



# Satisfying the demand for radio spectrum - The German experience

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- The penetration of ICT into all areas of business and private life is increasingly shaping the information society
- High-performance communications infrastructure is a vital precondition
- Mobile use of the internet and its services will create independent areas of new application
- ICT has driven half of the productivity growth in Europe over the past 15 years
- Information technology will drive innovation and have an impact on all key industries and change many sectors significantly



## ■ Network Agency:

**Determination of the site-specific parameters (800 MHz) for several hundred base stations (status: November 2010)**

## ■ 800 MHz networks in white spots launched in December 2010:

### ➤ Deutsche Telekom

- "Friendly-User" launch 1 December 2010
- Road map: some 500 LTE stations ready for use in 2010 / will provide service to a further 1,000 white spots in 2011
- "4G" market launch: planned date is April 2011

[<http://www.telekom.com/dtag/cms/content/dt/de/595698?archivArticleID=957648>]

## ■ Vodafone

- "LTE" market launch date: 1 December 2010 (LTE surfsticks)
- Road map: benefits for customers in some hundred communities in 2010 / planned to run 1,500 sites by the end of March 2011 to serve some thousand communities

[[http://www.vodafone.de/unternehmen/presse/pm-archiv-2010\\_176927.html](http://www.vodafone.de/unternehmen/presse/pm-archiv-2010_176927.html)]



### ■ Administrative realisation:

- **Transparent procedure** for determining the technical site-related parameters; published on the internet  
[http://www.bundesnetzagentur.de/clin\\_1912/DE/Sachgebiete/Telekommunikation/RegulierungTelekommunikation/Frequenzordnung/OeffentlicherMobilfunk/VergabeVerfahrenDrahtlosNetzzugang/vergabeVerfahrenDrahtlosNetzzugang\\_node.html](http://www.bundesnetzagentur.de/clin_1912/DE/Sachgebiete/Telekommunikation/RegulierungTelekommunikation/Frequenzordnung/OeffentlicherMobilfunk/VergabeVerfahrenDrahtlosNetzzugang/vergabeVerfahrenDrahtlosNetzzugang_node.html)
- In planning their network rollout, the **network operators must apply for determination of the technical site-related parameters** before they can actually use the frequencies
- In their applications, **applicants must declare plausibly** how they will secure efficient and interference-free use so **that compatibility with other frequency usages is given**
- **Network Agency has created an IT-based procedure** to determine compatibility with other frequency usages



### ■ Regulatory framework:

- Telecommunications Act:  
Frequencies can only be used after assignment subject to "their compatibility with other frequency usages" and "their efficient and interference-free use by the applicant being secured."
- Usage Provision 36 (Frequency Band Allocation Ordinance) reads:  
"... The mobile service in the band 790 – 862 MHz must not cause any interference to the broadcasting service."
- President's Chamber Decision:  
.. compatibility will be achieved through the prescribed compliance with the basic requirements (BEM for the out of block emissions) in accordance with the Commission Decision on harmonised technical conditions of use in the 800 MHz band.



## Overall concept

- to meet the enormous demand for spectrum for wireless communications, and
- for more flexible use of spectrum at 450 MHz / 900 MHz / 1.8 GHz / 2 GHz / 3.5 GHz

(published 21.10.2009;

<http://www.bundesnetzagentur.de/cae/servlet/contentblob/160992/publicationFile/8818/DecisionPresidentChamberFlexibilisation101022pdf.pdf>)

