



Federal Network Agency



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# Radio spectrum strategies for BWA services: global versus specific

ANCOM International Conference on Radio Spectrum Strategies  
Bucharest, 12 May 2011

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- The penetration of ICT into all areas of professional and private life increasingly shapes 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.



### Federal Government's Broadband Strategy (February 2009):

#### Goals:

- Nationwide capable broadband access by the end of 2010 if possible.
- A total of 75 percent of households should have high speed broadband access with transmission rates of at least 50 MB/sec by 2014; nationwide access with this high-speed broadband as soon as possible.

#### By means of:

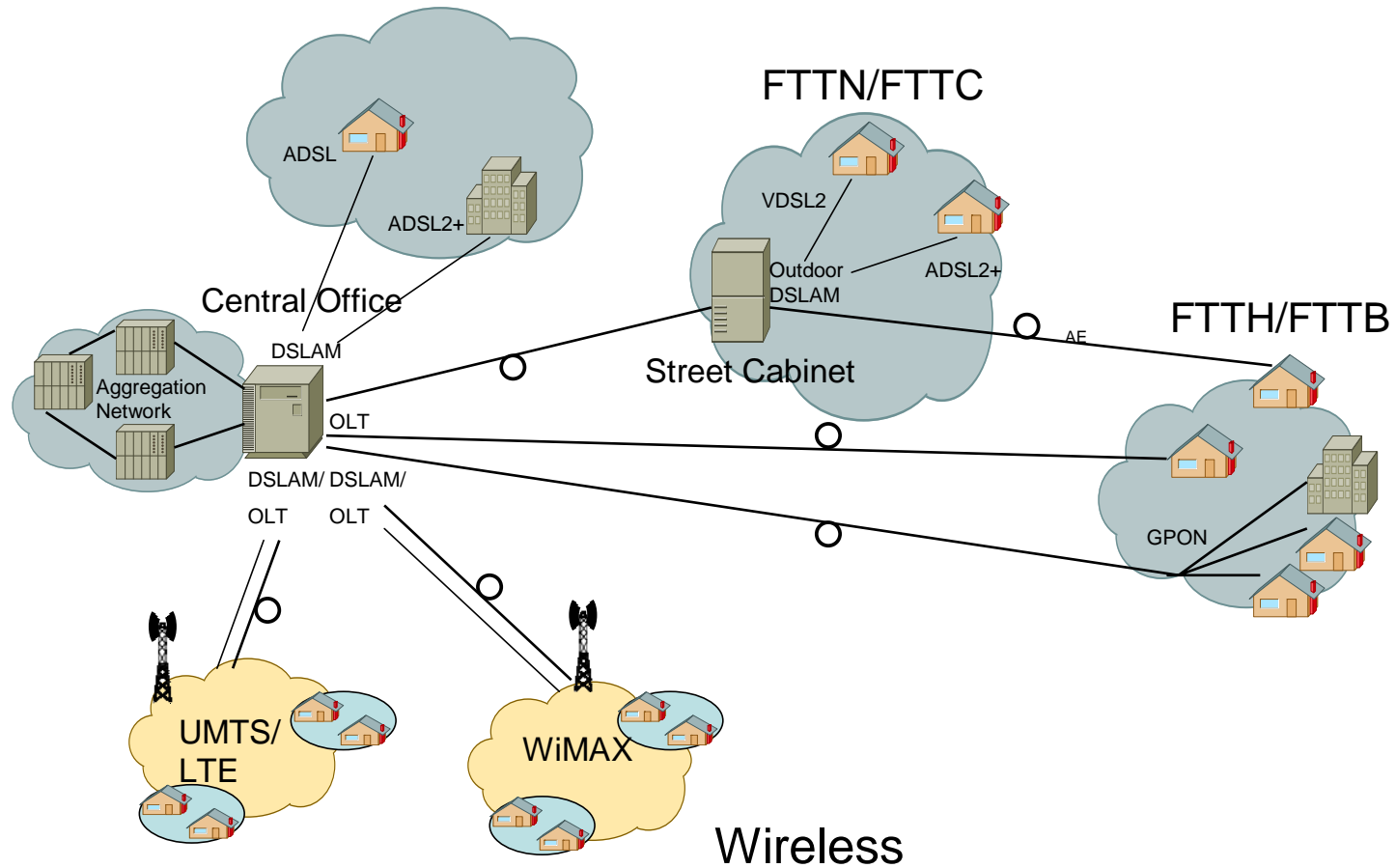
(as far as the competences of the Federal Network Agency are concerned)

