TRANSLATION[*]

Decisions of the President's Chamber of the Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway of 12 October 2009 on combining the award of 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 for the provision of telecommunications services (Decision of the President's Chamber of 7 April 2008, reference: BK1-07/003 on the order for and choice of award proceedings and on the determinations and rules) and on the determinations and rules for conduct of the proceedings to award spectrum in the bands 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz for wireless access for the provision of telecommunications services (auction rules); Decisions taken under sections 55(9), 61 subsections (1), (2), (4) and (5), 132 subsections (1) and (3) TKG

– Reference: BK1a-09/002

Background information

To date, three President's Chamber decisions have been issued on the order for and choice of award proceedings and on the conditions for awarding spectrum in the bands 1.8 GHz, 2 GHz and 2.6 GHz for wireless access for the provision of telecommunications services (Order 34/2008, Federal Network Agency Official Gazette 7/2008, page 581ff.)

Provision was made in the economic stimulus package II and in the federal government's broadband strategy adopted by the federal cabinet on 18 February 2009 for the band 790 – 862 MHz to be used promptly to provide sparsely populated areas with innovative mobile applications and broadband Internet access. Following dedication of the spectrum in the band 790 – 862 MHz for wireless access for the provision of telecommunications services this spectrum will be included in the proceedings to award spectrum in the bands 1.8 GHz, 2 GHz and 2.6 GHz for wireless access for the provision of telecommunications services in the interests of swift, unbureaucratic procedures, in line with the aims of the federal government's broadband strategy. Awarding spectrum on a technology and services-neutral basis in a competitive procedure can generate innovative applications, enabling unrestricted access to the Internet to become established in competitive markets, in particular. This should happen above all in regions where broadband Internet access is realised initially as a result of using the digital dividend.

The President's Chamber of the Federal Network Agency opened a consultation on the draft decision 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 for the provision of telecommunications services (cf Order 34/2008, Federal Network Agency Official Gazette 7/2008, page 582ff) (auction rules, Communication 319/2009, Federal Network Agency Official Gazette 10/2009 of 3 June 2009). In a further step the President's Chamber also opened a consultation on the determinations and rules for conduct of the proceedings to award spectrum for wireless access for the provision of telecommunications services in the bands 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz in accordance with sections 55(9), 61 subsections (1), (2), (4) and (5) TKG (auction rules) (Communication 390/2009, Federal Network Agency Official Gazette 14/2009 of 29 July 2009).

[*] In case of divergent interpretation of the German and English text, the German text shall prevail.

After studying the responses to the above drafts, the President's Chamber now issues decisions on the following:

I. combining 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,

II. ordering award proceedings under section 55(9) in conjunction with section 61 TKG,

III. the choice of an auction in accordance with section 61(1) TKG,

IV. the award conditions in accordance with section 61(4) TKG, and

V. the auction rules in accordance with section 61(5) TKG.

The auction will be held as an open ascending simultaneous multiround auction. Simultaneous multiround bidding has proved successful in the past. It was introduced for the ERMES licences in 1996 (BMPT Official Gazette 1996, page 948, Order 115/1996) and later used to auction the UMTS spectrum (RegTP Official Gazette 4/2000, Order 14/2004) and the BWA spectrum (Order 42/2006, Federal Network Agency Official Gazette 20/2006).

Five frequency blocks in the band at 800 MHz, three blocks in the band at 1.8 GHz and the frequencies available in the band at 2.6 GHz will be awarded in abstract form – that means not at a specific position in the spectrum. The spectral position will be determined in a separate allotment procedure after the auction. The remaining blocks in the bands at 800 MHz, 1.8 GHz and 2 GHz will be auctioned at a specific spectral position.

A major new element in the auction rules this time is that individual minimum frequency requirements (so-called minimum essential spectrum package) can be requested. This can be done specifically for the band at 800 MHz and/or altogether for the bands in which spectrum is to be awarded. Moreover, bidders will be given the opportunity to withdraw highest bids, the possibility of doing so being designed to promote efficient allocation of frequencies. To prevent abuse, bid withdrawal will be linked with the obligation to pay if none of the other bidders submits a higher bid in the further course of the auction.

In respect of any frequency blocks not acquired, the President's Chamber will take a decision within two working days on whether, and if so when, these blocks should be auctioned in a second stage. The same rules will apply for any such second stage as for the first stage of the auction.

The Chamber decisions on the award and auction rules are issued with the participation of the federal states in accordance with usage provision 36 of the Second Ordinance Amending the Frequency Band Allocation Ordinance of 14 July 2009 (Federal Law Gazette I No 41 of 20 July 2009, page 1809), after hearing the parties concerned and in consultation with the Advisory Council, section 132 subsections (1) and (3) TKG.

Usage provision 36 reads:

> "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."

The frequency blocks will be awarded to the successful bidders after the auction. The award notices will specify the spectrum packages won. The abstract blocks will then be given their particular spectral position in a separate allotment procedure. In planning their network build and rollout, the future network operators must apply for determination of the technical site-related parameters before they can actually use the frequencies. These frequencies can only be used after assignment subject to "their compatibility with other frequency usages" as stated in section 55(5) sentence 1 para 3 TKG and "their efficient and interference-free use by the applicant being secured" as stated in section 55(5) sentence 1 para 4 TKG (cf point 4 of Bundesrat Decision of 12 June 2009, Bundesrat Printed Paper 204/09).

So that the spectrum can be awarded promptly, qualification to take part in the auction should begin before the end of the year. The auction itself is scheduled for the second quarter of 2010.

Qualification to take part opens with publication of this Decision in the Federal Network Agency Official Gazette.

Applications to qualify to take part should be made in writing, in German, in one original and six copies, and electronically in Word or PDF format, to

Bundesnetzagentur
Referat 212
Kennwort: Versteigerungsverfahren
Tulpenfeld 4
53113 Bonn

The closing date for applications is 15:00 hours on 21 January 2010.

GENERAL ADMINISTRATIVE ORDER

Decisions of the President's Chamber of the Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway of 12 October 2009 on combining the award of 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 for the provision of telecommunications services (Decision of the President's Chamber of 7 April 2008, reference: BK1-07/003 on the order for and choice of award proceedings and on the determinations and rules) and on the determinations and rules for conduct of the proceedings to award spectrum in the bands 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz for wireless access for the provision of telecommunications services; Decisions taken under sections 55(9), 61 subsections (1), (2), (4) and (5), 132 subsections (1) and (3) TKG

– Reference: BK1a-09/002

The Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway hereby issues, through the President's Chamber, the following decisions under sections 55(9), 61 subsections (1), (2), (4) and (5) sentence 2, 132 subsections (1) and (3) of the Telecommunications Act (TKG) on combining proceedings to award spectrum for wireless access for the provision of telecommunications services in the bands 790 to 862 MHz, 1710 to 1725 MHz and 1805 to1820 MHz with proceedings to award spectrum in the bands 1.8 GHz, 2 GHz and 2.6 GHz and on the determinations and rules for conduct of the proceedings to award spectrum in the bands 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz for wireless access for the provision of telecommunications services:

I. Combined proceedings

Reference: BK1a-09/002

The award of spectrum in the bands 790 to 862 MHz, 1710 to 1725 MHz and 1805 to 1820 MHz (ref: BK1a-09/002) for wireless access will be combined with the award of spectrum in the bands 1.8 GHz, 2 GHz and 2.6 GHz (ref: BK1-07/003). The spectrum will be awarded in one set of proceedings.

II. Order for award proceedings

It is hereby ordered under section 55(9) TKG that assignment of the frequencies for wireless access for the provision of telecommunications services in the bands 790 to 862 MHz, 1710 to 1725 MHz, 1805 to 1820 MHz and 1.8 GHz, 2 GHz and 2.6 GHz be preceded by award proceedings according to section 61 TKG.

III. Choice of award proceedings

The award proceedings referred to in section 61(1) TKG will be conducted in the form of an auction in accordance with section 61 subsections (4) and (5) TKG.

IV. Determination and rules

IV.1. Qualification requirements, section 61(4) sentence 2 para 1 TKG

1. The right to take part in the auction, given the minimum specialist and other requirements within the meaning of section 61(4) sentence 2 para 1 TKG, is not limited.
2. Undertakings may qualify once only. This also applies in respect of consortia. Undertakings that have merged under section 37 of the German Competition Act (GWB) are deemed to be one undertaking. Undertakings merging for application

purposes must certify that there are no objections to this form of organisation under the Competition Act.

3. In their application, applicants must state how the requirements for admission to the auction as set out in section 61(4) sentence 2 para 1 TKG are met (for details of the application requirements see Annex 5).

4. In their application for admission, applicants are entitled to request the minimum frequency requirements needed for their business model (so-called minimum essential spectrum package).

   They must state whether they are looking to acquire a minimum essential spectrum package specifically for the band 800 MHz, for all the bands available for award, or for all the frequencies available for award and from these, specifically for the 800 MHz band:

   Thus applicants can request a 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.

   Applicants requesting a minimum essential spectrum package but bidding for less during the auction will be eliminated from the entire proceedings.

   Any minimum essential spectrum package requested is to be set out in the frequency usage concept in line with the criteria laid down in Annex 5.

5. The Federal Network Agency will state the particular bidding entitlements and the minimum essential spectrum package on the qualification notice. This specification of the minimum essential spectrum package is binding and will be reflected in the auction software for the particular bidder. The bidding entitlements will be given in lot ratings (cf V.3.8).

6. Qualification to take part in the auction opens with publication of this Decision in the Federal Network Agency Official Gazette.

   Applications to qualify to take part should be made in writing, in German, in one original and six copies, and electronically in Word or PDF format, to

Bundesnetzagentur
Referat 212
Kennwort: Versteigerungsverfahren
Tulpenfeld 4
53113 Bonn

The closing date for applications is 15:00 hours on 21 January 2010.

IV.2. Determination of the relevant product and geographic market for which the frequencies to be assigned may be used, section 61(4) sentence 2 para 2 TKG

1. 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.
2. The relevant geographic market for which the frequencies to be assigned may be used in observance of the Frequency Usage Plan is the territory of the Federal Republic of Germany.

IV.3. Basic spectrum package and bidding rights restrictions, sections 61(4) sentence 2 para 3 TKG, 61(5) sentence 1 in conjunction with section 61(2) sentence 1 TKG

1. A basic spectrum package as referred to in section 61(4) sentence 2 para 3 TKG will not be stipulated.
2. For the band 790 to 862 MHz bidding rights will be restricted to a maximum of 2 x 20 MHz (paired). Existing spectrum packages in the band at 900 MHz (of the GSM operators) will count towards this. This means the following rights restrictions for the GSM operators:

GSM operators	**Bidding rights restricted to**
D network operators	2 x 10 MHz (paired) in the band at 800 MHz
E network operators	2 x 15 MHz (paired) in the band at 800 MHz

IV.4. Frequency usage conditions, including the degree of coverage with the frequency usage, section 61(4) sentence 2 para 4 TKG

1. The spectrum for award in the bands 790 to 862 MHz, 1710 to 1725 MHz, 1805 to 1820 MHz and 1.8 GHz, 2 GHz and 2.6 GHz is to be used for wireless access for the provision of telecommunications services. There are no restrictions on the technologies that may be used. Every available technology can be deployed in observance of the usage provisions.

   The spectrum available will be awarded as follows:

Band	**Spectrum available**	**For award**
800 MHz	791-821 MHz and 832-862 MHz	6 blocks of 2 x 5 MHz (paired)
1.8 GHz	1710-1725 MHz and 1805-1820 MHz	3 blocks of 2 x 5 MHz (paired)
	1730,1-1735,1 MHz and 1825,1-1830,1 MHz	2 x 5 MHz (paired)
	1758,1-1763,1 MHz and 1853,1-1858,1 MHz	2 x 5 MHz (paired)
2 GHz	1900,1-1905,1 MHz	5 MHz (unpaired)
	1930,2-1935,15 MHz and 2120,2-2125,15 MHz	2 x 4.95 MHz (paired)
	1935,15-1940,1 MHz and 2125,15-2130,1 MHz	2 x 4.95 MHz (paired)
	1950,0-1954,95 MHz and 2140,0-2144,95 MHz	2 x 4.95 MHz (paired)
	1954,95-1959,9 MHz and 2144,95-2149,9 MHz	2 x 4.95 MHz (paired)

	2010,5-2024,7 MHz	14.2 MHz (unpaired)
2.6 GHz	2500-2570 MHz and 2620-2690 MHz	14 blocks of 2 x 5 MHz (paired)
	2570-2620 MHz	10 blocks of 5 MHz (unpaired)

2. The usage conditions in Annex 3 apply to frequency usages in the bands 1.8 GHz, 2 GHz and 2.6 GHz. The provisional usage conditions in Annex 2 apply to frequency usages in the band at 800 MHz.

   Assignees may diverge from these conditions if they have made mutual arrangements to this effect and divergence is without detriment to the frequency usage rights of third parties. The Federal Network Agency must be informed of this in writing beforehand.

   The frequency usage conditions can be modified subsequently, particularly if this is necessary to secure efficient and interference-free use of frequencies or as a result of international harmonisation agreements. The usage conditions in Annex 2 for the 800 MHz band are a case in point, as final decisions at European and national level are still outstanding.

3. The frequency assignments are valid until 31 December 2025.

4. An assignee using spectrum 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. The parameters to be observed will be determined subsequently in light of the technology deployed.

   Diverging from this, the requirement for frequencies which were the subject matter of an administrative law dispute at the time of the present Decisions is for the prescribed degrees of coverage to be achieved within periods of three and five years respectively from the end of the year in which the decision became final. This applies solely in the case that the administrative law dispute is concluded with binding effect after announcement of the particular frequency assignment.

5. In light of the special legal requirements a separate obligation has been stipulated in usage provision 36 of the Ordinance Amending the National Table of Frequency Allocations for spectrum in the band at 800 MHz. 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 (see attachments) as from 1 January 2016. The degree of coverage refers to the entire population in all the specified towns and districts in each federal state.

   This rollout obligation must be met with spectrum from the 800 MHz band. If, in the period up to 1 January 2016, towns and districts are served by other providers/technologies using equivalent or advanced broadband solutions, this coverage will count towards the 90% target rollout obligation.

   In every federal state, the following towns and districts are to be provided with broadband access in stages, initially as follows:

   a) Provision will be made in the first stage to the towns and districts specified by the federal states whose inhabitants number not more than 5,000 (priority stage 1).

b) Provision will be made in the second stage to the towns and districts specified by the federal states whose inhabitants number between 5,000 and 20,000 (priority stage 2).

c) Provision will be made in the third stage to the towns and districts specified by the federal states whose inhabitants number between 20,000 and 50,000 (priority stage 3).

d) Provision will be made in the fourth stage to the towns and districts specified by the federal states whose inhabitants number more than 50,000 (priority stage 4).

Assignees are required to build and roll out their networks in the specified towns and districts of priority stages 1 to 4 as follows:

Priority stage 2 network rollout can only begin in a federal state when at least 90% of the population in the towns and districts specified by that federal state for priority stage 1 has been provided with access. Priority stage 3 network rollout can only begin in a federal state when at least 90% of the population in the towns and districts specified by that federal state for priority stage 2 has been provided with access. Priority stage 4 network rollout can only begin in a federal state when at least 90% of the population in the towns and districts specified by that federal state for priority stage 3 has been provided with access.

Assignees can enter into cooperation agreements and lease frequencies as permitted under the regulatory and competition law frameworks.

Notwithstanding the separate obligation set out above, assignees are required to cover at least 50% of the population as from 1 January 2016.

6. From the time the frequencies are assigned, assignees must report to the Federal Network Agency on 31 December of every year on the progress of frequency usage and of network build and rollout.

7. A condition subsequent will be attached to the assignment of frequencies which, at the time of the present Decisions, were the subject matter of an administrative law dispute pending at the time of assignment, to the effect that assignment will be rescinded if the legal requirements are to be regarded as not given at the time of assignment as a result of the court's final decision. This secondary provision may be worded differently on the individual assignment notices.

8. No obligation will be imposed on assignees to offer service providers access, on a non-discriminatory basis, to services.

IV.5. Minimum bid, section 61(5) sentence 2 TKG

1. The minimum bid for a frequency block of 2 x 5 MHz (paired) or of 2 x 4.95 MHz (paired) will be 2,500,000 euros.

2. The minimum bid for a frequency block of 1 x 5 MHz (unpaired) will be 1,250,000 euros.

3. The minimum bid for a frequency block of 1 x 14.2 MHz (unpaired) (2010.5 MHz to 2024.7 MHz) will be 3,550,000 euros.

V. Auction rules

V.1. General provisions

V.1.1. Venue

The auction will be conducted in the physical presence of the bidders at the Agency's Mainz office, Canisiusstraße 21, Mainz.

V.1.2. Eligibility

Eligible to take part in the auction are applicants qualified under subsection IV.1.5 who have provided security for the bidding entitlements in accordance with subsection V.1.3 and whose representatives have been authorised in accordance with subsection V.2.2.

V.1.3. Security

Qualified applicants shall, not later than 14 days before the auction begins, pay a deposit to an account to be specified by the Federal Network Agency. The security can also take the form of an unconditional, continuing, irrevocable, absolute bank guarantee for the amount of the security payable, issued by a domestic financial institution or a financial institution authorised as a customs and tax guarantor.

The security is 1,250,000 euros per lot rating (cf Annex 6). The total is derived from the bidding entitlements in lot ratings (cf subsections V.3.8 and IV.5).

V.1.4. Lots

The spectrum in the band at 800 MHz will be auctioned in five abstract blocks of 2 x 5 MHz (paired) and one concrete block of 2 x 5 MHz (paired).

The spectrum in the band at 1.8 GHz will be auctioned in three abstract blocks of 2 x 5 MHz (paired) and two concrete blocks of 2 x 5 MHz (paired).

The spectrum in the band at 2 GHz will be auctioned in four concrete blocks of 2 x 4.95 MHz (paired), one concrete block of 5 MHz (unpaired) and one concrete block of 14.2 MHz (unpaired).

The spectrum in the band at 2.6 GHz will be auctioned on the one hand in 14 abstract blocks of 2 x 5 MHz (paired) and on the other in 10 blocks of 5 MHz (unpaired).

Details are given in Annex 6.

V.1.5. Restrictions on bidding entitlements

Bidding entitlements for frequency blocks in the band at 800 MHz are a maximum of 2 x 20 MHz (paired) per bidder (spectrum cap). Existing packages in the band at 900 MHz will count towards this (cf subsection IV.3).

The number of bidding entitlements is restricted to a maximum of 8 lot ratings as a result of the spectrum cap in the band at 800 MHz (cf subsection V.3.8). Specifically, the maximum entitlements in this band are as follows:

Potential bidders	**Maximum entitlements in lot ratings in the band 800 MHz**
D network operators	4
E network operators	6
New entrants	8

V.2. Power of attorney and auction tutorial

V.2.1. Power of attorney

Applicants must, by the auction tutorial date at the latest, confer a power of attorney on four to eight persons who will take part in the tutorial and will then be authorised to bid at the auction on behalf of their undertaking. A written declaration of power of attorney must be provided to the Federal Network Agency. During the auction, at least two persons per bidder with power of attorney and authorised through having attended the tutorial must be present in the bidder's room.

V.2.2. Auction tutorial

The persons with a power of attorney must take part in a tutorial before the auction is held. The aim of the tutorial is to give these persons instruction in the practical conduct of the auction, in particular in the electronic bidding proceedings and the special software used.

The tutorial will be held in the Agency's Mainz office. The tutorial date should be close to the auction date.

The authorised agents must provide the Federal Network Agency at the end of the tutorial with a written declaration stating that they have understood the auction rules and the electronic bidding method. They must also undertake to comply with the rules.

Participation in the tutorial and the declaration specified in paragraph 3 are preconditions for participation in the auction. The tutorial will be held once only.

Only the persons who have attended the tutorial are authorised to submit bids for the bidder. On the part of the bidders, only the authorised agents have access to their rooms (cf subsection V.3.2).

V.3. Conduct of the auction

V.3.1. Form of auction

The auction will be held as an open ascending simultaneous multiround auction.

V.3.2. Organisation

The auction will be held on Mondays to Fridays. It will begin at 08:00 hours and finish as a rule at 18:00 hours.

Each bidder will be provided with a room of his own within the building. Each room will be equipped with a computer for making bids, a telephone permitting connections solely to the auctioneer, and a second telephone and a fax permitting connections solely to the decision-makers in the qualified undertaking. For security reasons, no other means of transmitting data to the undertakings is planned.

Any suspension of the auction will be announced by the auctioneer, who will also inform the bidders of the time at which the auction will be resumed.

The auction results will be publicly announced.

V.3.3. Bidders

A bidder is an undertaking that has qualified to take part in the auction. Bidders will be represented by persons with powers of attorney and authorised agents.

V.3.4. Bid submission

In each round, bidders can submit bids simultaneously and independently of one another and, subject to their bidding entitlements, are free to choose which blocks to bid for (cf subsections V.1.5 and IV.1.5).

Bids will be submitted electronically by means of special software.

V.3.5. Valid bids

In the first round the minimum valid bid is the minimum bid for a frequency block. In the subsequent rounds the minimum valid bid is a bid that exceeds the current highest bid for a frequency block by the current minimum bid increment. If no valid bid was made for a frequency block in the previous rounds, the minimum valid bid will count as the minimum bid. If a highest bid in a round is withdrawn (cf subsection V.3.11) and no new valid bid for this block is submitted in that round, the new minimum valid bid will be derived from the amount of the withdrawn highest bid plus the current minimum bid increment.

In each round, the software will provide a list for each frequency block showing the valid bids from which bidders can choose their bid amount (click box bidding).

The following bid amounts from which bidders can choose are listed as follows:

- the minimum valid bid,
- the minimum valid bid plus €10,000
- the minimum valid bid plus €20,000
- the minimum valid bid plus €50,000
- the minimum valid bid plus €100,000
- the minimum valid bid plus €200,000
- the minimum valid bid plus €500,000
- the minimum valid bid plus €1,000,000
- the minimum valid bid plus €2,000,000
- the minimum valid bid plus €5,000,000
- the minimum valid bid plus €10,000,000
- the minimum valid bid plus €20,000,000
- the minimum valid bid plus €50,000,000
- the minimum valid bid plus €100,000,000
- the minimum valid bid plus €200,000,000
- the minimum valid bid plus €500,000,000.

V.3.6. Minimum bid increment

If there is a highest bid for a frequency block at the end of a round, the auctioneer will stipulate a minimum bid increment for it for the subsequent rounds.

The minimum bid increment is a particular (not minus) sum of money by which the highest valid bid in a round must increase as a minimum.

In the first stage, the minimum bid increment is 15% of the designated highest bid. Depending on how the auction proceeds, the minimum bid increment can be lowered step by step by the auctioneer for further stages to 10%, 5% and 2% of the designated highest bid (so-called incremental stages).

Diverging from this, the auctioneer can stipulate a specific amount for individual frequency blocks as the minimum bid increment.

The auctioneer will notify bidders at the start of a round of the level of the particular minimum bid increment, rounded to the next whole multiple of €1,000.

V.3.7. Highest bids

At the end of every round the highest bid for each frequency block will be identified by evaluating the round. The highest bid is the highest active bid for a frequency block at the end of a round. If identical highest valid amounts are bid for a frequency block, the bidder who submitted his bid first will be considered to have the highest bid. The

current highest bid for a frequency block will be designated as such at the beginning of the next round.

V.3.8. Lot ratings

Standardised numerical values are determined for every frequency block depending on its spectral extent (so-called lot ratings).

A frequency block of 1 x 5 MHz (unpaired) is given a lot rating of 1, a block of 2 x 5 MHz (paired) or 2 x 4.95 MHz (paired) is given a lot rating of 2 and the block of 1 x 14.2 MHz (unpaired) has a lot rating of 3.Details are given in Annex 6.

Bidding entitlements are given in lot ratings.

V.3.9. Activity rules

A bidder's activity in a round is the sum of all the bidding entitlements in lot ratings exercised for frequency blocks for which the bidder has submitted an active bid.

An active bid for a block in a round is deemed given when, at the beginning of the round, either the bidder holds the highest bid for the block – and does not withdraw it in the current round as set out in subsection V.3.11 – or submits a valid bid as per subsection V.3.5 for a block in the current round.

A bidder must exercise his bidding entitlements to a certain extent if he is not to lose any (so-called minimum level of activity), unless he makes use of a waiver as provided for in subsection V.3.10.

The auction is divided into four consecutive activity phases:

- Activity phase 1 requires a minimum activity level of 50% of the current bidding entitlement.
- Activity phase 2 requires a minimum activity level of 65% of the current bidding entitlement.
- Activity phase 3 requires a minimum activity level of 80% of the current bidding entitlement.
- Activity phase 4 requires a minimum activity level of 100% of the current bidding entitlement.

The auctioneer will decide when to move on to the next activity phase in accordance with the progress of the auction.

The minimum activity level determines the minimum activity a bidder will engage in. Minimum activity is derived from the product of the number of the bidder's bidding entitlements and the minimum activity level in the particular activity phase, rounded up to the next highest whole number.

A bidder keeps his full bidding entitlement for the next round if he has complied with or surpassed the minimum activity level in the current round.

If a bidder falls below the minimum activity level and does not use a waiver (cf subsection V.3.10), his bidding entitlement will be determined anew for the next round:

- in activity phase 1 by multiplying his activity level (sum of the lot ratings for frequency blocks for which an active bid has been submitted) by 100/50.
- in activity phase 2 by multiplying his activity level (sum of the lot ratings for frequency blocks for which an active bid has been submitted) by 100/65.
- in activity phase 3 by multiplying his activity level (sum of the lot ratings for frequency blocks for which an active bid has been submitted) by 100/80.
- in activity phase 4 by multiplying his activity level (sum of the lot ratings for frequency blocks for which an active bid has been submitted) by 100/100.

A bidder not submitting a new valid bid in a round for any frequency block, not holding a highest bid and not using a waiver (active or passive) as provided for in subsection V.3.10, will be eliminated from the auction.

Notwithstanding this activity rule, a bidder must at any rate exercise his bidding entitlements to match the extent of the minimum essential spectrum package he has specified (cf subsection IV.1.5). If fewer bidding entitlements are exercised than the minimum essential spectrum package agreed, the bidder will lose all his bidding entitlements and will be eliminated from the auction, provided he has not used any waivers (active or passive) as specified in subsection V.3.10.

V.3.10. Waivers

Each bidder will be given five waivers that he can use in five different rounds. Using a waiver means that no bidding entitlements will be lost in the particular round (cf subsection V.3.9).

A distinction is made between active and passive waivers.

Active use of a waiver is made by activating a command to this effect in the software (active waiver).

There are two ways of doing so:

1. A bidder can either sit out a whole round, ie not submit a valid bid and not withdraw a bid in the particular round. In this case he does not lose any bidding entitlements.
2. Or he can submit valid bids and/or withdraw bids and – as long as he remains below the required minimum activity level – can avoid his bidding entitlements being reduced by active use of the waiver.

   If the bidder engages in less than the minimum activity level and exercises bidding entitlements to match his minimum essential spectrum package, he can explicitly do without using a waiver. In this case he will lose bidding entitlements (cf subsection V.3.9).

   This form of active waiver is not available to a bidder with an agreed minimum essential spectrum package if he has not exercised bidding entitlements to match his minimum essential spectrum package.

A passive waiver, by contrast, is automatically effected by the software when the bidder allows time to elapse in a round without submitting a valid bid or withdrawing a bid and he falls below the minimum activity level even with his highest bids (cf subsection V.3.9). A passive waiver has no effect on the termination rule (cf subsection V.3.16).

V.3.11. Withdrawal of highest bids

Every bidder is entitled to withdraw, in part or in full, highest bids he holds in ten rounds of the auction. A bidder can also submit new valid bids in the same round with the entitlements that have been released.

A bidder is not permitted to withdraw a bid if the bid submitted falls below his agreed minimum essential spectrum package in the particular round.

Withdrawal of a bid does not have any effect on the termination rule of the auction (cf subsection V.3.16). If a bidder withdraws one or more bids in the last activity phase and none of the bidders submits a new valid bid or uses an active waiver, the auction will end.

A bidder withdrawing a bid will be bound by his bid to pay if no new valid bid is made for the frequency block in question in the course of the first stage of the auction. In this case the bidder will be obliged to pay a sum equivalent to the bid he has withdrawn.

If the frequency block is awarded in a second stage, the price bid for the block will be deducted from the amount the withdrawing bidder has to pay.

V.3.12. Time of a round, completion of a round, discontinuation of a round and suspension of the auction

At the beginning of the auction, the time for a round in which bids can be submitted is 90 minutes. In the course of the auction, the auctioneer can set a different time before the start of a round, after due consideration of the circumstances.

There will be an automatic reminder ten minutes before the round expires.

A round is completed after the bids from all the bidders have been received by the auctioneer or after expiry of the specified time period for the submission of bids. A round is closed after evaluation by the auctioneer.

The auctioneer may discontinue a round not yet completed if there is a technical defect in the equipment needed for conducting the auction or if other reasons jeopardise proper conduct of the auction. In this case the auction will resume with the result of the previous round.

Each bidder will be given one opportunity to request the auctioneer to suspend the auction. Upon request, it can also be suspended during a round. The request must be declared for record with the auctioneer. The auction will then be continued at 13:00 hours on the next working day.

Bidders will be notified of the reason for and length of any suspension of the auction.

V.3.13. Provision of information to bidders

The auctioneer will give every bidder the following information at the start of a round:

- the current round,
- the current activity phase (cf subsection V.3.9),
- the duration of the round (cf subsection V.3.12),
- the highest bid and the highest bidder for each frequency block (cf subsection V.3.7),
- the minimum valid bid and the minimum bid increment for each frequency block (cf subsections V.3.5 and V.3.6),
- a click box list from which bidders can select the amount of their bid (cf subsection V.3.5),
- the extent of their current bidding entitlements (in lot ratings) and their minimum activity level in the current round (cf subsection V.3.9),
- the number of waivers remaining (cf subsection V.3.10),
- the number of bid withdrawal opportunities remaining (cf subsection V.3.11),
- the names of the bidders eliminated or excluded.

At the close of every round the auctioneer will inform every bidder of the current highest bid for each frequency block and the active bids of all the bidders and their identity by means of special software. This information will also be transmitted electronically to the authorised agents in the bidder's room for further processing, but to no one else.

V.3.14. Exclusion of bidders / collusion

Any bidders working together before or during the auction to influence the course or the result of the auction (colluding) may be excluded from taking part in the entire proceedings. Bidders may also be excluded from taking part as a result of irregular behaviour or as a result of holding up proper conduct of the auction.

An excluded bidder is bound by his bid to pay if a highest bid he held at the time of exclusion is not outbid in the course of the auction by a new valid bid. In this case he has to pay the amount of his highest bid. If the frequency block is awarded in the second section of the auction (cf subsection V.3.18) to another bidder, the bid price for the block will be deducted from the amount to be paid by the excluded bidder. If the price for the particular frequency block in the second stage is higher or the same as his highest bid in the first stage of the auction, the excluded bidder is not obliged to pay.

The frequency block will not be awarded to the excluded bidder.

If collusive or irregular behaviour is established only after the auction has closed, award and/or frequency assignment will be revoked. A highest bidder will remain bound by his bid to pay. He will also have to meet his payment obligation for withdrawing his bids (cf subsection V.3.11). Payments made will not be refunded.

V.3.15. Elimination from the auction

A bidder will be eliminated from the auction if he has no more bidding entitlements (cf subsection V.3.9) or has been excluded (cf subsection V.3.14).

V.3.16. End of the auction (termination rule)

The auction will end if no valid bid has been made in the last (fourth) activity phase for any frequency block and none of the bidders has used an active waiver. The final result of the auction will be announced by the auctioneer.

If, in an earlier activity phase of the auction, no valid bid has been submitted in a round and none of the bidders has used an active waiver and if all the bidding entitlements are bound by highest bids, it is up to the auctioneer to continue the auction by taking it into the next activity phase or to end it directly.

The auction can also end through discontinuation. The auctioneer may discontinue the auction if there is a technical defect in the equipment needed for conducting the auction, if bidders collude, or if other reasons jeopardise the proper conduct of the auction. In this case, the Federal Network Agency will set a date for a new auction.

V.3.17. Award

The bidder holding the highest bid for a frequency block at the end of the auction will be awarded the block. Bidders with an agreed minimum essential spectrum package will be awarded the spectrum only if they have won their minimum essential package at least.

The award price will be equal to the highest bid submitted by the particular bidder.

A frequency block for which

a) there is no valid bid at the end of the auction,

b) no new valid bid was submitted after a bid was withdrawn,

c) award was denied, or

d) there is a bid, but the highest bidder failed to acquire his agreed minimum essential spectrum package,

will not be awarded in the auction.

Award will be made in writing. The award notice will be presented after the auction.

V.3.18. Second stage of the auction

If frequency blocks have not been awarded at the close of the first stage of the auction (cf subsection V.3.17), the President's Chamber will take a decision within two working days on whether, and if so, when these blocks should be auctioned in full or in part in a

second stage. Provided that it is appropriate to do so, the following arrangements will apply as a general rule:

The bidding entitlements will also be restricted in the second stage as a result of the cap on spectrum in the band at 800 MHz. Spectrum won in the first stage will count.

The same minimum bids for the frequency blocks as in the first stage will apply in the second stage.

For the second stage of the auction the same rules will apply as for the first stage, with the following exceptions:

- Only bidders that have been awarded one or more frequency blocks in the first stage will be eligible to take part.
- The maximum number of bidding entitlements in the second stage will be derived from the difference between the number of bidding entitlements established as a result of the application and the entitlements successfully exercised in the first stage. Bidders may also submit bids for frequency blocks for which they withdrew a bid in the first stage.
- Bid withdrawal is not possible.
- A minimum essential spectrum package cannot be requested.

V.4. Auction close

V.4.1. Obligation to pay

The bidder awarded a frequency block at the close of the auction must pay the amount of his highest bid.

A bidder that has withdrawn a current highest bid must likewise pay the amount of this highest bid if no new valid bid is made for the frequency block in question in the course of the first stage of the auction. If the frequency block is awarded in the second stage of the auction, the bid price for the block will be deducted from the amount to be paid by the withdrawing bidder (cf subsection V.3.11).

The award notice will be presented together with the notice of the amount payable, against acknowledgement of receipt. Payment of the award price less any security deposited as a sum of money (cf subsection V.1.3) is payable immediately after presentation of the notice of amount payable, payment being made within five banking days to the account specified by the Federal Network Agency. Compliance with the deadline is determined by the time at which the sum is credited to the account (value date). The debtor will automatically default after the deadline has expired if payment is not made. There does not need to be a reminder. Interest will be charged during the period of default on the award price less any security deposited as a sum of money. The rate of interest for the year will be five percentage points above the base rate as per section 247 of the German Civil Code.

The security will likewise be deducted if there are other payment obligations under the auction rules.

The security will not earn interest. Bidders not awarded a frequency block and having no other payment obligations will be refunded for their security without delay after the close of the entire auction proceedings. The surety bonds will be returned after receipt of payment.

V.4.2. Allotment of the abstract frequency blocks won

The abstract frequency blocks won will be allotted to their highest bidders at the end of the auction with a view to assigning contiguous spectrum. The blocks will be allotted in an open, transparent and non-discriminatory procedure in accordance with the following rules:

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 (separately for paired and unpaired spectrum).
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. The successful bidders in the same frequency band will draw lots for placements, with position 1 for the blocks won being at the lower band edge and the subsequent placements following in ascending order. Lots will be drawn separately for every band in which the frequencies have been acquired without a specific spectral position and separately according to paired and unpaired spectrum.

Grounds

In the bands at 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz there is a total of around 360 MHz available for award.

In the 790 – 862 MHz band there are 60 MHz available for wireless access for the provision of telecommunications services. According to the previous Frequency Band Allocation Ordinance the frequency band had already been allocated to the mobile service (with the exception of the aeronautical mobile service). So far, this frequency band has predominantly been used for military applications, in a sub-band for broadcasting services and also for radio microphones. The Second Ordinance Amending the Frequency Band Allocation Ordinance of 14 July 2009 (Federal Law Gazette I no 41/2009 of 20 July 2009, page 1809ff) identifies this frequency band for wireless broadband coverage, particularly in rural areas. This utilisation corresponds with the federal government's broadband strategy of 18 February 2009, which aims to provide broadband access as quickly as possible to areas not yet served. The supporting spectrum policy is one of the four pillars of the federal government's broadband strategy.

The Federal Ministry of Defence declared itself willing to relocate existing military applications out of the frequency band by the end of 2009. This means that the frequency bands 790 – 814 MHz und 838 – 862 MHz, previously used by the military, are available for civil use from 1 January 2010. Use of the 814 MHz – 838 MHz sub-band (channels 64, 65 and 66) for broadcasting was limited from the start to the switchover from analogue to digital television, as per the Frequency Band Allocation Ordinance. A secondary usage condition to this effect (secondary usage condition 22) was included in the Ordinance in May 2001. This switchover is almost complete. At present, fewer than ten broadcasting transmitters are operating in this frequency band. The intention is to relocate the existing broadcasting services to other frequency bands as soon as possible. The Bundesnetzagentur is carrying out the measures required for this in consultation with the relevant state authorities and the frequency assignees, in order to further ensure the broadcasting coverage requirements established by the federal states.

The relocation measures in this frequency band can essentially be completed by mid-2010. Continued exercising of an existing spectrum usage right past this point in time will only be permitted on an individual basis if the further exercising of the right is deemed temporarily necessary following appraisal of the circumstances of the particular case, and in no way obstructs the use of the 790 – 862 MHz frequency band for wireless access for the provision of telecommunications services. No new frequencies for broadcasting will be assigned in this band.

In the 1.8 GHz band, 3 further blocks of 2 x 5 MHz (paired) are available, since the military administration has stopped further use in the 1710 – 1725 MHz and 1805 –1820 MHz bands. There is therefore a total of 5 blocks, each comprising 2 x 5 MHz (paired), available for award in this band.

With the exception of the frequencies from 1710 – 1725 MHz and 1805 – 1820 MHz, the frequencies in the 1.8 GHz band are indirectly the subject of litigation. With the implementation of action plan I of the first GSM strategy (Order 88/2005, Bundesnetzagentur Official Gazette 23/2005, page 1852ff) these frequencies have been cleared by the E network operators in return for assignment of frequencies in the E-GSM band (cf Communication 78/2006, Bundesnetzagentur Official Gazette 4/2006, page 702). Legal action was filed against this frequency relocation, and dismissed by the Cologne Administrative Court in the first instance. For one sole action, filed at a later date, the court's judgment is as yet unknown. However, a final and absolute decision is also still pending for some of the other cases. Appeals by two companies to the Higher Administrative Court of North Rhine-Westphalia were unsuccessful, with one appeal being dismissed as inadmissible and the other due to the action being unfounded. Leave to appeal to the highest court was refused in both cases. One company has however filed an appeal against denial of leave to appeal, which the Federal Administrative Court in Leipzig must now decide upon. In

the case of the second company, it also cannot be ruled out that such an appeal will be filed, as the deadline for this has not yet passed.

Due to the legal uncertainties expected, the E network operators have only waived usage rights to the cleared spectrum in the 1.8 GHz band on the condition that frequency assignment from the E-GSM band will remain unaffected upon completion of the administrative court proceedings. Should the legal action against the frequency relocation prove successful, contrary to the expectations of the Bundesnetzagentur, the waiver would become void and the frequencies in the 1.8 GHz would no longer be available.

In the 2 GHz frequency band, there is a total of around 2 x 20 MHz (paired) and 4 blocks of around 5 MHz each (unpaired) available. Due to the return of the spectrum previously assigned to Mobilcom Multimedia GmbH during the auction in 2000, 2 x 10 MHz (paired) and 1 x 5 MHz (unpaired) are available without restrictions for renewed award. The frequencies originally assigned to Quam GmbH, consisting of another 2 x 10 MHz (paired) and 1 x 5 MHz (unpaired) have been revoked by the Bundesnetzagentur; legal action was filed against the revocation, and dismissed in the first instance by the Cologne Administrative Court with its judgment of 25 April 2007. However, this judgment is also not yet final and absolute. The appeal submitted by the complainant was nevertheless unsuccessful. The Higher Administrative Court of North Rhine-Westphalia also confirmed the judgment given by the court of first instance in this case. Leave to appeal to the highest court was not granted here either; however an appeal has been filed against this. In the event of the appeal not being granted by the Higher Administrative Court of North Rhine-Westphalia, the Federal Administrative Court shall have to decide. Based on the situation as it stands, it must therefore be assumed that these frequencies will be the subject of litigation at the time of decision.

The 2.6 GHz band comprises a total of 190 MHz of spectrum. This band, which was also allocated to the fixed service until 31 December 2007 in the National Table of Frequency Allocations, has from 1 January 2008 been allocated exclusively to the mobile service, this being the primary service as defined in section 3(3) of the Frequency Band Allocation Ordinance. A large part of this spectrum is currently not in usage and therefore available. However, attention should be drawn to the fact that regionally up to 56 MHz were assigned for fixed service applications until 31 December 2007. The Bundesnetzagentur rejected the requested extension of this frequency assignment, but the assignee has appealed against this rejection. In a hearing on 2 March 2007 as part of the summary proceedings, a settlement in court was made on the suggestion of the court itself. The settlement states that the complainant can continue to exercise spectrum usage rights in the 2.6 GHz band after 31 December 2007, until the principal proceedings are concluded, at the most however until usage is taken over by another assignee. On the basis of the oral proceedings of 15 June 2007, the Cologne Administrative Court found that the Bundesnetzagentur is obligated to extend the current frequency assignments for fixed service usage in the 2.6 GHz band from 1 January 2008 to 31 December 2016. In appellate proceedings, the Higher Administrative Court of North Rhine-Westphalia overturned the decision by the Cologne Administrative Court on 30 October 2008 and dismissed the case, amending the judgment of the court of first instance. Leave to appeal to the highest court was not granted. Regarding the subsequent appeal against denial of leave to appeal, the Federal Administrative Court decided to overturn the judgment of the Higher Administrative Court and to hand the case back down to this court for a renewed hearing and judgment.

Furthermore, legal action has also been taken against the decisions as issued by Orders 34/2007 and 34/2008 published in the Official Gazette (decisions of the President's Chamber on the order for auction proceedings and on the determinations and rules for the award proceedings: BK 1-07/003), to the extent that the subject matter of the decision was the frequencies which had previously been assigned for usage in the fixed service. The action was dismissed by the Cologne Administrative Court in its ruling of 3 December 2008 on the grounds of being inadmissible. The Federal Administrative Court has since granted

the appeal, however, and referred the case back to the Cologne Administrative Court as it considers that the inadmissibility ruling issued by this court was legally incorrect.

It is therefore not foreseeable at present when the court judgments relating to the aforementioned lawsuits will be issued or declared final and absolute. Where some parties advised awaiting the outcome of the court proceedings, the Chamber stresses that only a final and absolute decision, concluding the court proceedings, can create legal and investment certainty. However, waiting for final decisions for each proceeding could delay the award and therefore the possibility of usage of the frequencies for years.

This decision specifies the individual blocks that are the subject of litigation, also taking into account the questions arising in connection with the award of spectrum for a specific or a non-specified spectral position (cf Rationale, Re II.2 and V.1.4 in this decision). For reasons of transparency, and with a view to facilitating a bidder's subjective assessment of the value of the individual frequency bands, the Chamber has also shown in a table which frequencies are the subject of litigation, as respondents requested.

The Chamber decided on 19 June 2007 that assignment of frequencies for digital cellular mobile radio in the 1.8 GHz, 2 GHz and 2.6 GHz bands was to be preceded by award proceedings as set out in section 61 of the TKG. Moreover, it decided that the proceedings referred to in section 61(1) of the TKG would take place as an auction, as per section 61(4) and (5) of the TKG. The decision of the President's Chamber of 7 April 2008 slightly amended the above decision by stipulating that the frequencies for wireless access for the provision of telecommunications services will be made available in line with the dedications in the Frequency Usage Plan.

Following these decisions the Chamber was to set which determinations and rules within the meaning of sections 61(4) sentence 2 paras 1 to 4 and 61(5) of the TKG would underpin the auction of frequencies in the 1.8 GHz, 2 GHz and 2.6 GHz bands for wireless access for the provision of telecommunications services (award conditions) in order to reach a further partial decision on the conduct of the auction as early as possible. The decisions as per section 61(4) sentence 2 paras 2 and 4 of the TKG were taken in consultation with the Advisory Council of the Bundesnetzagentur, in line with section 132(1) and (3) in conjunction with section 120(2) of the TKG. Consultation with the Advisory Council took place at the Council's 61st meeting on 7 April 2008.

Before the President's Chamber decided on the rules for conduct of the auction (auction rules) as per section 61(5) of the TKG, it first awaited the pending decision of the Higher Administrative Court of North Rhine-Westphalia, which was issued on 30 October 2008, in view of the fact that the frequencies are the subject of litigation, particularly those in the 2.6 GHz band.

In parallel to this, discussions started in 2008 regarding the usage of the so-called digital dividend (790 - 862 MHz) began to reveal that further frequencies can be made available for wireless access. Following the intended dedication of the spectrum in the band 790 – 862 MHz also for wireless access for the provision of telecommunications services, this spectrum will be included in the proceedings to award spectrum in the bands 1.8 GHz, 2 GHz and 2.6 GHz in the interests of prompt, non-bureaucratic procedures, in line with the aims of the federal government's broadband strategy. In light of the award proceedings started, by including frequencies from the 790 – 862 MHz band in particular, the Bundesnetzagentur contributes to full coverage of high-speed Internet access.

In preparation for this inclusion, the Bundesnetzagentur developed key elements for awarding spectrum in the 790 – 862 MHz band for wireless access for the provision of telecommunications services. In order to structure the debate at an early stage and provide all parties with concrete suggestions, the key elements were published in the Official Gazette (Communication 209/2009, Bundesnetzagentur Official Gazette 6/2009, page 985) and on the Bundesnetzagentur's website.

In addition, further frequencies from the 1710 – 1725 MHz / 1805 – 1820 MHz bands (former military use) are now available for wireless access for the provision of telecommunications services.

These decisions constitute a slight amendment to the decisions issued by the President's Chamber on 19 June 2007 regarding the order for and choice of award proceedings and on the determinations and rules for awarding spectrum in the 1.8 GHz, 2 GHz and 2.6 GHz bands for wireless access for the provision of telecommunications services (Order 34/2007, Bundesnetzagentur Official Gazette 14/2007), as published on 7 April 2008, – BK 1-07/003 – (Order 34/2008, Bundesnetzagentur Official Gazette 7/2008, page 582ff); they were taken with the involvement of the federal states as required in usage condition 36 of the Ordinance Amending the National Table of Frequency Allocations after hearing the parties concerned and in consultation with the Advisory Council, and are issued together with the auction rules.

The President's Chamber of the Bundesnetzagentur had opened a consultation on the draft decision to combine proceedings to award spectrum in the bands 790 – 862 MHz, 1710 – 1725 MHz and 1805 – 1820 MHz with proceedings to award spectrum in the bands 1.8 GHz, 2 GHz and 2.6 GHz for wireless access for the provision of telecommunications services (cf Order 34/2008, loc cit) (auction rules, Communication 319/2009, Bundesnetzagentur Official Gazette 10/2009 of 3 June 2009). In a further step the President's Chamber also opened a consultation on the determinations and rules for conduct of the proceedings to award spectrum for wireless access for the provision of telecommunications services in the bands 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz in accordance with sections 55(9), 61 subsections (1), (2), (4) and (5) of the TKG (auction rules) (Communication 390/2009, Bundesnetzagentur Official Gazette 14/2009 of 29 July 2009).

After studying the responses to the above drafts, the President's Chamber hereby issues decisions on the following

I. combining proceedings to award spectrum in the bands 790 – 862 MHz, 1710 – 1725 MHz and 1805 – 1820 MHz with proceedings to award spectrum in the bands 1.8 GHz, 2 GHz and 2.6 GHz for wireless access for the provision of telecommunications services,

II. ordering award proceedings under section 55(9) in conjunction with section 61 of the TKG,

III. the choice of an auction in accordance with section 61(1) of the TKG,

IV. the award conditions in accordance with section 61(4) of the TKG and

V. the auction rules in accordance with section 61(5) of the TKG.

With regard to the further details of the consultation and the interest expressed, the President's Chamber makes reference to the contents of the statements published on the website of the Bundesnetzagentur.

