Telekom-Control Commission

Mariahilfer Strasse 77-79

A-1060 Vienna, Austria

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Tender Documentation for Frequency Assignments in the 2.6 GHz Band

NON-BINDING TRANSLATION

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1 Legal framework

The Telekom-Control Commission is conducting a procedure to allocate frequencies in the 2.6 GHz band in accordance with Art. 55 of the Austrian Telecommunications Act 2003 (TKG 2003).

1.1 General conditions under Austrian law

This invitation to tender is being carried out on the basis of the Austrian Telecommunications Act 2003 (TKG 2003, Federal Law Gazette I No. 70/2003 as amended by Federal Law Gazette I No. 65/2009). In addition, Austrian procedural rules and regulations are also applicable, especially the General Administrative Procedures Act of 1991 (AVG; Federal Law Gazette No. 51 as amended by Federal Law Gazette I No. 135/2009).

The Telekom-Control Commission's responsibility for allocating frequencies under Art. 55 TKG 2003 is based on Art. 54 Par. 3 No. 2 in conjunction with Art. 117 No. 10 TKG 2003. Under Art. 54 Par. 3 No. 2 TKG 2003, the regulatory authority is responsible for frequency assignment as well as changing and revoking assignments for those frequencies which are subject to a limitation pursuant to Art. 52 Par. 3 TKG 2003 in the Frequency Utilization Plan (limit on the number of assignments).

These limits were defined in the Ordinance of the Austrian Federal Minister of Transport, Innovation and Technology on the use of frequencies (Federal Law Gazette II No. 333/2009).

1.2 Frequency assignment procedure

Under Art. 55 Par. 1 TKG 2003, the regulatory authority is to allocate the frequencies placed under its authority to the applicant who fulfills the general prerequisites under Art. 55 Par. 2 No. 2 TKG 2003 and ensures the most efficient use of the frequencies. This is determined by the amount of the frequency license fee offered.

The frequency assignment procedure is divided into two stages:

1. Once the applications have been received, the regulatory authority will check whether the prerequisites have been met in accordance with Art. 55 Par. 2 No. 2 TKG 2003 (cf. Section 4.3). In accordance with Art. 55 Par. 8 TKG 2003, those applicants who do not fulfill the prerequisites will be excluded from the frequency assignment procedure.

2. The second part of the frequency assignment procedure will be carried out in the form of an auction.

1.3 Collusion

Any and all forms of cooperation among the applicants or their stakeholders, be it direct or indirect, with the intention of influencing the events or results of the auction (collusive behavior) are prohibited. Should applicants cooperate in a collusive manner before or during the auction procedure, they may be excluded from the remainder of the procedure (Art. 55 Par. 9 TKG 2003). The auctioneer shall have the right to take all appropriate measures to prevent collusive behavior.

Likewise, threats to competitors or the public announcement of participation in the auction, or of bids or bidding strategies – also prior to the auction procedure – may result in exclusion from the assignment procedure.

In this context, specific reference is also made to the provisions of general competition law in Austria.

1.4 Annulment of the invitation to tender, discontinuation of the procedure

Under Art. 55 Par. 12 TKG 2003, the regulatory authority is authorized to annul the invitation to tender and discontinue the procedure at any stage for important reasons, especially if

1. the regulatory authority identifies collusive behavior among applicants and/or an efficient, fair and non-discriminatory procedure cannot be conducted;
2. none or only one of the applicants fulfills the requirements under Par. 2;
3. none or only one of the applicants who fulfills the requirements under Par. 2 actually participates in determining the high bid;
4. the procedure results in the applicants requesting less frequency spectrum than the amount to be allocated.

None of these circumstances justify any claim to remuneration, government authority liability claims notwithstanding.

1.5 Frequency assignment

The frequencies will be allocated by the Telekom-Control Commission within one month after publication of the auction results.

1.6 Transfer of frequencies

Under Art. 56 Par. 1 TKG 2003, operators are also permitted to transfer frequency usage rights. However, such transfers require prior approval by the regulatory authority. Transfers are to be understood as the sale of frequency use rights (in part or in full) as well as the temporary transfer of such rights.

1.7 Site sharing under the TKG 2003

Operators of public communications networks are entitled to site sharing with regard to antenna masts and high-voltage power line masts under Art. 8 Par. 2 TKG 2003. Additional usage rights are set forth in the provisions of Art. 8 TKG 2003.

2 Objects of the auction

2.1 Frequency spectrum and terms of use

In the course of the frequency assignment procedure, frequency channels in the 2.6 GHz band which have been transferred to the regulatory authority by the Austrian Federal Minister of Transport, Innovation and Technology pursuant to Art. 51 Par. 3 TKG will be assigned to the applicants.

2.1.1 Available spectrum

(1) Available spectrum: 2500 – 2690 MHz (total bandwidth: 190 MHz).

(2) Pursuant to Art. 52 Par. 3 TKG 2003, the Frequency Utilization Plan (Annex to the Frequency Utilization Ordinance as amended by Federal Law Gazette (BGBl.) II No. 333/2009) stipulates that the number of frequencies which can be assigned in the above-mentioned frequency band is limited. Consequently, pursuant to Art. 54 Par. 3

No. 2 TKG 2003, the regulatory authority is in charge of assigning those frequencies.

2.1.2 Purpose of use

In accordance with Commission Decision 2008/477/EC of 13 June 2008 (see Annex G to this document), the available frequency spectrum is to be used for terrestrial systems which provide electronic communications services.

2.1.3 Fundamental stipulations

(1) In general, the provisions of the Radio Regulations (RR) in the version approved by the World Radio Conference 2007 (WRC-07), and in particular the provisions of the Annex to Commission Decision 2008/477/EC of 13 June 2008 (see Annex G to this document), apply to the use of these frequencies.

(2) The available frequency spectrum is in principle subdivided into:

- 14 basic frequency blocks in the 2500 – 2570 MHz frequency range (referred to below as the "lower band") paired with frequencies in the 2620 – 2690 MHz frequency range (referred to below as the "upper band"). The bandwidth of each basic frequency block is 2 x 5 MHz (5 MHz in both the lower and upper band). In the course of the auction procedure, these paired basic frequency blocks are labeled A1 to A14 and assigned to Category A.

- 10 unpaired basic frequency blocks in the 2570 – 2620 MHz frequency range. The bandwidth of each basic frequency block in this range is 5 MHz. In the course of the auction procedure, these unpaired basic frequency blocks are labeled B1 to B10 and assigned to Category B.

(3) The frequencies will be assigned only for use throughout the entire territory of Austria.

(4) The frequencies will be assigned in such a way that bidders can only acquire contiguous frequency blocks in whole multiples of 2x5 MHz in the paired range and in whole multiples of 5 MHz in the unpaired range.

(5) As specified in lit. A Nos. 2 and 3 of the Annex to Commission Decision 2008/477/EC of 13 June 2008, the following additional conditions apply to the assignment and use of the frequencies:

- In general, the paired frequency blocks (2500 – 2570 MHz range, paired with the 2620 – 2690 MHz range) are available for use in the frequency division duplex (FDD) operation mode. In this mode of operation, the duplex spacing is 120 MHz, with terminal station (uplink) transmission in the lower band (from 2500 MHz upward) and base station (downlink) transmission in the upper band (from 2620 MHz upward).

- The paired frequency blocks (2500 – 2570 MHz range, paired with the 2620 – 2690 MHz range) may also be used in the time division duplex (TDD) operation mode or in other operation modes not regarded as FDD operation under the following conditions:

  a) The frequencies must be assigned in such a way that the paired frequency blocks are used in TDD operation (or in other operation modes not regarded as FDD operation) to the same extent in the upper band (from 2690 MHz downward) and in the lower band (from 2570 MHz downward).

  b) The applicable block edge mask (BEM) requirement according to the Annex to Commission Decision No. 2008/477/EC of 13 June 2008 must be observed.

c) The provisions set forth in Section 2.1.4 with regard to the use of any guard blocks must be observed.

- In general, the unpaired frequency blocks (2570 – 2620 MHz range) are available for use in the TDD operation mode (or in other operation modes not regarded as FDD operation).

2.1.4 Guard blocks

(1) In cases where neighboring frequency blocks are used in different operation modes (one in TDD operation [or in other operation modes not regarded as FDD operation] and one in FDD operation), or where neighboring frequency blocks are used in unsynchronized TDD operation, it is generally necessary to provide for a guard block with a bandwidth of 5 MHz, especially in order to protect networks operating in FDD mode. In principle, any use of those 5 MHz guard blocks will increase the risk of radio interference.

(2) Guard blocks are assigned in order to enhance frequency efficiency. If guard blocks are used, then it is generally necessary to comply with the parameters of the restricted block edge mask (BEM) requirement in accordance with the Annex to Commission Decision 2008/477/EC of 13 June 2008 for neighboring frequency blocks in which different operation modes are used (cf. Recital 8 of Commission Decision 2008/477/EC of 13 June 2008).

(3) Possible restrictions with regard to the usability of 5 MHz guard blocks rest with that frequency assignment holder whose operation mode requires the use of the restricted block edge masks (BEMs) in accordance with the Annex to Commission Decision 2008/477/EC of 13 June 2008.

(4) Agreements between any frequency assignment holders who use neighboring frequency blocks in different operation modes with regard to changes in the parameters of the restricted block edge mask (BEM) mentioned in Paragraph (2) above for the purpose of improving the usability of any assigned 5 MHz guard blocks are permitted and recommended in the interest of optimizing the use of frequencies.

2.1.5 Frequency use near national borders

(1) Austria's neighboring countries will handle the provision of spectrum for electronic communications services in the 2500 – 2690 MHz frequency band in different ways. Given the lack of international procedures at the present time, it will only be possible to specify the conditions for the use of this frequency band in the vicinity of Austria's borders and thus also the usage possibilities in those areas at a later point in time. In particular, it can be expected that the frequencies will be subject to different frameworks for coordination in the vicinity of borders. Restrictions may vary from region to region in terms of frequencies, volumes and technologies, depending on whether two or more countries are to be involved in coordination and on which of the various technologies are used near the borders in each case. The coordination distances may also depend on the technologies used.

(2) In general, it can be assumed that in the worst case, a maximum field strength limit of 21 dBµV/m at the border with reference to a bandwidth of 5 MHz and 10% of the time, 50% of antenna locations and an antenna height of 3 m (based on the calculation method defined in the most recent version of Recommendation ITU-R P.1546) will be sufficient as a trigger value in order to avoid mutual harmful interference between terrestrial systems providing electronic communications services if they use the same frequencies.

(3) If possible, the limit indicated under (2) may be amended based on any coordination

procedures carried out by the Telecommunications Authority in accordance with potential future requirements as defined by the relevant European bodies and/or in accordance with bilateral or multilateral agreements with the neighboring telecommunications authorities concerned.

(4) Agreements between frequency assignment holders in Austria and their counterparts in neighboring countries with regard to individual changes in the maximum field strength and power density limits defined by the relevant Telecommunications Authorities for the area around borders are permissible but require the consent of the Telecommunication Authorities concerned.

2.1.6 Potential usage restrictions due to radio applications in adjacent frequency bands

In order to protect radio applications in the frequency bands below 2500 MHz and above 2690 MHz, the Telecommunications Authority may order specific adaptations to the terms and conditions of use for frequencies, frequency blocks or regions.

2.1.7 Other international bases for frequency planning and use

(1) The documents below published by European Conference of Postal and Telecommunications Administrations (CEPT) are to be regarded as fundamental, non-binding information for frequency planning and use in the 2500 – 2690 MHz band:

- ECC Decision ECC/DEC/(05)05
- ECC Report 45
- ECC Report 119
- CEPT Report 19

These documents can be found on the European Communications Office's web site at http://www.erodocdb.dk/.

(2) The relevant ETSI standards are available at http://www.etsi.org.

(3) The relevant ITU recommendations can be found at http://www.itu.int.

2.1.8 Protection of Direction Finders

In order to protect the stationary direction finders of the Telecommunications Authorities, the maximum field strength caused by any radio transmitter at the locations of the stationary direction finders must not exceed the limit of 105 dBµV/m (measured at each system-specific bandwidth).

The locations of the relevant direction finders are listed in Annex F.

2.2 Objects of the auction

The diagram below shows the 2500 – 2690 MHz frequency band with the basic frequency blocks (referred to as "frequency blocks") A1 to A14 and B1 to B10.

