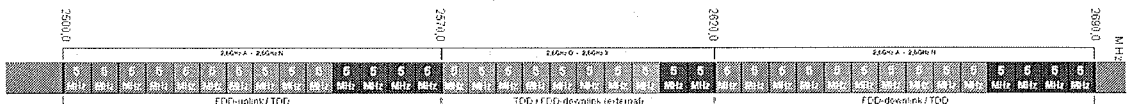
• Frequency band 1.8 GHz



• Frequency band 2.1 GHz



• Frequency band 2.6 GHz



Telekom Deutschland
  E-Plus-Gruppe
  Telefónica O, Germany
  Vodafone
  0.80GHz concrete awarded
  0.80GHz abstract awarded



## Overview

Starting position

Decisions

Auction

Aftermath

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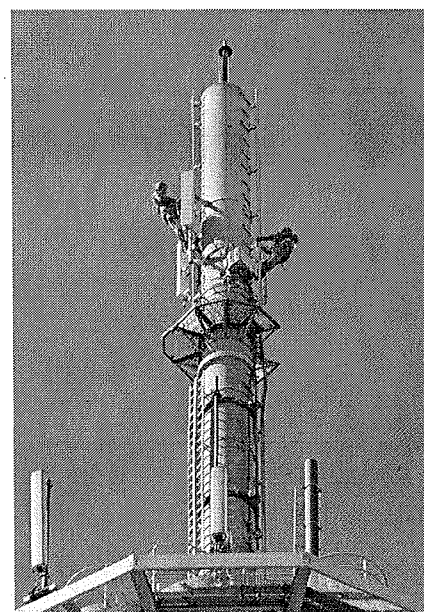
## Co-existence of DVB-T and LTE



Site-specific parameters

Transparent procedure

No interference yet



© Deutsche Telekom AG

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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



## Site-specific parameters



LTE at 800 MHz

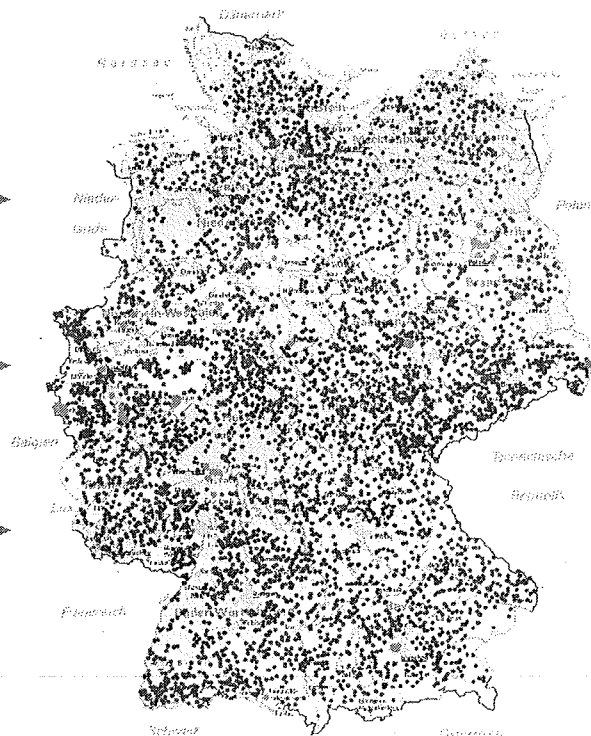
7,448 sites

LTE at 1.8 GHz

1,254 sites

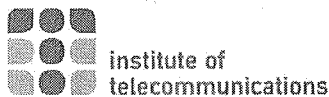
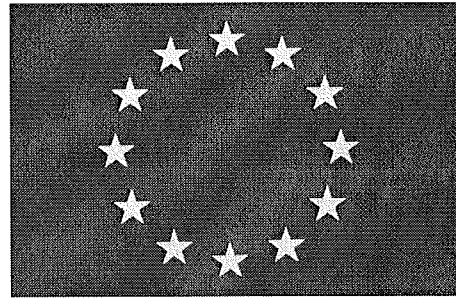
LTE at 2.6 GHz

203 sites





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) (\*\*).

