



LTE Frequency Allocations in Germany

Fondazione Ugo Bordoni
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- **The Federal Government's Broadband Strategy of February 2009**
 - Broadband access shall be available nationwide by the end of 2010
 - A total of 75 percent of households shall be provided with access with transmission rates of 50 MBit/s by 2014 and nationwide as soon as possible

- **Digital Agenda of the European Commission**

- 100% coverage of broadband access of EU citizens by 2013
- Provision of all EU citizens with broadband access with at least 30 MBit/s and 50% of European households with at least 100 MBit/s by 2020





- Capitalising on synergies from infrastructure projects by creating possibilities of using infrastructure of telecommunications providers and other infrastructure providers
- Supportive frequency policies, e.g. by usage of the digital dividend (790 – 862 MHz) for the roll-out of broadband access networks in rural areas
- Regulation that fosters growth and innovation
- Financial Aid for programs that support the roll-out of broadband in areas neglected by the market



- On 12. October 2009 the President's Chamber decided to combine proceedings to award spectrum in the bands 790 to 862 MHz, 1710 to 1725 MHz and 1805 to 1820 MHz with proceedings to award spectrum in the bands 1.8 GHz, 2 GHz and 2.6 GHz for wireless access

⇒ Reasons:

- speed-up the proceedings
- more flexibility for the bidders

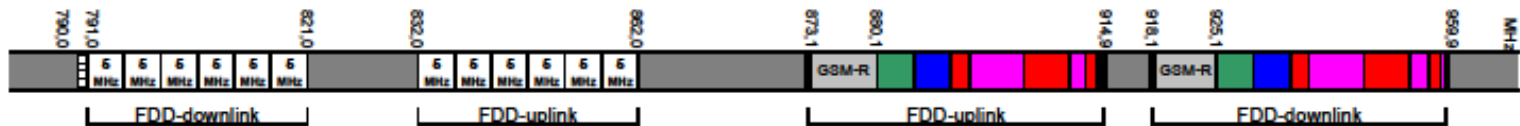
The available Spectrum



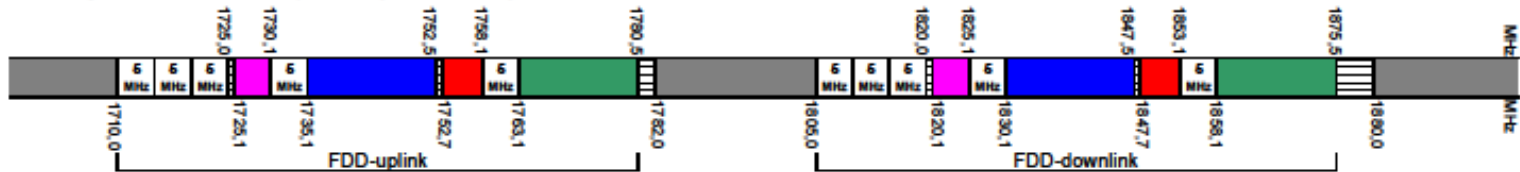
Übersicht der zur Vergabe stehenden Frequenzen in den Bereichen bei 800 MHz, 1,8 GHz, 2 GHz und 2,6 GHz

Schutzkanäle
 verfügbares Spektrum
 bereits zugeteiltes Spektrum

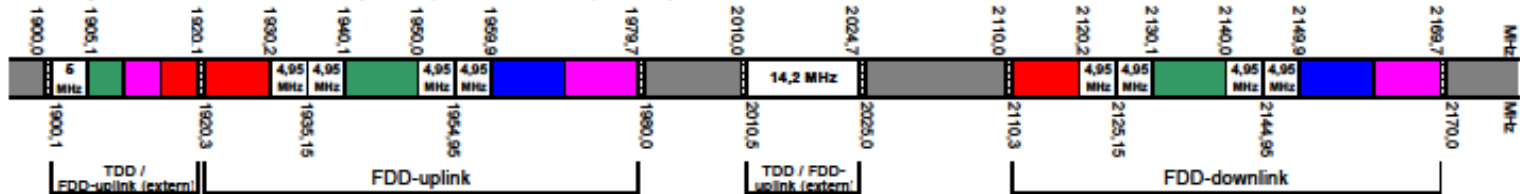
> Frequenzbereich bei 800 / 900 MHz (2 x 30 MHz bei gepaartem Spektrum)