The decisions are based on the following considerations:

Re I. Combined proceedings

The following comments were made:

Some respondents agree overall with the draft for consultation or expressly support the combining of proceedings as set out in subsection I. By including frequencies from the "digital dividend" in the already advanced preparations for the award of frequencies in higher ranges, the spectrum will be available quickly and therefore the availability of the spectrum required for mobile broadband networks accelerated. In this way, the short-term objective of nationwide coverage of high-speed broadband connections is achieved, along with the long-term aim of establishing high-speed networks throughout Germany in line with the broadband strategy.

Bringing proceedings together prevents an artificial scarcity which would otherwise arise, and affords potential bidders a greater level of flexibility to acquire the usage rights required for their business plans.

The mobile network operators in particular required new (2.6 GHz) and existing (1800 MHz, 2 GHz) bands at the high end of the spectrum for additional capacities, along with new (800 MHz) and existing (900 MHz) bands at the lower end of the spectrum to cover their broadband networks in rural areas and in buildings. All frequency bands suitable for mobile broadband, eg 800 MHz, 900 MHz, 1800 MHz, 2 GHz and 2.6 GHz, are therefore to be made available simultaneously. However, release of the 900 MHz and 1800 MHz frequencies for UMTS (HSPA+), as well as for other technologies which according to CEPT studies could coexist with the technologies already approved in the frequency bands, should occur as soon as possible and before release of the 2.6 GHz and 800 MHz bands.

It was also noted, however, that the combining of the proceedings requires review. It was important not to neglect careful consideration of the aspects for and against joint award, despite the time pressure associated with the coverage of rural areas. There is a risk of undesirable developments if the existing plans are realised without any amendments.

The combined proceedings, linked to the preparations made thus far for the award of the UMTS extension bands, were dominated by UMTS, for which additional frequencies were to be made available and which was establishing a frequency reserve for the requirements of next generation mobile services. The proceedings were based on a sense of confidence in the market and auction methods, even in areas where regulatory determinations are necessary, because the provision of broadband access to rural areas sets specific requirements for the award proceedings. Thus earlier award of the 800 MHz spectrum is suggested, where auction proceedings would not necessarily need to be applied.

Furthermore, it was noted that the planned combination with award proceedings for frequencies in the 1.8 GHz, 2 GHz and 2.6 GHz bands would lead to considerable legal uncertainties for all market participants. It had so far been the Bundesnetzagentur's administrative practice to carry out separate award processes for individual contiguous frequency bands. The reference to the "consistency requirement" was therefore not understandable in this context.

It was impossible to comprehend why such a valuable spectrum such as the 800 MHz band should be combined with an award order that is the subject of litigation. This exposed the award of the spectrum to unnecessary risk, as it was not clear to what extent the 800 MHz band would also be affected by any repeals. Moreover, it remained unclear whether the intended decision is to replace the award decision already issued by the President's Chamber for the 1.8 GHz, 2 GHz und 2.6 GHz bands. As the previous decisions have legal effect, a repeal or a modification to the relevant statutory procedure would need to be made in accordance with the Administrative Procedures Act, which is not intended and would increase legal uncertainty further.

It was also unclear to what extent advantages would be created through the combination. As different conditions are to apply to the 800 MHz band than to the other frequency bands, no combination advantages are apparent.

Combining award proceedings for the 800 MHz band with the frequency award proceedings also impeded competition, as small and medium-sized businesses operating regionally would be virtually excluded from the award by the determination of the Federal Republic of Germany as the relevant geographical market. This was clear discrimination against smaller, more regional providers.

Furthermore, attention was drawn to the necessity of clarifying first whether compatibility with the broadcasting services can be ensured. Combining proceedings could therefore lead to either the delay of the overall award in order to clarify individual questions regarding the 800 MHz band, or – and this is more probable – the frequencies would be awarded without interference issues having first been solved.

In order to be able to apply a use to the other frequency bands involved in the proceedings in a timely manner, it has been suggested not to combine the award proceedings for the 800 MHz band with those for other bands and to postpone the assignment of frequencies 790 – 862 MHz.

The Chamber has ruled as follows:

The President's Chamber will offer the entire available spectrum for wireless access for the provision of telecommunications services in the 800 MHz, 1.8 GHz, 2 GHz und 2.6 GHz frequency bands for award.

The potential of the "digital dividend" should be used swiftly, particularly to support the provision of the population with broadband Internet access, especially in rural areas. With the inclusion in the already well-advanced preparations for the award of higher frequencies, there is a particular opportunity for the rapid award of the 800 MHz frequencies. Where respondents remarked that the combining of proceedings should not take place under the sort of time pressure associated with the coverage of rural areas, to avoid the risk of undesirable developments, attention is drawn to the following:

The rapid award of the frequencies particularly suited to the coverage of rural areas through the combining of proceedings requires that an impact assessment and appraisal of conflicting interests be carried out. For the purpose of assessing the possible effects of such a combination, the Chamber drafted key elements in the run-up to the decision, in order to structure the discussion on including these frequencies early on and to give all parties involved the opportunity to submit their views on the matter. Scientific market analyses and studies were also commissioned in preparation for this decision by the Chamber (these are published on the Bundesnetzagentur's website; www.bundesnetzagentur.de).

The inclusion of the 800 MHz frequencies (and the other available frequencies in the 1.8 GHz band) follows the regulatory approach of avoiding regulation-induced frequency scarcity. Attention was already drawn to this in Administrative Order 33/2005 of 4 May 2005 (Regulatory Authority for Telecommunications and Post 8/2005, page 782ff). There, the following statements were made in this respect:

> *"(….) the Regulatory Authority pursues the idea of, as far as possible, preventing frequency scarcity induced by regulation and resulting from partial awards.*
>
> *As a foundation for a UMTS mobile service frequency award concept to be developed, the Regulatory Authority has drafted the following key elements. The subject of the key elements is the need-oriented joint provision at the earliest possible stage of frequencies for UMTS/IMT 2000 from the frequency bands of the so-called UMTS core band and the UMTS extension band."*

The GSM concept also follows these considerations. The following was communicated in the GSM concept (Order 88/2005, Bundesnetzagentur Official Gazette 23/2005, page 1852ff):

> *"In addition to frequency engineering and regulatory issues, competitive aspects, which can assume particular significance in the award of frequencies, must also be taken into consideration. For example, amongst other things, the amount of spectrum made available or potentially available for use determines whether frequencies are available in sufficient numbers (sections 55(9), 61 of the TKG) and, as a result, the type of award proceedings, as well as ultimately the costs of obtaining spectrum resources. On the other hand, radio applications (such as GSM and UMTS/IMT-2000 mobile communications) can only compete successfully if they are provided with sufficient spectrum and optimal technical conditions. As a result, both pending partial concepts, such as those for GSM and UMTS, and the future overall concept of "radio-based access technologies" will need to be developed with the objective of avoiding scarcity situations as far as possible while enabling fast, transparent and non-bureaucratic frequency award proceedings.*

The plan is to update the GSM strategy, following execution of the action plan described, with a view to facilitating the combination with other strategies such as the UMTS concept, in order to ultimately achieve extensive merging of radio markets and their regulatory framework."

Offering all the spectrum available, including the 800 MHz band, at the same time is therefore in line with the Chamber's existing practice of awarding, as far as possible, all available frequencies in one proceeding (consistency requirement).

To those claiming that the Bundesnetzagentur's administrative practice has been to carry out separate award proceedings for individual contiguous frequency bands, it is pointed out that no such administrative practice exists. The award proceedings carried out in the past did indeed relate to one particular frequency band. However, this only reflected the availability of spectrum at the respective time and does not contradict the practice of awarding all available frequencies in one proceeding. At the award of the UMTS/IMT-2000 frequencies in 2000, attention was drawn to the fact that further frequencies in the 2.6 GHz band would be made available as quickly as possible, as soon as the legal planning conditions had been fulfilled. Had these frequencies in the 2.6 GHz band already been available in 2000, they would also have been offered for award together with frequencies from the 2 GHz band. This is also demonstrated by the fact that those frequencies in the 2.6 GHz band were already referred to as UMTS extension spectrum in 2000. Likewise, the award proceedings for frequencies for wireless access demonstrate the administrative practice of making all frequencies used for the same purpose available, as far as this is possible. In this way, right at the beginning of the proceedings, the decision of the President's Chamber of 19 June 2007 (cf. Order 34/2009, Bundesnetzagentur Official Gazette No 14/2009, page 3115ff) issued an order that at this time all frequencies available for digital cellular mobile radio (1.8 GHz, 2 GHz and 2.6 GHz) were to be auctioned.

Through joint award of the 800 MHz frequencies, the other 1.8 GHz frequencies and the remaining frequencies in the 1.8 GHz, 2 GHz and 2.6 GHz bands could particularly help avoid any artificial frequency scarcities which could potentially arise with an isolated award of the spectrum. That is why conceptual considerations need to be made when awarding frequencies, in order to be able to award, if possible, all available frequencies in one proceeding.

For this reason, in addition to frequency engineering and regulatory aspects, the Bundesnetzagentur considers competitive aspects in its concepts, which can be of particular importance during frequency award. For example, amongst other things, the amount of spectrum made available for use determines whether frequencies are available in sufficient numbers and therefore the type of award proceedings, as well as ultimately the costs of frequency assignment. On the other hand, business models with radio applications (such as GSM and UMTS/IMT-2000 mobile communications) can only be compete successfully if they are provided with sufficient spectrum and optimal technical conditions. As a result, overall concepts need to be developed with the objective of avoiding regulation-induced scarcity situations as far as possible while enabling fast, transparent and non-bureaucratic proceedings.

If the advantages of combining proceedings are questioned, on the grounds that different conditions are to apply to the 800 MHz band than to the other bands, it can be countered that it is precisely not about the interchangeability of the 800 MHz frequencies with the other frequencies for award, as claimed by one respondent. Rather, joint award of all the spectrum available in different bands allows bidders to buy an optimal spectrum package tailored to their respective business models. With this inclusion of the 800 MHz frequencies, bidders are able to obtain both frequencies for rural area coverage as well as capacity supply in one proceeding.

When including other frequencies, the Chamber took into consideration that a joint auction of all available frequencies would reduce bidding competition and make access to the spectrum easier, as bidders could fall back on other (more cost-effective) frequencies.

Although some respondents do not yet consider interference-free use to be sufficiently secured and therefore call for award of the 800 MHz frequencies to be postponed, it should be noted that the Bundesnetzagentur has a legal obligation to secure interference-free use of frequencies within the framework of frequency assignment (cf section 55(5) sentence 1 paras 3 and 4 of the TKG). Following the award proceedings, the frequencies are assigned by the Bundesnetzagentur to those network operators whose bid has been successful. This requires compatibility with other frequency usages, and the applicant must ensure interference-free frequency use. The technical parameters currently applicable for securing interference-free and efficient frequency use are also set out under subsection IV.4.2. of this decision, as well as in Annexes 2 and 3. Furthermore, the inclusion of the 800 MHz frequencies in the award proceedings for the 1.8 GHz, 2 GHz and 2.6 GHz bands is supported by both the fact that the frequencies in the 800 MHz band are available, as well as the execution of efficient and swift proceedings in line with the federal government's broadband strategy. In this way, all available frequencies can be offered for award as quickly as possible.

Where respondents have stated that the combining of proceedings and the choice of proceedings are oriented towards the UMTS mobile communications proceedings and are therefore not suitable for providing rural areas with broadband access, the Chamber points out that the TKG does not provide for any special proceedings for UMTS. The proceedings follow the statutory requirements of section 61 of the TKG. Under this section, the President's Chamber must make determinations in each individual case in line with the regulations of section 61(4) sentence 2 paras 1 to 4 of the TKG and the regulatory aims, unless the proceedings are unlikely to secure the regulatory aims. This may be the case if there is a legally justified preference for frequencies – such as the frequencies for broadcasting services. The frequencies in the 800 MHz, 1.8 GHz and 2.6 GHz bands are all dedicated to wireless access and are therefore available for nationwide use by wireless access applications. When combining proceedings, the Chamber took into consideration that all available frequencies are allocated to the mobile radio service as per the Frequency Band Allocation Ordinance. The Chamber took into account the specifications for the 800 MHz frequencies set out in the Frequency Band Allocation Ordinance by imposing a specific condition for providing the population with mobile broadband Internet access in rural areas.

The Chamber does not share the view expressed by some respondents that the determination of the Federal Republic of Germany as the relevant geographic market acts as an obstacle to competition as small and medium-sized businesses operating regionally would be virtually shut out of the award proceedings; this argument does not preclude the combining of proceedings either. Both the frequencies in the 800 MHz band and the frequencies in the 1.8 GHz, 2 GHz and 2.6 GHz bands are available nationwide and will be offered nationwide. The Chamber is of the opinion that nationwide frequency assignment is better suited for the implementation of the requirements of the federal government's broadband strategy to enable nationwide broadband access (cf Rationale, re subsection IV.2.2 for details). In this context, the Chamber draws attention to the fact that the realisation of regional business models is possible by obtaining regional spectrum usage rights from the holder of the nationwide assignment, for example. Companies interested in regional frequency use are therefore not prevented from receiving relevant spectrum through spectrum leasing from the holder of a nationwide assignment.

Where a respondent has spoken out against combining proceedings, citing that this exposes spectrum award to unnecessary risk as it is impossible to predict to what extent the 800 MHz band would also be affected by any repeals of the Chamber's decision on frequency award, it can be pointed out that any repeals would be restricted to those frequencies currently the subject of litigation (section 113(1) sentence 1 of the Rules of the Administrative Courts). Moreover, the Chamber draws attention to the fact that the TKG requires available frequencies are to be provided. Any litigation relating to the frequencies does not prevent their availability.

After the proceedings (Ref. BK 1-07/003 and BK 1a-09/002) have been combined into one proceeding, the reference number is BK 1a-09/002.

Re II. Order of award proceedings

The following comments were made:

Re II.1 Timing:

There have been calls for the compatibility problems to be solved before award starts. There have also been requests for a decision to be made regarding the flexibilisation of usage rights before awarding is commenced.

Re II.1.a Allocation of the 790 – 862 MHz frequency band

Attention is drawn to the fact that the 800 MHz band is allocated to both the fixed service as well as the mobile radio service in the draft Frequency Band Allocation Ordinance. In this respect the statements by the Bundesnetzagentur are missing the essential service neutrality.

There is alleged different treatment of assignees in this band from the GSM network operators and calls for an extension of the time of use, as in the GSM sector.

Re II.1.b Dedication of frequency bands for wireless network access:

It is noted that at least part of the spectrum is to be "made available solely for establishing broadband Internet access". It is also stated that the terms "mobile radio service" and "mobile radio applications" have been kept too vague. The lack of specification in the terminology is also mentioned.

It has been stated that the exclusion of the fixed service represents a restriction in the 2.6 GHz band and that the statutory definition of mobile radio service cannot be changed with an alternative definition from the Bundesnetzagentur.

Re II.2 Availability / Usability

Several respondents stated that mobile service use in the 790 – 862 MHz frequency band would significantly impair broadcasting reception. Moreover, the guard band of 790 – 792 MHz is viewed as too small, with some respondents calling for a guard band of 10 MHz, taken from mobile service use.

It is noted that the spectrum in the 814 – 838 MHz band has been assigned for DVB-T switchover until 2024/2025. Before frequencies are awarded for telecommunications services, adequate alternative frequencies must be provided for broadcasting.

The reallocation of the 814 – 838 MHz band will likely cause the provision and use of DVB-T2 to be delayed.

It has been said that so far no equivalent alternative spectrum for radio microphones has been firmly designated in a sufficient quantity by the Bundesnetzagentur. The frequency bands indicated above 1 GHz (the so-called L band) could only be used for in-ear monitoring and microphone paths with a line-of-sight link. Moreover, no devices had been developed for the 1785 – 1800 MHz band thus far.

Wireless means of production require generally assigned spectrum in the UHF band free from interference. Shared use of the 470 MHz – 790 MHz band would not cover frequency requirements. Respondents fear a conflict of resources if radio microphones are relocated, due to the primary DVB use. It has been said that the wireless microphones would bring active DVB-T antennae into the range of saturation. Individual frequency assignment has been suggested for use of the 470 – 790 MHz spectrum for PMSE (Program Making and Special Events). Moreover, the proposed centre gap from 822 – 832 MHz would only allow 5 – 7 MHz for the use of wireless microphones. Attention is also drawn to the fact that as yet no acceptable solution exists for frequency use with wireless microphones outdoors.

Re II.3 Scarcity:

The order of the award proceedings and the combining of proceedings for all frequencies available for wireless access was welcomed in part. Radio frequencies represented a limited public commodity. The mobile operators required new (2.6 GHz) and existing (1800 MHz, 2 GHz) bands at the high end of the spectrum for additional capacities, along with new (800 MHz) and existing (900 MHz) bands at the lower end of the spectrum to cover their broadband networks in rural areas and in buildings.

There are requests for more specific information on the litigation as regards scarcity, and for the frequencies subject to litigation to be mentioned explicitly in the interests of clarity and transparency.

It was said that the Bundesnetzagentur's decision to order award proceedings based on a forecast decision was efficient and appropriate. In order to achieve the broadband objectives, it was important that the frequency resources to be awarded be provided to the market swiftly. Procedural steps that were not necessary and which could therefore cause time delays were to be avoided. An example of such a procedural step would be an application phase prior to the proceedings to determine actual frequency scarcity, which would only serve to confirm the Bundesnetzagentur's current forecast with actual applications, yet at the cost of a further delay to provision.

Other respondents commented that a lack of spectrum has not been clearly established for all relevant frequency bands. The existing "forecast decision" for the 2.6 GHz, 2 GHz and 1800 MHz bands was based even in 2007 on outdated consultations from 2005, at which point the Bundesnetzagentur could also not determine any scarcity. A more up-to-date, formal and transparent establishment of requirements was necessary, while the reference to a single study was insufficient. It was suggested that the following wording should be deleted: *"With the increasing requirement for higher data rates... the available spectrum is exceeded considerably."*

It was pointed out that there is currently no scarcity of frequencies for other mobile telecommunications services eg voice, or where scarcity does exist for these applications it is nowhere near as extensive as it is for the provision of high-bandwidth Internet connection.

Contrary to the assumption made by the Bundesnetzagentur that the spectrum in the 800 MHz band would be of great interest, particularly for potential new entrants, entry of a fifth mobile service provider to the German market was considered extremely unlikely.

It was true, the respondents said, that new technologies require more spectrum than previous ones, as broadband Internet pilot projects thus far have shown how quickly the bandwidth requirement increases. However, the award proceedings should be preceded by a differentiated market analysis. This must take into account the fundamental difference between the provision of a basic service in areas that have not been sufficiently catered for thus far, and the introduction of the next generation of broadband mobile access.

It was pointed out that regulation is at least a contributing factor to frequency scarcity, as the Bundesnetzagentur did not provide free spectrum to the market in recent years.

The Chamber has ruled as follows:

In the decisions of 19 June 2007 as published on 7 April 2008, the Chamber ordered that the assignment of frequencies from the 1.8 GHz, 2 GHz and 2.6 GHz bands was to be preceded by award proceedings (for details see Order 34/2007 re point I, Bundesnetzagentur Official Gazette 14/2007).

The decision to order award proceedings is upheld irrespective of the inclusion of other frequencies from the 800 MHz and 1.8 GHz bands. Frequencies are not available in sufficient numbers for assignment for wireless access for the provision of telecommunications services in the 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz bands.

Under section 55(9) sentence 1, 1st alternative of the TKG, the assignment of frequencies for wireless access in the 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz bands is to be preceded by award proceedings as per section 61 of the TKG.

According to section 55(9) sentence 1 of the TKG, it may be ordered, without any prejudice to section 55(5) of the TKG, that assignment of frequencies be preceded by award proceedings based on conditions according to section 61 of the TKG as determined by the Bundesnetzagentur. Award proceedings may be ordered where frequencies are not available for assignment in sufficient numbers or where more than one application has been made for particular frequencies. This order as per section 55(9) of the TKG is at the discretion of the Bundesnetzagentur.

The Chamber has reached the conclusion that there is an insufficient quantity of frequencies available for assignment for wireless access for the provision of telecommunications services in the 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz bands, (section 55(9) sentence 1, 1st alternative of the TKG). This determination is based on a forecast decision by the Bundesnetzagentur. The Telecommunications Act provides in section 55(9) for this possibility of determining scarcity by the Bundesnetzagentur. As stated in the section-by-section analysis of the Act, this is the case if the Bundesnetzagentur reaches the conclusion that there is an insufficient quantity of frequencies for assignment (cf official analysis of section 53(9) of the government draft, Bundesrat Printed Paper 755/03, page 109). When fulfilling tasks related to spectrum management and in particular determining scarcity in accordance with section 55(9) of the TKG, the Bundesnetzagentur has considerable scope for interpretation, as planning and implementing decisions regarding spectrum management requires assessment and weighting in order to balance out conflicting interests on the one hand and weigh up regulatory aims on the other. In this context the Bundesnetzagentur must work on assumptions that not only reflect current knowledge and experience, but are also comprehensible and take into account the regulatory aims.

1) Timing of order

This decision orders that all available frequencies from the 800 MHz, 1.8 GHz, 2 GHz, and 2.6 GHz bands will be offered for award simultaneously.

The requirement for assignment of these frequencies as stated in section 55(5) sentence 1 para 1 of the TKG, in other words the dedication of the frequencies for the intended use in the Frequency Usage Plan, has been met.

This was preceded by a number of necessary activities:

a) Allocation of the 790 – 862 MHz frequency band in the National Table of Frequency Allocations

The 790 – 862 MHz band had already been allocated to the mobile service (with the exception of the aeronautical mobile service) on a primary basis in the previous National Table of Frequency Allocations. The World Radiocommunication Conference of the ITU (International Telecommunication Union) in 2007 decided to identify this band for IMT (International Mobile Telecommunications) (cf footnote 5.317A of the Radio Regulations) in order to meet the mobile service demand for spectrum. These decisions are also mentioned in the European Council's conclusions on optimal exploitation of the digital dividend in Europe. The European Commission supports relevant harmonisation activities.

The WRC decision was implemented on a national level with the Second Ordinance Amending the Frequency Band Allocation Ordinance (Second Amending Ordinance, Federal Law Gazette I No. 41 of 20 July 2009, page 1809), adding usage condition D317A to the existing allocation of the frequency band to the mobile service (with the exception of aeronautical mobile service) on a primary basis. This creates the possibility of reallocating spectrum previously used for the broadcasting service to the mobile service (in particular broadband Internet access), as a result of technological advance and the associated digital dividend (spectrum usage options resulting from the switch from analogue to digital terrestrial television). Due to the good propagation properties of radio waves in this band, this could particularly benefit the supply of sparsely populated areas with innovative mobile applications and the provision of broadband Internet connections. The Second Amending Ordinance provides for the following in usage condition 36:

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

The allocation of the 800 MHz band for the mobile service with the relevant usage conditions meets the political requirements for closing gaps in coverage in rural areas. This also corresponds to the federal government's aims in their broadband strategy.

As regards the additional frequency bands in the 1.8 GHz band (1710 – 1725 MHz / 1805 – 1820 MHz), the most important requirements (frequency allocation for the mobile service within 1710 – 1930 MHz on a primary basis) have already been met in the National Table of Frequency Allocations.

To those requesting clarification regarding whether the 800 MHz band is allocated to both the fixed service and the mobile service in a service-neutral way in the draft of the Frequency Band Allocation Ordinance, the Chamber points out that allocation to the mobile service does not exclude any fixed service applications, as it is above all significant for international frequency coordination and the resulting frequency usage parameters. Allocation to the mobile service permits both mobile applications along with fixed service and nomadic applications, as long as the frequency usage parameters are observed.

In this context, where companies have called for an extension of the time of use as in the case of GSM, the Chamber points out that the administrative practice of the Bundesnetzagentur in cases of time extension is consistent and non-discriminatory (for details see President's Chamber decision on flexibilisation of frequency usage rights for wireless access for providing telecommunications services, BK 1a-09/001, reasons for action 3, in the Bundesnetzagentur's Official Gazette of the same day).

b) Dedication of frequency bands for wireless network access

The necessary dedication for wireless access was already provided for in the Frequency Usage Plan for the bands 1.8 GHz, 2 GHz and 2.6 GHz. The entries in the current Plan (published in the same Official Gazette) for the bands 790 – 862 MHz, 1710 – 1725 MHz and 1805 – 1820 MHz are dedicated to wireless access.

In line with the requirements of the Frequency Usage Plan Ordinance (FreqNPAV), the Bundesnetzagentur drafted amended and supplementary entries of the relevant subplans and, as part of the participation proceedings outlined in the FreqNPAV, invited interested parties, amongst others, to submit their suggestions and concerns on the matter. The Bundesnetzagentur carried out the proceedings for establishing an amended Frequency Usage Plan at the same time as the existing proceedings. This means that an amended Frequency Usage Plan is also established in time for the 800 MHz frequencies and the other frequencies from the 1710 – 1725 MHz and 1805 – 1820 MHz bands. The Bundesnetzagentur's decision in accordance with section 8(1) of the FreqNPAV was made in agreement with the Federal Ministry of Defence as per section 52(3) of the TKG.

With the dedication of these frequency bands for wireless access for the provision of telecommunications services, mobile, nomadic and fixed service applications can be delivered within the framework of the frequency usage conditions. This allows the network operators to realise all applications in their respective business models.

As requested by respondents, the term "wireless access" was already specified in the decision of 7 April 2008 (re subsection III.2.1).

> *"In light of this, the dedication of these frequency bands needed to be adjusted accordingly. The frequency bands have therefore been dedicated to wireless access for the provision of telecommunications services in the Frequency Usage Plan. This means that the frequencies can be used for wireless access for the provision of telecommunications services in observance of their sole allocation to the mobile*

service in the National Table of Frequency Allocations, defined in section 4 para 22 of the Frequency Band Allocation Ordinance as radio service between mobile and fixed stations or between mobile stations.

For the purposes of clarification, attention is drawn to the fact that due to the technologies used in practice, the previous dedication to digital cellular mobile radio was based on "inter-cell handover without interruption of the communication connection (Ex. GSM, UMTS/IMT 2000)". As the naming of specific technologies is to be avoided for reasons of neutrality, this description can be dispensed with. …"

The term "wireless access for the provision of telecommunications services" was described as follows in the Frequency Usage Plan (Order 33/2009 Bundesnetzagentur Official Gazette no. 15/2009): "This usage connects terminal equipment to radio-based networks via fixed stations. This is generally for the provision of telecommunications services."

To those who have claimed that fixed service applications were excluded by the allocation of the 2.6 GHz band for the mobile service, the Chamber points out that section 4 para 22 of the Frequency Band Allocation Ordinance (FreqBZPV) describes the mobile service as radio service between mobile and fixed stations or between mobile stations. Allocation to the mobile service in the National Table of Frequency Allocations does not exclude any fixed service radio application, as it is above all significant for international frequency coordination and the resulting frequency usage parameters. Despite the fact that the 2.6 GHz band has been allocated to the mobile service, fixed service and nomadic applications are therefore also permissible in addition to mobile applications, as long as the key frequency usage parameters resulting from the coordination are observed. Contrary to allegations by some respondents, the Bundesnetzagentur has not amended the definition of mobile service contained in the Ordinance in connection with the dedication.

The relevant subplans for the bands 800 MHz, 1710 – 1725 MHz and 1805 – 1820 MHz in the Frequency Usage Plan were updated (published in the Bundesnetzagentur Official Gazette of the same day).

In order for the frequencies to be available to the market in good time, the Chamber considers it necessary to include the other frequencies from the 800 MHz, 1710 – 1725 MHz and 1805 – 1820 MHz bands in the proceedings (cf subsection I of this decision).

Where it has been remarked that at least one part of the frequencies is to be "made available solely for enabling broadband Internet access", the Chamber points out that the frequency usage conditions are focussed on the creation of broadband applications, yet without excluding other applications. Furthermore, the special obligation applicable in the 800 MHz band ensures that broadband Internet connection is provided (cf subsection IV.4.5 of this decision).

2) Availability / Usability

The following bands were available for assignment of frequencies for wireless access for the provision of telecommunications services at the time of the decision by the President's Chamber of 19 June 2007 (for more details see Order 34/2007 Re subsection I, Bundesnetzagentur Official Gazette No. 14/2007):

Band	Spectrum available	For award
1.8 GHz	1730.1-1735.1 MHz and 1825.1-1830.1 MHz 1758.1-1763.1 MHz and 1853.1-1858.1 MHz	2 x 5 MHz (paired) 2 x 5 MHz (paired)
2 GHz	1900.1-1905.1 MHz 1930.2-1935.15 MHz and 2120.2-2125.15 MHz 1935.15-1940.1 MHz and 2125.15-2130.1 MHz 1950.0-1954.95 MHz and 2140.0-2144.95 MHz 1954.95-1959.9 MHz and 2144.95-2149.9 MHz 2010.5-2024.7 MHz	5 MHz (unpaired) 2 x 4.95 MHz (paired) 2 x 4.95 MHz (paired) 2 x 4.95 MHz (paired) 2 x 4.95 MHz (paired) 14.2 MHz (unpaired)
2.6 GHz	2500-2570 MHz and 2620-2690 MHz 2570-2620 MHz	14 blocks of 2 x 5 MHz (paired) 10 blocks of 5 MHz (unpaired)

Moreover, further frequencies are available for wireless access for the provision of telecommunications services in the 800 MHz and 1.8 GHz bands.

Band	Spectrum available	For award
800 MHz	791-821 MHz and 832-862 MHz	6 blocks of 2 x 5 MHz (paired)
1.8 GHz	1710-1725 MHz and 1805-1820 MHz	3 blocks of 2 x 5 MHz (paired)

Frequencies that are the subject of litigation can be found in the 1.8 GHz, 2 GHz and 2.6 GHz bands. As requested by respondents, a detailed overview of the frequencies in litigation as of 1 October 2009 is provided:

<table>
<tr><th>Frequency band</th><th colspan="2">Grounds for litigation in certain frequency bands
(Designation of frequency blocks as per Annex 6)</th></tr>
<tr><td rowspan="2">1.8 GHz (paired)</td><td>1.8 GHz D</td><td>1730.1 – 1735.1 MHz / 1825.1 – 1830.1 MHz</td></tr>
<tr><td colspan="2">DB Netz AG versus the Federal Republic of Germany (OVG NRW 13 A 161 / 08)
Repeal of the frequency relocation decisions benefitting E-Plus and O2 (1800 → 900 MHz) and assignment of spectrum in the E-GSM band.</td></tr>
</table>

Frequency band	Grounds for litigation in certain frequency bands (Designation of frequency blocks as per Annex 6)	
	Airdata AG versus the Federal Republic of Germany (OVG NRW 13 A 424 / 08) Repeal of the frequency relocation decisions benefitting E-Plus and O2 (1800 → 900 MHz) and execution of proceedings as per section 55 of the TKG (assignment or award proceedings).	
	Inquam GmbH versus the Federal Republic of Germany (VG Cologne 21 K 5789/09) Repeal of the frequency relocation decisions benefitting E-Plus and O2 (1800 → 900 MHz).	
	1.8 GHz E	**1758.1 – 1763.1 MHz / 1853.1 – 1858.1 MHz**
	DB Netz AG versus the Federal Republic of Germany (OVG NRW 13 A 161 / 08) Repeal of the frequency relocation decisions benefitting E-Plus and O2 (1800 → 900 MHz) and assignment of spectrum in the E-GSM band.	
	Airdata AG versus the Federal Republic of Germany (OVG NRW 13 A 424 / 08) Repeal of the frequency relocation decision benefitting E-Plus and O2 (1800 → 900 MHz) and execution of proceedings as per section 55 of the TKG (assignment or award proceedings).	
	Inquam versus the Federal Republic of Germany (VG Cologne 21 K 5789/09) Repeal of the frequency relocation decisions benefitting E-Plus and O2 (1800 → 900 MHz).	
2.0 GHz (unpaired)	**2.0 GHz E**	**1900.1 – 1905.1 MHz**
	Quam GmbH ./. Federal Republic of Germany (OVG NRW 13 A 2069 / 07) Revocation of UMTS licence	
2.0 GHz (paired)	**2.0 GHz A**	**1930.2 – 1935.15 MHz / 2120.2 – 2125.15 MHz**
	Quam GmbH ./. Federal Republic of Germany (OVG NRW 13 A 2069 / 07) Revocation of UMTS licence	
	2.0 GHz B	**1935.15 – 1940.1 MHz / 2125.15 – 2130.1 MHz**
	Quam GmbH ./. Federal Republic of Germany (OVG NRW 13 A 2069 / 07) Revocation of UMTS licence	

<table>
<tr><th>Frequency band</th><th colspan="2">Grounds for litigation in certain frequency bands
(Designation of frequency blocks as per Annex 6)</th></tr>
<tr><td rowspan="3">2.6 GHz (paired)</td><td>2.6 GHz A – 2.6 GHz N</td><td>2500 – 2570 MHz / 2620 – 2690 MHz</td></tr>
<tr><td colspan="2">Airdata AG ./. Federal Republic of Germany (BVerwG 6 B 5.09 and 6 B 6.09)
Application for extension of 36 assignments in the 2.6 GHz band, limited until 31 December 2007.</td></tr>
<tr><td colspan="2">Airdata AG ./. Federal Republic of Germany (BVerwG 6 C 4.09)
"Wireless access for the provision of telecommunications services" award proceedings: Repeal of orders no 34/2007 and no 34/2008 published in the Official Gazette (decisions by the President's Chamber on the ordering of the award proceedings, in so far as the frequencies of Airdata AG in the 2.6 GHz band are affected).</td></tr>
<tr><td rowspan="3">2.6 GHz (unpaired)</td><td>2.6 GHz O – 2.6 GHz X</td><td>2570 – 2620 MHz</td></tr>
<tr><td colspan="2">Airdata AG ./. Federal Republic of Germany (BVerwG 6 B 5.09 and 6 B 6.09)
Application for extension of 36 assignments in the 2.6 GHz band, limited until 31 December 2007.</td></tr>
<tr><td colspan="2">Airdata AG ./. Federal Republic of Germany (BVerwG 6 C 4.09)
Award proceedings "Wireless access for the provision of telecommunications services": Repeal of Orders no 34/2007 and no 34/2008 published in the Official Gazette (decisions by the President's Chamber on the order for award proceedings) to the extent the frequencies of Airdata AG in the 2.6 GHz band are concerned).</td></tr>
</table>

As per section 55(5) sentence 1 para 1 of the TKG, frequency assignment requires that the frequencies are designated for the planned usage in the Frequency Usage Plan.

The bands 790 – 862 MHz, 1710 – 1725 MHz and 1805 – 1820 MHz are consistently dedicated to wireless access for the provision of telecommunications services. This implements the considerations of the WAPECS concept in these concrete national award proceedings.

As per section 55(5) sentence 1 para 2 of the TKG, frequencies are available if they are not yet occupied by other users with frequency assignments (cf official analysis of section 53 of the government draft, Bundesrat Printed Paper 755/03, page 105).

Regarding the military use of frequencies in the 1710 – 1725 MHz and 1805 – 1820 MHz bands, it should be pointed out that the Federal Ministry of Defence has declared itself willing to relocate existing military applications out of the 800 MHz frequency band by the end of 2009. This means that the frequency bands 790 – 814 MHz und 838 – 862 MHz, previously used by the military, are available for civil use from 1 January 2010.

Use of the 814 MHz – 838 MHz sub-band (channels 64, 65 and 66) for broadcasting was limited from the start to the switchover from analogue to digital television from the start, as per the Frequency Band Allocation Ordinance. A secondary usage condition to this effect (secondary usage condition 22) was included in the Ordinance in May 2001. This switchover is almost complete.

At present, fewer than ten broadcasting transmitters are operating in this frequency band. The intention is to relocate the existing broadcasting services to other frequency bands as soon as possible. The Bundesnetzagentur is carrying out the measures required for this in consultation with the relevant state authorities and the frequency assignees, in order to further ensure the implementation of the broadcasting requirements established by the federal states.

The relocation measures in this frequency band can essentially be completed by mid-2010. Continued exercising of an existing spectrum usage right past this point in time will only be possible on an individual basis if the further exercising of the right is deemed temporarily necessary following appraisal of the circumstances of the particular case and in no way obstructs use of the 790 – 862 MHz frequency band for wireless network access for the provision of telecommunications services. No new frequencies for broadcasting will be assigned in this band.

Where respondents have noted that the spectrum in the 814 – 838 MHz band has been assigned for DVB-T switchover until 2024/2025, the Chamber draws attention to the fact that when digital terrestrial television broadcasting was first introduced, the 790 – 862 MHz band was only intended for broadcasting service usage for a transition period. The relevant secondary usage condition 22 in the previous Frequency Band Allocation Ordinance provided for usage by the broadcasting service being limited to digital transmission (DVB-T) and the transition from analogue to digital transmission.

Requirements for broadcasting in Germany can be covered within channels 21 – 60. Depending on the development of transmission technology and network topology, this also covers future development possibilities such as DVB-T2.

Where respondents call for a 10 MHz-wide guard band (790 MHz-800 MHz), the Chamber is convinced that such a guard band is unnecessary, due to the frequency usage conditions set down under subsection IV.4.2 (block edge masks). In this context, the Chamber draws attention to the fact that the usability of the lower frequency block (791 MHz – 796 MHz) may be restricted due to broadcasting usage in the higher band of 470 to 790 MHz (television channel 60) (cf subsection IV.4.1 of this decision).

Moreover, the frequency bands 790 – 814 MHz and 838 – 862 MHz have been generally assigned for radio microphones for professional usage with a maximum permitted effective radiated power (e.r.p.) of 50 mW by Order 91/2005 published in the Official Gazette. The general assignment came into force on 1 January 2006.

The general assignment is for a fixed period until 31 December 2015. However, use of frequencies for wireless access for the provision of telecommunications services is possible before expiry of the general assignment. The general assignment therefore contains the explicit information that the frequencies may also be used by other radio applications. The radio microphones operating in the 800 MHz band as a result of the general assignment could in future be subject to interference through the use of frequencies for wireless access. Due to the lower priority status of the general assignment, this interference must nevertheless be tolerated. However, the Chamber draws attention to the fact that the network operators must initially supply "rural areas" as a result of the obligation set out in subsection IV.4.5 of this decision. As radio microphones are mainly used in densely populated regions, the majority will not be affected immediately, if at all.

The Chamber also expects that when building networks, future network operators take suitable technical measures by way of self-coordination and cooperate particularly with radio

microphone operators, in order to minimise harmful interference. The Bundesnetzagentur will support the frequency users involved, thus fulfilling its legal duties.

No extension of the general assignment is planned, as parallel interference-free usage is not generally possible. There are, however, plans for use of the 790 – 862 MHz band by radio microphones to be made possible after 31 December 2015 in certain individual cases by means of individual assignment, particularly if interference with radio microphones and wireless access applications for providing telecommunications services are ruled out.

The Bundesnetzagentur is currently aware of a large number of radio microphones operated by professional users under the general assignment. These include for example private broadcasters and programme producers, theatres, concerts, universities, municipal halls and similar bodies. These professional users demand high levels of operational reliability and transmission quality. In the event of usage of this frequency band for wireless access, there is a great likelihood of microphone interference in areas supplied with wireless access applications.

Should affected users require interference-free use of their radio microphones, they can request individual assignments in other bands from the Bundesnetzagentur. General assignment already exists in the 1785 –1800 MHz band (cf Order 18/2006 in the Bundesnetzagentur's Official Gazette No 7/2006, page 787) The Bundesnetzagentur has become involved in the relevant bodies for opening further bands for radio microphones.

Regarding comments on the availability of needs-oriented spectrum for wireless means of production, in particular radio microphones, the Chamber draws attention to the fact that the binding provision of additional spectrum is not the purpose of these proceedings, but instead has already taken place during establishment of the Frequency Usage Plan (published in the same Official Gazette). The focus of these proceedings is rather the issue of spectrum availability for wireless access for the provision of telecommunications services.

Irrespective of this however, the Chamber is aware of the economic and societal significance of wireless means of production and therefore views it urgently necessary to find a swift solution to the issue of providing needs-oriented spectrum for wireless means of production. In this respect the Bundesnetzagentur has already developed a "Concept for frequency assignments for radio microphones and other PMSE (Program Making and Special Events) facilities" and published this on its website. Taking this concept as a basis, the rules for proceedings and assignment have been and will be developed in close cooperation with the parties concerned, also taking into account relevant aspects raised in relation to both this draft and the parallel draft decision BK 1a-09/001.

The Bundesnetzagentur thus now makes the following additional bands available for the applications in question:

- 174 – 230 MHz (Band III of the VHF range)
- 470 – 790 MHz (lower UHF-band)
- 823 – 832 MHz (in the so-called duplex centre gap)
- 1452 – 1477.5 MHz
- 1785 – 1800 MHz (European harmonised band), in future up to 1805 MHz

The so-called duplex centre gap (821 – 832 MHz) in the 800 MHz band exists with the award of paired spectrum (cf table under subsection IV.4.1 and Rationale re subsection IV.4.1). A draft ECC decision is now available regarding the usage possibilities of the FDD centre gap, stating that the 823 – 832 MHz band can be used by wireless means of production.

The lower priority usage of the 470 – 790 MHz band for radio microphones and other outside broadcast radio equipment is in principle so far reserved for public service broadcasters. Relocation of the remaining professional applications from the upper (790 – 862 MHz) to the lower (470 – 790 MHz) UHF band would be planned through individual assignments and only

insofar as the other alternative bands prove unsuitable, particularly due to the physical propagation properties. The intention is also for as many uses as possible to be located outside of the lower UHF band (470 – 790 MHz) in future. The Chamber draws attention to the following:

Band III of the VHF range (174 – 230 MHz), characterised by favourable physical propagation properties, is suitable for wireless means of production. This is supported by the high number of existing frequency assignments without increased incidences of harmful interference.

In the 790 – 862 MHz band, individual assignments for wireless means of production will continue to be possible in individual cases across the entire band. In practice however, individual assignments will only be possible in the FDD centre gap. Outside of the centre gap, individual assignments will only be possible in special exceptional cases, where mutual interference between radio microphones and wireless access applications for the provision of telecommunications services can be ruled out. A draft ECC decision is now available regarding the usage possibilities of the FDD centre gap (821 – 832 MHz), stating that the 823 – 832 MHz band can be used by wireless means of production.

In all likelihood, the 1452 – 1477.5 MHz band (L-band) will soon be implemented in the relevant ERC recommendation (Recommendation 70-03). On a European level, expansion to the 1427 – 1525 MHz band is the target.

In addition to this aforementioned band, the higher frequency bands, particularly the 1785 – 1800 MHz band which has already been assigned generally (Official Gazette Order 18/2006) are particularly suitable for in-ear monitoring, fixed installations and live outdoor broadcast teams. The band has been expanded in the Frequency Usage Plan (published in this Official Gazette) to 1805 MHz. Based on this, the aforementioned general assignment is expanded accordingly.

Regarding the alternative spectrum for radio microphones referred to in para 4 of the Bundesrat Decision mentioned previously, it is to be stressed in addition to the statements made above that solutions for this have been set out at CEPT level (see in particular CEPT Report 32) and potential alternative spectrum has already been identified across CEPT. This pan-European approach will have a beneficial effect on the implementation of new equipment technologies and the costs for microphone users.

Where use of other bands is not possible for wireless means of production, in future the 470 – 790 MHz band can also be used for professional wireless production applications in addition to broadcast-related applications, as a result of the amended usage condition D296 in the Frequency Band Allocation Ordinance.

Based on current knowledge, the heart of the new arrangement in the lower UHF band will be the distribution of UHF channels 21 – 60 according to user group. Accordingly, some of the channels will be intended for use primarily by public service broadcasting and other channels for use primarily by other professional wireless productions. This approach keeps the level of coordination required as low as possible and guarantees a high level of operational reliability for both sides.

Respondents raised the particular issue of interference between radio microphones and DVB-T receiving equipment with active antennas (antenna amplifiers). They especially addressed the subject of saturation, which could result from radio microphone transmissions.

The Chamber is of the opinion that interference resulting from saturation in connection with the operation of radio microphones is extremely unlikely. Saturation in the receiver occurs as the result of a cumulative effect, particularly if either a transmitter is operated in the immediate vicinity of the affected receiver, or a transmitter using high radiated power in the surrounding area. Microphones usually transmit with maximum radiated power of 50 mW ERP. Furthermore, professional radio microphones are typically operated in theatres or concert halls, for example, and are therefore not in the immediate surrounding area of television receivers. The technical checks carried out by the Bundesnetzagentur have shown

that the interference experienced by DVB-T reception if active antennas are used is mainly caused by the built-in amplifier itself. The apparent advantage of a higher antenna gain is actually countered by the broadband amplification in connection with intermodulation products.

The term "professional production" refers to expert use of wireless means of production (private broadcast programmes and productions, along with other professional events such as theatre performances, concerts by professional groups of musicians, or professional event technology services), which tends to focus on a performance.

The arrangements will swiftly be adopted into the Administrative Rules for Frequency Assignments in Traditional PMR (VVnömL), which form the basis of frequency assignments in this band.

As matters stand at present, the Chamber assumes that overall there will continue to be enough suitable spectrum available for wireless means of production in future, too. The also applies expressly to large-scale events such as elections for the Bundestag, major sporting events and similar occasions where frequencies are coordinated by the Bundesnetzagentur. During such events, all usable bands are made available to meet frequency requirements.

With regard to harmful interference, particularly between digital television broadcasting and wireless access for the provision of telecommunications services, numerous respondents stressed that this should be clarified before the spectrum is awarded. In doing so, they also referred to the Bundesrat decision (printed paper 204/09 of 12 June 2009), particularly para 4:

> *"Prior to the actual frequency award and use of the digital dividend, a satisfactory solution must be found for the interference problems associated with wireless means of production and both wire-based and non-wire-based broadcast transmission. Furthermore, the Bundesrat considers it necessary to concretely designate equivalent alternative spectrum for users of radio microphones before commencement of the auction proceedings."*

The relevant interference aspects have been investigated in detail within the ECC of the CEPT, with the involvement of all parties concerned. Bundesnetzagentur representatives were actively involved in this. At the ECC Plenary from 22 – 26 June 2009, CEPT Reports 30 and 31, along with the ECC decision "on harmonised conditions for mobile/fixed communications networks operating in the band 790 – 862 MHz" were adopted for CEPT-wide public consultation.

Although these working results have not yet been ultimately adopted, a secure basis is available. The Chamber assumes that both CEPT Reports and the ECC decision will be finally adopted at the upcoming ECC Plenary from 26 – 30 October 2009.

The interference aspects regarding the relationship between wireless access for the provision of telecommunications services and digital television broadcasting are addressed in particular in CEPT Report 30. This report was also drafted with the involvement of broadcasting representatives; it must be emphasised that the European Broadcasting Union (EBU) in Geneva expressly welcomed the results. Excerpt from the report of the ECC Plenary from 22 – 26 June 2009:

> *"The EBU has expressed its appreciation for the work carried out in SE42. EBU believes that the common and minimum restrictive technical conditions for ECN in the sub-band 790 – 862 MHz as defined in the draft CEPT Report 30 provide a suitable basis for protection of broadcasting services and that the remaining cases of interference can be resolved by applying appropriate mitigation techniques."*

The Chamber comes to the conclusion that in terms of the broadcasting service (digital television broadcasting), all interference aspects in Germany have been sufficiently clarified, both with respect to usage condition 36 of the Frequency Band Allocation Ordinance (protection of the broadcasting service) and on a CEPT level.

The pan-European harmonisation of the frequency band 790 – 862 MHz will also assist with border coordination for Germany. The Bundesnetzagentur can only evaluate a concrete local case of interference between a base station used for wireless access for the provision of telecommunications services and television broadcasting in detail when determining the site-specific technical parameters for the base station in question, fulfilling its legal obligation to ensure efficient and interference-free use of frequencies (cf section 55(5) sentence 1 paras 3 and 4 of the TKG).

The results obtained within the CEPT (ECC), particularly those documented in CEPT Report 30, will serve as a basis for these considerations of individual cases. This also includes the application of the interference mitigation techniques described in this report.

Regarding the compatibility between applications of wireless access for the provision of telecommunications services and frequency usage in and along conductors, it is important to bear in mind that conductor applications do not constitute frequency usage which could be subsumed under a radio service as defined by Article 1 of the ITU's Radio Regulations or in the Frequency Band Allocation Ordinance. That is why this frequency usage is subordinate in regulatory terms to the use of frequencies within a radio service. Frequency usage in and along conductors is not subject to the Telecommunications Act; instead the relevant standards as found in the Electromagnetic Compatibility Act apply to the devices involved, eg cable modems and set-top boxes.