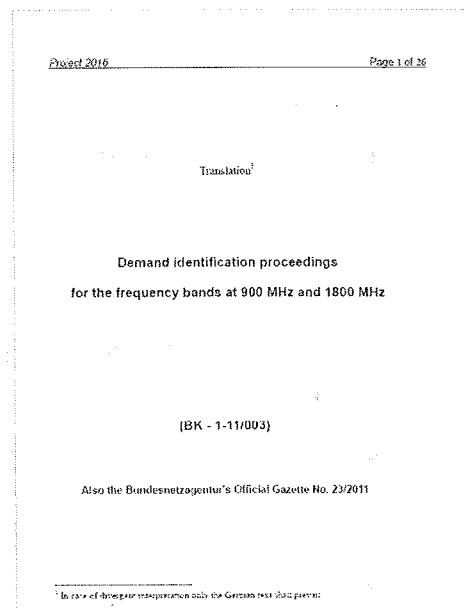


From our point of view a combination of spectrum costs and networks costs is the most suitable indicator to objectively determine competitive distortions. [...] We do not see indicators for distortions of competition stemming from spectrum distribution and the flexibilization of the 900 MHz band.



Expiry of GSM licences by the end of 2016

Statements of interest in usage by January 2012



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 Ndemo, 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

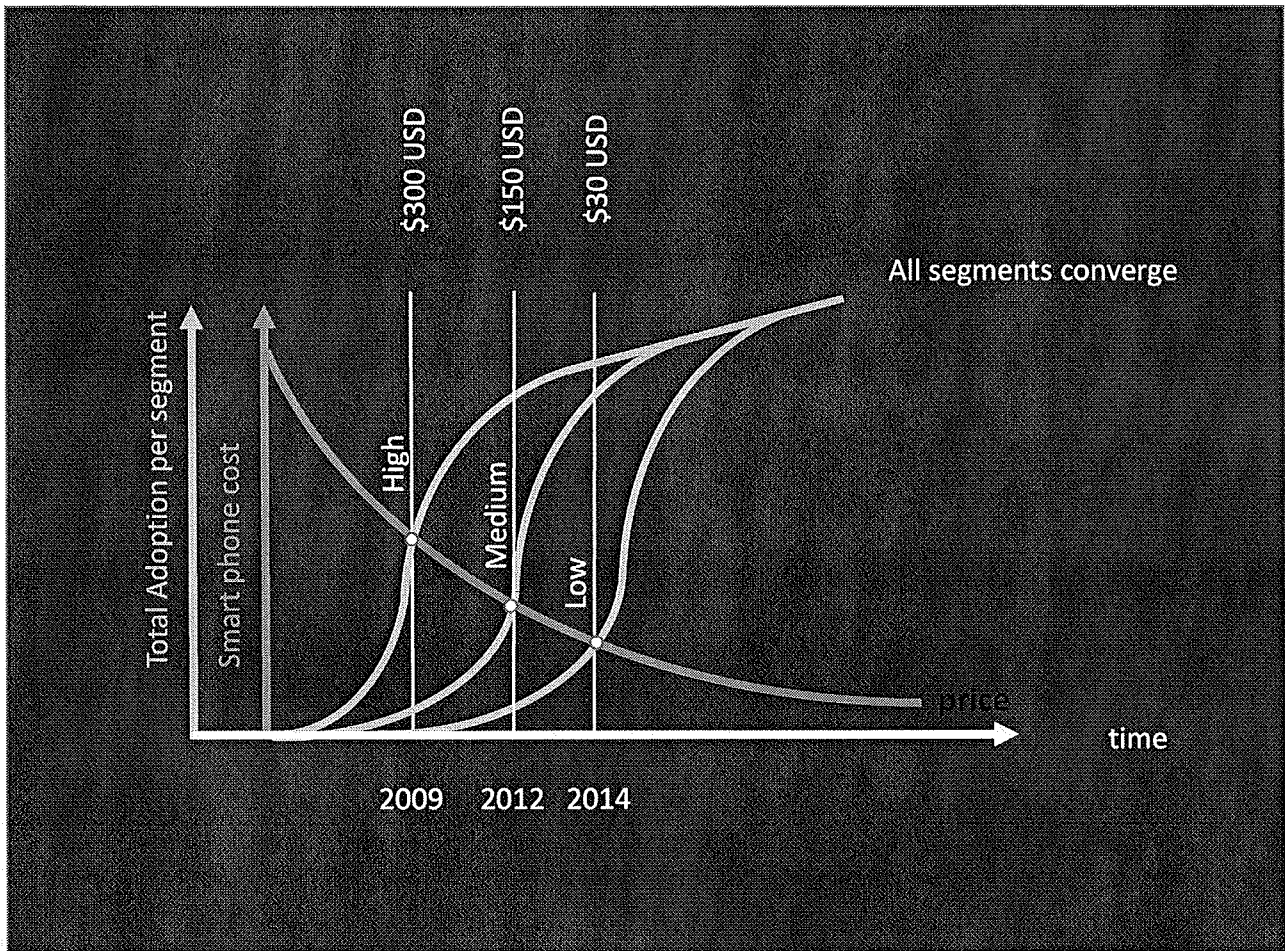
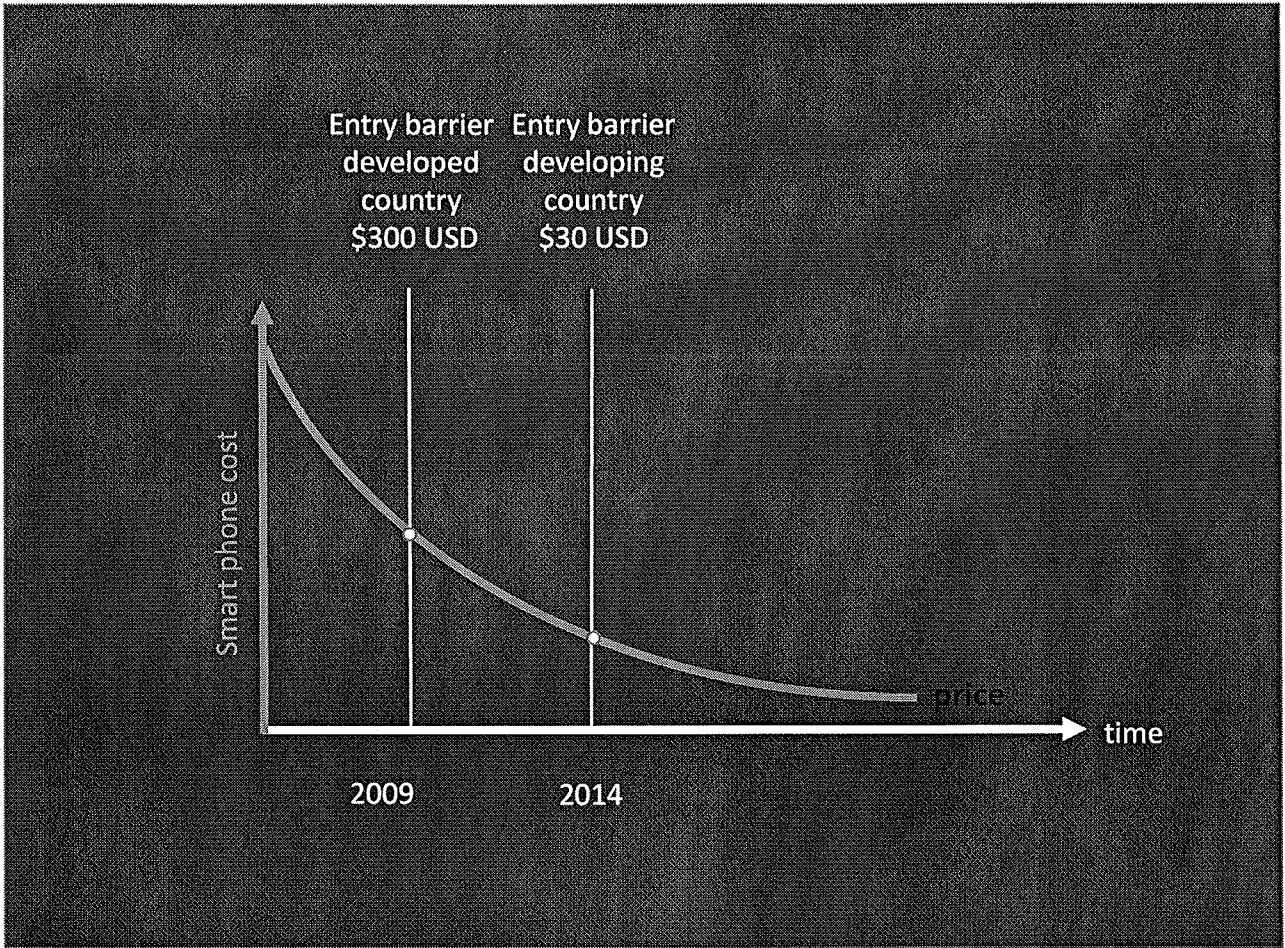
Luis Lucatero  
Chief of Regulatory Policy  
COFETEL, Mexico