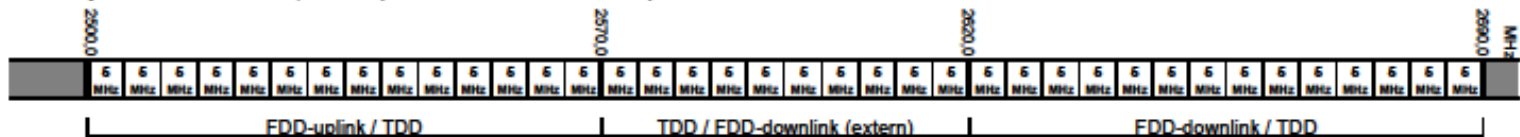
> Frequenzbereich bei 1,8 GHz (2 x 25 MHz)



> Frequenzbereich bei 2 GHz (2 x 19,8 MHz und 19,2 MHz)



> Frequenzbereich bei 2,6 GHz (2 x 70 MHz und 50 MHz)





- The right to take part in the auction is not limited, given the minimum specialist and other requirements.
- Undertakings may qualify once only. This also applies in respect of consortia.
- Applicants must state how the requirements for admission to the auction are met.



- A basic spectrum package as referred to in section 61(4) sentence 2 para 3 TKG is not stipulated.
- But: Applicants can request the minimum frequency requirements for their business model (see next slide)



- In their application for admission, applicants are entitled to request the minimum frequency requirements for their business model (so-called minimum essential spectrum package) either
 - a. for the 800 MHz band only, or
 - b. for all the frequencies available for award (without specifying particular bands), or
 - c. for all the frequencies available for award and from these, specifically for the 800 MHz band.

- If a minimum essential spectrum package is requested and the requesting bidder bids for less in the auction, he will be eliminated from the entire proceedings

- No one did request a minimum package in this auction



- The relevant product market for which the frequencies to be assigned may be used in observance of the Frequency Usage Plan is the market for wireless access for the provision of telecommunications services.
- The relevant geographic market is the territory of the Federal Republic of Germany.



Technology Neutrality

- There are no restrictions as regards the technologies that may be used. Every available technology can be deployed in observance of the usage provisions.
- Different usage conditions in the bands 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz.
- Assignees may diverge from these conditions if they have made mutual arrangements and divergence is without detriment to the frequency usage rights of third parties. The Federal Network Agency must be informed in writing beforehand



- In the band 1.8 GHz, 2 GHz and 2.6 GHz is required to cover at least 25% of the population as from 1 January 2014 and at least 50% as from 1 January 2016.



- Usage provision 36 of the Ordinance amending the National Table of Frequency Allocations for spectrum in the band at 800 MHz:

"The band 790 – 862 MHz is to be used, in consultation with the federal states, for mobile broadband Internet coverage at the earliest possible opportunity. The main purpose of this is to close gaps in coverage in rural areas. The mobile service in the band 790 – 862 MHz must not cause any interference to the broadcasting service."



Coverage obligations for the 800 MHz Band

- Accordingly, an assignee using spectrum in the band at 800 MHz is obliged to achieve, in every federal state, a degree of coverage of at least 90% of the population in the towns and districts specified by the individual federal states as from 1 January 2016.