With regard to potential effects on broadcast reception (wire-based and non-wire-based), the Chamber expects that future network operators will, if necessary, take suitable measures to minimise interference to affected devices in a reasonable way.

Furthermore, it must be remembered that the density of radio stations among the terminal devices for wireless access for the provision of telecommunications services – crucial to this particular interference scenario – should be relatively low for the foreseeable future, and the likelihood of potential interference therefore similarly so. Until a significant market penetration has been reached, there are possibilities on both sides (potential sources of interference and broadcast reception equipment) for improving coexistence conditions.

3) Scarcity

The Chamber is convinced that demand is continuing to exceed available spectrum and that frequencies are consequently scarce in the sense defined in section 55(9) sentence 1, 1st alternative of the TKG.

Award proceedings can be ordered when frequencies are not available in sufficient quantity for frequency assignments or when a number of applications are made for specific frequencies (section 55(9) of the TKG). The decision whether to order such proceedings is at the discretion of the Bundesnetzagentur.

Frequencies are not available in sufficient quantity for frequency assignments for wireless access even when further spectrum is made available in the bands 800 MHz and 1710 – 1725 MHz / 1805 – 1820 MHz - over and above spectrum in the bands 1.8 GHz, 2 GHz and 2.6 GHz (section 55(9) 1st alternative of the TKG).

This finding is based on a forecast decision by the Bundesnetzagentur. Section 55(9) of the TKG provides for the Bundesnetzagentur to find that there is a scarcity of available frequencies. In accordance with the section by section analysis of the Act, such is the case when the Bundesnetzagentur reaches the conclusion that spectrum is not available in sufficient quantity for frequency assignments (cf official section by section analysis, for section 53(9) of the TKG, of the federal government's draft in Bundesrat printed paper 755/03, page 109). For the performance of its tasks under frequency regulation and in particular for ascertaining scarcity in terms of section 55(9) of the TKG, the Bundesnetzagentur has very broad scope for assessment. The reason is that, for planning and executive decisions to be taken under frequency regulation, evaluations and weightings have to be carried out in order, on one hand, to balance out interests which in some cases are contradictory and, on the other, to weigh up the regulatory aims against each other. In

doing so the Bundesnetzagentur must base its assessment on assumptions that are logically acceptable, correspond to the current level of knowledge and experience and take the regulatory aims into account.

The decision of the President's Chamber dated 7 April 2008 stipulated that the frequencies available in the bands 1.8 GHz, 2 GHz and 2.6 GHz would be awarded simultaneously. The award proceedings will now make further frequencies available in the 800 MHz band (2 x 30 MHz (paired)) and in the 1.8 GHz band (2 x 15 MHz (paired)) for wireless access for the provision of telecommunications services. A further 90 MHz is therefore available for wireless access, with total available spectrum thus amounting to about 360 MHz.

Even with this extra 90 MHz being available, the Bundesnetzagentur is still convinced that demand is greater than current available spectrum and that there is not a sufficient quantity of available spectrum for assignments of frequencies for wireless access; that, therefore, spectrum is scarce in the sense of section 55(9) 1st alternative of the TKG.

Irrespective of specific applications and declarations of interest, demand will basically continue to rise because of the increase in data traffic and the growing demand for ever higher transmission rates coupled with continuing mobility. In addition, technological advances will prompt market players to request large bandwidths, which means that it must be possible to acquire contiguous spectrum. Future development in the direction of LTE (Long Term Evolution), for example, will make it possible to use contiguous spectrum with a bandwidth of up to 20 MHz. The spectrum thus made available will enable such needs to be met.

The decision of President's Chamber on 19 July 2007 included the following comment on the question of scarcity:

> *"This was also confirmed by the results of the consultations that have already been conducted.*
>
> *By order 33/2005 published in Bundesnetzagentur Official Gazette 8/2005, page 782 ff, a consultation was opened with a view to determining how much frequency demand should be expected in the bands 2 GHz and 2.6 GHz as from 2008. This written consultation reflected a demand for frequencies, aimed at the realisation of a very wide variety of business models, which was in excess of available spectrum. This finding was confirmed by the oral hearings of 27 October 2005.*
>
> *The existing UMTS network operators have submitted total frequency requirements that encompass all available frequencies in the 2 GHz band, as well as the 2.6 GHz band. This means that the interests of the UMTS network operators compete with those of potential new entrants, who have already announced their intention to apply for the available frequencies during the consultation.*
>
> *BWA operators and manufacturers of relevant system technology have also announced their interest in the use of frequencies in the 2.6 GHz band for the operation of mobile data transmission systems. In connection with the auction of frequencies for BWA in the 3.5 GHz band in December 2006, interested parties once again stated that they would avoid participating in the BWA auction, waiting instead for the future award of frequencies in the 2.6 GHz band, which has better propagation properties and is therefore better suited to mobile applications. The fact that not all frequencies were awarded during the auction of the 3.5 GHz band can therefore by no means be a sign of sinking market interest in frequencies from the spectrum to be awarded now.*
>
> *The Chamber still considers all notifications of requirements submitted in 2005 to be stable, meaning that – particularly with respect to the interest announced on the occasion of the BWA auction – scarcity can continue to be assumed. This also applies in light of the intended inclusion of available frequencies from the 1.8 GHz band (2 blocks of 5 MHz paired).*

Moreover, during the consultation on the draft of these decisions, a number of requirements were filed and some already concrete applications for frequency assignment in all bands in question – particularly in the band 2.6 GHz – were made. These notifications of requirements and applications together also exceed the total spectrum available. The total of 270 MHz available in the frequency bands for award is confronted with requirement notifications and assignment applications that exceed this amount by over 100 MHz. The scarcity forecast made as a result of consultations in 2005 has thus been confirmed. The Chamber therefore adheres to its scarcity forecast under section 55(9) sentence 1, 1st alternative of the TKG."

In light of the notifications of need and announcements of interest to date, it can be established that the total 270 MHz of spectrum available in the bands 1.8 GHz, 2 GHz and 2.6 GHz is exceeded by more than 100 MHz. Particularly due to the increasing demand for high data rates, the forecast continues to be that there is currently an even greater demand for appropriate frequencies, extending beyond the original notifications and announcements of interest. This means that, despite the fact that a total of 90 MHz is now additionally available, the total spectrum available for award is not sufficient for assignment. The scarcity forecast under section 55(9), sentence 1, 1st alternative of the TKG is thus adhered to.

Attention is also drawn to the following:

Contrary to statements from respondents, a determination of frequency scarcity is not reliant on new applications being made or a formal establishment of requirements being carried out for the frequencies available for award. The consultation on the draft of this decision also confirmed that an insufficient amount of spectrum is available.

New concrete requirements have been voiced for spectrum in the 800 MHz band in particular, for coverage of rural areas. During the consultation on the flexibilisation of frequency usage rights in the bands 900 MHz and 1800 MHz (Discussion paper K 9|18, cf Bundesnetzagentur Official Gazette 22/2008 Communication 663/2008, page 3649ff), the inclusion of these bands in the existing award proceedings had already been called for. The so-called E-network operators have drawn attention to the fact that they require frequencies for rural coverage, and that thus far this requirement has not been sufficiently taken into account due to a lack of available frequencies under 1 GHz (for details see President's Chamber Decision on the flexibilisation of frequency usage rights for wireless access for the provision of telecommunications services, BK 1a-09/001, in the Bundesnetzagentur Official Gazette of the same day).

Moreover, a claim exceeding the available spectrum below 1 GHz was made by all mobile network operators active in the market for contiguous spectrum in the 800 MHz band, particularly for the provision of broadband services in rural areas. These requirements are based on provision of 2 – 3 Mbit/s. With the growing demand for higher data rates, over 160 MHz are required in the mid to long-term in order for bandwidths of 6 Mbit/s to be realised. The requirements voiced for the 800 MHz band for rural area coverage alone exceed the available spectrum several times over. These requirements have been confirmed in a study commissioned by the Bundesnetzagentur (Report investigating the digital dividend of 29 January 2009, Dipl. Ing. Arne Börnsen, published on the Bundesnetzagentur's website, www.bundesnetzagentur.de).

The requirements of GSM/UMTS mobile network companies for frequencies under 1 GHz for rural area coverage alone show that the available spectrum particularly suited to this type of coverage due to its good propagation properties is insufficient for meeting the needs of these network operators, meaning that there is an inadequate amount of frequencies under 1 GHz available for assignment.

Furthermore, the spectrum in the 800 MHz band is also of particularly great interest to potential new entrants who wish to enter the market for wireless access. This market is based on sustainable competition, both in terms of services and infrastructures and geographically (nationwide). In the relevant geographic market, sustainable competition supports the creation of telecommunication networks and corresponding products in rural as

well as urban areas. If new entrants focus on the existing competition, it can be expected that they will also aim for frequencies suitable for use in rural areas in the 800 MHz band. This also applies should the opinion prevail that market entry by new entrants is unlikely. The Chamber must take the possibility of market entry for new entrants into account in its considerations. The award proceedings are to be carried out openly, transparently and on a non-discriminatory basis. The consultation on the draft of this decision showed that in addition to GSM/UMTS mobile network operators, other companies may also be interested in the frequencies. Independent of this, considering only the requirements and interest announced by network operators already active on the market, the Chamber is convinced that frequencies are scarce, as indicated above.

Finally, as some of the frequencies are the subject of litigation, it can be assumed that the interests of all potential bidders will focus more on frequencies from the 800 MHz and 1.8 GHz bands. The frequencies included in the award proceedings thus far at 1.8 GHz, 2 GHz und 2.6 GHz are for the most part the subject of pending legal action. It is not clear when these legal proceedings will be completed. In contrast, the frequencies at 800 MHz, and also at 1.8 GHz are not involved in any litigation and could therefore acquire greater appreciation in the award proceedings.

Where respondents have called for a differentiated market analysis regarding the issue of frequency scarcity, it must be pointed out that a distinction between the provision of "basic services" in areas hitherto not sufficiently catered for and the introduction of the next generation of mobile broadband access is not in line with the legal requirements of secondary usage condition 36 in the Frequency Band Allocation Ordinance. The policy of making frequency regulation more flexible contradicts the differentiation between various business models. Moreover, the realisation of various business models will be determined by market demand.

The Chamber must also consider the fact that the federal government's broadband strategy calls for the fastest possible award of frequencies for supplying regions that have not been served thus far. Carrying out a formal assessment of needs before a decision by the President's Chamber would definitely have involved delays. In accordance with section 10 sentence 2 of the Administrative Procedures Act, the President's Chamber is to carry out proceedings simply, appropriately and swiftly. With respect to comments that frequency scarcity is – at least in part – caused by regulation, as the Bundesnetzagentur did not provide the market with any free spectrum in recent years, the Chamber had already stated the following in the decision of 19 July 2007:

> *"The Bundesnetzagentur will offer all spectrum available for digital cellular mobile communications for award simultaneously. This helps to avoid regulation-induced frequency scarcity. Accordingly, the Bundesnetzagentur did not immediately make the frequencies returned by Mobilcom Multimedia GmbH available to the market in 2003, but rather included these in the overall plans for the so-called UMTS core band, the UMTS extension band and the GSM bands (mobile radio overall concept)."*

Re III. Choice of award proceedings

The following comments were made:

Several respondents expressly welcomed the choice of auction as the form of award proceedings. In particular, the coupling of an auction with special coverage requirements for the future frequency holders would be fundamentally suitable for ensuring basic broadband provision in the so-called "white spots".

On the other hand, it was noted that the auction is not a suitable choice of award proceedings for ensuring the regulatory aims defined in section 2(2) of the TKG. In particular, the intended award proceedings would not allow the regulatory aims of "closing gaps in coverage in rural areas" in consumers' interests, fair competition and guaranteeing provision of interference-free DVB-T broadcasting services to be ensured. This was confirmed by a comparison with other award proceedings such as WLL, WiMAX and UMTS, as these were

also linked with the aim of ensuring sufficient Internet provision, particularly in rural areas, which in reality did not come to be, however. Furthermore, with an auction frequencies would tend to be assigned to the bidders with the most spending power, regardless of whether these have the necessary expertise or are committed to a region.

An auction was not permissible as frequencies had already been assigned, without an auction, in the relevant product and geographical market for which frequencies in the 800 MHz band were to be awarded (GSM licences through invitation to tender). Moreover, due to its design, an auction could affect competition on the German mobile communications market in the long term, and make market entry by new entrants effectively impossible.

It was suggested that the frequencies, or at least certain bands, should be put out to tender specifically for the known "white spots", or auctioned solely for these areas. Award proceedings structured on a regional basis were also suggested, following the model of the 26 GHz PMP frequency award in 1999.

In an invitation to tender, the potential effects on consumers and infrastructures, as well as the aims of ensuring provision of basic telecommunications services throughout the Federal Republic of Germany and ensuring provision of interference-free basic DVB-T broadcasting services could be taken into account.

The Chamber has ruled as follows:

In the decisions of 19 June 2007 as issued on 7 April 2008, the Chamber ordered that the proceedings required under section 61(1) of the TKG will be carried out as an auction in accordance with section 61(4) and (5) of the TKG. The decision on the choice of award proceedings is upheld despite the inclusion of other frequencies from the 800 MHz and 1.8 GHz bands (cf Order 34/2008 re Point II, Bundesnetzagentur Official Gazette 7/2008).

If frequencies are not available for assignment in sufficient numbers, the President's Chamber can order that assignment be preceded by award proceedings. Section 61(2) of the Telecommunications Act essentially provides for an auction as the standard award proceedings.

As stated in section 61(2) sentence 1 of the TKG, an auction is to be held as described in section 61(5) of the TKG, unless this form of proceedings is unsuitable for ensuring the regulatory aims under section 2(2) of the TKG. There are currently no obvious reasons suggesting that an auction would not be suitable for ensuring the regulatory aims under section 2(2) of the TKG:

The President's Chamber already ordered an auction to be carried out for frequencies from the bands 1.8 GHz, 2 GHz and 2.6 GHz, which are also dedicated to wireless access for the provision of telecommunications services (cf decision by the President's Chamber of 7 April 2008, Bundesnetzagentur Official Gazette No 7/2008 of 23 April 2008, Order 34/2008). Carrying out an auction for the 800 MHz frequencies and the other 1.8 GHz frequencies, which are also dedicated to wireless access for the provision of telecommunications services, is in compliance with the consistency requirement.

With regard to comments that frequencies had already been assigned without an auction in the relevant product and geographical market, for which frequencies in the 800 MHz band are awarded (GSM licences through invitation to tender), making an auction impermissible, the Chamber has already stated the following on this matter in the decision of 19 June 2007 (cf Bundesnetzagentur Official Gazette No 14/2007 of 18 July 2007, Order 34/2007):

> *"...As stated in section 61(2) sentence 1 of the TKG, an auction is by way of exception not to be carried out if it is not likely to secure the regulatory aims according to section 2(2) of the TKG. In line with section 61(2) sentence 2, 1st alternative of the TKG, this may particularly be the case if frequencies have already been assigned without a prior auction in the relevant product and geographic market for which the radio frequencies may be used in observance of the Frequency Usage Plan.*

The choice of auction proceedings for awarding frequencies in the bands 1.8 GHz, 2 GHz and 2.6 GHz does not conflict here with the fact that in the past frequencies for digital cellular mobile radio in the 900 MHz and 1.8 GHz bands were awarded through an invitation to tender. The example provided in section 61(2) sentence 2 of the TKG for cases in which auction proceedings may not be suitable (…frequencies already assigned on the relevant product and geographical market without a prior auction…) is at most an indication of potential non-suitability of an auction. The fact that this example is provided does not on its own automatically mean that an invitation to tender is to be used…"

The aim of the Second Ordinance Amending the Frequency Band Allocation Ordinance (secondary usage condition 36 of the Frequency Band Allocation Ordinance, Annex Part B), ie use of the frequency band predominantly to close gaps in coverage in rural areas, does not mean that an auction is not likely to secure the regulatory aims according to section 2(2) of the TKG. An invitation to tender allows the degree of geographic coverage to be specially taken into account when selecting a bidder. As laid down in section 61(4) sentence 2 para 4 of the TKG, auction proceedings also allow the degree of coverage to be determined and coverage prescribed by the regulator.

In any event, the Telecommunications Act provides for an auction as the standard proceedings where it is likely to secure the regulatory aims according to section 2(2) of the TKG. As the legislator has set an auction as the standard procedure, it must first and foremost be ascertained whether the political aim of "completely closing gaps in coverage in rural areas within a short time" corresponds to a regulatory aim that can be secured through appropriate award conditions.

When answering the question of whether the regulatory aims can be secured, the protection objective of section 61(2) sentence 2 1st alternative of the TKG must be taken into account. The provision is to prevent unreasonable competitive disadvantages through asymmetric market entry conditions. Even if market entry conditions for wireless access have differed thus far (invitations to tender and auctions), these earlier conditions were for that very reason not directly comparable, as they refer to market entry under different conditions at different times. At any rate, this makes symmetrical conditions for access to frequencies all the more important, when frequencies are to be awarded simultaneously or nearly simultaneously for the same relevant product and geographic market. Unequal award conditions arising from an invitation to tender could however have a particularly negative effect here on new entrants.

To those who have stated that, due to its design, an auction could impair competition in the German mobile communications market in the long term and make market entry effectively impossible for new entrants, it must be pointed out that the award condition details and the auction rules take into account the regulatory aim of securing fair competition and promoting telecommunications markets with sustainable competition in services and networks and in associated facilities and services in rural areas as well set out in section 2(2) para 2 of the TKG. The award conditions and auction rules sufficiently ensure this for example through the introduction of a spectrum cap as stated in subsection IV.3.2 along with the possibility of setting an individual minimum frequency requirement as stated in subsection IV.1.4 of this decision.

Where comments have been made stating that the planned award proceedings are not compatible with the regulatory aims of "closing gaps in coverage in rural areas" in the interests of consumers and fair competition, and ensuring provision of interference-free DVB-T broadcast services, it must be said that the aim of closing coverage gaps in rural areas is sufficiently taken into consideration in subsections IV.4.4 and IV.4.5. Particularly the special obligation to implement secondary usage condition 36 of the Frequency Band Allocation Ordinance, imposed in deviation from earlier award proceedings, requires assignees to give priority to the supply of rural areas that have not been previously served.

Furthermore, an auction is well suited to achieving the statutory aim of award proceedings, namely to select those bidders who are best suited to using the frequencies efficiently. The

following is stated in this respect in the official analysis of section 61(5) of the TKG (section 59(5) of the government draft, Bundesrat printed paper 755/03, page 109):

> *"The successful bid typically proves the willingness and ability to use the frequency to be assigned in the most optimal way in the market-economy service range competition and to strive for efficient and economical use of the frequency"*

Contrary to the opinion of one respondent, an auction does not mean frequency assignment to only the highest bidder, regardless of whether they have the necessary expertise or are committed to a region. Instead, the minimum technical requirements for admission to the auction are checked during the qualification stage (cf subsection IV.1.3). An applicant must prove their reliability, specialist knowledge and efficiency at this point. In addition, substantiated statements on fulfilling coverage obligations, particularly with regard to unserved rural areas, are required in the frequency usage concept submitted.

Furthermore, the auction has proved to be a swift procedure in administrative practice. It represents a suitable procedure for awarding frequencies which, in line with the federal government's broadband strategy, quickly harnesses the potential of the digital dividend and puts it to use.

Re IV. Award conditions

Re IV.1. Qualification requirements, section 61(4) sentence 2 para 1 of the TKG

In its decision of 7 April 2008 the Chamber defined the qualification requirements for the auction as per section 61(4) sentence 2 para 1 of the TKG (for details see Order 34/2008, Re 1, Bundesnetzagentur Official Gazette of 23 April 2008). This decision is upheld despite the inclusion of other frequencies from the 800 MHz and 1.8 GHz bands.

Re IV.1.1. No limitations on participation

The following comments were made:

The absence of restrictions on participation was welcomed. On the other hand it was noted that reservation of the right to exclude bidders in order to prevent them bidding on their own frequencies currently involved in litigation, would be unlawful.

It was also proposed that the exclusion of the established mobile network operators should be considered.

It was requested that the established mobile operators that already had spectrum below 1 GHz should be excluded from the award of 800 MHz spectrum in order to give new entrants a chance and to secure fair competition.

The Chamber has ruled as follows:

Essentially, any person or company can submit an application to qualify for the auction (for details see Order 34/2008, Re 1.1, Bundesnetzagentur Official Gazette of 23 April 2008).

In response to those who commented that reservation of the right to exclude bidders in order to prevent them bidding on their own frequencies currently involved in litigation would be unlawful, the following should be said. A bidder is not excluded from the auction solely on the grounds that the bidder has commenced legal proceedings regarding part of the spectrum to be awarded. All potential bidders are therefore free to participate in the award proceedings. However, during the qualification stage each bidder will be checked to ensure that they meet the requirements for admission under subsection IV.1.3.

The request from one respondent of excluding existing mobile network operators from the award proceedings cannot be implemented. In its decision published on 7 April 2008 (cf Bundesnetzagentur Official Gazette 7/2008 of 23 April 2008), the Chamber had already stated the following in this respect:

> *"According to section 61(3) of the TKG, an applicant may be excluded from participation in award proceedings where their successful bid or successful tender is*

expected to prejudice fair competition in the relevant product and geographic market for which the radio frequencies to be assigned may be used in observance of the Frequency Usage Plan. It should be hereby ensured that the possible actions of successful bidders are not disproportionately restricted by the market entry of other, superior competitors. Superior competitors may therefore be excluded from award proceedings in order to ensure fair competition. However, companies in a dominant market position may not be excluded from using new technologies (Bundestag printed paper 15/2316, page 70 re section 59 of the draft TKG).

An abstract danger or mere assertion of competition distortion does not justify exclusion under section 61(3) of the TKG. Strict requirements must be in place for exclusion as per section 61(3) of the TKG because of the irreversible competitive effects associated. The Chamber is certain that there is little likelihood of fair competition in the market for wireless access for the provision of telecommunications services being threatened solely by successful bids from established mobile network operators. As long as and insofar as competition on the market for wireless access for the provision of telecommunications services is not threatened in concrete terms, the exclusion of one or more companies from award proceedings is unreasonable. The fact alone that mobile network operators are already active in this market does not justify exclusion of such companies from participating in award proceedings.

Furthermore, attention is drawn to the fact that as stated in the explanatory notes, even dominant companies cannot be excluded from award proceedings from the outset. Moreover, as stated in section 61(3) sentence 2 of the TKG, an applicant's justified interests in the use of new technologies must be duly considered. The possibility of exclusion must therefore not result in companies being excluded from technological development. This applies even in the case of market dominance being determined."

To respondents calling for the exclusion of established network operators from the 800 MHz band, the President's Chamber points out that it adheres to the considerations stated above, namely that no company will be excluded from participating in the award proceedings from the outset. In order to ensure fair access to the 800 MHz frequencies for new entrants too, the President's Chamber provides for a restriction of bidding rights taking into account existing frequency usage rights under 1 GHz (for details see subsection IV.3.2 of this decision).

Re IV.1.2. Competitive independence

The following comments were made:

These arrangements were predominantly welcomed by the respondents. The admission of consortia – also on a band-specific basis – where possible under competition law was particularly significant. In this context, the necessity of further developing cooperation possibilities such as "national roaming" and "spectrum sharing" ("pooling" of frequencies) was emphasised.

The Chamber has ruled as follows:

If frequencies are not available for assignment in sufficient numbers, assignment will be made to companies that are competitively independent of each other, in line with the existing regulatory practice (for details see Order 34/2008, Re 1.2, Bundesnetzagentur Official Gazette of 23 April 2008).

The regulatory aim of securing fair and workable competition (section 2(2) para 2 of the TKG) requires competitive independence of frequency assignees or network operators. Multiple applications are not therefore permitted. When applying to qualify, the applicant must therefore certify that there are no objections to this form of organisation under the Restraints of Competition Act (cf Annex 5 Point B).

As stressed by the respondents, the Chamber will examine and develop possible ways of cooperating further. However, attention must be drawn to the fact that the agreements to be

made between network operators who wish to cooperate are also subject to individual checks by the anti-trust authorities to ensure that they comply with competition law.

Re IV.1.3. Requirements for admission to the auction

The following comments were made:

The majority of respondents agreed with the arrangement, although some emphasised that the planned preliminary check for reliability, specialist knowledge and efficiency, as well as the applicants' frequency usage concepts, are of great significance. In particular, in their frequency usage concept applicants must describe amongst other things how spectral compatibility with the DVB-T broadcasting service would be ensured and how the intended quality of service (throughput, latency), would be achieved.

Furthermore, clarification was proposed regarding publication only of the admission to the auction and possibly the successful party awarded spectrum, but no other information.

It was noted that it makes little sense, particularly for network operators already active in the market, to draw up and provide detailed reasons for a complete business plan for every potential usage of the frequencies purchased, as final market positioning will be highly dependent on the actual result of the auction. On the other hand, the Bundesnetzagentur should check whether new entrants have plausible business models which would enable actual market entry. A situation where new entrants only participate in the auction in order to drive prices upwards or to start trading in spectrum is to be prevented.

The Chamber has ruled as follows:

Companies will be admitted to the auction on application.

Entitlement to participate in the auction proceedings is free from restrictions. Yet being entitled to submit an application gives only the abstract possibility of participation. Participation in the auction requires individual admission by the Bundesnetzagentur. This is issued in a separate decision (qualification notice). Admission to participate presupposes that bidders fulfil minimum specialist and other requirements, subject to verification. An auction must therefore be preceded by a procedure in which fulfilment of the legal requirements for admission to the auction is determined (for details see Order 34/2008, Re 1.3, Bundesnetzagentur Official Gazette of 23 April 2008).

The applicants who have applied for frequency assignments in connection with the comments on the previous draft decisions on the order for and choice of award proceedings must, under section 61(4) sentence 2 para 1 of the TKG, apply for admission to the auction and supply appropriate documents and evidence of the aforementioned criteria.

The duty to demonstrate suitability goes beyond personal characteristics such as reliability, efficiency and specialist knowledge. According to section 55(5) sentence 1 para 4 of the TKG, the assignment of frequencies also requires their efficient and interference-free use by the applicant being secured. To this end, every applicant should set out, in the form of a frequency usage concept, how they intend to secure efficient use of the spectrum. The frequency usage concept must be clear and conclusive and in particular contain statements on the technical planning regarding the specific business model and service concept. A distinction between existing network operators and new entrants – as requested by respondents – is not possible for reasons of equal treatment of applicants.

To those requesting that all issues relating to radio compatibility with neighbouring systems should be examined at the start in the frequency usage concept, it is pointed out that this can only be considered insofar as section 2(2) para 7 in conjunction with section 55(5) sentence 1 para 4 of the TKG require the interference-free use of frequencies to be secured. The frequency usage conditions for the respective band are to be referred to here.

In order to fulfil the minimum specialist and other requirements for qualification for the auction within the meaning of section 61(4) sentence 2 para 1 of the TKG, an applicant must demonstrate and prove (for details see Annex 5)

- that they meet the legal assignment requirements within the meaning of section 55(4) and (5) of the TKG,
- that they ensure efficient and interference-free frequency usage, section 55(5) sentence 1 para 4 of the TKG,
- that they have access to the financial resources necessary for purchasing the frequencies,
- that they have a serious bidding intention and
- how the financial interests and ownership of their company are structured.

In order to accommodate the public's need for information and particularly to establish transparency for the auction participants, the Bundesnetzagentur will publicly announce the bidders admitted to the auction and later the successful parties awarded spectrum.

Re IV.1.4. Individual minimum spectrum requirements

The following comments were made:

A restriction of the minimum essential spectrum package to a maximum of 2 x 10 MHz in the 800 MHz band has been called for. There was no clear reason why a package of 2 x 10 MHz should not be sufficient for technically and commercially viable network operation. It would not be fair to grant one group of network operators the option of defining a higher minimum spectrum package, while this possibility does not exist for another group of network operators due to spectrum caps. A higher minimum essential spectrum package could be an indication of inefficient frequency usage.

It was noted that the "determination of a minimum essential spectrum package" would create scope for tactical bidding, for example in order to drive prices upwards without having any actual interest in the respective spectrum. In this context there have been calls for the bidders' minimum essential spectrum packages to be closely examined in terms of plausibility, and where necessary, capped.

The options provided for notifying individual minimum frequency requirement are not clear. It was therefore questionable whether an individual minimum frequency requirement must definitely be indicated for the 800 MHz band or whether this was also possible for the total spectrum for award without the specification of particular bands. Moreover, it was not entirely clear whether there was a financial obligation if the highest bids were held at the end of the auction, which were however lower than the minimum frequency requirements determined prior to proceedings. It was also unclear whether it would be sufficient, for example, if a bidder obtained their total requirement, yet this was in the 800 MHz band. Attention was drawn in this respect to the fact that flexible change between bands must be possible at all times, regardless of any determined minimum essential package.

It has furthermore been suggested that it should be possible to state minimum packages for particular bands in isolation, without successful bids in other bands being affected.

The Chamber has ruled as follows:

Applicants are entitled to request the individual minimum frequency requirements they regard as the absolute minimum for the respective business model in light of spectrum efficiency and business management reasons (so-called minimum essential spectrum package).

Under subsection IV.3.1, the Chamber decided that no basic spectrum package will be set. Where however a bidder has an individually higher minimum frequency requirement for their business model, which is greater than 5 MHz, the smallest unit available for award here, they can notify a minimum essential spectrum package in their application. The minimum essential spectrum package must be clearly and conclusively demonstrated in the frequency usage concept. With the submitted frequency usage concept, the Chamber will examine the applicant's details regarding the minimum essential package. The applicant's minimum essential package will be stated on the qualification notice.

Where a minimum essential package has been set, bidders will be awarded the blocks for which they hold the highest bid at the end of the auction only if the blocks at least total the minimum essential package determined. This ensures that a bidder does not receive less than the minimum frequency requirements for the respective business model.

An applicant can request a 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.

Due to the misunderstanding of case c) which became clear from the comments, the following example is provided:

> An applicant requests a minimum essential spectrum package totalling 2 x 20 MHz (paired) for all the frequencies available for award (ie for frequencies in the 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz bands). The applicant states that of these 2 x 20 MHz (paired), 2 x 10 MHz (paired) in the 800 MHz band are essential in order to realise their business model.
>
> With this agreed minimum essential spectrum package, a bidder needs to obtain 2 x 10 MHz (paired) in the 800 MHz band along with 2 x 10 MHz (paired) in the entire spectrum available for award (800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz) in order to be successful. To clarify: this bidder can, for example, also obtain 2 x 15 MHz (paired) in the 800 MHz band and 2 x 5 MHz (paired) in another band for award in order to achieve the minimum essential spectrum package available.
>
> In the interests of simplicity, this example was based on a bidder requiring paired spectrum. Attention is drawn to the fact that the minimum essential spectrum package will be expressed in lot ratings (cf subsection V.3.8)

If a minimum essential spectrum package is requested and agreed to when the bidder qualifies for the auction, this affects the minimum level of activity required from the bidder: a bidder is eliminated from the entire auction if they do not bid for at least their agreed minimum essential package (cf subsections V.3.9 and V.3.15). Bidders whose minimum essential package has been agreed to will only be awarded spectrum if at the end of the auction they hold the highest bids for at least this minimum package (cf subsections V.3.7 and V.3.17).

If for example – as in case c) – a minimum essential spectrum package is requested for all the frequencies available for award (amount 1), and from these specifically for the 800 MHz band (amount 2), the bidder is eliminated if their bid does not total both amounts (1 and 2).

With regard to calls for restricting the minimum essential spectrum package to a maximum of 2 x 10 MHz in the 800 MHz band, the Chamber draws attention to the following:

The Chamber does not consider it necessary to restrict the minimum essential spectrum package in advance. A highly diverse range of telecommunications services can be offered with the spectrum available for award, so that a uniform minimum amount of spectrum above the smallest unit of 5 MHz cannot be determined in the abstract for all conceivable business models (for more details see Order 34/2008, Re 3, Bundesnetzagentur Official Gazette of 23 April 2008). This also applies to a restriction of the minimum essential spectrum package. The Chamber understands a minimum essential spectrum package to be the absolutely essential spectrum package for technically and commercially viable network operation. A minimum package must be demonstrated clearly and conclusively in the frequency usage

concept (cf Annex 5). The Chamber currently assumes that 2 x 10 MHz should be sufficient in the 800 MHz band.

As a minimum package is only agreed to following detailed examination by the Bundesnetzagentur of the application for admission, if this is demonstrated clearly and conclusively in the frequency usage concept, the Chamber considers the risk low that scope for tactical bidding will result from the determination of a minimum package.

The request for the ability to indicate minimum essential packages for particular bands above 1 GHz (e.g. 1.8 GHz) in isolation without bids in other bands being affected cannot be granted by the Chamber. The possibility of indicating a minimum essential package should secure the absolutely necessary frequency package for realising technically and commercially viable network operation, particularly for new entrants. The Chamber considers the option of stating a minimum essential package especially for the 800 MHz band justified as the physical propagation properties of these frequencies differ from those of the other frequencies available for award. Specification of the minimum package for the 1.8 GHz, 2 GHz and 2.6 GHz bands, on the other hand, does not seem necessary as these frequencies are similar in terms of propagation properties. With regard to calls for the decision on the award of spectrum to be made regardless of whether the bidder has achieved the minimum essential amount in other bands, the Chamber is of the opinion that this holds a high risk of abusive bidding.

The operative provisions have been amended as follows solely for the purposes of clarification:

> In their application for admission, applicants are entitled to request the minimum frequency requirements needed for their business model (so-called minimum essential spectrum package).
>
> They must state whether they are looking to acquire a minimum essential spectrum package specifically for the band 800 MHz, for all the bands available for award, or for all the frequencies available for award and from these, specifically for the 800 MHz band:
>
> Thus applicants can request a 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.
>
> Applicants requesting a minimum essential spectrum package but bidding for less during the auction will be eliminated from the entire proceedings.
>
> Any minimum essential spectrum package requested is to be set out in the frequency usage concept in line with the criteria laid down in Annex 5.

Re IV.1.5. Qualification Notice

The following comments were made:

It was not clear how the Bundesnetzagentur will determine the number of bidding entitlements based on the documents submitted. It was unclear whether each successful application will receive exactly the bidding entitlements requested or whether the Bundesnetzagentur would change these.

The Chamber has ruled as follows:

Qualification to the auction requires a particular decision by the President's Chamber as per sections 132(3) in conjunction with 55(9), 61(4) sentence 2 para 1 of the TKG (so-called qualification notice).

The qualification notice establishes the fulfilment of the legal requirements for frequency assignment (section 55(4) and (5) of the TKG) as a precondition for qualification for participation in the auction and determines the scope of the minimum essential spectrum package and the number of bidding entitlements (in lot ratings) (cf subsection V.3.8). The determinations in the qualification notice are binding for the auction. Determinations regarding minimum essential package scope and respective maximum bidding entitlements are pre-set for the bidder in the auction software. Bidding entitlements are only granted if applicants show clearly and conclusively that they will make efficient use of the frequencies applied for in realising their business plan when applying to take part in the auction.

Re IV.1.6. Launch of qualification procedure

The following comments were made:

In light of the scope of the application to be made, a period of eight weeks following publication of the decision for submission of applications was considered too short and a time limit of twelve weeks was suggested.

The Chamber has ruled as follows:

Qualification to take part in the auction opens with publication of this Decision in the Bundesnetzagentur Official Gazette. The Decision will also be published on the website of the Bundesnetzagentur. The qualification stage precedes the auction. The qualification procedure establishes the fulfilment of the legal requirements for qualification for participation in the auction (cf Annex 5). The President's Chamber makes the decision on auction qualification in line with sections 132(3) in conjunction with 55(9), 61(4) sentence 2 para 1 of the TKG.

With the publication of this Decision in the Official Gazette, applications for qualification for the auction can be submitted by 21 January 2010. Bearing in mind and evaluating the comments submitted, the original limit of eight weeks has been extended to the 21 January 2010. This will enable potentially interested parties to submit the complete application documents in good time.

In their application, applicants must declare that they consent to it being made publicly known that they have qualified to take part in the auction and to publication of the fact that they have been awarded spectrum, if appropriate.

The operative provisions have been amended accordingly:

> Applications to qualify to take part in the auction are to be submitted by 21 January 2010, 15:00 hours.

Re IV.2. Determination of the relevant product and geographic market for which the frequencies to be assigned may be used, section 61(4) sentence 2 para 2 of the TKG

Re IV.2.1. Relevant product market

The following comments were made:

Several respondents agreed to the determination of wireless access for the provision of telecommunications services as the purpose of use. The ability for mobile, nomadic and fixed applications to be delivered within the framework of the frequency usage conditions was particularly welcomed. Nevertheless, it was noted that there is a contradiction between the fact that the spectrum at 800 MHz is solely intended for the provision of broadband Internet access on the one hand, and the principle of technological neutrality on the other. Moreover it was questionable whether use for infrastructure purposes was permissible and what influence such applications would have on fulfilling coverage obligations.

Some respondents pointed out that the determination of the relevant product market for wireless access for the 2.6 GHz band excluded fixed services, as the fixed radio service as

defined in section 4 para 5 of the Frequency Band Allocation Ordinance was excluded from this band.

The Chamber has ruled as follows:

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.

According to section 61(4) sentence 2 para 2 of the TKG the relevant product market for which the available frequencies may be used in observance of the frequency usage plan is to be determined.

The following is to be stated regarding the product market:

The relevant product market for which the available frequencies from the bands 1.8 GHz, 2 GHz and 2.6 GHz may be used is the market for wireless access for the provision of telecommunications services and corresponds to the dedications of the frequency bands in the frequency usage plan (for more details see Order 34/2008, Re 1.4, Bundesnetzagentur Official Gazette of 23 April 2008). With the current amendments to the frequency usage plan (published in the same Official Gazette) the included bands at 800 MHz and 1.8 GHz can also be used for the market for wireless access for the provision of telecommunications services.

A restriction of the products to mobile "applications" will not occur. It is neither necessary nor indicated that specific technologies with which the frequencies can be used be explicitly named, or other technologies excluded, as long as the user adheres to the frequency usage conditions set. Network operators are therefore in a position to provide their customers, in line with demand, with all products which can be realised based on the radio technology selected.

The relevant product market is therefore wide. This wide market set-up allows the network operators to offer customers all products in line with demand. In particular, this also allows the demand for mobile broadband Internet access to be met - as required by secondary usage condition 36 of the Frequency Band Allocation Ordinance (FreqBZPV) and in subsection IV.4.5 of this Decision. In light of the Bundesnetzagentur's current policy of awarding frequencies in the 1.8 GHz, 2 GHz and 2,6 GHz bands for wireless access and flexibilising current GSM usage rights in the range at 900/1800 MHz to permit wireless access, the Chamber sees the award of the 800 MHz frequencies as an opportunity to harmonise these frequency regulation measures in such a way that radio applications are able to make a contribution to nationwide provision of fast Internet access in the short, medium and also long-term (for details see federal government's broadband strategy, page 13ff). The provision of these 800 MHz frequencies, particularly suited to the coverage of rural areas, enables fast supply of mobile broadband access to sparsely populated areas and creates the foundation for building a long-term high-performance infrastructure.

With regard to comments made saying that there is a contradiction between the purpose of the 800 MHz frequencies being solely the provision of broadband Internet access on the one hand, and the principle of technological neutrality on the other, the Chamber points out that there are no determinations regarding the use of certain technologies associated with this. Under section 1 of the TKG, the Bundesnetzagentur is required to define technology-neutral regulation and hence the technology-neutral use of frequencies as far as possible in line with statutory requirements. The assignees are free to implement any technology which allows the legal requirements of the FreqBZPV (secondary usage condition 36) to be fulfilled. Even if this means that in some regions, where mobile broadband Internet coverage is required, certain forms of technology (eg narrowband) cannot be implemented on a stand-alone basis, this does not contradict the principle of technological neutrality.

The relevant product market is therefore the market for wireless access for the provision of telecommunications services, ie mainly to provide wireless connections for subscribers. Other applications, eg for infrastructure purposes, are not ruled out in principle. This means

that the frequencies may also be used for infrastructure purposes, as long as the coverage obligation set out in subsections IV.4.4 and IV.4.5 is fulfilled. Where is has been noted that the determination of the relevant product market for wireless access for the 2.6 GHz band excludes fixed services as defined in section 4 para 5 of the FreqBZPV, it is pointed out that the fact that these frequencies have been allocated to the mobile service does not preclude their use for fixed service applications. With the broad dedication of these frequency bands for wireless access for the provision of telecommunications services, mobile, nomadic and fixed service applications can be delivered under the frequency usage conditions. This will allow the network operators to realise all the applications in their respective business models.

Re IV.2.2. Relevant geographic market

The following comments were made:

The determination of the relevant geographic market was agreed to in part. This would lead to optimal nationwide use of the spectrum with mobile radio technologies for broadband services. Mobility meant use throughout Germany. Only in this way could consumers genuinely be provided with a mobile service. Moreover, only with the nationwide assignment of frequencies could economically viable concepts for closing the "white spots" be developed.

On the other hand, it has been said that the planned nationwide award would put smaller regional providers at a disadvantage. In rural areas in particular, competition between a wide variety of services must be made possible. It would also have to be ensured that in the interests of Open Access, the assignees provide a platform open to applications, systems and terminal equipment from third parties. What is more, in practice regional companies in particular would have rolled out networks in unserved areas and connected consumers. Regional network operators and companies therefore had to be given access to the frequencies. On the one hand, they had precise knowledge of the respective regional conditions and were therefore in a position to use the frequencies efficiently. On the other, the 800 MHz frequencies are particularly well-suited to realising economically viable regional business models due to the physical-technical properties. Some respondents therefore called for both nationwide and regional assignments, so that small or medium-sized providers and innovative technological processes would not be excluded.

Other respondents called for a regional invitation to tender, as the areas lacking broadband Internet access are not geographically connected and the requirements of the Bundesrat Resolution of 12 June 2009 could only in this way be implemented. The exclusion of regional frequency assignments was viewed as unlawful by some, as it meant that regional suppliers would be discriminated against.

For improved frequency usage, another respondent suggested a centrally-coordinated dynamic award be carried out according to requirement, where on average each assignee receives the bandwidth granted to them, but where higher regional requirement can be informally served through mutual exchange.

It was doubted that, in the event of assignment to the existing mobile network operators, parts of the spectrum would be leased to third party suppliers in certain areas. The question was also raised whether regional spectrum leasing was possible given the obligation for nationwide coverage.

The assumption that award on a nationwide basis would require less coordination was doubted, in terms of compatibility with DVB-T.

The Chamber has ruled as follows:

According to section 61(4) sentence 2 para 2 of the TKG the relevant market for which the available frequencies may be used in observance of the frequency usage plan is to be determined not only in terms of products, but also geographically. The relevant geographic market is the territory of the Federal Republic of Germany.

The frequency bands at 800 MHz and 1.8 GHz now included are also available on a nationwide basis. Accordingly, the frequencies can and should be assigned nationwide. Regionalisation would not appear to be appropriate (for more details see Order 34/2008, Re 2.2, Bundesnetzagentur Official Gazette of 23 April 2008).

The frequencies for award at 1.8 GHz, 2 GHz and 2.6 GHz are already dedicated to wireless access for the provision of telecommunications services. With the current amendments to the frequency usage plan (published in the same Official Gazette) the included bands at 800 MHz and 1.8 GHz have also been dedicated to wireless access for the provision of telecommunications services.

Nationwide award of the entire spectrum including the 800 MHz frequencies and the other 1.8 GHz frequencies for wireless access is in line with the administrative practice of the President's Chamber thus far (consistency requirement). In the 900 MHz, 1.8 GHz and 2 GHz bands it has become clear that supply to end customers can be secured most efficiently by nationwide providers. Assignments made to date in these bands have accordingly been nationwide. The Chamber therefore provides for all frequencies now available for award to be assigned nationwide, too. Regarding comments that in practice regional companies in particular would secure efficient frequency usage, as they had already rolled out networks in unserved areas and connected consumers, it must be pointed out that nationwide frequency use is required, especially in order to secure mobile broadband usage. Regional usage only of the frequencies could limit mobility significantly.

In addition, the 800 MHz frequencies for award here are virtually predestined for nationwide assignment due to the technical frequency usage conditions and the particularly well-suited propagation properties.

There are currently no reasons to suggest that the relevant geographic market for the 800 MHz frequencies should be changed from the determined nationwide market. As with the frequencies from the 1.8 GHz, 2 GHz and 2.6 GHz bands, the 800 MHz frequencies are to be available in future for wireless access on a nationwide basis and are therefore to be assigned nationwide (for more details see Order 34/2008, Re 2.2, Bundesnetzagentur Official Gazette of 23 April 2008).

Furthermore, the result of the 3.5 GHz frequency auction (BWA, Broadband Wireless Access) in 2006 showed that nationwide business models are preferable for the market, as although the frequencies were offered regionally, they were mostly purchased in such a way that nationwide coverage was achieved in each case.

In reply to the call from respondents that assignees provide a platform in the interests of open access, open to third party applications, systems and terminal equipment, it must be pointed out that imposing access obligations on operators of public telecommunications networks is only possible under the provisions of the Telecommunications Act. In particular, access obligations according to section 21 of the TKG require the prior determination of significant market power held by the respective assignee.

Nationwide award of these frequencies for wireless access enables networks for mobile broadband services to be established nationwide. For physical-technical reasons, the 800 MHz frequencies are suitable for supply to both rural areas and urban centres. Due to these propagation properties, which are especially well-suited to mobile radio applications, the frequencies are also particularly ideal for nationwide usage. In response to comments stating that the 800 MHz frequencies are especially well-suited to the realisation of economically viable regional business models thanks to the physical-technical properties, it must be said that this applies equally to nationwide business models. However, the Chamber

is of the opinion that nationwide frequency assignments are better suited to fulfilling the requirements of the federal government's broadband strategy for establishing nationwide broadband access. This applies in particular when considering the special obligation associated with these frequencies as per subsection IV.4.5 of this Decision. For these reasons, the Chamber cannot agree to the suggestion of awarding solely or in part to regional network operators. Neither can it agree to the suggested successive needs-oriented ("dynamic") award of frequencies because of the limited spectrum in the 800 MHz band of just 2 x 30 MHz (paired) in total. The ability to exchange frequencies requested by some parties is permissible under the provisions of the TKG.

Moreover, the regulatory aim of efficient and interference-free frequency use within the meaning of section 2(2) para 7 of the TKG can be optimally achieved by means of nationwide award of the 800 MHz frequencies, as less coordination is required for this method compared to regional or local award. In the case of nationwide frequency assignment, coordination takes place only with respect to the national border. In this context, the Chamber draws attention to the fact that coordination here refers only to geographical coordination. Nationwide award also dispenses with the need to establish protection ratios. This particularly applies in light of the large coverage ranges of these frequencies, as this means that correspondingly large interference ranges must also be taken into consideration. The spectrum in the 790 – 862 MHz band can therefore be used considerably more efficiently through nationwide award than it would be with regional or local frequency award.

It must also be remembered that frequencies with similar propagation properties in the 900 MHz band were awarded nationwide in the past. In light of this the frequencies in the 800 MHz band should also be awarded on a nationwide basis, particularly in order to give potential new entrants fair access to comparable frequencies.

Where some respondents have said that nationwide award sets smaller regional providers at a disadvantage, attention is drawn to the fact that the realisation of regional business models is not essentially ruled out. It must be pointed out for all the spectrum available in the 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz bands, that the realisation of such regional business models is possible, for example by means of regional leasing of frequency usage rights from the holder of the nationwide assignment. Companies interested in regional frequency use are therefore not prevented from leasing spectrum from a nationwide assignment holder. However, imposing such an obligation on the assignees is not possible under the current legislation. In addition, frequencies may be transferred by singular succession as set out in section 55(7) sentence 1 para 1 of the TKG or by means of spectrum trading as described in section 62 of the TKG (cf Communication 152/2005, RegTP Official Gazette of 29 June 2005).

Re IV.3. Basic spectrum package, section 61(4) sentence 2 para 3 of the TKG, section 61(5) sentence 1 in conjunction with section 61(2) sentence 1 of the TKG

Re IV.3.1. Basic package

The following comments were made:

On the one hand, explicit approval was given to not having a minimum spectrum package, because interested parties would then have greater flexibility to meet their particular spectrum needs and the number of users would not be limited by regulatory constraints. On the other hand, it was proposed that a minimum package be set for the 800 MHz band but not for the 1.8 GHz, 2 GHz and 2.6 GHz bands.

