

Auction rules for the awarding of spectrum in the 700, 1500 and 2100 MHz bands

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# 1 General information

## 1.1 Overview

- 1.1.1 Frequencies are being awarded in three bands that together total 270 MHz of spectrum:
- 2x30 MHz in the 700 MHz band (703–733 MHz paired with 758–788 MHz)
  - 90 MHz in the 1500 MHz band (1427–1517 MHz); and
  - 2x60 MHz in the 2100 MHz band (1920–1980 MHz paired with 2110–2170 MHz).
- 1.1.2 The available spectrum is being auctioned off on a national basis.
- 1.1.3 In the course of the award procedure, extended coverage obligations (some of which are bound to certain frequencies) will also be assigned in addition to basic and band-specific obligations.
- 1.1.4 These extended coverage obligations are defined in addition to the obligation to provide coverage for a certain number of cadastral municipalities currently lacking adequate coverage.
- For the extended coverage obligations bound to certain frequency blocks, a list of cadastral municipalities is specified for each block of this kind. The winner of this block is required to provide coverage for a certain number of these communities (some of these also having higher priority than others). Winners are at liberty to state which specific cadastral municipalities they will provide coverage to in fulfilment of this obligation.
  - In addition, other extended coverage obligations not bound to spectrum will be auctioned off at a separate stage. Successful winners of spectrum may undertake to provide coverage to other cadastral municipalities in return for a price discount.

For further details, please see section 4 of the Tender Document.

- 1.1.5 The award procedure is split into a total of four stages.
- In the first stage, frequencies in the 700 and 2100 MHz bands are awarded as abstract frequency blocks (that is, awarded only as bandwidth plus their associated extended coverage obligation, but not in relation to the position of defined blocks within the respective band).
  - In a second stage, frequencies in the 1500 MHz band are then awarded as abstract frequency blocks.
  - A third stage is used to determine which specific frequencies within the bands will be assigned to the winners of spectrum in the first two stages.

- Additional extended coverage obligations not bound to frequencies are then auctioned off in the fourth and final stage.
- 1.1.6 The auctioning off of abstract frequency blocks during stage 1 and stage 2 utilises the simultaneous multi-round (SMR) auction format. Bidders will not typically bid on specific blocks, however, but will specify the number of blocks they wish to acquire in a lot category for the applicable round price. At the end of a bidding round, the auctioneer determines the provisional winners of the available blocks. If new bids are placed or waivers are used within a round, then a further round of bidding is completed. For each lot category in which only provisional winning bids are available at the current round price, the round price increases for the next bidding round. If there is no further bidding round, then the provisional winning bids become the actual winning bids and the successful bidders then pay the corresponding prices for the bids that they have won.
- 1.1.7 Applicants may take part in the first two stages of the auction procedure if they have not been excluded from the spectrum award procedure as specified in Art. 55 Par. 8 of the Telecommunications Act (TKG 2003).
- 1.1.8 The maximum amount of spectrum that a bidder may acquire at auction in stages 1 and 2 is limited by any of the following:
- The spectrum caps set by the Telekom-Control-Kommission (TKK) (see also section 6.4 of the Tender Document and the terms under 3)
  - The bidding restrictions according to the provisions in 4.6.4
  - The bidding limit resulting from the bank guarantee provided by the bidder (cf. section 6.3 of the Tender Document)
- 1.1.9 Stage 3 is conducted as a single sealed bidding round in which winners of spectrum submit bids for various combinations of specific frequency blocks across bands, thereby enabling the mutually compatible assignment of contiguous spectrum to the winners of spectrum in each band (assignment options). Winning bids are identified by determining the combination of mutually compatible bids with the highest total value. The winners receive the actual frequency blocks contained in their respective winning bids at what are termed 'additional prices', which are calculated on the basis of a modified second price rule. The third stage of the auction procedure is open to those applicants who in the preceding stages acquired abstract frequency blocks, where more than one assignment option exists for these blocks.
- 1.1.10 Stage 4 is conducted as a single sealed bidding round in which the winners of spectrum are invited to indicate their readiness to accept additional extended coverage obligations in return for a reduction in the price to be paid for the use of their acquired spectrum.
- 1.1.11 The total price to be paid by a successful bidder is calculated as the sum of the bidder's successful bids during the first two stages, plus the addi-

tional price less any deduction determined during the fourth stage as a result of accepting any additional coverage obligations.

- 1.1.12 The auctioneer is the TKK or a member as commissioned by that body. The TKK may also entrust the handling of the auction to members of the Telecommunications and Postal Services Division of the Austrian Regulatory Authority for Broadcasting and Telecommunications (RTR).

## 1.2 **Bids and bid submission**

- 1.2.1 All bids are submitted electronically via auction software (EAS). The process for bid submission is described in detail in the auction software user guide, which will be provided to bidders in good time before the commencement of the first stage of the procedure.
- 1.2.2 The submission of bids without EAS (by fax, phone or email, for example) is permitted only in exceptional cases. The submission of bids without EAS may be permissible, for example, if technical problems occur that prohibit bid submission via the auction software. It is for the auctioneer to decide whether such an exceptional case applies. A detailed description of the process for submitting bids without EAS is given in the rules of procedure. Bids will only be accepted if they are valid within the meaning of the Auction Rules and conform to the bank guarantee rules set out in section 6.3 of the Tender Document.

