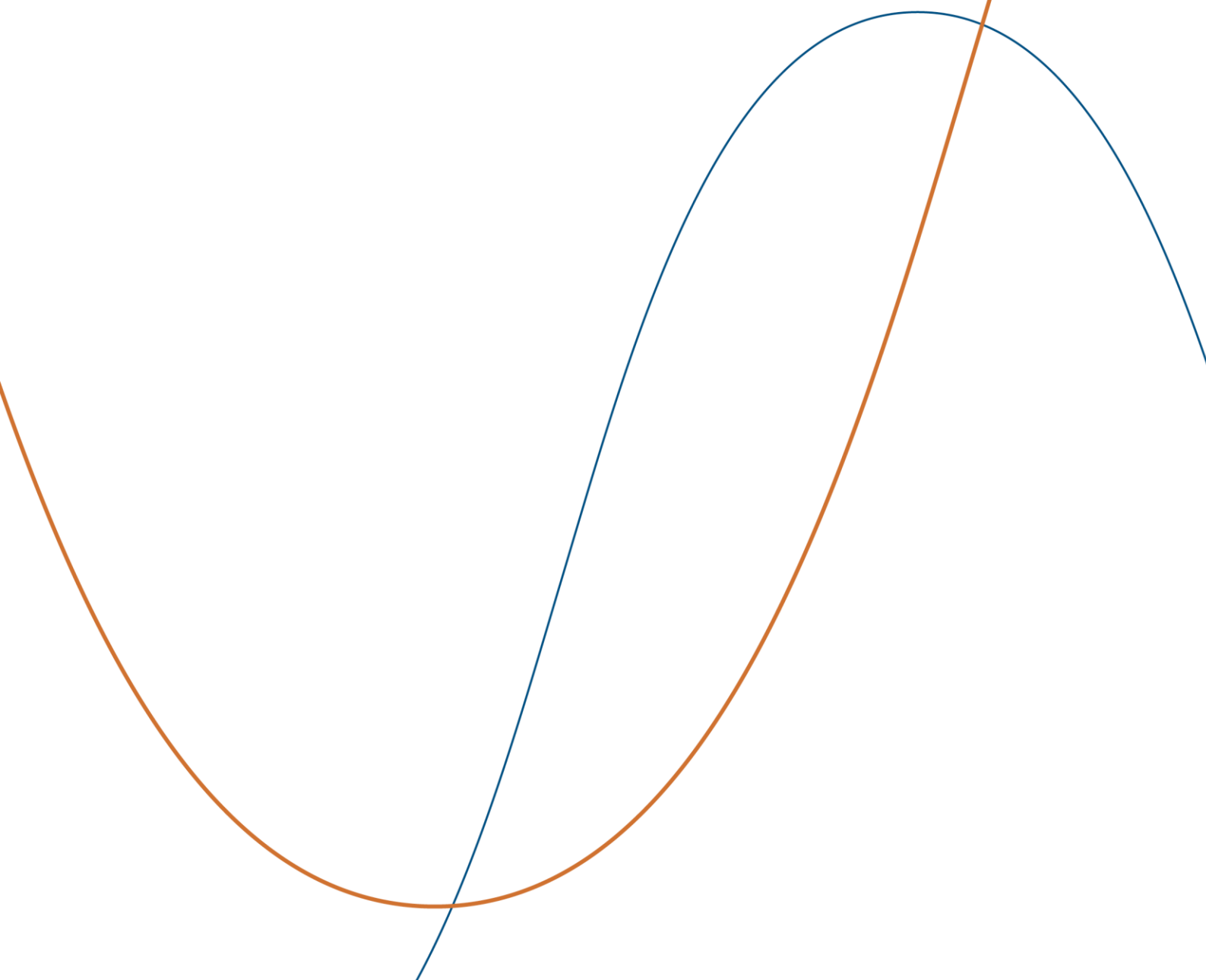


# **Award of frequencies in the 2.6 GHz and 3.6 GHz frequency bands**

**Auction Rules – for consultation**

**5 February 2021**



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## 1 Introduction

In this document the Norwegian Communications Authority (Nkom) presents the draft auction rules for the award of spectrum in the 2.6 GHz and 3.6 GHz frequency bands (the 'award bands').

These draft auction rules are being released on 5 February 2021 for public consultation. Subsequent to the consultation, Nkom will determine the final auction rules. The deadline for responding to the consultation is 9 April 2021.

The auction will determine who will be awarded the spectrum available, the specific frequencies assigned to each participant and the price they will be required to pay to be awarded their corresponding licences.

Once the draft rules are finalised following any amendments deemed necessary following the consultation, Nkom will publish the final auction rules, which will constitute, together with the overall framework for the award, the regulations for the award.

The time schedule may be altered and the process postponed. All specific dates in this document might be changed.

## 2 Overall framework

The document entitled "Overordnede rammer for tildeling av 2,6 GHz- og 3,6 GHz-båndene"<sup>1</sup> (the overall framework for the award) published 5 February 2021, states the overall objectives and the overall framework for the award, including reserve prices and spectrum caps. The overall framework is not part of the consultation on the auction rules.

## 3 Overview of the award

### 3.1 Spectrum available for this award

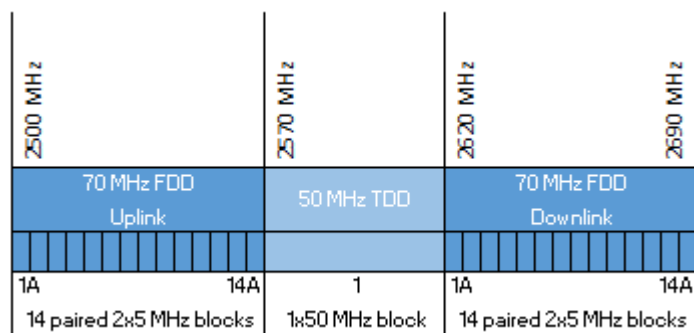
#### 3.1.1 The 2.6 GHz band

There is a total of 190 MHz available in the 2.6 GHz band. The spectrum available in the 2.6 GHz band has been packaged as follows:

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<sup>1</sup> In Norwegian only.

- 14 blocks of 2 x 5 MHz FDD; and
- A single block of 50 MHz TDD (the centre block).

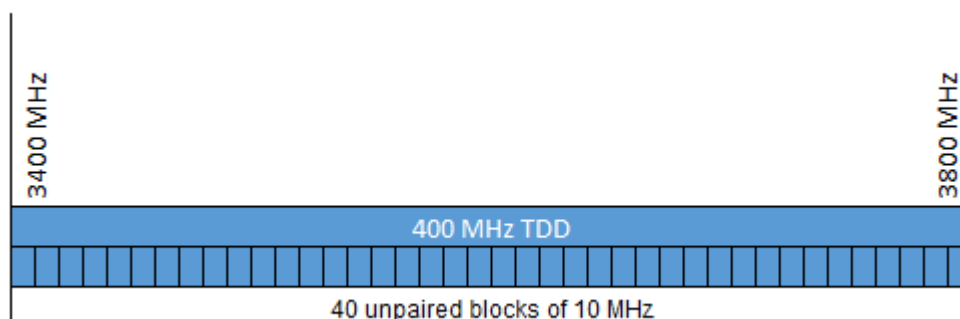


Figur 1: 2.6 GHz band

In the auction the spectrum in the 2.6 GHz band will be awarded as frequency-generic lots, see Section 3.4.

### 3.1.2 The 3.6 GHz band

There is a total of 400 MHz available in the 3.6 GHz band, divided into 40 blocks of 10 MHz.



Figur 2: 3.6 GHz band

In the auction the spectrum in the 3.6 GHz band will be awarded as frequency-generic lots divided into two different lot categories, see Section 3.4.