## ■ Award of 360 MHz spectrum in April / May 2010

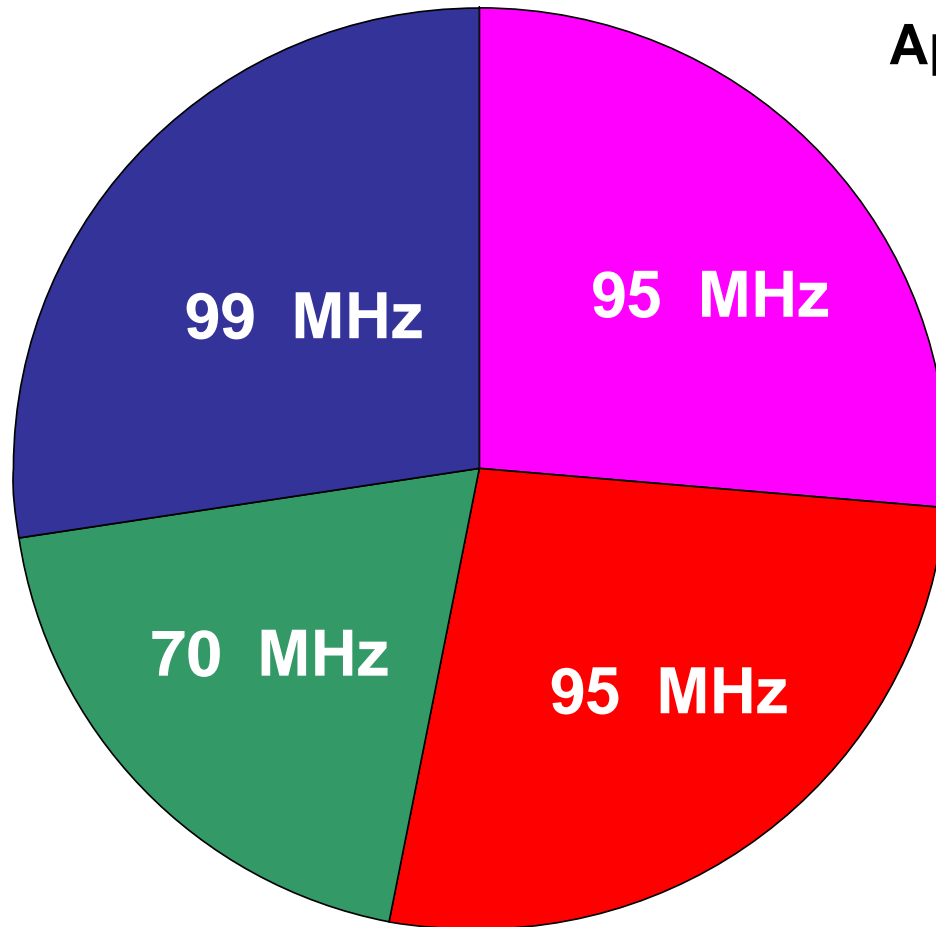
(Decision published 21.10.2009;

<http://www.bundesnetzagentur.de/cae/servlet/contentblob/138364/publicationFile/8817/DecisionPresidentChamber101022.pdf>)

- combining award at 1.8/2/2.6 GHz with award at 800 MHz
- spectrum auction
- technology and service neutrality for Electronic Communications Services (ECS; can be used for mobile, fixed or nomadic systems or applications)
- spectrum cap in the band 800 MHz (2 x 20 MHz; paired)



- **360** MHz
- **41** frequency blocks
- **4** frequency bands (800 MHz, 1.8 GHz, 2 GHz, 2.6 GHz)
- **1** auction
- **6** applicants
- **4** bidders
- **6** weeks
- **224** rounds