## 1.3 **Collusion and cancellation of the procedure**

- 1.3.1 Any coercion of applicants or the applicants' shareholders, whether direct or indirect, with the intent of influencing the course or result of the auction (collusive behaviour) is prohibited. Collusive behaviour on the part of applicants before or during the auction procedure can lead to their exclusion from subsequent stages of the procedure (Art. 55 Par. 9 TKG 2003). The auctioneer is entitled to take all suitable measures to prevent collusive behaviour.
- 1.3.2 Other potential grounds for exclusion from the procedure include threats against competitors as well as disclosure of participation in the auction, of bids, or of bidding strategies, even prior to the auction procedure.
- 1.3.3 In this context, reference is also made to the provisions of general competition law and to Art. 168b of the Austrian Criminal Code (StGB).
- 1.3.4 The TKK is entitled to cancel the auction procedure if it discovers collusion between applicants and an efficient, fair and non-discriminatory procedure cannot be conducted (Art. 55 Par. 12 No. 1 TKG 2003), or if there are other important reasons that endanger the proper and correct organisation and completion of the auction procedure. In such cases, the TKK will decide whether the procedure should be terminated in accordance with section 2.4 of the Tender Document or whether a new auction date should instead be set.

## **2 Items for auction**

### **2.1 Items for auction in stage 1**

- 2.1.1 The spectrum will be awarded in the form of abstract frequency blocks. Abstract frequency blocks are defined by their respective bandwidth and any extended coverage obligations associated with each of these blocks. A more detailed description of the terms and conditions of use as well as the licence terms for the blocks is given in sections 3 and 4 of the Tender Document, as are the extended coverage obligations associated with individual blocks.
- 2.1.2 For the purpose of applying the rules of activity, each block is assigned a certain number of bidding points in stage 1. The bidding points per block vary from one lot category to another and are listed in Table 1.
- 2.1.3 The round prices for the first round correspond to the minimum bids listed in Table 1, each for a single frequency block in the respective lot category.
- 2.1.4 In the 700 MHz band, a total of six blocks are available, each with a bandwidth of 2x5 MHz. Each block in this band is associated with a specific extended coverage obligation that defines the lot category (Aa to Af).
- 2.1.5 In the 2100 MHz band, a total of twelve blocks are available, each with a bandwidth of 2x5 MHz. All blocks in this band are awarded in a single lot category (lot category C).

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Table 1: Lot categories in stage 1

Lot category	Extended coverage obligation	Number of blocks	Bidding points	Minimum bid per block
Aa	See section 4.3 and appendix G.1	1	2	9,500,000 €
Ab	See section 4.3 and appendix G.2	1	2	2,375,000 €
Ac	See section 4.3 and appendix G.3	1	2	9,500,000 €
Ad	See section 4.3 and appendix G.4	1	2	9,500,000 €
Ae	See section 4.3 and appendix G.5	1	2	7,125,000 €
Af	See section 4.3 and appendix G.6	1	2	9,500,000 €
C	N/A	12	1	13,900,000 €

## 2.2 Items for auction in stage 2

2.2.1 The spectrum will be awarded in the form of abstract frequency blocks. A more detailed description of the terms and conditions of use as well as the licence terms for the blocks is given in sections 3 and 4 of the Tender Document.

2.2.2 In the 1500 MHz band, a total of nine blocks of 10 MHz are available, although one block is subject to highly restrictive usage conditions. This block is assigned during stage 3, which means that only eight blocks are available during stage 2. These eight blocks are awarded in a single lot category (B).

2.2.3 The round price for the first round is set at EUR 3,125,000 per block.

## 2.3 Items for auction in stage 3

2.3.1 To determine the specific assignment options in stage 3, blocks in the bands are numbered consecutively, starting at the lower end of the frequency range, as follows: blocks in the 700 MHz band are numbered from A01 to A06; blocks in the 1500 MHz band are numbered from B01 to B09; and blocks in the 2100 MHz band are numbered from C01 to C12. The following table lists the specific frequency assignments for the respective blocks.

*Fehler! Textmarke nicht definiert.: Summary of specific frequency assignments*

Label	Frequency range
A01	703–708MHz/758–763 MHz
A02	708–713MHz/763–768 MHz
A03	713–718MHz/768–773 MHz
A04	718–723MHz/773–778 MHz
A05	723–728MHz/778–783 MHz
A06	728–733MHz/783–788 MHz
B01	1427–1437 MHz
B02	1437–1447 MHz
B03	1447–1457 MHz
B04	1457–1467 MHz
B05	1467 – 1477 MHz
B06	1477–1487 MHz
B07	1487–1497 MHz
B08	1497–1507 MHz
B09	1507–1517 MHz
C01	1920–1925 MHz/ 2110–2115 MHz
C02	1925–1930 MHz/ 2115–2120 MHz
C03	1930–1935 MHz/ 2120–2125 MHz
C04	1935–1940 MHz/ 2125–2130 MHz
C05	1940–1945 MHz/ 2130–2135 MHz
C06	1945–1950 MHz/ 2135–2140 MHz
C07	1950–1955 MHz/ 2140–2145 MHz
C08	1955–1960 MHz/ 2145–2150 MHz
C09	1960–1965 MHz/ 2150–2155 MHz
C10	1965–1970 MHz/ 2155–2160 MHz
C11	1970–1975 MHz/ 2160–2165 MHz
C12	1975–1980 MHz/ 2165–2170 MHz

2.3.2 The auctioneer uses the frequency blocks acquired by the bidders during the first two stages to determine a potential allocation of blocks for each bidder, such that contiguous spectrum is assigned to each bidder within each band while also keeping together any unsold frequencies as a contiguous block of spectrum. The bidders then bid on these assignment options.