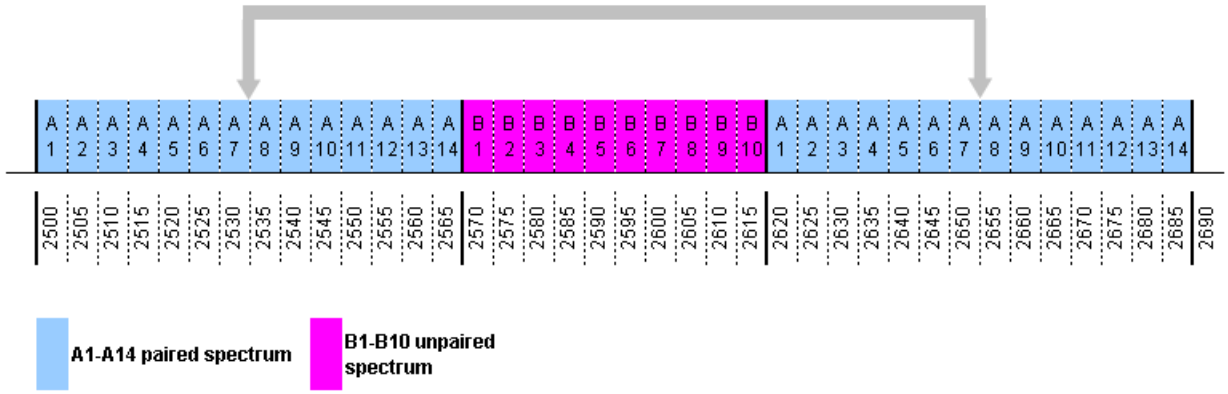

Figure 1: Frequency blocks in the 2500 – 2690 MHz band

The table below shows the individual frequency blocks and the corresponding frequency ranges. In this context, it is also necessary to refer to the provisions in Section 2.1.4 (Guard blocks), which may create usage restrictions, especially for the Frequency B10 and the lowest frequency block (i.e., the frequency block with the lowest frequency) of multiple related frequency blocks in Category B. The frequency block B10 (2615 – 2620 MHz) will not be auctioned off explicitly, but awarded to the bidder who receives frequency block B9.

Category	Frequencies	Package designation
A (paired frequencies)	2500 – 2505 MHz, paired with 2620 – 2625 MHz	A1
	2505 – 2510 MHz, paired with 2625 – 2630 MHz	A2
	2510 – 2515 MHz, paired with 2630 – 2635 MHz	A3
	2515 – 2520 MHz, paired with 2635 – 2640 MHz	A4
	2520 – 2525 MHz, paired with 2640 – 2645 MHz	A5
	2525 – 2530 MHz, paired with 2645 – 2650 MHz	A6
	2530 – 2535 MHz, paired with 2650 – 2655 MHz	A7
	2535 – 2540 MHz, paired with 2655 – 2660 MHz	A8
	2540 – 2545 MHz, paired with 2660 – 2665 MHz	A9
	2545 – 2550 MHz, paired with 2665 – 2670 MHz	A10
	2550 – 2555 MHz, paired with 2670 – 2675 MHz	A11
	2555 – 2560 MHz, paired with 2675 – 2680 MHz	A12
	2560 – 2565 MHz, paired with 2680 – 2685 MHz	A13
	2565 – 2570 MHz, paired with 2685 – 2690 MHz	A14
B (unpaired frequencies)	2570 – 2575 MHz	B1
	2575 – 2580 MHz	B2
	2580 – 2585 MHz	B3
	2585 – 2590 MHz	B4
	2590 – 2595 MHz	B5
	2595 – 2600 MHz	B6
	2600 – 2605 MHz	B7
	2605 – 2610 MHz	B8
	2610 – 2615 MHz	B9
	2615 – 2620 MHz (not to be auctioned off separately; see explanations in Section 2.2)	B10

Table 1: Overview of frequency packages to be auctioned off

2.3 Duration of use

Under Art. 54 Par. 11 TKG 2003, frequencies can only be allocated for a limited period of time.

These frequencies will be allocated to operators until December 31, 2026.

2.4 Usage and coverage requirements

2.4.1 Minimum coverage

Each frequency assignment holder will be required to ensure a coverage level of at least 25% for the spectrum allocated in this procedure by December 31, 2013. The "level of coverage" (or "coverage level") is defined as the percentage of the resident population covered in relation to the total resident population.

In the areas covered, a bearer service must be offered with a data transmission rate of at least 1 MBit/s on the downlink and at least 256 kBit/s on the uplink.

2.4.2 Verification and review of coverage levels

The calculation of coverage areas will be based on simulation calculations to be performed by the frequency assignment holder using recognized simulation tools. For this purpose, the base stations in operation as of the deadline as well as their technical parameters will be taken as the basis for these calculations. Capacity utilization levels for radio communication cells and quality parameters which are realistic and based on real measurement data are to be used as input parameters for the simulation calculations. The simulation calculations are to focus on coverage outside of buildings using standard handsets available on the consumer market.

The raster cells according to the "ArcAustria Microraster (125m)" in its most recent version or comparable geodata are to be used as population units (i.e., the smallest areas covered or not covered). A raster cell is considered to be covered if the entire cell falls within the coverage area indicated.

The resident population covered in Austria is to be calculated by adding up the populations of all raster cells covered. The resident population covered – expressed as a percentage of the total population of Austria – will be the resulting level of coverage. The illustration below provides an example of how to calculate the resident population covered.

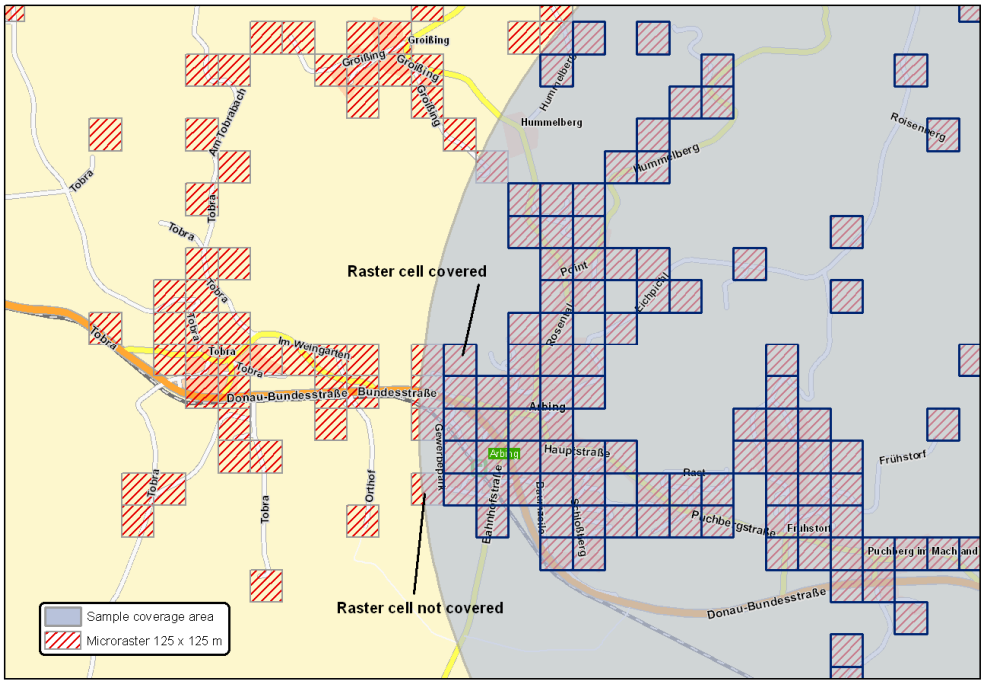

Figure 2: Example of raster cells covered and not covered

In order to verify coverage levels, frequency assignment holders are to submit the following documentation in electronic form to the Telekom-Control Commission by February 28, 2014:

- A list of all base station locations including the relevant geocoded data (GIS format, vector graphics) and an indication of the frequency blocks used in each cell;
- Traffic figures and capacity utilization of cells;
- Other essential input parameters for simulation calculations;
- A map of Austria with base station locations and covered areas (GIS format, vector

graphics);

- A list of raster cells covered and the coverage level calculated on that basis.

All information is to be provided using the cutoff date December 31, 2013.

The Telekom-Control Commission may take measurements to verify coverage levels at any time. The costs of this verification process are to be borne by the frequency assignment holder.

2.4.3 Penalty in case of non-fulfillment of coverage requirements

Frequency assignment holders who fail to roll out their networks will be charged a penalty in the amount of EUR 25 million. This amount is based on a coverage level of 0%. Should an operator fall short of the required coverage level, the penalty will be reduced in proportion to the coverage level actually attained.

> Example: If the operator falls short of the required coverage level by 10% as of the deadline, the penalty will be 10% of EUR 25 million (EUR 2.5 million).

This penalty will be due annually from December 31, 2013 onward until the frequency assignment holder has reached the required coverage level. The penalty will also be charged in cases where a frequency assignment holder falls below a previously attained coverage level.

2.4.4 Penalty for early return of frequencies

With regard to frequency administration, the Telecommunications Act 2003 stipulates the objective of ensuring the most efficient possible use of frequencies. Accordingly, Art. 1 Par. 2 No. 2 lit. d TKG 2003 stipulates that regulatory measures are to ensure the efficient use and administration of frequencies. Art. 55 TKG 2003 also reflects this fundamental objective by stipulating that frequencies are to be allocated to the applicant who ensures the most efficient use of those frequencies. Finally, it is also necessary to refer to Art. 54 Par. 12 TKG 2003, which states that a frequency license may be revoked if the licensed frequency is not used for the intended purpose within six months of licensing or if usage is interrupted for more than six months.

The provisions cited above thus clearly demonstrate that one objective of the TKG 2003 is to prevent the non-use of allocated frequencies, as the frequencies would be removed from the market in such a case. In order to ensure that these objectives of the TKG 2003 are fulfilled, the regulatory authority has made arrangements for cases in which an assignment holder fails to use allocated frequencies and returns such frequencies to the regulatory authority. The purpose of these regulations is to provide assignment holders with an incentive to return frequencies early so that they can be made available to the market once again in such cases.

If frequencies are returned to the regulatory authority before the coverage measurement date, a penalty will be imposed on the basis of the time at which the frequencies are returned.

Time	**Penalty**
Return by December 31, 2011	EUR 200,000
Return by December 31, 2012	EUR 10 million
Return by December 30, 2013	EUR 15 million

Table 2: Penalties based on time at which frequencies are returned

> Example: An assignment holder who returns frequencies in June 2012 will be charged a penalty in the amount of EUR 10 million.

3 Auction design: Fundamentals

3.1 General

The auction procedure will be carried out in the form of a combinatorial clock auction. This procedure consists of two stages (separate auctions), that is, a principal stage to determine the number of abstract frequency blocks from the paired and unpaired spectrum to be allocated to the winning bidders, and an assignment stage in which the specific frequency blocks are assigned.

The principal stage will consist of a number of open rounds of bidding (clock stage) in which each bidder can submit a combinatorial package bid for abstract frequency blocks. In their bids, the bidders will indicate the desired number of abstract frequency packages they would like to acquire at the current prices in each round. Once the clock stage has been completed, the bidders may submit supplementary package bids for (other) combinations of abstract frequency blocks in the course of a sealed-bid stage. The combination of winning bids which maximizes the auction revenues will then be determined algorithmically from all bids submitted during the principal stage; a maximum of one bid from each bidder (from all bids submitted during the clock stage and the sealed-bid stage) will be included in the winning combination.

The winning bidders will be those whose bids are included in the successful combination which maximizes the revenues from the auction. The winning bidders will receive the number of abstract frequency blocks indicated in their successful bids in each category at the "base prices". Base prices will be determined on the basis of a modified second price rule and are the lowest prices the winning bidders (together) would have had to offer in order to still be successful (minimum core prices). Moreover, the base price of each successful bid must be at least as high as the total of minimum bids for the abstract frequency blocks in each case.

The second stage of the auction (assignment stage) will consist of a single sealed bid round of bidding in which bidders can submit package bids on various combinations of actual contiguous frequency blocks which are compatible with the number of abstract frequency blocks won by the successful bidders in the principal stage. The winning bidders will receive the actual frequency blocks as indicated in their successful bids in each category at the respective "top-up" prices. Top-up prices will also be determined on the basis of a modified second price rule.

The total price to be paid is calculated as the sum of the prices from the two stages of the auction.