- Regulation geared to growth and innovation
- Infrastructure atlas
- **Supportive frequency policy**  
(→ make digital dividend spectrum available for the market)



## Copper-centric

## Fibre-centric





- First in Europe to auction digital dividend spectrum.
- A total of almost 360 MHz of the 0,8 GHz (“digital dividend”), 1,8 GHz, 2,0 GHz and 2,6 GHz frequency band were auctioned.
- Auction started on April 12th and ended on May 20th after 224 rounds of bidding.
- Participants in the auction were the 4 German mobile network operators: Deutsche Telekom, Vodafone, Telefónica and E-Plus.
- Altogether the frequencies were auctioned for 4.4 bn €, including more than 3.5 bn € for the frequencies of the digital dividend.
- Frequencies may be used for “wireless access to networks” until the end of 2025.
- Successful bidders of digital dividend frequencies need to fulfil a special coverage obligation to provide services in “white spots” and rural areas which are currently lacking broadband:
  - Licensees will have to cover at least 90% of the population in the cities, which the federal states identified as being “white spots”, by January 1st, 2016.
  - Small cities and communities must be covered first.

# Frequency Auction



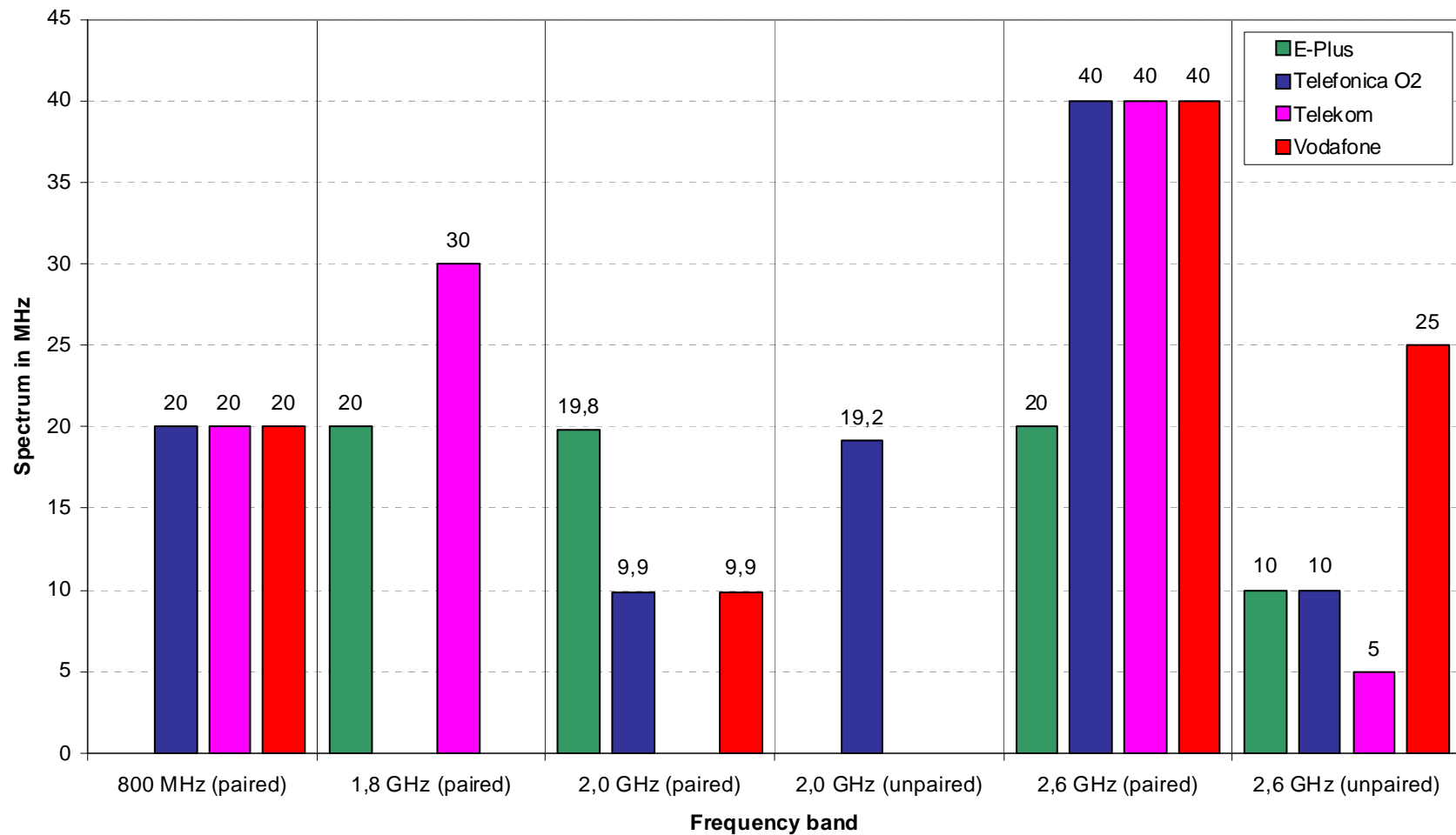
## End of auction

Frequenzbereich	Block	Ausstattung	Höchstbieter	Höchstgebot (€ in Tsd)
0,8 GHz (gepaart)	0,8 GHz A	2x5 MHz konkret	To2 GER	616.595
	0,8 GHz B	2x5 MHz abstrakt	To2 GER	595.760
	0,8 GHz C	2x5 MHz abstrakt	Telekom D	570.849
	0,8 GHz D	2x5 MHz abstrakt	Telekom D	582.949
	0,8 GHz E	2x5 MHz abstrakt	Vodafone	583.005