## **2.4 Items for auction in stage 4**

- 2.4.1 In stage 4, obligations to provide coverage for cadastral municipalities are auctioned off where these obligations were not nominated by network operators who acquired blocks in lot categories Aa–Af in the first stage or specified by the auctioneer. Before stage 4 starts, the auctioneer provides a list of the cadastral municipalities that are still available. Bidders nominate the number of cadastral municipalities and the price discount they would require in order to accept an obligation to provide coverage.
- 2.4.2 These kinds of coverage obligations are assigned to bidders in a way that maximises the total number of communities provided with additional coverage based on a specified budget for financing the price discounts according to the provisions in 0.

## **3 Spectrum caps**

### **3.1 Individual spectrum caps**

To safeguard competition in downstream markets, there is a limit (spectrum cap) placed on the total number of frequency blocks that a bidder may acquire by auction (individual spectrum caps). Restrictions as follows apply (refer also to section 6.4 of the Tender Document):

- i In the 700 MHz band, each bidder may acquire a maximum of four blocks with the exception of A1 Telekom Austria AG, which is restricted to a maximum of two blocks.
- ii In the 2100 MHz band, each bidder may acquire a maximum of eight blocks with the exception of A1 Telekom Austria AG, which is restricted to a maximum of six blocks.
- iii In the 1500 MHz band, each bidder may acquire a maximum of six blocks; this does not include block B01, which may be assigned during stage 3.
- iv A1 Telekom Austria AG may acquire a maximum of 130 MHz over all three bands; block B01 is not included when calculating this assignment of spectrum.

### **3.2 Joint spectrum cap**

In addition, A1 Telekom Austria AG and T-Mobile Austria GmbH are subject to the restriction that they may not jointly acquire more than 15 blocks in total in the 700 and 2100 MHz bands ('joint spectrum cap').

## 4 **Stages 1 and 2**

### 4.1 **General information**

4.1.1 The two stages 1 and 2 use an identical auction format, and differ only in terms of the relevant spectrum caps and the rules of activity. Both stages are conducted as simultaneous multi-round (SMR) auctions, as follows:

- Each stage comprises one or more bidding rounds, in which the bidders submit bids on the lots available in that round.
- At the end of each bidding round, the auctioneer provisionally determines winning bids and establishes whether another bidding round is necessary.
- If no further bidding round is necessary, the provisional winning bids become actual winning bids—the bidders receive the corresponding number of frequency blocks in the respective band at the prices specified in the provisional winning bids.
- Otherwise the auctioneer conducts another bidding round.

4.1.2 Another bidding round becomes necessary in a stage if new bids have been placed or waivers have been exercised in a round (see 4.5.3 and 4.5.3) and rule 4.8.2 is not applicable.

### 4.2 **Bidding rounds**

4.2.1 A bidding round is a period of time set by the auctioneer within which bidders may submit bids.

4.2.2 The scheduling of bidding rounds is at the discretion of the auctioneer. In particular, the auctioneer may schedule the round duration and the time between the rounds as is considered appropriate to ensure the proper and expeditious completion of the auction. However, it is not envisaged that a bidding round should last less than 30 minutes or more than two hours.

4.2.3 Bidding rounds will not start before 9 am and not after 6 pm on normal working days in Austria. While no limit is placed on the number of bidding rounds per day, it is not envisaged that more than eight bidding rounds should be held per day.

4.2.4 The auctioneer informs bidders of the start of a bidding round at least 10 minutes before the round is due to start. At the same time, the auctioneer provides each bidder with the following information:

- The length of the planned bidding round.
- The respective round price for each lot category.
- The number of blocks in each lot category for which the bidder receives provisional winning bids, as well as the price per block of these provisional winning bids.
- The maximum bid amount (bid limit) resulting from the bank guarantee provided by the bidder.
- The number of waivers remaining to the bidder.

From the second bidding round onwards, bidders are also given the following information:

- The aggregated demand in each lot category in the previous round, i.e. the total of new bids received for the respective lot category and the unchanged provisional winning bids.
- At stage 1, if the joint spectrum cap applies and bidders not subject to this cap together submit bids for no more than three blocks, bidders are informed firstly that the joint spectrum cap is in effect and secondly of the lot categories Aa to Af for which the placement of new bids by bidders subject to the joint spectrum cap would not prevent the end of the stage as set out in provision 4.8.2.

4.2.5 At the end of each auction day, the auctioneer also informs the bidders about the provisional round plan for the following day. This information is non-binding, and the auctioneer may elect to hold fewer rounds than the number originally planned. The number of rounds held on an auction day never exceeds the number announced by the auctioneer the day before.

### 4.3 Bids

4.3.1 A bid is a binding offer to acquire a lot in a specific lot category at the round price set for that category in the respective round in which the bid has been submitted.

4.3.2 A bid is submitted by specifying the number of blocks that the bidder wishes to acquire in a lot category at the specific round price. If a bidder specifies more than one block in a lot category, this is referred to in the plural as 'bids' in this document. To clarify: it is possible that only some of the bids submitted by a bidder in a round are provisionally awarded as winning bids.

4.3.3 Bids are submitted using the auction software and must be received within the period of time set for the round by the auctioneer. The submission of bids without EAS is permitted only in exceptional cases (see 1.2.2).