The maximum amount of spectrum which a bidder can acquire is limited by the bidding eligibility requested by that bidder on the one hand, and by the spectrum limitations defined by the Telekom-Control Commission on the other (cf. Sections 3.3 and 3.4).

The auctioneer will be the Telekom-Control Commission or a member appointed by the Commission. The Telekom-Control Commission may also appoint employees of RTR's Telecommunications Division to carry out the auction.

A legally non-binding introduction to the combinatorial clock auction procedure can be found in Annex H.

In accordance with Art. 55 Par. 9 (last sentence) TKG 2003, the detailed rules governing the auction procedure will be delivered to the applicants participating in the auction at least two weeks before the start of the auction. The Telekom-Control Commission plans to deliver the rules of procedure to the applicants as soon as possible after the tender submission deadline.

3.2 Starting prices in the principal stage

Under Art. 55 Par. 4 TKG 2003, the tender documentation can also include information on the minimum frequency license fee to be offered.

This information is to be based on the amount of the frequency assignment fees which are likely to be charged for the frequencies allocated. The Telecommunications Fees Ordinance (Federal Law Gazette II No. 29/1998 as last amended by Federal Law Gazette II No. 82/2008) defines the frequency assignment fees for mobile communications systems as follows: The assignment fee amount to EUR 998.69 for every multiple of 25 kHz (or part thereof) of spectrum allocated for telephone networks under Art. 3 No. 18 TKG 2003 for the provision of public mobile communications services, and for the assignment of frequencies for radio communications networks under lit. A no. IIIb by the Telecommunications Authority (Art. 54 Par. 3 No. 3 TKG 2003) for deployment throughout Austria.

On the basis of these fees, the minimum bid (starting price) for each frequency block is shown in the table below.

Category	Starting price in EUR
A (paired frequencies)	400,000
B (unpaired frequencies)	200,000

Table 3: Starting price amount per frequency block

The minimum bid in the assignment stage is EUR 0.00.

3.3 Bidding eligibility and eligibility points

The frequency packages are assigned a certain number of bidding points which reflect the relative value of the frequencies. A participant's bidding eligibility determines the maximum number of frequency packages for which that participant can submit a package bid in the principal stage. Bidders will be allowed to be active on any combination of abstract frequency blocks as long as the total bidding points of the frequency blocks in a package bid do not exceed the bidder's current bidding eligibility. A package bid on N paired frequency blocks is assigned 2*N bidding points, that is, the bidder is active on 2*N bidding points. A package bid on M unpaired frequency blocks is valued at M-1 bidding points, that is, a bidder who submits a bid for M unpaired frequency blocks is active on M-1 bidding points (see explanations on guard blocks in Section 2.1.4). A bidder who submits a bid for N paired and M unpaired frequency blocks is active on (2*N)+(M–1) bidding points.

> Example: A bidder who submits a bid for 4 paired and 3 unpaired frequency blocks is active on 4 * 2 + 3 – 1 = 10 bidding points.

The bidding eligibility for the first round of the principal stage will be based on the information provided in each bidder's application and must be secured by a bank guarantee (see Section 4.3.5). After the first round of the principal stage, each bidder's eligibility will be based on the rules of activity.

3.4 Spectrum limitations

In order to ensure a competitive market structure and to prevent monopolization of the spectrum, the following spectrum limitations will apply:

Bidders who already hold frequency assignments in the

- 880 – 915 MHz
- 925 – 960 MHz
- 1710 – 1785 MHz
- 1805 – 1880 MHz

may:

- acquire a maximum of six frequency blocks in Category A (paired frequency blocks) and
- apply for a maximum of 18 bidding eligibility points.

In the determination of a bidder's frequency assignments, any assignments to affiliated companies will also be taken into account (see Section 4.2.2).

All other bidders may:

- acquire a maximum of eight frequency blocks in Category A (paired frequency blocks) and
- apply for a maximum of 18 bidding eligibility points.

For frequency blocks in Category B, there are no spectrum limitations; in this category, package bids for less than three frequency blocks are not permitted. No such lower limit is defined for Category A. As a result, bidders may apply for a bidding eligibility of 2 to 18 points.

4 Assignment procedure

4.1 Steps in the assignment procedure

As mentioned in Section 1.1, the frequency assignment procedure is divided into two stages. In the first stage, the regulatory authority will check whether the applications fulfill the criteria stipulated in Art. 55 Par. 2 No. 2 TKG 2003 (in accordance with Art. 55 Par. 1 and Par. 2 No. 2 TKG 2003). Those applicants who do not fulfill the prerequisites pursuant to Art. 55 Par. 2 No. 2 TKG 2003 will be excluded from the frequency assignment procedure in accordance with Art. 55 Par. 8 TKG 2003.

4.1.1 Assignment procedure schedule

The table below contains the most important dates in the assignment procedure.

Activity	**Date**
Publication of invitation to tender	April 21, 2010
Questions to be submitted by:	May 17, 2010, 12:00 noon local time (CET)
Questions to be answered by the TKK	Planned for June 1, 2010
End of tender submission period	July 12, 2010, 12:00 noon local time (CET)
Admission to the auction	Planned for August 2010
Auction procedure	Planned for September 2010
Frequency assignment	Within one month after the end of the auction

Table 4: Assignment procedure schedule

4.2 Requirements in the assignment procedure

4.2.1 Legal personality of applicant

The applicant must be a physical person or legal entity who/which is fully capable of entering into legally binding contracts as specified in Art. 9 of the Austrian General Administrative Procedures Act (AVG).

4.2.2 Affiliated companies

In this invitation to tender, only one applicant from companies that are affiliated with one another under Art. 228 in conjunction with Art. 244 HGB or Art. 15 AktG and Art. 115 GmbHG, or in the form described under Art. 7 KartG 2005 (directly or indirectly) will be allowed to participate in the frequency auction. The same applies when applicants are affiliated with each other in another way which could lead to one applicant directly or indirectly exercising influence over another applicant in a manner which has a substantial effect on competition (e.g., by syndicate agreements, etc.). For the purposes of this invitation to tender, influence which has a substantial effect on competition is considered to be present where a significant stake as specified in Articles 91 et seq. BörseG is held, with the exception of purely financial stakes.

When assessing individual cases, the regulatory authority will also take into consideration whether the applicants are currently in the process of a demerger. In such cases, previous decisions made by competition authorities (at both the national and EU levels) are to be taken into special consideration (e.g., restrictions imposed in permits regarding the execution of a demerger, etc.).

Should two or more companies which are affiliated in the manner described above apply for frequencies, the applicant who submitted the application first will be admitted to the frequency auction.

4.2.3 Changes in ownership structure

Throughout this procedure, changes in the person submitting an application, or any and all substantial changes (direct or indirect) in the stakes held in a company submitting an application will require the permission of the regulatory authority. Permission will be granted in cases where the company's full competitive independence from other applicants is also maintained after the changes are effected. In any case, a change exceeding the percentage limits set forth in Art. 91 et seq. BörseG or the initial acquisition of a significant stake as defined in Art. 91 et seq. BörseG, with the exception of purely financial stakes, will be considered a substantial change. Should an applicant effect such a change in the person, company or the ownership of the company applying to participate in the auction, the applicant in question will be excluded from the assignment procedure.

All applicants are required to inform the Telekom-Control Commission of any proceedings of authorities for monopoly/cartel affairs (both pending and to be expected) pertaining to their ownership structure and to include in their applications any and all decisions made in this regard. All changes in ownership structure carried out in order to fulfill such obligations are to be reported to the Telekom-Control Commission immediately, even after submission of the application.

Art. 56 Par. 2 TKG 2003 shall apply with regard to changes in the ownership structure of companies which are allocated frequency usage rights in a procedure under Art. 55 TKG 2003.

4.2.4 Rights to application documents

In submitting an application for frequency assignment, the applicant irrevocably agrees to allow the Telekom-Control Commission to use – without restriction – all information and documents received in connection with the application for the purposes of the assignment procedure, for the review of compliance with the official assignment decision, and for all procedures otherwise associated with the frequency assignment.

4.2.5 Clarifications

For the purpose of preparing their applications, interested parties who have paid the fee of EUR 200.00 for the provision of tender documentation will be allowed to submit questions to the Telekom-Control Commission regarding the tender documentation during a question-and-answer period. The Telekom-Control Commission reserves the right to decide whether questions are answered in each individual case.

Questions to the Telekom-Control Commission can be sent – by e-mail only – to tkfreq@rtr.at with the subject " F 4/08 - FRAGE 2,6 GHz-Vergabe " until May 17, 2010, at 12:00 noon local time (date and time of receipt). The regulatory authority plans to answer questions in writing by June 1, 2010 (date of dispatch).

The questions submitted to the Telekom-Control Commission will be collected and forwarded, along with the corresponding answers, to all interested parties listed above without disclosure of the names of the parties who posed the questions.

If the Telekom-Control Commission considers it necessary or appropriate to pose questions to applicants, the applicant irrevocably agrees in submitting the application to reply to such inquiries and submit the requested additional information within the appropriate period specified in each case by the Telekom-Control Commission.

4.2.6 Inquiries and consultants

In the course of this tender procedure, the Telekom-Control Commission may call in consultants in the course of its inquiries and investigations (Art. 55 Par. 11 TKG 2003). This also applies (but in no way exclusively) to inquiries related to the clarification issues mentioned in Section 4.2.5, inquiries related to the review of eligibility criteria under Art. 55 Par. 2 No. 2 TKG 2003, and support in the course of the auction procedure.

4.2.7 Inspection of records

Upon request, all applicants will be allowed to inspect records to the same extent. The right to inspect records does not include those components of records which, if inspected, would cause damage to justified interest of a party or third parties, or endanger the authority's performance of its duties, or compromise the purpose of the procedure. No separate appeals against the refusal to allow an inspection of records will be permitted (Art. 17 AVG).

The Telekom-Control Commission acknowledges the fact that in the course of this procedure a large amount of information will be provided and that the inspection of these records may damage the legitimate interests of parties to the procedure or those of third parties. In addition, the procedure may involve information which, if viewed by one of the parties, could endanger the fulfillment of the regulatory authority's duties or frustrate the purpose of the procedure. The Telekom-Control Commission thus reserves the right to deny parties the right to inspect such parts of the records.

In particular, the Telekom-Control Commission assumes that, with regard to the possibility of collusive behavior, the announcement of the applicants' names prior to the completion of the auction may compromise the purpose of the procedure. Therefore, the Telekom-Control Commission will not publish the names of the applicants, and this information will not be made available in the inspection of records prior to the completion of the auction. Once the auction has ended, all information will be made available to the applicants, but with due attention to the protection of company and trade secrets.

In order to ensure the confidentiality of sensitive information provided by the applicants, the applicants are to label all data regarded as company or trade secrets accordingly in their applications. In addition, a copy of the application is to be submitted in which the company and trade secrets have been omitted; in this version of the application, it must be made obvious that those elements have been removed. The Telekom-Control Commission furthermore reserves the right to deny parties the right to inspect other records pursuant to Art. 17 Par. 3 AVG. Likewise, the Telekom-Control Commission reserves the right to allow the inspection of records which are labeled by the applicants as company or trade secrets if damage to the legitimate interests of a party or third party is not expected to arise from allowing such an inspection.

Art. 125 TKG 2003 as well as Austrian Administrative Court Ruling 2002/03/0273 of February 25, 2004 shall be applied with regard to company or trade secrets.

The applicants undertake to use any information on other applicants obtained in the course of this procedure exclusively for the purposes of the procedure and not to announce such information publicly.

4.2.8 Publication

The Telekom-Control Commission intends to announce the results of the auction on the regulatory authority's web site.

4.3 Information to be included in the application

Under Art. 55 Par. 1 TKG 2003, the regulatory authority is to allocate the frequencies placed under its authority to applicants who fulfill the general prerequisites under Par. 2 No. 2 leg. cit.

In order to determine whether applicants fulfill the prerequisites indicated in Art. 55 Par. 2 No. 2 TKG, the Commission will require information on the applicant's organizational structure. This information includes precise indications as to the applicant's legal and financial situation as well as the applicant's ownership structure.