	0,8 GHz F	2x5 MHz abstrakt	Vodafone	627.317
1,8 GHz (gepaart)	1,8 GHz A	2x5 MHz abstrakt	Telekom D	20.700
	1,8 GHz B	2x5 MHz abstrakt	Telekom D	20.700
	1,8 GHz C	2x5 MHz abstrakt	Telekom D	19.869
	1,8 GHz D	2x5 MHz konkret	E-Plus Grp	21.550
	1,8 GHz E	2x5 MHz konkret	E-Plus Grp	21.536
2,0 GHz (gepaart)	2,0 GHz A	2x4,95 MHz konkret	Vodafone	93.757
	2,0 GHz B	2x4,95 MHz konkret	E-Plus Grp	103.323
	2,0 GHz C	2x4,95 MHz konkret	E-Plus Grp	84.064
	2,0 GHz D	2x4,95 MHz konkret	To2 GER	66.931
2,0 GHz (ungepaart)	2,0 GHz E	1x5 MHz konkret	To2 GER	5.731
	2,0 GHz F	1x14,2 MHz konkret	To2 GER	5.715
Ausgeschiedene Bieter:				
2,6 GHz (gepaart)				
	2,6 GHz A	2x5 MHz abstrakt	Telekom D	19.096
	2,6 GHz B	2x5 MHz abstrakt	Telekom D	19.025
	2,6 GHz C	2x5 MHz abstrakt	To2 GER	17.364
	2,6 GHz D	2x5 MHz abstrakt	To2 GER	17.364
	2,6 GHz E	2x5 MHz abstrakt	Vodafone	18.948
	2,6 GHz F	2x5 MHz abstrakt	Vodafone	19.025
	2,6 GHz G	2x5 MHz abstrakt	Telekom D	19.069
	2,6 GHz H	2x5 MHz abstrakt	Telekom D	19.038
	2,6 GHz I	2x5 MHz abstrakt	To2 GER	18.948
	2,6 GHz J	2x5 MHz abstrakt	E-Plus Grp	18.931
	2,6 GHz K	2x5 MHz abstrakt	E-Plus Grp	17.739
	2,6 GHz L	2x5 MHz abstrakt	To2 GER	17.739
	2,6 GHz M	2x5 MHz abstrakt	Vodafone	17.739
	2,6 GHz N	2x5 MHz abstrakt	Vodafone	17.752
2,6 GHz (ungepaart)				
	2,6 GHz O	1x5 MHz abstrakt	Vodafone	9.130
	2,6 GHz P	1x5 MHz abstrakt	Vodafone	9.130
	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
	2,6 GHz X	1x5 MHz abstrakt	E-Plus Grp	8.229
Summe aller gehaltenen Höchstgebote (€ in Tsd)				4.384.646
Zahlungsverpflichtung aufgrund zurückgenommener Höchstgebote (€ in Tsd)				0
Summe				4.384.646