#### 4.4 **Round prices**

- 4.4.1 In each bidding round, the auctioneer sets a price per frequency block for each lot category (the round price). The round prices in the first bidding round correspond to the minimum bids as set out in Table 1 and 2.2.3.
- 4.4.2 If another bidding round is required, the round price then increases for the next bidding round in a lot category by a price increment specified by the auctioneer, if and when:
- i the number of the blocks provisionally awarded at the round price is the same as the number of blocks available in the category; or
  - ii application of the joint spectrum cap has prevented the provisional awarding of blocks.
- Otherwise, the round price remains unchanged for the next round. An illustration of this pricing rule is given in appendix A.2.
- 4.4.3 The setting of price increments is at the discretion of the auctioneer. Price increments may vary across the individual lot categories and may be specified as a percentage increment or as an absolute increment (in addition, round prices may, if required, be rounded up to the next multiple of EUR 1,000).
- 4.4.4 The auctioneer will set the price increments so as to ensure that the auction completes in an orderly and expeditious fashion. However, the round price will not increase from one bidding round to the next by more than 10% (plus any amount needed to round up to the next multiple of EUR 1,000).
- 4.4.5 At the end of each auction day, the auctioneer informs the bidders about the increments planned for the next auction day. This information is nonetheless non-binding, and the auctioneer may choose to set the increments at a lower level than announced if this would appear to improve the efficiency of the procedure. This means that round prices do not increase faster than bidders would anticipate from the preliminary information they received.

#### 4.5 Rules of activity

4.5.1 A bidder's level of activity in a round is as follows:

- i In stage 1, the total bidding points of blocks for which the bidder submits new bids in the current round, in addition to the bidding points of blocks for which the bidder receives a provisional winning bid in the lot categories in which this bidder does not submit a new bid.
- ii In stage 2, the number of blocks for which a bidder bids or for which the bidder receives a provisional winning bid at the start of the round, assuming the bidder does not submit a bid.

4.5.2 A bidder's bidding eligibility in a round is determined as follows:

- i In the first bidding round of stage 1, eligibility is determined by the spectrum caps applying to the bidder.
- ii In each subsequent bidding round in stage 1:
  - identical to the bidder's bidding eligibility in the preceding round if the bidder has utilised a waiver;
  - zero if the bidder has an activity level of zero and has not used a waiver.

If neither of the two points above applies (in cases where the bidder had an activity level greater than zero in the preceding round and did not use a waiver), the bidding eligibility in a subsequent round is the lesser of the two following values:

- activity of the bidder in the preceding round, plus one bidding point;
- bidding eligibility of the bidder in the preceding round.

- iii In the first bidding round of stage 2, eligibility is determined by the bidder's spectrum caps while accounting for the blocks acquired in stage 1.
- iv In each of the following bidding rounds in stage 2, if the bidder has exercised a waiver, eligibility is equal to the bidder's activity in the previous round or the bidder's bidding eligibility in the preceding round.

4.5.3 Each bidder is granted three waivers at the beginning of stage 1 and one waiver at the beginning of stage 2. Each waiver may be exercised only once. Waivers are not transferable from stage 1 to stage 2.

#### 4.6 Bidder options in a bidding round

- 4.6.1 In each bidding round, a bidder can submit bids or confirm any existing provisional winning bids.
- 4.6.2 If a bidder does not submit any bids in a round and does not confirm any existing provisional winning bids, then a waiver is applied automatically, if and when:
- i the bidder still has waivers available; and
  - ii the bidder's activity from the provisional winning bids at the beginning of the round is not sufficient to maintain bidding eligibility.
- 4.6.3 If bids are submitted or winning bids are confirmed and the associated level of activity is not sufficient to receive bidding eligibility, bidding eligibility is reduced in accordance with the rules of activity.
- 4.6.4 In submitting bids, bidders are subject to the following restrictions:
- i If a bidder submits bids in a bid category, these replace any existing provisional winning bids the bidder may have made.
  - ii If the round price is higher than the price of the provisional winning bids, the number of blocks in one bid in a lot category in which the bidder received a provisional winning bid at the start of the round must be at least as high as the number of provisionally awarded blocks. If the round price is not higher than the price of the provisional winning bids, then the number of blocks in a lot category must always be higher than the number of provisionally assigned blocks.
  - iii Taking into account all new bids placed and winning bids not yet replaced, a bidder may specify only as many blocks as the bidder may acquire according to the spectrum caps in each lot category or in total across multiple categories—also noting that, in stage 2, the amount of spectrum acquired in stage 1 is also counted.
  - iv Bids must not lead to an activity that exceeds a bidder's bidding eligibility.
  - v The values of the bids (that is, the total of the round prices for blocks in new bids as well as retained provisional winning bids) must not exceed the bidding limit as determined by the bank guarantee provided by the bidder. In stage 2, the value of the blocks acquired in stage 1 is taken into account.

An example of the application of these criteria is provided in appendix A.1.

To further clarify this point: Implicit in rule 4.6.4 (i) is the fact that all of a bidder's bids in a lot category must be submitted at the same price.