4.3.1 Information on the applicant

Wherever applicable, the application documents are to contain the following information on the applicant:

a) Name (company), place of incorporation (address), date and place of establishment including a current excerpt from the Commercial Register (or from a comparable register maintained in the applicant's country of incorporation and equivalent to the Austrian Commercial Register);

b) Type and number of capital shares, nominal value of capital shares as well as voting and dividend rights associated with any and all types of shares;

c) Subscribed capital per type of capital share, precise information on the stakeholders at the time the application is submitted, as well as any and all foreseeable changes in this

respect;

d) Number, value and rights (including conversion rights) of any and all options, certificates of entitlement, preferred stock or debt capital as well as any other securities issued by the applicant;

e) The company's articles of incorporation in their current version;

f) A description of the applicant's business activities;

g) The name of the applicant's authorized recipient, who must fulfill the requirements set forth in Art. 9 of the Austrian Service of Documents Act (ZustG), along with his/her telephone and fax numbers as well as postal and e-mail addresses (cf. also Section 4.3.8);

h) Any and all other information which, if mentioned or omitted, could substantially influence the Telekom-Control Commission's decision in the review to be carried out prior to the frequency assignment procedure in compliance with Art. 55 Par. 2 No. 2 TKG 2003.

Should the information indicated above not be provided in its entirety, the Telekom-Control Commission will request the missing information as it deems necessary for the purpose of making a decision. In this context, the Telekom-Control Commission may also request additional information as necessary for this purpose.

4.3.2 Information on the applicant's stakeholders, shareholders, etc.

For each stakeholder, shareholder, bearer of options, of certificates of entitlement, of preferred stock, of debt capital or of other securities issued by the applicant, the information indicated under Items a) to d) in Section 4.3.1 lit. a) to d) (with the required information under Item d) referring to the respective company instead of the applicant) as well as f) and h) is to be submitted wherever applicable.

In addition, the following is to be indicated/described for each of these parties:

i) Relationship to the applicant (e.g., number and type of capital shares or securities held), syndicate / consortium agreements;

j) Group parent company/companies, superordinate group company/companies (where applicable).

In cases where capital shares or other securities issued by the applicant are held for a third party by persons acting as trustees or in other similar functions, these circumstances are to be noted in the application, and the aforementioned details are to be provided for the actual economic owner.

4.3.3 Additional description of ownership structure for superordinate companies holding substantial interests

In the event that multiple superordinate stakeholders (e.g., shareholders, bearers of options, of certificates of entitlement, of preferred stock, of debt capital or of other securities issued by the applicant) hold a consolidated interest of 25% or more in the applicant (ultimate owner principle) without holding a direct stake in the applicant, these interests must be described in the application.

In this context, the information required in Section 4.3.2 of this document is to be provided on each company which holds a consolidated interest of at least 25% in the applicant, regardless of the superordinate level at which this interest is held.

Therefore, the information required in Section 4.3.2 of this document must also be provided for companies which hold a stake of 25% or more in the applicant not through a specific investment in *one* of the companies superordinate to the applicant but through consolidation of multiple superordinate interests in multiple companies superordinate to the applicant.

In cases where capital shares or other securities issued by the applicant which correspond to an interest of 25% or more – even if these are held indirectly through superordinate interests – are held for third parties by persons acting as trustees or in another similar function, these circumstances are to be noted in the application, and the aforementioned details are to be provided on the actual economic owner.

The information required in this section can be illustrated using tables or diagrams which show direct and indirect interests as well as the type of control over the applicant (especially the type of interest held). In depicting such interests, applicants are to ensure that these depictions enable the Telekom-Control Commission to identify any economic interrelationships through which one applicant may exert substantial competitive influence on another applicant (or other applicants) directly or indirectly.

Should the information indicated above not be provided in its entirety, the Telekom-Control Commission will request the missing information as it deems necessary for the purpose of making a decision. In this context, the Telekom-Control Commission may also request additional information as necessary for this purpose.

4.3.4 Information on consortia

In the case of consortia or joint ventures, the following additional information will be necessary:

The type of relationship among the members as well as detailed information on:

- Syndicate agreements, consortium agreements;
- Joint venture agreements;
- Declarations of intent;
- Stakeholder agreements.

In addition, the information indicated in Section 4.3.2 is to be included in the application for all consortium members.

Should the information indicated above not be provided in its entirety, the Telekom-Control

Commission will request the missing information as it deems necessary for the purpose of making a decision. In this context, the Telekom-Control Commission may also request additional information as necessary for this purpose.

4.3.5 Bank guarantee

All applicants are to secure the requested bidding eligibility by means of an abstract bank guarantee, payable at first demand, from a bank in good credit standing (see Annex B).

The required amount of the bank guarantee is to be calculated by multiplying the requested number of eligibility points by EUR 1,000,000.00. If the requested bidding eligibility is not completely backed by the bank guarantee, the bidding eligibility will be reduced to the number of points actually secured by the bank guarantee.

At the least, an original of the bank guarantee is to be enclosed with the application.

In addition, the following rules apply to the amount of the bank guarantee securing the bids:

Bank guarantee	**Maximum bids in the principal stage**
Less than EUR 5 million	EUR 10 million
EUR 5 million and higher	EUR 20 million
EUR 10 million and higher	EUR 40 million
EUR 20 million and higher	EUR 80 million
EUR 40 million and higher	Unlimited

Table 5: Maximum bid amounts

It will also be possible to submit additional bank guarantees during the auction. However, each bidder's eligibility will remain unaffected by any additional bank guarantees presented.

For cases in which bank guarantees are presented during the auction, then such guarantees must be submitted by 12:00 noon local time (CET) on the business day preceding the bidding (Monday to Friday) in order to ensure sufficient time for the necessary verification procedures. Additional guarantees must be issued by the same bank which issued the guarantee enclosed with the application.

In this context, it is necessary to note that due to the design of the auction, the sealed-bid stage for supplementary bids may already take place on the second day of the auction. In such a case, it would be necessary to present additional bank guarantees by 12:00 noon on the first day of the auction.

> Example 1: A bidder applies for 18 eligibility points and presents a bank guarantee in the amount of EUR 18 million. The bidder will this be entitled to submit bids in the maximum amount of EUR 40 million.

The bank guarantee's sole purpose provision must be the official assignment of frequencies to the applicant in the course of this tender procedure. The guarantee must name the Federal Government of the Republic of Austria as beneficiary and be valid from September 1, 2010 (at the latest) to at least January 31, 2011. Additional bank guarantees submitted at a later point in time must be valid from the day on which it is presented until at least January 31, 2011.

In the assignment stage, bidders will not be required to secure bids with bank guarantees.

The Telekom-Control Commission reserves the right to require additional bank guarantees or

security without indicating reasons for such requirements.

Once the procedure has been completed, bank guarantees will be returned to those applicants to whom the requested frequencies are not allocated. As for applicants who do acquire frequencies in this procedure, the bank guarantees will be returned once the frequency license fee has been paid in full.

A sample text for a bank guarantee is provided in Annex B.

4.3.6 Information on technical capabilities, quality of services and coverage requirements

Under Art. 55 Par. 2 No. 2 TKG 2003, there must be no reason to believe that the applicant will fail to provide the planned service, especially with regard to service quality and coverage requirements. In addition, the applicant must possess the technical capabilities necessary to provide such services. The information required in the following sections is intended to aid the regulatory authority in reviewing these prerequisites.

Applicants will be required to demonstrate that they fulfill the applicable prerequisites.

In demonstrating such fulfillment, applicants must include the following points:

- Description of planned use of spectrum (services, technologies, data transmission rates, quality, availability);
- Planned coverage levels over the entire validity period of the assignment;
- Number of base stations over the entire validity period of the assignment;
- Capabilities and experience in the planning and operation of radio networks.

4.3.7 Information on financial strength

Applicants will be required to prove that they have the financial resources necessary to build and operate a radio communications network.

In this context, applicants should pay special attention to the fact that their financial strength and stability must also be in line with the amount of the frequency license fee offered.

With regard to financial strength, application documents are to contain the following information:

4.3.7.1 Business plan / balance sheet

Applicants are to submit a business plan for the business area(s) in which the frequencies applied for are to be used, based on their strategy, their overall market assessment as well as their estimates of business operations in the five (5) years after frequency assignment.

The business plan can be structured in any way the applicant chooses. However, the most essential costs and revenues should be clearly visible in the structure used (see Annex C).

4.3.7.2 Financing

Applicants will also be required to provide evidence that they can raise capital in line with the business plan described in the application. For this purpose, the following information is

required:

- Schedule and sources of equity capital, including planned issues of company capital;
- Debt capital: credit lines, available collateral, duration and lenders for all loans in the first four years after frequency assignment.

4.3.8 Authorized recipient

Upon submitting an application, physical persons whose registered primary residence is not in Austria or legal entities which are not incorporated in Austria shall be required to name an authorized recipient as defined in Article 9 of the Austrian Service of Documents Act (*ZustG*; Federal Law Gazette No. 200/1982 as amended by Federal Law Gazette I No. 5/2008; cf. (cf. Section 4.3.1). An unrestricted authorization of the recipient must be signed by official representatives of the company and included with the application documents. In cases where the recipient is changed, a new unrestricted authorization is to be sent to the Telekom-Control Commission without delay.

4.3.9 Declaration of completeness

Properly completed written applications must contain all of the information required in Section 4.3. In addition, a declaration of completeness (Annex E) is to be enclosed with the application to confirm that it contains complete and accurate indications of all information requested in this tender document as well as all information relevant to the Telekom-Control Commission's evaluation of the objective facts.

4.4 Submission of application for frequency assignment

Please send applications to:

Telekom-Control Commission
Mariahilfer Strasse 77-79
A-1060 Vienna
Austria

The complete application for frequency assignment must be received by the Telekom-Control Commission in a sealed envelope or package labeled " F 4/08 – Frequenzzuteilungsantrag 2,6 GHz " by July 12, at 12:00 noon local time. Applications received after the deadline will not be reviewed.

Applications are to be submitted in writing (one original) in German language as well as in electronic format (e.g., CD-ROM, USB stick). However, required enclosures such as annual reports and maps will also be accepted in English.

The amendment or withdrawal of applications after the application deadline will not be permitted (Art. 55 Par. 6 TKG 2003).

4.5 Checklist for application documents

Applicants are asked to structure their applications according to the following checklist:

- Application form;
- Information on organizational structure;

- Information on technical capabilities, quality of services and coverage requirements (see Section 4.3.6);
- Information on financial strength (see Section 4.3.7 and sample in Annex C);
- Bank guarantee (see sample in Annex B);
- Authorization of recipient (see Section 4.3.8 and sample in Annex D);
- Declaration of completeness (see Section 4.3.9 and sample in Annex E).

5 Costs and fees

5.1 Frequency license fee

The successful applicants are to effect payment of the frequency license fee determined in the course of the auction within 10 business days after the frequency assignment decision takes legal effect.

The frequency license fee does not include value-added tax.

In the case of non-payment (including delayed or incomplete payments) of the frequency license fee, the frequency assignment will be rendered void. Notwithstanding the condition mentioned above, the Federal Republic of Austria shall have the right in such cases to draw the bank guarantee or to collect the unpaid portion of the frequency license fee by means of administrative enforcement.

5.2 Spectrum fees

In accordance with Art. 82 Par. 2 TKG 2003, spectrum fees for the use of frequencies are also to be paid by the network operators. These fees are defined in the Telecommunications Fees Ordinance (Federal Law Gazette II No. 29/1998 as last amended by Federal Law Gazette II No. 82/2008). These fees will be prescribed by the Telecommunications Offices when the operation permit is issued.

5.3 Consultancy costs

In the course of the procedure, any and all costs for the services of experts or consultants called in by the Telekom-Control Commission at any point in this procedure, are to be paid on a pro rata basis by those applicants to whom frequencies are allocated (Art. 55 Par. 11 TKG 2003).

These costs will be prescribed in the official frequency assignment decision and are to be paid within 10 days of receipt of the official decision.

A. Antragsformular

Antragsformular im Verfahren betreffend Frequenzzuteilungen im Frequenzbereich 2,6 GHz

Antragsteller

Name

Anschrift

Bietberechtigung

Es wird eine Bietberechtigung im Umfang von _____ (in

Worten_____) Bietpunkten

beantragt.

Besicherung

Die Besicherung in der Höhe von Euro_____ (in Worten

_____) liegt dem Antrag im Original bei.

Datum (firmenmäßige Zeichnung)

B. Muster Bankgarantie

Bankbezeichnung
Adresse

Republik Österreich
c/o Telekom-Control-Kommission
Mariahilfer Straße 77-79
A-1060 Wien

Garantie Nummer ……..