One of the proposals for the spectrum at 800 MHz was two packages of 2 x 15 MHz (paired). This would enhance spectral efficiency in particular as regards use by LTE systems. If the UHF band were split into too many sub-bands, this would be diametrically opposed, in competition terms, to the aim of full coverage of the population in rural areas with broadband Internet.

Another proposal was to award spectrum from the 800 MHz band in three blocks of 2 x 10 MHz (paired).

It was also thought advisable to set a basic or minimum spectrum package of 2 x 10 MHz (paired) in the band at 800 MHz. Here, unlike in the other bands, it could not be left to the companies themselves to assess the minimum amount of spectrum needed in light of their particular business model, but it was necessary for the Bundesnetzagentur to award the spectrum at 800 MHz in accordance specifically with the political aims.

It was proposed that regional basic spectrum packages be set that reflected the area to be covered and the number of inhabitants for whom service was to be provided. Setting basic packages was necessary if the high bandwidth coverage requirements were to be met and in view of the limited spectrum at 800 MHz.

A proposal was made to award as many 2 x 20 MHz (paired) packages as possible and to award spectrum in the band at 2.6 GHz in three packages of 2 x 20 MHz (paired) and one of 2 x 10 MHz (paired). The 2 x 20 MHz channelling for FDD would make it possible to realise the potential of LTE technologies, eg supporting a larger number of users in the same channel and a reduced price per MBit. It would also allow a mobile FDD terminal station operating in the 10 MHz channel at 2560 –2570 MHz to meet the requirements of the block edge mask for out-of-block emissions from mobile terminal stations in accordance with ECC Report 131 by using the conventional HF components. A mobile terminal with greater bandwidth at the upper end of the FDD uplink band could meet these requirements by accepting reduced efficiency in the form of, for instance, lower transmitting power on the scale of several dB.

The Chamber has ruled as follows:

A basic spectrum package will not be set. Under section 61(4) sentence 2 para 3 of the TKG the Chamber can determine, where necessary and prior to the award proceedings, the basic spectrum package required for commencement of the particular telecommunications service.

It is not necessary to do so in this case. A highly diverse range of telecommunications services can be offered with the spectrum available for award, so that a uniform minimum amount of spectrum above the smallest unit of 5 MHz cannot be determined generically for all conceivable business models (for more details see Order 34/2008, Re 3, Bundesnetzagentur Official Gazette of 23 April 2008).

The spectrum for award is being made available for wireless access for the provision of telecommunications services and thus for a considerably wider relevant product market (see Rationale, Re subsection IV.2.1). Hence a large number of business models are possible, so that a uniform basic spectrum package cannot be determined. Given this, the Chamber cannot agree with the calls from respondents to determine basic packages of 2 x 10 MHz, 2 x 15 MHz or 2 x 20 MHz. In setting the award and auction rules, the Chamber has taken account of the fact, as referred to in the responses, that the deployment of new technologies such as LTE will be more efficient with bandwidths greater than 2 x 5 MHz. This will make sure that successful bidders are awarded contiguous spectrum in the relevant bands (see the allotment procedure set out in subsection V.4.2.). Additionally, bidders whose individual requirements for basic spectrum for their business model exceed the smallest unit of 5 MHz available here can specify this as their minimum essential spectrum package. In the auction, bidders will be awarded packages only when the number of packages won, in total, matches at least the minimum essential package specified (for more details see subsection IV.1.4). This will make sure that bidders do not receive less than the minimum spectrum they have identified and thus are not dependent on obtaining – eg by way of transfer – further spectrum after the auction in order to be able to start their intended service.

Also, the Chamber believes that bidders will be given maximum flexibility if a basic package is not set.

As far as respondents call for a basic package to be set in light of the obligation referred to in subsection IV.4.5 for the 800 MHz spectrum, the Chamber wishes to point out that it is

possible to apply for a minimum essential package for this particular band. This minimum essential package will then amount to an individual basic spectrum package in this band. The Chamber had to take account of the fact that a variety of business models was possible here, so that determining a particular amount of spectrum to be regarded as a basic package for every potential bidder was not appropriate. Particularly for network operators with spectrum holdings already, notably spectrum suitable for use in rural areas, it would not be helpful, the Chamber believes, to set a basic package that applied equally to all bidders.

It would be equally unsuitable, against the background of the national relevant geographic market, to set a regional basic spectrum package (see subsection IV.2.2 on this).

Re IV.3.2. Restriction of bidding rights

The following comments were made:

1.8 GHz, 2 GHz, 2.6 GHz
It was proposed that bidding rights also be restricted in the bands above 1 GHz. This could be a good way of achieving market equilibrium, giving new entrants opportunities. Without such action, additional competition for the current assignees as a result of new entrants acquiring spectrum could not be expected to unfold. The interests and the financial resources of the current mobile operators would likely be too great. Hence it was proposed that 2 x 30 MHz (paired) above 1 GHz, too, be reserved for new entrants, or at least that a spectrum cap of 2 x15 MHz (paired) or 1 x 30 MHz (unpaired) per bidder be envisaged.

800 MHz
Some of the respondents supported a restriction of the bidding rights as proposed in the draft for consultation. This would secure fair competition for new entrants as well.

Restricting the frequency usage rights in the band below 1 GHz to 2 x 20 MHz (paired) per operator was appropriate if a level playing field was to be created for all the companies operating in this band. Restricting the bidding rights would mean fair access for all to available spectrum resouces, which could be used according to individual requirements on a technology-neutral basis. It would also avoid reallocation of spectrum in the 900 MHz band, which is practically not possible for technical, economic and legal reasons. Finally, restricting the bidding rights, with the high degree of flexibility that this brings, would enable highly diverse business models to be realised and provide opportunities for new entrants. It would also mean support for the considerations of the President's Chamber on flexibilisation of today's GSM 900 MHz usage rights. Yet it was also pointed out that, as a result of the heavy use of the GSM network today, the environment for technology-neutral use was not given. The next few years will see continued high demand for use by GSM of spectrum resources at 900 MHz, in particular for GSM data services and, as a result of falling prices, for voice too, on account of the heavy growth of traffic volumes.

There were no plans, respondents stated, for technology change before expiry of the usage rights in the 900 MHz band. There was no free capacity in the 900 MHz band on account of the high levels of voice traffic, both present and anticipated. Intensive use was made of the spectrum at 900 MHz for GSM services and the structures of the GSM network were designed for the specific properties of this spectrum. Furthermore, having to give up spectrum could not be reconciled with investments made in light of existing and promised spectrum holdings, particularly not as the usage rights had only recently been extended.

Some respondents thought it advisable to restrict the bidding rights of the D network operators to 2 x 5 MHz (paired) each, so as to give other bidders equal access to 800 MHz spectrum. Such a restriction would enable the E network operators to largely wipe out their legacy disadvantages in the provision of 900 MHz spectrum. The planned award rules, in conjunction with the flexibilisation of existing GSM usage rights, would create a situation that was likely to lower competition intensity in the mobile sector more than temporarily. If the bidding rights were restricted as planned, the outcome of the auction would likely be that one of the E network operators was not able to acquire spectrum at 800 MHz and, as a result, would be considerably disadvantaged in competing to serve not just rural areas but also

indoor service in conurbations, affecting competition significantly. The strategic aim for the D network operators would be to win maximum spectrum, although they would already be able to use the bandwidth of 2 x 10 MHz (paired) with just 2 x 5 MHz (paired) from the 800 MHz band by means of bandwidth aggregation with 900 MHz spectrum.

A case was made for setting a "hard" spectrum cap of 2 x 20 MHz that would include all the spectrum assigned below 1 GHz, without exceptions and without any rounding up, in order to put all the bidders for spectrum below 1 GHz on an equal footing and to prevent any further distortion of competition. The D network operators could, for instance, transfer spectrum of 2 x 2.4 MHz (paired) to an E network operator before the auction or relinquish usage rights under section 63(6) of the TKG and thus increase their bidding rights to 2 x 10 MHz (paired).

It was said that a lower spectrum cap, too, would be compatible with the regulatory aims of encouraging efficient investment in infrastructure and promoting innovation. In this context the President's Chamber had initially not taken account of the fact that one of the D network operators had usage rights in the 450 MHz band that were to be flexibilised. It should also be remembered that the D network operators could combine frequencies from the 900 MHz band with frequencies from the 800 MHz band to create bandwidth of 2 x 10 MHz (paired) (also known as bandwidth aggregation). The development of bandwidth aggregation technologies was already well advanced. Thus the 3GPP Release 8 features DC-HSDPA (Dual Cell HSDPA), which enables two 5 MHz blocks in one band to be combined to form a shared carrier (2 x 10 MHz) with higher bandwidth and capacity. An extension of this feature to adjacent bands (800 MHz and 900 MHz) is in the final standardisation phase at 3GPP and will be adopted before the end of 2009 (Release 9), so that the technology will be available in 2010 to combine a 5 MHz block at 800 MHz with a 5 MHz block at 900 MHz for broadband use. The D network operators, too, would push this solution. After all, 3GPP was also working on bandwidth aggregation functionality for LTE. This was part of Release 10 and was expected to be available at the end of 2010. This meant a technical solution for LTE as a broadband technology of the future, fitting for further rollout at 800 MHz, with which two physical 5 MHz blocks at 800 MHz and 900 MHz could be combined to create a shared 10 MHz LTE carrier, allowing efficient investment in future broadband networks. Unlike the E network operators, the D network operators, having more spectrum at 900 MHz, were therefore perfectly able to make a competitive broadband offer with only one 5 MHz block at 800 MHz, on the basis of 10 MHz bandwidth. Further, a spectrum cap would not really restrict the D network operators' bidding rights as they were not expected to want more than two blocks, seeing as use of more than 2 x 10 MHz at 800 MHz was debatable under the state of the art.

The cap of 2 x 17.5 MHz (paired) that the consultation proposed would encourage a level playing field in which every operator, after the auction, would have 2 x 10 MHz (paired) for broadband services. It would also give new entrants a better chance to acquire spectrum. Small and medium-sized enterprises' interests would also be taken into account, as required by section 61(5) of the TKG.

One respondent proposed that the spectrum at 800 MHz be split into two equal packages of 2 x 15 MHz (paired). This would enhance spectral efficiency in particular as regards use by LTE systems. LTE supported channel bandwidths up to 20 MHz and provided greater throughput according to the bandwidth of the channel used. Greater channel bandwidth was therefore particularly important for broadband service to rural areas at acceptable speeds. Moreover, spectrum award as proposed provided the opportunity, not just in the band at 800 MHz, to maximise channel bandwidth. There was also the opportunity, in connection with the flexibilisation of the GSM usage rights, to give all the current mobile operators relatively wide bands for LTE. Thus it was conceivable, the spectrum packages being modified accordingly, for one company to receive 2 x 20 MHz (paired) in the GSM band, one to receive 2 x 15 MHz (paired) in the GSM / E-GSM band and two companies to receive 2 x 15 MHz (paired) each in the 800 MHz band. These modifications could be achieved through spectrum trading or a combination of spectrum trading and spectrum auction. By contrast, the award conditions in the draft President's Chamber decision could lead to a

fragmentation of the 800 MHz band, that is to say to further fragmentation of spectrum below 1 GHz.

It was proposed that 2 x 10 MHz from the available 2 x 30 MHz be awarded in a first step to each of the new entrants that had qualified to take part or that a block of 2 x 10 MHz be reserved to auction among all the new entrants participating. The remaining spectrum from the band could then be freely auctioned among all the bidders in blocks of 2 x 5 MHz (paired) in a further step.

It was also said that the established mobile operators with spectrum holdings below 1 GHz should be excluded from the award of 800 MHz spectrum in order to give new entrants a chance and to secure fair competition.

On the other hand, restricting bidding rights was rejected on the grounds that every operator should be able to obtain the resources needed for its business model in competitive proceedings. Setting spectrum caps, however, restricted competition for scarce resources and might actually foreclose the market to potential participants in the auction. In all other respects there was no justification for such intervention. There was not an asymmetric competitive situation between the current holders of spectrum for mobile services that had to be offset by means of spectrum caps. On the contrary, imposing a cap would result in distortions of competition to the detriment of the companies concerned.

With reference to the bandwidth aggregation of blocks from the 800 MHz and 900 MHz bands discussed in connection with spectrum caps it was said that this feature of LTE technologies was still in the early stages of standardisation and terminal equipment therefore could not be expected within the foreseeable future. Even if devices were available, it would still not be possible to introduce this feature on account of the traffic load in the GSM network continuing into the medium term.

The restriction must not be allowed to rule out the build and operation of a commercially viable mobile network based on modern transmission technology, reflecting political objectives, consumer interest and the principle of efficient use of frequencies. For this, a minimum package of 2 x 10 MHz was needed.

Several respondents wanted the bidding rights restrictions to be lifted in a further stage of the auction if, at the end of the first stage, not all the 2 x 5 MHz blocks in the 800 MHz band had been awarded.

The Chamber has ruled as follows:

1.8 GHz, 2 GHz, 2.6 GHz

Spectrum caps for the bands at 1.8 GHz, 2 GHz and 2.6 GHz will not be imposed (for more details see Order 34/2008, Re 3, Bundesnetzagentur Official Gazette of 23 April 2008). Essentially, the Chamber's working hypothesis for these bands is as follows.

While the Chamber believes that restricting each bidder's rights could, in principle, facilitate market entry for potentially interested parties, it feels that the spectrum for auction in the 1.8 GHz, 2 GHz and 2.6 GHz bands, amounting as it does to some 300 MHz, provides enough scope. It does not consider it necessary to set a general spectrum cap to prevent acquiring spectrum being made more difficult for new entrants. In light of the spectrum available (almost 300 MHz), the probability of strategic bidding is regarded as slight (demand reduction effect in competition).

Also, if it were to set a cap, the Chamber would have to take into account that too low a cap would rule out business models with higher spectrum requirements. For companies already active in the market, frequencies in the bands at 1.8 GHz, 2 GHz and 2.6 GHz will serve as extension bands both to relieve congestion in existing applications and to develop new services. A new entrant will require these frequencies – besides those in the band at 800 MHz – to launch service and keep its business model up and running. Depending on the company's business plans and reasons for acquiring spectrum, its frequency requirements

can be relatively high or low. Given the diverse uses to which the spectrum can be put, the different business strategies and the volume of spectrum available in these bands, the Chamber does not consider it necessary to set any limits.

Proposals to limit bidding rights in the higher bands (above 1 GHz) to make it easier for newcomers are therefore rejected for the above reasons.

800 MHz

Bidding rights in the 790 – 862 MHz band are limited to a maximum package of 2 x 20 MHz (paired). Account is taken of the GSM operators' existing spectrum holdings in the band at 900 MHz. This produces the following restrictions for them:

GSM operators	Bidding rights restricted to
D network operators	**2 x 10 MHz (paired) in the 800 MHz band**
E network operators	**2 x 15 MHz (paired) in the 800 MHz band**

On account of the particularly good propagation conditions at 800 MHz compared with those in the higher bands and the relatively small amount of this 2 x 30 MHz (paired) spectrum, the frequencies at 800 MHz will be looked at separately and special arrangements made with a view to equal access. Hence setting a spectrum cap here, limiting the bidding rights per bidder, is suitable, necessary and proportionate.

In setting a spectrum cap the Chamber is, in particular, pursuing the regulatory aims of securing fair competition and promoting markets with sustainable competition as set out in section 2(2) para 2 of the TKG and encouraging efficient investment in infrastructure as set out in section 2(2) para 3 of the TKG. It must be remembered that this spectrum at 800 MHz, unlike the other spectrum for award, is especially suitable for covering rural areas and is thus especially important as regards more cost-effective network build in just these areas. Thus care must be taken to ensure that potential bidders have equal access to this spectrum, besides access to the spectrum at 1.8 GHz, 2 GHz and 2.6 GHz.

To secure equal access to these frequencies the Chamber considers it necessary to restrict the bidding rights by means of a spectrum cap. This restriction is designed to prevent a situation in which one company alone can acquire these frequencies. On the contrary, the aim is for a maximum number of bidders to win the spectrum. Then, new entrants will have the opportunity to acquire enough spectrum that is suitable for use in rural areas to enable them to implement their particular business model. Also, the four existing mobile operators will have the possibility of winning more such spectrum.

The Chamber has set the cap in light of the following considerations.

On account of the relatively low amount of spectrum available at 800 MHz, namely 2 x 30 MHz (paired), the Chamber considers a cap of 2 x 20 MHz (paired) appropriate. In setting the cap the Chamber was guided by the principle that potential bidders should, as far as possible, be able to determine their frequency requirements individually, in line with their particular business model, during the auction. Setting the cap at 2 x 20 MHz (paired) is thus proportionate in terms of keeping the restriction to a minimum. A bigger cap than 2 x 20 MHz (paired) is not appropriate in view of the total of only 2 x 30 MHz (paired), and would not be an effective measure, in the Chamber's view. A cap of less than 2 x 20 MHz (paired) could disproportionately hinder the implementation of particular business models of both new entrants and existing operators. New entrants thus have the chance of acquiring 2 x 20 MHz (paired) for cost-effective infrastructure deployment.

This will also give the existing mobile operators that already have spectrum holdings the possibility of obtaining more spectrum for use in rural areas. Giving existing operators maximum flexibility in exercising their bidding rights is another reason for deciding not to set a cap of less than 2 x 20 MHz (paired). All the mobile operators have requested contiguous spectrum at 800 MHz in order to provide broadband service in rural areas. As demand for higher data rates grows, the requirements for the medium to long term will exceed 160 MHz. Against this background it is appropriate to give the current mobile operators the possibility of meeting at least some of their requirements in the band at 800 MHz.

With regard to this cap of 2 x 20 MHz (paired) it should not be forgotten, however, that the mobile operators already have frequencies that are suitable for use in rural areas in the band at 900 MHz. These frequencies at 900 MHz are comparable with those at 800 MHz in terms of their physical propagation properties. Thus there is justification for including their spectrum holdings in the 900 MHz band in the envisaged cap.

With this inclusion, the current mobile operators cannot bid for 2 x 20 MHz (paired) in the 800 MHz band. Their bidding rights will be reduced by the amount of spectrum won at 900 MHz.

Responding to calls for spectrum holdings at 450 MHz as well to factor into the restrictions on bidding rights, the Chamber wishes to point out that these holdings cannot be included in the restrictions on bidding rights in the 800 MHz band. In the 450 MHz band, each operator has been allocated only 2 x 1.25 MHz (paired), whereas the block bandwidths in the 800 MHz band are 5 MHz.

Specifically then, the restrictions on bidding rights are as follows.

The so-called D network operators both have 2 x 12.4 MHz (paired) in the 900 MHz band. In purely arithmetical terms, they could acquire a further 2 x 7.6 MHz (paired) under the cap. However, as only 5 MHz blocks are being awarded, the Chamber believes that restricting the rights to just 2 x 5 MHz (paired) would not be conducive to achieving the regulatory aim of encouraging efficient investment in infrastructure and promoting innovation, as set out in section 2(2) para 3 of the TKG. For the purpose of efficient investment in infrastructure, future broadband technologies will be deployed to greater effect if – as described below – more than 2 x 5 MHz (paired) is allocated.

This would also reflect the regulatory aim of safeguarding consumer interests as set out in section 2(2) para 1 of the TKG if consumers, as a result, could avail themselves of broadband services at favourable prices. Another point for consideration is that the frequencies at 800 MHz are intended most notably to provide service across the country and thus in rural areas particularly (cf secondary usage condition 36 of the Frequency Band Allocation Ordinance). They are particularly well suited for the provision of broadband service.

As the 800 MHz spectrum is to be awarded in blocks of 5 MHz, the D network operators will be able to acquire a maximum of 2 x 10 MHz (paired) with the spectrum cap of 2 x 20 MHz (paired).

The E network operators both have 2 x 5 MHz (paired) in the 900 MHz band, so that they are subject to restricted bidding rights of 2 x 15 MHz (paired) for the 800 MHz band.

A bidder without spectrum in the 900 MHz band can exercise bidding rights in the 800 MHz band up to a maximum of 2 x 20 MHz (paired).

The Chamber does not agree with the respondents' proposal for greater restrictions on the D network operators' bidding rights.

On the one hand there are calls for spectrum below 1 GHz to be reallocated in favour of the E network operators, to avoid distortions of competition. This could be done either by a spectrum cap of 2 x 5 MHz (paired) in the 800 MHz band for the D network operators or by each D network operator relinquishing at least 2 x 2.4 MHz (paired) in the 900 MHz band. This follows most notably from the amended GSM Directive, according to which Member

States are to eliminate distortions of competition by making GSM usage rights in the particular mobile market more flexible. Reference is also made to the possibility of combining blocks from the 800 MHz and 900 MHz bands to create a single channel (bandwidth aggregation).

On the other hand, if network costs and frequency usage are to be efficient, the possibility of acquiring 2 x 10 MHz (paired) in the 800 MHz band – in particular to provide mobile broadband service to rural areas – is essential. Being restricted to 2 x 5 MHz (paired) would be tantamount to excluding the D network operators, as bandwidth aggregation will not be technically feasible before 2015. A minimum package of 2 x 10 MHz (paired) in the 800 MHz band is therefore necessary.

The Chamber is in no doubt that a combination of frequencies from the bands at 800 MHz and 900 MHz cannot be considered an alternative to a contiguous block of 2 x 10 MHz at 800 MHz for the spectrum cap, neither as far as timescales are concerned – above all meeting the coverage requirements – nor in connection with possible transmission rates.

Bandwidth aggregation would combine a 2 x 5 MHz block from the 800 MHz band with a 2 x 5 MHz block from the 900 MHz band to create one channel. The current version of the LTE standard ("Release 8") and its successor version whose standardisation is expected by the end of the year ("Release 9"), do not permit any such aggregation. According to the timetable of the 3GPP (3rd Generation Partnership Project) standardisation group, not before LTE "Release 10", the completion of which is set for late 2010 / early 2011, will it be possible to aggregate bandwidth from different bands. Here, it should be emphasised that the time between completion of the standard and availability of the network components and handsets can differ considerably, depending on the interests of the manufacturers and the network operators. Hence it is not possible to forecast with any reliability when LTE broadband aggregation will be available.

Even if this technology were available, an aggregated block of 2 x 10 MHz would have to be equivalent to a block of 2 x 10 MHz at 800 MHz to be considered an alternative. However, equivalence is not given with the current state of play, as the 3GPP broadband aggregation debate addresses solely the transmit band for the base stations (downlink) and not the transmit band for the handsets (uplink). Thus customers could not be offered the same data speeds and so not the whole service portfolio. Also, bandwidth aggregation would presuppose that the D network operators could make immediate plans to release a contiguous block of 2 x 5 MHz at 900 MHz which, in the Chamber's view, and as the respondents noted, would create considerable re-planning costs.

The Chamber has also taken account of the comments that require every network operator, particularly if it is to provide service to rural areas with maximum efficiency in terms of network costs, to be able to acquire at least 2 x 10 MHz (paired) in the 800 MHz band. Secondary usage condition 36 of the Frequency Band Allocation Ordinance calls for the 800 MHz spectrum to be used to provide rural areas with mobile broadband Internet. It is precisely the physical properties of the 800 MHz spectrum that allow network operators to use large cells to cover large areas and thus to incur relatively low network costs. If broadband services are to be offered, sufficiently large capacity must be made available. Bandwidth over 2 x 5 MHz (paired) allows greater capacity to be provided more cost-effectively. Against this background and in consideration of the special coverage obligations, every network operator must be able to obtain at least 2 x 10 MHz (paired) in the 800 MHz band to be in a position to provide broadband service in rural areas.

The possibility of every operator being able to obtain at least 2 x 10 MHz (paired) in the 800 MHz band cannot be made dependent on individual operators having to return spectrum at 900 MHz, however. Thus some respondents thought that, with a spectrum cap of 2 x 20 MHz (paired), existing usage rights below 1 GHz should be deducted in full. This would mean that the D network operators, by giving up, for instance, just 2 x 2.4 MHz (paired) in the 900 MHz band, could acquire 2 x 10 MHz (paired) in the 800 MHz band. However, bearing in mind the extension of the GSM usage rights to 2016, the Chamber

assumes continued efficient use of frequencies in the 900 MHz band for GSM services. The D network operators' GSM frequency usage rights were extended in August 2009. The E1 network operator has also reserved the right to extend its GSM frequency usage rights after 2012. This will create the same framework conditions for all the GSM operators as regards the duration of the usage rights.

The GSM licence terms have been extended as a result of stage II of the GSM strategy 2005 (Order 88/2005, Bundesnetzagentur Official Gazette 23/2005 of 30 November 2005), creating uniform framework conditions for the continued offer of GSM services. The Chamber is certain that demand for GSM services will continue into the medium to long term. This is also confirmed by the D network operators, who pointed out that the entire spectrum at 900 MHz would still be used for GSM services in the medium to long term and that a change of technology was not therefore planned at the present time. In light of this, the Chamber cannot include in its considerations on the spectrum cap the calls from respondents for the D network operators to give up frequencies in the 900 MHz band. Even if, in purely arithmetical terms, both D network operators were then given the chance, unlike the E network operators and new entrants, to obtain more than 2 x 20 MHz (paired) below 1 GHz, this cannot be viewed as discrimination against the E network operators and new entrants.

The intended restriction of bidding rights enabling the D network operators to acquire 2 x 10 MHz (paired) will not mean that the current asymmetric holdings of frequencies suitable for use in rural areas are consolidated, as the respondents fear. Of this the Chamber is quite certain, pointing out that the GSM strategy, as the basis for extending the GSM frequency usage rights until 2016, provides for a fresh review of the competitive environment in the case of flexibilisation of the usage rights. On this, the GSM strategy says the following:

> *"This GSM strategy also provides for a uniform legal framework in that the current frequency usage conditions of the E networks for GSM services apply to both offerings at 1800 MHz and at 900 MHz and the terms all run until 31 December 2016, the expiry date of the E2 licence. In light of further technological development and the likely convergence of the GSM and UMTS markets, reviews and any flexibilisation of the frequency usage conditions will be necessary in the coming years already, not only after 2016."*

According to the amended GSM Directive, too, which will take effect this October, the Member States must examine the effect of the flexibilisation of the GSM usage rights on competition in the mobile markets concerned. Article 1(2) of the amending Directive states that 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, address such distortions in accordance with Article 14 of Directive 2002/20/EC. Recital 6 of the amending Directive has the following to say:

> *"The liberalisation of the use of the 900 MHz band could possibly result in competitive distortions. In particular, where certain mobile operators have not been assigned spectrum in the 900 MHz band, they could be put at a disadvantage in terms of cost and efficiency in comparison with operators that will be able to provide 3G services in that band. Under the regulatory framework on electronic communications, and in particular 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), Member States can amend and/or review rights of use of spectrum and thus have the tools to deal, where required, with such possible distortions."*

It follows from this that it is not actually liberalisation of the 900 MHz band itself, but liberalisation of the rights of use that could result in distortions of competition. For this, the companies concerned would have to make use of the liberalised regulatory framework. Hence there cannot be any distortions of competition within the meaning of Article 1(2) of the

Directive amending Directive 87/372/EEC in favour of the D network operators at the expense of the E network operators as long as the D network operators use the frequencies at 900 MHz exclusively for GSM applications. For this time the D network operators cannot gain any competitive edge as a result of the possibility of parallel operation of GSM and UMTS (for more details see the President's Chamber decision on the flexibilisation of frequency usage rights for wireless access for the provision of telecommunications services, BK 1a-09/001, Rationale Re action 2, in Bundesnetzagentur Official Gazette of the same day).

Thus under the President's Chamber decision on the flexibilisation of frequency usage rights (BK 1a-09/001) the matter of the competitive neutrality of the spectrum regulatory conditions will have to be looked at in the case of the flexibilisation of the GSM spectrum rights (actions 2 and 3).

After looking at all the arguments and weighing the regulatory aims, the Chamber has concluded that redistribution of the spectrum at 900 MHz is not necessary, because the aims connected with calls for reallocation can be achieved just as effectively with the award of spectrum in the 800 MHz band, without the need for intervention in the well established operations of the network operators concerned. On the contrary, restricting the bidding rights as envisaged means that both the existing GSM operators and potential new entrants will have equal access to this spectrum.

The Chamber does not agree with what some respondents called for, namely for the bidding rights restrictions to be lifted in a further stage of the auction if, at the end of the first stage, not all the 2 x 5 MHz blocks in the 800 MHz band had been awarded. The above considerations on the need for a spectrum cap apply, no matter how the auction proceeds. The aim of restricting the bidding rights is to ensure that as many companies as possible have access to spectrum below 1 GHz (see also subsection V.3.18)

Re IV.4. Frequency usage conditions, section 61(4) sentence 2 para 4 of the TKG

The Chamber determines under section 61(4) sentence 2 para 4 of the TKG, before the auction begins, the frequency usage conditions, including the degree of coverage with the frequency usage, and the time needed to achieve this degree of coverage. Besides the technical requirements, the frequency usage conditions give details of the type and extent of the frequencies (eg position in the band, size of the blocks).

Re IV.4.1. Purpose of use

The following comments were made:

Several respondents basically supported the draft decision. A number thought that, additionally, it was necessary to stipulate the 790 – 862 MHz band for FDD. There would be less interference if FDD systems only were permitted. It was declared that this was not prescribing the technology, but just the method of frequency usage. It was also declared that future technologies would have both duplex modes. And finally, there would be cost advantages that could be passed on to the customers because of the clear requirements for implementing the handsets.

Not authorising TDD use would help to encourage efficient use of frequencies, to prevent interference at both national and international level and to promote economies of scale in producing systems and handsets. On the other hand, however, the principle of technology and service neutrality would be called into question if preference were given to FDD for 800 MHz.

Some respondents advocated the use solely of TDD systems in this band, as customers were usually provided with asymmetric data speeds for the uplink and downlink, and TDD could deliver more efficient spectrum utilisation here.

An editorial change was requested with regard to the band edges at 791 to 862 MHz and accordingly the centre gap from 821 to 832 MHz. Otherwise, there should be no departures from the harmonised CEPT specifications.

A proposal was made to award spectrum from the 800 MHz band in blocks of 2 x 10 MHz (paired). Such packages offered optimum, cost-effective coverage for HSPA+ and LTE broadband access in rural areas and smaller towns and communities, with the resulting positive effects. Using bandwidths of more than 10 MHz in bands structured thus would require either considerable progress in HF technology or result in considerably less sensitivity. Better HF performance could not be expected in the short or medium term, as this would require a vast improvement over the performance of today's components.

Respondents called for the transmission technology to be successively adapted to the most efficient technology available and for this to be prescribed.

It was proposed that the exclusion zones for radio astronomy stations be clearly defined and hence the area of 60 bis 100 km envisaged by ECC Report 45 adapted in line with local terrain conditions.

A proposal was made to rededicate the 2010 – 2025 MHz band for femtocell use, or to take it out of the auction and reserve it for femtocells. General authorisation for wireless access via low power femtocells and home base stations in this band was proposed for this.

It was pointed out that use of individual 5 MHz blocks in the preferred harmonised FDD band plan should be avoided for TDD at all costs in the bands at 1.8 GHz, 2 GHz and 2.6 GHz. In the interest of optimum spectrum efficiency there should also be a clear dividing line between FDD and TDD use in the 2.6 GHz band.

There were concerns about use of the 800 MHz band, since disadvantages could be expected for current users as well as degradation of the digital broadcasting service on adjacent frequencies. Hence use of these frequencies appeared risky at present on legal and financial grounds.

Several respondents thought the development potential of the broadcasting service would be greatly constrained. In technical and formal terms, the unrestricted and interference-free use of all the frequencies used for broadcasting would have to be secured, at least in part, by future assignees in the 790 – 862 MHz band being required to commit to funding so-called mitigation techniques. Over and above this, there were calls for binding procedures to be laid down to deal with interference scenarios properly and to require frequency assignees to provide remedies, self-funded, if need be.

It was noted that detailed provisions to secure the interference-free coexistence of wireless and wire-based use of the 800 MHz band still needed to be drawn up for the annex to the draft decision giving the frequency usage conditions for the 800 MHz band.

Some of the respondents saw considerable interference potential in the adjacent broadcasting band in terrestrial and cable transmission, and urged that binding requirements be set out both in the draft decision and in the Frequency Usage Plan for a definitive solution to the matter of peaceful coexistence of broadcasting and telecommunications services before the frequencies were assigned.

Attention was drawn to the fact that basic broadband coverage did not necessarily mean mobile only. Accordingly, fixed broadband should be envisaged for coverage of rural areas as well as mobile broadband.

It was said that the exclusion of the fixed service represented a restriction in the 2.6 GHz band that was inconsistent with Community law and that the binding definition of mobile service in the Radio Regulations could not be changed with an alternative definition from the Bundesnetzagentur.

The Chamber has ruled as follows:

The purpose of use of the spectrum for award at 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz is wireless access for the provision of telecommunications services. There are no restrictions on the deployment of any technologies. The usage conditions support all available technologies. The Bundesnetzagentur is tasked under section 1 of the TKG with providing technology-neutral regulation and hence technology-neutral use of frequencies.

With these frequency bands being loosely designated for wireless access for the provision of telecommunications services, mobile, nomadic and fixed applications are all possible under the usage conditions. This gives the network operators scope for a whole range of services in their business models. The clarification that some respondents called for that fixed broadband should be possible as well as mobile broadband for the coverage of rural areas is not therefore needed.

To those claiming that fixed applications were ruled out by allocation of the 2.6 GHz band to mobile services, the Chamber pointed out that section 4 subpara 22 of the Frequency Band Allocation Ordinance describes the mobile service as a radio service between mobile and fixed stations or between mobile stations. The allocation to the mobile service in the National Table of Frequency Allocations does not exclude any fixed radio applications; its main significance is for the international coordination of frequency usages and the resulting usage parameters. Under allocation of the 2.6 GHz band to the mobile service fixed and nomadic applications are therefore permissible in addition to mobile applications, as long as the usage parameters resulting from international coordination are observed. Contrary to what some respondents implied, the definition of mobile service has not been amended by the Bundesnetzagentur at the designation level.

The frequency usage conditions have been set in accordance with international provisions.

In response to calls for the 2010 – 2025 MHz band to be redesignated for the use of femtocells or to be taken out of the auction and reserved for femtocells, the Chamber pointed out that it was also possible to use low power femtocells and home base stations under the service and technology-neutral designation and in compliance with the frequency usage conditions. Removing this spectrum from the auction would, moreover, artificially increase spectrum scarcity. Nor would external pairing using frequencies from the 2.6 GHz band be possible any longer. ECC Decision (06)01 addressing reservation of the band from 2010 to 2025 MHz for self provided applications would then be suspended. Hence it is not recommended to reserve this band for low power femtocells or home base stations. Additionally, the Chamber drew attention to the general authorisations for cordless DECT telecommunications systems in the 1880 – 1900 MHz band (Order 54/2008, Bundesnetzagentur Official Gazette 18/2008, page 2647ff) and WLAN in the bands at 2.4 GHz (Order 89/2003, Bundesnetzagentur Official Gazette 25/2003, page 1374) and 5 GHz (Order 8/2006, Bundesnetzagentur Official Gazette 3/2006, page 279f).

Internationally, there are many technical reports, recommendations and decisions addressing the spectrum for award that have to be accommodated in the frequency usage conditions.

In respect of the 800 MHz band, international determinations on conditions for future usages at 790 – 862 MHz have been drawn up, consulted on CEPT-wide until the closing date of 6 September 2009 and scheduled for final adoption at the ECC Plenary from 26 to 30 October 2009. Thus there is a stable European policy position for this band, providing orientation for the Bundesnetzagentur (for more details see subsection IV.4.2).

Studies in the CEPT/ECC bodies, especially those in connection with the European Commission's second mandate to CEPT on the digital dividend, show – unlike the findings in the 2.6 GHz band – that parallel use of FDD (Frequency Division Duplex) and TDD (Time Division Duplex) applications cannot be advocated at national level, considering the extent of spectrum available and the necessary guard bands or distances between FDD and TDD usages.

The studies conducted so far thus indicate that FDD applications, with great probability, are more suited than TDD applications under the current framework to meet the basic requirements of spectrum efficiency and interference-free use of frequencies, here specifically in the broadcasting service below 790 MHz and the mobile service above 790 MHz. Hence there is a preference for FDD. From the point of view of efficient and interference-free use of frequencies, FDD has the advantage that it can be separated from the broadcasting service below 790 MHz considerably more easily, as its uplink band can be shifted into the upper band at 832 – 862 MHz; this cannot be done with TDD. This is significant particularly for the potential scenario "interference to DVB-T reception from terminal equipment used for wireless access".

FDD can provide better protection than TDD for broadcasting in the 470 – 790 MHz band, and can also reduce the technical and regulatory requirements for wireless access usages in the 790 – 862 MHz band needed for this protection. This results in usage conditions that show improvements in both planning and economic terms.

CEPT ECC has drawn up framework conditions for both frequency duplex and time duplex applications. Band plans for both duplex variants can be found in the ECC Decision on harmonised conditions for mobile/fixed communications networks operating in the band 790 – 862 MHz (downloadable at http://www.ero.dk), based on the results of studies described in CEPT Reports 30 and 31. The ECC, however, prefers the FDD band plan given in Annex 1 to the ECC Decision. DECIDES 2 of the ECC Decision says the following on this:

> "…*that those administrations wishing to implement mobile/fixed communications networks based on FDD in the entire frequency band 790 – 862 MHz should adhere to the preferred harmonised frequency arrangement given in Annex 1…*"

Even before the ECC studies were completed it was clear that Europe-wide support for FDD applications (most notably LTE (Long Term Evolution) was considerably greater than for TDD applications. In consideration of what CEPT Reports 30 und 31 say, the Chamber determines, in respect of the 800 MHz band, that only FDD use is possible in principle.

The majority of respondents also spoke in favour of sole use of FDD in this spectrum. The Chamber's determination thus reflects the wishes of potential network operators as regards use of the 790 – 862 MHz band.

A band plan harmonised across Europe will facilitate border coordination and ultimately deliver economies of scale for end users. An FDD band plan will simplify border coodination, as additional cross-border network synchronisation – such as needed for TDD – will not be necessary.

Determining sole use of FDD in the 800 MHz band is fully in line with the regulatory aim of efficient and interference-free use of frequencies as set out in section 2(2) para 7 of the TKG. Mixed FDD and TDD use would require appropriate separation distances between the FDD and TDD operators. As the spectrum in the 800 MHz band is limited to a total of 72 MHz and a channel plan for paired spectrum with a centre gap of 11 MHz is used as the reference point, the separation distances needed with mixed use would run counter to the regulatory aim of efficient use of frequencies. Considerably less spectrum is available anyway in the 800 MHz band (2 x 30 MHz) than in the 2.6 GHz band in which both duplex variants are possible given the spectrum of 2 x 70 MHz (paired).

Even if some respondents question the FDD channelling arrangements in the 800 MHz band on the grounds of possible idle capacity in the uplink on the one hand and insufficient capacity in the downlink on the other or even call for exclusive use of TDD systems, the Chamber considers a European harmonised approach necessary. Determining a band plan for paired spectrum does not rule out the realisation of asymmetric data speeds with use of FDD systems, too. Asymmetric data speeds come about chiefly because of the higher speed of downlink traffic compared to that of uplink traffic. Particularly where broadband applications are concerned this means that the base stations have a higher data throughput rate. The greater transmitting power and greater signal to noise ratio make a high modulation

stage possible. Using the uplink are mostly lower power devices with a lower modulation stage. FDD systems can achieve asymmetric data transfer by using different modulation stages, so that the advantages of TDD systems put forward by the respondents are not apparent.

Nor does the Chamber see any inconsistency with technology and standards neutrality, since deciding in favour of FDD is not prescribing a particular technology or standard. Yet the principle of technology neutrality referred to in section 1 of the TKG does mean there can be no stipulation – as called for by the respondents – of use of the most efficient technology available. Under section 1, the Bundesnetzagentur is required to provide technology-neutral regulation and consequently technology-neutral use of frequencies within the regulatory framework. Assignees are free to use their preferred technology within the limits of the frequency usage conditions.

Thus the spectrum is available for award as follows:

Band	Spectrum available	Award
800 MHz	791–821 MHz and 832–862 MHz	6 blocks of 2 x 5 MHz (paired)
1.8 GHz	1710–1725 MHz and 1805–1820 MHz 1730.1–1735.1 MHz and 1825.1–1830.1 MHz 1758.1–1763.1 MHz and 1853.1–1858.1 MHz	3 blocks of 2 x 5 MHz (paired) 2 x 5 MHz (paired) 2 x 5 MHz (paired)
2 GHz	1900.1–1905.1 MHz 1930.2–1935.15 MHz and 2120.2–2125.15 MHz 1935.15–1940.1 MHz and 2125.15–2130.1 MHz 1950.0–1954.95 MHz and 2140.0–2144.95 MHz 1954.95–1959.9 MHz and 2144.95–2149.9 MHz 2010.5–2024.7 MHz	5 MHz (unpaired) 2 x 4.95 MHz (paired) 2 x 4.95 MHz (paired) 2 x 4.95 MHz (paired) 2 x 4.95 MHz (paired) 14.2 MHz (unpaired)
2.6 GHz	2500–2570 MHz and 2620–2690 MHz 2570–2620 MHz	14 blocks of 2 x 5 MHz (paired) 10 blocks of 5 MHz (unpaired)

The spectrum available at 800 MHz covers the 791 – 821 MHz and 832 – 862 MHz bands. The determinations for these have been amended by the Chamber since the draft consultation to reflect the latest findings of international bodies, as called for by the respondents. Thus the Chamber is supporting the CEPT deliverables, which have been achieved with input from the Bundesnetzagentur and all parties concerned in open, transparent procedures.

The ECC Decision on harmonised conditions for mobile/fixed communications networks operating in the band 790 – 862 MHz was subject to CEPT-wide public consultation until 6 September 2009 and is to be finally approved, as are CEPT Reports 30 und 31, at the forthcoming ECC Plenary from 26 to 30 October 2009. The Bundesnetzagentur will base the frequency usage provisions on the final version of the ECC Decision. However, changes may occur at a later time as a result of amendments to the ECC Decision or as a result of the forthcoming European Commission Decision on the 800 MHz band. The Commission Decision on the 800 MHz band is scheduled for early 2010 and will be binding on Germany.

In response to those commenting that further studies on the introduction of mobile services in the 790 – 862 MHz band were necessary, it should be said that the general conditions of the relevant CEPT and Commission Decisions are the necessary, and adequate, basis for efficient and interference-free use of spectrum, across borders, too (for more details see Order 34/2008, Re 4.2, Bundesnetzagentur Official Gazette of 23 April 2008).

As far as respondents pointed out that use of individual 5 MHz blocks within the preferred harmonised FDD band plan should be avoided at all costs for TDD in the bands at 1.8 GHz, 2 GHz and 2.6 GHz, the following must be said.

As a result of the introduction of block edge masks, or BEMs, it is now possible, under certain conditions, to use TDD systems too in the paired band at 2.6 GHz in derogation of the determinations in ECC Decision (05)05. Thus it is not necessary to exclude TDD systems. A separation of 5 MHz is needed between the services of adjacent users where the constellations FDD to TDD or TDD to TDD (unsynchronised) are concerned. Separation between adjacent services must be provided in their own spectrum by assignees using TDD

systems. In the case of subsequent changes to the system technology used (duplex methods), the guard block must be provided by the assignee causing the greater protection requirements. Thus in the Chamber's view fixed partitioning between FDD and TDD usages in the 2.6 GHz band is not required either.

Interference studies on the coexistence of TDD and FDD systems are not yet to hand for the paired bands at 1.8 GHz and 2 GHz. Existing assignments in these bands rule out the use of TDD systems at present. In June 2009 the European Commission issued a mandate to CEPT that also covered the 1.8 GHz band. The mandate is scheduled for completion by June 2010. One of its areas for study is the deployment of new technologies.

In June 2009, the Commission also issued a mandate to CEPT for the 2 GHz band. This is to provide the basis for drafting, by June 2010, minimum requirements for block edge masks for the 2 GHz band comparable with those for the 2.6 GHz band under Commission Decision 2008/477/EC. The Chamber is working on the assumption that, once CEPT has completed these two mandates, the Commission will issue binding decisions that will necessitate amended usage conditions for the 1.8 and 2 GHz bands.

Essentially, the spectrum in all four bands will be available in blocks of 5 MHz. Award is therefore consistent with the draft international channel plans for the 800 MHz band, currently under discussion in CEPT/ECC. Awarding spectrum in 5 MHz blocks also offers maximum flexibility for bidders, enabling them to realise their (different) business models. This auction design allows bidders to acquire 5 MHz and multiples thereof. Thus the Chamber does not share the views of respondents calling for the award of 800 MHz spectrum in blocks of 2 x 10 MHz (paired) or 2 x 15 MHz (paired).

To ensure that interfererence is not caused to broadcasting services below 790 MHz particularly when television channel 60 is used, special measures may be necessary for wireless access for the provision of telecommunications services. These relate to the transmitting frequencies for the base stations which, when FDD is used, begin directly at 791 MHz, and are to be implemented as part of the determination of the site parameters for the base stations concerned, based on the frequency usage conditions described in Annex 2.

To the respondents fearing that the development potential of the broadcasting service would be curtailed, the Chamber pointed out that current identifiable requirements for broadcasting in Germany could be met within channels 21–60. It would also be possible to cover emerging future developments in broadcasting applications. In this connection the Chamber also mentioned what the broadcasting operators had always said on the limited suitability of the upper UHF band, namely that channels 61 – 69 were less suitable for the broadcasting service on account of the unfavourable characteristics of the receiving antennas.

In other European countries, too, with much higher capacity requirements than Germany as a result of the very high rate of terrestrial primary coverage, broadcasting requirements can be met in the channels 21 to maximum 60. Together with its counterparts in neighbouring states, the Bundesnetzagentur is active in promoting the interests of broadcasting so that national requirements can be satisfied in the channels 21 to 60 and equitable access secured. CEPT is currently drawing up a report on this.

With a view to unrestricted and interference-free use of all the frequencies used for broadcasting some respondents called for a funding obligation on future assignees in the 790 – 862 MHz band for so-called mitigation techniques. In this connection, the Chamber pointed out that secondary usage condition 36 of the Frequency Band Allocation Ordinance states that the mobile service may not cause any interference to the broadcasting service. An assignee in the band at 800 MHz must therefore comply with the usage conditions set out in subsection IV.4.2 of this decision. Any measures needed to fund so-called mitigation techniques are dependent on the individual case and cannot therefore be addressed under this general administrative order. The Chamber refers instead to the Bundesrat decision of 12 June 2009 in Bundesrat printed paper 204/09.

Some respondents called for binding requirements to be set on the issue of the "peaceful" coexistence of broadcasting and telecommunications services before the frequencies were assigned. To this it was replied that there was no right to the use of particular frequencies in the context of meeting broadcasting requirements. The aim is to satisfy all requirements for broadcasting, specific ones and ones yet to be specified, economically and in line with demand, bearing in mind, in equal measure, the regulatory aims of interference-free use and efficient use of frequencies.

In this context, the Chamber wishes to draw attention to the fact that use of the lower block (791 MHz – 796 MHz) is restricted due to broadcasting services in the upper band 470 to 790 MHz (television channel 60). If television channel 60 is used to meet broadcasting requirements now and in the future, interference-free reception of the broadcast programmes will have to be ensured in compliance with the underlying coverage requirements. However, it must be considered whether television channel 60 is specifically envisaged under the updated frequency usage concept for coverage of the particular place and whether it can normally be received in that place in line with these coverage requirements. The areas in which television channel 60 is envisaged under the updated frequency usage concept as a matter of necessity are given in Annex 4.

Compliance with foreign protective rights, most notably for television channel 60, is also required besides compliance with domestic rights of use (see also Annex 4 on this). Another factor for consideration is that the usage rights resulting from international coordination must be protected for the whole of the 790 to 862 MHz band.

In respect of the 2.6 GHz band attention should be drawn to the fact that frequency usages in the paired 2.6 GHz band are not restricted to FDD applications and that TDD applications are thus possible. Use of the blocks in the 2.6 GHz band are subject to restrictions at the upper band edge. For instance, use of blocks 13 and 14 in the upper band (2680 – 2690 MHz) requires protection of the radio astronomy stations in Effelsberg (Eifel) and Westerbork (Netherlands). Here, the directly adjacent band from 2690 – 2700 MHz is the important one, allocated as it is to the radio astronomy service on a primary allocation basis and entitled to claim special protection under usage provision D340 of the Frequency Band Allocation Ordinance.