#### 4.7 **Determination of provisional winning bids**

- 4.7.1 After the completion of a bidding round, the auctioneer determines the provisional winning bids for each lot category. In doing so, the auctioneer proceeds as follows for each lot category within the stage for which new bids have been submitted:
- i First of all, all bidders who in that bidding round submitted bids for blocks in that category are randomly sorted.
  - ii This order is then used to enter the bids submitted by the bidders into a waiting list.
  - iii Following this, all provisional winning bids not yet replaced are entered into the waiting list in their original order.
  - iv Utilising the resulting order, and in consideration of the restrictions applicable from the joint spectrum cap, the bids in the waiting list are then defined as provisional winning bids, as long as blocks are available in the category and the entire list has not yet been processed in its entirety.
  - v In applying the joint spectrum cap, the existing provisional awards to the respective bidders are taken into account in the lot categories already completed as well as the provisional winning bids from the preceding round in the categories not as yet completed.
- 4.7.2 In lot categories in which no new bids have been placed, any provisional winning bids that were determined in the preceding round remain unchanged.
- 4.7.3 The order of bidders is determined separately for each lot category. The order of lot categories for determining the provisional winning bids after each bidding round is also determined at random.

This process is illustrated by example in appendix A.2.

#### 4.8 **Stage end**

- 4.8.1 A stage ends when no new bids are placed or no waiver is exercised in a round.
- 4.8.2 Stage 1 also ends if the joint spectrum cap is in effect and bidders who are subject to this cap submit bids solely for blocks in lot categories Aa to Af for two consecutive rounds, in cases where the bidders who are not subject to the joint spectrum cap hold provisional winning bids for these blocks or these blocks have not been provisionally awarded. The information that is necessary in order to identify bids of this kind is provided (see provisions 0 and 4.9.1).
- 4.8.3 At that point, the provisional winning bids become actual winning bids—that is, the bidders are awarded the blocks in their provisional winning bids at the respective prices for those blocks.

#### 4.9 **Information at the end of bidding rounds**

- 4.9.1 At the end of each bidding round, excepting the last bidding round in a stage, the auctioneer provides each bidder with the following information:
- i The bids submitted by the respective bidder.
  - ii The number of blocks provisionally awarded to the bidder and the price of each block.
  - iii The bidder's bidding eligibility for the next bidding round.
  - iv The waivers still available to the bidder.
  - v The aggregated demand for each lot category, i.e. the total of new bids received for the respective lot category and the unchanged provisional winning bids.
  - vi At stage 1, if the joint spectrum cap applies and bidders not subject to this cap together submit bids for no more than three blocks, bidders are informed firstly that the joint spectrum cap is in effect and secondly of the lot categories Aa to Af for which the placement of new bids by bidders subject to the joint spectrum cap would not prevent the end of the stage as set out in provision 4.8.2.
- 4.9.2 At the end of the last bidding round in each stage, the auctioneer informs each bidder about the number of blocks awarded to the respective bidder in each category and at which price.
- 4.9.3 At the end of the last bidding round in stage 1, the auctioneer also informs each winner of frequency blocks in the 700 MHz band about the period (four to seven working days) in which the bidder must nominate the cadastral municipalities to which the bidder will provide coverage (cf. section 4.3.4 of the Tender Document).

#### **4.10 Nomination of cadastral municipalities**

- 4.10.1 After the end of stage 1, and within a period to be set by the auctioneer, the winners of frequencies in the 700 MHz band must notify the auctioneer of the specific cadastral municipalities to which they intend to provide coverage in fulfilment of their assigned extended coverage obligation.
- 4.10.2 The format to use for this notification is specified by the auctioneer and is announced in the rules of procedure.
- 4.10.3 If a bidder does not nominate the cadastral municipalities to which the bidder intends to provide coverage within the specified period, the auctioneer then specifies a list of cadastral municipalities which the bidder must cover. This selection is made randomly.
- 4.10.4 Both the cadastral municipalities nominated by the bidder and those specified by the auctioneer are binding. Exchanging cadastral municipalities with others is possible only in accordance with the provisions set out in section 4.3.4 of the Tender Document.

### **5 Stage 3:**

#### **5.1 General information**

- 5.1.1 Stage 3 is used for the assignment of specific frequencies to the winners of frequency blocks from the first two stages.
- 5.1.2 The assignment of spectrum is conducted in a sealed bidding procedure with a modified second-price rule, and bidders accordingly submit sealed bids for the assignment options available to them.
- 5.1.3 Bids are submitted using the auction software and must be received within the period of time set for the round by the auctioneer. The submission of bids without EAS is permitted only in exceptional cases (cf. 1.2.2). There are no round extensions in this bidding round.

#### **5.2 Assignment options**

- 5.2.1 After completion of the first two stages, the auctioneer informs all winners about any assignment options that are relevant for them, namely all potential combinations of assignments of specific frequencies across all three bands that ensure the following:
  - i The bandwidth of the assignment corresponds exactly to the amount of spectrum that the respective bidder has won in the course of the first two stages. In calculating the assignment option bandwidth, the lowest block in the 1500 MHz band (B01) is allocated a bandwidth of 0 MHz.
  - ii The frequency assignments to a bidder within a band are contiguous.

- iii No option excludes the assignment of contiguous spectrum to other bidders or the maintenance of any non-assigned blocks as contiguous blocks at the upper or lower end of the respective band.

### 5.3 **Assignment bids**

- 5.3.1 An assignment bid specifies the maximum amount that the bidder is prepared to pay for an assignment option in order to be assigned the spectrum specified in that option.
- 5.3.2 Any amount (as an integer EUR value) can be bid for the individual assignment options. The minimum bid in the assignment stage is EUR 0 for each assignment option. There is no ceiling set for maximum bids.
- 5.3.3 If bidders do not submit an assignment bid for a potential assignment option designated for them, a corresponding bid of EUR 0 is generated automatically for that option. If bidders do not submit an assignment bid before the end of the assignment round, a bid with a bid amount of EUR 0 is generated automatically for each assignment option.