Die Bank XX gibt hiermit der Republik Österreich die nachstehend umschriebene unwiderrufliche Garantieerklärung ab:

Der Bank ist bekannt, dass sich die Firma …….., im Rahmen des derzeit laufenden Ausschreibungsverfahrens um Frequenzzuteilungen im Frequenzbereich 2,6 GHz (F 4/08) bewirbt. Gemäß Kapitel 4.3.5 der Ausschreibungsunterlage vom XX.XX.2010 der Telekom-Control-Kommission muss die Firma ……. zusammen mit ihrem Antrag eine abstrakte Bankgarantie einer Bank mit guter Bonität zur Besicherung der beantragten Bietberechtigung erbringen.

Die Bank XX garantiert hiermit gegenüber der Republik Österreich, ohne Prüfung des zugrundeliegenden Rechtsverhältnisses und unter Verzicht auf jede Einwendung daraus, eine Zahlung bis zu einer Gesamtsumme von

Euro XX
(in Worten XX Euro)

auf Ihre erste schriftliche Aufforderung auf das von Ihnen bezeichnete Bankkonto zu leisten, unter der Bedingung, dass die Zuteilung der Frequenzen nach dieser Ausschreibung an die Firma XX erfolgt ist. Der Eintritt dieser Bedingung gilt als nachgewiesen, wenn Sie uns dies in Ihrer schriftlichen Aufforderung bestätigen.

Diese Garantie kann nicht vor dem XX.XX.2010 in Anspruch genommen werden.

Diese Garantie erlischt automatisch, sobald wir diese Urkunde zurückerhalten haben, spätestens jedoch am XX.XX.2010, selbst bei Nichtrückgabe dieser Urkunde, es sei denn, dass sich von Ihnen mittels Brief (per eingeschriebener Post oder Kurierdienst) spätestens an diesem Tag bei uns eintreffend, in Anspruch genommen wurde.

Ansprüche aus der gegenständlichen Garantie können nur mit ausdrücklicher Zustimmung zugunsten Dritter abgetreten, verpfändet bzw. vinkuliert werden.

Datum (firmenmäßige Zeichnung)

C. Muster Businessplan

	PLAN G&V	2011	2012	2013	2014	2015
		in Tsd EUR	in Tsd EUR	in Tsd EUR	in Tsd EUR	in Tsd EUR
	Dienste					
	Vorleistungen					
	Sonstige					
Erträge	**Gesamt**	**0**	**0**	**0**	**0**	**0**
	Personal eigenes					
	Leasingpersonal und freie Mitarbeiter					
	technischer Aufwand durch Dritte					
	Miete, Leasing von technischem Anlagevermögen					
	Mietleitungsaufwand					
	Vorleistungen					
	Abschreibung auf technisches Anlagevermögen Funknetz					
	Abschreibung auf sonstiges technisches Anlagevermögen					
	sonstige Abschreibung					
	sonstiger Aufwand					
Aufwand	**Gesamt**	**0**	**0**	**0**	**0**	**0**
	Betriebsergebnis	**0**	**0**	**0**	**0**	**0**
	Cash Flow	**0**	**0**	**0**	**0**	**0**
Investitionen	techn. Ausstattung Funknetz					
	sonstige techn. Ausstattung					
	sonstige Investitionen					
	Gesamt	**0**	**0**	**0**	**0**	**0**
Finanzierung	Eigenmittel					
	Fremdmittel verbundene Unternehmen kurzfristig (bis ca. 3 Jahre)					
	Fremdmittel verbundene Unternehmen langfristig					
	Fremdmittel sonstige kurzfristig (bis ca. 3 Jahre)					
	Fremdmittel sonstige langfristig					
	Gesamt	**0**	**0**	**0**	**0**	**0**
Personal	Anzahl Mitarbeiter (in GTK)[1] techn. Personal					
	Anzahl Mitarbeiter (in GTK)[1] sonstiges Personal					
	Leasingpersonal und freie Mitarbeiter					
	Gesamt	**0**	**0**	**0**	**0**	**0**

	PLANBILANZ	2010	2011	2012	2013	2014
		in Tsd EUR	in Tsd EUR	in Tsd EUR	in Tsd EUR	in Tsd EUR
	technisches AV Funknetz					
	sonstiges technisches AV					
	sonstiges AV					
	Anlagevermögen Gesamt	0	0	0	0	0
	Sonstige Aktiva					
Aktiva	**Gesamt**	**0**	**0**	**0**	**0**	**0**
	Eigenkapital					
	Verbindlichkeiten verbundene Unternehmen kurzfristig (bis ca. 3 Jahre)					
	Verbindlichkeiten verbundene Unternehmen langfristig					
	Verbindlichkeiten sonstige kurzfristig (bis ca. 3 Jahre)					
	Verbindlichkeiten sonstige langfristig					
	Sonstige Passiva					
Passiva	**Gesamt**	**0**	**0**	**0**	**0**	**0**

1) **G**anz-**T**ages-**K**räfte (GTK): Umrechnung des teilbeschäftigten Personals auf vollbeschäftigtes:
Eine Teilzeitkraft mit 10 Wochenstunden entspricht 0,25 GTK (wenn die Regelarbeitszeit bei Vollbeschäftigung 40 Wochenstunden beträgt).

D. Muster Zustellvollmacht

Zustellvollmacht

FIRMA XXXX ermächtigt hiermit XXX zur Entgegennahme der gesamten Korrespondenz im Verfahren F4/08 betreffend Frequenzzuteilungen im Frequenzbereich 2,6 GHz.

Kontaktdaten von Frau/Herrn NAME XX XXX:

Straße
PLZ Ort
Telefon +43...
Fax +43....
E-Mail ....@....

Datum (firmenmäßige Zeichnung)

E. Muster Vollständigkeitserklärung

An
Telekom-Control-Kommission
Mariahilfer Straße 77-79
A-1060 Wien
Österreich

Name und Anschrift des Antragstellers

Betrifft Antrag zu F4/08

Der Antragsteller erklärt Folgendes:

Die Informationen und Unterlagen, die gemäß Ausschreibungsunterlage, F 4/08, verlangt werden und die sonst für die Beurteilung des Antrags im Frequenzzuteilungsverfahren gemäß den anzuwendenden Bestimmungen des europäischen Gemeinschaftsrechts und den anzuwendenden österreichischen Rechtsvorschriften, insbesondere des Telekommunikations-gesetzes, erforderlich sind, sind im Antrag vollständig und wahrheitsgemäß enthalten, auch wenn diese in der Ausschreibungsunterlage nicht ausdrücklich verlangt werden.

Insbesondere bestehen hinsichtlich
- der Eigentumsverhältnisse des Antragstellers
- der geplanten Finanzierung
- des Geschäftsplanes

außer den im Antrag offen gelegten keine Vereinbarungen, Nebenabreden oder andere relevante Sachverhalte, welche Einfluss auf die Beurteilung des Antrags haben können.

Datum (firmenmäßige Zeichnung)

F. Locations of Direction Finders

Last updated June 25, 2008

In order to protect the stationary direction finders of the Telecommunications Authorities, the maximum field strength caused by any radio transmitter at the locations of the stationary direction finders must not exceed the limit of 105 dBµV/m (measured at each system-specific bandwidth).

Vienna

16E22 39 48N14 24 1200 VIENNA, Höchstädtplatz 3
16E20 08 48N15 45 1190 VIENNA, Krapfenwaldgasse 17
16E15 43 48N13 04 1140 VIENNA, Ulmenstraße 160
16E23 32 48N11 14 1030 VIENNA, Ghegastraße 1

Lower Austria

16E28 43 48N19 40 2201 GERASDORF, Peilstelle Seyring (EZ 146/2)
14E48 24 48N00 12 3332 ROTTE, Nöchling Nr. 5

Upper Austria

14E16 02 48N17 52 4020 LINZ, Freinbergstraße 22
14E01 31 48N14 54 4611 SCHARTEN, Hochscharten 3

Salzburg

13E02 44 47N49 14 5020 SALZBURG, Mittelstraße 17
13E02 20 47N48 05 5020 SALZBURG, Mönchsberg 35
13E26 02 47N46 35 5360 ST.GILGEN, Schafberg/Berghotel

Tyrol

11E26 23 47N15 56 6020 INNSBRUCK, Valiergasse 60
11E22 51 47N18 43 6020 INNSBRUCK, Hafelekar/Berghütte
11E33 19 47N15 12 6060 HALL, Tulferberg, Tulfes 59
12E19 36 47N30 06 6370 REITH bei Kitzbühel, Astberg

Vorarlberg

09E42 23 47N29 29 6971 HARD, Rheinstraße 4
09E39 38 47N26 49 6890 LUSTENAU, Hagen-Silo
09E38 36 47N29 06 6972 FUSSACH, Peilstelle

Styria

15E25 49 47N02 07 8055 GRAZ, Triester Straße 280
15E29 14 47N05 01 8010 GRAZ-RIES, Ledermoarweg 19
15E54 51 47N31 49 8253 WALDBACH, Hochwechsel-Aspangberg (107m westlich Wetterkoglerhaus)
15E21 38 47N24 17 8600 Bruck/Mur, Ottokar-Kernstock-Straße Richtfunkstation Rennfeld

Carinthia

14E18 19 46N37 22 9010 KLAGENFURT, Dr. Herrmann-Gasse 4
14E18 05 46N36 21 9020 KLAGENFURT, Südring 240
13E51 33 46N36 44 9500 VILLACH, Dr. Semmelweißstraße 18
14E29 48 46N38 19 9131 GRAFENSTEIN, Thon 21 (Gebäude der Messstelle und Peilantennenstandort)

(All coordinates indicated in accordance with WGS84.)

G. **Commission Decision 2.6 GHz**

COMMISSION DECISION of 13 June 2008 on the harmonisation of the 2 500 – 2 690 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community (2008/477/EC)

COMMISSION DECISION

of 13 June 2008

on the harmonisation of the 2 500-2 690 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community

(notified under document number C(2008) 2625)

(Text with EEA relevance)

(2008/477/EC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Decision No 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision) [1], and in particular Article 4(3) thereof,

Whereas:

(1) The Commission has supported a more flexible use of spectrum in its Communication on 'Rapid access to spectrum for wireless electronic communications services through more flexibility' [2], which, *inter alia*, addresses the 2 500-2 690 MHz band. Technological neutrality and service neutrality have been underlined by Member States in the Radio Spectrum Policy Group (RSPG) opinion on Wireless Access Policy for Electronic Communications Services (WAPECS) of 23 November 2005 as important policy goals to achieve a more flexible use of spectrum. Moreover, according to this opinion, these policy goals should not be introduced abruptly, but in a gradual manner to avoid disruption of the market.

(2) The designation of the 2 500-2 690 MHz band for systems capable of providing electronic communications services is an important element addressing the convergence of the mobile, fixed and broadcasting sectors and reflecting technical innovation. The services provided in this frequency band should mainly target end-user access to broadband communications.

(3) It is expected that the wireless broadband electronic communications services for which the 2 500-2 690 MHz band is to be designated will to a large extent be pan-European in the sense that users of such electronic communications services in one Member State could also gain access to equivalent services in any other Member State.

(4) Pursuant to Article 4(2) of Decision No 676/2002/EC, on 5 July 2006 the Commission gave a mandate to the European Conference of Postal and Telecommunications Administrations (hereinafter the CEPT) to develop least restrictive technical conditions for frequency bands addressed in the context of WAPECS.

(5) In response to that mandate, the CEPT has issued a report (CEPT Report 19) on least restrictive technical conditions for frequency bands addressed in the context of WAPECS. This report contains technical conditions and guidance for the application of least restrictive conditions to base stations and terminal stations operating in the 2 500-2 690 MHz band, which are appropriate to manage the risk of harmful interference within as well as outside of national territories, without requiring that any type of particular technology is used, based on optimised parameters for the most likely use of the band.

(6) In accordance with CEPT Report 19 this Decision introduces the concept of Block Edge Masks (BEM), which are technical parameters that apply to the entire block of spectrum of a specific user, irrespective of the number of channels occupied by the user's chosen technology. These masks are intended to form part of the authorisation conditions for spectrum usage. They cover both emissions within the block of spectrum (i.e. in-block power) as well as emissions outside the block (i.e. out-of-block emission). They are regulatory requirements aimed at managing the risk of harmful interference between neighbouring networks and are without prejudice to limits set in equipment standards under Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity [3] (the R&TTE Directive).