The Chamber believes that the protection rights of the radio astronomy service (2690 – 2700 MHz) in the directly adjacent band (2680 – 2690 MHz) are localised only, since there are only two sites with radio astronomy stations that require protection at present. The coordination distance in ECC Report 45 of 60 – 100 km around the radio astronomy stations does not describe an exclusion zone, however, but the area in which coordination is required before base stations can be operated. The calculations are based on the threshold levels of interference given in Table 1 of ITU-R RA.769-2 and all the other relevant facts. The Chamber would point out that specific protection areas cannot be calculated a priori – as respondents called for – on the basis of generic assumptions, but only in the individual case when the particular site for a base station and the data of the technology the operator is to deploy are known (see also subsection V.1.4).

The operative provisions were adapted for the 800 MHz band.

The spectrum for award in the bands at 790 to 862 MHz, 1710 to 1725 MHz, 1805 to 1820 MHz and 1.8 GHz, 2 GHz and 2.6 GHz is to be used for wireless access for the provision of telecommunications services. There are no restrictions on the deployment of any technologies. The usage provisions support all available technologies.

The spectrum is available for award as follows:

Band	Available spectrum	Award
800 MHz	791–821 MHz and 832–862 MHz	6 blocks of 2 x 5 MHz (paired)
1.8 GHz	1710–1725 MHz and 1805–1820 MHz	3 blocks of 2 x 5 MHz (paired)
	1730.1–1735.1 MHz and 1825.1–1830.1 MHz	2 x 5 MHz (paired)
	1758.1–1763.1 MHz and 1853.1–1858.1 MHz	2 x 5 MHz (paired)
2 GHz	1900.1–1905.1 MHz	5 MHz (unpaired)
	1930.2–1935.15 MHz and 2120.2–2125.15 MHz	2 x 4.95 MHz (paired)
	1935.15–1940.1 MHz and 2125.15–2130.1 MHz	2 x 4.95 MHz (paired)
	1950.0–1954.95 MHz and 2140.0–2144.95 MHz	2 x 4.95 MHz (paired)
	1954.95–1959.9 MHz and 2144.95–2149.9 MHz	2 x 4.95 MHz (paired)
	2010.5–2024.7 MHz	14.2 MHz (unpaired)
2.6 GHz	2500–2570 MHz and 2620–2690 MHz	14 blocks of 2 x 5 MHz (paired)
	2570–2620 MHz	10 blocks of 5 MHz (unpaired)

Re IV.4.2. Frequency usage conditions

The following comments were made:

The majority of respondents agreed with the determinations on the frequency usage conditions.

It was additionally noted that lowering the field strength from 96 dBµV/m to 90 dBµV/m to protect the Bundesnetzagentur's radio monitoring service (PMD) considerably restricted the network operators' deployment options. The original figure should therefore be kept.

The data on frequencies in the 800 MHz band should be adapted to reflect the level of international debate.

There were calls for the maximum transmitting power of customer premises equipment (CPE) in the 790 – 862 MHz band to be increased from 26 dBm/10 MHz EIRP to 35 dBm/5 MHz EIRP and thus to align this figure with the CPE limit in the 2.6 GHz band. This would deliver better quality coverage in rural areas, from antennas with pronounced directivity, for instance.

It was also proposed that the maximum radiated power of base stations in rural areas be raised in line with the values in CEPT Report 30 from 65 dBm/10 MHz to 67 dBm/10 MHz, as this would greatly improve coverage conditions. If generic limits were not set, higher limits should be approved upon application, in the given instance. Proposals were made that filters in base stations to protect channel 60 should be prescribed only in regions in which the channel was in use; currently, these regions accounted for just 12% of the total area.

The inclusion of a time limit on the possibilities of use that provided for compatible use with cable services was called for. Securing interference-free operation of the GSM-R network was necessary, so that provisions to this effect had to be included.

With reference to the Bundesrat decision and secondary usage condition 36 of the Frequency Band Allocation Ordinance as published in the Second Amending Ordinance of 14 July 2009 it was said that first of all, the problems of interference between mobile and broadcasting services (wire-based and non-wire-based) would have to be resolved and new frequency bands found for wireless means of production before spectrum from the digital dividend could be awarded. Further, a clear reference to the risks and restrictions for mobile operators in this band should be made. Some of the respondents, on grounds of planning and legal certainty, advocated delaying award or separating out the 800 MHz spectrum until the compatibility issues had been resolved. Optionally, regional restrictions or solutions similar to those for radio relay issues could be prescribed for this period.

It was emphasised that the interference scenarios had to be known before the spectrum could be awarded. Also, subsequent modifications of the frequency usage conditions should be limited to securing efficient and interference-free use of frequencies and to supporting international harmonisation agreements, and the network operators should be granted transitional periods.

Some of the respondents wanted further studies on introduction of the mobile service in the 790 – 862 MHz band. It was also remarked that interference to portable reception was clearly underestimated and interference caused by blocking wrongly assessed and that the parameters used in the studies and relevant ECC Reports were inadequate. It had to be possible to secure the operation of commercially available equipment, no matter whether this was DVB-T or DVB-C receivers.

It was noted that interference could be caused by image frequencies not just to channel 60, but also to channels 52 – 55 and 57 – 60.

Some respondents, with reference to studies on the matter, argued for the introduction of a 10 MHz guard band (790 – 800 MHz) between the broadcasting band and the new mobile band.

A definition of the term "interference" was called for that also covered the terminal equipment, which would include a look at the terminal equipment and cable connections in the studies.

Respondents called for clarification of whether the interference issues were also a cross-border problem. It was also said that a reference to CEPT Report 30 and the limits contained therein for out of block emissions should be included.

One respondent requested clarification of the term "Funkstelle" (radio station). This should refer to a sector and not to the location as a whole.

A possible guard band between broadcasting and mobile (790 – 792 MHz) should not be envisaged for use by wireless microphones in light of the expected interference and the narrow band.

In the bands at 1710 – 1785 MHz / 1920 – 1980 MHz maximum permissible EIRP should be adapted to 25 dBm, it was said. This was limited in the uplink to 24 dBm per channel, whereas the 3GPP standard TS25.101 stated the maximum value as 24 dBm +1 dB / -3 dB.

Guard bands should be introduced in the 2.6 GHz band between paired and unpaired spectrum. Another proposal was to have the guard blocks awarded separately as "restricted blocks". It was regretted that the principle of equal treatment was not observed in the decisions on implementing guard bands between TDD and FDD blocks in the spectrum of the TDD operator.

The Chamber has ruled as follows:

The frequency usage conditions are set on the basis of international recommendations and decisions.

Use of the basic framework conditions of the relevant CEPT and Commission Decisions is the basis for (cross-border) efficient and interference-free use of available spectrum (for more details see Order 34/2008, Re 4.2, Bundesnetzagentur Official Gazette of 23 April 2008).

The frequency usage conditions in Annex 3 for the bands at 1.8 GHz, 2 GHz and 2.6 GHz and the provisional conditions in Annex 2 for the band at 790 – 862 MHz are also intended to secure interference-free coexistence of different applications in the adjacent bands. For this, compliance is required with the usage conditions in section 1 of Annex 3 and in Annex 2 such as spectrum masks and block edge masks. Additional mitigation techniques must be used or measures taken in the geographic regions with adjacent broadcasting in television channel 60 (below 790 MHz), so that the spectrum immediately above can be used for wireless access for the provision of telecommunications services above 790 MHz.

In response to those who proposed that, to protect broadcasting channel 60, special requirements be set for base stations only in areas in which the channel was currently used or would be used in future to satisfy broadcasting requirements, the Chamber had the following to say.

Particularly important for the protection of digital broadcasting are the frequency usage conditions set out in section 3 of Annex 2. To protect television channel 60 (and possibly others below) compliance is required below 790 MHz with the basic requirements in section 3.2.2 (Table 4) of Annex 2 (block edge masks for out of block emissions from base stations) in particular:

Case	Base station in block EIRP P (dBm/10 MHz)	Maximum permissible EIRP	per TV channel concerned (in particular channel 60)
A) TV broadcasting (channel 60) occupied	$P \geq 59$	0 dBm	8 MHz
	$44 \leq P < 59$	(P - 59) dBm	8 MHz
	$P < 44$	-15 dBm	8 MHz
B) TV broadcasting (channel 60) occupied (special local conditions)	$P \geq 59$	10 dBm	8 MHz
	$44 \leq P < 59$	(P - 49) dBm	8 MHz
	$P < 44$	-5 dBm	8 MHz
C) TV broadcasting (channel 60) not occupied	No restrictions	22 dBm	8 MHz

Hence if television channel 60 (782 – 790 MHz) is not used in a particular region at the time frequencies are assigned for wireless access for the provision of telecommunications services, the values given under C) apply in respect of the site-related parameters.

Should channel 60 be used in this region at this time or later, the values given under A) apply in respect of the site-related parameters.

In the case of subsequent occupation of the channel, existing determinations must be modified accordingly. However, in each case the regional conditions must be taken into account in determining the site-related parameters for the base stations, so that the values given under B) may be applicable in individual cases.

To this extent, then, the Chamber has accommodated the proposal from the respondents that television channel 60 be protected only in those regions in which this is justified. How the limits in the above table are observed (for instance, by installing special filters, reducing radiated power, etc) is a matter for the particular wireless access operator to decide. The areas in which television channel 60 is envisaged in the updated frequency usage concept

as a matter of necessity are given in Annex 4 . Consideration of the foreign protective rights, most notably for television channel 60, is also required besides consideration of the domestic rights of use (see also Annex 4 on this).

By proceeding thus, the Chamber is taking account of respondents' calls for maximum transparency in respect of possible interference scenarios prior to the spectrum being awarded. It should not be forgotten, however, that frequency assignments may be influenced over time by the progress of international harmonisation and growing experience with measures to secure efficient and interference-free use of frequencies.

To those requesting a definition of the term "interference" the Chamber responded that the prevailing international definitions based on the ITU's Radio Regulations (last edition 2008, in particular No 1.166ff), were already sufficiently comprehensive and that the Bundesnetzagentur was guided by these definitions. The Chamber would also point out that studies of interference look not only at the transmission paths but also at the terminal equipment.

Some respondents had called for subsequent modifications to the frequency usage conditions to be limited to securing efficient and interference-free use of frequencies and to supporting international harmonisation agreements. This was only possible, the Chamber said, under section 60(2) sentence 2 of the TKG. Accordingly, the type and the extent of the particular frequency usage could be modified only to secure efficient and interference-free use of frequencies. The suitability of transitional periods would then be determined on a case by case basis.

A number of respondents stressed that interference aspects, particularly those concerning interference between digital television broadcasting and wireless access for the provision of telecommunications services, should be clarified before the spectrum is awarded. In this connection, reference was again made to the Bundesrat decision in printed paper 204/09 of 12 June 2009, particularly number 4, which says the following:

> *"Prior to the actual frequency award and use of the digital dividend, a satisfactory solution must be found for the interference problems associated with wireless means of production and both wire-based and non-wire-based broadcast transmission. Furthermore, the Bundesrat considers it necessary to designate, in binding manner, equivalent alternative spectrum for users of wireless microphones before commencement of the auction proceedings."*

The Chamber is of the opinion that, for the broadcasting service (digital television broadcasting), all the interference aspects in Germany have been sufficiently clarified, both under secondary usage condition 36 of the Frequency Band Allocation Ordinance (protection of the broadcasting service) and at CEPT level.

The Bundesnetzagentur can only determine any specific local interference between a base station used for wireless access for the provision of telecommunications services and television broadcasting in setting the site-related parameters for the base station concerned (see above table). As any interference is heavily dependent on the local and regional conditions and possibly on border coordination aspects too, an examination is necessary in the given instance when the site-related parameters are set. The CEPT(ECC) deliverables, particularly those documented in CEPT Report 30, will serve as a basis for these considerations of individual cases. This also includes application of the mitigation measures described in this Report.

To respondents calling for more studies on introduction of the mobile service in the 790 – 862 MHz band, the Chamber replied that comprehensive international studies have been carried out for this band in view of its allocation to the mobile service (CEPT Reports), as well as a large number of national studies. The interference aspects have been explored in depth within the ECC and with the participation of all concerned. Broadcasting representatives, (the European Broadcasting Union (EBU) in Geneva) and the Bundesnetzagentur have also been

actively involved. The EBU has explicitly welcomed the findings. Indeed, the report of the ECC Plenary from 22 to 26 June 2009 said the following:

> *"The EBU has expressed its appreciation for the work carried out in SE42. EBU believes that the common and minimum restrictive technical conditions for ECN in the sub-band 790 – 862 MHz as defined in the draft CEPT Report 30 provide a suitable basis for protection of broadcasting services and that the remaining cases of interference can be resolved by applying appropriate mitigation techniques."*

At this ECC Plenary, CEPT Reports 30 and 31, along with the ECC Decision on harmonised conditions for mobile/fixed communications networks operating in the band 790 – 862 MHz, were adopted for CEPT-wide public consultation. Although these deliverables have not yet been finally adopted, a secure basis for determination on the matter is available. The Chamber assumes that both CEPT Reports and the ECC Decision will be finally adopted at the upcoming ECC Plenary from 26 to 30 October 2009.

Pan-European harmonisation of the 790 – 862 MHz band for wireless access for the provision of telecommunications services will also facilitate border coordination for Germany. The final procedures for border coordination between wireless access usages for the provision of telecommunications services (5 MHz blocks) and broadcasting (8 MHz channels) will be drawn up with reference to CEPT Report 29. CEPT Report 29 was given final approval at the ECC Plenary from 22. Here, attention should be drawn to the fact that the determinations on interference were made at international level. They therefore include consideration of cross-border interference.

It was also remarked that interference to portable reception was clearly underestimated and interference caused by blocking wrongly assessed and that the parameters used in the studies and relevant ECC Reports were inadequate. The Chamber reminded the respondents that the ECC Decisions had been drawn up with the participation of all concerned, in open and transparent procedures. The ECC deliverables mark completion of the Commission's second mandate to CEPT. It can be assumed that the Commission will enact a decision in early 2010.

CEPT Report 30 sets out common and minimal conditions for the use of spectrum for wireless access to telecommunications services (Note: CEPT Report 30 which appears in English only, uses the term "Electronic Communication Networks" (ECN)). It takes account of the coexistence of different operators on the one hand and the protection of broadcasting on the other. The minimal conditions are set by specifying block edge masks, or BEMs, comparable to the minimum requirements for wireless access for the provision of telecommunications services at 2.6 GHz and 3.5 GHz. The block edge masks (see Annex 2) set out limits and conditions both on in block and out of block emissions for base stations and terminal stations.

Maximum permissible EIRP for the particular radio station has been determined for the in block emissions of the base stations (see Annex 2, section 3.2.1). Respondents asked for clarification of the term "Funkstelle" (radio station). "Radio station" is defined in No 1.61 of the Radio Regulations. Accordingly, it relates to a location, not to a sector, and thus covers every conceivable sectoral component. The term is sufficiently wide to include stations with different high frequency components and/or multiple antennas (MIMO). It is not possible to diverge from this definition, particularly as the limits that have been set relate only to radio stations as defined in the Radio Regulations. Also, the specific limits for a particular sector can only be set when the site-related parameters are established during assignment.

With out of block emissions, a distinction is made between general and specific requirements. As minimum conditions are described by the block edge masks, local or regional additional measures may be necessary to achieve coexistence with other users. This is assessed in light of the exact site and the local or regional conditions when the site-related parameters are determined.

To respondents in favour of introducing a 10 MHz guard band (790 – 800 MHz) between the broadcasting and the new mobile band as a result of studies carried out, the Chamber wishes to say that, according to its information, such studies assume a 10 MHz guard band because they do not – as the present decision does in the frequency usage conditions – apply block edge masks with the corresponding restrictions on out of block emissions.

The Chamber assumes that compatibility will be achieved through the prescribed compliance with the basic requirements (block edge masks for the out of block emissions of the base stations) below 790 MHz in accordance with Table 4 in section 3.2.2 of Annex 2.

This means that, for instance, with maximum radiated power within the block (ie greater than or equivalent to 59 dBm EIRP per 10 MHz), maximum permissible EIRP within television channel 60 may not exceed 0 dBm EIRP per 8 MHz. This strict requirement on an operator of wireless access for the provision of telecommunications services renders invalid a guard band greater than 1 MHz for the transmit band (downlink) of the base stations above 790 MHz, as called for by some respondents.

It is up to the operator to decide how to limit the out of block emissions in its frequency block (eg by special filtering). This also does away with the need for a general limitation of radiated power for the base stations, which would be inconsistent with the desired aim of wide area broadband coverage. In this connection it should also be remembered that a restrictive limit on the radiated power of the base stations would automatically lead to more base stations, which, in turn, would increase the likelihood of interference.

The studies carried out by the ECC were based in the first instance on the assumption of fixed rooftop DVB-T reception. Subsequent studies then showed that the findings were also applicable in respect of portable DVB-T reception. The findings are described in CEPT Report 30. The report concludes that, for the terminal stations used, -50 dBm EIRP as an out of block emission per DVB-T channel (8 MHz) below 790 MHz is enough as a basic requirement to protect fixed DVB-T reception.

For portable DVB-T reception the higher limit of -65 dBm EIRP is necessary. In the frequency usage conditions set out in Annex 2 this stricter limit has therefore generally been used for the terminal stations (see Table 8 in subsection 3.3.2). Implementation of the FDD band plan with a reverse duplex arrangement (ie terminal station transmit band in the upper band) automatically creates a guard band of at least 42 MHz between the transmit band of the terminal stations and digital broadcasting below 790 MHz.

The Chamber therefore believes that all the potential interference scenarios for digital television broadcasting below 790 MHz have been taken into sufficient account, also considering portable television reception.

In the Chamber's view, the potential blocking of DVB-T receivers that the respondents also mentioned would not be significant, as this could only occur if terminal equipment was operated in the immediate vicinity of the television receivers or antennas.

Moreover, the broadcasting transmitters, which usually transmit with very high radiated power, contribute to possible blocking themselves. In a typical user environment there is sufficient space as a rule between the terminal equipment for wireless access for the provision of telecommunications services and the television receiver or antenna. Thus blocking as a result of this terminal equipment is generally unlikely. Moreover, the assumption is that future television receivers will have enhanced technology in this respect, especially as regards linearity of the receiver characteristics and adjacent channel selectivity.

In reply to the respondents wanting a time limit on possible usages to achieve interference-free use of cable and mobile services, the Chamber had the following to say.

Regarding possible interference between wireless access applications for the provision of telecommunications services and frequency usages in and along conductors, it must be borne in mind that wire-based applications do not constitute frequency usages which could

be subsumed under a radiocommunication service as defined in Article 1 of the ITU Radio Regulations or in the Frequency Band Allocation Ordinance.

These frequency usages are not subject to the provisions of the Telecommunications Act; instead the relevant standards as found in the Electromagnetic Compatibility Act apply for the equipment concerned, eg cable modems and set-top boxes.

With regard to the feared effects (wire-based and non-wire-based) on broadcast reception the Chamber expects that future network operators will, if necessary, take suitable measures to minimise interference to equipment affected in a reasonable way.

Furthermore, it must be remembered that radio station density in this particular interference scenario for the terminal equipment used in wireless access for the provision of telecommunications services and thus the potential for interference is likely to be relatively low for the foreseeable future. Until there is significant market penetration, there are possibilities on both sides (potential sources of interference and broadcast receivers) for improving coexistence conditions.

The Chamber had the following to say to respondents calling for interference-free operation of commercially available equipment, regardless of whether this was DVB-T or DVB-C receivers.

The DVB-T receivers currently available in the market and currently operated are designed for reception in the entire 470 – 862 MHz band. Interference to these receivers as a result of transmissions in the 790 – 862 MHz band cannot be ruled out with absolute certainty if a wireless access network for the provision of telecommunications services is operated in the vicinity.

Critical here is the terminal equipment that can be operated in the vicinity of DVB-T receivers. As a rule, this interference can be prevented by using bandpass filters in the receivers or by putting more space between the interfering and the interfered with equipment. In this connection it should also be remembered that a significant number of DVB-T receivers have been placed on the market as USB sticks. It is safe to assume that these inexpensive devices, with their short product life cycles, will be replaced by new ones in the near future whose receive band will be adapted to the future broadcasting band edge.

The Chamber also assumes that future television receivers will have improved selectivity features. For the reasons given, it would be disproportionate, in the Chamber's view, to delay broadband rollout using the 790 – 862 MHz band. Such a delay would also run counter to the federal government's broadband strategy stipulating that the 790 – 862 MHz band be used at the earliest possible opportunity to progress coverage of sparsely populated areas with innovative mobile applications and broadband Internet connections. For this, the frequencies are to be used in 2010 already.

Regarding respondents' calls for the provision of substitute spectrum for wireless microphones the Chamber emphasised that, for this, too, solutions have been found at CEPT level (see in particular CEPT Report 32) and that potential substitute spectrum has already been identified CEPT-wide. The ECC Decision on harmonised conditions for mobile/fixed communications networks operating in the band 790 – 862 MHz sets out basic conditions for PMSE (Program Making and Special Events) applications in the duplex gap (821/823 MHz to 832 MHz).

This pan-European approach will have a beneficial effect on the deployment of new equipment technologies and equipment costs for microphone users. The Bundesnetzagentur has already started to modify the Frequency Usage Plan to be able to make further bands available for wireless microphones at national level.

Further, the Bundesnetzagentur has developed a "Concept for frequency assignment for wireless microphones and other outside broadcast radio equipment (PMSE, Program Making and Special Events)", which it has posted on its website.

In response to comments saying, in the context of availability of spectrum for wireless microphones, that a possible guard band between broadcasting and mobile services should not be envisaged for PMSE applications it was said that the Chamber did not consider this low bandwidth (1 MHz only under the proposed channel plan) enough to make the frequencies available for other applications.

Restricting the possible uses of wireless access for the provision of telecommunications services, for instance in regional terms or in terms of the type of use (only applications similar to radio relay), as respondents had proposed, was not considered appropriate. Restricting them to applications similar to radio relay would not be compatible with the legal requirements (secondary usage condition 36 of the Frequency Band Allocation Ordinance). Interference studies have also shown that such restrictions are not necessary. These studies are based precisely on the capability of terminal stations to be operated on a fixed, nomadic or mobile basis. The frequency usage conditions have been developed in light of this, in consideration of the protection of digital broadcasting below 790 MHz. Any restriction on the mode of operation would thus be inconsistent with the ECC deliverables. A case cannot be made for any regional restriction, mindful of the fact that the market is a national one, and given the findings of the compatibility studies.

Moreover, special arrangements apply in respect of the bands at 1710 – 1785 MHz / 1805 – 1880 MHz to secure freedom from interference with the existing GSM networks to be afforded protection (see ECC Report 82 on this) and those at 1920 – 1980 MHz/ 2110 – 2170 MHz to secure protection of usages here (UMTS) (section 2 of Annex 3).

The Bundesnetzagentur determines block edge masks as part of its frequency usage conditions. These masks relate to the spectrum blocks allocated to users. Such blocks are described by the relevant parameters and may have several channels, irrespective of the technology used. The block edge masks describe both permissible in block emissions and out of block emissions. Essentially, these are regulatory requirements to reduce the risk of harmful interference between adjacent networks (for more details see Order 34/2008, Re 4.2, Bundesnetzagentur Official Gazette of 23 April 2008).

Likewise, the use to which a 5 MHz block can be put in the 1.8 GHz band may be subject to restrictions on account of the adjacent GSM usages which have to be protected if there is to be compliance with the necessary separation.

Clarification that the prescribed 5 MHz masks did not preclude use of 200 kHz GSM systems was given to respondents remarking that further requirements were needed in the 1.8 GHz band for GSM use. The relevant conditions in Annex 3 take special account of the framework conditions for wireless broadband applications (5 MHz). Should GSM (200 kHz) be used in the 1710 – 1785 MHz and 1805 – 1880 MHz bands, the parameters of the harmonised standards for GSM will be applicable.

Respondents calling for the introduction of guard bands between paired and unpaired spectrum at 2.6 GHz were referred by the Chamber to its decision of 7 April 2008 (Order 34/2008, Re 4.2, Bundesnetzagentur Official Gazette 7/2008 of 23 April 2008) stating the following:

> *"…to reduce harmful interference between adjacent users, frequency separation of 5 MHz is necessary between the edges of the blocks where the constellations FDD to TDD or TDD to TDD (unsynchronised) are concerned. Any use of these 5 MHz bands, too, would increase the risk of the occurrence of harmful interference.*
>
> *In this connection the Chamber would point out that both the paired bands 2500 MHz to 2570 MHz and 2620 MHz to 2690 MHz and the unpaired band 2570 MHz to 2620 MHz can be used for both FDD and TDD applications. Free use of the available spectrum does not apply, however, without restrictions. This may be the case, for instance, with the use of TDD systems alongside FDD systems, since the appropriate separation must be heeded here which will restrict the free use of adjacent channels. The gap between adjacent usages must be provided by assignees using TDD*

systems in their own spectrum. This does not apply in the case of subsequent modifications to the system technology used (duplex method). In this case, protection is the responsibility of the user causing the greater protection requirements…".

These determinations are based on CEPT Report 19, which provides technical parameters and guidance for the application of least restrictive conditions in the band at 2500 MHz to 2690 MHz, which are appropriate to manage the risk of harmful interference both within and beyond national territories. No particular technology is to be prescribed, and the parameters are to be optimised for the most likely use. These conditions were adopted in Commission Decision 2008/477/EC of 13 June 2008, transposed with this Decision.

In light of this, separate award of the guard bands as "restricted blocks" that some respondents called for is ruled out. Restricting the free use of TDD systems (providing protective separation) is advisable on grounds of the efficient and interference-free use of frequencies as set out in section 2(2) para 7 of the TKG and is proportionate in relation to the alternative of the protective separation having to be created in the FDD system.

Assignees may diverge from these conditions if they have made mutual arrangements to this effect and divergence is without detriment to the frequency usage rights of third parties. They thus have considerable flexibility as far as specific use is concerned. The Bundesnetzagentur must be advised accordingly, in writing, in order that it may process reports of interference promptly and effectively.

The frequency usage conditions can be modified subsequently if this is necessary to secure efficient and interference-free use of frequencies or as a result of international harmonisation agreements. This holds good particularly for the conditions given in Annex 2 for the 790 – 862 MHz band, as the relevant studies have been completed by CEPT/ECC.

It is possible that some details, not known at present, will be changed during the final adoption process for the all-important ECC Decision at the upcoming ECC Plenary from 26 to 30 October 2009 as a result of the CEPT-wide consultation. However, the Chamber does not anticipate any material changes. Subsequent modifications of the usage conditions can also be expected as a result of future revisions of the ECC Decision and the Commission Decision on this band, which is expected in 2010. For similar reasons, subsequent modifications to the usage conditions at 1.8 GHz, 2 GHz und 2.6 GHz are also possible.

The Bundesnetzagentur will take full account of any need for modification resulting from the CEPT/ECC and Commission determinations. As respondents have called for, the maximum permissible EIRP limits for FDD terminals will be raised to 25 dBm in the bands at 1710 – 1785 MHz and 1920 – 1980 MHz (see Annex 3, chapter B in section 1). The EIRP limits for TDD terminals will be raised accordingly from 24 dBm to 25 dBm in the bands at 1900 – 1920 MHz and 2010 – 2025 MHz (see Annex 3, chapter D in section 1).

The Chamber pointed out that the maximum permitted power levels in the relevant standards usually referred to output power and the limits in the frequency usage conditions as per Annex 3 to radiated power (EIRP). Depending on the antenna configuration (antenna gain) and coexistence with adjacent usages, higher levels than 25 dBm EIRP are possible in principle.

Already, requirements for further modification beyond this are becoming apparent. In June 2009 the European Commission issued a mandate to CEPT that also addressed the 1.8 GHz band. It was scheduled for completion by June 2010. One of the areas for study was the deployment of new technologies. In June 2009, the Commission also issued a mandate to CEPT for the 2 GHz band. Based on these, minimal technical conditions (block edge masks) were to be drafted by June 2010 for the 2 GHz band, comparable with those for the 2.6 GHz band under Commission Decision 2008/477/EC. The Chamber is working on the assumption that, once CEPT has completed these two mandates, the Commission will issue binding Decisions necessitating modified usage conditions for the 1.8 and 2 GHz bands in Annex 3.

In response to views pointing out the need to secure interference-free operation of the GSM-R network, the Chamber said it was fully aware that the radio applications of public

railways, compared with other applications in the land mobile service, required higher levels of operating safety because interference in the GSM-R network could lead, for instance, to trains having to brake abruptly.

Meanwhile, the Chamber assumes that the award of spectrum at 800 MHz will not cause significant interference to the GSM-R frequencies, for the following reasons.

Currently available for the radio applications of public railways in the 900 MHz band (GSM-R and E-GSM-R) are the duplex bands 873 – 880 MHz (uplink) and 918 – 925 MHz (downlink) both within CEPT and in Germany. The frequency band for wireless access for the provision of telecommunications services ends at 862 MHz. Thus effectively, there is a "guard band" of 11 MHz between these two applications that is used predominantly for short range devices (SRDs).

It is important to remember that the transmit band for the base stations (downlink) used in wireless access for the provision of telecommunications services ends at 821 MHz already. The Chamber thus assumes that the interference potential from this wireless access cannot be significant in light of the separation of more than 10 MHz between the terminal stations and more than 50 MHz between the base stations.

No aspects of interference to the radio applications of public railways were brought up during the drafting of the ECC Decision on harmonised conditions for mobile/fixed communications networks operating in the band 790 – 862 MHz, either by the CEPT administrations or by the representatives of the public railways. Nor does the Chamber believe there is a coordination duty, in light of the clear frequency separation. To assess detriment to a GSM-R network it would be necessary, the Chamber believes, to look not just at the potential source of interference but also, for instance, at the field strength in any GSM-R network affected.

There were calls from the respondents for the maximum transmitting power of customer premises equipment (CPE) in the 790 – 862 MHz band to be increased from 26 dBm/10 MHz ERP to 35 dBm/5 MHz EIRP and thus to align this figure with the CPE limit in the 2.6 GHz band.

The Chamber declared that the draft President's Chamber decision and the provisional frequency usage conditions for the 800 MHz band, published in Official Gazette No 10 (Communication No 319) on 3 June 2009, were based on the state of play in Europe at the time. Since the ECC Plenary (22 to 26 June 2009) there had been a stable policy position as a result of the adoption of ECC's deliverables for CEPT-wide public consultation. The frequency usage conditions for the 800 MHz band, including the limits for the terminal stations, will therefore be modified to reflect the current level of knowledge within the ECC.

Assumed for the maximum in-block emissions of the terminal stations is 25 dBm EIRP as a general rule, whereby – depending on the antenna configuration – higher levels are also possible (see section 3.3.1 of Annex 2). In particular for terminal stations with fixed antennas, typically with higher antenna gain, markedly higher levels may be permitted after consideration of coexistence with other frequency usages. This presupposes consent from the Bundesnetzagentur on a case by case basis.

This will facilitate broadband service in rural areas, in particular. It is possible that some details, not known at present, will be changed during the final adoption process for the all-important ECC Decision at the upcoming ECC Plenary from 26 to 30 October 2009 as a result of the CEPT-wide consultation.

Responding to comments that the maximum radiated power of base stations in rural areas should be raised from 65 dBm/10 MHz to 67 dBm/10 MHz in line with the levels in CEPT Report 30, the Chamber said that the frequency usage conditions for base stations in the 800 MHz band would also be modified to reflect the prevailing level of knowledge in the ECC. Hence it is assumed, based on ECC studies (most notably those in CEPT Report 30), that EIRP levels for base stations will range from 56 dBm in urban areas to 64 dBm in rural areas per 5 MHz block (see also section 3.2.1 of Annex 2).

The EIRP for a particular base station is set with reference to the right to protection of the broadcasting service and further site-specific aspects which may arise, for instance, from coordination with other radio stations, possibly in neighbouring countries, too. Thus in certain cases, higher EIRP levels than 56 dBm and 64 dBm will be permissible. This will be decided for the particular site in the process to determine the site-specific parameters for the base stations.

Some respondents noted that lowering the field strength from 96 dBµV/m to 90 dBµV/m to protect the Bundesnetzagentur's radio monitoring service (PMD) would considerably restrict the network operators' deployment options and that the old figure should therefore be kept. On this, the Chamber had the following to say.

The field strength limits given have been set on the basis of the relevant technical characteristics of the receiving equipment used by the Bundesnetzagentur's radio monitoring stations. This produces a limit of 90 dBµV/m for the band from 1800 to 2700 MHz. A higher field strength (96 dBµV/m) was allowed for some of the Bundesnetzagentur's sites in the past in consideration of the sensitivity of the receivers typically used at the time.

The Bundesnetzagentur continues to allow a field strength of 96 dBµV/m for the sites of existing frequency assignments (grandfathering arrangements), although this could result in interfererence. For all new frequency assignments, however, improved receiver sensitivity at the radio monitoring stations should be used as the reference. Thus compliance with the limit of 90 dBµV/m locally to protect the individual sites of the Bundesnetzagentur's radio monitoring stations is required.

Re IV.4.3. Time limits for right of use

The following comments were made:

Time limits for the frequency assignments were basically welcomed. Only in this way could planning certainty for the assignees and the efficient use of frequencies be secured. Some respondents favoured a longer term of 20 years minimum, since a payback period of 15 years was too short. This was especially true of the assignments in the 800 MHz band, which had special rollout obligations and thus required immense investment in regions that tended to be economically unattractive. Moreover, fixing the duration at 20 years would be in line with the approach taken for the GSM and UMTS/IMT-2000 licences.

The Chamber has ruled as follows:

The assignments will all run until 31 December 2025. Section 55(8) sentence 1 of the TKG makes provision for frequencies to be assigned for a limited period. Section 55(8) sentence 2 of the TKG requires the time limit to be appropriate to the service concerned (for details see Order 34/2008, Re 4.3, Bundesnetzagentur Official Gazette of 23 April 2008).

In setting the time limit, the Chamber takes into account, on the one hand, the interest of the assignees in having an appropriate payback period for their investment. On the other, the Bundesnetzagentur's scope should not be unduly restricted, so that the time limit should not exceed a proportionate period in order to retain a measure of control.

The Chamber pointed out to those noting that the term of mobile licences was, without exception, 20 years, that this applied only to the UMTS/IMT-2000 licences. Terms of 15 as well as 20 years had been agreed in the past. Initially, the GSM licences ran for 15 years. Also, in 2006, the term of the assignments for Broadband Wireless Access (BWA) in the 3.5 GHz band was fixed at 15 years.

To provide a suitable payback period, deciding in these proceedings that the assignments would run until the end of 2025 would seem appropriate and necessary. The assignees – and especially the new network operators – must be given enough time to build their networks, to realise their business models and to recoup their investment. The period of 15 years applies all the more to operators that are already active in the market and already have infrastructures and in relation to whom shorter payback periods ought to apply. Against

this background, the term of 15 years provided by the expiry date of 31 December 2025 would therefore appear adequate.

Even with a view to the obligation for the 800 MHz spectrum for the phased coverage of rural areas (see subsection IV.4.5 of this decision) there is no need, the Chamber believes, to extend the time limit beyond 2025. True, the assignees are required, before having complete freedom to use this spectrum, to provide service to rural areas; realising the full economic potential of this particular spectrum will thus only be possible when the first phase of the coverage requirement has been completed. The Chamber assumes, however, that the assignees will do so rapidly.

Economic aspects will make assignees hasten to use the 800 MHz frequencies for service across the country. Thus an extension of the time limit would not seem appropriate either for this band or for all the other available spectrum. Nor would a longer term be appropriate in light of uncertain future developments and trends. This holds good particularly in light of section 55(8) of the TKG which provides for extension. The time limit applies in respect of all the spectrum for award. There is no differentiation between whether the spectrum is acquired by existing operators or new entrants, as different durations in one set of proceedings would affect the value of the spectrum purely as a result of regulation.

Re IV.4.4. Coverage obligation for the 1.8 GHz, 2 GHz and 2.6 GHz bands

The following comments were made:

Imposing a coverage obligation for the 1.8 GHz, 2 GHz and 2.6 GHz bands of at least 25% of the population from the beginning of 2014 and of at least 50% of the population from the beginning of 2016 was expressly welcomed by some respondents. It was appropriate, especially because the market for wireless access for the provision of telecommunications services was looked at as a whole. It was also appreciated that the degree of coverage achieved in the UMTS and GSM markets would count towards meeting the requirements stipulated in these proceedings. In technical terms, these service platforms could not be separated. Customers' devices would give them the best infrastructure that was available in the particular place, at the particular time, no matter whether this was GSM, UMTS or a new technology.

Yet if the coverage targets were to be achieved, it was essential to stipulate a harsh penalty for the event of failure to do so.

However, respondents said that established operators' usages to date ought not to be factored in. The determinations in the coverage obligations would handicap new entrants and favour the established operators. The established operators had recourse on the one hand to existing infrastructures created with spectrum other than that which was being awarded, so that the targets, in fact, hardly applied to them. On the other, there was the risk that they would acquire spectrum that they did not necessarily need, to keep potential competitors out of the market.

It was also brought to the Chamber's attention that the term "degree of coverage of the population" was not clearly defined. In setting the targets, care should be taken that end customers regarded as covered had speeds initially of not less than 1 MBit/s, in accordance with the broadband strategy of the federal government, with modifications being made as time went on.

The Chamber has ruled as follows:

An assignee using spectrum in the bands at 1.8 GHz, 2 GHz and 2.6 GHz is required to cover at least 25% of the population from 1 January 2014 and at least 50% of the population from 1 January 2016.

The Bundesnetzagentur, under section 61(4) sentence 2 para 4, determines the frequency usage conditions, including the degree of coverage with the frequency usage and the time required for this, prior to the auction. The coverage obligation is made a constituent part of the frequency assignment under section 61(7) of the TKG.

The need to impose a coverage obligation for usages in the bands at 1.8 GHz, 2 GHz and 2.6 GHz is based on the following considerations.

First, the obligation is designed to ensure that network build is started promptly, and second, that build is ongoing. The aim is to provide consumers with telecommunications networks and services at the earliest opportunity. At the same time, it ensures efficient use of the frequencies assigned at an early point in time.

Hence imposing a coverage obligation is one way of achieving the regulatory aims flowing from the Federation's mandate to ensure the availability of telecommunications infrastructure (Article 87f of the Basic Law, or constitution). In particular, the regulatory aims of safeguarding user, most notably consumer, interests in telecommunications (section 2(2) para 1 of the TKG), promoting telecommunications markets with sustainable competition in services and networks and in associated services and facilities (section 2(2) para 2), encouraging efficient investment in infrastructure (section 2(2) para 3) and securing efficient and interference-free use of frequencies (section 2(2) para 7) are implemented.

A corresponding coverage obligation takes account of these aims, so it cannot be dispensed with, as some comments called for. It is implemented by section 61(4) sentence 2 para 4 of the TKG under which the Bundesnetzagentur, prior to carrying out award proceedings, determines not just the frequency usage conditions but also – explicitly – the degree of coverage with the usage and the timescale. Under section 61(7) of the TKG the obligation is made a constituent part of the frequency assignment as per section 55 of the TKG.

Accordingly, the usage rights in these bands all come with coverage obligations. This is to make sure that network build begins promptly and is continued in an ongoing process and that services can be developed at the earliest possible time.

The spectrum rights granted in 2000 for UMTS/IMT-2000 came with the following coverage obligations (see Order 13/2000, Reg TP Official Gazette 4/2000, page 516 (539ff)): assignees were required to provide UMTS/IMT-2000 services to at least 25% of the population by 31 December 2003 and to at least 50% by 31 December 2005.

In the present case, too, the Chamber still adheres to the goal of meeting the coverage requirements in three / five years after assignment. The chosen compliance period of five years after assignment is enough to give assignees the necessary flexibility to respond to market and technological developments. However, to promote early, uninterrupted network build it was necessary additionally to impose a coverage obligation of 25% within three years of assignment. In light of the current stage of proceedings, the Chamber assumes that assignments can be issued in 2010 at the earliest. Accordingly, it was necessary to make an editorial change to the President's Chamber decision of 7 April 2008, setting the three year period to close on 31 December 2013 and the five year period to close on 31 December 2015, as the frequency assignments would begin correspondingly later.

For the award of spectrum at 1.8 GHz, 2 GHz and 2.6 GHz, too, the Chamber considers it appropriate to phase the coverage obligation to initially 25% and then 50% of the population, to achieve the aims pursued. The new wording, "as from" instead of "by", is intended to make clear that the prescribed coverage of the population is also to be guaranteed beyond the date referred to in the obligation.

The Chamber does not recommend that the degree of coverage be lowered to, say, 10% and 25% respectively in view of the mobile services already provided. The requirement must not be set too low, the Chamber believes, as the regulatory aims it is designed to achieve will only be fulfilled with a minimum degree of actual coverage. This is particularly true in respect of infrastructure competition as per section 2(2) para 3 of the TKG and the safeguarding of user interests as per section 2(2) para 1. It must also be noted that targets of 25% and 50% of the population relate in terms of surface area to only a small part of the Federal Republic of Germany, and do not therefore represent a disproportionate burden for any of the assignees.

The following should be said with regard to GSM use of the 1800 MHz spectrum, in response to comments calling for a coverage obligation of 75% of the population in line with the targets for the existing mobile operators, to secure fair competition. Imposing a coverage requirement in the 1800 MHz band resulted from tendering (beauty contest) in which the level of coverage was one of the selection criteria. The tenderers thus committed to the particular coverage targets. Details of the successful tenderer's coverage obligation were then incorporated in the assignment (licence). Hence coverage that exceeded the prescribed minimum was established voluntarily by the tenderers and not – as in the present case of the auction as set out in section 61(4) sentence 2 para 4 of the TKG – by the Bundesnetzagentur ex officio.

If the Chamber's words in its initial considerations were taken to mean that existing network operators were exempted from the coverage obligation, it must be emphasised that this is not the case.

Under section 61(4) sentence 2 para 4 of the TKG, the coverage obligation is imposed at the time the spectrum is awarded and accordingly linked with the spectrum rights. The obligation becomes a constituent part of every frequency assignment and thus applies without restriction for every assignee. Thus it is of no relevance whether the assignee already operates a mobile network. Hence the coverage requirements apply not just to new entrants, as some respondents remarked, but also, as part of each frequency assignment under section 61(7) of the TKG, to current assignees as well.

The incorporation of a coverage obligation in every assignment does not mean, however, that the obligation must be met for each of the blocks acquired. While assignees must use all the frequencies assigned to them, the only requirement is that the prescribed degree of coverage be achieved with all the spectrum allocated for the relevant product and geographic market, not with every single block. The relevant product market is the wireless access market for the provision of telecommunications services, ie mainly wireless connections for subscribers. Other applications are not thereby ruled out. Under this loose definition of the relevant product market, network operators can offer their customers a whole range of services on the basis of their chosen wireless technology, in line with customer demand. Given this wide definition, the relevant product market also encompasses existing markets such as GSM and UMTS. It is therefore entirely appropriate that the degree of coverage already achieved in these markets should count towards meeting the coverage requirement imposed in the present proceedings. It is not a matter of the particular frequencies used. Thus it is not really helpful to distinguish between the 2.6 GHz band and the other bands, as one respondent called for.

To respondents maintaining that a separate coverage obligation ought to apply in relation to existing operators for newly acquired spectrum, otherwise a barrier to market entry would be set up for new entrants and bidding strategies to keep competitors out of the market would be facilitated without the bidders being interested in using the spectrum themselves, the Chamber replied that frequencies would not be won at auction solely with a view to foreclosure. First, a successful bid typically signalled the desire to make optimal use of the spectrum to provide services in a competitive environment. Moreover, the probability of strategic bidding to prevent new entrants from winning spectrum must be regarded as slight (see subsection IV.3 on this). And second, it should be remembered that the existing operators, too, are required to submit a frequency usage concept setting out their spectrum requirement as part of qualifying to take part in the auction.

The coverage obligation does not constitute a barrier to market entry for newcomers, in the Chamber's view. The prescribed minimum degree of coverage of at least 25% and 50% respectively of the population is necessary and recommended if the regulatory aims connected with the obligation are really to be achieved. The actual surface area to be covered under the obligation is only around 8% of the territory of the Federal Republic of Germany. The Chamber also believes that this is the minimum area for infrastructure build, as it is not clear otherwise how a network operator can be successful in competing in the

national market. Nor do possible disadvantages for new entrants as a result of later market entry justify not imposing a coverage obligation.

The parameters to be met under the obligation are decided subsequently, in consideration of the technology deployed. The assignees are asked to state their views beforehand. This practice has proved its worth, so that the Chamber does not share the views of the respondents calling for prior definition of the term "degree of coverage of the population".

To respondents wanting a particular transmission rate, the Chamber replied that, while a minimum speed was desirable in the consumer interest, telecommunications law did not make provision for it. Transmission rates depended on a number of technical factors and therefore could not be prescribed.

The purpose of imposing a reporting requirement was to make sure the coverage obligation was met. Even if the coverage obligation had to be met only from 1 January 2014 and 1 July 2016 respectively, it was prudent for the Bundesnetzagentur to be informed regularly of progress.

The Chamber pointed out to respondents calling for assignees to be required to pay a substantial penalty in the event of failure to reach the stipulated rollout target that there was no enabling statute for such a penalty. For the event of non-fulfilment the Telecommunications Act provides, in section 63(2) para 2, for revocation of the frequency assignment. Calls for clear arrangements on such revocation were met by the Chamber drawing attention to section 63(2) para 2 of the TKG, use of which the Bundesnetzagentur had made in the past.

With regard to the spectrum in litigation, the Chamber is aware that the current legal uncertainty and accompanying risk of frequency assignments being terminated depending how the court decides, inhibit investment in infrastructure. This applies particularly to assignees with no network infrastructure to date. If the coverage obligation were to apply equally in respect of these frequencies, too, it would mean that the assignees were forced to make just such – uncertain – investments. Thus the Chamber considers it appropriate that the time limits for the coverage obligation (3 and 5 years after assignment) should begin to run only after final conclusion of the court proceedings in respect of the frequencies that were in litigation on the day on which an order for the award proceedings was issued (19 June 2007). As regards the coverage obligation in normal circumstances, the close of the year in which the issue becomes non-apppealable is decisive.

Re IV.4.5. Coverage obligation in the 800 MHz band

The following comments were made:

The separate coverage obligation for the 800 MHz spectrum was welcomed by some. The obligation was technically and commercially challenging but not rigid, and lent itself to achieving the political objectives intended.

Support was given to providing service to the so-called white spots first of all. But it was suggested that the term "built up areas" be deleted, being too indeterminate. The fact that the federal states would be able to specify underserved communities individually was also welcomed.

The creation of priority stages was considered a good idea by some, to boost broadband deployment in rural areas.

With regard to serving rural areas, in particular with regard to moving to the next highest priority stage, it should be remembered that use of the 800 MHz spectrum in border areas might not be (readily) possible on account of existing broadcasting applications in a neighbouring country.

The approach of voluntary cooperation following assignment of the spectrum rights and the announcement of an updating of the infrastructure sharing principles was welcomed. Cooperation would enable substantial savings and more rapid, denser network build, as well

as promote more rapid availability in rural areas. The exact nature of cooperation should be left to the market participants to decide. National roaming, in particular, was a technically simple solution to the matter of providing service to sparsely populated areas. The view was put forward that questions of possible cooperation were a matter for the antitrust authorities and that, accordingly, cooperation was permitted in principle. Once the spectrum had been awarded, there was no legal reason under the TKG to apply stricter criteria.

A large number of respondents argued that the proposal in the draft was not a suitable way of bringing broadband to "white spots" and meeting actual requirements. It was not concerned with what communities did not actually have broadband. General requirements that had to do with number of inhabitants, population density or other purely statistical parameters and which did not consider the actual situation should be rejected.

Being guided by population figures would mean that even in local communities already covered by broadband, additional build would inevitably take place. This would mean huge intervention in business models, especially in regions in which broadband had been deployed despite difficult economic conditions. Competition structures should be able to develop in the free market and, at least in the case of competition between different technologies, not be enforced as a result of licence conditions. It was not clear why priority stages should be identified on the basis of population figures. A number of smaller local communities, particularly those close to centres of population, already had basic broadband services.

Moreover, linking the terms "not served", "underserved" and "served for the most part, but with gaps" with the respective population figures was arbitrary, as the coverage requirements would also encompass areas with sufficient broadband deployment. Nor was it sure that the federal states would apply uniform measures in identifying the priority stages.