# Frequency Auction

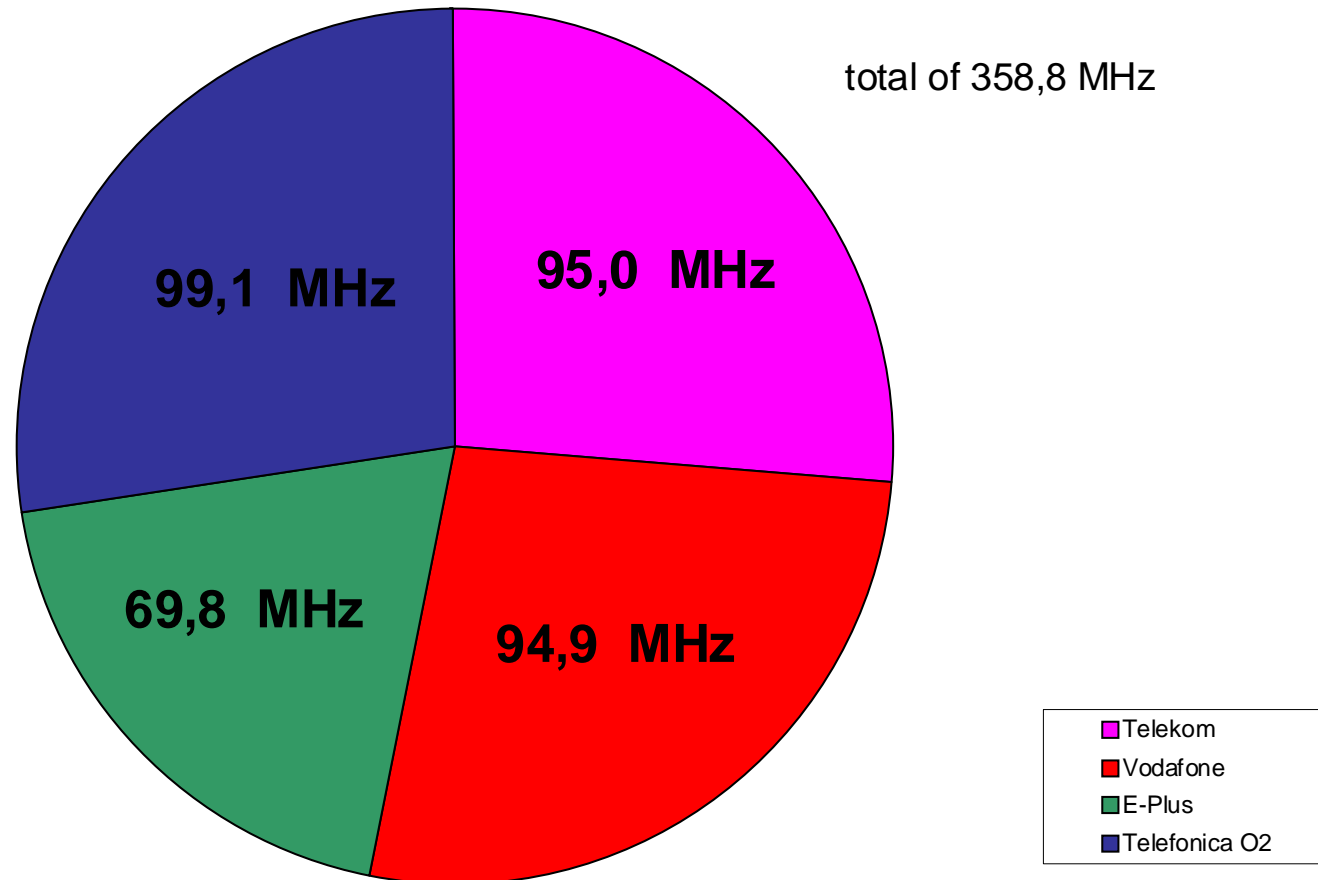


## Outcome of the auction