[1] OJ L 108, 24.4.2002, p. 1.
[2] COM(2007) 50.
[3] OJ L 91, 7.4.1999, p. 10. Directive as amended by Regulation (EC) No 1882/2003 (OJ L 284, 31.10.2003, p. 1).

(7) The designation and making available of the 2 500-2 690 MHz band in accordance with the results of the mandate to CEPT recognises the fact that there are other existing applications. Appropriate sharing criteria for coexistence between some systems have been developed in the Electronic Communications Committee's ECC Report 45. For other systems and services appropriate sharing criteria for coexistence may be based on national considerations.

(8) To achieve compatibility a separation of 5 MHz is needed between the edges of spectrum blocks used for unrestricted TDD (time division duplex) and FDD operation (frequency division duplex) or in the case of two unsynchronised networks operating in TDD mode. Such separation should be achieved by either leaving these 5 MHz blocks unused as guard blocks; or through usage that complies with parameters of the restricted BEM when adjacent to an FDD (uplink) or between two TDD blocks; or through usage that complies with parameters of either restricted or unrestricted BEMs when adjacent to an FDD (downlink) block. Any usage of a 5 MHz guard block is subject to an increased risk of interference.

(9) The results of the mandate to the CEPT should be made applicable in the Community and implemented by the Member States without delay given the increasing requirements identified in studies at European and global levels for terrestrial electronic communications services providing broadband communications.

(10) Harmonisation under this Decision should not exclude the possibility for a Member State to apply, where justified, transitional periods that could include radio spectrum sharing arrangements, pursuant to Article 4(5) of the Radio Spectrum Decision.

(11) In order to ensure effective use of the 2 500-2 690 MHz band also in the longer term, administrations should continue with studies that may increase efficiency and innovative use. Such studies should be taken into account when considering a review of this Decision.

(12) The measures provided for in this Decision are in accordance with the opinion of the Radio Spectrum Committee,

HAS ADOPTED THIS DECISION:

Article 1

This Decision aims at harmonising the conditions for the availability and efficient use of the 2 500-2 690 MHz band for terrestrial systems capable of providing electronic communications services in the Community.

Article 2

1. No later than six months after entry into force of this Decision Member States shall designate and subsequently make available, on a non-exclusive basis, the 2 500-2 690 MHz band for terrestrial systems capable of providing electronic communications services, in compliance with the parameters set out in the Annex to this Decision.

2. By way of derogation from paragraph 1, Member States may request transitional periods that may include radio spectrum sharing arrangements, pursuant to Article 4(5) of Decision No 676/2002/EC.

3. Member States shall ensure that systems referred to in paragraph 1 give appropriate protection to systems in adjacent bands.

Article 3

Member States shall keep the use of the 2 500-2 690 MHz band under scrutiny and report their findings to the Commission to allow regular and timely review of this Decision.

Article 4

This Decision is addressed to the Member States.

Done at Brussels, 13 June 2008.

For the Commission

Viviane REDING

Member of the Commission

ANNEX

PARAMETERS REFERRED TO IN ARTICLE 2

The following technical parameters called Block Edge Mask (BEM) shall be applied as an essential component of conditions necessary to ensure coexistence in the absence of bilateral or multilateral agreements between neighbouring networks, without precluding less stringent technical parameters if agreed among the operators of such networks. Member States should ensure that network operators are free to enter into bilateral or multilateral agreements to develop less stringent technical parameters and, if agreed among all affected parties, these less stringent technical parameters may be used.

Equipment operating in this band may also make use of equivalent isotropically radiated power (e.i.r.p.) limits other than those set out below provided that appropriate mitigation techniques are applied which comply with Directive 1999/5/EC and which offer at least an equivalent level of protection to that provided by these technical parameters.

A. GENERAL PARAMETERS

1. The assigned blocks shall be in multiple of 5,0 MHz.

2. Within the band 2 500–2 690 MHz, the duplex spacing for FDD operation shall be 120 MHz with terminal station transmission (up link) located in the lower part of the band starting at 2 500 MHz (extending to a maximum limit of 2 570 MHz) and base station transmission (down link) located in the upper part of the band starting at 2 620 MHz.

3. The sub-band 2 570–2 620 MHz can be used by TDD or other usage modes complying with the BEMs in this Annex. Outside of the sub-band 2 570–2 620 MHz such usage can be decided at national level and shall be in equal parts in both the upper part of the band starting at 2 690 MHz (extending downwards) and the lower part of the band starting at 2 570 MHz (extending downwards).

B. UNRESTRICTED BEM FOR BASE STATIONS

The BEM for an unrestricted spectrum block is built up by combining Tables 1, 2 and 3 in such a way that the limit for each frequency is given by the higher value out of the baseline requirements and the block specific requirements.

Table 1

Baseline requirements — Base Station out-of-block e.i.r.p. BEM

Frequency range in which out-of-block emissions are received	Maximum mean e.i.r.p. (integrated over a 1 MHz bandwidth)
Frequencies allocated to FDD down link and ± 5 MHz outside the range of frequency blocks allocated to FDD down link.	+ 4 dBm/MHz
Frequencies in the band 2 500-2 690 MHz not covered by the definition above.	– 45 dBm/MHz

Table 2

Block specific requirements — Base Station in-block e.i.r.p. BEM

Maximum in-block e.i.r.p.	+ 61 dBm/5 MHz

NB: Member States can relax this limit to 68 dBm/5 MHz for specific deployments e.g. in areas of low population density provided that this does not significantly increase the risk of terminal station receiver blocking.

Table 3

Block specific requirements — base station out-of-block e.i.r.p. BEM

Offset from relevant block edge	Maximum mean e.i.r.p.
Start of band (2 500 MHz) to – 5 MHz (lower edge)	Baseline requirement level
– 5,0 to – 1,0 MHz (lower edge)	+ 4 dBm/MHz
– 1,0 to – 0,2 MHz (lower edge)	+ 3 + 15(Δ_F + 0,2) dBm/30 kHz
– 0,2 to 0,0 MHz (lower edge)	+ 3 dBm/30 kHz
0,0 to + 0,2 MHz (upper edge)	+ 3 dBm/30 kHz
+ 0,2 to + 1,0 MHz (upper edge)	+ 3-15(Δ_F – 0,2) dBm/30 kHz
+ 1,0 to + 5,0 MHz (upper edge)	+ 4 dBm/MHz
+ 5,0 MHz (upper edge) to end of band (2 690 MHz)	Baseline requirement level

Where: Δ_F is the frequency offset from the relevant block edge (in MHz).

C. RESTRICTED BEM FOR BASE STATIONS

The BEM for a restricted spectrum block is built up by combining Tables 1 and 4 in such a way that the limit for each frequency is given by the higher value out of the baseline requirements and the block specific requirements.

Table 4

Block specific requirements — base station in-block e.i.r.p. BEM for restricted block

Maximum in-block e.i.r.p.	+ 25 dBm/5 MHz

D. RESTRICTED BEM FOR BASE STATIONS WITH RESTRICTIONS ON ANTENNA PLACEMENT

In cases where antennas are placed indoors or where the antenna height is below a certain height, a Member State may use alternative parameters in line with Table 5, provided that at geographical borders to other Member States Table 1 applies and that Table 4 remains valid nationwide.

Table 5

Block specific requirements — base station out-of-block e.i.r.p. BEM for restricted block with additional restrictions on antenna placement

Offset from relevant block edge	Maximum mean e.i.r.p.
Start of band (2 500 MHz) to – 5 MHz (lower edge)	– 22 dBm/MHz
– 5,0 to – 1,0 MHz (lower edge)	– 18 dBm/MHz
– 1,0 to – 0,2 MHz (lower edge)	– 19 + 15(Δ_F + 0,2) dBm/30 kHz
– 0,2 to 0,0 MHz (lower edge)	– 19 dBm/30 kHz
0,0 to + 0,2 MHz (upper edge)	– 19 dBm/30 kHz
+ 0,2 to + 1,0 MHz (upper edge)	– 19-15(Δ_F - 0,2) dBm/30 kHz
+ 1,0 to + 5,0 MHz (upper edge)	– 18 dBm/MHz
+ 5,0 MHz (upper edge) to end of band (2 690 MHz)	– 22 dBm/MHz

Where: Δ_F is the frequency offset from the relevant block edge (in MHz).

E. LIMITS FOR TERMINAL STATIONS

Table 6

In-block power limits for terminal stations

	Maximum mean power (including Automatic Transmitter Power Control (ATPC) range)
Total radiated power (TRP)	31 dBm/5 MHz
e.i.r.p.	35 dBm/5 MHz

NB: E.i.r.p. should be used for fixed or installed terminal stations and the TRP should be used for the mobile or nomadic terminal stations. TRP is a measure of how much power the antenna actually radiates. The TRP is defined as the integral of the power transmitted in different directions over the entire radiation sphere.

H. Introduction to the combinatorial clock auction

1 Introduction

This section presents a legally non-binding introduction to the combinatorial clock auction in order to provide applicants with a basic understanding of the auction procedure. The legally binding rules of the auction will be sent to applicants in due course prior to the start of the auction.

The scenarios described in the examples are fictitious and are not intended to reflect any specific characteristics of Procedure F4/08.

2 Description

The combinatorial clock auction will consist of two separate auctions (stages). In the first stage, known as the **principal stage**, abstract frequency blocks will be auctioned off in different categories (e.g. paired and unpaired abstract frequency blocks). The principal stage will serve to determine how many abstract frequency blocks each winning bidder receives in each category.

In the second stage, known as the **assignment stage**, the actual frequency blocks will be assigned. Only the successful bidders from the principal stage will be eligible to participate in the second stage. In this stage, bidders will be allowed to bid on actual contiguous frequency blocks in line with the results of the principal stage.

The total price to be paid by each winning bidder is calculated as the sum of the prices from the two stages of the auction.

3 Principal stage

During the principal stage, the frequency blocks to be allocated will be grouped in different categories (e.g., one paired category and one unpaired category). Bidders will not bid on specific frequency blocks, but on abstract blocks in the different categories.

During the bidding process, bidders may submit package bids for combinations of abstract frequency blocks in the different categories (cf. Info Box below). Once the bidding process has been completed, an algorithm will be used to determine the combination among all package bids submitted which maximizes the auction revenues; this combination will include no more than one package bid per bidder.

The winning bidders will be those whose bids are included in the winning combination of package bids. The winning bidders will receive the number of abstract frequency blocks in each category included in their respective winning bids at "base prices," which will be determined using a modified second price rule. These prices represent the lowest price the winning bidders (together) would have had to bid in order for their respective bids to be successful (minimum core prices).

INFO BOX: Combinatorial bids in the principal stage

During the principal stage, bidders submit combinatorial package bids for abstract frequency blocks in the different categories. These bids are defined by multiple parameters, specifically the maximum bid amount and the number of frequency blocks in the relevant category which the bidder would like to acquire at that price (NB: The number of blocks may also be zero).

If a combinatorial bid is part of the winning combination at the end of this auction, then each winning bidder will receive precisely the number of frequency blocks in each category indicated in his/her winning package bid.

In the course of the principal stage, bidders can enter a large number of (different) package bids, but no more than one of those bids will be taken as part of the combination which maximizes the revenues from the auction.

3.1 Bidding process

The principal stage will begin with the clock stage, which refers to an open bidding stage with one or more rounds in which each bidder can submit a combinatorial package bid for abstract frequency blocks. Bidders can do so by indicating the number of abstract frequency blocks they wish to acquire at the respective price in the given round (cf. Info Box below). The clock stage will end once all excess demand is eliminated in all categories, that is, once the number of frequency blocks demanded by bidders no longer exceeds the number of blocks available.

Info Box: The clock auction

In a clock auction, the auctioneer sets the price for an item and the bidders indicate whether and how many items they wish to purchase at that price. If there are multiple interested parties, or if there is higher demand for the items than the number of items available, the auctioneer increases the price, and the bidders again indicate whether and how many items they would be willing to purchase at the current price.

The process ends once the excess demand is completely eliminated, that is, once the number of items demanded by bidders no longer exceeds the number of items available.

Once the clock stage has ended, a sealed-bid stage will take place in which bidders may submit supplementary package bids. These bids may also refer to different combinations of frequency blocks than those indicated in the package bids during the clock stage. However, under the rules of activity, supplementary bids will be limited on the basis of the bids from the clock stage.

3.1.1 Example with one category

In a given category, there are four abstract frequency blocks to be allocated (cf. Figure 1). The bidders may submit bids for any number of abstract frequency blocks.