Another respondent declared that not all the communities in Annex 5 of the draft decision were not served; random checks of particular communities had shown this.

Some respondents proposed that the updated federal government broadband atlas be used to determine where the gaps in supply in the rural areas actually were. On this basis, the communities that were not, or were insufficiently served, could be identified. In this way, all the existing infrastructures would be used and unnecessary duplication of resources avoided. The Bundesnetzagentur and the Federal Economics Ministry were actively called on to support operators in realising their sites. Notification of white spots by the local authorities should be linked with the obligation to propose relevant sites and issue planning permission.

It was said, however, that it was very probable that not all the white spots would be covered, since network build in priority stage 2 could already begin when 70% of the users in priority stage 1 were served and overall a target of only 80% was envisaged by 2016. Some respondents wanted higher levels for priority stage 1. Looked at conversely, 30% of the population would not have service if the target was only 70%. This was a missed opportunity to give these households broadband access too.

On the other hand, an obligation to cover 50% of the population by 31 December 2016 was considered appropriate.

It was asked why the areas in priority stage 4 needed a separate obligation for 800 MHz. These areas, just as those communities in priority stage 3, should not be subject to the obligation. It could be assumed that these areas already had broadband coverage.

There was also a lack of clarity about the extent to which the obligation was considered met for all the licence holders when one licence holder filled in a white spot. Incentives should be created for "concerted deployment". Coordinated planning for the white spots should thus be allowed and encouraged. For instance, a degree of coverage to be achieved jointly by all the successful bidders could supplement the individual obligations.

One respondent asked for clear conditions on the average minimum bandwidth to be offered. It should also be clear that restricting access if a particular data volume was exceeded was

not permitted. Further, a clear definition of "broadband access", particularly as regards the transmission rate, was called for. A guaranteed minimum bandwidth, even, was wanted in view of the growing requirements for Internet services.

By contrast, another respondent said that effective benefit for the user in underserved areas was little in terms of what the federal government's broadband strategy was looking to achieve, since there was not enough bandwidth/capacity. Channel capacity for the service the strategy envisaged of 1 Mbit/s for up to 1,600 households would still not be enough if a network operator acquired 2 x 20 MHz (paired).

Comments were received that said the obligation had to be met in a technology and frequency neutral manner, ie it must be possible for it to be met with all the technologies (including wire-based ones) and frequencies available. The coverage obligation for a particular area should cease to exist as soon as broadband access (mobile, DSL, cable) was provided. There was no objective reason to use only the 800 MHz spectrum for coverage with (mobile) broadband. Rather, the obligation had to be compatible with the obligation for the other frequencies for award and hence with all the spectrum allocated for the relevant product and geographic market. Otherwise, the obligation would lead to duplicated infrastructure for an operator, which would not make business management sense. It would guarantee that initially, actual requirements could be satisfied with all the means available and thus considerably more efficiently, economically and more rapidly. Bidders must be able to decide themselves, depending on the particular situation, whether to use other spectrum that was perhaps better suited to achieve the coverage targets.

Attention was also drawn to the fact that the obligation had been defined without consideration of the 900 MHz spectrum, which was not consistent with restricted bidding rights. The 900 MHz spectrum should be included, at least as far as the obligation to cover 80% of the population in every federal state with effect from 1 January 2016 was concerned.

It was also said that comprehensive broadband coverage by 2010 was only possible with the help of satellite connections. At present and for the foreseeable future, satellite was the only possible way of providing all the population with broadband access on attractive financial terms, without state aid.

Respondents thought it should not be possible for network build accomplished with other technologies – eg fibre optic – to factor into the obligation. This would be inconsistent with the aim of reallocating the 800 MHz band.

On the one hand it was felt that it was absolutely essential to complete deployment to non-served regions, more or less, before a provider could begin deployment in other regions. On the other, it was felt that phased use of frequencies was not likely to encourage rapid network rollout. Nationwide use of the 800 MHz frequencies should not therefore be made dependent on the complete fulfilment of the rollout obligation. Otherwise the consequence would be that households outside the white spots would only benefit from the better network coverage at a later time. In overall economic terms, this was not efficient.

As an incentive for rapid rollout in the white spots it was proposed that rollout should be allowed at the same number of locations (which the holder was free to choose anywhere in the country) as were promised by the spectrum rights holder for the white spots in the particular year. As a further incentive, spectrum rights holders should be authorised to use their 800 MHz spectrum freely across the country as soon as they had met half of the rollout obligation in the white spots. Parallel coverage of the remaining communities in non-served and underserved areas could be adequately secured by an annual progress report requirement, a completion deadline and the threat of penalties in the event of failure to meet the obligation.

It was also noted that the companies operating in the market would need the opportunity to make a profit on their investment. There was a considerable risk that it would not be possible to build and operate a network in the areas not yet provided with broadband Internet, given the current market prices. Spectrum rights holders should therefore be given the opportunity

early on to use the frequencies in those regions in which economic use was possible. Nothing else would be consistent with the aim of efficient use of frequencies.

A number of respondents commented that network operators would be forced to build more than one network as a result of the proposed coverage obligation.

As it was fairly improbable that this would happen, the obvious answer would seem to be to set up open networks with access for resellers (as envisaged for DVB-H in a comparable case). An open access approach would allow gaps to be plugged better, and there would be an incentive for SMEs and regional companies to deploy broadband in rural areas. There could be Internet access restrictions under the award conditions as practised, for instance, by the mobile companies in respect of Internet telephony. Access via broadcasting frequencies would thus become second class broadband access. Open access based on OSI layers 2 or 3 could help here.

A number of respondents argued for greater flexibility as regards the possibility for cooperation between the licence holders. Network operators should be able to engage in cooperation activities to fill in the white spots.

One respondent emphasised that new technologies would enable operators to work together in a variety of ways. It was in the interests of the companies themselves, their customers and the national economy for the companies to explore all the forms of cooperation that were technically possible, as far as there were no antitrust objections. In this way, the operators would not be unduly restricted in their entrepreneurial freedom. No restrictions should therefore be written into the frequency assignments.

There were calls, in particular, for frequency pooling to be allowed. Other forms of cooperation, too, such as national roaming and spectrum sharing should be simplified in order to find economically viable solutions to the coverage of sparsely populated, underserved areas especially.

It was also held that precautions were necessary in the case of frequency leasing to make sure that the coverage obligation was also "transferred".

Some respondents felt that the target of 80% of the population in the particular regions of a federal state by 2016 lacked urgency. Broadband must be deployed much faster if the provision of broadband Internet access by 2010, the goal stipulated in the federal government's broadband strategy, was to be met. One respondent called for deployment to be completed in 2011 at the latest.

Others, by contrast, said that the time of completion of the obligation depended on the availability of the network facilities and terminal equipment. One respondent found the deadline of 31 December 2014 appropriate. The equipment was not expected to be available before the end of 2010. Thus it was unrealistic to believe the aims could be reached by 31 December 2012. It should not be forgotten that there could be delays in introducing the technical systems, the terminal equipment and the technical aids. A situation should be avoided in which an assignee was forced to deploy unproven technology in possibly unsuitable locations just to meet licence conditions, without there being any real benefit for the customer.

It was additionally recommended that a latency period be included. Otherwise there would be a risk that there was indeed pro forma coverage, as with UMTS, but the subscriber would not consider this a replacement for fixed DSL.

A reporting requirement only was not enough, according to the comments. Not least the experience gained with award of the BWA spectrum showed that companies did not automatically keep to the rules.

It was also noted that there was no guarantee the coverage obligation would be met with the 800 MHz spectrum as it was not intended to check its actual use for the priority coverage of rural areas.

Some respondents wanted sanctions if the obligation was not met, as for instance the immediate revocation of the frequencies, or a financial penalty. Not only was an effective sanction mechanism necessary, however, but also prompt execution by the Bundesnetzagentur in the event of failure to meet the obligation.

Many respondents proposed that the obligation for the 800 MHz spectrum be given a different emphasis. Common to all is that they were in favour of a technology and frequency neutral emphasis for the obligation and their view that areas that had been provided with wire or radio-based connections should be taken out of the obligation.

One respondent suggested that priority stage 1 should include all those communities that, on a given date, did not have access to broadband networks. Communities in which use of the 800 MHz frequencies would be susceptible to interference for several years as a result of other use in neighbouring countries should initially be taken out of the obligation. Priority stage 1 should envisage 90% of the population being covered within a period of one and a half years of mobile broadband technology becoming available for the 800 MHz spectrum. The same should apply, once the interference no longer existed, to communities experiencing interference to use of the 800 MHz spectrum as a result of services in other countries.

Another respondent proposed that those acquiring 800 MHz spectrum be obliged to give priority to filling in the white spots in relation to the amount of spectrum won. "White spots" should be defined as those communities in Germany in which, in the current broadband mapping reporting period, less than 50% of households were able to avail themselves of at least a cable or radio-based offer of broadband access at a minimum downstream speed of 1 MBit/s. The list of white spot communities should be updated every six months in accordance with the broadband mapping reporting cycle, and all the communities on the list that had been covered in the interim should be deleted. A rights holder should be required to have completed broadband deployment in at least 50% of the communities designated for initial coverage by the end of 2012.

Two alternatives were proposed for allotment of the spectrum blocks. In the first, the Bundesnetzagentur should allot the blocks to the communities, taking account of federal state proportionality aspects, a balance by community size and the preference of the particular spectrum rights holder. In the second, the spectrum should be awarded through an alternating selection process.

Another respondent proposed that the areas without broadband Internet at the time of assignment be divided into six regions for the 800 MHz blocks, as this would mean that companies were not forced to set up parallel structures whose economic viability was debatable. Every assignee would then be required to provide wireless broadband telecommunications services in the areas in one of the packages by a particular time (area coverage requirement).

The Chamber has ruled as follows:

A special obligation is applicable for the 790 – 862 MHz band as a result of legal requirements.

By imposing a special obligation in derogation of the determinations in the coverage obligations set out in subsection IV.4.4 for the frequencies in the 1.8 GHz, 2 GHz and 2.6 GHz bands the Chamber is implementing the legal requirements from the Second Ordinance Amending the Frequency Band Allocation Ordinance of 14 July 2009 (Federal Law Gazette I No 41/2009 of 20 July 2009, page 1809ff) to close gaps in supply in rural areas.

Secondary usage condition 36 in the Frequency Band Allocation Ordinance (see NB 36 of the Ordinance, Annex Part B, loc cit) means for the 800 MHz spectrum a departure from the determinations on the degree of coverage in the bands at 1.8 GHz, 2 GHz and 2.6 GHz. The section by section analysis of the Ordinance has the following to say:

"The 790 – 862 MHz band is intended for use to improve broadband coverage in rural areas. This means that, in the first instance, gaps in coverage are to be filled in rural areas and in other regions subsequently, and that to begin with, planning may not be for non-rural areas. In the Bundesnetzagentur's award proceedings, the federal states are to be suitably involved. (see Federal Law Gazette No 41/2009 of 20 July 2009, page 1809ff Re No 3, loc cit).

It must be decided in accordance with the Frequency Band Allocation Ordinance (see NB 36 of the Ordinance, Annex Part B, loc cit) and with the participation of the federal states that, and to what extent, a future holder of frequency assignments in the 800 MHz band has to close gaps in coverage.

The federal states, after studying the responses to the draft consultation document, issued a statement on the special obligation regarding frequencies in the band at 800 MHz. Thus the following arrangement has been made, accommodating the joint proposal from the federal states and the consultation responses.

The federal states have submitted lists of towns and districts in which the coverage obligation is to be met for each priority stage.

Specifically, this is as follows:

An assignee using spectrum in the 800 MHz band is required to cover, in every federal state, at least 90% of the population in the towns and districts specified by the individual federal states (see lists and attachments) from 1 January 2016. The degree of coverage relates to all the population in all the towns and districts specified for each federal state.

The term "built up area" was deleted in agreement with the federal states and in line with the respondents' wishes.

The rollout obligation must be achieved with the 800 MHz spectrum, to which these coverage requirements apply solely. If, in the period to 1 January 2016, towns and districts are served by other providers/technologies using equivalent or advanced broadband solutions, this coverage will count towards the target to be reached. This is why the federal states set a target of 90% of the population.

In every federal state, the towns and districts on the lists are to be provided with broadband access in stages, in the first instance:

a) Provision will be made in the first stage initially to the towns and districts specified by the federal states whose inhabitants number not more than 5,000 (priority stage 1).

b) Provision will be made in the second stage to the towns and districts specified by the federal states whose inhabitants number between 5,000 and 20,000 (priority stage 2).

c) Provision will be made in the third stage to the towns and districts specified by the federal states whose inhabitants number between 20,000 and 50,000 (priority stage 3).

d) Provision will be made in the fourth stage to the towns and districts specified by the federal states whose inhabitants number more than 50,000 (priority stage 4).

Assignees are required to build and rollout their networks in the specified towns and districts of priority stages 1 to 4 as follows:

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. Priority stage 3 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 2 has been provided with access. Priority stage 4 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 3 has been provided with access.

As the federal government's broadband strategy is intended to improve broadband coverage, broadband connections are to be provided under such obligation. On this, the government's broadband strategy has the following to say (see page 8):

> *"...radio/satellite connections ... enable immediate provision of blanket coverage with high speed broadband connections. Such connections are currently defined as having transmission rates of at least 1 MBit/s."*

To respondents wanting a guaranteed transmission rate, the Chamber replied that, while a minimum rate was desirable in the consumer interest, telecommunications law did not make provision for it. Transmission rates depended on a number of technical factors and could not be readily prescribed. Rather, the Telecommunications Act assumes that high data rates will be provided by the market, unless particular quality characteristics are prescribed under a universal service obligation. The Chamber assumes, however, that all the participants in the auction are familiar with, and support, the aims of the federal government's broadband strategy.

Specifically, the following applies:

In light of the special legal requirements a separate obligation has been stipulated by the federal states in secondary usage condition 36 of the Frequency Band Allocation Ordinance for spectrum in the band at 800 MHz. Accordingly, an assignee using frequencies in the 800 MHz band is required to provide broadband access to particular areas in a federal state initially in stages. An assignee 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 (cf see attachments) as from 1 January 2016. The degree of coverage refers to the entire population of all the specified towns and districts in each priority stage, in each federal state, at the time the lists were made.

To identify white spots, the areas in which there is little or no broadband provision, the federal states have compiled lists of the relevant towns and districts. The lists are based – as respondents wished – on the broadband mapping activities of the Federal Economics Ministry as of June 2009. Additionally, the federal states were able to specify areas they had identified as underserved using their own surveys.

In all the federal states, the specified towns and districts are to be provided with broadband access in stages:

Priority stage 1 – provision will be made to the towns and districts specified by the federal states whose inhabitants number not more than 5,000. These are to be given top priority.

Priority stage 2 – provision will be made to the towns and districts specified by the federal states whose inhabitants number between 5,000 and 20,000.

Priority stage 3 – provision will be made to the towns and districts specified by the federal states whose inhabitants number between 20,000 and 50,000.

Priority stage 4 – provision will be made to the towns and districts specified by the federal states whose inhabitants number more than 50,000.

In setting the obligation the federal states allowed for assignees to be able, even with the given priorities, to build network infrastructures for more than one priority stage to a certain extent at the same time, as far as their business plan allowed. This possibility is dependent on the progress of network build in the towns and districts to be served beforehand (earlier priority stages). Accordingly, rollout in a particular federal state can only move from one stage to the next when provision has been made to at least 90% of the population of the towns and districts specified by that federal state in the particular priority stage.

The idea behind this requirement for priority use and phased "release" of spectrum is that service is provided to these Cinderella areas in every federal state at the earliest possible time. It requires assignees to meet the requirement before they can use these frequencies freely.

It is not detrimental to meeting the obligation if broadband also becomes available – as a side effect, as it were – in the higher categories through the presence of the transmitting stations in the rural areas (say, in districts with fewer than 5,000 inhabitants in priority stage 1). In light of this, such a requirement is also likely to encourage assignees to meet it as soon as possible. Accordingly, even before the decision was issued, potential bidders declared themselves willing to enter into a voluntary commitment. An additional requirement securing the actual use of spectrum would not therefore seem necessary.

Respondents wanting less restricted use of the 800 MHz spectrum were told that this was not possible on account of the legal requirements. It should be noted, however, that the use of frequencies will not be restricted as a rule to the towns and districts on the lists in view of their physical propagation properties.

The lists presented by the federal states will become constituent parts of the assignments under section 61(7) of the TKG. They specify the towns and districts for broadband deployment, and are updated regularly. In the updating process, towns and districts in which broadband has been made available in the meantime are marked accordingly. This then counts towards the 90% target. A factor for consideration is that access must be provided on a technologically neutral basis, so that a district is regarded as served if a different kind of connection has been provided – DSL, cable or wireless, for instance. This allows gaps in supply to be closed quickly, to begin with, so that broadband is brought to the population with minimum delay and hence compliance with the regulatory aim of safeguarding user, most notably consumer, interests in telecommunications as set out in section 2(2) para 1 of the TKG and the federal government's broadband strategy is achieved. It also answers respondents' concerns about avoiding multiple infrastructures if these are inefficient.

The Chamber welcomed efforts to use satellite technologies, too. This was in response to comments stating that widespread broadband coverage could be achieved by 2010 if satellite connections were used as well.

The Chamber could not share the views of respondents wanting the coverage obligation to be linked with an obligation that the towns and districts in non-served areas would make suitable locations available there. Frequency assignments issued under the Telecommunications Act had no influence on other legal relationships such as those of a building or environmental nature. All the same, the Chamber assumes that those responsible in non-served towns and districts will, in their own interests, take action on sites as far as they are able.

Replying to respondents who pointed out that, particularly when moving from one priority stage to the next it must be remembered that use of the 800 MHz frequencies in border areas might be affected or might not be possible as a result of existing broadcasting applications in neighbouring countries, the Chamber had the following to say. If use of frequencies in the 800 MHz band should be affected by existing broadcasting services in a neighbouring country and thus coverage of the population – as per the obligation – not be possible within the given time in these border areas, the Bundesnetzagentur will have to take account of this. Facts that make meeting the coverage requirement difficult will have to be taken into consideration.

Notwithstanding the special obligation, assignees using spectrum in the 800 MHz band are required to cover at least 50% of the population from 1 January 2016. The parameters to be met under the obligation will be decided subsequently, in light of the technology deployed. The prescribed minimum degree of coverage of at least 50% of the population is necessary and recommended if the regulatory aims connected with the obligation really are to be achieved. To be ensured particularly is the steady progression of network build throughout the assignment area. The aim is to provide consumers with telecommunications networks and services at the earliest opportunity. A benefit of this can also be efficient spectrum use in Germany. Hence imposing a coverage obligation is one way of achieving the regulatory aims flowing from the Federation's mandate to ensure the availability of telecommunications infrastructure (Article 87f of the Basic Law, or constitution). Transposed in particular are the

regulatory aims of safeguarding user, most notably consumer, interests in telecommunications (section 2(2) para 1 of the TKG), promoting telecommunications markets with sustainable competition in services and networks and in associated services and facilities (section 2(2) para 2), encouraging efficient investment in infrastructure (section 2(2) para 3) and securing efficient and interference-free use of frequencies (section 2(2) para 7).

The Chamber expects that these arrangements will make sure that every assignee contributes to bringing service to rural areas ("burden sharing").

To those maintaining that just a reporting requirement was not enough to make sure that the coverage obligation was met it was pointed out that failure to meet this obligation constituted grounds for revocation under section 63(2) sentence 1 para 2 of the TKG. Section 63(2) sentence 1 para 2 of the TKG states that a frequency assignment may be revoked where an obligation arising from the assignment has not been fulfilled.

In other respects, attention is drawn to the following.

To respondents proposing that networks be built on the open access principle with access for resellers, the Chamber replied that access to the relevant infrastructures was indeed possible for service providers and virtual network operators (MVNOs). However, it was not possible to impose an access obligation on account of the lack of legal powers. Under section 21 of the TKG, such an obligation may be imposed only on public telecommunications network providers with significant market power (SMP) (see also the key elements paper for the regulatory framework for progressing modern telecommunications networks and creating powerful broadband infrastructures, downloadable at www.bundesnetzagentur.de). The Chamber will allow cooperation activities, as long as these are permitted under regulatory and competition aspects. Yet the Bundesnetzagentur can only examine the issues when the auction has been completed and on a case by case basis. To meet the coverage obligation, future assignees can use available scope that will promote rapid, efficient network build in rural areas too. Economic cooperation with other network operators is possible, within the bounds of what is permitted in regulatory and competition terms. Relevant examples are agreements on shared infrastructures, or frequency lease.

As in earlier award proceedings, so too in these will assignees have possibilities – within the bounds of competition and telecommunications law – facilitating both access to the frequencies and meeting their coverage obligation. Following the regulatory principles drawn up by the Bundesnetzagentur on infrastructure sharing, assignees will be able to use infrastructures jointly. On the possibility of infrastructure sharing, the Bundesnetzagentur has already stated the conditions under which it considers this not to raise concerns (downloadable at www.bundesnetzagentur.de). It is planned to update these conditions in light of more recent technological advance and the flexibilisation of spectrum management in particular.

If service is provided to subscribers by other network operators leasing the frequencies, this can count towards the assignee's coverage obligation being met. In the case of frequency lease, however, the Chamber wishes to point out that the assignee continues to have responsibility for the spectrum rights, but also for the obligations. The Bundesnetzagentur has published guidelines on the question of the possibilities and procedures for spectrum trading, for the transfer and for the temporary lease of frequency assignments under the Telecommunications Act (see RegTP Official Gazette 12/2005 of 19 June 2005, Communication No 152/2005).

Hence the operative provisions have been amended as follows.

> In light of the special legal requirements a separate obligation has been stipulated in secondary usage condition 36 of the Ordinance Amending the National Table of Frequency Allocations for spectrum in the band at 800 MHz. 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 (cf see attachments) as from 1 January

2016. The degree of coverage refers to the entire population of all the specified towns and districts in each federal state.

This rollout obligation must be met with spectrum from the 800 MHz band. If, in the period up to 1 January 2016 towns and districts are served by other providers/technologies using equivalent or advanced broadband solutions, this coverage will count towards the 90% target rollout obligation.

In all the federal states, the specified towns and districts are to be provided in stages with broadband access initially as follows:

a) Priority stage 1 – provision will be made to the towns and districts specified by the federal states whose inhabitants number not more than 5,000.

b) Priority stage 2 – provision will be made to the towns and districts specified by the federal states whose inhabitants number between 5,000 and 20,000.

c) Priority stage 3 – provision will be made to the towns and districts specified by the federal states whose inhabitants number between 5,000 and 20,000.

d) Priority stage 4 – provision will be made to the towns and districts specified by the federal states whose inhabitants number more than 50,000.

Assignees are required to build and rollout their networks in the specified towns and districts of priority stages 1 to 4 as follows:

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. Priority stage 3 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 2 has been provided with access. Priority stage 4 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 3 has been provided with access.

Assignees can enter into cooperation agreements and lease frequencies, as long as this is permitted under the regulatory and competition law frameworks.

Notwithstanding the separate obligation set out above, assignees are required to cover at least 50% of the population as from 1 January 2016.

Re IV.4.6. Reporting Requirements

The following comments were made:

The requirement for an annual report on the status of the network build in "white spots" is welcomed as this would be helpful in verifying the rapid development in these areas and would consequently lead to earlier approval of unrestricted, nationwide use by network operators.

Demands have also been made for sanctions in the event that coverage requirements are not met.

The Chamber has ruled as follows:

From the time the frequencies are assigned, assignees must report to the Bundesnetzagentur on 31 December of every year on the progress of frequency usage and of network build and rollout.

The imposition of reporting requirements is intended to ensure that coverage obligations stipulated in subsections IV.4.4 and VI.4.5 are met. The Bundesnetzagentur should be

continuously informed about the progress of frequency usage in order to ensure that all frequency assignees make use of their frequencies promptly, particularly in the priority towns and communities specified in subsection VI.4.5 .

This will also enable unlimited nationwide usage to be established promptly by operators for assignments in the 800 MHz band – as noted by respondents.

Where noted that the imposition of reporting requirements alone will not be enough to ensure coverage obligations are met, attention is drawn to the fact that coverage obligations or their non-fulfilment represent grounds for revocation under section 63(2) sentence 1 para 2 of the TKG. Under section 63(2) sentence 1 para 2 of the TKG the assignment of a frequency may be revoked if the obligations attendant on the assignment are not met.

Re IV.4.7. Condition subsequent for disputed frequencies

The following comments were made:

Some respondents largely support the proposed arrangements. However, it was stated that the stipulation according to which frequency assignments in as yet disputed frequency bands will be rescinded if the legal dispute is resolved to the detriment of the Bundesnetzagentur will mean that it will not be possible to buy blocks such as these. These blocks would therefore have to be clearly identified by the auction design to ensure that bidders are aware of any problems associated with such spectrum for which they are bidding.

The assumption is made that in the event that a court forces the return of the spectrum, the award amount would be repaid.

The proposed condition subsequent is problematic because the content is unclear and restoration of the status quo ante therefore not assured. This risk has been further exacerbated by the ruling by the Cologne Administrative Court of 3 December 2008 (21 K 3363/07) in which the Court assumes that the stipulation is merely abstract in nature and does not yet have any actual impact in reality. The stipulation of a condition subsequent may be challenged after the award proceedings.

It was noted that inadequate information had been provided about ongoing legal proceedings, particularly as regards the 2.6 GHz frequency band. All the frequency blocks in this band were treated as equal in value. There was no reference to the fact that in the 2.6 GHz band, too, numerous individual frequency blocks are in litigation as a result of pending court proceedings on the extension of existing rights of use. This must be explained more clearly as, if a final court decision is reached in favour of an extension of existing rights of use in the 2.6 GHz band, this will affect specific frequency blocks but not the entire band.

The Chamber has ruled as follows:

The assignment of the frequencies in litigation must be tied to a condition subsequent for the event that the Bundesnetzagentur is forced by court ruling to extend or renew the rights of use of other companies. These secondary conditions are essential in order to ensure that the court rulings are applied.

The following is stated in this respect in the Rationale for the decisions by the President's Chamber of 19 June 2007 (cf Order 34/2007, page 3115, Bundesnetzagentur Official Gazette 14/2007 of 18 July 2007):

> *"First it should be pointed out that the frequencies in litigation are also available within the meaning of section 55(5) sentence 1 para 2 of the TKG as they have not yet been taken by other users with frequency assignments (cf official section by section analysis, for section 53 of the government draft, Bundesrat printed paper 755/03, page 105). The telecommunications legislation envisages in principle that available frequencies must be made available to the market, even if the assignments must be subject to revocation. This also applies to frequencies for which rights of use have been effectively, though not definitively, revoked. […]*

The Bundesnetzagentur must honour the duty assigned to it by section 52(1) of the TKG to secure the efficient and interference-free use of frequencies within the meaning of section 2(2), para 7 of the TKG, taking account of other regulatory aims specified in section 2(2) of the TKG. If available frequencies were held back from the market by regulation, this would inevitably mean that such frequencies - and consequently public resources - are not put to use. The outcome would not be reconcilable with the principle of ensuring efficient use of frequencies and would contradict statutory duties."

The Chamber upholds this argument.

The comments requested that the auction design should ensure that the disputed nature of specific frequencies is clearly apparent. The Chamber has already complied with this request by outlining the disputed nature of specific frequency bands and the status of particular legal proceedings in its description of the factual situation. In the interest of clarity any frequencies in litigation are also shown separately under subsection II.2 of this decision, especially as bidders are able to bid for frequencies in various frequency bands. It is intended to provide admitted bidders with an up-to-date description of the status of relevant proceedings.

With regard to requests for clarity about frequency blocks in litigation particularly in the 2.6 GHz band, it is important to point out that the entire 2.6 GHz band is also currently the object of proceedings aimed at overturning the previous decisions by the Chamber in 2007 and 2008. Hence the Chamber is not able at the present time to make any statement on whether - depending on the outcome of the proceedings - a claim for extension for the fixed radio service will create options for the use of this band for wireless access.

Nonetheless the Chamber has decided that a condition subsequent as specified in section 36(2) para 2 of the Administrative Procedures Act would be the more appropriate legal means to employ in order to restore the spectrum usage rights of previous assignees in compliance with a court ruling. The imposition of a condition subsequent can bring about the termination of the assignment of frequencies upon the occurrence of the condition without the need for further administrative action, while exercising a reserved right of revocation would require a new administrative act which could be subject to legal appeal. In order to maintain legal certainty the assignment of frequencies should therefore go hand in hand with a condition subsequent. The specific nature of a condition subsequent will be defined in the framework of the assignment.

It is also stated that the envisaged condition subsequent may be challenged after the award proceedings and that in this respect there was still considerable legal uncertainty attached to the implementation of court rulings. In this context it is important to note that where final court rulings have been made implementation may take the form of enforcement of the judgement.

Where the comments suggested making an explicit stipulation on the repayment of the award price, the Chamber has already commented on subsection IV.5 of this decision that, in the event that a court requires the spectrum to be returned, the award amount will be repaid.

Re IV.4.8 No obligation to provide access to service providers

The following comments were made:

Some of the respondents agreed with the considerations regarding subsection IV.4.8.

It was also requested that the old licences should be amended and the service provider obligations stipulated therein be cancelled. Clarification should also be provided in the award rules. The draft decision envisages that the continuing service provider obligations based on the GSM and UMTS/IMT-2000 licences shall continue to apply regardless of the frequencies assigned. Taking current law into account the continuation of the service provider obligations had to be limited: In accordance with section 150(4) of the TKG, the service provider obligations under GSM licences only apply to the rights to use spectrum granted under the old law and thus only to the extent stipulated in the old licences. These could not, therefore, be extended to cover new "additional" spectrum acquired by the licensee in an auction based on the new law. This would mean the service provider obligations – regardless of the amount

of spectrum which an old licensee might acquire in the pending auction – would only need to be met with a spectrum capacity of 22.5 MHz. Any additional spectrum may not - by law, owing to the requirement to assign frequencies on a non-discriminatory basis - be subject to service provider obligations.

In contrast, it was stated that under section 61(4) sentence 2 para 4 of the TKG the Bundesnetzagentur was also empowered to impose service provider obligations, as a secondary condition, on companies which do not have significant market power under section 18 of the TKG. The rule had to be seen in the context of Art. 8(2) and (3) of the Access Directive which also explicitly envisages an exception for award proceedings.

Moreover, the fact that a service provider obligation was not envisaged would undermine the scope and further application of the service provider obligation, legally guaranteed by section 150(4) and (4a) of the TKG, to old licences as it would no longer be clear which of the relevant frequencies could be used by the assignee with or without a service provider obligation.

The Chamber has ruled as follows:

No obligation will be imposed on assignees to offer service providers access to services on a non-discriminatory basis.

The Chamber is not legally empowered in the proceedings under section 61 of the TKG to impose obligations requiring assignees to offer service providers access to services on a non-discriminatory basis.

Section 61(4) sentence 2 para 4 of the TKG does not provide sufficient authority for this purpose. Under this provision, the Bundesnetzagentur determines the frequency usage conditions, including the degree of coverage with the frequency usage and the time required to achieve such degree, prior to carrying out award proceedings. Frequency usage conditions in this sense not only include technical specifications which ensure efficient and interference-free use, but can also include arrangements for achieving other regulatory aims according to section 2(2) of the TKG. The Chamber takes the view, however, that section 61(4) sentence 2 para 4 of the TKG cannot be interpreted as giving power to impose a service provider obligation.

There are no objective grounds for believing that the law was intended to give the Bundesnetzagentur powers, other than instruments for regulating the market, to impose a service provider obligation on assignees, regardless of their market power. It is important to consider in this context that the obligation to offer access to service providers would represent interference with the constitutionally protected private autonomy of frequency assignees. As the law stands such private autonomy can only be restricted if very specific conditions apply (cf in this context section 21(1) and (2) of the TKG). Restrictions on private autonomy may also be justified under certain circumstances by the right to use a scarce public resource – such as frequencies – given that the holder of the right to such a scarce resource enjoys a benefit not available to the public as a whole. This benefit might be compensated in the sense of public welfare by subjecting the network operator to a special obligation in the public interest. Nonetheless whether or not this is justification enough for interfering with network operators' constitutionally protected rights can only be ultimately decided by legislation, as in fact is the case in section 21(2) para 3 of the TKG.

For these reasons the Chamber does not consider that section 61(4) sentence 2 para 4 of the TKG provides sufficient powers to impose a service provider obligation.

Section 60(2) sentence 1 of the TKG does not provide a basis for such powers either for the same reasons. Where respondents stated that the service provider obligation is a permissible secondary condition under section 60(2) sentence 1 of the TKG because such a condition would ensure efficient and interference-free use of the frequencies, it must be pointed out that this enabling provision also does not provide powers to impose such a service provider obligation, neither explicitly nor may it be interpreted as such.

In this context the Chamber points out that the GSM and UMTS/IMT-2000 licences continue to contain valid service provider obligations. This results particularly from section 150(4) of the TKG. As these service provider obligations are a constituent element of personal licences, the regulations of which continue to be legally valid, they continue to apply regardless of the frequencies assigned in the individual case. This means that calls to overturn the service provider obligations in the "old licences" cannot be met. The fact that the obligation is part of the personal licence also means that a service provider obligation cannot be imposed on just a particular spectrum held by a licensee/assignee either.

This means that the service provider obligations imposed on the GSM/UMTS network operators continue to apply. No further service provider obligations need be imposed on them therefore. As discussed above, the obligation is person specific and does not apply to individual frequencies. The service provider obligation would not therefore be undermined as suggested by respondents.

Where it was stated that the Bundesnetzagentur is also empowered by section 61(4) sentence 2 para 4 of the TKG to impose a service provider obligation, as a secondary condition, on companies which do not have significant market power under section 18 of the TKG, the Chamber points out that such an obligation to provide access under section 18 in conjunction with section 25 of the TKG would have to be imposed in a separate administrative procedure in the framework of market regulation under Part 2 of the Act. Hence, under section 132 of the TKG the Chamber does not in any case hold responsibility for such access order.

With regard to facilitation of "national roaming" discussed in connection with the obligation to offer access to service providers it is important to note there are no fundamental objections in terms of spectrum management to "national roaming" agreements being reached between network operators. At the same time it is important to clarify that the frequency assignees are subject to coverage obligations, which cannot be considered to be met by the provision of "national roaming", as well as (under section 63(1) of the TKG) to the obligation to use the frequencies. In this respect the Chamber upholds the statements in the decision BK-1b-98/005-1 of 14 February 2000 (Order 13/2000, Reg TP Official Gazette 4/2000, page 516 (530ff)).

Re IV.5 Minimum bid, section 61(5) of the TKG

The following comments were made:

Several respondents agreed with the regulations concerning minimum bids for the planned spectrum award. This, it was stated, enabled various objectives, such as procedural economy, to be achieved by obtaining higher minimum bids and ensuring that only serious bidders take part in the award process. The proposal was however made that the amount to be paid after the auction should be paid in annual instalments to ensure that the financial burden on market players is not excessive.

The minimum bid regulations were rejected by some respondents owing to the nationwide award of frequencies and the associated minimum bid as this would discriminate against small and medium-sized bidders.

The Chamber has ruled as follows:

The minimum bids will be stipulated for the paired and unpaired 5 MHz blocks as well as for the 14.2 MHz block.

A minimum bid may be stipulated for participation in the auction under the provisions of section 61(5) sentence 2 of the TKG.

In its decision of 7 April 2008 the Chamber stipulated the minimum bids for paired and unpaired 5 MHz blocks and for the 14.2 MHz block. These are based on the lower value in the scale of fees defined for the assignment of a frequency in the 900 MHz and 1800 MHz ranges (GSM network) in the Frequency Fee Ordinance (cf specifically Order 34/2008, re 5,

Bundesnetzagentur Official Gazette of 23 April 2008). This decision and the reasons for stipulating a minimum bid is upheld despite the inclusion of other frequencies in the 800 MHz and 1.8 GHz ranges.

There are no apparent reasons for stipulating a different minimum bid for the frequencies additionally included at 1.8 GHz (1710 – 1725 MHz and 1805 – 1820 MHz) than for the other frequencies to be awarded in the 1.8 GHz, 2.0 GHz and 2.6 GHz bands.

Due to the specific coverage obligations for the 800 MHz frequencies included in the award proceedings whereby the frequencies must primarily be used to close coverage gaps in rural areas (priority use of the frequencies and a phased release of the spectrum; cf subsection IV.4.5), the Chamber was also guided in setting the minimum bid by the lower end of the scale of fees. Owing to the special coverage obligations it would not appear legitimate to stipulate a higher minimum bid on account of the better propagation conditions.

The actual amount of the minimum bid is therefore based on the statutory assignment fees for all frequencies available for award; no distinctions are made in terms of frequency band (cf in detail Order 34/2008, re 5, Bundesnetzagentur Official Gazette of 23 April 2008). The Chamber has based the stipulated minimum bid on the lower value of the scale of fees simply in order to determine the lowest auction bidding price.

The specific amounts stipulated as minimum bids are therefore upheld. The following therefore applies:

The minimum bid for a 5 MHz duplex block or a 4.95 MHz duplex block is set at 2,500,000 euros. The minimum bid for a frequency block of 1 x 5 MHz (unpaired) is 1,250,000 euros.

The minimum bid for the frequency block from 2010.5 MHz to 2024.7 MHz (14.2 MHz) is stipulated at 3,550,000 euros.

The same minimum bids are envisaged for frequencies in litigation as, from the point of view of the Chamber, these are so low that any impairments arising from the disputed nature of the spectrum are taken into account. In this context it is important to point out that if the court were to force the return of the spectrum, the award price would be repaid.

Where respondents stated that the minimum bid discriminates against small and medium-sized companies, it must be pointed out that the amount for each minimum bid is the same as that of the statutory assignment fee. Where respondents cast doubt in this context on the nationwide award, reference is made to the considerations of the Chamber regarding the relevant geographic market (cf subsection IV.2.2).

The Chamber does not uphold the demand voiced by some respondents that the award price should be payable in annual instalments. As bidders must have demonstrated their efficiency as part of qualifying to take part in the auction, the requirements for payment by instalment cannot be met. Under section 34(1) of the Federal Budgetary Regulations (BHO) revenues must be promptly collected in full. Promptly means that the due date for payment must be established as soon as legally possible. Under section 59(1) subpara 1 BHO payment in instalments or deferment is only possible in specific cases if immediate collection would entail considerable hardship. Considerable hardship may only be assumed if the debtor is having temporary but serious payment difficulties owing to unfavourable business circumstances or would suffer considerable hardship if owed amounts were collected immediately. The requirement for evidence of efficiency is one of the preconditions of taking part in award proceedings.

Re V. Auction

Re V.1. General provisions

Re V.1.1. Venue

The following comments were made:

The arrangements for the auction in the physical presence of the bidders at the Bundesnetzagentur building in Mainz entail considerable logistical cost for all those involved. Remote bidding via secure data lines would make the process much simpler.

The Chamber has ruled as follows:

As it is very much in the interests of the Bundesnetzagentur to make the frequencies available to the market as quickly as possible (owing to the scale of demand and in order to implement the German government's broadband strategy), the auction will take place in the presence of the bidders at the auction location in Mainz using locally networked computers (on site auction). This should ensure that the frequency award proceedings can be implemented as quickly, efficiently and smoothly as possible.

The Chamber's response to calls for a remote auction instead of an on site auction is as follows: More intensive preliminary work would be required and a longer test phase needed to ensure that a remote auction can be held properly and that collusive behaviour is precluded and this would entail delaying the auction itself. This would run counter to the federal government's broadband strategy. The prompt and smooth procedure guaranteed by an on site auction has also proved effective in the past. Given the high level of security which the Bundesnetzagentur requires such frequency award proceedings to meet, the Bundesnetzagentur believes that an on site auction is absolutely essential as things stand. Auctions at a central location provide a significantly greater guarantee that collusion will be counteracted and proper proceedings ensured than if each bidder were to bid from his own business premises.

Re V.1.2. Eligibility

The formal preconditions which need to be met for an applicant to participate in the auction are set down in subsection V.1.2. Accordingly the prerequisites for participation are admission, money deposit and authorisation of bidders' representatives.

The Bundesnetzagentur will publicly announce the names of those eligible to take part in the auction before the auction is held.

Re V.1.3. Security

The following comments were made:

It was pointed out that the envisaged deposit puts smaller and medium-sized regional bidders at a disadvantage. As such telecommunications companies only wish to bid for single or several blocks in the 800 MHz band to cover a limited area, the stipulation of a deposit and a minimum bid would in effect exclude them from participation in the auction and would exclude them from the outset from taking part in the process of supplying rural areas with broadband Internet connections.

The Chamber has ruled as follows:

One of the preconditions for taking part in the auction is that the admitted bidder provides a deposit. The purpose of the deposit is to demonstrate that the bidder is earnest in its intention to participate in the auction; the deposit also provides partial security that the price will be paid by the successful bidder. This does not affect the requirement for evidence of efficiency, particularly by submitting a funding statement.

The deposit may be remitted to an account specified by the Bundesnetzagentur. The amount must have been credited 14 days prior to the auction at the latest.

Alternatively, instead of remitting the deposit the applicant can provide an unconditional, continuing, irrevocable absolute bank guarantee for the amount of the deposit issued by a domestic financial institution or a financial institution authorised as a customs and tax guarantor. Under section 766 sentence 1 of the German Civil Code (BGB) the statement of guarantee must be made in writing. The guarantee statement is made by submitting the original declaration to the Bundesnetzagentur. Only the copy of notarised documents intended for the Bundesnetzagentur need be submitted. The condition that the guarantee may only be issued by one of these two types of institution aims to ensure applicability of German law to claim assertion, and enforceability in accordance with German law. The bank guarantee must be submitted to the Bundesnetzagentur 14 days before the auction begins at the latest.

The amount of the deposit depends on the applicant's maximum bidding entitlements based on the application for admission. The minimum bid for the frequency blocks for which the applicant has obtained bidding entitlements is used as the reference value. The minimum bid in turn is based on the lower value in the scale of fees stipulated for the assignment of a frequency in the 900 MHz and 1800 MHz (GSM network) bands in the Frequency Fee Ordinance (cf specifically Order 34/2008, re 5, Bundesnetzagentur Official Gazette of 23 April 2008).

If respondents state that the level of the deposit discriminates against small and medium-sized network operators, it must be pointed out that the amount of deposit due corresponds to the applicable minimum bid and thus to the statutory assignment fee. An amount which is at least as high would in any case have to be paid if the frequencies were assigned as the Chamber continues to adhere to its definition of the relevant geographic market. If, in this context, respondents cast doubt on the nationwide award, reference is made to the considerations of the Chamber regarding the relevant geographic market (cf subsection IV.2.2).

This means that 1,250,000 euros must be paid for each bidding entitlement (expressed in lot ratings).

This means, for example, that the deposit would be as follows:

- for 2 lot ratings for a frequency block of 2 x 5 MHz (paired) or a frequency block of 2 x 4.95 MHz (paired) 2,500,000 euros,
- for 1 lot rating for a frequency block of 1 x 5 MHz (unpaired) 1,250,000 euros

and

- for 3 lot ratings for the frequency block of 1 x 14.2 MHz (unpaired) (2010.5 MHz to 2024.7 MHz) 3,750,000 euros.

The tie up with the minimum bid is intended to ensure that interested companies do not refrain from taking part in the auction just because of a high deposit. The Chamber has thus taken particular account of the concerns of smaller and medium-sized companies as required by section 61(5), end of sentence 1, of the TKG.

If the deposit is remitted to the Bundesnetzagentur's account, it goes towards the award price if the bid is successful or towards any other payment obligations under the auction rules.

If the deposit is made in the form of a bank guarantee, this is released again after payment has been made.

Deposits do not attract interest. If a bidder has not won spectrum and no other payment obligations exist, the deposit will be refunded without undue delay after close of the auction as a whole. In this case the guarantee statement is surrendered.

Re V.1.4. Lots

The following comments were made:

It was noted that insufficient information had been provided about the current court proceedings, particularly as far as the 2.6 GHz frequency band is concerned. All the frequency blocks in this band were treated as equal in value. There was no reference to the fact that numerous individual frequency blocks in the 2.6 GHz band are also the subject of litigation as a result of pending court proceedings on the extension of existing rights of use. This had to be made transparent as a final court ruling in favour of extending the existing rights of use in the 2.6 GHz band would affect individual frequency blocks but not the entire band.

Some respondents perceive differences in the value of each of the frequency blocks. The technical restrictions on certain frequency blocks are said to be so serious that they cannot be regarded as equally valuable as other – technically unproblematic – frequency blocks in the respective frequency bands. This would result in different values for the various blocks which ought to be taken into account in award proceedings which take spectrum efficiency seriously, especially as these differences themselves may vary from one bidder to the next. These blocks should therefore be auctioned for a specific spectral position.

Delegation of the award decision to award proceedings subsequent to the auction which included an element of chance would not, on the other hand, be adequate to the objective of awarding frequencies efficiently.

In order to assess the value of technically restricted frequency blocks the Bundesnetzagentur should also stipulate the framework conditions to which use is subject. This is said to apply in particular to the regional scope of any additional protection measures which may be required.

Specifically this would concern the lowest block of the 800 MHz frequency band which can only be used in certain regions if separate technical measures are taken in order to prevent the adjacent broadcasting channel 60 directly below 790 MHz from being affected by any out-of-block emissions.

In this connection calls have been made for a 10-MHz protection interval to be set up in order to avoid interference with broadcast reception and enable full use to be made of channels 58 – 60 in the future.

It was stated that secondary usage condition 36 in the Frequency Band Allocation Ordinance absolutely prohibits interference to broadcast reception by wireless access transmitters.

The same also applied to the two upper blocks of the 2.6 GHz band owing to the specific conditions regarding the protection of the neighbouring radio astronomy stations in Effelsberg (Eifel) and Westerbork (Netherlands). In the conurbations of Düsseldorf and Cologne these conditions could only be met with considerable technical input and might even restrict or exclude use altogether. This would mean that the 2.6 blocks are not of equal value.

If the issues referred to in the draft paper for consultation – conversion of the FDD spectrum into TDD spectrum after the auction, protective zones for radio astronomy – continue to be relevant to the award, the 2.6 GHz band would not be suitable for being auctioned for a non-specified spectral position (abstract award) and should be auctioned specifically. An abstract award would only be possible if the option of converting FDD spectrum into TDD spectrum after the auction no longer existed, if the channelling arrangements fully complied with ECC Decision (05)05 and if the radio astronomy protection zone around Effelsberg still did not affect the Cologne conurbation.

There is also said to be a certain difference in the value of the top FDD blocks in the 2.6 GHz band (2680 – 2690 MHz) as these blocks are directly adjacent to the frequency band allocated to the radio astronomy service. Certain conditions must be met here to protect the radio astronomy service. It is asserted that these conditions need to be specified more precisely prior to the auction.

The proposal has been made that the unspecified award of these blocks should be kept to a minimum to enable the bidders to influence the range of the spectrum assigned to them.

The Chamber has ruled as follows:

All the spectrum available in the 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz bands for assignment for wireless access for the provision of telecommunications services will be auctioned.

The President's Chamber awards the frequency blocks in the 2.6 GHz band as well as five paired frequency blocks in the 800 MHz band and three paired frequency blocks in the 1.8 GHz band abstractly, ie without specifying the exact position of the relevant frequency block in the radio spectrum. The specific position of the blocks acquired will be determined in a separate allotment procedure after the auction under subsection V.4.2. The frequency blocks won will be allotted to their highest bidders in the period between the close of the bidding proceedings (by awarding the individual auction items and handing over the award notice) and the issue of the assignment notices. The allotment procedure is specified in detail in subsection V.4.2. The remaining blocks in the 800 MHz, 1.8 GHz and 2 GHz bands will be auctioned for a specific spectral position.

The award of abstract frequency blocks is more advantageous for the bidder and auctioneer than awarding concrete frequency blocks. Abstract awards make it easier for bidders to make bidding decisions and to acquire contiguous spectrum. It is very much in bidders' interests to be able to use contiguous spectrum in a frequency band. The linking up of several frequency blocks to create a single packet of contiguous frequency blocks results in greater efficiency when using the frequencies as the use of contiguous frequency blocks becomes more efficient at a disproportionately higher rate than when individual, non-contiguous frequency blocks are used. The probability of interference between adjacent frequency blocks run by different operators is also reduced. It is therefore in the legitimate interest of bidders to ensure that they acquire contiguous spectrum.