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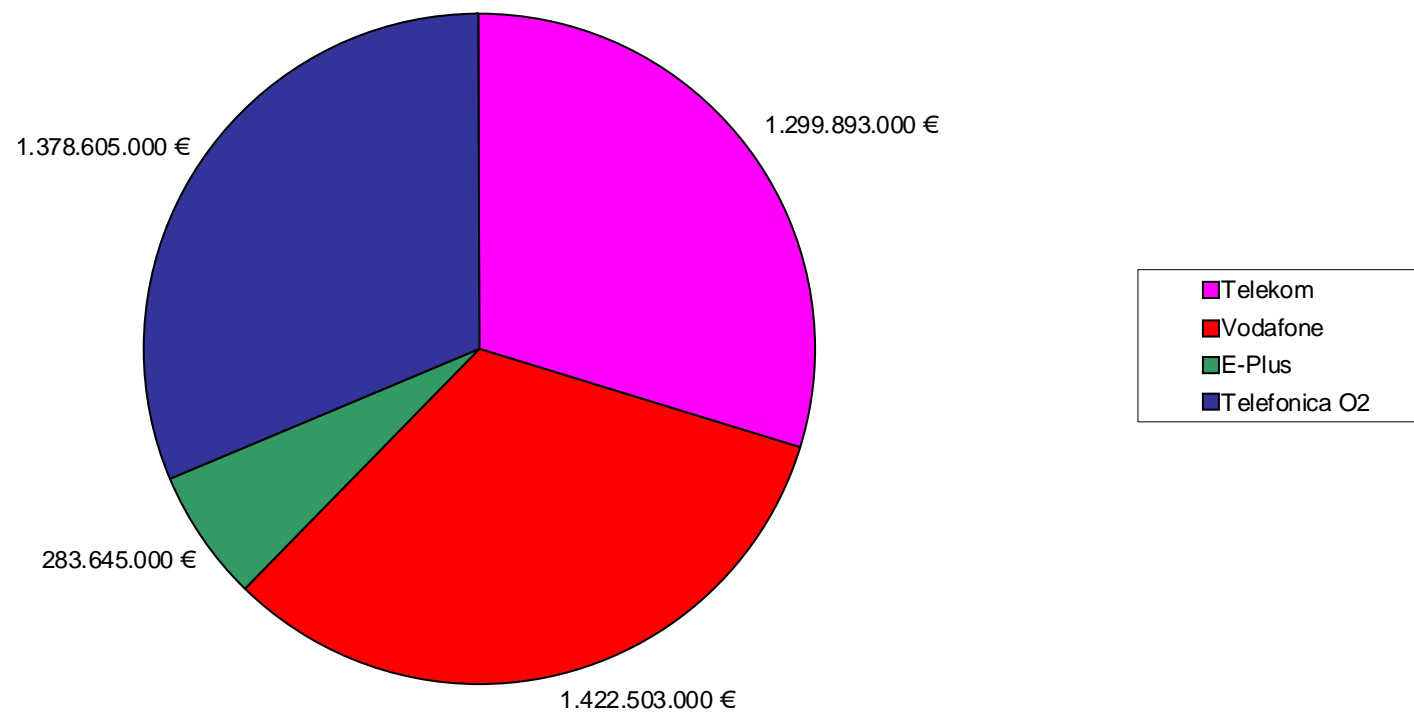