## 3.2 Spectrum caps

Spectrum caps establish the maximum total bandwidth a bidder is permitted to acquire in the auction. The spectrum caps have been set in the overall framework for the award. There are two spectrum caps in the auction:

- a cap of 80 MHz in the 2.6 GHz band (including both FDD and TDD, counting a 2 x 5 MHz FDD lot as 10 MHz); and
- a cap of 120 MHz in the 3.6 GHz band.

### 3.3 Two-stage process for the assignment of frequency-generic lots and specific frequencies

The frequencies available will be assigned using a two-stage process:

- The first stage (the lot assignment stage) will assign frequency-generic lots. For this stage, the available frequency blocks are grouped into four categories. One category consists of a single TDD lot in the 2.6 GHz band and so its frequency range is determined. For the other three lot categories, each frequency-generic lot will correspond to a frequency block of a given bandwidth within a wider frequency range, but will not correspond to any specific frequencies within that range for the purposes of this stage of the auction. Therefore, the blocks within a category are offered as identical lots. In this stage, bidders can bid for a number of lots within each category (and so a certain amount of bandwidth) without being able to specify which particular frequency blocks they wish to acquire.
- The second stage (the frequency assignment stage) will determine the specific frequency blocks assigned to the winners of frequency-generic lots. Each winner from the first stage will receive the number of frequency blocks that corresponds to the lots won in the first stage. Where a winner has won multiple lots in the same lot category in the first stage, contiguous frequency blocks will be assigned to that winner in the second stage.

### 3.4 Frequency-generic lots in the award

The blocks in the 2.6 GHz band will be offered in the following lot categories:

- **A:** lots of 2 x 5 MHz FDD (14 lots available); and
- **B:** lot of 50 MHz TDD (one lot available).

The blocks in the 3.6 GHz band will be offered in the following lot categories:

- **C:** lots of 40 MHz, offered under the constraint that each bidder can bid for at most one lot in category C (four lots available ); and
- **D:** lots of 10 MHz (24 lots available).

The grouping of lots into frequency-generic lot categories is summarised in the table below:

<i>Lot category</i>	<i>Description</i>	<i>Number of lots</i>
A	2 x 5 MHz of FDD spectrum in the 2.6 GHz band	14
B	50 MHz of TDD spectrum in the 2.6 GHz band	1
C	40 MHz of spectrum in the 3.6 GHz band (each bidder may bid for at most one of these lots)	4
D	10 MHz of spectrum in the 3.6 GHz band	24

*Table 1 – Categories of frequency-generic lots*

### 3.5 Reserve prices

The reserve prices have been set in the overall framework for the award. The reserve prices is summarised in the table below:

<i>Lot category</i>	<i>Reserve price per lot</i>
A	NOK 25 million
B	NOK 50 million
C	NOK 100 million
D	NOK 25 million

*Table 2 – Reserve prices*

## 4 Licence terms and conditions

### 4.1 Draft spectrum licences

The licence terms and conditions follow from the draft spectrum licences with annexes, published together with the auction rules.

### 4.2 Geographic scope

The spectrum licences will be assigned for terrestrial frequency use on the Norwegian mainland, the internal waters<sup>2</sup> and out to 70 kilometres from the baseline, with the exception of Svalbard, Jan Mayen and the Norwegian dependencies.

The licences are subject to restrictions in use in order to protect satellite earth stations and radar systems operating within the 3.6 GHz band. A detailed description of the restrictions can be found in the draft spectrum licences for the 3.6 GHz band.

<sup>2</sup> Section 3 of Act no. 57 of 27 June 2003 concerning Norway's territorial waters and related zones.



### 4.3 Licence duration

The licences in the 2.6 GHz band will be valid from 1 January 2023 and expire on 31 December 2042.

The licences in the 3.6 GHz band will be valid from 1 January 2023 at the latest and will expire on 31 December 2042. The licences might be made available earlier with some restrictions due to coexistence with existing licensees.<sup>3</sup>

### 4.4 Annual fees

The 2.6 GHz and 3.6 GHz bands will not be subject to annual spectrum fees, but the licensee is required to pay annual administrative charges (sector fees) to Nkom. These will be levied from the start date of the licence.

With reference to Section 12-1 of the Electronic Communications Act, the model for sector fees is laid down in Regulations No. 386 of 20 March 2017 concerning sector fees and charges payable to the Norwegian Communications Authority. Information on sector fees payable to Nkom is available on [www.nkom.no](http://www.nkom.no).

Under the current regulations concerning sector fees to Nkom, sector fees for licences in the 2.6 GHz and 3.6 GHz band are priced to a moderate level compared to licences in other frequency bands used for public mobile services. The sector fees aim to reflect the work that Nkom has with these licences. Licensees must therefore expect the model for sector fees for the 2.6 GHz and 3.6 GHz bands to be amended before or shortly after the licences become valid. The exact model for the sector fees will be set in the regulation concerning sector fees to Nkom. Differences in bandwidth and available spectrum in the bands will be taken into account.

Licensees must expect that the sector fee for 2 x 10 MHz or 20 MHz in the 2.6 GHz band or 100 MHz in the 3.6 GHz band might be approximately equal to the sector fee for e.g. 2 x 10 MHz in the 800 MHz band. The sector fee for 2 x 10 MHz in the 800 MHz band was approximately NOK 970 000 for 2020.

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<sup>3</sup> See draft spectrum licences in the 3.6 GHz band section 4.3 and the document “Beskrivelse av særskilte vilkår for tildeling av 2,6 GHz- og 3,6 GHz-båndene” published by Nkom 5 February 2021.

## 5 Overview of the auction process

### 5.1 Contiguous blocks

The spectrum available is packaged into blocks, which are then grouped into lot categories, as described in Section 3 above.

Except for category B, which consists of a single 2.6 GHz TDD lot, each lot category consists of multiple, identical frequency-generic lots.

If a bidder wins more than one frequency-generic lot within a category, then it is guaranteed to be awarded contiguous range of frequencies corresponding to these lots (with the uplink and downlink frequencies each forming separate contiguous ranges in the case of the A lots).

### 5.2 Two stages

The auction process consists of two stages:

- the **lot assignment stage**, which will determine the assignment of frequency-generic lots amongst bidders using a multiple-round bidding process; and
- the **frequency assignment stage**, which will determine the assignment of specific frequency blocks to each winner of frequency-generic lots.

### 5.3 Lot assignment stage

#### 5.3.1 Clock auction

The lot assignment stage is a multiple-round bidding process. It determines the number of lots in each lot category that will be assigned to each bidder.

In the lot assignment stage, the spectrum is offered as frequency-generic lots in the lot categories identified in section 3.4 above. Lots within each category are identical for the purposes of this stage.

The lot assignment stage will use a clock auction to determine the number of lots assigned to each bidder in each lot category. At the start of a round, Nkom will announce a price per lot for each category (the 'clock prices'). Each bidder can then make a bid by indicating the number of lots in each category they wish to acquire at those prices – this is the bidder's 'clock bid' for that round.

After each round, the auction software will calculate for each lot category the total number of lots demanded in the clock bids placed in that round (the 'total demand' for that lot category). If the total demand is greater than the number of lots available in a lot category, then there is excess demand for that lot category. If there is excess demand in any lot category, then the clock price for lot categories subject to excess demand will be increased and a further round will be run. Otherwise, the lot assignment stage ends, and bidders win the lots specified in the clock bid they submitted in the last round at clock prices.

An implication of this approach is that when a bidder places a clock bid, it will either win all the lots included in that bid (as this is the last clock round and the lot assignment stage finishes) or there will be a further opportunity to place another clock bid. Therefore, a bidder can only win all, and not just some, of the lots included in its clock bid.

### **5.3.2 Exit bids**

It is possible that, when the lot assignment stage finishes, the total demand for a lot category could be strictly less than the number of lots available. In this case, lots could potentially go unassigned. To deal with this possibility, the clock auction will include a feature – 'exit bids' – that allows a bidder to compete for such potentially unassigned lots. This is an optional feature and there is no obligation on bidders to make any exit bids.