### 5.4 **Determination of winners and prices**

- 5.4.1 After the end of the bidding round, the auctioneer determines, from all bids submitted by bidders and generated automatically by the auction software, the combination of bids in each case that is able to satisfy the following conditions:
  - i Exactly one bid per bidder is considered.
  - ii The assignment of frequency blocks associated with the bids is mutually compatible and spectrum is uniquely assigned.
  - iii The sum of bid amounts is not lower than the sum of each alternative combination of bids that satisfies the first two conditions.
  - iv If only a single combination of assignment bids satisfies the conditions given in (iii), then this is the combination of successful bids.
  - v If multiple combinations of assignment bids meet the conditions given in (iii), then the combination of successful assignment bids is determined at random.
  - vi Individual bidders receive the frequency blocks as specified in their bid within the successful combination of bids and pay the additional price in accordance with the rules below.
- 5.4.2 An additional price required to be paid by the successful bidder is determined for each successful assignment bid. Additional prices are determined collectively for all bidders and must meet the following conditions:
  - i The additional price for each and every successful bid cannot be negative. The additional price for each and every successful bid cannot be higher than the amount bid.

- ii Additional prices are those prices with the lowest total value that satisfy the condition given in rule (i) and ensure that the combination of successful bids at the respective additional prices satisfies the conditions given in rule 5.4.1. Accordingly, additional prices are the lowest prices that successful individual bidders would have had to bid in order to have been successful with their bids.
- iii If only one combination of prices satisfies the conditions given in rules (i) and (ii), then those prices, rounded up to an integer EUR value, are used as the additional prices.
- iv Where multiple groups of prices fulfil these conditions, the combination of additional prices is used that best approximates the combination of opportunity costs as determined for each winner individually, in each case rounded up to an integer EUR value. The opportunity costs determined individually for a bidder constitute the lowest bid in accordance with rule (i) capable of ensuring that the combination of successful bids satisfies the conditions in rule 5.4.1 if all other winners pay their original bid amount.

The algorithm used to determine additional prices is defined in appendix B.

## 5.5 **End of stage 3**

- 5.5.1 Once the auctioneer has determined the successful additional bids and the additional prices to be paid for those bids, bidders are informed about the specific frequency assignments.
- 5.5.2 Individual bidders are also informed about the additional price they have to pay.

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## 6 **Stage 4:**

### 6.1 **General information**

6.1.1 In stage 4, winners of spectrum from the first two stages are offered an opportunity to provide coverage to a number of cadastral municipalities exceeding those required for the fulfilment of the obligations assigned in stage 1, in return for a discount on the price to be paid by these winners.

6.1.2 Assignment of additional extended coverage obligations is conducted as a sealed bidding procedure. Stage 4 consists of a single sealed bidding round.

6.1.3 Before the bidding round starts, the auctioneer provides each bidder with the list of cadastral municipalities yet to receive coverage. These are the cadastral municipalities that were not nominated for the fulfilment of the coverage obligations assigned in the first stage.

6.1.4 The auctioneer also informs each bidder about the price the bidder is to pay after the first three stages. This corresponds to the total of winning bids in the first three stages plus the additional price.

### 6.2 **Bids for additional extended coverage obligations**

A bid to accept additional extended coverage obligations consists of the following specification:

- A number of cadastral municipalities (selectable from the list of cadastral municipalities still requiring coverage) for which the bidder is prepared to provide coverage.
- A price discount for which the bidder will accept the coverage obligation for these communities.

### 6.3 **Bid submission**

6.3.1 Bids are submitted using the auction software and must be received within the period of time set for the round by the auctioneer. The submission of bids without EAS is permitted only in exceptional cases (cf. 1.2.2). There are no round extensions in this bidding round.

6.3.2 Each bidder may submit multiple, mutually exclusive bids (that is, the bidder may overall win only one of these bids). Bids must differ in terms of the number of cadastral municipalities specified in each bid. Accordingly, no two bids may specify the same number of cadastral municipalities. The price discount can be chosen as required (as an integer EUR value) and its upper limit is the price to be paid by the bidder based on the bids submitted in the previous rounds.

## 6.4 **Determination of winners and prices**

- 6.4.1 Bids with a price discount exceeding a maximum price discount specified by the auctioneer for the respective number of cadastral municipalities are not considered further in the procedure used to determine winners.
- 6.4.2 The auctioneer considers all remaining bids to determine the combination of bids that, taken together, specifies the maximum number of cadastral municipalities while also applying the following criteria:
- i The sum of cadastral municipalities must not exceed the number of cadastral municipalities still requiring coverage.
  - ii The sum of the price discounts requested must not exceed the budget as set by the auctioneer.
- 6.4.3 If there are multiple combinations of bids with the same highest overall number of cadastral municipalities, the auctioneer selects the combination with the lowest total price discount. The winner is decided at random if there are multiple combinations of bids with the same highest overall number of cadastral municipalities and the same lowest total price discount. An illustrative example is given in appendix C.
- 6.4.4 The combination of bids thereby determined is the winning combination. The successful bidders receive the price discount that they specified and in return accept the additional obligation to provide coverage to their specified number of cadastral municipalities.

## 6.5 **End of stage 4**

- 6.5.1 Once the auctioneer has determined the successful bids for accepting additional extended coverage obligations, bidders are informed of the number of municipalities for which they must provide coverage and the price discount granted in return for this obligation. The provisions used to select the actual communities for which successful bidders must provide coverage can be found in section 4.3.4 of the Tender Document.