Approx total 360 MHz

- Telekom
- Vodafone
- E-Plus
- Telefonica O2

# Highest bids per operator

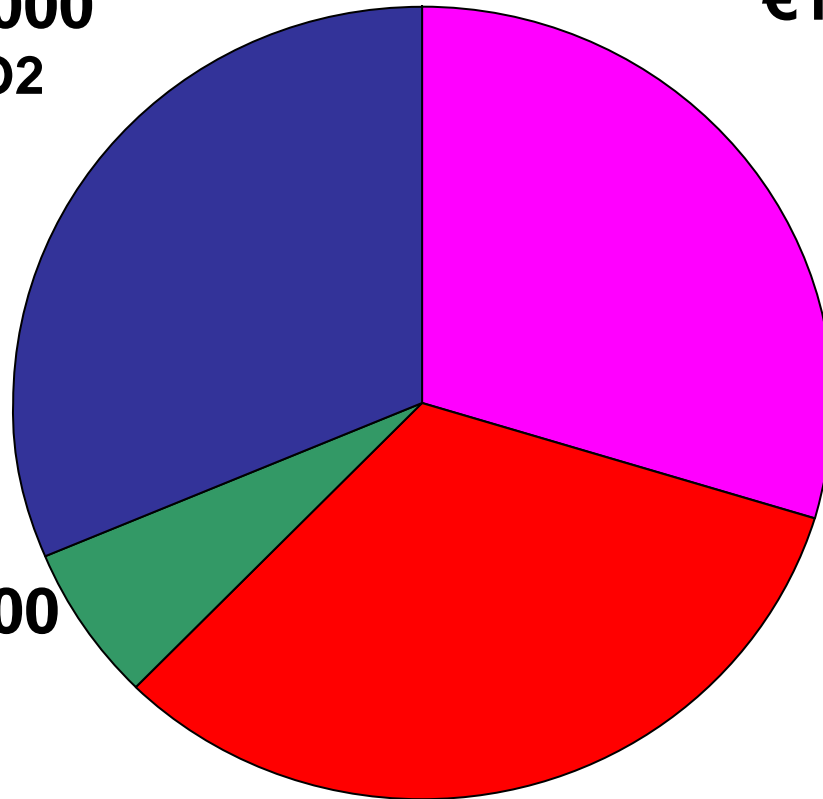


**€1,378,605,000**  
Telefonica O2

**€1,299,893,000**  
Telekom

**€283,645,000**  
E-Plus

**€1,422,503,000**  
Vodafone



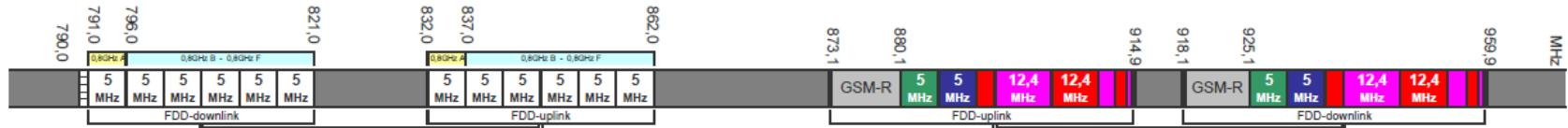


- **Friedrich Jousen** (CEO Vodafone Germany):  
The outcome of the auction was *"very good for the company and also for Germany."*
- **René Schuster** (CEO Telefónica Germany):  
*"... We achieved all our aims at the auction. ... The price for the frequencies was in line with our predictions."*
- **KPN's press release:**  
*"In line with the company's expectations, KPN's subsidiary E-Plus has been able to obtain a valuable combination of spectrum in various bands without additional rollout obligations."*
- **Niek Jan van Damme** (Head of Deutsche Telekom Germany):  
Telekom is *"very happy" with the auction results ...*

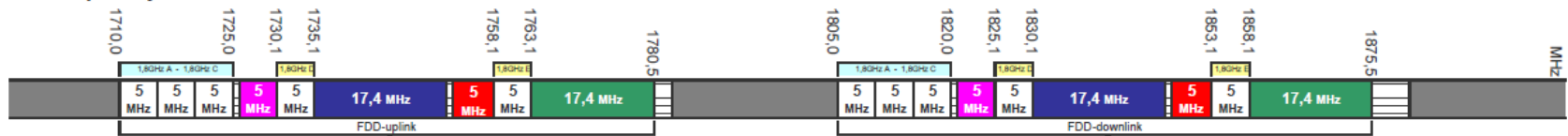


## Spectrum in the bands 800 MHz, 900 MHz, 1.8 GHz, 2.0 GHz und 2.6 GHz

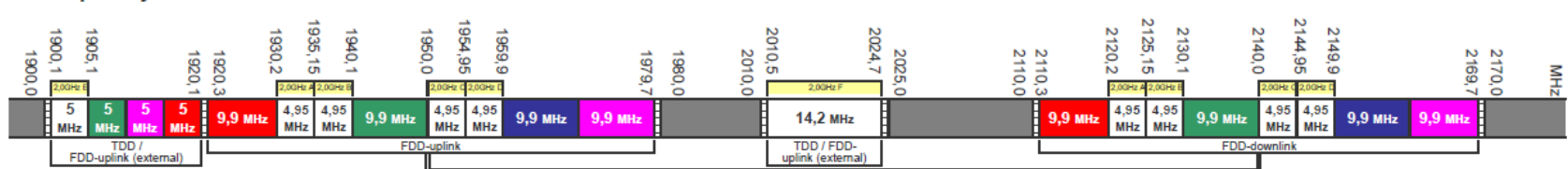
### • Frequency bands 800 MHz and 900 MHz



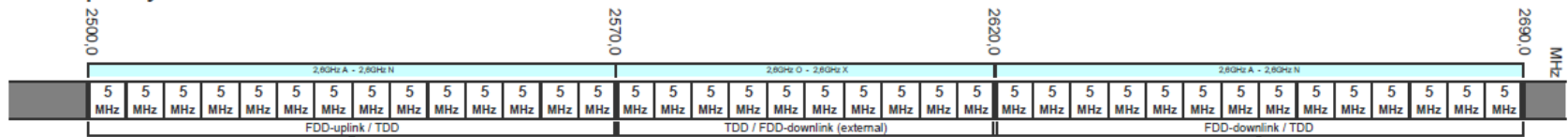
### • Frequency band 1.8 GHz



### • Frequency band 2.0 GHz



### • Frequency band 2.6 GHz



Telekom Deutschland
  E-Plus-Gruppe
  Telefónica O<sub>2</sub> Germany
  Vodafone
  concrete blocks
  abstract blocks