Each lot has an associated number of eligibility points depending on its lot category (see section 11.2.6 below). The eligibility associated with a bidder's clock bid is the sum of the eligibility points associated with the lots included within that bid. A bidder may not increase its overall demand, measured by the total eligibility points associated with its clock bid, from one round to the next.

In overview, whenever a bidder reduces its overall demand (measured in eligibility points) relative to the previous clock round, it can make one or more exit bids. By making an exit bid, a bidder indicates that it would be willing to add lots to its current clock bid in one particular lot category, at a price for those additional lots intermediate between the current clock price and the previous clock price. Therefore, an exit bid is a conditional offer to take *additional* lots in one category on top of some particular number of lots in that category. The detailed rules for making exit bids are set out subsequently in section 11.2.3.3 below.

Exit bids are made as bidders reduce demand, but whether or not they are accepted as winning bids is only determined at the end of the lot assignment stage.

If any lots remain unassigned after assigning to bidders the lots in their clock bids, then some exit bids may be selected as winning bids in addition to the clock bids made in the final round. Winning exit bids are selected with the objective of maximising the total value of all winning bids, subject to certain rules on when exit bids may be accepted (set out in detail

subsequently). When a bidder wins an exit bid, it will pay for the additional lots at the price specified in the exit bid, which will be at a price not exceeding the final clock prices of those lots.

If an exit bid is for two or more lots in a category, then it will not be sub-divided, and a bidder will receive all of these lots if that exit bid wins.

### **5.3.3 Minimum bandwidth requirement**

The 3.6 GHz band is split into C and D lots, but exit bids are made for single lot categories. If a bidder makes an exit bid for a C lot and another exit bid for one or more D lots, then there is the possibility that its exit bid for a C lot wins, but that its exit bid for D lots does not, or vice versa. This could result in a bidder winning some 3.6 GHz lots, but that these add up to a bandwidth which it considers insufficient for its business case. To avoid such outcomes, bidders may indicate a minimum amount of spectrum in the 3.6 GHz band that they are willing to accept – the ‘minimum bandwidth requirement’ – when applying to participate in the auction. Any winning exit bids will then be selected such that if the bidder wins any lots in the 3.6 GHz band, it will win at least its minimum requirement.

This minimum bandwidth requirement will cease to apply if the bidder makes a clock bid that includes some lots in the 3.6 GHz, but less than its stated minimum bandwidth requirement.

## **5.4 Frequency assignment stage**

The frequency assignment stage will determine the assignment of specific frequencies to winners of A, C and D lots. The single B lot is already associated with specific frequencies, so it does not enter this stage of the auction. There will be two frequency assignments, one for the 2.6 GHz band (i.e. the A lots) and one for the 3.6 GHz band (i.e. the C and D lots).

As A, C and D lots are frequency-generic, there may be various assignment options which could be assigned to winners of these lots. The frequency assignment stage provides an opportunity for those bidders with options for the frequency blocks they could be assigned to make bids for those various options. Upon concluding the lot assignment stage, the auction software will shortlist the ‘candidate plans’ in each band, which are the assignments of frequency blocks to winning bids that satisfy:

- (i) each bidder being assigned the relevant number of blocks it has won in that band as a contiguous frequency range; and
- (ii) any unsold blocks being contiguous at the lower end of the band.

The winning band plan must be selected amongst these candidate plans. For a band where more than one candidate plan has been shortlisted, the auction software will list the alternative frequency positions that each bidder could potentially be assigned under the various candidate

plans for that band. Nkom will then run a sealed-bid process in which bidders who could be assigned different frequency positions are invited to bid for their preferred positions. The bidding process will be run simultaneously for both bands, though the two processes are independent of each other.

The auction software will then select for each band a candidate plan which yields the maximum total value of winning bids. If there are multiple candidate plans with the same maximum value of bids, then one of these plans will be selected at random by the software.

The software will then calculate prices for the frequency assignment stage on the basis of opportunity costs, as explained in section 11.3.4. **Feil! Fant ikke referanseilden.** below. This results in bidders paying prices for the frequency assignment stage not exceeding the amount of their winning frequency position bids.

A winning bidder's overall price is the sum of the prices determined in the lot assignment stage and the frequency assignment stage.

## 6 Requirements for participation in the auction

### 6.1 The participants

Any person or undertakings registered in the European Economic Area (EEA) or Switzerland may register for the auction. Note that the undertakings must be registered with an organisation number from The Brønnøysund Register Centre ([www.brreg.no](http://www.brreg.no)) before a frequency licence will be issued.

In cases where persons or undertakings would be treated as a single economic unit, with respect to Article 53 (1) of the EEA agreement (Article 101 (1) of the TEU Treaty), only one of these may register as a bidder. This implies that two or more undertakings within the same corporate group may not register for the auction.

Persons or undertakings may be refused to participate in the auction to prevent activities that may cause a non-insignificant risk of security-threatening activities, based on the Security Act<sup>4</sup> Section 2-5.

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<sup>4</sup> Act of 1 June 2018 No. 24 relating to National Security

## 6.2 Financial situation

A person or undertaking cannot participate in the auction if the person or the undertaking:

- is in suspension of payments;
- has entered into debt settlement negotiations/proceedings;
- is insolvent or is subject to a petition of bankruptcy or winding-up, or has passed a resolution for a voluntary winding up;
- has gone into bankruptcy/liquidation.

## 6.3 Prohibition of collusive behaviour

Agreements or concerted practices which have as their object or effect the prevention, restriction or distortion of competition, i.e. collusive behaviour regarding bidding or bidding strategies, are prohibited under Section 10 of The Competition Act.

## 6.4 Registration

Only persons or undertakings who register in accordance with the provisions set in these auction rules, see Section 7, are allowed to participate in the auction.

# 7 The registration process

## 7.1 Required registration documents

Valid registration for participation in the auction requires submission/delivery of the following registration documents and information:

1. The registration form provided in Annex 1.
2. Certificate of Registration that states signature requirements and power of procuration.
3. Description of ownership and organizational structure of the participant, e.g. if the participant constitutes, together with a parent company or a subsidiary or subsidiaries, a company group. Participants must inform Nkom if there are shareholders or companies with determinative influence over the participant that originate from or has relations to countries Norway does not have a security agreement with.
4. Credit rating, no older than 3 months and based on the last known annual accounts, conducted by a publicly approved credit institution. An explanation of the rating criteria must be included to elaborate the scores.
5. Bank guarantee with wording conform to the template in Annex 2.

6. Written power of attorney for the financing bank/institute issuing the bank guarantee.

## **7.2 Bank guarantee**

The bank guarantee is payable on first demand.

The Norwegian State acts as self-insurer, consequently central bodies and categories of bodies governed by public law are exempted from presenting a bank guarantee. Nkom decides which bodies fall under the exemption.

The guarantee must be issued by a financial institution registered in the EEA or Switzerland, and otherwise meet the requirements stipulated by Nkom, see Annex 2.

The guarantee must be valid until 28 February 2023.

The guarantee must be for NOK 50 million.

See Section 0 on payment under the guarantee.

## **7.3 Minimum bandwidth requirement for 3.6 GHz spectrum**

Bidders can specify a minimum bandwidth requirement for 3.6 GHz spectrum on their application, see Section 11.2.7. This will ensure that a bidder is not assigned any bandwidth in this band unless it can be assigned a bandwidth that is at least its minimum bandwidth requirement.

The minimum bandwidth requirement will be automatically voided and cease to apply if the bidder makes a clock bid that includes 3.6 GHz lots, but adding up to a bandwidth that is strictly less than its minimum bandwidth requirement.

## **7.4 Registration time frame**

Registration documents can be delivered to Nkom from [date].

The registration deadline is [date], 12:00 Norwegian time.

## **7.5 Delivery of documents for registration**

Nkom must receive the registration documents before the final date for registration [date], 12:00 Norwegian time.