These objectives can be achieved by an abstract award. The subsequent allotment of abstract frequency blocks won in the bidding proceedings to a package with contiguous concrete frequency blocks therefore meets the objective of securing efficient and interference-free use of frequencies (sections 2(2) para 7, 52(1) of the TKG).

The Chamber takes the view that the abstract award of frequency blocks in earlier auctions has been successful (GSM 1800 in the year 1999 and UMTS/IMT-2000 in 2000). This was supported by the bidders at the time and is familiar to interested parties.

However, it would be appropriate to award frequency blocks for a specific spectral position whenever there are substantial differences in value between the frequency blocks. Otherwise there would be a significant conflict of interests in the subsequent allotment of frequencies. What is more, the associated uncertainties in the auction may result in inefficient bidder behaviour.

One reasons for awarding spectrum for a specific spectral position may be that certain frequency blocks are subject to litigation which may substantially affect the value of certain of them. If, in the subjective view of a bidder, there is a significant risk of losing frequency usage rights acquired by auction as a result of a court decision, there may be considerable discrepancy in the value of two different – but otherwise equally valued – frequency blocks in the same frequency band if one frequency block is the object of litigation and the other not.

Specific disputes:

<table>
<tr><th>Frequency band</th><th colspan="2">Grounds of litigation in specific frequency bands
(Designation of frequency blocks in Annex 6)</th></tr>
<tr><td rowspan="10">1.8 GHz (paired)</td><td>1.8 GHz D</td><td>1730.1 – 1735.1 MHz / 1825.1 – 1830.1 MHz</td></tr>
<tr><td colspan="2">DB Netz AG versus Federal Republic of Germany (Higher Admin. Court NRW 13 A 161 / 08)
Repeal of the frequency relocation notices issued in favour of E-Plus and O2 (1800 → 900 MHz) and assignment of spectrum in the E-GSM band.</td></tr>
<tr><td colspan="2">Airdata AG versus Federal Republic of Germany (Higher Admin. Court NRW 13 A 424/08)
Repeal of the frequency relocation notices issued in favour of E-Plus and O2 (1800 → 900 MHz) and implementation of proceedings under section 55 of the TKG (assignment or award proceedings).</td></tr>
<tr><td colspan="2">Inquam GmbH versus Federal Republic of Germany (Admin. Court Cologne 21 K 5789/09)
Repeal of frequency relocation notices issued in favour of E-Plus and O2 (1800 → 900 MHz)</td></tr>
<tr><td>1.8 GHz E</td><td>1758.1 – 1763.1 MHz / 1853.1 – 1858.1 MHz</td></tr>
<tr><td colspan="2">DB Netz AG versus Federal Republic of Germany (Higher Admin. Court NRW 13 A 161 / 08)
Repeal of the frequency relocation notices issued in favour of E-Plus and O2 (1800 → 900 MHz) and assignment of spectrum in the E-GSM band.</td></tr>
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Repeal of frequency relocation notices issued in favour of E-Plus and O2 (1800 → 900 MHz)</td></tr>
<tr><td>2.0 GHz (unpaired)</td><td>2.0 GHz E</td><td>1900.1 – 1,905.1 MHz</td></tr>
</table>

Frequency band	**Grounds of litigation in specific frequency bands** (Designation of frequency blocks in Annex 6)	
	Quam GmbH ./. Federal Republic of Germany (Higher Admin. Court NRW 13 A 2069 / 07) Revocation of the UMTS licence	
2.0 GHz (paired)	**2.0 GHz A**	**1930.2 – 1935.15 MHz / 2120.2 – 2125.15 MHz**
	Quam GmbH ./. Federal Republic of Germany (Higher Admin. Court NRW 13 A 2069 / 07) Revocation of the UMTS licence	
	2.0 GHz B	**1935.15 – 1940.1 MHz / 2125.15 – 2130.1 MHz**
	Quam GmbH ./. Federal Republic of Germany (Higher Admin. Court NRW 13 A 2069 / 07) Revocation of the UMTS licence	
2.6 GHz (paired)	**2.6 GHz A – 2.6 GHz N**	**2500 – 2570 MHz / 2620 – 2690 MHz**
	Airdata AG ./. Federal Republic of Germany (Federal Admin. Court 6 B 5.09 and 6 B 6.09) Application for extension of 36 assignments in the 2.6-GHz range currently limited until 31 December 2007.	
	Airdata AG ./. Federal Republic of Germany (Federal Admin Court 6 C 4.09) Award proceedings "wireless access for the provision of telecommunications services": Repeal of Orders No. 34/2007 and No. 34/2008 published in the Official Gazette (decisions of the President's Chamber on the order for award proceedings) to the extent the frequencies of Airdata AG in the 2.6 GHz band are concerned.	
2.6 GHz (unpaired)	**2.6 GHz O – 2.6 GHz X**	**2570 – 2,620 MHz**
	Airdata AG ./. Federal Republic of Germany (Federal Admin. Court 6 B 5.09 and 6 B 6.09) Application for extension of 36 assignments in the 2.6 GHz band currently limited until 31 December 2007.	
	Airdata AG ./. Federal Republic of Germany (Federal Admin Court 6 C 4.09) Award proceedings "wireless access for the provision of telecommunications services": Repeal of the Orders No. 34/2007 and No. 34/2008 published in the Official Gazette (decisions of the President's Chamber on the order for award	

Frequency band	Grounds of litigation in specific frequency bands (Designation of frequency blocks in Annex 6)
	proceedings) to the extent the frequencies of Airdata AG in the 2.6 GHz band are concerned.

Status on 1 October 2009

Other reasons for not regarding frequency blocks as equal in value may be different amounts of spectrum, restrictions on usage as a result of cross-border coordination agreements or further regional restrictions on use of specific national frequencies.

Where respondents have noted differences in the value of the frequency blocks and have called for some blocks to be awarded for a specific spectral position, particularly considering the technical restrictions affecting some frequency blocks, the Chamber has taken this into account. The issue concerning the equal value of frequency blocks has therefore been considered for each frequency band. The framework conditions for the use of the frequencies are laid out specifically in the reasons for the decision on the purpose of use (cf subsection IV.4.1) and on the frequency usage conditions (cf subsection IV.4.2) as well as in Annexes 2 and 3.

In light of this it would be possible to award frequency blocks in abstract form in the 800 MHz (partly), 1.8 GHz (partly) and 2.6 GHz bands in these award proceedings, but not in the other 800 MHz (partly), 1.8 GHz (partly) and 2 GHz frequency bands. However, an abstract award of frequency blocks would depend on frequency blocks in a particular frequency band being regarded as equal in value.

Re the 800 MHz band:

The Chamber regards the frequency blocks offered in the 800 MHz band as equal in value except for the lowest block(791 MHz to 796 MHz and 832 MHz to 837 MHz). The Chamber takes the view that there are no substantial differences in the value of the remaining blocks. The blocks are therefore considered to be equal in value, regardless of their spectral position.

The Chamber has stated the following regarding the issue of equal value of the entire 800 MHz band in its draft paper for consultation:

> On the basis of the current status of the internationally agreed frequency usage parameters for this band there are no grounds for arriving at a different view. These frequency usage parameters serve the objective of not interfering with broadcasting services under 790 MHz. This objective is reflected by the federal law provision of usage condition 36 in the Frequency Band Allocation Ordinance, as amended by the Second Ordinance Amending the Frequency Band Allocation Ordinance of 14 July 2009 (Federal Law Gazette No. 41 of 20 July 2009, page 1809).
>
> At the international level the decision has been made – in order to avoid interference with broadcasting more effectively – to reverse the receive direction in the upper and lower band at 800 MHz in contrast to current practice for the public mobile service. As a result the base stations transmit in the lower band and not the mobile terminal stations.
>
> The frequency usage parameters are stipulated in a combination of block edge masks (BEM). According to the current draft CEPT report 30 and to Annex 3 to the draft of an applicable decision by the CEPT's Electronics Communication Committee (ECC) the out-of-block emissions from base stations may not exceed a level of 0 dBm EIRP per 8 MHz (with a maximum possible level for in-block emissions) in spectrum below

790 MHz used for broadcasting. The actual frequency block above 790 MHz from which the out-of-block emissions originate is irrelevant. These BEMs take account of the protection requirements of the broadcasting service immediately below 790 MHz in particular.

According to the current status of consultations at the international level (draft CEPT report 31) in addition to the out-of-block conditions for wireless access a 1 MHz guard band will also be stipulated between the frequencies dedicated to television broadcasts (up to 790 MHz) and the frequencies which will be dedicated (in the future) for wireless access for the provision of telecommunications services (over 790 MHz) to protect broadcasting services below 790 MHz. The frequencies usable for wireless access for the provision of telecommunications services will therefore begin at 791 MHz.

In light of the above the Chamber is convinced, following an evaluation, that the first frequency block in the 800 MHz band is equal in value with the other frequency blocks.

The Chamber is aware that, compared with the other five paired frequency blocks, additional technical measures may need to be taken by the network operators in certain cases (such as using special filters in the base station high frequency unit) in order to realise the maximum level for out-of-block emissions from the frequency block 791 MHz to 796 MHz. At the same time the Chamber assumes that these special precautions would only be needed in exceptional cases during actual operation.

One reason for this assumption is the guard band from 790 MHz to 791 MHz. Another reason is that the restrictions on reception of broadcasting signals by the DVB-T receivers – which must be prevented by means of protective measures in terms of spectrum management – will be extremely unlikely, both in terms of time and geographically.

On the one hand, DVB-T reception may be restricted in certain cases owing to the accumulation of radio signals in the receiver's tuning range. However, the probability that such reception interference would actually occur owing to super-saturation from out-of-block emissions depends crucially on the specific circumstances.

A cumulative effective of this kind could – if at all – only occur where a large number of DVB-T channels are actually used. This is not usually the case in rural areas, however, which are to be provided with wireless access for the provision of telecommunications services. It is also probable that the base stations which might potentially interfere with DVB-T reception will be built on the outskirts of communities in these rural areas owing to the special obligation to provide coverage in this band. This means that in most cases there will be sufficient geographic space between the base station and the DVB-T receiver in order to avoid super-saturation.

On the other hand, in specific cases DVB-T reception may be restricted in areas where, firstly, a DVB-T receiver is on the outer edge of a DVB-T coverage area (with a low wanted field strength) and, secondly, the base station may not be far enough away from the DVB-T receiver. In these – in the view of the Chamber – rare cases, the interference may be effectively combated by the (mobile radio) network operator by installing a special filter in the base station, for example.

If such a filter needs to be installed and if this gives rise to higher costs for the holder of the rights of use to the frequency block 791 MHz to 796 MHz, these additional costs would not be of a type or extent which would make this frequency block generally less valuable as an auction item than the other 800 MHz frequency blocks. The additional costs, which cannot initially be entirely excluded, are - in the view of the Chamber - comparable with the differences usually affecting network operators as a result of cross-border coordination agreements.

While the Chamber fundamentally upholds this assessment, it does however take account of the concerns expressed by the respondents and awards the lowest block (791 MHz to 796 MHz and 832 MHz to 837 MHz) for a specific spectral position. In the view of the respondents, the relevant technical precautions for this block are so serious that it would not be seen as equal in value with the other blocks in this spectrum. An abstract award of this block would, however, merely postpone judgement regarding the value of this block until the later allotment procedure.

The Chamber takes the view that the objective pursued by awarding the entire band in abstract form as originally intended, ie facilitating the retention of contiguous spectrum, can also be achieved by a concrete award of the lowest block. The concrete provision of the lowest block is not irreconcilable with a simple, fast and purposeful implementation of the award proceedings. The fact that the bidders are aware from the very start which blocks special requirements apply to means that they are able to develop a specific bidding strategy which reflects their view of the value. The allotment procedure also continues to guarantee that contiguous spectrum is allotted (cf subsection V.4.2).

Re the 1.8 GHz band:

Some of the frequency blocks available for award in the 1.8 GHz band will be awarded in abstract form and some for specific spectral positions.

The paired frequency blocks A, B and C in the 1710 to 1725 MHz and 1805 to 1820 MHz bands should be treated as equal in value and will be awarded in abstract form. Even if one of the frequency blocks is adjacent to another frequency block which has already been assigned to a potential bidder, the Chamber believes this is of no relevance in this specific case. If this potential bidder buys at least one of these frequency blocks, the allotment procedure ensures that these frequencies are contiguous with frequencies which have been previously assigned. This takes account of the aim referred to above of securing efficient frequency use in accordance with section 2(2) para 7 of the TKG by assigning contiguous spectrum. For this reason, these frequency blocks must be regarded as equal in value, including from the point of view of such a company.

The paired frequency blocks D and E are separate and both are adjacent, at both ends, to frequency blocks which have already been assigned to potential bidders. Moreover, in contrast to the frequency blocks A to C, these two frequency blocks are both involved in litigation. These frequency blocks cannot therefore be regarded as equal in value, either equal with each other or with the frequency blocks A to C and must be awarded for specific spectral positions.

Re the 2 GHz band:

The available frequency blocks in the 2 GHz band are not equal in value either and must also be awarded for a specific spectral position.

The blocks A, B and E are disputed following an action by the previous holder of rights of use Quam GmbH. Although the action was dismissed in the ruling by the Higher Administrative Court in North Rhine-Westphalia (13 A 2969/07) of 30 June 2009 in the second instance and an appeal refused, the plaintiff is nonetheless still able to contest the exclusion of an appeal. For this reason the ruling on the action cannot yet be regarded as final.

These blocks are not equal in value with the undisputed frequency blocks C and D and this is why these blocks will be awarded for a specific spectral position.

Block F is unique compared with the other auction items owing to its block width of 14.2 MHz and this therefore excludes the advantages of an abstract award from the very start.

Re the 2.6 GHz band:

The frequency blocks in the 2.6 GHz band available for award are equal in value and can therefore be awarded for a non-specified spectral position.

In this case the litigation regarding the band does imply a difference in value. Airdata AG brought an action in which it petitioned for the decision by the President's Chamber BK1-07/003 of 19 June 2007 as published on 7 April 2008 to be rescinded to the extent that this decision ordered the award proceedings for frequencies for wireless access for the provision of telecommunications services in the 2.6 GHz band to take the form of an auction. The action was dismissed by the Cologne Administrative Court in its ruling of 3 December 2008 on the grounds that the action was inadmissible. The Federal Administrative Court has since approved the appeal, however, and referred the matter back to the Cologne Administrative Court as it considers that the inadmissibility ruling issued by this court was legally incorrect. The Federal Administrative Court has not as yet issued a ruling on the matter, however.

This means that all frequency blocks in the 2.6 GHz band are involved in ongoing court proceedings and that the risk of litigation affects all the frequency blocks in the same way.

The difference in value of frequency blocks within the frequency blocks A to N is not due to the fact that restrictions apply to the frequencies at the upper end of the band. Of crucial importance here is the immediately adjacent band from 2690 MHz to 2700 MHz which has been assigned to the radio astronomy service on a primary basis under section 53 of the TKG. The Bundesnetzagentur is obliged to accord the radio astronomy service special protection under usage condition D 340 of the Frequency Band Allocation Ordinance and provision 5.340 of the Radio Regulations of the International Telecommunication Union (ITU). As regards the award of frequency blocks in the 2680 MHz to 2690 MHz band this applies specifically to the radio astronomy stations in Effelsberg (Eifel) and Westerbork (Netherlands) which also receive on the adjacent frequency band 2690 to 2700 MHz.

Where reference is made to the fact that – in the event that the conurbations of Düsseldorf and Cologne are affected – the 2680 to 2690 MHz band may not be equal in value the Chamber states that: The right of the radio astronomy service (2690 – 2700 MHz) to protection has a merely local effect as concerns the immediately adjacent frequency band (2680 - 2690 MHz) available for a award, given that currently two locations with radio astronomy stations must be protected. The radiuses referred to in the ECC Report 45 do not constitute fixed protection zones in which it is not possible to build a network; hence whole conurbations or regions are not affected. In fact, restrictions will depend on the specific location of a base station and this can be taken into account in the framework of network planning. The coordination work entailed in stipulating location-specific parameters is not, however, of a type or extent that these frequency blocks would have a lower value in an auction compared with the other 2.6-GHz frequency blocks. In the view of the Chamber, any additional expenses would be comparable with the usual expenses incurred on the part of the network operator as a result of cross-border coordination agreements.

The Chamber upholds the option of making flexible use of the spectrum in contrast to the view that the abstract award of frequencies would only be possible if the subsequent option to convert FDD spectrum to TDD spectrum is excluded. The flexible arrangements for the potential use of the frequencies will only be relevant for network operators, however, which change technology.

The operative provisions have been amended for the 800 MHz band as follows:

> The spectrum in the band at 800 MHz will be auctioned in five abstract blocks of 2 x 5 MHz (paired) and one concrete block of 2 x 5 MHz (paired).
>
> The spectrum in the band at 1.8 GHz will be auctioned in three abstract blocks of 2 x 5 MHz (paired) and two concrete blocks of 2 x 5 MHz (paired).
>
> The spectrum in the band at 2 GHz will be auctioned in four concrete blocks of 2 x 4.95 MHz (paired) and one concrete block of 5 MHz (unpaired) and one concrete block of 14.2 MHz (unpaired).
>
> The spectrum in the band at 2.6 GHz will be auctioned on the one hand in 14 abstract blocks of 2 x 5 MHz (paired) and on the other in 10 blocks of 5 MHz (unpaired).

Details can be found in Annex 6.

Re V.1.5. Restrictions on bidding entitlements

The amount of spectrum which can be bought in an auction per bidder (spectrum cap) for the 1.8 GHz, 2 GHz and 2.6 GHz bands will not be limited (cf subsection IV.3.2 for details).

The amount of spectrum which can be bought per bidder in the 800 MHz band will be limited. The spectrum cap will be set at a maximum of 2 x 20 MHz (paired). The Chamber has based its stipulation of the spectrum cap on the band plan for paired spectrum. Existing assignments in the band at 900 MHz will be taken into account when the individual bidding entitlements of a bidder in the band at 800 MHz are determined (cf subsection IV.3.2 for details).

Owing to the spectrum cap in the 800 MHz band the number of bidding entitlements is limited to a maximum of 8 lot ratings. Specifically, the maximum entitlements in this band are as follows:

Potential bidder	**Maximum bidder entitlements in lot ratings in the 800 MHz band**
D network operators	4
E network operators	6
New entrants	8

Overall new entrants can apply for a maximum bidding entitlement of 68 (expressed in lot ratings), E-network operators for a maximum of 66 and D-network operators for a maximum of 64. By way of clarification reference is made to the fact that the maximum number of bidding entitlements, expressed in lot ratings, is the sum of all the lot ratings in the 1.8 GHz, 2 GHz and 2.6 GHz bands and the maximum possible number of bidding entitlements for the 800 MHz band resulting from the spectrum cap (cf Annex 6 for details).

Comments made on this issue have already been taken into account in the decision on subsection IV.3.2.

Re V.2. Power of attorney and auction tutorial

Re V.2.1 Power of attorney

In order to ensure that the auction can be undertaken swiftly and orderly it is essential that applicants are represented at the auction by well-informed persons who have familiarised themselves with the auction rules and modalities of the computer-assisted implementation.

In order to achieve this, the applicants must appoint representatives in advance of the tutorial for bidders who must then taken part in a tutorial.

During the auction at least two trained representatives per bidder with power of attorney (authorised under subsection V.2.2 of this decision) must be present in the bidder's room to ensure that the auction can be held swiftly and smoothly.

Re V.2.2 Auction tutorial

The following comments were made:

Bearing in mind the complexity of the system and the relevance of the auction the suggestion has been made that potential bidders should be provided with more information about the auction software (eg in manual form) as soon as possible to ensure that bidders can prepare appropriately for the auction itself.

Participation in the tutorial should not be restricted to those authorised by the bidder either. It may also be necessary to train employees at the company's head office or other specialists who may be working on site at and during the auction. For this reason bidders ought to be able to decide who can take part in tutorials alongside authorised agents.

There must also be enough time after initial information about the auction setting has been obtained to make preparations for the auction at the bidder's head office. On the other hand, it is important that tutorials are held relatively close in time to the auction itself to ensure that authorised agents recognise the setting again. For these reasons calls have been made for a two-phase tutorial process. The first tutorial in preparation for the auction should be held about two months before the auction begins and a second tutorial just before the auction itself.

It was not felt to be reasonable to exclude follow-up tutorials entirely. Follow-up training would be justified by the fact that the potential losses for the bidder in the event that insufficient trained personnel are available for the auction would be enormous - particularly when considered in relation to the cost of training.

The Chamber has ruled as follows:

The practical implementation of an open ascending simultaneous multiround auction depends on clear auction rules and, above all, on the software needed to implement the auction rules and thereby to enable the auction to be held at all. The persons to be authorised for the auction must be able to familiarise themselves in advance with the auction rules and the software used. Alongside the consultation on the auction rules, this aim is also served by bidder tutorials. As bidder tutorials are an indispensable element of smooth auction proceedings, participation in such tutorials must be made obligatory.

After the bidder tutorial has been held the agents to be authorised for the auction must submit a written declaration to the Bundesnetzagentur in which they confirm that they have understood and will comply with the auction rules and the electronic bidding method. Only then will the persons acting on behalf of the company be authorised to take part in the auction. Such authorisation enables responsibilities to be clearly assigned and legal uncertainty to be avoided.

The Chamber is aware of the critical importance of the bidder tutorial as an indispensable element of smooth-running auction proceedings. It therefore recognises the interest of respondents in providing training for other employees working in the company head office or other specialists as well as for the agents to be authorised. The Bundesnetzagentur will therefore do all in its power to take this matter into account and to enable employees of the applicants other than the agents to be authorised to take part in bidder tutorials.

Applications to take part in bidder tutorials may be submitted in writing after submission of the application under subsection IV.1.6, no later however than five working days prior to the start of the bidder tutorial. The application must be submitted to

Bundesnetzagentur
Referat 215
Kennwort: Bieterschulung.

Provided that capacities are sufficient the Bundesnetzagentur will provide training for up to twelve people from one company at a time.

The Chamber does not consider it necessary to meet calls for training in two phases with the first tutorial in preparation for the auction being held approximately two months prior to the start of the auction. The lessons learned from previous auctions have shown that the auction software is user friendly, intuitively understandable and easy to use and that bidders learn how to use it very quickly. Bidders are given the opportunity to test out the software themselves immediately after the bidder tutorial. They also receive written information in manual form. The bidder tutorial is held very near to the date of the auction, that is to say about three to six weeks before the auction begins. If a bidder is then able to demonstrate a

legitimate interest in testing the software on site again the Bundesnetzagentur will endeavour, where feasible, to make sure that this is possible.

Owing to the larger group of people taking part in the bidder tutorial and in order to guarantee swift auction proceedings, the Chamber remains firm in its statement that no follow-up training will be offered for bidders.

Re V.3. Conduct of the auction

Re V.3.1. Type of auction

The following comments were made:

The conduct of the auction in open ascending simultaneous multi-round form (SMR) and the simultaneous auctioning of frequencies from all the frequency bands concerned was given an emphatic welcome. This type of auction was felt to be basically suited to securing the efficient use of scarce frequency resources. The procedure had proved its worth in earlier auctions carried out by the Bundesnetzagentur, and market players were familiar with its basic structure. Intuition was enough to make its implications readily acceptable, which was a great help for the targeted decision-making of the undertakings doing the bidding.

On the other hand there was a request for laboratory tests to be done on the present auction format and the results to be published, as the proposed procedure, with its particular combination of auction rules and the details of the products to be auctioned, had never been experimentally tested in that way. There was also criticism that there had not been sufficient testing of the extent to which the type of auction selected was suited to the achievement of the regulatory aims. In light of the experience made in other countries respondents were of the opinion that the Bundesnetzagentur should reconsider its choice of auction design. The proposed auction format, it was said, made the auction intensely competitive. But if the idea was to promote competition then the format should not provide incentives for tactical bidding. Neither the ousting of competitors nor "driving prices up" by tactical bidding was compatible, it was claimed, with the Telecommunications Act.

The format selected had basically proved its worth, but on the other hand support was given to a clock auction as a version of the SMR system. In this version the prices were raised by the auctioneer himself. The bidders remained in the auction by showing acceptance of the new price. If they did not accept a raised price they would lose their right to bid. The clock system, it was argued, made it harder for bidders to collude by dividing up frequency blocks among themselves. There was also a request for the use of a so-called combinational clock auction on the grounds that this format could largely eliminate the fundamental drawbacks of the simultaneous ascending auction. Neither the possibility of withdrawing bids nor the essential minimum spectrum package could eliminate the aggregation risk and related risks.

It was also suggested that in view of the importance of the auction there should be talks with auction experts, if this had not already been done.

The Chamber has ruled as follows:

The auction will be held as an open ascending simultaneous multi-round auction.

It is simultaneous in the sense that all frequency blocks in a given frequency band are offered at the same time. The auction is open, ie for every round the bidders are given information on the bids of the other bidders. Bidders are thus enabled - during the auction - to assess the value attached to specific frequency blocks by the other bidders. As the result is clear to all bidders at the end of each round, they can adjust their bidding accordingly. This makes it possible to reduce the risk of putting an unrealistically high value on the frequency blocks and paying an excessively high price for them (winner's curse risk). As an ascending multi-round auction, it ends only when no higher bid is made for any of the frequency blocks. Until that time bids can be made for all frequency blocks. No limit will be placed on the number of rounds.

In an auction of this type the bidders can decide, on the basis of the prices at any given moment, which frequency blocks in which frequency bands they wish to bid for - of course within the limits of their bidding entitlements. The simultaneity makes it possible for the bidders to reflect, implicitly, the interdependence of values as among the frequency blocks in the various frequency bands. In a simultaneous multi-round auction these options basically continue to be open until the end of the auction. The bidding opportunities that are created make it likely that at the end of such an auction the prices to be paid for frequency blocks of the same value will be pretty nearly identical.

The simultaneous multi-round auction is a tried and trusted auction system which is appropriate to the given starting situation. All the frequency auctions held in Germany to date (ERMES in 1996, GSM in 1999, UMTS in 2000 and BWA in 2006) were conducted as simultaneous multi-round auctions. From the regulatory point of view there are no apparent reasons for departing from this format in the present case. International experience - for example in Austria, Australia and the USA - also strengthens the case for describing it as adequately tested, comprehensible, transparent and non-discriminatory.

Potential risks related to the expediency of the system can to a large extent be guarded against by specific rules for a simultaneous multi-round auction.

The offer of comparatively small frequency blocks creates the risk, particularly for a so-called new entrant, that he will not be able to acquire the specific minimum amount of spectrum he requires in order to implement his business model (the so-called aggregation risk). The auction system provided for by the Chamber will keep this risk sufficiently low because before the auction starts the bidders will be offered the opportunity to stipulate a minimum essential spectrum package, as set out in subsection IV.1.4. Any bidder who in the course of the auction gains a smaller amount of spectrum than that specified in his package will be eliminated and will therefore be under no obligation to pay (for the details see subsections IV.1.4, V.3.9. and V.3.15). The bidder is therefore no longer exposed to the aggregation risk in relation to a required minimum number of frequency blocks. To prevent abuse in the form of tactical bidding, the bidder is, for his part, obliged, in every auction round, to bid at least to the amount of the stated minimum essential spectrum package, unless he makes use of a waiver under subsection V.3.10. Otherwise he will be eliminated from the auction.

It should also be noted that while there is no guarantee that the offer of small frequency blocks will result in the acquisition of contiguous spectrum in one and the same frequency band, it is certainly desirable in the interest of efficient use of frequencies. The auction rules therefore make special provision for minimising the risk in this respect.

The risk arises when frequencies from various bands, or alternatively concrete frequency blocks in a certain band, are auctioned. To avoid an inefficient assignment of individual frequency blocks, bidders will, in this auction, be able to withdraw bids (see subsection V.3.11 for details), which enables them to switch all their bids over to contiguous frequency blocks. It must also be stressed that available frequencies are to a large extent offered in abstract blocks. The risk does not exist for the blocks awarded in abstract form in the bands at 800 MHz, 1.8 GHz and 2.6 GHz, as the allotment procedure defined in subsection V.4.2 ensures that the Bundesnetzagentur assigns the abstract blocks won as contiguous spectrum.

The Chamber is aware that there are alternative types of auction. One of them is the combinational clock auction, which has recently been used for example in the UK and which was mentioned in the comments as an alternative. Though it has not escaped the Chamber's notice that this format is in certain respects innovative, it doubts whether it is a better option for the present frequency award situation. It must be emphasised in this context that the Chamber will award spectrum from a variety of frequency bands in these proceedings and that frequencies in certain bands are also awarded for specific spectral positions, partly because of value differences in terms of frequency efficiency. Applied to the present award situation, a combinational clock auction would be many times more complicated than the

clock auction in the UK, where the only frequencies that were auctioned were in the 2.6 GHz band. The crucial question is whether that type of auction would be operable in the award situation that is here under consideration. Apart from the practicalities and the electronic systems used, the complexity of the rules that would have to be developed would raise a number of questions. The Chamber's view is that such combinational auctions, which involve assignment prices that can only be calculated on the basis of complex computing procedures, are hard to communicate and certainly not easy to understand (cf Peter Cramton, 2009, http://www.cramton.umd.edu/papers2005-2009/cramton-spectrum-auction-design.pdf). This point applies particularly to the decision-makers in the undertakings and to their decision-making and communication processes. There is potentially considerable risk here for the rational bidding decisions of the participants and thus the efficiency of the auction itself.

The Chamber's experience with the selected auction format, as used in actual practice, has been exclusively positive. In addition, the potential bidders, on the basis of past frequency auctions in Germany, are familiar with the auction format and the software. Some of the respondents expressly welcomed the auction type selected, stressing in particular the comprehensibility of the rules. It is a type that continues to be used for the award of frequencies in other countries as well. Further, the respondents were unable to make a convincing argument that, in view of the individual assessments of the value of the frequency blocks available for award, a combinational clock auction, specifying all the details, would produce a more efficient result than the auction type intended. Nor does the specialist literature seem to offer them any supportive evidence at present. In a recent scientific article (Optimales Bietverhalten in Auktionen, Prof. Dr. Veronika Grimm, Erlangen-Nuremberg, Prof. Dr. Ulrich Schmidt, Kiel, und Prof. Dr. Martin Weber, Mannheim, Wirtschafts-wissenschaftliches Studium, August/2009, p. 418), Professors Grimm, Schmidt and Weber state:

> *"While the auctioning of an object has been dealt with relatively comprehensively in the relevant theoretical and experimental literature, the theory and experimental investigation of multi-unit auctions is still in its infancy."*
>
> (Note by the Chamber: the present case qualifies as a "multi-unit" auction because a number of frequency blocks are auctioned.)

Furthermore, in line with the German government's broadband strategy, the Chamber has an ambitious time frame for the frequency awards. It believes that the introduction of a new and highly complex type of auction would not be possible in the time available except at considerable risk to the need for smooth operation: the details would have to be specified, the software implementing the rules would have to be programmed, and not only the bidders but the auction team too would have to be schooled in the use of the software. Given the above considerations, the Chamber sees no reason to depart from the auction type used in the past and intended for the immediate future.

The auction type to be used has two new elements compared with the frequency auctions conducted in Germany in the past. Firstly, it will now be possible for the participants to designate essential minimum quantities both for the frequency blocks in the 800 MHz band and for the other bands. This element is new only in a limited, ie gradual, sense. At the UMTS auction in 2000 the Chamber prescribed a minimum essential package of two frequency blocks - though of the same quantity for all participants. The instrument is therefore a tried and trusted one. Secondly, the withdrawal of bids, subject to an obligation to pay, is a system that is already in use in other countries within the auction type selected.

The implementation of the rules in the software is checked in detail in each case. However, the Chamber does not regard an experimental testing of the software in so-called test laboratories as absolutely necessary. Furthermore, a test phase would have held up the whole process for a considerable length of time, and it would not have been possible to complete the award process on schedule. The Chamber also feels there is no proof that such tests would have made it significantly easier to select and decide on an auction format.

The Chamber was already aware of the suggested theoretical analyses available in the specialist literature, which sought to demonstrate the potential flaws of the auction format. For the most part these analyses only cover certain parts or aspects and do not take account of the operation of the auction rules as a whole. They also largely disregard the assessments of value actually made by the potential bidders. The analyses of this kind that were produced in the run-up to the 2000 UMTS auction also show that such inevitably simplified studies can result in incorrect conclusions being drawn. The Chamber is convinced that the auction type it has selected can be regarded as the result of an adequate appraisal of the aspects relevant to regulatory efficiency, as required by the Telecommunications Act.

Re V.3.2. Organisation

The following comments were made:

With reference to providing information for the general public it was suggested, on the one hand, that not only the final result but also the result of each round should be made public by being placed on the Internet immediately after the conclusion of each round.

On the other, clarification was requested as to which information is to be made public. According to the current wording of the draft decision, it was conceivable that only the highest bids per block (without naming the highest bidder) would be published, or alternatively other information as well (for instance the name of the highest bidder, the bids placed by all bidders, the use of waivers, etc). It was felt that only the amounts of the highest bids for the respective blocks should be published and no other information. This would both satisfy the public's need for information and serve the interest of the auctioneer and the bidders in an orderly auction procedure.

The Chamber has ruled as follows:

The auction will take place at the offices of the Bundesnetzagentur in Mainz. Having it at a central venue goes a long way towards guaranteeing that the auction will proceed briskly and smoothly and that the formalities will be duly observed. The auction will last the whole day, with a break of one hour between 12:00 hours and 14:00 hours, the commencement of the break being announced by the auctioneer at the end of a round.

In order to ensure that the bidders are undisturbed during their participation in the auction and can conduct internal consultations, each bidder will be provided with a room of his own (bidder's room). The telephones and fax machine provided may be used solely for communication with the auctioneer and the decision-makers in the undertaking. Not later than the auction tutorial, the bidders must each specify two numbers, one for the telephone and one for the fax machine, which may be used solely for communication between the bidder's room and the undertaking. No other numbers will be connected. Other means of communication (eg mobile phones) will not be permitted in the bidder's room.

Independently of the communication equipment provided by the Bundesnetzagentur, the software used makes it possible to print out any image on the bidder's monitor at any time, and to make printouts of the results after the evaluation of an auction round. Such printouts can be faxed to the undertakings at any time, so that they are informed almost immediately about the course of the auction. For security reasons, there is no possibility of direct electronic access by the undertakings to data in the bidder's room, for example results of particular rounds.

Further, bidders will have the option of using encryption equipment for communicating with their decision-makers. Such equipment must be provided by the bidders themselves. As the Bundesnetzagentur will provide analogue switched connections in the bidder's rooms for the period of the auction, the encryption equipment will have to be compatible. Please bear in mind that technical defects in encryption devices or other technical equipment used by the bidders will not cause an auction to be suspended.

Provision will be made for qualified bidders, on request, to test their encryption devices on site before the auction. This will be subject to prior agreement on a date and time.

The auction will be conducted via locally networked computers.

In addition the bidders will have the option of using or having available their own laptops and their own printers, plus replacement equipment. The bidders must however ensure that any radio interfaces in their equipment are deactivated in the bidder's room.

The Bundesnetzagentur will make sure that the results of individual auction rounds are made known in a room, specially intended for access by the public, in the building where the auction is held (so-called public room). It is also planned to publish in the Internet not only the final auction result but also the results of individual rounds promptly after the evaluation of a round in order to satisfy the public's need for information. The experience gained through the so-called UMTS auction, however, has shown that the Bundesnetzagentur cannot guarantee that this will be done.

With reference to the information that is made publicly known, the Chamber's decision is as follows: it is planned to make known only the effective highest bids and the names of the respective highest bidders.

Re V.3.3. Bidders

A bidder is an undertaking which has qualified to take part in the auction. It is represented by persons with power of attorney and authorised agents who, in pursuance of subsection V.2.2, attended a tutorial before the auction.

Re V.3.4. Bid submission

The following comments were made:

It should be made clear whether a bid can be submitted for all blocks, ie as part of a "collective bid" (one data record) or whether the bidder can make a number of bids for several blocks inside one round (several individual data records).

It should also be specified whether the withdrawal of bids would be included in the data record. This, it was felt, was particularly relevant to the question of reducing the length of a round (cf subsection V.3.12).

The Chamber has ruled as follows:

Bids will be submitted via locally networked computers using the auction software prepared for the purpose.

A distinction is made between the entry and the submission of bids/withdrawals. The procedure is as follows. In a round that is in progress each bidder uses the software first to enter all the intended bids and the planned withdrawals for the frequency blocks in question (entry). Having made another check, he then submits these intended bids/withdrawals en bloc by activating the relevant button in the software (placement). Until the moment of that en bloc submission he can alter his entries in the current round at any time.

The bids are processed automatically by the software. The results (cf V.3.13) of a round are transmitted to each bidder's computer, an electronic process which reduces both the likelihood of errors and the time needed. In the event of a technical defect the auctioneer will decide whether the auction will be interrupted briefly, for the defect to be remedied, and then resumed, or whether the auction will be stopped and repeated at a later date (cf subsection V.3.12).

The software displays, in a so-called click box, all the possible bids for the current round, which means it is impossible to submit invalid bids (cf subsection V.3.5). After examination of the application for admission, the Chamber sets an upper limit on the number of bidding entitlements in its qualification notice (cf subsection IV.1.5), subject to the provision of security (cf subsection V.1.3). The individual bidding entitlements per bidder will be activated

in the software subject to the provisions of subsections VI.1.5 and VI.1.3. The bidder can therefore utilise only the number of entitlements for which he has provided security.

Re V.3.5. Valid bids

The following comments were made:

The click-box bidding system proposed by the Bundesnetzagentur makes it easy to devise a strategy for dividing up the market. For example, two bidders who noticed that they were bidding for the same blocks could reach agreement that one of them would enter a high increment (eg €100,000) for one half of the blocks and a standard increment (€10,000) for the other half. This would be understood by the second bidder as a signal to bid only for the blocks showing a low increment.

It was also pointed out that a check on the planned click-box amounts which bidders can add to the minimum increment with a view to reaching the highest bid showed that the amounts of €20,000, €20 million and €50 million were missing from the official list of increments. The amount of €20,000 should definitely be included as a way of giving bidders more options in the lower range. On the other hand, at the top end, the amount of €200 million could be dispensed with, which would keep the list easily manageable.

Furthermore, it was difficult to understand why, in the event of the withdrawal of the highest bid, the new minimum valid bid should be calculated as the amount of the withdrawn highest bid plus the applicable minimum increment. It would suffice for a new bidder in a subsequent round to take over the withdrawn highest bid.

The Chamber has ruled as follows:

A valid bid for a frequency block in an auction round must exceed the highest bid submitted up to that moment by the minimum increment (cf subsection V.3.6). If no valid bid has yet been submitted for a frequency block in previous auction rounds, the minimum bid will be deemed to be valid.

If a highest bid is withdrawn (cf subsection V.3.11) and no new valid bid is submitted for the same frequency block in that round, the new minimum valid bid will be calculated as the amount of the withdrawn highest bid plus the applicable minimum increment.

The software includes a so-called click box which prescribes for the bidder, for each round, all the possible valid bids per frequency block. Click-box bidding simplifies the procedure because it does not allow bidders to enter amounts manually. One reason is to prevent incorrect entries and ensure the auction can proceed briskly.

But there is another reason, and that is to prevent bidders sending each other signals via their bids (so-called code bidding or signalling), for example with the final digits of the bid, that is, coordinating their bids with other bidders. The Chamber therefore does not share the view that click-box bidding makes it very easy to devise a strategy for dividing up the market by means of signalling. On the contrary, the Chamber is convinced that click-box bidding goes a long way to preventing bidders sending each other signals. The Chamber has decided not to reduce bidding possibilities to a single valid bid, one reason being that it wishes to make it possible for bidders to help the auction proceed briskly.

With regard to the suggestion that the click-box list should include the amounts €20,000, €20,000,000 and €50,000,000, the Chamber is in favour. The €20,000 amount will be added to the list particularly as a response to the doubts that were expressed about the regulation in subsection V.3.7 (highest bids) for identical highest bids, namely that in that situation the bidder who was the first to submit his bid would be declared to have submitted the highest bid. In the comments on that subsection it was argued that this would lead to over-hasty decisions. The addition of the €20,000 amount to the list gives the bidder an extra option in that he can select a valid option that is only slightly higher than the minimum bid. To add the other amounts as well is seen as a logical step and a way of enabling bidders to help the auction to proceed briskly. For these reasons the Chamber has also added the €500,000,000 amount and, going against what was suggested, will retain the €200,000,000 amount.

With reference to the calculation of the new valid bid after the withdrawal of a highest bid, the position is as follows: the auctioneer lays down the minimum increment in each auction round. If the auctioneer finds, after due consideration, that it is appropriate to set the minimum increment on a percentage basis, he will do so in the interest of moving the auction briskly forward. However, he can also determine the minimum increment for each frequency block separately. If the bidding indicates that a higher or lower minimum increment than that decided by percentage is appropriate, the auctioneer will stipulate a suitable minimum increment for that block, though it must be at least €1,000.

Given all this, the Chamber cannot accede to the request for the new valid bid, after bids have been withdrawn, to be at the level of the withdrawn highest bid.

The points added to the operative provisions are as follows:

> In the first round the minimum valid bid is the minimum bid for a frequency block. In the subsequent rounds the minimum valid bid is a bid that exceeds the highest bid for a frequency block by the current minimum bid increment. If no valid bid was made for a frequency block in the preceding rounds, the minimum valid bid will count as the minimum bid. If a highest bid in a round is withdrawn (cf subsection V.3.11) and no new valid bid for this block is submitted in that round, the new minimum valid bid will be the derived from the amount of the withdrawn highest bid plus the current minimum bid increment.
>
> In each round, the software will provide a list for each frequency block showing the valid bids from which bidders can choose their bid amount (click-box bidding).
>
> The bid amounts from which bidders can choose are as follows:
>
> - the minimum valid bid,
> - the minimum valid bid plus €10,000,
> - the minimum valid bid plus €20,000,
> - the minimum valid bid plus €50,000,
> - the minimum valid bid plus €100,000,
> - the minimum valid bid plus €200,000,
> - the minimum valid bid plus €500,000,
> - the minimum valid bid plus €1,000,000,
> - the minimum valid bid plus €2,000,000,
> - the minimum valid bid plus €5,000,000,
> - the minimum valid bid plus €10,000,000,
> - the minimum valid bid plus €20,000,000,
> - the minimum valid bid plus €50,000,000,
> - the minimum valid bid plus €100,000,000,
> - the minimum valid bid plus €200,000,000,
> - the minimum valid bid plus €500,000,000

Re V.3.6. Minimum bid increment

The following comments were made:

The view was expressed that the minimum bid increment for the first phase (15%) was too high and it was suggested that this increment phase be scrapped, since the only purpose of the auction dynamics that it generated was to maximise income.

A proposal was also made that the minimum bid increment in the third phase be reduced to 1.5%, so as to minimise the financial strain on the undertakings. In light of the level of bid that would then exist, the increment planned in the draft for the third increment phase (2%) would mean a comparatively high amount to be paid by the bidding undertakings.

There was also a call for differentiation as between the increment phases per frequency band, even if this resulted in greater complexity. The bidding in the various bands would probably not, it was argued, be equally intense at every moment. It was on the contrary more likely that bidding would focus first on a few specific bands until a stable situation was attained, and then switch to other bands. What was needed, therefore, for the bands that the bidding concentrated on first, was a relatively prompt transition to the final increment phase, whereas for the other bands large increments would continue to be appropriate.

The Chamber has ruled as follows:

The minimum bid increment is a specific sum of money stating the minimum amount by which the next bid must exceed the current highest bid in an auction round. During the auction the auctioneer stipulates the minimum bid increment applicable at any given time. There are two main aspects for him to consider in deciding on the amount:

The higher the minimum bid increment is set,

- the sooner the auction is over, and
- the greater is the likelihood of a discrepancy between the auction result and the values actually assessed by the bidders.

The auctioneer is to stipulate the minimum bid increment on the basis of the following guidelines:

The percentage determining the minimum bid increment in the first stage of the auction is 15% of the highest bid (increment stage 1). As a rule it decreases over the course of the auction to 10% (increment stage 2), then 5% (stage 3) and, towards the end of the auction, 2% (stage 4). The auctioneer will decide when to move from one stage to the next, after due consideration of the course taken by the auction. With a view to taking account of the special features occurring in any given auction, the auctioneer can depart from the above rule and, at his own discretion, set the minimum bid increment individually for each frequency block as an absolute (not minus) amount.

The minimum bids are at the lowest level of fees and charges. It must be assumed that the market value of the frequency blocks is appreciably higher, so that 15% in the first increment stage is requisite, appropriate and proportionate. It will also ensure that the auction proceeds briskly, and there is no reason to expect it to cause an economic distortion of the auction result. Furthermore, it is possible for the auctioneer to move quickly on to the next stage, where the minimum bid increments are lower.

In order to ensure that the final stage of the auction also proceeds at a reasonably brisk pace, the Bundesnetzagentur feels it is expedient to keep the 2% increment in the fourth and last phase. An across-the-board reduction to 1.5% is unnecessary because the auctioneer can depart from the percentage rule and set individual minimum bid increments manually for each frequency block.

The Bundesnetzagentur made a conscious decision not to draw up a minimum bid increment rule for each band separately. For one thing, that would jeopardise the logical intelligibility of the procedure as a whole. For another, the point should be repeated that the auctioneer can set minimum bid increments for specific frequencies and therefore also bands, and thus react to the way the auction actually develops.

Application of the above percentages can result in the minimum bid increments being expressed in odd numbers. They are therefore rounded off to the next whole multiple of €1,000.

Re V.3.7. Highest bids

The following comments were made:

Because it was not possible to distinguish between the abstract blocks (eg at 2.6 GHz) at the start of the auction, a number of bids by various bidders could be distributed over the abstract blocks, decided primarily by size and secondarily by time of submission. However, in the course of the auction different prices would possibly emerge for the various blocks, so that they would become distinct from each other by virtue of their highest bid (possibly even on the basis of the time of submission). A request was made for more precise definition of how the bids were distributed over the abstract blocks, some of which were distinguishable, some not. This was of special interest in respect of blocks marked out by highest bids which either had been withdrawn or whose bidders had been eliminated from the auction.

Concern was also expressed about the rule according to which, when identical highest bids were submitted for a frequency block, the party that was the first to submit the bid was declared to be the highest bidder. The fear was that, particularly at a stage in the auction when bids were approaching the ultimate award level, this could result in over-hasty decisions being taken, simply to ensure that a highest bid was achieved or held. In order to forestall precipitate bid submissions, a random number generator should determine the highest bidder in the event of identical highest bids.

The Chamber has ruled as follows:

With regard to the distinguishability of the abstract frequency blocks, the Chamber wishes to point out that the software gives each of the frequency blocks a specific designation, including the abstract blocks. Each of them has a capital letter (cf for example Annex 6, Part 1, Column 2 for the 800 MHz band: 0.8 GHz is A, 0.8 GHz B, 0.8 GHz C, etc). In each round bids are made for such specifically designated blocks and not for a frequency band in which abstract blocks will be awarded. This makes it possible to distinguish between the blocks, including the abstract ones, even though the specific spectral position is only ascertained after the auction.

The Chamber has decided not to change the procedure for determining the highest bidder during its evaluation at the end of each round, namely that when there is more than one valid bid at the same highest level, the first party to submit that bid will be the holder of the highest bid. This rule has proved to be successful in the past. It also helps to speed up proceedings since it constitutes an incentive for bidders to submit their bids as quickly as possible. The Chamber does not see that there is any danger of over-hasty bids being submitted, because a bidder who needs a little more time to think things over and wants to put off his bid for a while has the option of using the click-box system to select a valid bid that is only slightly higher than the minimum bid. In this connection it should be stressed that the Bundesnetzagentur has taken up one of the suggestions made by respondents and provided for an extra bid in the click box, which ought to encourage the use of this option (cf subsection V.3.5).

A bidder will be considered to be active in the next round to the extent of the highest bids he holds and has not withdrawn.

Re V.3.8 Lot ratings

The following comments were made.

Clarification was suggested as to whether the lot ratings could basically be distributed over the blocks in all bands and whether in later rounds, subject to the requirements of the activity rule, bids could be submitted for blocks and bands which had not been bid for before.