## 7 **End of the auction**

### 7.1 **Information at the end of the auction**

Once the auction is completed, all bidders are provided with the following information:

- The spectrum acquired by each bidder in each category.
- The number of cadastral municipalities for which each bidder must provide coverage.
- The overall price to be paid by each bidder.

## Appendix A: Illustration of the auction procedure in stage 1 and 2

### A.1 Examples of valid bids

For simplicity's sake, we consider stage 2. We assume that three bidders (X, Y and Z) bid for spectrum in the 1500 MHz band. We also assume that each bidder has won two blocks in the 700 MHz band in stage 1, with X and Y winning three blocks each in the 2100 MHz band, and Z (who is subject to a spectrum cap of 130 MHz across all bands) winning the remaining six blocks.

In the first round of stage 2, X and Y may therefore bid on a maximum of six blocks, and Z may bid on a maximum of five.

We assume that each bidder bids on four blocks in the first round, with X and Y provisionally being each awarded four blocks at the round price  $P_1$  at the end of the round. Since all provisional winning bids have been awarded at the round price, the round price for the next bidding round increases to  $P_2$ .

If X wishes to submit a bid in the next round, this bid must comprise exactly four blocks.

We assume that Z bids for two blocks in the next round and that neither of the other two bidders submits a bid. After the round concludes, Z is provisionally awarded two blocks at price  $P_2$ . We also assume that the provisional award of four blocks to Y at price  $P_1$  remains unchanged and that the other blocks remain provisionally awarded to bidder X at price  $P_1$ . Some provisional winning bids have not been awarded at the round price: as a result, a price increase is not required for the next round.

X may now bid for two or more blocks; the round price now exceeds the price at which the bidder receives a provisional winning bid. The same applies to Y, although the rules of activity limit Y to four blocks. Z would have to bid on more than two blocks—but this is prohibited by the rules of activity.

## A.2 Determination of provisional winning bids and round prices

We assume that three bidders (X, Y and Z) have made bids for blocks in the 700 MHz band (lot categories Aa to Af) and in the 2100 MHz band (lot category C) at the round prices of 200 and 100, specifically:

- X bids on Aa and Ab, and eight C blocks.
- Y bids on Ab, Ac, Ad and Af, and six C blocks.
- Z bids on Ad, Ae and Af, and four C blocks.

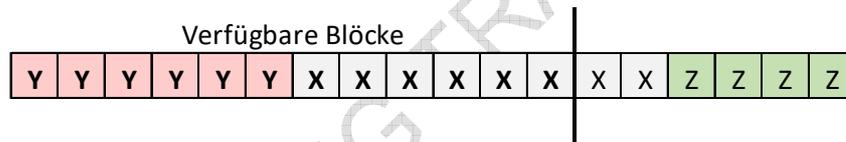
X and Y are subject to the joint spectrum cap of 2x75 MHz across the 700 and 2100 MHz bands.

The order in which the provisional winning bid will be selected in the bands is determined randomly. We assume that the lot categories will be processed in the following order:

C – Ab – Af – Aa – Ac – Ad – Ae.

### Lot category C

The auctioneer randomly determines an order for the bidders, which we assume results in the following order: Y – X – Z. This produces a waiting list as follows:



The entire bid submitted by bidder Y becomes a provisional winning bid. A total of six blocks are then available, which are provisionally awarded to bidder X. Bidder X therefore receives a provisional winning bid for only some of the 2100 MHz spectrum in which X is interested. Bidder Z receives nothing in the 2100 MHz band in this round. Provisionally awarded winning bids are shown in bold type.

### Lot categories Aa to Af

We assume that the order of bidders in the respective categories is as shown in the following table.

Category	Bids from...	Ranking
Ab	X, Y	X–Y
Af	Y, Z	Z–Y
Aa	X	X
Ac	Y	Y
Ad	Y, Z	<b>Y–Z</b>
Ae	Z	Z

In Ab to Ad, provisional awards can be made as indicated by the order of bidders. However, an assignment of the block in Ad to Y would violate the joint spectrum cap: as a result, this block is provisionally awarded to bidder Z.<sup>1</sup>

The following picture therefore emerges for the provisional awards after the first round:<sup>2</sup>

Category	X	Y	Z
Aa	1@200		
Ab	1@200		
Ac		1@200	
Ad			1@200
Ae			1@200
Af			1@200
C	6@100	6@100	

All provisional awards are at the round price: accordingly, the prices in both categories increase according to rule 4.4.2 (i), i.e. to 220 in categories Aa to Af, for example, and to 110 in category B.

### The next round

In the next round, we now assume that bidder Y bids for Ab, Ad and Af, and that bidder Z bids for four blocks in category C. We further assume that provisional

<sup>1</sup> Please note: Application of the joint spectrum cap means that the provisional awards depend on the order of lot categories. If lot category Ac were to be processed last, for example, bidder Y would then receive the provisional award in the category Ad and the block in Ac would not be provisionally awarded as yet.