All registration documents exempt the bank guarantee may be delivered by e-mail to Nkom, but may also be delivered in person or by courier to Nkom.

For the bank guarantee Nkom must receive the original document. However, Nkom are looking into the possibility for the bank guarantee to be delivered electronically from the bank issuing the bank guarantee to Nkom's bank.

For delivery in person or by courier to Nkom, please make an appointment with Nkom beforehand. Please contact Anja Vimme Skadal ([avi@nkom.no](mailto:avi@nkom.no)) or Vibeke Skofsrud ([vsk@nkom.no](mailto:vsk@nkom.no)) by email or phone, telephone number; +47 22 82 46 00.

### **Mark the envelope or e-mail "Spectrum assignment 2021".**

#### Address for delivery by courier:

Nasjonal kommunikasjonsmyndighet  
Nygård 1  
N-4790 Lillesand – Norway

#### Address for delivery by regular mail:

Nasjonal kommunikasjonsmyndighet  
Postboks 93  
N-4791 Lillesand – Norway

#### Address for electronically delivery:

[5G-auksjon@nkom.no](mailto:5G-auksjon@nkom.no) with a copy to [avi@nkom.no](mailto:avi@nkom.no) and [vsk@nkom.no](mailto:vsk@nkom.no)

## **7.6 Valid registration**

Nkom must receive the registration documents, including the original bank guarantee, before the final date for registration [date], 12:00 Norwegian time.

The person or undertaking is responsible for ensuring that:

- All registration documents are complete and duly signed and in accordance with requirements; and
- All registration documents, including the original bank guarantee, are delivered and received by Nkom within the closing date on [date], 12:00 Norwegian time.



Nkom will assess the registration documents and decide whether a registration is valid or not based on the provisions set in the auction rules. Nkom may allow rectification of minor errors or incorrections. Nkom will not extend the deadline for registration unless extraordinary circumstances occur.

Nkom will notify the person or undertaking whether the registration is considered valid or not within three working days after deadline for registration.

## **7.7 Principal legal consequences of registration**

Person or undertakings that register for participation in the auction accepts and agrees to be legally bound in accordance with the rules set in the overall framework and the auction rules.

# **8 General rules on bidding**

## **8.1 Assumption that bids are submitted on behalf of bidder**

The representative(s) stated in the registration form will be considered authorized to act on behalf of the person or undertaking stated as bidder in the registration form.

Nkom will assume that any bids submitted in the auction using the authentication credentials given to the authorised representative(s) are submitted on behalf of the relevant bidder.

## **8.2 Liability for foreseeable situations**

The bidder is liable for all foreseeable situations, such as circumstances on bidder's side, for instance delay, technical failures, breakdowns of the bidder's machinery/equipment, unavailability of the authorised representative(s) and the loss or damage of confidential material and information received from Nkom.

## **8.3 Principal legal consequences of bidding**

Bids are unconditional and irrevocable. Bids remain binding until 31 December 2021. Bidders may be released from their bids by notification from Nkom before this date.

Bidders are liable up to the full amount of their winning bid(s) for:

- frequency-generic lots they win in the lot assignment stage; and
- frequency options they win in the frequency assignment stage.

Bidders receiving a notification in accordance with the rules are obliged to pay their corresponding prices in the manner and to the place of payment stated by Nkom, see Section 12.

## **9 Exclusion from the auction**

Breach of rules set in the overall framework and auction rules may lead to exclusion.

If a bidder is excluded from the auction, the bidder will remain liable for its bids and any payment following from these bids in case that the excluded bidder would have become a winner. However, an excluded bidder may not be awarded a licence.

Nkom may decide to void bids of a bidder who has been excluded. Voiding of bids may require a recalculation of winning bids and prices.

## **10 The auction process**

### **10.1 Preparations for the bidders**

Upon application, Nkom will give to each applicant a code and a set of passwords to be used in any further communications between Nkom and the applicant. Nkom will provide these to the authorised representative(s) stated as the bidder's representative in the registration form.

The auction will be conducted over the public Internet using an Auction System (AS). Bidders are obliged to participate in a mock auction where they will have the opportunity to test their computers and familiarise themselves with the auction system.

Upon qualification and prior to the mock auction, Nkom will provide each qualified bidder with the necessary authentication credentials (digital certificate, username and login password) to access the AS, a user manual for the AS, and example files of the auction data files downloadable from the AS during the auction. Nkom will provide these to the authorised representative(s) stated as the bidder's representative in the registration form.

Any loss or damage of received confidential material must immediately be reported to Nkom.

The AS will run in a standard web browser and no specialist software is required. The AS user manual will include a list of supported web browsers. Bidders will need a reliable broadband Internet connection. Bidders will need to install the digital certificates provided by Nkom for

authentication purposes on any computer they may intend to use to access the auction system. Detailed instructions for installing the digital certificates used for authentication, accessing the auction system and submitting bids will be provided in the AS user manual.

## **10.2 Time frame**

Bidders will only be allowed to participate in the auction if they have participated in the mock auction, scheduled for [month/year]. Bidders might also be required to participate in a webinar explaining the auction process before the auction.

The real auction will begin on [date]. The initial bidding schedule for the lot assignment stage will be announced to bidders the day before the start of the auction.

Unless otherwise announced, bidding will be conducted within normal business hours on each business day until bidding has stopped. The actual progress of the auction will be decided on a day-to-day basis and set at the discretion of Nkom.

# **11 Conduct of the auction**

## **11.1 General rules across both stages**

### **11.1.1 Bid rounds**

A round is a fixed time window during which bidders may submit their bids. Rounds are scheduled by Nkom.

Once Nkom has scheduled a round, the following information will be available from the bidder interface of the AS:

- the time at which the round is scheduled to start;
- the scheduled duration of the round; and
- the time at which the round is scheduled to end.

Nkom may reschedule a round in accordance with Section 11.1.4.

### **11.1.2 Submission of bids**

Bidders may only submit bids during the time window specified by Nkom for each round. Bids must be submitted using the AS.

Submitting bids using the AS involves the following two steps:

- First, the bidder must enter the bids it wishes to submit in the round into a bid entry form provided by the AS. The completed form needs to be submitted to the auction server, where the bids will be checked against the auction rules. If the set of bids is invalid, the bid entry form will be reloaded with an error message informing the bidder of the reasons why the set of bids entered is invalid.
- If the set of bids is valid, the bidder will be provided with a bid confirmation form, pre-filled with the set of bids checked by the auction system. The bidder will then have the option to confirm the bids that have been checked or revert to the bid entry form (where the bids may be modified and then re-submitted for checking). Once the bidder has confirmed a set of bids in a round it cannot amend or withdraw any of the bids submitted, nor submit any further bids in that round.

Submissions are only accepted if confirmation has been received by the auction server within the specified round time (including any extension period that may apply to the bidder as set out in Section 11.1.3). Confirmations received outside this time window will be rejected.

Once the auction server has received confirmation from the bidder, the auction system will provide an acknowledgement page to the bidder setting out the details of the bid form submitted. This confirmation page will be displayed on the bidder's interface until the round ends, allowing the bidder to verify that the auction server has received the bidder's confirmation. It is the responsibility of the bidder to check the acknowledgement page provided by the auction system, and to alert Nkom if it believes that it has not been able to successfully make or confirm a submission due to a technical error in the AS.

### **11.1.3 Round extensions**

Bidders who are eligible to make bids in a round and fail to make a submission in accordance with Section 11.1 before the scheduled end time of a round may be granted an extension of up to 30 minutes (the 'extension period') to make their submission.

All bidders who are granted an extension will be allowed to submit bids during the extension period. However, bidders who are not granted an extension will not be allowed to submit bids during the extension period, even if other bidders have been granted an extension.

The extension period may be less than 30 minutes if all bidders who have been granted an extension submit their bids before the extension period reaches its maximum duration of 30 minutes.