THIS DOCUMENT DOES NOT REPRESENT  
THE OFFICIAL VIEWS OF COFETEL

Regulatory Policy: What guides us?

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







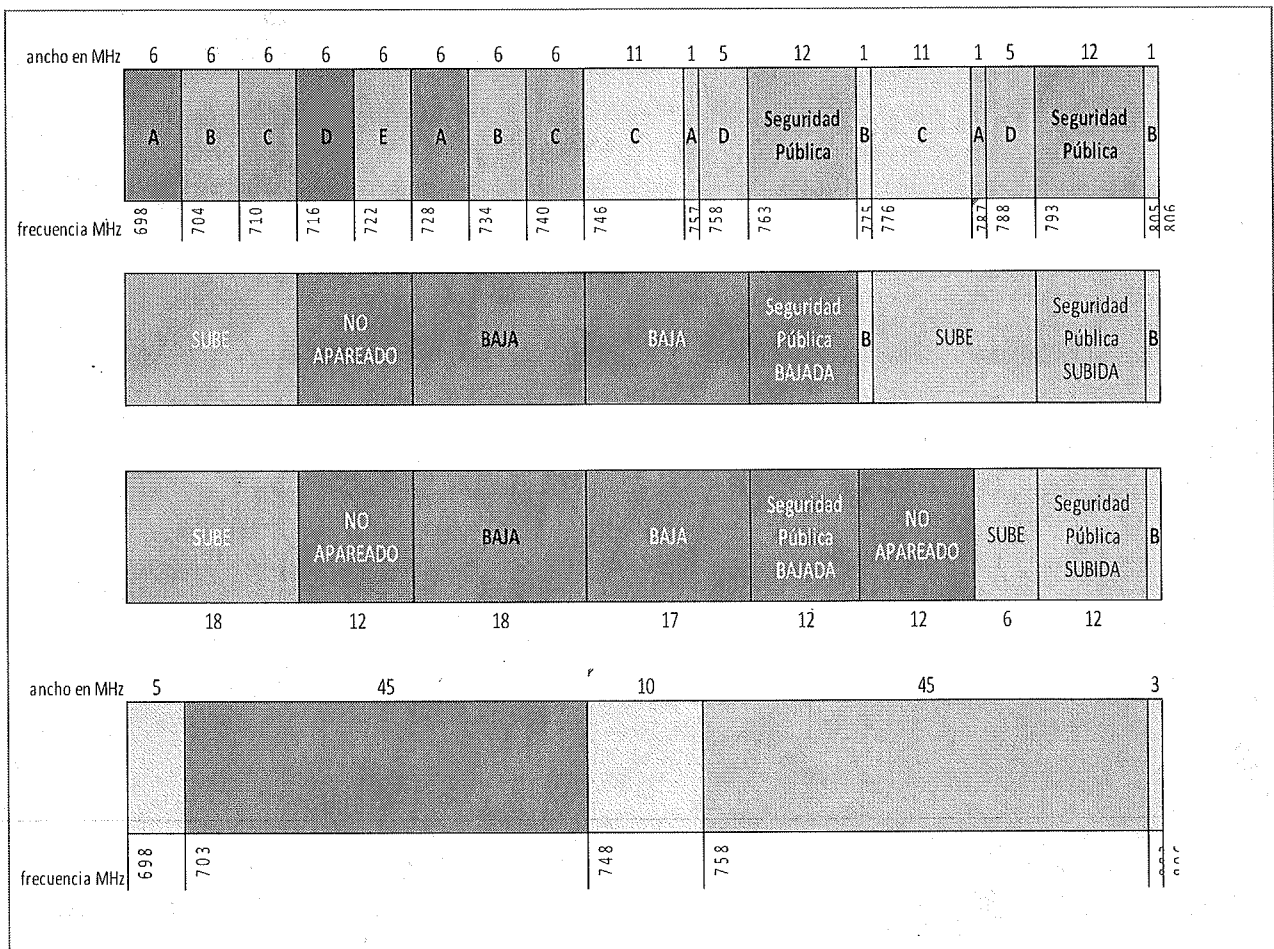