Gemeinde-schlüssel	Gemeinde	Teilgemeinde	ArtGemeinde	Ein-wohner	Einw. in Teil-gemeinde	Haus-halte	Haus-halte in Teil-gemeinde	Verfügbarkeit 1 Mbit/s für Prozent der Haushalte
08125108	Zaberfeld		Gemeinde	3978		1637		67,84
08125111	Hardthausen am Kocher		Gemeinde	4055		1669		69,26
08125111	Hardthausen	Kochersteinsfeld			1.009		415	
08125111	Hardthausen	Lampoldshausen			995		410	
08125113	Langenbrettach		Gemeinde	3543		1458		67,53
08125113	Langenbrettach	Langenbeutingen			1.240		510	
08126011	Bretzfeld	Adolzfurt			1.127		490	
08126011	Bretzfeld	Dimbach			754		328	
08126011	Bretzfeld	Geddelsbach			239		104	
08126011	Bretzfeld	Scheppach			952		414	
08126011	Bretzfeld	Schwabbach			1.171		509	
08126011	Bretzfeld	Siebeneich			202		88	
08126011	Bretzfeld	Unterheimbach			1.177		512	
08126011	Bretzfeld	Waldbach			1.379		600	
08126020	Dörzbach		Gemeinde	2411		992		78,44
08126020	Dörzbach	Hohebach			578		238	
08126028	Forchtenberg	Sindringen			819		343	
08126028	Forchtenberg	Wohlmuthausen			423		177	
08126039	Ingelfingen	Criesbach			597		250	
08126039	Ingelfingen	Diebach			232		97	
08126039	Ingelfingen	Dörrenzimmern			392		164	
08126039	Ingelfingen	Eberstal			400		167	
08126039	Ingelfingen	Hermuthausen			275		115	
08126039	Ingelfingen	Stachenhausen			228		95	
08126039	Ingelfingen	Weldingsfelden			222		93	
08126045	Krautheim		Stadt	4871		2005		55,44
08126045	Krautheim	Oberginsbach			345		142	
08126045	Krautheim	Oberndorf			137		56	
08126045	Krautheim	Unterginsbach			268		110	
08126046	Künzelsau	Amrichshausen			510		222	
08126046	Künzelsau	Belsenberg			436		190	
08126046	Künzelsau	Gaisbach			1.814		789	



Coverage obligations for the 800 MHz Band

- Coverage has to be fulfilled in stages:
 1. Starting with small towns and districts below 5.000 inhabitants
 2. Towns and districts between 5.000 and 20.000 inhabitants
 3. Towns and districts between 20.000 and 50.000 inhabitants
 4. Towns and districts with more than 50.000 inhabitants
- Priority stage 2 network rollout can only begin in any federal state when at least 90% of the population in the towns and districts specified by the particular federal state for priority stage 1 has been provided with access, etc.

- The minimum bid for a frequency block of 2 x 5 MHz (paired), that is to say 2 x 4.95 MHz (paired) was 2,500,000 EUR.
- The minimum bid for a frequency block of 1 x 5 MHz (unpaired) was 1,250,000 EUR.
- The minimum bid for a frequency block of 1 x 14.2 MHz (unpaired) (2010.5 MHz to 2024.7 MHz) was 3,550,000 EUR.

Ende der Auktion

Frequenzbereich	Block	Ausstattung	Höchstbieter	Höchstgebot (€ in Tsd)
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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	670.849
	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	84.054
	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:

Frequenzbereich	Block	Ausstattung	Höchstbieter	Höchstgebot (€ in Tsd)
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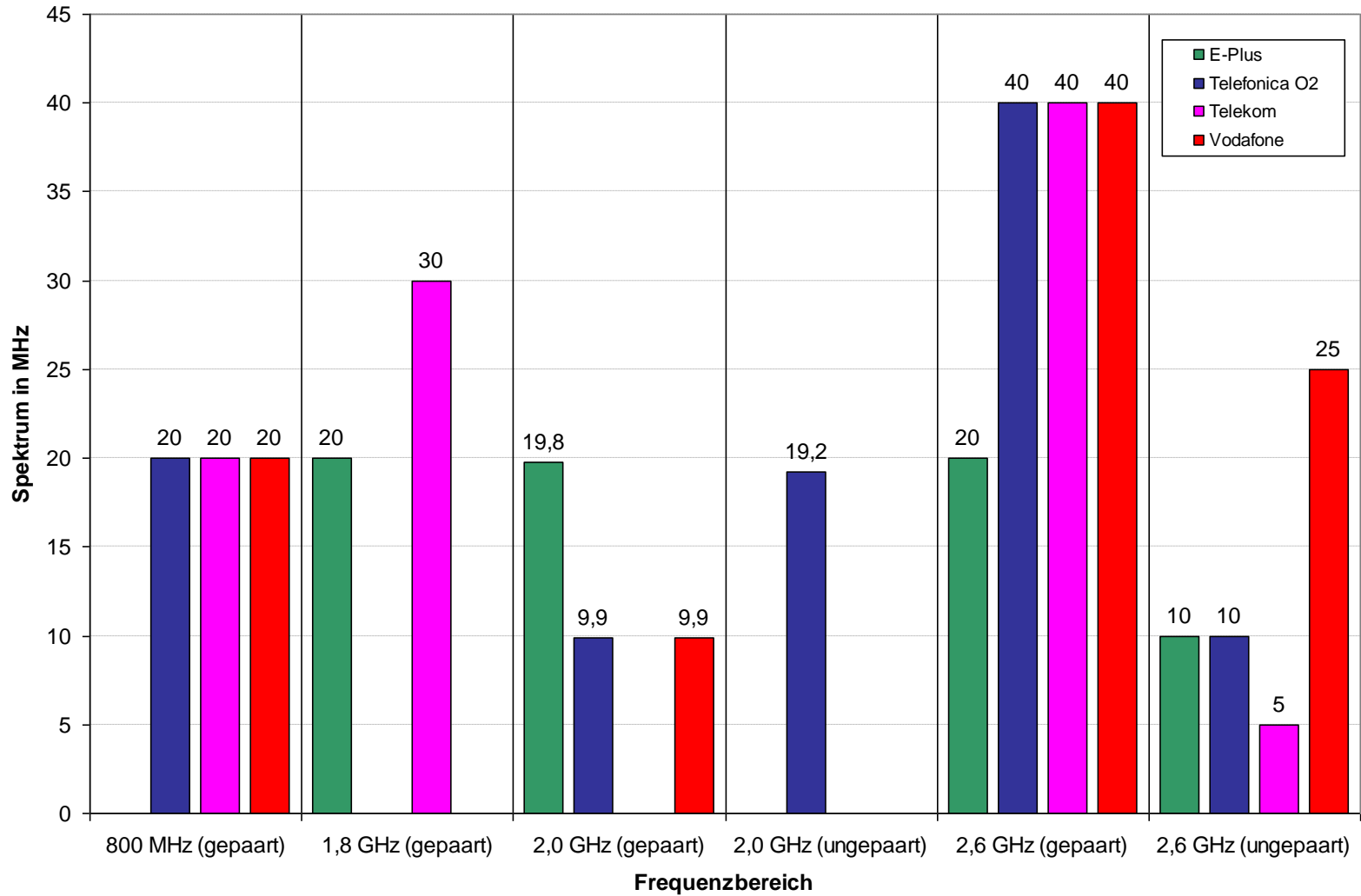
2,6 GHz (gepaart)	2,6 GHz A	2x5 MHz abstrakt	Telekom D	19.096
	2,6 GHz B	2x5 MHz abstrakt	Telekom D	19.025
	2,6 GHz C	2x5 MHz abstrakt	To2 GER	17.364
	2,6 GHz D	2x5 MHz abstrakt	To2 GER	17.364
	2,6 GHz E	2x5 MHz abstrakt	Vodafone	18.948
	2,6 GHz F	2x5 MHz abstrakt	Vodafone	19.025
	2,6 GHz G	2x5 MHz abstrakt	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