Each bidder will begin the auction with two extension rights. A bidder who is granted an extension, will have an extension right deducted from its remaining extension rights.

Extensions are granted automatically if a bidder who is eligible to make bids in the round, and has extension rights left, does not submit its bid form before the scheduled end of the round. Therefore, a bidder who wants to reduce its demand to zero must explicitly place a clock bid of zero lots, as opposed to not placing a clock bid, to avoid activating a round extension.

#### **11.1.4 Exceptional circumstances**

In the case of exceptional circumstances during any stage of the auction, Nkom has discretion to:

- reschedule a round that has been scheduled but has not yet started;
- postpone the end of a round in progress or the release of round results;
- postpone the scheduling of a round;
- cancel a round that is underway or has already been completed;
- grant additional extension rights to a bidder;
- exclude one or more bidders from the auction; and/or
- cancel the auction.

Nkom determines whether a situation of exceptional circumstances has arisen. Exceptional circumstances could include, for example, widespread technical failure or concern about possible collusion amongst bidders.

## **11.2 Lot assignment stage**

### **11.2.1 Overview**

The lot assignment stage determines how frequency-generic lots are assigned amongst bidders. It takes place over multiple rounds of bidding.

Nkom will set a round price per lot for each lot category for each round (the 'clock prices'). Each bidder can then indicate the number of lots in each category it wishes to acquire at the prevailing clock prices. This defines the bidder's clock bid for that round. A clock bid is a single bid for one or more lots, potentially across multiple lot categories, with a single bid amount equal to the total price of all lots at clock prices.

A bidder's activity in a round is measured as the sum of eligibility points of all the lots included in its clock bid. A bidder's activity in the first round cannot exceed that bidder's initial eligibility. After the first round, a bidder's activity may not exceed its activity in the preceding round.

At the end of each round the AS assesses whether there is excess demand for any lot category at clock prices (i.e. if the total number of lots in that category specified in the clock bids submitted by all bidders in that round exceeds the number of lots available in that

category). If there is excess demand for any lot category, then the round price for that category will be increased and a new round will be run. Otherwise, this stage ends and bidders win the lots they specified in the clock bid they submitted in the final clock round, at the corresponding clock prices.

Where a bidder reduces its activity relative to the preceding round, it may place one or more 'exit bids' for the lots it dropped from its clock bid. An exit bid is an offer to buy, under conditions explained in detail in section 11.2.3.3 below, one or more lots within a particular lot category at a price per lot specified by the bidder.

The number of lots and prices that bidders can specify in exit bids are constrained by various activity rules. These are detailed in section 11.2.3.3 below, but the key rules are that bidders are only allowed to make exit bids if they reduce their overall demand, and then only for lots in categories for which the bidder is reducing its demand and which have had a price increase relative to the previous round. The bidder can choose the price per lot offered in its exit bids, but this must be between at least the previous round's clock price and less than the current round price.

There are a number of differences between clock bids and exit bids. First, whereas a single clock bid can include lots from different lot categories, an exit bid is for lots in only one lot category. However, it may be possible to make more than one exit bid in the same round for the same or for different lot categories.

Second, a clock bid is made at the clock prices specified by the auctioneer, whereas a bidder can choose the price per lot it offers in an exit bid (subject to constraints).

Third, an exit bid is a *conditional* offer to buy lots in a particular category in *addition* to a certain number of lots in that category – we call this number of lots the 'base' of that exit bid. An exit bid may only be selected as a winning bid if the bidder is already assigned the exit bid's base number of lots in that category. The base number of lots may be reached through the bidder's winning clock bid, or through any other exit bids with a smaller base.

An exit bid remains valid for subsequent rounds except where the bidder:

- increases the number of lots included in its clock bid in that lot category above the exit bid's base, in which case the exit bid is automatically cancelled; or
- chooses to withdraw the exit bid (when submitting a further clock bid).

If any lots remain unassigned after satisfying the demand in the winning clock bids, the auction software may select some exit bids as winning bids, in a way that maximises the total value of winning exit bids.

When selecting winning exit bids, the auction software will respect any applicable minimum bandwidth requirements for 3.6 GHz spectrum. Minimum bandwidth requirements only apply for bidders who have specified this in their application and have not made any clock bids for lots in the 3.6 GHz band which add up to a bandwidth that is less than this minimum.

Bidders who have a winning exit bid will be assigned the corresponding lots at the price specified in their winning exit bid.

### **11.2.2 Lots offered in the lot assignment stage**

Spectrum is offered in the lot categories listed in section 3.4.

### **11.2.3 Bids**

#### **11.2.3.1 Types of bids**

A bid is a price offer to acquire a package of lots indicated by the bidder.

There are two types of bids in the lot assignment stage:

- **clock** bids; and
- **exit** bids.

A clock bid may include one or more lots drawn from one or more categories. An exit bid includes lots in only one lot category.

#### **11.2.3.2 Clock bids**

A clock bid is an offer to buy one or more lots drawn from the various lot categories. A bidder makes a clock bid by specifying how many lots it wants to buy in each of the lot categories, subject to not violating the spectrum cap or the activity rules outlined in Section 11.2.6 below. Therefore, a clock bid is for a **package** of lots drawn from the various lot categories.

A clock bid must be placed at clock prices. Therefore, the bid amount is equal to the sum of the current round prices for all of the lots included (we call this the **round price** of the package). When making a clock bid using the AS, the bidder chooses the number of lots in each lot category and the bid amount will be set automatically to the round price of that package. This is the bidder's **demand** for that lot category in that round.

In each round, each bidder may submit at most one clock bid.

A bidder may make a bid for no lots in every lot category (an empty package) at a bid amount of zero. In this case, the bidder will not be eligible to submit any further clock bids. The bidder may be able to make one or more exit bids alongside this clock bid for an empty package. Any

valid exit bids will still be considered and may win even if a bidder has submitted a clock bid for an empty package.

If a bidder does not make a clock bid within the required deadline in a given round (including any extension granted to the bidder under the provisions set out in Section 11.1.3), then its clock bid for that round is a bid of zero for an empty package.

### **11.2.3.3 Exit bids**

Exit bids allow bidders to make 'final' offers for lots they drop from their clock bid. Each exit bid remains associated with the round in which it was made. A bidder may make multiple exit bids. If a bidder places exit bids across different lot categories in the same round, then these exit bids are not mutually exclusive. None, some or all of these exit bids could win.

An exit bid for a given lot category is defined by three parameters:

- the 'base', which is the number of lots in that category which the bidder must already win in order for the exit bid to be considered;
- the 'additional lots', which is the number of lots in that category demanded by the bidder in the exit bid; and
- the 'exit price', which is the price that the bidder offers to pay for each of the additional lots.

Exit bids submitted in a given round are for lots that are *additional* to the number of lots specified for its lot category in the bidder's clock bid for that round. Where a bidder makes a single exit bid for a lot category in a given round, the number of lots in that category in the bidder's clock bid for that round is the base for that exit bid.

Where the bidder makes a demand reduction of more than one lot in that lot category in its clock bid, then it may be able to make multiple exit bids for that category in that round, provided that the total number of additional lots across these exit bids does not exceed its demand reduction in the round, and are subject to the activity rules described in Section 11.2.6.4. The base for its first exit bid will be the number of lots in that category in its clock bid for that round. If the bidder makes a second exit bid for that category in that round, then the base for its second exit bid will then be the sum of the base and the additional lots in its first exit bid for that category for that round. If the bidder makes further exit bids for that category in that round, then the base for these bids will be the sum of the base and the additional lots in the preceding exit bid for that category in that round. Therefore, where a bidder makes multiple exit bids for a given lot category in a round, these build one upon another, allowing the bidder to make offers for lots it dropped from its clock bid in that round in one or more steps.



An exit bid may only become a winning bid if the bidder already wins *exactly* the number of lots in its base in the corresponding lot category, either through its winning clock bid or through winning exit bids with a smaller base.