<sup>2</sup> By way of example: If lot category C were to be processed last, the following situation would result:

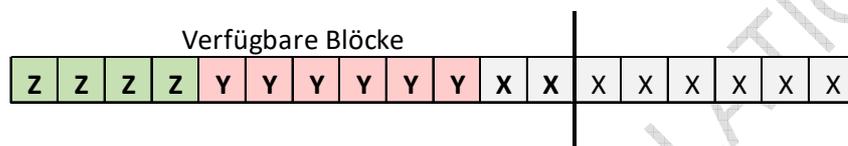
Category	X	Y	Z
Aa	1@200		
Ab	1@200		
Ac		1@200	
Ad		1@200	
Ae			1@200
Af			1@200
C	5@100	6@100	1@100

winning bids in the lot categories in which new bids have been placed are now determined in the following order (provisional winning bids in the other categories remain unchanged):

Ad – Ab – C–Af

In category Ad, a higher bid has in fact been submitted by Y. However, this cannot be provisionally awarded, since an award of this kind would infringe the joint spectrum cap when taking into account the provisional winning bids from the preceding round in the categories Aa and Ac (unchanged), and Ab and C (not yet completed). In category Ab, however, the block can be provisionally awarded to bidder Y, since this constitutes an exchange with X that accordingly results in no infringement of the joint spectrum cap.

In category C, the waiting list is as follows:



All four blocks for which bidder Z has made a bid can be provisionally awarded. For the remaining eight blocks, the earlier provisional awards to Y (six blocks) and X (two blocks) remain in place.

Following the annulment of provisional awards of blocks in the 2100 MHz band to bidder X, Af can now also be awarded to Y.

The situation at the end of the round is as follows:

Category	X	Y	Z
Aa	1@200		
Ab		1@220	
Ac		1@200	
Ad			1@200
Ae			1@200
Af		1@220	
C	2@100	6@100	4@110

A price increase is required in the categories Ab and Af (all provisional awards at the round price), and in category Ad (provisional award prevented by joint spectrum cap).

## Appendix B: Determination of additional prices

The following procedure results in additional prices that satisfy the criteria in rule 5.4.2.

The following definitions apply here:

- $W$ : Number of bidders who have won spectrum in the bands and who therefore participate in stage 3.
- $\beta_i^*$ : Value of the successful assignment bid from bidder  $i$  in the combination of assignment bids determined in compliance with rule 5.4.1
- $v^{-C}$ : Maximum bid value from the winners determined in accordance with rule 5.4.1 if the bids from bidders in  $C \subseteq W$  are set to zero (that is,  $v^{-W} = 0$  and  $v^{-\emptyset} = \sum_{i \in W} \beta_i^*$ )
- $\sigma(C)$ : Opportunity costs of assignment of spectrum in the successful assignment bids of bidders in  $C \subseteq W$ , i.e.  $\sigma(C) = v^{-C} - \sum_{i \notin C} \beta_i^*$ .
- $p_i$  Additional price for bidder  $i$

**Step 1:** Determine a price combination  $p^*$  that minimises revenues as a solution to the optimisation problem below:

$$\min \sum_{i \in W} p_i$$

applying the ancillary conditions:

$$\sum_{i \in C} p_i \geq \sigma(C) \forall C \subseteq W$$

**Step 2:** If  $\sum_{i \in W} p_i^* = \sum_{i \in W} \sigma(\{i\})$ , the solution is unambiguous and the prices that minimise revenues are identical to the individual opportunity costs

**Step 3:** Otherwise, determine the additional prices by solving the following optimisation problem:

$$\min \sum_{i \in W} (p_i - \sigma(\{i\}))^2$$

applying the ancillary conditions

$$\sum_{i \in C} p_i \geq \sigma(C) \forall C \subseteq W$$

$$\sum_{i \in W} p_i = \sum_{i \in W} p_i^*$$

**Step 4:** The prices determined are rounded up to integer EUR values.

## Appendix C: Example illustrating the determination of successful bids in stage 4

We assume that 100 cadastral municipalities remain without coverage for stage 4 and that the following bids have been made:

Bidder	Bid ID	Number	Price discount	Maximum price discount
X	X1	10	1000	1500
	X2	20	2500	3000
	X3	30	4000	4500
	X4	50	8000	7500
Y	Y1	10	1300	1500
	Y2	15	2000	2250
	Y3	25	3500	3750
	Y4	30	5000	4500
	Y5	40	8000	6000
Z	Z1	20	1800	3000
	Z2	25	2000	3750
	Z3	30	5000	4500

We assume that the auctioneer has set a maximum price discount per cadastral municipality of 150. This means that the bids marked in grey are no longer considered.

The following tables show the total number of cadastral municipalities for all possible combinations of remaining bids and the total price discounts as requested

No bid by Z	No bid by Y	Y1	Y2	Y3
No bid by X	0/0	10/1300	15/2000	25/3500
X1	10/1000	20/2300	25/3000	35/4500
X2	20/2500	30/3800	35/4500	45/6000
X3	30/4000	40/5300	45/6000	55/7500

Z1	No bid by Y	Y1	Y2	Y3
No bid by X	20/1800	30/3100	35/3800	45/5300
X1	30/2800	40/4100	45/4800	55/6300
X2	40/4300	50/5600	55/6300	65/7800
X3	50/5800	60/7100	65/7800	75/9300

Z2	No bid by Y	Y1	Y2	Y3
No bid by X	25/2000	35/3300	40/4000	50/5500
X1	35/3000	45/4300	50/5000	60/6500
X2	45/4500	55/5800	60/6500	70/8000
X3	55/6000	65/7300	70/8000	80/9500

We assume that the maximum available budget is 6000, which means that the greyed-out bid combinations are now excluded because of this budget.

With the available budget, additional coverage can be provided to a maximum of 55 additional cadastral municipalities (highlighted in green)—either by the combination of X3 and Z2 or by the combination of X2, Y1 and Z2. The latter combination would result in a lower overall price discount and is therefore selected (cell with red border).

NON BINDING TRANSLATION