## Sum of closing bids

in total: 4.384.646.000 €





Preparing the auction at 800 MHz / 1.8 / 2 / 2.6 GHz	
2005	Consultations on the availability of spectrum at 2 / 2.6 GHz
2007	Consultations on award at 1.8 / 2 / 2.6 GHz President's Chamber decisions on <ul style="list-style-type: none"><li>▪ the order for an award</li><li>▪ the choice of an auction</li></ul>
2008	President's Chamber decision on <ul style="list-style-type: none"><li>▪ the award conditions</li></ul>
2009	Consultations and decisions of the President's Chamber on <ul style="list-style-type: none"><li>▪ combining the award of spectrum at 800 MHz with 1.8 / 2 / 2.6 GHz</li><li>▪ the auction rules</li></ul>
April/May 2010	Auction conducted



- Mobile operators have started to deploy LTE networks and to commercially market LTE services.
- For more than 3500 base stations BNetzA has determined site-specific parameters (800 MHz). These base station may be used for LTE services.
- Many “white spots” have already been connected to the digital highways.
- Actual challenges for the regulator:
  - Cross-border frequency co-ordination
  - Co-ordination of point-to-point radio lines in order to link up base stations





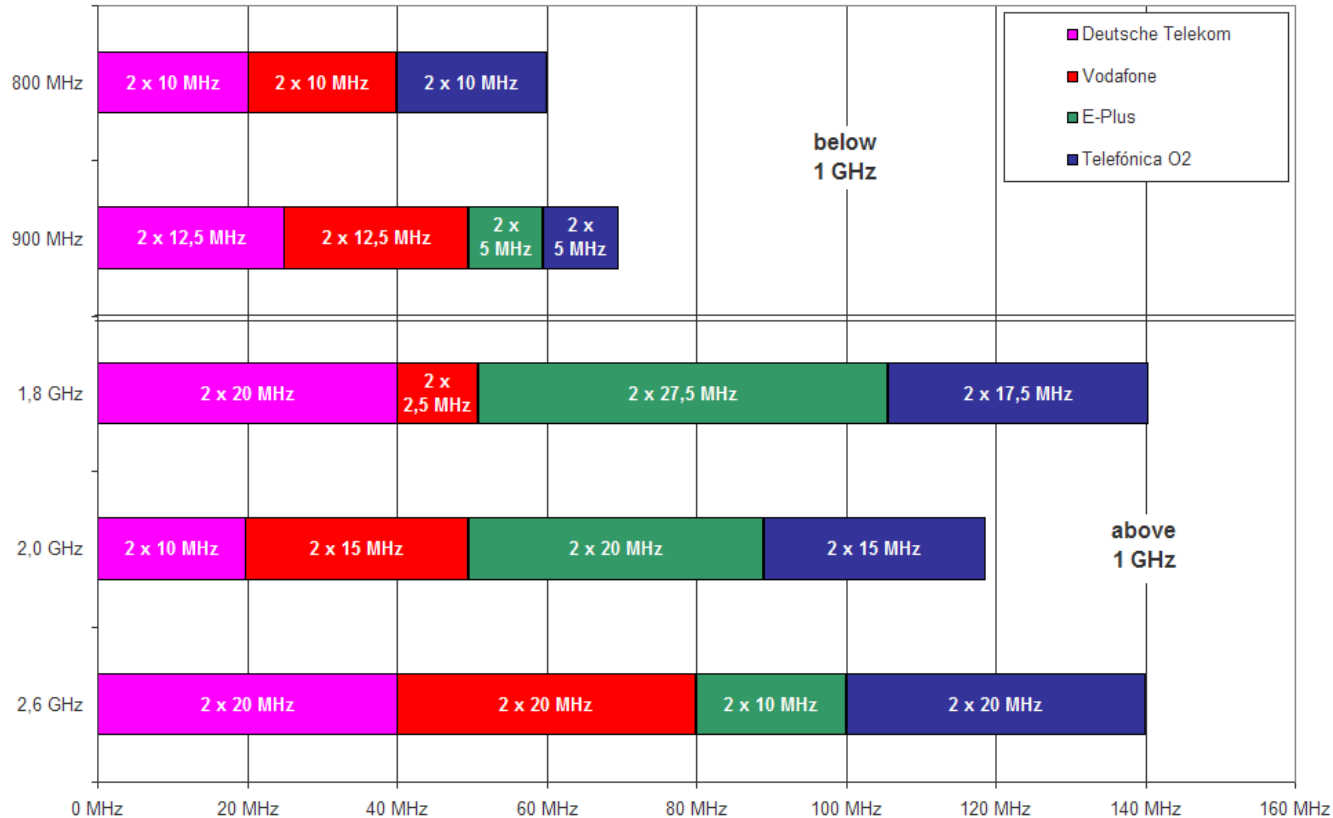
Decision on the flexibilisation of frequency usage rights for wireless access for the provision of telecommunications services in the bands 450 MHz, 900 MHz, 1800 MHz, 2 GHz and 3.5 GHz of 12 October 2009.