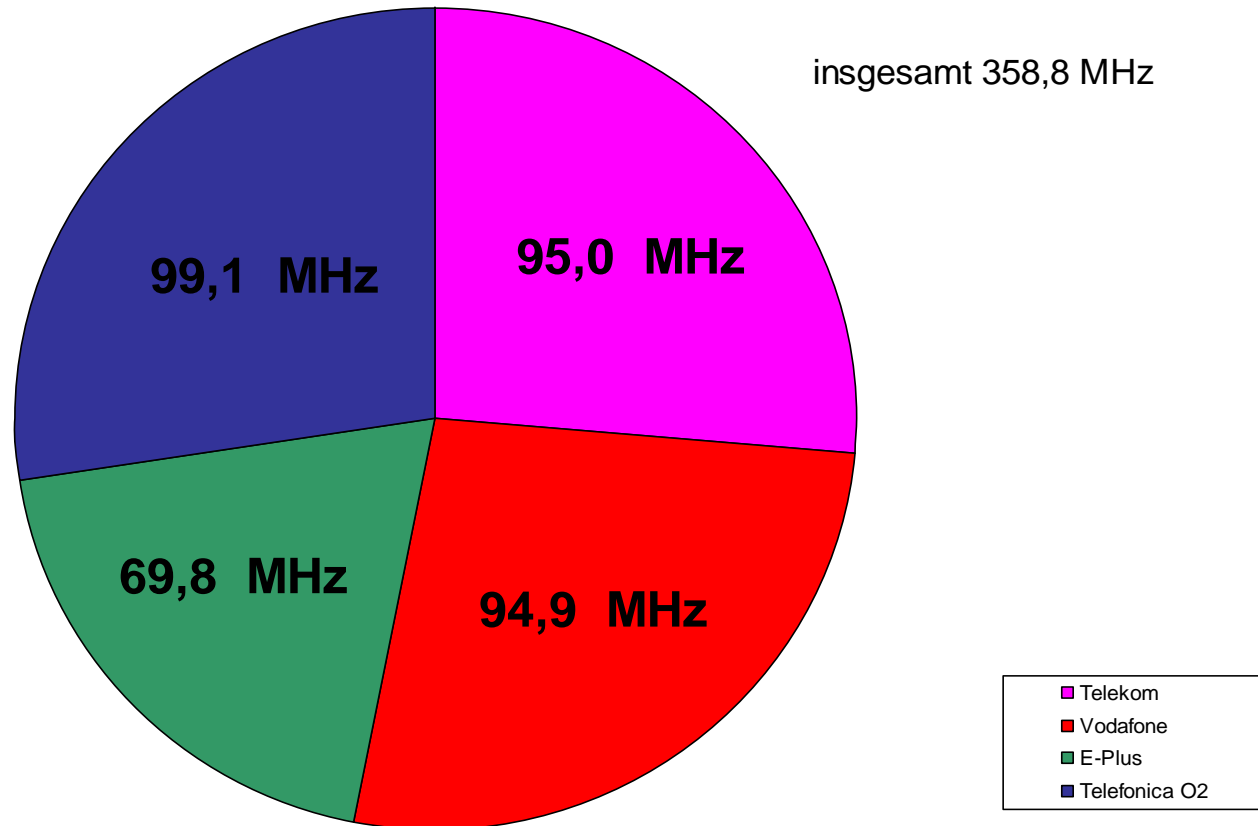
Summe aller gehaltenen Höchstgebote (€ in Tsd)	4.384.646
Zahlungsverpflichtung aufgrund zurückgenommener Höchstgebote (€ in Tsd)	0
Summe	4.384.646



Spektrumsverteilung - Ergebnis der Auktion



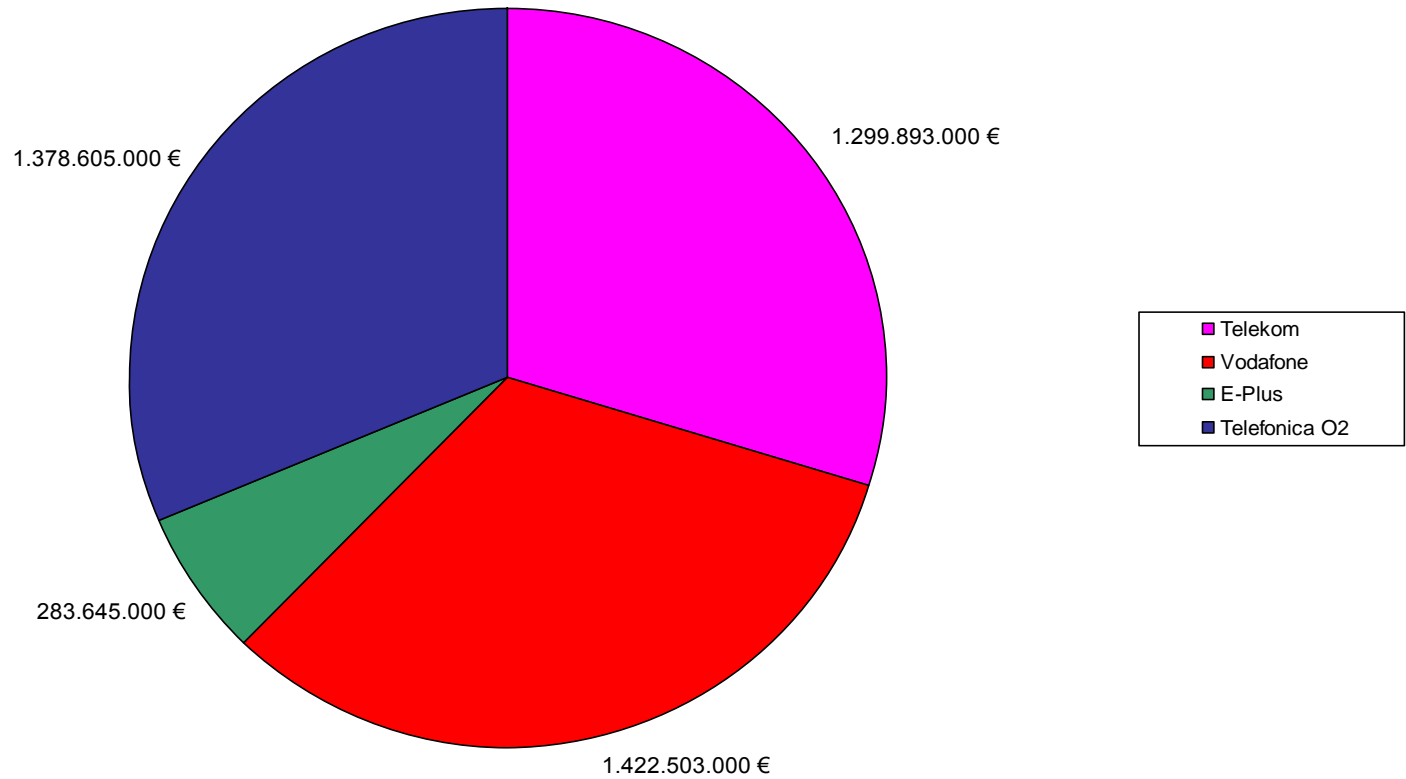
Spektrumsverteilung - Ergebnis der Auktion