For the avoidance of doubt, a bidder may place one or more exit bids when reducing its clock bid to a zero bid for an empty package. In this case, there is always potential for those exit bids to be accepted. Where the bidder does not make any exit bids when reducing its clock bid demand to **zero**, then none of its earlier exit bids in that category can win, as it will not be possible for the bidder to win the corresponding base number of lots for those exit bids.

The additional lots for an exit bid cannot be greater than the difference between the bidders demand for that lot category in the previous round, and the exit bid's base.

Exit bids are non-divisible. If an exit bid includes multiple additional lots, then the bidder will either be assigned all of those additional lots or none. Under this approach, a bidder does not face a risk of bidding for a certain number of lots in a category and then winning a smaller number unless the bidder explicitly bids for a smaller number of lots in that category. However, exit bids are evaluated independently for each lot category. Therefore, whether an exit bid for additional lots in a certain category can win does not depend on what the bidder wins in other lot categories.

Suppose that a bidder reduces its demand from six to two lots in lot category D. The bidder could, for example:

- Make a first exit bid for two additional lots, with base two. This exit bid would be for two additional lots conditional on the bidder already winning two lots. The bidder could then make a second exit bid for two further additional lots, with base four. This second exit bid would be for two additional lots conditional on the bidder already winning four lots. In this case, if the bidder were to win two D lots through its winning clock bid and/or through exit bids with base less than two, then it could end up winning a total of either two D lots (if none of these exit bids win), four D lots (if only its exit bid with base two wins) or six lots (if both of these exit bids win).
- Make an exit bid for four additional lots, with base two. In this case, the bidder could not make further exit bids linked to this demand reduction. Then, if the bidder were to win two D lots through its winning clock bid and/or through exit bids with base less than two, then it could end up winning a total of either two D lots (if this exit bid does not win) or six lots (if this exit bids wins).

*Example 1: Making multiple exit bids linked to the same demand reduction*

The exit price must be at least the clock price for the corresponding lot category in the previous round and must be strictly less than the clock price in the round when the exit bid is made. Where the bidder makes more than one exit bid for a lot category in the same round, then the exit price cannot be greater than that for other exit bids made for the same category in the same round which have a smaller base.

Suppose that we observe the following prices and bids for Bidder 1.

Round	Prices				Clock Bids				Price (NOK million)
	A	B	C	D	A	B	C	D	
1	25	50	100	25	3	1	1	6	375
2	30	100	100	30	3	1	1	2	350
3	35	150	100	35	3	0	1	2	275

At Round 2 prices, the bidder drops his clock bid demand by four D lots. At this point the bidder may also submit an exit bid for additional D lots at a price per lot of at least NOK 25 million and less than NOK 30 million. Suppose that the bidder makes an exit bid for two additional D lots at a price of NOK 29 million per lot. The base for this exit bid is two, and therefore this exit bid will only be eligible to become a winning bid if the bidder wins exactly two D lots through its clock bid in the final clock round and/or through any other exit bids it may submit in later rounds.

For instance:

- suppose that the auction ends with round 3, so that the bidder's winning clock bid includes two D lots – then its exit bid could potentially become a winning bid;
- suppose that in round 4 the bidder reduces its demand for D lots to zero and makes another exit bid for two D lots (with a base of zero), and that the auction ends at this point – then the bidder's exit bid for two D lots from round 2 may only become a winning bid if the bidder's exit bid for two D lots from round 4 also becomes a winning bid;
- suppose that in round 4 the bidder reduces its demand for D lots to zero without making any exit bids and the auction ends – then the bidder's exit bids from round 2 cannot become a winning bid, as it is not possible for the bidder to win its base of two D lots.

*Example 2: Potential for exit bids to win depending on the bidder winning the exit bid's base*

#### **11.2.4 Assessment of clock bids at the end of the round**

After each round, the AS will evaluate the clock bids received in the round in order to determine whether the auction can close or whether a further round is required.

The total clock demand for a lot category is equal to the sum of the number of lots in that category specified in all the clock bids received in a clock round. If the total clock demand exceeds the number of lots available in that lot category, then there is excess demand for that lot category.

The auction ends when there is no excess demand in any of the lot categories. Otherwise, a further round is needed.

#### **11.2.5 Round prices and price increments for ascending price rounds**

In the first round, the round price for each lot category will be equal to the reserve price for lots in that lot category.

If a further clock round is needed, then the clock price of lot categories for which there was excess demand in the preceding round must be increased. The clock price for lot categories for which there was no excess demand remains unchanged.

Nkom will determine the level of price increments.

#### **11.2.6 Activity rules**

##### **11.2.6.1 Eligibility points and activity**

Each lot will be assigned a number of **eligibility points**, indicated below.

<i>Lot category</i>	<i>Eligibility points per lot</i>
A	1
B	4
C	4
D	1

*Table 3 – Eligibility points per lot*

The **activity** of a bidder in a round is calculated as the sum of eligibility points of all lots included in its clock bid in that round.

##### **11.2.6.2 Bidder eligibility**

Each bidder will be assigned a **bidder eligibility** level for each round.

In the first round, due to constraints in the spectrum cap (see Section 3.2), the bidder eligibility will be 20 points. In subsequent rounds, the bidder eligibility will be equal to its activity in the preceding round.

**11.2.6.3 Activity rules for the submission of clock bids**

A bidder’s activity cannot exceed its eligibility for that round.

**11.2.6.4 Activity rules for the submission of exit bids**

Exit bids are optional and may be made when a bidder reduces overall demand. There is no requirement for a bidder to submit exit bids.

Exit bids relating to a reduction in demand can only be placed in the round in which the bidder made that demand reduction and cannot be amended or placed in subsequent rounds.

A bidder may not submit an exit bid in the first round. A bidder may submit one or more exit bids in a round after the first round in which that bidder’s activity is strictly less than its eligibility. If a bidder’s activity is equal to its eligibility, then that bidder may not submit any exit bids.

A bidder may only submit exit bids for a lot category in which it has reduced demand in the round. If the bidder submits exit bids for a given lot category in a given round, then the total number of additional lots in these exit bids may not exceed its demand reduction for that lot category in that round.

The sum of eligibility points of the additional lots included across all of the exit bids made in a given round cannot exceed the bidder’s reduction in activity relative to the preceding round. As a result, if a bidder switches activity across lot categories, then it may not be possible for a bidder to make an exit bid for all the lots it dropped in one category for which it has reduced its demand. The example below illustrates this.

Consider the following variation based on the previous example. Suppose that we observe the following prices and bids for Bidder 1.

Round	Prices				Clock Bids				Price (NOK million)	Activity
	A	B	C	D	A	B	C	D		
1	25	50	100	25	3	1	1	6	375	17
2	30	100	100	30	4	1	1	2	380	14

In this case the bidder may not place an exit bid for four additional D lots, as the total eligibility points associated with four D lots is four, but the bidder's reduction in activity relative to the preceding round is only three. Therefore, the maximum number of additional D lots for which the bidder can make an exit bid in relation to this reduction is three.

*Example 3: Submitting exit bids when partially switching demand to other lot categories*

#### **11.2.6.5 Cancellation of exit bids**

Any currently valid exit bids from earlier rounds will be listed in the bidder's bid form. Bidders may cancel one, several or all exit bids from earlier rounds when submitting their clock bid. For the avoidance of doubt, a bidder will not be able to withdraw its exit bids if its eligibility has dropped to zero, as from that point onwards it is unable to place any further clock bids.

If the bidder increases the number of lots in its clock bid for a given lot category, then any exit bids for that category from earlier rounds with a base which is strictly smaller than the number of lots in that category in the bidder's current clock bid will be automatically cancelled. The bidder can make new exit bids in later rounds if it subsequently reduces demand again for that lot category. Otherwise, exit bids remain valid unless explicitly withdrawn by the bidder in a subsequent round.