Figure 1: Available abstract frequency blocks

The clock stage begins at the minimum (or starting) price. In this example, the starting price is EUR 10.00. The bidders can then submit package bids by indicating the number of blocks they

wish to acquire at the current price. In this example, Bidder 1 submits a package bid for three blocks with a bid amount (package price) of EUR 30.00 (number of blocks multiplied by the current price).

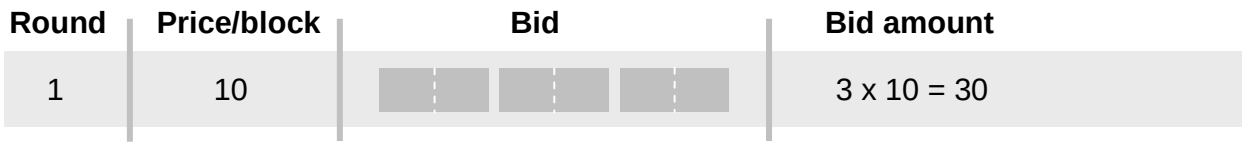

Figure 2: Bidder 1's package bid in the first round

In addition to Bidder 1, two other bidders submit package bids. Bidder 2 submits a package bid for four abstract frequency blocks, while Bidder 3 submits a bid for two blocks (cf. Figure 3).

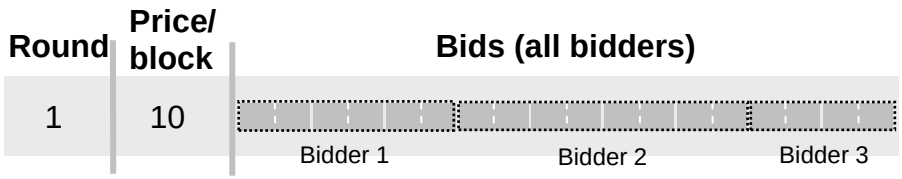

Figure 3: Package bids from all bidders in the first round

At the end of the round, the auctioneer evaluates the bids received and determines whether there is still excess demand (ED). Excess demand is considered to exist when the total number of blocks demanded exceeds the number of blocks available. If there is excess demand, then the auctioneer will raise the price per frequency block and announce the next round of bidding. In this example, the three bidders demanded a total of nine frequency blocks in the first round of the clock stage. The excess demand thus amounts to five blocks (cf. Figure 4).

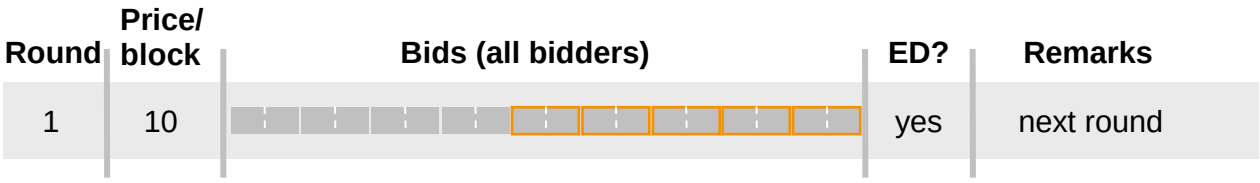

Figure 4: Results of the first round

The auctioneer then raises the price (in this case to EUR 15.00) and announces the next round of bidding. The bidders again indicate the number of frequency blocks they wish to acquire at that price. In the example, Bidder 1 submits a package bid for three blocks at a package price of EUR 45.00. The auctioneer once again calculates the excess demand, increases the price and starts the next round of bidding (cf. Figure 5).

In Round 8, at a price of EUR 45.00 per block, Bidder 1 reduces his/her demand to two blocks. This also reduces Bidder 1's bidding eligibility for the ensuing clock rounds; Bidder 1 can then only bid on two blocks in the ensuing rounds of the clock stage. Bidder 1 then bids on two blocks until the 10th round (cf. Figure 5).

Round	Price/block	Bid	ED?	Remarks
1	10		yes	next round
2	15		yes	next round
3	20		yes	next round
…	…			
7	40		yes	next round
8	45		yes	next round
9	50		yes	next round
10	55		no	Reduction of demand by other bidders; end of clock stage

Figure 5: Bidder 1's package bids during the clock stage

In the 10th round, the total number of blocks demanded by all bidders no longer exceeds the number of blocks available (cf. Figure 6).

Round	*Price /*	*Bids (all bidders)*	*ED?*	*Remarks*
1	***1***		***y***	***next round***
2	***1***		***y***	***next round***
3	***2***		***y***	***next round***
…	***…***			
7	***4***		***y***	***next round***
8	***4***		***y***	***next round***
9	***5***		***y***	***next round***
1	***5***		***no***	***End of clock stage***

Figure 6: Results of rounds during the clock stage

This marks the end of the clock stage and the start of the sealed-bid stage, in which bidders can submit supplementary bids. In placing these bids, the bidders must indicate the desired number of blocks as well as the package price. However, the supplementary bids are subject to the rules of activity (see Info Box below on the rules of activity for supplementary bids).

Info Box: Rules of activity for supplementary bids[1]

In the sealed-bid stage, a bidder may submit a supplementary bid on any combination of blocks on which s/he bid – or would have been able to bid – during the clock stage. The package bid from the final round of the clock stage can be increased by any amount. If the last bid was submitted in an earlier round of the clock stage, the bidder may only increase his/her last bid from the clock stage to the prices from the round immediately following the round in which that bid was submitted.

Supplementary bids for any other combinations of frequency blocks are subject to a relative price cap. The price cap for a certain **Combination C** is based on the last clock round in which the bidder would have been able to bid on that combination, that is, the round in which s/he reduced his/her bidding eligibility. This round is referred to as the **anchor round**.

However, the actual bid submitted by the bidder during that round was for a different combination. That combination is referred to as **Anchor Combination C'**. In the third step, the **anchor bid** is determined; this bid refers to the highest bid ever submitted for the anchor combination.

Finally, the **value difference** (i.e., the difference in package prices) between Combination C (for which the supplementary bid is submitted) and Anchor Combination C' is calculated on the basis of the prices from the anchor round.

This results in the price cap for Combination C as follows:

Maximum bid for C = Anchor bid + Value difference between C and C' in the anchor round

Accordingly, the supplementary bid for Combination C must not be higher than the corresponding anchor bid plus the value difference between Combination C and the corresponding Anchor Combination C' at the prices in the anchor round.

In the example used here, Bidder 1 can increase his/her bid from the last clock round (two blocks at a package price of EUR 110.00) by any amount. Bidder 1 thus submits a bid of EUR 200.00 (cf. Figure 7).

Figure 7: Supplementary bid based on package bid from last clock round

A supplementary bid for three blocks is subject to a price cap. The anchor round in this case is Round 8, that is, the last round in which the bidder would have been able to bid on three blocks. The anchor combination – i.e., the combination on which s/he actually bid in the anchor round – is the package bid for two blocks (cf. Figure 8). The anchor bid – i.e., the highest bid entered for the anchor combination – amounts to EUR 200.00 (the supplementary bid for two blocks).

[1] A complete description of the rules of activity with regard to sealed bids can be found in the Rules of Procedure.

Round	Price/block	Bid	ED?	Remarks
1	10		y	next round
2	15		y	next round
3	20		y	next round
…	…			
7	40		y	next round
8	45		y	next round
9	50		y	next round
10	55		no	Reduction of demand by other bidders; end of clock stage

Anchor round

Anchor combination

Figure 8: Anchor round and anchor combination for a supplementary bid on three blocks

The value difference (difference in package prices) between three and two blocks at the prices in the anchor round amounts to EUR 45.00. The maximum bid for three blocks is then calculated as the anchor bid plus the value difference between three and two blocks at the prices in the anchor round. Accordingly, the maximum bid comes to EUR 245.00 (= 200.00 + 45.00).

Supplementary bid	Combination	Bid amount / maximum bid
A		Bid: 200
B		Maximum bid: 200 + (135 - 90) = 245
C		Maximum bid: 200 + (55 - 110) = 145

Anchor bid

Value difference in the anchor round

Figure 9: Price cap for Bidder 1's supplementary bids

The maximum bid for one block is calculated in an analogous manner. The anchor round is now Round 10, that is, the last round in which the bidder could have bid on one block. The anchor combination is the package bid for two blocks. The anchor bid amounts to EUR 200.00. Therefore, this bidder can submit a supplementary bid of up to EUR 145.00 (= 200.00 – 55.00; cf. Figure 9).

3.1.2 Example with two categories and bidding points

A total of six paired and six unpaired frequency blocks are available. The abstract frequency blocks in the paired category are valued at two bidding points, while those in the unpaired category are worth one bidding point.[2] For the first round of bidding, Bidder 1 requested a bidding eligibility of four bidding points.

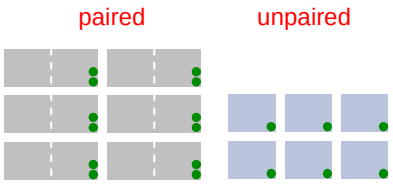

Figure 10: Available paired and unpaired frequency blocks

The clock stage starts at a price of EUR 20.00 for a paired frequency block and EUR 6.00 for an unpaired frequency block. With a bidding eligibility of four points, Bidder 1 can bid on any combination of paired and unpaired frequency blocks in the first round as long as the total number of bidding points assigned to those blocks does not exceed his/her bidding eligibility. In this example, Bidder 1 bids on one paired frequency block and two unpaired frequency blocks (cf. Figure 11). The package bid amounts to EUR 32.00 (20.00 + 2 x 6.00).

Round	Price/block	Bid	Bid amount
1	20 6		1 x 20 + 2 x 6 = 32

Figure 11: Bidder 1's package bid in the first round

At the end of the round, the auctioneer evaluates the bids received and calculates the excess demand in each category. If there is excess demand in a given category, then the auctioneer will raise the price per frequency block in that category and announce the next round of bidding. In this example, the excess demand after the first round amounts to three blocks in the paired category and six blocks in the unpaired category (cf. Figure 12).

Round	Price/ block	Bids (all bidders)	ED?	Remarks
1	20 6		yes yes	next round

Figure 12: Results of the first round

The auctioneer then raises the price in each category (to EUR 22.00 and EUR 8.00, respectively) and announces the next round of bidding. The bidders again indicate the number of frequency blocks they wish to acquire at those prices. In the second round, Bidder 1 submits a package bid for two unpaired blocks with a package price of EUR 44.00 and is therefore active on four bidding points, as in the previous round (cf. Figure 13). The auctioneer once again calculates the excess demand in each category, and (because there is still excess demand) then increases the price and starts the next round of bidding.

In Round 3, Bidder 1 bids on four unpaired blocks, a combination which also totals four bidding

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[2] The "n-1" rule for unpaired blocks is not applied here.

points. Later, in Round 8, Bidder 1 bids on a combination worth only three bidding points (one paired and one unpaired block) for the first time. This decision reduces Bidder 1's bidding eligibility to three points for the ensuing rounds, meaning that from that time onward, s/he can only be active on combinations of paired and unpaired blocks worth a total of three bidding points (cf. Info Box below).

Info Box: Rules of activity during the clock stage

Each participant's **bidding eligibility** determines the maximum number of abstract frequency blocks a bidder can be active on in one round. During the clock stage, a bidder will be allowed to be active on any combination of abstract frequency blocks as long as the total bidding points of all abstract frequency blocks in a package bid do not exceed that bidder's current bidding eligibility.

Each bidder's initial eligibility (for the first round of the auction procedure) will be determined by the information in the bidder's application. In the ensuing rounds, the current eligibility of each bidder will be determined by the rules of activity. The **activity** of a bidder in a given round is defined as the total bidding points assigned to the abstract frequency blocks on which the bidder submits a combinatorial package bid during a given round. The bidding eligibility in a given round is equal to the bidder's activity from the previous round.

In the final round of the clock stage, the bidder bids on one unpaired and one paired block (cf. Figure 13).

Round	Price/block	Bid	ED?	Remarks
1	20 6		yes yes	next round
2	22 8		yes yes	next round
3	24 10		yes yes	next round
…	…			
7	32 18		yes yes	next round
8	34 20		yes yes	next round
9	36 22		no yes	next round
10	36 24		no no	Reduction of demand by other bidders; end of clock stage

Figure 13: Bidder 1's package bids during the clock stage

In Round 9, there is no longer any excess demand in the paired category, but there is still excess demand in the unpaired category (cf. Figure 14). This means that only the price of unpaired frequency blocks is increased (from EUR 22.00 to EUR 24.00 in this example). In Round 10, the excess demand is eliminated in both categories, thus ending the clock stage.