Monetäre Summe der Höchstgebote

insgesamt 4.384.646.000 €





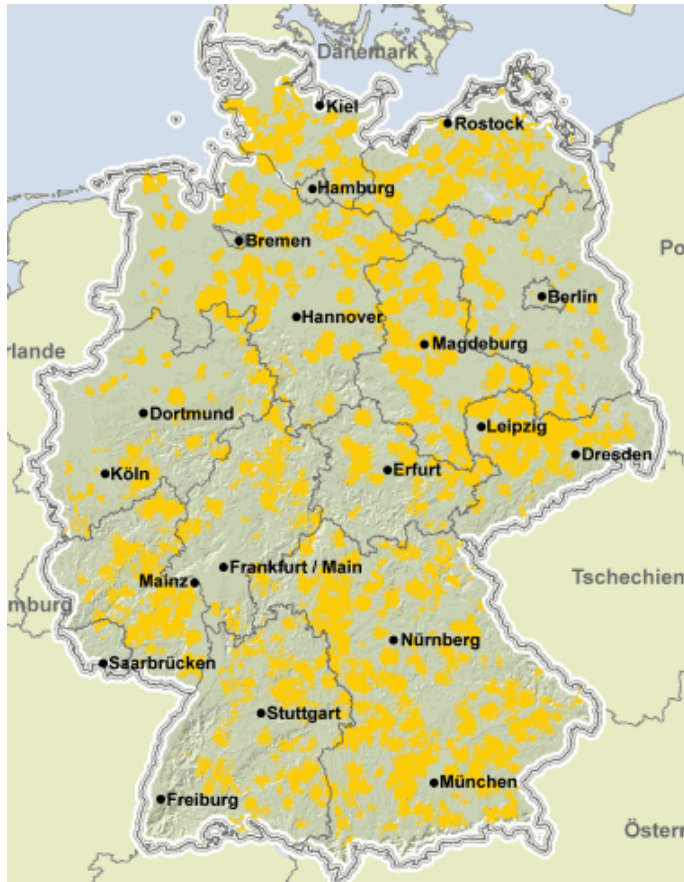
1. The successful bidders will have the opportunity to agree amongst themselves, within a period of three months of the close of the auction, the spectral position of their blocks in the particular frequency band.
2. If agreement between the successful bidders is not reached within this period, the Federal Network Agency will concentrate initially on the aspect of assigning contiguous spectrum and will allot the abstract blocks won in the bands at 800 MHz and 1.8 GHz – with regard also to adjacent concrete blocks won and existing adjacent assignments – accordingly.
3. Allotment of the remaining frequency blocks will be decided by lot.



No agreement was reached, so that a lottery procedure had to decide



LTE coverage



Source: Breitbandatlas

- Mobile operators have started to deploy LTE networks and to commercially market LTE services.
- Coverage obligation has already been fulfilled in 6 German federal states (“Länder”).
- For more than 6,000 base stations BNetzA has determined site-specific parameters (800 MHz). These base stations may be used for LTE services.

Thank you for your attention

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