#### **11.2.7 Minimum bandwidth requirement for 3.6 GHz spectrum**

Bidders may specify a minimum bandwidth requirement for the 3.6 GHz band on their application. The minimum bandwidth requirement is to prevent an outcome in which the bidder receives an amount of spectrum in this band (in relation to exit bids for C and D lots) which it considers insufficient for its business case. The minimum bandwidth requirement will only apply if none of the clock bids placed by the bidder throughout the auction included some C and/or D lots which added to a total bandwidth strictly less than the minimum bandwidth requirement specified by the bidder on its application.

Notice that as a result, the minimum bandwidth requirement is only relevant if the bidder has not included any C and D lots in the clock bid it submitted in the final clock round (as otherwise either this clock bid already meets the minimum bandwidth requirement, or otherwise it cancels it).

Where a minimum bandwidth requirement for the 3.6 GHz band applies to a bidder, then the total bandwidth assigned to the bidder across C and D lot categories through exit bids will be either zero or at least this minimum bandwidth requirement.

### **11.2.8 Information available at the end of each round**

At the end of each round, Nkom will inform each bidder of:

- whether a further round is needed;
- the lot categories for which the price will be increased in the following round;
- its own bidding eligibility for the following round; and
- its own clock bid and any exit bids held by the bidder at the end of the round.

### **11.2.9 Selection of winning bids**

When the lot assignment stage ends, each bidder will be assigned the lots included in the clock bid it submitted in the final clock round and required to pay the final clock prices for these lots.

In the event that any lots remain unassigned after assigning to bidders the lots indicated in their clock bid in the final clock round, the auction system will identify any winning exit bids as follows.

If any A lots remain unassigned, then the system will select the combination of exit bids for A lots that generates the highest value (ties broken at random) that satisfies the following conditions:

- the total number of A lots in the exit bids in the combination does not exceed the number of lots that remained unassigned after assigning the lots in the winning clock bids; and
- an exit bid can only be included in the combination if the bidder is also assigned the base number of lots for that exit bid, through its winning clock bid and any other exit bids with a smaller base.

Suppose that the auction ends with three A lots remaining unassigned after satisfying winning clock bids.

Suppose that we have only received four exit bids for additional A lots:

- Bidder 1 made an exit bid for three additional A lots when it reduced its demand from five to two A lots, offering NOK 39 million. Bidder 1 ended with a clock bid including two A lots, which is the base for its exit bid. Therefore, bidder 1's exit bid can be selected as a winning bid.

- Bidder 2 made an exit bid for three additional A lots when it reduced its demand from five to two A lots, but then it further reduced its demand from two to zero A lots without making an exit bid. Therefore, bidder 2's exit bid cannot be selected as a winning bid, as bidder 2 cannot win the number of lots in the exit bid's base through its clock or subsequent exit bids.
- Bidder 3 made an exit bid for two additional A lots when it first reduced its demand for A lots from four to two, offering NOK 35 million per lot (the base for this exit bid is thus two); and a second exit bid for two additional A lots when it last reduced its demand for A lots from two to zero, offering NOK 40 million per lot (the base for this exit bid is thus zero). Bidder 3 does not win any A lots through its final clock bid. Therefore, its second exit bid can be selected as a winning bid, as it has base zero, but its first exit bid can only be selected as winning if its second exit bid also wins, so that the bidder wins the first exit bid's base of two lots – however, notice that this will not be possible, as only three A lots remain unassigned after satisfying winning clock bids.

In this scenario we would select bidder 1's exit bid as a winning bid, as this generates the highest value. Note that whilst the price per lot offered by Bidder 3 in its second exit bid is higher, accepting this bid would leave one lot unassigned. The total value when accepting Bidder 1's exit bid is therefore NOK 117 million (three times NOK 39 million), whilst the total value when accepting Bidder 3's second exit bid is only NOK 80 million (twice NOK 40 million).

*Example 4: Selection of winning bids for A lots*

If the B lot is not assigned through clock bids and there is at least one exit bid for the B lot, then the highest exit bid for the B lot (ties broken at random) will be selected as a winning bid and the B lot will be assigned at the price indicated in the bid.

If any C and/or D lots remain unassigned, then the system will select the combination of exit bids for C and D lots that generates the highest value (ties broken at random) that satisfies the following conditions:

- the total number of C lots in the exit bids in the combination does not exceed the number of lots that remained unassigned after assigning the lots in the winning clock bids;
- the total number of D lots in the exit bids in the combination does not exceed the number of lots that remained unassigned after assigning the lots in the winning clock bids;

- an exit bid for a given category can only be included in the combination if the bidder is also assigned the base number of lots for that exit bid, through its winning clock bid and any other exit bids with a smaller base; and
- if any exit bids are included for a bidder to whom a minimum bandwidth requirement applies, then the total amount of spectrum across all of the exit bids for that bidder is at least the bidder's minimum bandwidth requirement.

Suppose that the auction ends with two D lots remaining unassigned after satisfying winning clock bids.

Suppose that we received the following bids for 3.6 GHz lots:

- Bidder 1, when reducing its demand from one C lot and four D lots to zero, made an exit bid for one C lot at a price per lot of NOK 150 million, with base zero; an exit bid for two D lots at a price per lot of NOK 42 million, with base zero; and an exit bid for two D lots at a price per lot of NOK 40 million, with base of two. As the clock bid when making the exit bids did not include any C or D lots, all of these bids could in principle be selected as winning bids – however, as only two D lots remain unassigned, only the exit bid for two additional D lots with base zero can be accommodated.
- Bidder 2 made an exit bid for two additional D lots when it reduced its demand from four to two D lots, with a base of two, at a price per lot of NOK 34 million. Bidder 2 eventually won two D lots with its final clock bid. Therefore, bidder 2's bid can be selected as a winning bid, as the bidder is already winning the base of two D lots.

Suppose that no minimum bandwidth requirement applies to bidder 1. In this case, its exit bid for two D lots, at NOK 42 million per lot, is selected as a winning bid.

Conversely, suppose that bidder 1 had specified a minimum bandwidth requirement of 40 MHz. In this case, as it is not possible for bidder 1 to win at least this bandwidth, we cannot accept its exit bid for two additional D lots with base zero (as this would leave the bidder with a total bandwidth which is less than its minimum bandwidth requirement), and thus we select bidder 2's exit bid as winning instead.

*Example 5: Selection of winning exit bids for 3.6 GHz spectrum*

#### **11.2.10 Information available at the end of the lot assignment stage**

At the end of the lot assignment stage, Nkom will inform each bidder of its winning bids.



## 11.3 Frequency assignment stage

### 11.3.1 Overview

The frequency assignment stage will determine the specific frequencies assigned to bidders who have been assigned A, C and/or D lots in the lot assignment stage. The process is run separately for each band, but simultaneously.

The AS will first calculate the possible assignments of blocks in each of the lot categories and assess whether any bidders have alternative options. Where bidders have alternative options for one or both bands, then a single round will be run, in which bidders will be able to make one submission with any bids they wish to make for their preferred options, for both bands. Nkom will then calculate the winning assignment plan and notify results for both bands.

### 11.3.2 Identification of candidate plans

Nkom will identify the **candidate plans** for each band, which are those assignments of blocks in which:

- each bidder receives a number of frequency blocks that exactly corresponds to the number of frequency-generic lots they have won;
- each of the bidders who is assigned multiple blocks is assigned a contiguous set of frequency blocks; and
- all the unsold frequency blocks form a contiguous set of frequency blocks at the lower part of the band.

The identification of candidate plans for each band will be done by placing unsold spectrum at the bottom of the band and then considering all the possible orders in which winners could be placed in the rest of the band.