The Chamber has ruled as follows:

Lot ratings are standardised numerical values which reflect the spectrum amount of the various frequency blocks. Because the blocks available for award vary in their spectrum

volume (unpaired 14.2-MHz-, 5-MHz- and paired 4.95-MHz blocks and 5-MHz blocks), the bidding entitlements are given standardised lot ratings of 1, 2 or 3 as a way of making it easier for bidders to get an overview of the auction and simplifying the bidding. A frequency block of 1 x 5 MHz (unpaired) is given a lot rating of 1, a block of 2 x 5 MHz (paired) or 2 x 4.95 MHz (paired) is given a lot rating of 2, and the block of 1 x 14.2 MHz (unpaired) has a lot rating of 3. Details can be found in Annex 6. The stipulation of lot ratings makes it basically possible for active bids to be switched as between the various blocks in all bands at any time, including the final stages of the auction when there is a high level of activity (cf subsection V.3.9).

A bidder's bidding entitlements are expressed at the start of the auction as the sum total of his lot ratings and correspond to his application for a specific quantity of available blocks inside the total spectrum that can be awarded.

The Chamber wishes to make it clear that the lot ratings are predefined for each frequency block. Every bidder is however free to decide in each round which blocks he wishes to bid for, subject to his bidding entitlements, which are expressed in lot ratings. This means that the new bids in each round can basically be distributed over the various blocks at will, and that in subsequent rounds bids can be submitted for blocks which have not been bid for before.

Re V.3.9. Activity rules

The following comments were made:

Basically the respondents would support the activity phases having different minimum activity levels. However, on the one hand there was a call for a further, fourth, activity phase of 80%, as the difference between the levels set for the second and the third phase, 65% and 100% respectively, seemed too large. Particularly when the auction is at an advanced stage and during the later activity phases, bidders should be able to switch without restriction from one band to another. The ability to do so could possibly be jeopardised by having to jump from the required minimum activity level of 65% in phase 2 to 100% in phase 3. A substitute for a specific bandwidth in band "A", for example, could require a greater bandwidth in band "B". On the other hand there was a request for the final activity phase to be reduced from 100% to only 90%, so that it would be possible even at an advanced stage of the auction to switch from bids for a few expensive blocks to bids for a larger number of less costly blocks.

It was also argued that the transition to the third activity phase should not take place too soon. The fact that activity phases were determined, subject to the activity rule, provided bidders, in general, with scope for designing a bidding strategy for the various bands. This was particularly important when, in pursuing a specific business plan, a different amount of spectrum was needed in bands that were basically interchangeable. If the amount of spectrum in a specific band, regarded as being technically equivalent, was larger than in other bands, a switch to that band would require a bigger number of exercised bidding rights. Leaving aside the option of withdrawing a highest bid, such a switch would be possible only if the bidder still had a sufficient number of bidding rights "in reserve". Such a reserve, however, no longer existed in the third activity phase, as all bidders were obliged to utilise all their bidding entitlements.

Furthermore, respondents argued that it was crucially important for the change-over from one activity phase to the next to be announced in good time and called for it to be done at least two rounds before. Only then would it be possible for bidders to make the necessary preparations and adjustments. Moreover, the Bundesnetzagentur should publish the guidelines according to which the auctioneer decided when to move on to the next activity phase.

With regard to the rounding off rule for the calculation of bidding rights in the event of a bidder falling short of his minimum activity, respondents suggested rounding up, not to the next whole number, but to the next even number. The example given was of a bidder reaching activity level 4 in activity phase 2 (65%), thus falling short of the required minimum

activity. In this case his bidding entitlements for the next round would be calculated as follows: [4 (activity) x 100/65 = 6.1].

In addition the comments included a request for clarification of the formulation of the penultimate paragraph of the activity rule with reference to the word "submits", which seemed to contradict the definition of an "active bid" (first paragraph on this point).

The Chamber has ruled as follows:

Activity rules in a multi-round auction stipulate the extent to which the bidder must submit active, or new valid bids, taking into account the highest bids held, if he is not to lose any bidding entitlements for the remainder of the auction. On the one hand the activity rule should be designed to ensure the auction proceeds briskly. It should stop bidders using wait-and-see tactics and thus prevent them from withholding information on how they assess the value of the blocks. On the other hand it should be flexible enough to give bidders sufficient time to make reasonable decisions and thus ultimately ensure the frequencies are assigned efficiently.

When blocks are auctioned in a variety of frequency bands, greater flexibility for bidders is attained by not, initially, requiring 100% activity. There is therefore a variety of minimum activity levels, reflecting the division of the auction into various activity phases. The minimum activity required starts at a low level and goes up by degrees to 100% in the final phase. If the mandatory minimum activity level is not reached, the number of bidding entitlements is reduced.

The Chamber believes that three activity phases are basically sufficient, on the one hand to give bidders the greatest possible scope for switching frequency bands and on the other to ensure that the auction proceeds briskly. Having three activity phases has also proved to be successful in the past. But the Chamber accepts that the leap from 65% in the second phase to 100% in the third could cause uncertainty in the minds of the bidders. To allow bidders more flexibility and allay their concerns about a premature change-over to the final (100%) phase, therefore, the Chamber has decided to accede to the request for an additional, 80%, phase. The Chamber feels that this decision will also go far enough to meeting the request for a reduction in the final phase from 100% to 90%.

If a bidder has specified a minimum essential spectrum package, he must always be active to the full extent of his bidding entitlements for that package, irrespective of the minimum activity level. Depending on how the auction is developing, the auctioneer will decide at his own due discretion when to switch over to the next activity phase, with a view to keeping the auction moving briskly forward.

However, when in any round there is no new valid bid and no active waiver has been utilised and the auctioneer does not feel it is right to end the auction prematurely (cf subsection V.3.16), he will switch over to the next activity phase.

It is not possible to accede to the request that the change-over to the next phase be announced in advance. The Chamber's view is that this is firstly unnecessary and secondly impracticable, since the auction rules provide for the auctioneer to decide at his discretion whether to change over to the next activity phase for the next round - and to do so after completion of a round. As indicated above, there can be situations in which a change-over to the next round seems advisable. But such situations cannot be foreseen. The needs of the respondents will be met by the introduction of an extra activity phase.

For that reason, too, it is not possible to accept the request for a point of time to be stipulated for the auctioneer's switch over to the next activity phase. The nature of the traditional simultaneous multi-phase auction makes it necessary for the auctioneer to be able to decide at his discretion when to move on to the next activity phase, depending on the progress of the auction. To decide the timing of the switch-over in advance would be to deprive the auctioneer of the flexibility he needs for reacting appropriately to the way the auction is in fact proceeding (which cannot be anticipated in every respect).

If a bidder falls short of the required minimum activity, the rule is that his bidding entitlements for the following rounds are calculated as the product of his activity in the previous round and the minimum activity level in the particular activity phase, rounded up to the next highest whole number. In the example presented by one of the respondents, where a bidder produced an activity of 4 lot ratings in activity phase 2 (65%) and thus fell short of his minimum activity level, his bidding entitlement for the following round would be calculated as follows: 4 (activity) x 100/65 = 6.1, rounded up to 7 lot ratings. However, the Chamber cannot adopt the proposal that the figure be rounded up to the next even number. The percentages for the activity phases and the rounding off rules were not specified at random. The Chamber does not feel that it is appropriate to round up to the next even number because that would substantially reduce the required minimum activity level. In the above example it would result in a de facto activity level of 50% instead of 65% being required for activity phase 2, since according to the proposal 6.1 would be rounded up to 8 instead of 7 lot ratings, even though the bidder in this particular case had only utilised 4 lot ratings. This would run counter to the whole point of the activity rules, which are intended to ensure brisk progress through the auction.

If a bidder does not submit an active bid during a round, does not hold a highest bid and does not use a waiver (active or passive), he loses his bidding entitlements and is eliminated from the auction. Acting in this way shows that he is no longer interested in acquiring the right to use spectrum. The same will apply to bidders who have been granted a minimum essential spectrum package if they fail to bid actively for that package during a round and do not use a waiver either. To clarify this rule the Chamber has given more concrete form to the operative provisions for cases of bidders being eliminated from an auction.

The changes to the operative provisions are as follows:

A bidder's activity in a round is the sum of all the bidding entitlements in lot ratings exercised for frequency blocks for which the bidder has submitted an active bid.

An active bid for a block in a round is deemed given when, at the beginning of the round, either the bidder holds the highest bid for the block - and does not withdraw it in the current round as set out in subsection V.3.11 - or submits a valid bid for a block in the current round in accordance with subsection V.3.5.

A bidder must exercise his bidding entitlements to a certain extent in order not to lose any of them (so-called minimum activity level), unless he makes use of a waiver as provided for in subsection V.3.10.

The auction is divided into four consecutive activity phases:Activity phase 1 requires a minimum activity level of 50% of the current bidding entitlement.Activity phase 2 requires a minimum activity level of 65% of the current bidding entitlement.Activity phase 3 requires a minimum activity level of 80% of the current bidding entitlement.Activity phase 4 requires a minimum activity level of 100% of the current bidding entitlement.The auctioneer will decide when to move on to the next activity phase in accordance with the progress of the auction.

The minimum activity level determines the minimum activity a bidder has to engage in. Minimum activity is derived from the product of the number of the bidder's bidding entitlements and the minimum activity level in the particular activity phase, rounded up to the next highest whole number.

A bidder keeps his full bidding entitlement for the next round if he has complied with or surpassed the minimum activity level in the current round.If a bidder falls below the minimum activity level and does not use a waiver (cf subsection V.3.10), his bidding entitlement will be determined anew for the next round:in activity phase 1 by multiplying his activity level (sum of the lot ratings for frequency blocks for which an active bid has been submitted) by 100/50.

- in activity phase 2 by multiplying his activity level (sum of the lot ratings for frequency blocks for which an active bid has been submitted) by 100/65.

- in activity phase 3 by multiplying his activity level (sum of the lot ratings for frequency blocks for which an active bid has been submitted) by 100/80.
- in activity phase 4 by multiplying his activity level (sum of the lot ratings for frequency blocks for which an active bid has been submitted) by 100/100.

A bidder who neither submits a new valid bid in a round for any frequency block, nor holds a highest bid nor uses a waiver (active or passive) as provided for in subsection V.3.10 will be eliminated from the auction.

Notwithstanding this activity rule, a bidder must at any rate exercise his bidding entitlements to match the extent of the minimum essential spectrum package he has specified (cf subsection IV.1.4). If fewer bidding entitlements are exercised than the minimum essential spectrum package agreed, the bidder will lose all his bidding entitlements and will be eliminated from the auction, provided he has not used any waivers (active or passive) as set out in subsection V.3.10.

Re V.3.10. Waivers

The following comments were made:

The rules for waivers basically met with approval.

There was however a request for clarification of the function of the passive waiver on the grounds that its use and necessity were unclear.

The Chamber has ruled as follows:

The use of waivers is intended to enable bidders to take an extended break to consider their options during the auction. The bidder does not lose any bidding entitlements in the round during which a waiver is used, regardless of the bidding he engages in. An extended break of this kind can become necessary when the auction takes an unexpected turn that will possibly prompt the bidder to change his bidding strategy. The number of waivers must however be limited as, otherwise, strategic considerations could hold up the auction for a considerable time and this would also lead to increased administrative costs.

It seems reasonable to set the limit at five waivers since this gives bidders adequate protection against the loss of bidding entitlements on the one hand, and does not delay proceedings unnecessarily on the other.

Furthermore, the second possibility for the use of an active waiver, as set out in the rules, does not apply to a bidder with a fixed minimum essential spectrum package if he keeps his active bids during the round below the level of that package. In other words, combining an active waiver with the submission of new valid bids (2nd possibility of active waiver) does not release the bidder from the obligation to submit new valid bids to the extent of the minimum essential spectrum package.

It must be stressed that only the use of an active waiver will have an effect on the auction's termination rule. That is to say, the auction cannot be ended when a bidder uses an active waiver because his doing so is a signal that he is considering submitting new valid bids in a subsequent round.

With reference to the request for clarification of the meaning of a passive waiver, the Chamber wishes to make it clear that a bidder can dispense with a passive waiver by taking action himself, for example by submitting a bid.

In the event of the bidder deliberately or unintentionally allowing the time available for the submission of a bid to elapse, a software application comes into effect. The software automatically activates a passive waiver, which protects the bidder from the loss of bidding rights and also, if the worst comes to the worst, from being eliminated. The Chamber continues to regard this software application as a sensible way of protecting the bidder.

Re V.3.11. Withdrawal of highest bids

The following comments were made:

It was argued that the withdrawal rule created incentives for tactical bidding in what were already extremely complex proceedings and should therefore be scrapped.

Irrespective of that, it was unclear whether, in a subsequent round, a bidder could bid for a block for which he had already withdrawn a highest bid.

The Chamber has ruled as follows:

Because frequencies are offered in relatively small blocks from a variety of bands and also because specific blocks are offered in a specific band, the bidder is basically exposed to the risk of acquiring blocks that are not contiguous. The risk arises when a bidder who has submitted the highest bid for one or more than one specific frequency block wants to switch his unused bidding entitlements over to a different band because of the way prices are developing. Being locked in to his highest bids, he can end up without contiguous spectrum.

With a view to making the assignment of single frequency blocks more efficient, bidders are given the possibility of withdrawing highest bids, thus enabling them to use the bidding entitlements thereby released to bid for other blocks. Every bidder is entitled, in ten rounds of his own free choice, to withdraw, wholly or in part, highest bids held by him and to use the bidding entitlements thus released for submitting new valid bids - in the selfsame round.

The possibility of withdrawing bids can, however, lead to abuse in the form of tactical bidding. A bidder could, at no risk to himself, drive up the prices for certain blocks, for example in order to prevent other bidders from acquiring the right to use spectrum in those blocks.

It was with a view to forestalling such tactical bidding that the rule obliging payment in the event of withdrawing a bid was adopted. The rule lays down that in the event of a bidder withdrawing a bid for a block he becomes liable for payment if no new valid bid is submitted for the block in question during the remainder of the first stage of the auction. In this case the bidder will be obliged to pay a sum equivalent to the bid he has withdrawn. If the frequency block is awarded in a second stage, the price bid for the block will be deducted from the amount the withdrawing bidder has to pay. If the price for that block in the second stage is higher than or the same as the highest bid in the first stage of the auction, the withdrawing bidder therefore is under no obligation to pay.

In order to avoid bidding abuse, the following rule has been laid down for a bidder with a fixed minimum essential spectrum package. Such a bidder can withdraw one or several highest bids only if, in that particular round, he has submitted active bids covering at least the extent of his minimum essential spectrum package. That is to say, the sum of the blocks for which he holds highest bids and the blocks for which he submits new valid bids must correspond at least to the volume of his package. The withdrawal of a highest bid and the use of an active waiver (2nd possibility of active waiver as set out in subsection V.3.10) does not release the bidder from the obligation to submit new active bids to the extent of his minimum essential spectrum package.

The Chamber is convinced that these two obligations - the obligation to pay and the obligation to submit active bids to the extent of the minimum essential spectrum package if there is a withdrawal - provide adequate protection against bidding abuse.

Bids are not allowed to be withdrawn after the results of the auction, or parts of the auction, have been made known.

In response to a suggestion, and in the interest of completeness, the Chamber wishes also to state that it is possible for a bidder who withdraws a valid highest bid for a block to make new valid bids for the same block during subsequent rounds.

Re V.3.12. Time of a round, completion of a round, discontinuation of a round and suspension of the auction

The following comments were made:

Support was given to a reduction of the time for a round to 60 minutes instead of the 90 provided for in the draft. 60 minutes was felt to be long enough as a rule for a close analysis of the current bidding situation.

In this connection there was a request for clarification of how long the time between the rounds would be. It was not clear whether at the end of a round there would be a break for the processing of the data and possibly an analysis by the Bundesnetzagentur, or whether, on the assumption of exclusively electronic processing, the end of the round would be followed within (milli-)seconds by the start of the next round.

A further request was made for bidders to be permitted to show, by giving a specific signal, that their activities in the current round were at an end and that they would not be using the time still due to them in the round in question.

There was also a request for bidders to be allowed to apply for a suspension of the auction on the grounds that the time gained by activating a waiver – 90 minutes at most - was too short for an in-depth discussion of the current bidding situation, which might mean extensive modification of their bidding strategy, particularly if external decision-makers at group head office were involved. Even the repeated use of waivers in successive rounds would not produce much improvement, since the bidding situation and thus the basis for decisions changed in the various rounds. To prevent such suspension prolonging the auction excessively, the length of rounds could be reduced in the event of a protracted suspension.

The Chamber has ruled as follows:

An open ascending simultaneous multi-round auction must stipulate the length of time allowed to bidders to submit their bids in any one round. On the one hand, bidders must be given long enough to take their bidding decisions and submit their bids. On the other hand, giving them too long would unnecessarily prolong the auction. In view of these considerations and the complexity of the auction proceedings, a period of 90 minutes for the submission of bids seems, to start with at any rate, to be about right for the initial phase.

All the same the auctioneer needs to be able to react to the way the auction actually unfolds, which may include setting a different time frame. This is to ensure that he can take appropriate action if, for example, the auction takes an unexpected turn. If he finds, during the auction, that a shorter time for a round would suffice, he will reduce the length of time in the interest of keeping the auction moving briskly forward. Shortening the time to one hour in advance, as was requested by some respondents, is however not a good idea, as it would deprive the auctioneer of the capacity for reacting flexibly to the actual course of events.

Ten minutes before expiry of the time for the round, bidders will be given an automatic reminder as a way of making sure they do not inadvertently fail to submit a bid in time.

To prevent the auction being prolonged unnecessarily, it is stipulated that the evaluation of the round should take place as soon as possible, ie as soon as all bidders have submitted their bids. In this connection, however, the Chamber wishes to make the following two points clear:

As soon as the last bidder has submitted his bid or exercised an active waiver or confirmed his highest bid, held at the start of the round, the auctioneer will start the evaluation of the round and thus close the round without waiting for the official time to expire. This means there is no need for the extra signal requested by some respondents as a means by which the bidder can show that he has ended his activities in the current round.

After evaluation, the next round is not started automatically, for example by the software after one logical second. Instead the auctioneer starts the new round manually, as soon as he has analysed the results of the round and taken the necessary decisions for the next round. The

time needed for this depends on the course of the auction and cannot be stipulated in advance. Bidders however need not be concerned that important information from the previous round may be lost after the start of the new one, as measures will be taken to ensure that round results will be available to bidders throughout the new round.

With reference to the possibility of the auction being suspended at the request of a bidder, the Chamber's position is as follows:

The Chamber believes that the use of waivers in principle creates enough time to enable the necessary decisions on bidding strategy to be taken.

The Chamber is nevertheless aware that the amount of the spectrum to be auctioned, the complexity of the proceedings and the importance of the auction results can set off unforeseeable events or problems, for which a bidder may need more decision time than is at present allowed for. Consequently, after analysing the comments received, the Chamber has decided to grant every bidder the right to have the auctioneer suspend the auction, once and only once during the course of the whole auction. The request must be declared to the auctioneer and entered in the record. Thereupon the auctioneer suspends the auction, and it is resumed at 13:00 hours on the next working day. If the request for a suspension is made while a round is in progress, the next round will take as its starting point the result of the previous, completed round. This procedure will give bidders enough time to take the necessary decisions regardless of the time of day the suspension is requested. A provision to this effect has been incorporated in the operative provisions.

The Chamber takes the view that it is enough for each bidder to have one chance of having the auction suspended. More would expose the procedure to abuse, and could also hold up proceedings to an unnecessary extent. The Chamber also expects bidders to make use of this option only when, in their view, they have serious reasons that would justify an extended break in proceedings.

If there is a technical defect or if other, similar reasons jeopardise proper conduct of the auction, it is the responsibility of the auctioneer to dispense with evaluation of the particular round and bring the round to an end. In this case the auction will resume with the result of the previous round. In the interest of transparent conduct of the auction, bidders will be informed accordingly.

The operative provisions have been amended as follows:

> At the beginning of the auction the time for a round in which bids can be submitted is 90 minutes. In the course of the auction, the auctioneer can set a different time before the start of a round, after due consideration of the circumstances.
>
> There will be an automatic reminder ten minutes before the round expires.
>
> A round is completed after the bids from all the bidders have been received by the auctioneer or after expiry of the specified time period for the submission of bids. A round is closed after it has been evaluated by the auctioneer.
>
> The auctioneer may discontinue a round not yet completed if there is a technical defect in the equipment needed for conducting the auction or if other reasons jeopardise proper conduct of the auction. In this case the auction will resume with the result of the previous round.
>
> Each bidder will be given one opportunity to request the auctioneer to suspend the auction. Upon request, it can also be suspended during a round. The request must be declared for record with the auctioneer. The auction will then be continued at 13:00 hours on the next working day.Bidders will be notified of the reason for and length of any suspension of the auction.

Re V.3.13. Provision of information to bidders

The following comments were made:

The arrangements for the provision of comprehensive information to bidders were basically welcomed. In particular it was felt that informing the authorised persons in the bidder's room of all the active bids of all bidders, and their identity, ensured the auction would take a rational course and speeded up the bidding. The transparency it created helped to make sure scarce frequency resources would be assigned efficiently.

However, even more information should be provided. For example, the bidders should be told the number of bidding entitlements applied for and granted, and the minimum essential spectrum packages applied for. All bidders should be informed when a bidder was using a waiver. In addition it should be made clear that, at the beginning of a round, the auctioneer would disclose all the active and valid bids of all bidders to every bidder. It was said that the draft auction rules had so far failed to make this point clear.

Irrespective of that there was a request that the information for the authorised persons should be forwarded in a form that would allow them to produce, simply and quickly, a clear and logically arranged printout that could, when required, be promptly faxed to the undertakings. It was also suggested that the Bundesnetzagentur make the format - or the syntax (type of document, structuring, etc) - of the data to be provided known in good time, that is, at least three months before the auction and in any case before the first auction tutorial. This would enable bidders to make sure they had the right data processing facilities in good time, and to conduct tests.

The Chamber has ruled as follows:

At the beginning of a round the auctioneer will inform all bidders of the effective parameters for that particular round. This procedure ensures they have the maximum information and transparency and enables them to bid accordingly.

At the close of each round the bidders will be told the active bids of all bidders (all the highest bids and the new valid bids). Because bidders can keep the bidding of other bidders in full view - ie their submission of active bids - it is possible for them to correct their assessment of the value of the frequency blocks being offered. The result is to reduce the risk of the so-called winner's curse.

It is not necessary to specify withdrawals of highest bids explicitly, as the information given on all the active bids of all bidders implicitly contains such details.

There is, in the Chamber's view, no need for further information (eg about the use of waivers by other bidders), as the bidder does not require additional information for his assessment of the value of the frequencies, and such information could even conceivably be misused for the purpose of tactical bidding.

The interests of bidders - and the complexity of the proceedings - require them to be given the possibility of further processing specific data electronically (all the valid bids submitted in the previous round, the effective highest bids and the identity of the particular bidder). This means they are given an overview of the current status of the auction within a very short time, as well as a basis for any further bidding decisions they may take.

Consequently the Bundesnetzagentur will ensure that this information is also made available to bidders on site in a form that allows of further electronic processing.

However, for security reasons, there will be no provision for the electronic transmission of the data in question to the head offices of the undertakings.

It is planned to provide the information to the authorised agents in the form of a logically arranged file. The file can be printed out and faxed to the undertakings. The format and/or syntax will be made known to qualified undertakings at the earliest possible date, if possible before the auction tutorial.

Re V.3.14. Exclusion of bidders / collusion

The exclusion of a bidder for irregular behaviour serves to ensure that the auction is conducted smoothly and briskly, and to stop bidders and/or authorised agents (cf subsections V.2.2 and V.3.3) acting together with a view to influencing the course or result of the auction (collusion).

Other reasons for exclusion can be behaviour that jeopardises the smooth conduct of the auction and other behaviour in breach of the auction rules. In addition, any firm indication that a bidder is deliberately attempting to stop the auction proceeding correctly can be deemed to be sufficient grounds for exclusion.

The rule according to which excluded bidders continue to be liable for payment of the bids they have submitted is necessary in order to ensure that the proceedings are kept objective and free from discrimination. The rule provides for the deployment of a rigorous sanction to counter collusion, which is thus effectively prohibited.

Re V.3.15 Elimination from the auction

The purpose of this rule is to make it clear that under the activity rule (cf subsection V.3.9) the loss of all bidding entitlements results in elimination from the auction.

It is also necessary to state clearly that the exclusion of a bidder necessarily leads to his elimination from the entire auction.

A bidder who is not active during the auction to the extent of the minimum essential spectrum package granted him will be eliminated from the entire auction (cf subsections IV.1.4 and V.3.9). Under the activity rule (cf subsection V.3.9), a bidder who has been granted a minimum essential spectrum package in his qualification notice must therefore be active to the full extent of his bidding entitlements in respect of that package.

The rule on the minimum essential spectrum package is stated in subsection IV.1.4. To repeat the essentials:

An applicant can apply for a 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.

For reasons of clarity, options a) to c) have been included in the operative provisions. But this does not imply any change.

If, as in option c), the minimum essential spectrum package relates to all available frequencies (quantity 1) and also specifically the 800 MHz band (quantity 2), the bidder will also be eliminated if he does not submit bids to the extent of the two stated levels (quantities 1 and 2).

The operative provisions have been amended as follows:

The auction will end if no valid bid has been submitted for any frequency block in the final (fourth) activity phase of a round and none of the bidders has used an active waiver. The final result of the auction will be announced by the auctioneer.

If, in an earlier activity phase of the auction, no valid bid has been submitted in a round and none of the bidders has used an active waiver and if all the bidding entitlements are bound by highest bids, it will be up to the auctioneer to continue the auction by moving on to the next activity phase or to end it directly.

The auction can also end through discontinuation. The auctioneer may discontinue the auction if there is a technical defect in the equipment needed for conducting the auction, if bidders collude, or if other reasons jeopardise the proper conduct of the auction. In this case, the Bundesnetzagentur will set a date for a new auction.

Re V.3.16. End of the auction (termination rule)

The following comments were made:

The termination rule, according to which in an earlier activity phase of the auction the auctioneer has the right to end the auction directly if no valid bid is submitted in a round and none of the bidders has used an active waiver, was found unacceptable.

The rule, it was claimed, involved an administrative intervention in the bidding at a time when, by definition and according to the current auction rules, bidders had to use only a maximum of 50% or 65% of their bidding entitlements. Bidders could therefore, at that moment, still have a considerable number of entitlements in hand, which, trusting in the continuation of the auction, they would be holding in reserve for later bids and which the other bidders, because of the activity rule, would not know about. These entitlements would have to be activated in full only in the third activity phase (100% of effective bidding entitlement). The rule therefore involved the risk of inefficient assignment of spectrum. If the bidders who were prevented from using their entitlements exercised them on a later continuation of the auction and this resulted in a different distribution of the blocks by the time the auction was brought to a regular end, such distribution would actually be efficient, as it would reflect the real amounts the bidders were prepared to pay for the various blocks.

It was also suggested that the rules be formulated to the effect that the withdrawal of a bid prevented the auction from being ended.

The Chamber has ruled as follows:

The auction will end automatically if no valid bid was submitted for the blocks offered in the final activity phase of the round just completed and none of the bidders has used an active waiver.

In this case it must be assumed that the total bids submitted have exhausted the values which the bidders attach to the blocks on offer. As long as a new valid bid is made for at least one frequency block, valid bids can continue to be made for the other blocks, subject to compliance with the activity rule (cf subsection V.3.9).

With regard to respondents' concern about the auctioneer ending the auction prematurely, the Chamber wishes to make it clear that the termination rule is intended to be applied only when, at an earlier stage than the final activity phase, the auction result is evident and all concerned can be spared an unnecessary wait until all phases have been formally worked through. This situation can however only have come about if in a completed round no new valid bid has been submitted, no active waiver has been used and all the bidders' bidding entitlements are bound by highest bids. Here too, though, the decision is not automatic but at the auctioneer's discretion. If one or more than one bidder has unused bidding rights, the auctioneer will move the auction on to the next activity phase (cf subsection V.3.9). The Chamber knows that the early ending of an auction will, with the highest possible degree of probability, be an exception. But because the rule can be used to ensure that the auction proceeds briskly, it will not be discarded.

For the sake of clarity the operative provisions have been supplemented and now read as follows:

> If, in an earlier activity phase of the auction, no valid bid has been submitted in a round and none of the bidders has used an active waiver and if all the bidding entitlements are bound by highest bids, it will be up to the auctioneer to continue the auction by moving on to the next phase or to end it directly.

With reference to the suggestion that the withdrawal of a bid should prevent the auction from being ended, the Chamber must point out that the exercise of the right of withdrawal on its own, ie without submission of a valid bid, is not considered to be an activity by the bidder. At the start of the round the auctioneer gives bidders the option of withdrawing highest bids held, which enables them to submit new valid bids for other frequency blocks. This makes it possible for them to bid for contiguous blocks which have become more attractive over the course of the auction. In this case, therefore, the withdrawal is accompanied by the submission of new valid bids. Consequently the Chamber sees no reason to depart from the existing termination rule.

The auction ends with the transmission of the result via the auction software. The result is also made known to the public. The auction can also be discontinued. In contrast to a suspension, which is followed by a resumption (cf subsection V.3.12), the effect of discontinuation is that the auction is restarted from the beginning, at a different time.

Re V.3.17 Award

The following comments were made:

A request was made for clarification of the circumstances in which, under case c), award would be denied.

The Chamber has ruled as follows:

In an open simultaneous multi-round auction the highest bidder for the particular frequency block will be awarded the block.

A frequency block for which

a) there is no valid bid at the end of the auction,

b) no new valid bid was submitted after a bid was withdrawn,

c) award was denied, or

d) there was a bid, but the highest bidder failed to gain his agreed minimum essential spectrum package,

will not be awarded in the auction.

By way of clarification: point c) relates to the case of a bidder being excluded from the auction under the provisions of subsection V.3.14. Bidders can be excluded because of collusion and any other behaviour that jeopardises the smooth conduct of the auction. Deliberate actions by a bidder aimed at preventing the auction proceeding correctly will also justify exclusion.

The particular frequency block will be awarded to the bidder holding the highest valid bid, and that bidder will be required to pay the price which he has bid. The auction is accordingly a so-called first-price auction.

The formulation of the operative provisions was adjusted.

Re V.3.18 Second stage of the auction

The following comments were made:

There was basically a welcome for the restrictions on bidding entitlement for the band at 800 MHz in the second stage of the auction.

On the other hand it was argued that, if these restrictions were in fact imposed in the second stage, blocks which had not been awarded during the first round would possibly not be acquired by anyone and would simply be left unused.

Furthermore, the target of efficient use of spectrum and the political objective of ensuring a reliable supply of broadband to rural areas indicated that what was required was to auction the blocks not awarded in the first stage among the bidders who subscribed to that supply

obligation. The reason why a second stage became necessary was, it was said, that a bidder had been eliminated in the first stage on grounds of having failed to acquire the minimum spectrum package essential for his business operations. It was felt to be logical to exclude from the second stage companies which could no longer implement their business strategies in terms of the minimum essential spectrum package.

In addition, there would be less incentive for tactical bidding in the first stage if the caps on spectrum in the second stage were removed.

With regard to cancelling the possibility of stating a minimum essential spectrum package in the second stage, it was commented that logic made this unacceptable. If a bidder's business strategy suggested that it was advisable for him to commit himself to such a package for the first stage of the auction, then exactly the same considerations would apply to any second stage, since a business strategy based on a minimum essential spectrum package did not change simply because there was a second stage of the auction. Further, the retention of the package would effectively reduce the temptation to misuse this auction instrument.

The Chamber has ruled as follows:

If frequency blocks have not been awarded at the close of the first stage of the auction, the President's Chamber will take a decision within two working days on whether, and if so when, these "stranded" blocks should be auctioned in full or in part in a second stage. A second stage will, in particular, be requisite if the reason why these blocks were not awarded in the first stage is that bids were withdrawn or the individually set minimum essential spectrum packages were not acquired. It is also conceivable that, for certain blocks, no bid was submitted throughout the whole of the first stage.

With a view to the prompt provision of available spectrum the second auction stage should basically take place very soon after the first. The result of the first stage could however make it unnecessary to have the second stage immediately. This could be the case if, for example, a comparatively large number of blocks were not awarded or if a relatively small number of bidders acquired frequency usage rights during the first stage. The basic rule is that the Bundesnetzagentur reserves the right to defer the award of the stranded blocks until further notice, and then, where applicable, to develop appropriate rules specifically for them. To make this point clear the Chamber has added the following sentence to the operative provisions:

> If it is appropriate to offer the frequencies in a second auction stage, the following provisions will apply.

The Chamber's assumption here is as follows:

The stranded blocks will be offered anew for minimum bids in the second stage of the auction.

The right to participate in the second stage will be restricted to bidders who submitted successful bids during the first stage. The point of this rule is to create an incentive for bidders to acquire frequency usage rights in the first stage and discourage them from speculating on a second stage for tactical purposes.

The maximum number of bidding entitlements in the second stage will be derived from the difference between the number of bidding entitlements established as a result of the application and the entitlements successfully exercised in the first stage. Bidders may also submit bids for frequency blocks for which they withdrew a bid in the first stage (cf subsection V.3.11). It is also possible to exercise bidding entitlements which were "lost" in the first stage under the activity rule laid down in subsection V.3.9.

The Chamber is unable to accede to the request made by some respondents for the restrictions on bidding entitlements for the band at 800 MHz to be lifted in a second auction stage if not all the blocks of 2 x 5 MHz in the 800 MHz band have been awarded by the end of the first stage. The arguments set out above for the necessity of a cap on spectrum are

applicable to these award proceedings, irrespective of the actual progress of the auction. The idea behind the restriction is that as many undertakings as possible should have access to spectrum below 1 GHz (cf subsection IV.3.2).

Some respondents are concerned that in a second phase of the auction spectrum would be awarded to bidders who, while not subject to any restrictions on bidding entitlements for 800 MHz, would still not be able to pursue their business strategies in relation to the stated minimum essential spectrum package. The answer to this is that bidders who failed to acquire their package in the first stage of the auction will not be entitled to take part in the second stage.

It is for that reason that it is not possible to set a minimum essential spectrum package per bidder for the second stage. Nor is it necessary, firstly because of the restricted entitlement to participate and secondly because all the bidders who have qualified for the second stage of the auction are required to have met all their minimum frequency requirements during the first stage. If a bidder has failed to acquire his minimum essential spectrum package in the first stage of the auction (on the assumption that he has stipulated one), he has in fact already been eliminated from the auction and is no longer entitled to participate (cf subsection V.3.9). Bidders' individual frequency requirements relate to their business models, and these requirements must be met in the first stage. The possibility of stipulating a minimum essential spectrum package is allowed in order to ensure that a bidder who needs more than one frequency block to implement his business model will definitely be left with the spectrum needed as the essential minimum at the end of the first stage, or with none at all. The only reason why provision is made for a second stage is that there may be frequencies left over, ie not awarded in the first stage

In contrast to the first stage it will not be possible to withdraw bids. This is to ensure that there will only be a stranded frequency block at the end of the second stage if no bids have been submitted for it.

Re V.4. Auction close

Re V.4.1. Obligation to pay

The bidder awarded a frequency block at the close of the auction must pay the amount of his highest bid.

A bidder that has withdrawn a current highest bid must likewise pay the amount of this highest bid if no new valid bid is submitted for the frequency block in question in the course of the first stage of the auction. If the frequency block is awarded in a second stage, the bid price for the block will be deducted from the amount the withdrawing bidder has to pay.

This obligation to pay is essential. Its purpose is to prevent the withdrawal of bids being misused as an instrument for tactical bidding. Without it, a bidder could drive up the price of a frequency block at no risk to himself, with the aim of preventing other bidders from obtaining the right to use that block. The obligation to pay in the event of no higher valid bids being submitted does in fact reduce the risk of auction misuse in the form of tactical bidding. The obligation is also commensurate, since the bidder can adjust his bidding to allow for the risk that he will be obliged to pay, particularly during a later activity phase.

The award notice will be presented together with the notice of the amount payable, against acknowledgement of receipt. Contrary to the draft document for consultation, payment of the award price less any security deposited as a sum of money (cf subsection V.1.3) will be due immediately after presentation of the notice of amount payable and must be made within five banking days to the account specified by the Bundesnetzagentur. The security will likewise be deducted in the event of a payment obligation having arisen in spite of the withdrawal of a highest bid. The option of paying in instalments will not be allowed. The surety bonds will be returned after receipt of payment. The security will not earn interest.

The payment obligations have been altered because, in order to meet the minimum specialist and other requirements for qualifying for the auction, as defined in section 61(2) sentence 2

para 1 of the Telecommunications Act, an applicant must inter alia prove that he has the funds necessary for the purchase of frequencies (cf also Annex 5 Point D). As a further requirement for participation in the auction the qualified applicant must deposit a security, one of whose purposes is to secure, at least partly, the amount to be paid by the successful bidder. The amount of the security will be deducted from the amount payable to the account specified by the Bundesnetzagentur. Consequently the balance is to be paid without delay, ie within no more than five banking days after presentation of the notice of the amount payable.

Bidders not awarded a frequency block and having no other payment obligations will be refunded for their security immediately after the close of the entire auction proceedings, or alternatively the surety bond will be returned.

The spectrum will be assigned after the bidder has met all his payment obligations.

The operative provisions have been amended as follows:

> The bidder awarded a frequency block at the close of the auction must pay the amount of his highest bid.
>
> A bidder who has withdrawn a current highest bid must likewise pay the amount of this highest bid if no new valid bid is made for the frequency block in question in the course of the first stage of the auction. If the frequency block is awarded in the second stage of the auction, the price bid for the block will be deducted from the amount to be paid by the withdrawing bidder (cf subsection V.3.11).
>
> The award notice will be presented together with the notice of the amount payable, against acknowledgement of receipt. Payment of the award price less any security deposited as a sum of money (cf subsection V.1.3) is due immediately after presentation of the notice of amount payable, and must be made within five banking days to the account specified by the Bundesnetzagentur. Compliance with the deadline is determined by the time at which the sum is credited to the account (value date). The debtor will automatically default after the deadline has expired if payment is not made. There does not need to be a reminder. Interest will be charged during the period of default on the award price less any security deposited as a sum of money. The rate of interest for the year will be five percentage points above the base rate as per section 247 of the German Civil Code. The security will likewise be deducted if there are other payment obligations under the auction rules.
>
> The security will not earn interest. Bidders not awarded a frequency block and having no other payment obligations will be refunded for their security immediately after the close of the entire auction proceedings. The surety bonds will be returned after receipt of payment.

Re V.4.2 Allotment of the abstract frequency blocks won

The following comments were made:

There was a welcome for the Bundesnetzagentur's efforts to allot the abstract frequency blocks won in a way that takes account of the frequency assignments a bidder already has and thus creates as much contiguous spectrum as possible. This, it was felt, ensured efficient use of frequency resources.

On the other hand the creation of contiguous spectrum should not be the only criterion for the allotment of the blocks awarded for a non-specified spectral position. In distributing 800 MHZ spectrum it should also be taken into account that less coordination would be needed for the five blocks with higher frequencies than was likely to be the case for the block with the lowest spectrum. This applied with particular force to cross-border coordination in respect of the use of the frequencies outside Germany for digital broadcasting. It was felt by this particular respondent that the trouble involved did not justify award of the frequency block for a specific spectral position.

The Bundesnetzagentur's draft procedure for the allotment of abstract frequency blocks won provided for a negotiating phase after the close of the auction, in which successful bidders would try to reach amicable agreement among themselves. This was stated to be neither neutral in terms of competition nor non-discriminatory, and to result from the rule that the allotment of abstract blocks won should be guided by existing adjacent frequency assignments. A breakdown of negotiations in that phase would be less detrimental for an undertaking which already had adjacent spectrum than for other assignees, who would have to rely exclusively on a lucky draw for the allotment of the frequency blocks. The Bundesnetzagentur's proposal could not be called non-discriminatory because it created inequitable conditions for the first post-auction phase.

It was proposed that if successful bidders were unable to reach agreement on the allotment among themselves, bidders who wanted to use TDD in paired spectrum should be given a price reduction. This would compensate for the disadvantage they were at through the protection to be given to adjacent FDD operators.

The negotiating phase would also lead to undesirable delays of up to three months, which would mean a later date for the expansion of network as well. For this reason the idea of a negotiating phase should be abandoned and instead an immediate start made on the allotment of the frequency blocks. The following modification was suggested for the drawing of lots:

> Lots should be drawn for each frequency band to determine a sequence for bidders awarded spectrum. The undertaking drawn first should be able to select the frequency blocks it prefers, and then it would be the turn of the undertaking drawn second, and so on. If this produced a situation in which a network operator could not be allotted contiguous spectrum because of the choices made by preceding undertakings, the allotments based on free choice would be cancelled and the procedure provided for by the Bundesnetzagentur would be applied.

The procedure proposed for the drawing of lots came in for criticism with respect to the blocks in the 2.6 GHz band. Particularly in the highest FDD blocks, it was claimed, the closeness of the radio astronomy service (downlink) and the TDD band (uplink) had a detrimental effect. The lowest FDD block (downlink) was also adjacent to the TDD band. Furthermore, the drawing of lots could mean a twofold disadvantage for a bidder. This would happen if a bidder was allotted the lowest block in the 800 MHz band and blocks whose use was limited by the radio astronomy service.

The Chamber has ruled as follows:

As laid down in subsection V.1.4, the frequency blocks in the band at 2.6 GHz, five paired frequency blocks in the band at 800 MHz and three paired blocks in the band at 1.8 GHz will be auctioned in the abstract, ie bidders will, to start with, gain the desired number of frequency blocks in specific bands without knowing the exact position of the blocks. The concrete allotment of the frequency blocks will take place after the auction itself and will follow the procedure described here, separately for each frequency band and in the case of the band at 2.6 GHz divided into paired and unpaired spectrum. Steps are taken to ensure that bidders get contiguous spectrum in each band.

The Chamber has decided to act on the point made by respondents about the differences with regard to the value of the lowest block in the band at 800 MHz, and auction the lowest block (791 MHz to 796 MHz, or 832 MHz to 837 MHz) as a concrete block. It is the Chamber's belief that the concrete auctioning of the lowest block is no obstacle to keeping the conduct of the auction simple, brisk and practical. The original aim of awarding the whole band in the abstract was to enable bidders to get contiguous spectrum, and this aim is also served by having the allotment procedure allow for the concrete award of the lowest block. The operative provisions have been changed accordingly.

Specifically, the following applies:

The Bundesnetzagentur first makes it possible for successful bidders to negotiate on the actual position in any particular band with a view to reaching amicable agreement without the Bundesnetzagentur being involved. This basically creates the possibility that bidders will achieve the position they want - and subjectively prefer - in the band under consideration. The period allowed for the bidders to reach such agreement is a maximum of three months, the aim being to have the frequencies assigned reasonably quickly after the close of the auction itself. The procedure is also a means of meeting the requirements of the federal government's broadband strategy.

If no such agreement is reached for one or more than one band within the three-month period, the basic rule is for lots to be drawn for the bands in question.

Under certain conditions the above procedure will be departed from in the case of frequencies auctioned in the abstract in the band at 1.8 MHz, with a view to ensuring that contiguous spectrum is assigned. If an undertaking already has usage rights for frequencies immediately adjacent to the abstract blocks auctioned, that undertaking will be allotted directly adjacent blocks in the same band to the extent of its successful highest bids. If after such allotment only one further bidder has been awarded frequency blocks, these too will be allotted concretely, without drawing lots.

The procedure for the band at 800 MHz is analogous. If the lowest block available for concrete award (791 MHz to 796 MHz, or 832 MHz to 837 MHz) is acquired by one bidder and this bidder has also won additional spectrum in the band at 800 MHz, the subsequent allotment will ensure that the bidder is given contiguous spectrum. The allotment procedure described above will be used for the other successful bidders in the band at 800 MHz.

The Chamber finds itself unable to accept the argument presented by respondents that the restrictions resulting from the radio astronomy service make the lots procedure proposed by the Chamber unsuitable. It is possible to meet the radio astronomy service's need for protection by means of frequency coordination when stipulating the site-specific parameters for the wireless access base stations concerned in the two upper 5 MHz blocks. But the coordination needed for the purpose is not of the type or scope that would reduce the value, at auction, of these frequency blocks compared with the other 2.6 GHz blocks. Any extra trouble or expense is, in the Chamber's view, comparable with that which a network operator would have through the operation of cross-border coordination agreements, and therefore at a customary level. Given all this, the Chamber is holding to its decision to auction the band at 2.6 GHz in the abstract (cf subsection V.1.4).

Consequently the Chamber regards the lots procedure as the right one for this band as well, since it ensures speedy allotment in the event of the successful bidders failing to agree on the concrete allotment of the frequency blocks won in any given case.

The request by respondents for a price reduction when paired spectrum is used with TDD technology is one the Chamber cannot accede to. Frequencies are auctioned on a technology-neutral basis, and bidders are free to decide on the technology for themselves - subject to the limits imposed by the usage conditions (cf subsection IV.4.2). The blocks available for abstract award all have the same degree of usability in terms of frequency technology, which means, in the Chamber's view, that they are of equal commercial value. Price reductions must therefore be ruled out.

The Chamber does not share the view of some respondents that the allotment procedure, in allowing for a first phase during which mutual agreement is sought, is not non-discriminatory in the case of successful bidders who already have adjacent spectrum. On the one hand the allotment procedure ensures that frequency blocks auctioned in the abstract are assigned to successful bidders as contiguous spectrum. On the other, the allotment of abstractly won blocks in the bands at 800 MHz or 1.8 GHz is guided by whether there are adjacent, concretely acquired blocks or already existing adjacent assignments. The allotment procedure therefore makes a direct contribution to achieving the regulatory aim - stated in section 2(2) para 7 of the TKG - of securing the efficient use of frequencies. The principle

involved applies equally to all successful bidders. Even before the auction itself they are assured of the use of an open, transparent and non-discriminatory allotment procedure.

Nor can the Chamber share the concern of respondents about the negotiation phase being unfit for purpose and merely liable to delay proceedings. As far as the Chamber is concerned, the advantage of the phase is that it basically gives bidders the chance of getting the spectral position they want - and subjectively prefer - in the band under consideration. The Chamber feels that the period allowed, a maximum of three months, is the right way to get the frequencies assigned reasonably quickly after the close of the auction and thus meet the requirements of the federal government's broadband strategy.

For these reasons the Chamber does not feel that the proposed amendment of the allotment procedure is appropriate. It would do away with the negotiation phase and substitute the drawing of lots for the order in which successful bidders could select the concrete frequency blocks they wanted. The Chamber believes such a system would make it unacceptably probable that not all undertakings would end up with contiguous spectrum and that their subjective preferences for a specific spectral position would not be given expression. The Chamber has therefore decided to abide by the allotment procedure it has proposed.

The operative provisions have been amended as follows:

> The abstract frequency blocks won will be allotted to their highest bidders at the end of the auction with a view to assigning contiguous spectrum. The blocks will be allotted in an open, transparent and non-discriminatory procedure in accordance with the following rules:
>
> 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 (separately for paired and unpaired spectrum).
> 2. If agreement between the successful bidders is not reached within this period, the Bundesnetzagentur 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. The successful bidders in the same frequency band will draw lots for placements, with position 1 for the blocks won being at the lower band edge and the subsequent placements following in ascending order. Lots will be drawn separately for every band in which the frequencies have been acquired without a specific spectral position and separately according to paired and unpaired spectrum.

Information on legal remedies

Actions against this notice may be filed in writing with the Cologne Administrative Court, Appellhofplatz, 50667 Köln, Federal Republic of Germany, or placed on record with the registry clerk within one month of its publication. The complaint must name the plaintiff, the defendant and the matter in dispute. It should specify the remedy pursued and state the facts and evidence justifying the action. Under section 137(1) of the Telecommunications Act legal actions do not have suspensory effect.

The complaint and all supporting documents should be accompanied by a sufficient number of copies for all parties concerned.Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway President's Chamber Bonn, 12 October 2009

Dr. Henseler-Unger	Kurth	Kindler
Vice Chair	Chairman	Vice Chair

Annexes and supplements

- **Annex 1 - Diagram of spectrum available for award at 800 MHz, 1.8 GHz, 2 GHz and 2.6 GHz**
- **Annex 2 - Frequency usage conditions for the band at 800 MHz**
- **Annex 3 - Frequency usage conditions for the bands at 1.8 GHz, 2 GHz and 2.6 GHz**
- **Annex 4 – Internationally agreed rights to protection for television channel 60**
- **Annex 5 - Qualification requirements to take part in the auction**
- **Annex 6 - Overview of items up for auction**
- **Supplements - Lists of towns and communities drawn up by the federal states showing coverage requirements for frequencies in the band at 800 MHz**