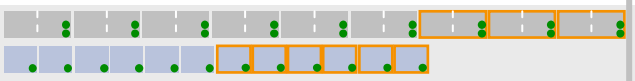
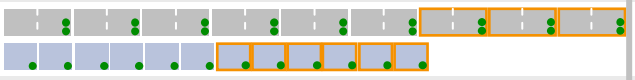
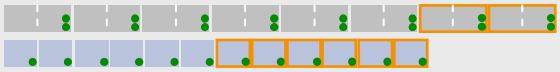
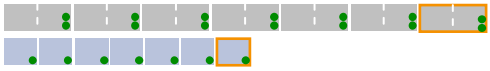
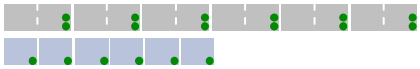
Round	Price/ block	Bids (all bidders)	ED?	Remarks
1	20 6		yes yes	next round
2	22 8		yes yes	next round
3	24 10		yes yes	next round
…	…			
7	32 18		yes yes	next round
8	34 20		yes yes	next round
9	36 22		no yes	next round
10	36 24		no no	End of clock stage

Figure 14: Package bids during the clock stage

The bidders can then submit supplementary bids in the sealed-bid stage. In placing these bids, the bidders must indicate the desired number of blocks as well as the package price. In this stage, a bidder may submit a supplementary bid on any combination of blocks on which s/he bid – or would have been able to bid – during the clock stage. The package bid from the final round of the clock stage can be increased by any amount. The supplementary bids for any other combinations of blocks are subject to a price cap (maximum bid).

In the example used here, Bidder 1 can increase his/her package bid (for one paired and one unpaired block) from the last clock round by any amount. The bidder's last bid during the clock stage was EUR 60.00. The bidder increases this package bid to EUR 140.00 (cf. Figure 15).

The bidder would now like to submit a supplementary bid for two paired frequency blocks, which requires four bidding points. The anchor round – i.e., the last round in which the bidder could have bid on a combination worth four bidding points – is Round 8. The anchor combination is the package bid for one paired and one unpaired block, and the anchor bid is the highest bid submitted for the anchor combination. In this case, the anchor bid is the supplementary bid of EUR 140.00. The value difference between two paired frequency blocks and the anchor combination equals EUR 14.00 (2 x 34 – (20 + 34)). The maximum bid which the bidder can submit for two paired frequency blocks is calculated as the anchor bid plus the value difference, that is, EUR 154.00 (140.00 + 14.00).

Supplementary bid	Combination	Bid amount / maximum bid
A		Bid: 140 (no limit)
B		Maximum bid: 140 + (2 x 34 - (34 + 20)) = 154
C		Maximum bid: 140 + (4 x 20 - (34 + 20)) = 166

Figure 15: Supplementary bids and maximum bids for Bidder 1

The maximum bid for four unpaired blocks is calculated in an analogous manner. Once again, the anchor round is Round 8; the anchor combination is a package bid for one paired and one unpaired block. The anchor bid is EUR 140.00. The value difference between four unpaired frequency blocks and the anchor combination at the prices in the anchor round amounts to EUR 26.00 (4 x 20.00 – (20.00 + 34.00)). Therefore, the bidder may submit a maximum bid of EUR 166.00 (= 140.00 + 26.00) for four unpaired frequency blocks.

3.2 Determination of winning bidders

After the end of the sealed-bid stage, the auctioneer will determine the combination which maximizes the auction's revenues from all bids submitted during the clock stage and the sealed-bid stage (and which can be satisfied with the available blocks). This combination will include no more than one combinatorial package bid per bidder.

In the example below, six bidders (Alan, Bob, Carl, Doris, Emma and Fred) bid on 14 paired abstract and nine unpaired abstract frequency blocks. During the principal stage, the bids listed in Table 1 are submitted.

Bidder	Package		Bid in principal stage
	Number of paired abstract frequency blocks	Number of unpaired abstract frequency blocks	
Alan	5	0	EUR 14.8 million
	4	0	EUR 14 million
Bob	6	4	EUR 21.8 million
	6	3	EUR 20.2 million
	5	4	EUR 20 million
	5	3	EUR 19.2 million
Carl	4	0	EUR 16 million
Doris	0	4	EUR 7 million
Emma	0	5	EUR 8 million
Fred	0	6	EUR 9.4 million
	0	5	EUR 9 million

Table 1: Combinatorial package bids in the principal stage

The package bids highlighted in gray are the winning bids because they (clearly) represent the combination which maximizes the revenues from the auction and which can be accommodated in the available spectrum (14 paired abstract frequency blocks and nine unpaired abstract frequency blocks). The total revenues from this combination amount to EUR 60.8 million. No other feasible combination of package bids yields higher revenues.

The winning bidders will receive the number of abstract frequency blocks in each category as indicated in their respective winning bids at the base price.

3.3 Calculation of base prices

Base prices are determined using the general logic of a second price rule in a Vickrey auction. The winning bidder does not pay the price bid, but the lowest amount which ensures that no other bidder outbids him. In a Vickrey auction, that amount is the second-highest bid.

In the example below, three bidders bid on one frequency block (cf. Table 2). The highest bidder is Bidder A, who bids EUR 10.00. The second-highest bid comes from Bidder B, who bids EUR 8.00. The price to be paid by Bidder A is therefore EUR 8.00.

Bidder	**Bid**
Bidder A	EUR 10.00
Bidder B	EUR 8.00
Bidder C	EUR 5.00

Table 2: Bids for one frequency block

Transposing this procedure onto the combinatorial clock auction requires a modification of the second price rule. The rule is amended in such a way that maximum bid reductions are calculated in order to ensure that there is no alternative combination of bidders and bids which would yield higher revenues from the auction.

How much is the maximum bid reduction which can be granted to Bidder A in the example above? In order to calculate the reduction, we theoretically eliminate the winning bidder (Bidder A) from the auction. In this case, the maximum revenues from the auction would be EUR 8.00. Therefore, Bidder A can be granted a bid reduction in the amount of the difference in revenues, namely EUR 2.00 (cf. Figure 16). This ensures that no other bidder has submitted a higher bid than Bidder A's bid minus the reduction, and that the winning bidder covers his/her opportunity costs with the price paid.

Maximum revenues with participation of Bidder A	***10 Euro***
MINUS	***-***
Maximum revenues without participation of Bidder A	***8 Euro***
Maximum bid reduction for Bidder A	***2 Euro***

Figure 16: Bid reduction for Bidder A

The two examples below serve to explain the adaptation of this rule to the combinatorial clock auction. Let us assume that there are three bidders (Bidder A, Bidder B and Bidder C) who are bidding on a total of two frequency blocks (one block in Category L1 and one block in Category L2). Bidder A bids EUR 10.00 for an abstract block in Category L1, Bidder B bids EUR 10.00 for a block in L2, and Bidder C bids EUR 5.00 for one of either blocks (but only wishes to acquire one; cf. Table 3).

Bidder	L1	L2	L1 + L2
Bidder A	EUR 10.00	-	-
Bidder B	-	EUR 10.00	-
Bidder C	EUR 5.00	EUR 5.00	-

Table 3: Bids for Frequency Blocks L1 and L2

The maximum bid reductions are calculated as in the previous example. The combination which maximizes the total revenues is that in which Bidder A receives Block L1 and Bidder B receives Block L2; the bids generate revenues totaling EUR 20.00. In turn, the opportunity costs (individual Vickrey prices) for the allocation of Block L1 to Bidder A can be calculated by theoretically eliminating Bidder A from the auction. In such a case, Bidder C would win Block L1, and the total value of bids would drop from EUR 20.00 to EUR 15.00.

Maximum revenues with participation of Bidder A	***20 Euro***
MINUS	***-***
Maximum revenues without participation of Bidder A	***15 Euro***
Maximum bid reduction for Bidder A	***5 Euro***

Figure 17: Bid reduction for Bidder A

This means that the maximum bid reduction which can be granted to Bidder A is EUR 5.00. The same applies to Bidder B, meaning that the base prices equal EUR 5.00 for both bidders.

However, there are cases where the individual Vickrey prices are not sufficient to outbid a package bid. In such cases, an additional price rule is applied. In contrast to the example above, let us now assume that Bidder C submits a package bid of EUR 15.00 for both abstract frequency blocks (cf. Table 4).

Bidder	L1	L2	L1 + L2
Bidder A	EUR 10.00	-	-
Bidder B	-	EUR 10.00	-
Bidder C	-	-	EUR 15.00

Table 4: Bidder C's package bid

The combination which maximizes the total value is again EUR 20.00. Bidder A receives Block L1, and Bidder B receives Block L2. On the basis of their individual opportunity costs, the two bidders could each be granted a maximum bid reduction of EUR 5.00. However, if both bidders were to pay their (individual) Vickrey prices, then they would be outbid by Bidder C. Therefore, in addition to the condition that each individual bidder must cover his/her opportunity costs, another condition is necessary: Taken together, the prices paid by the two bidders must be high enough that no other combination of bids generates a higher value. This means that the two bidders together have to pay at least a total of EUR 15.00 in order to (jointly) outbid Bidder C. In this context, a 'fair' division of the difference to the individual Vickrey prices is carried out. Therefore, each bidder pays a base price of EUR 7.50.

A precise description of the mathematical procedure used to determine base prices will be provided in the Rules of Procedure.

4 Assignment stage

The assignment stage consists of a single sealed-bid round in which the winning bidders from the principal stage can submit package bids for actual contiguous frequency blocks in line with the results of the principal stage. On the basis of the results of the principal stage, the auction software generates a complete list of all assignment options for each winning bidder.

In the example below, it is assumed that 14 paired and nine unpaired frequency blocks are being auctioned off. The actual paired blocks are labeled A1 to A14, while the unpaired blocks are labeled B1 to B9. Block B10 will be allocated to the bidder who wins Block B9.

The following winning bidders emerged from the principal stage:

- Alan won four paired abstract frequency blocks and three unpaired abstract frequency blocks;
- Ben won four paired abstract frequency blocks;
- Carl won six paired abstract frequency blocks;
- Dana won six unpaired abstract frequency blocks.

The assignment stage is subdivided into two simultaneous procedures:

- the auction for actual paired frequency blocks;
- the auction for actual unpaired frequency blocks.

The possible allocation options for paired spectrum are shown in Figure 18. The possible options for each bidder are as follows:

- Alan: A1-A4; A5-A8; A7-A10; A11-A14.
- Ben: A1-A4; A5-A8; A7-A10; A11-A14.
- Carl: A1-A6; A5-A10; A9-A14.

Figure 18: Assignment options for paired spectrum

The possible allocation options for unpaired spectrum are shown in Figure 19. The possible options for each bidder are as follows:

- Alan: B1-B3; B7-B9 (with the additional frequency block B10).
- Dana: B1-B6; B4-B9 (with the additional frequency block B10).

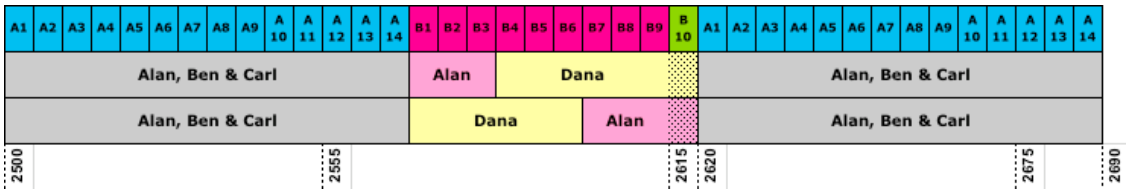


Figure 19: Assignment options for unpaired spectrum

The bidders may then submit bids for each option. For example, Alan can submit a package bid for each of the options shown above in the paired (A1-A4; A5-A8; A7-A10; A11-A14) and unpaired (B1-B3; B7-B9) spectrum. The minimum bid in the assignment stage is EUR 0.00. For each option on which a bidder does not bid, a bid in the amount of the minimum bid is submitted automatically.

At the end of this round, the auctioneer will determine the combination of package bids which generates the highest revenues in each category. Each winning bidder will be assigned the frequency blocks specified in the bid included in the winning combination and will pay a "top-up" price, which is also determined on the basis of the modified second price rule.