- Upon request and in accordance with the Directive of the European Parliament and of the Council amending Council Directive 87/372/EEC, BNetzA will flexibilise the GSM frequency usage rights (900 MHz and 1800 MHz) as quickly as possible.
- The same applies for the frequency usage rights in the 450 MHz-, 2 GHz- and 3.5 GHz bands.

# Frequency Distribution Examination



Spectrum distribution below / above 1 GHz



As provided for in the GSM directive BNetzA is currently examining whether the existing assignment of the 900 MHz band is likely to distort competition in the mobile markets concerned.



- BNetzA issued a discussion paper addressing several key questions in August 2010.
- Key Questions comprise the following issues:
  - Should only the 900 MHz band be analysed or all frequencies used by the mobile operators?
  - Price for the digital dividend in comparison to the costs incurring for the construction of a network with higher frequencies.
  - Reallocation of frequencies in the 900 MHz band before expiry of the usage rights at the end of 2016?
- BNetzA has also obtained an expert opinion about the key questions which is currently discussed with the market.
- Public hearing took place in April 2011.
- BNetzA will deliver a draft decision at the beginning of July.
  
- In addition: BNetzA has opened the procedure concerning the further assignment of the frequencies in the 900 MHz band since the current time limit will expire at the end of 2016. It will publish a discussion paper at the beginning of July.



- A harmonised approach for the usage of frequencies for broadband wireless access to telecommunication networks in Europe is desirable in order to allow synergies and to facilitate the implementation.
- But the differences between the member states must be borne in mind, such as:
  - The spectrum available differs from country to country  
for example: Not in all countries the 800 MHz and 2.6 GHz bands can be used for commercial purposes
  - Population density, network coverage → relevant market, coverage obligation  
for example: Germany (229 pop/km<sup>2</sup>, national award), Sweden (21 pop/km<sup>2</sup>, regional award)
  - Number of operators and existing allocation of spectrum below 1 GHz  
→ spectrum caps, spectrum reserved for newcomers  
Germany (4 operators, all with spectrum below 1 GHz), every country has a different situation