# The 700MHz band

Large channels: low latency high throughput

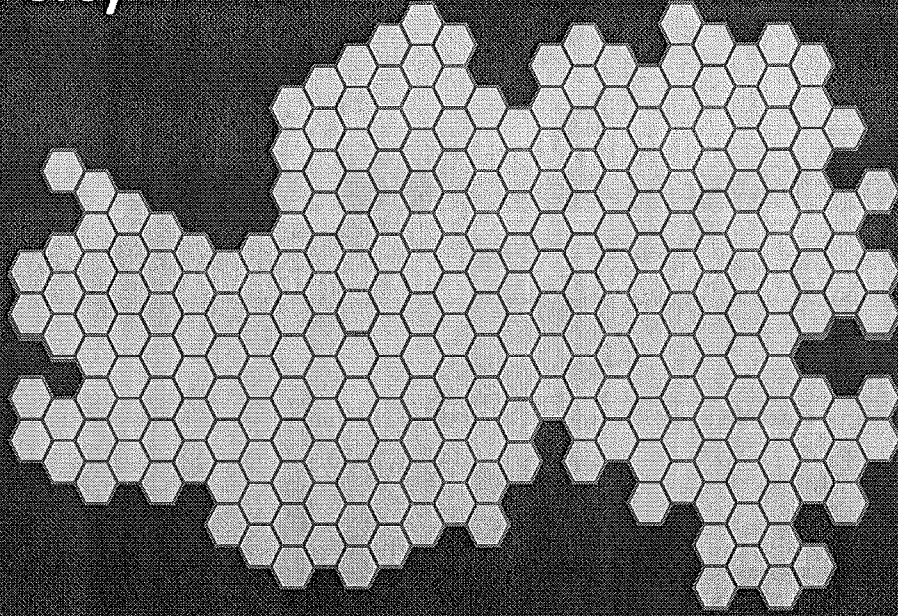
Low frequency: Affordable coverage

High spectrum efficiency: LTE

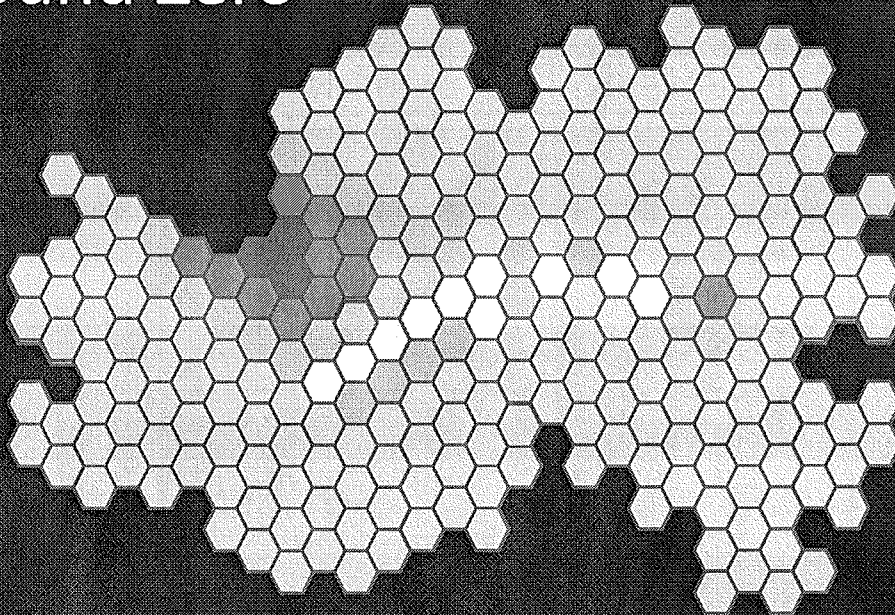
No spectrum for official use: capacity models



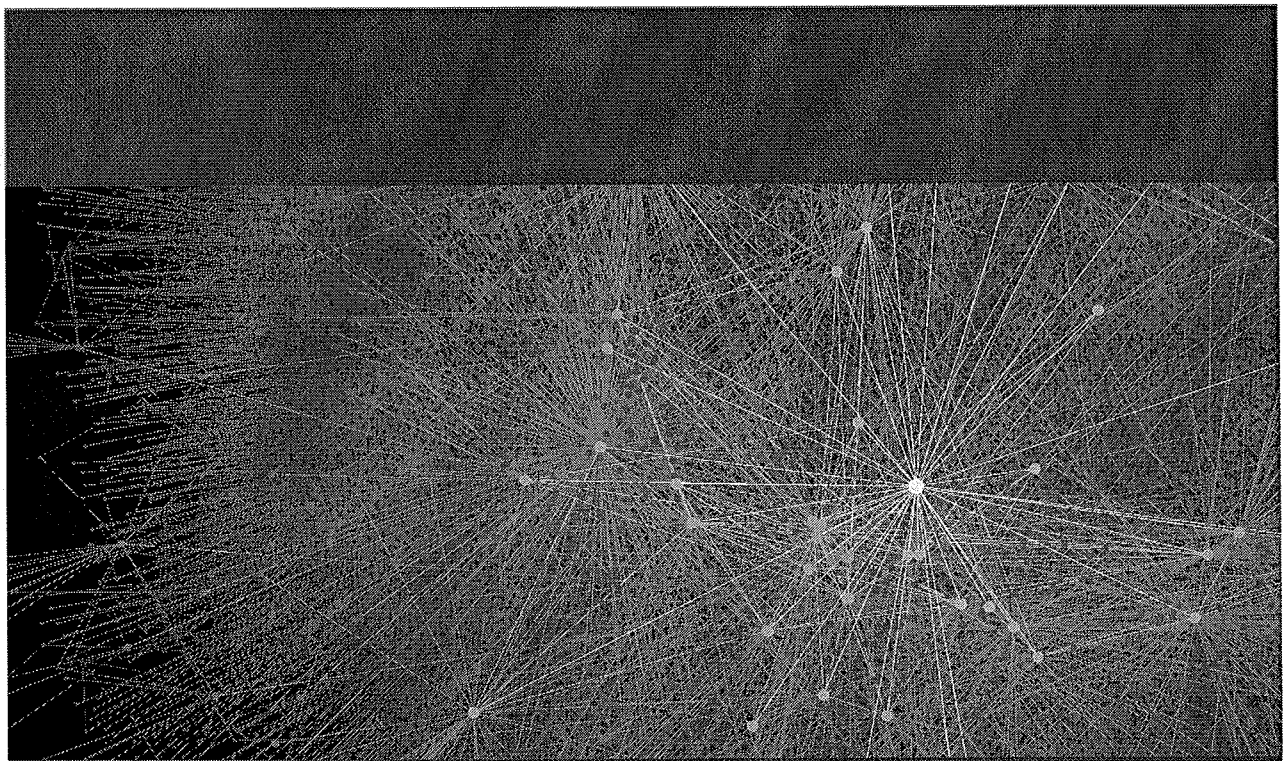
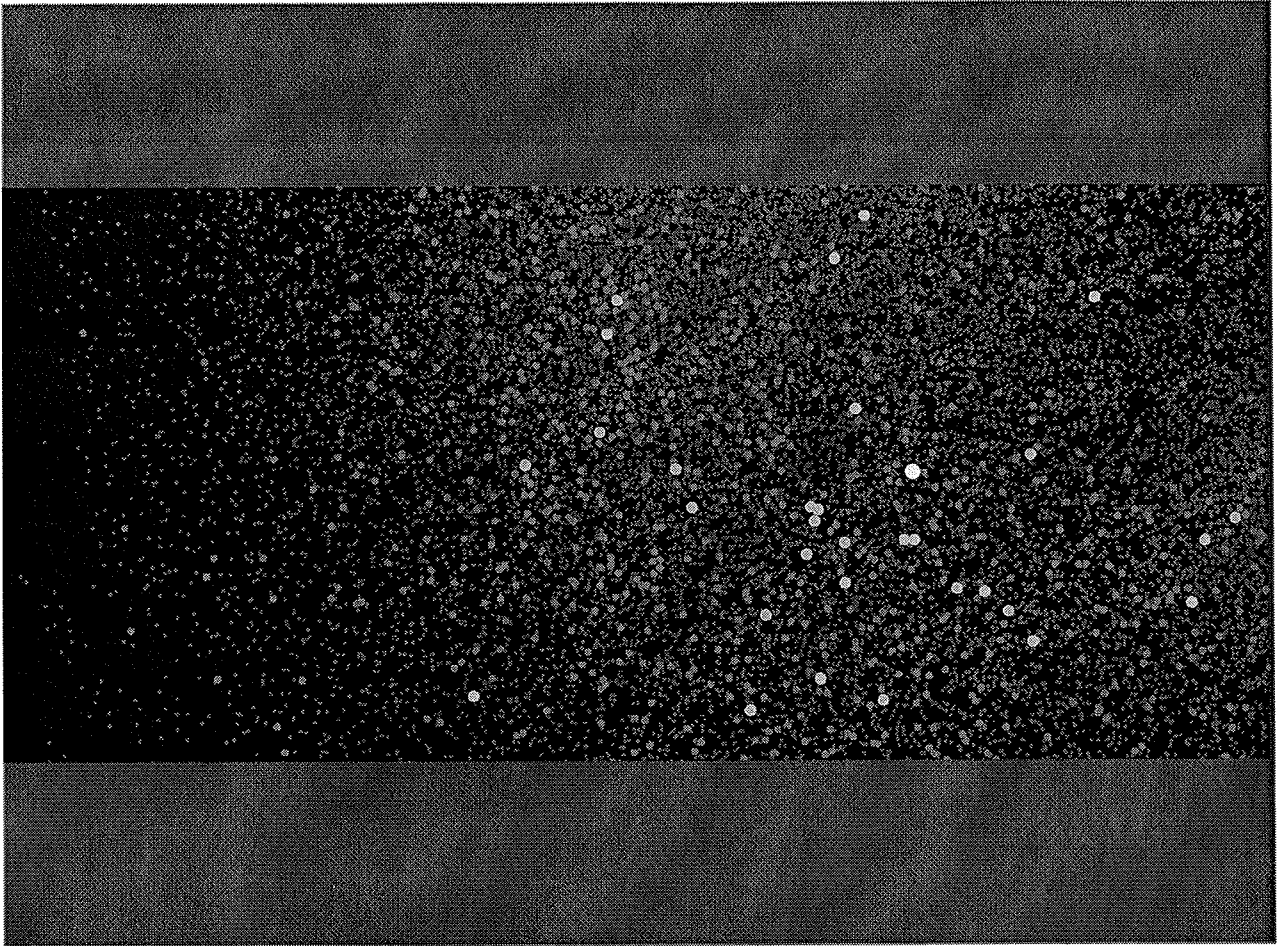
My city



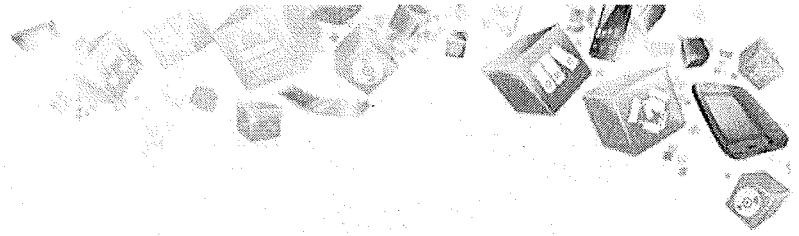
Ground Zero







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