Suppose that two bidders (bidder1 and bidder2) have each won four A lots and a third bidder (bidder3) has won six A lots. The candidate plans for assigning 2.6 GHz FDD are obtained by creating all the possible orders of the winners in the band, i.e.:

- plan i: bidder1 (A1-A4), bidder2 (A5-A8), bidder3 (A9-A14);
- plan ii: bidder2 (A1-A4), bidder1 (A5-A8), bidder3 (A9-A14);
- plan iii: bidder1 (A1-A4), bidder3 (A5-A10), bidder2 (A11-A14);
- plan iv: bidder2 (A1-A4), bidder3 (A5-A10), bidder1 (A11-A14);
- plan v: bidder3 (A1-A6), bidder1 (A7-A10), bidder2 (A11-A14); and
- plan vi: bidder3 (A1-A6), bidder2 (A7-A10), bidder1 (A11-A14).

*Example 6: Identification of candidate plans*

### 11.3.3 Identification of frequency options for each bidder

Nkom will identify, for each band and each bidder, the alternative combinations of frequency blocks that might be assigned to the bidder. We call these the bidder's 'frequency options'. Bidders will be allowed to make bids for their alternative options to express their preferences.

Following from example 6, the frequency options for each bidder for 2.6 GHz FDD blocks would be:

- for bidder1: A1-A4, A5-A8, A7-A10 and A11-A14;
- for bidder2: A1-A4, A5-A8, A7-A10 and A11-A14; and
- for bidder3: A1-A6, A5-A10 and A9-A14.

*Example 7: Identification of frequency options*

### 11.3.4 Bidding process for the frequency assignment stage

#### 11.3.4.1 Participation in the bidding process

Bidders who have won A, C and/or D lots can participate in the bidding process – we refer to these as the **assignment bidders**.

The bidding process will consist of a single sealed-bid round in which each assignment bidder will be allowed to submit a single set of bids for its alternative frequency options. Bids for different frequency options for a given band are mutually exclusive – the bidder will be assigned exactly one option for that band.

Assignment bidders are not required to submit bids in the frequency assignment stage. An assignment bidder who does not submit any bids for its frequency options will not have to pay a frequency assignment price, but will still be assigned one of its frequency options.

By submitting bids for some or all of its frequency options, an assignment bidder may be able to obtain a frequency option that it prefers over its alternative frequency options. However, this may be subject to the assignment bidder paying a 'frequency assignment price', calculated as described in Section 11.3.4.4. Where applicable, frequency assignment prices will be charged in addition to the bidder's lot assignment price.

#### 11.3.4.2 Making bids in the frequency assignment stage

A frequency assignment bid is the maximum price, in whole NOK, that the assignment bidder is offering to pay to be assigned a specific frequency option. Assignment bidders will be assigned exactly one frequency option in each band; therefore, bids for alternative frequency options for the same band are mutually exclusive.

At the scheduled round start time, the AS will present each assignment bidder with the bid entry form that lists the bidder's frequency options in both bands. Assignment bidders may then enter a bid for each of its frequency options.

An assignment bidder does not need to enter a bid for all the frequency options for which it can bid. The bid for frequency options for which the assignment bidder does not enter a bid will be zero. The assignment bidder may still be assigned one of these options, but in this case its frequency assignment price will be zero.

Assignment bidders should enter all the bids they wish to submit into the form. The assignment bidder must then submit its bids in accordance with the procedure described in Section 11.1.

#### **11.3.4.3 Determination of winning frequency assignment plans**

The **total value** of a candidate plan is the sum of the bids from each assignment bidder for the frequency option it would be assigned in this candidate plan.

The winning frequency assignment plan must achieve the maximum total value across all of the candidate plans for the corresponding band. If several candidate plans achieve the maximum total value for the band, then one of these will be randomly selected as the winning frequency assignment plan for this band.

Following from examples 6 and 7, suppose that for the assignment of specific 2.6 GHz frequencies we receive the following bids:

- bidder1: NOK 1,000 for A1-A4, NOK 0 for its other options;
- bidder2: NOK 10,000 for A5-A8, NOK 0 for its other options; and
- bidder3: NOK 10,000 for A9-A14, NOK 0 for its other options.

In this case the value of the candidate winning plans would be:

- plan i:  $\text{NOK } 1,000 + \text{NOK } 10,000 + \text{NOK } 10,000 = \text{NOK } 21,000$ ;
- plan ii:  $\text{NOK } 0 + \text{NOK } 0 + \text{NOK } 10,000 = \text{NOK } 10,000$ ;
- plan iii:  $\text{NOK } 1,000 + \text{NOK } 0 + \text{NOK } 0 = \text{NOK } 1,000$ ;
- plan iv:  $\text{NOK } 0 + \text{NOK } 0 + \text{NOK } 0 = \text{NOK } 0$ ;
- plan v:  $\text{NOK } 0 + \text{NOK } 0 + \text{NOK } 0 = \text{NOK } 0$ ; and
- plan vi:  $\text{NOK } 0 + \text{NOK } 0 + \text{NOK } 0 = \text{NOK } 0$ .

Therefore, the winning plan is candidate plan i.

Now suppose that we receive the following bids instead:

- bidder1: NOK 1,000 for A1-A4, NOK 0 for its other options;
- bidder2: NOK 10,000 for A1-A4, NOK 0 for its other options; and
- bidder3: NOK 10,000 for A9-A14, NOK 0 for its other options.

In this case the value of the candidate winning plans would be:

- plan i:  $\text{NOK } 1,000 + \text{NOK } 0 + \text{NOK } 10,000 = \text{NOK } 11,000$ ;
- plan ii:  $\text{NOK } 10,000 + \text{NOK } 0 + \text{NOK } 10,000 = \text{NOK } 20,000$ ;
- plan iii:  $\text{NOK } 1,000 + \text{NOK } 0 + \text{NOK } 0 = \text{NOK } 1,000$ ;
- plan iv:  $\text{NOK } 10,000 + \text{NOK } 0 + \text{NOK } 0 = \text{NOK } 10,000$ ;
- plan v:  $\text{NOK } 0 + \text{NOK } 0 + \text{NOK } 0 = \text{NOK } 0$ ; and
- plan vi:  $\text{NOK } 0 + \text{NOK } 0 + \text{NOK } 0 = \text{NOK } 0$ .

Therefore, the winning plan in this case is candidate plan ii.

*Example 8: Determination winning frequency assignment plan*

#### **11.3.4.4 Determination of frequency assignment prices**

Frequency assignment prices are calculated for each band separately.

The **minimum price for an assignment bidder** in a band is:

- the maximum total value that could be achieved across all candidate plans if all the assignment bids from this assignment bidder were set to zero; minus
- the sum of bids made by each other assignment bidder for the frequency option it is assigned in the winning frequency assignment plan.

The **minimum price for a group of assignment bidders** in a given band is:

- the maximum total value that could be achieved across all candidate plans if all the assignment bids from all the assignment bidders in the group were set to zero; minus
- the sum of bids made by each assignment bidder not in the group for the frequency option it is assigned in the winning frequency assignment plan.

The frequency assignment prices for each band, consisting of one price for each of the assignment bidders with more than one option in that band, are in whole NOK and must satisfy the following conditions:

- the frequency assignment price for each assignment bidder is at most its bid for the frequency option it is assigned in the winning frequency assignment plan;
- the frequency assignment price for each assignment bidder is at least its minimum price;
- the sum of the frequency assignment prices for each group of assignment bidders must be at least the minimum price for the group;
- the sum of the frequency assignment prices across all assignment bidders is the smallest across all possible frequency assignment prices for that band that satisfy the conditions above; and
- the sum of squared differences between each assignment bidder's minimum price and its frequency assignment price is the smallest across all possible frequency assignment prices for that band that satisfy the conditions above.

Following from examples 6, 7 and 8, consider the case where bids were:

- bidder1: NOK 1,000 for A1-A4, NOK 0 for its other options;
- bidder2: NOK 10,000 for A5-A8, NOK 0 for its other options; and
- bidder3: NOK 10,000 for A9-A14, NOK 0 for its other options.

and the winning plan is candidate plan i.

The minimum price for bidder1 is calculated as follows:

- if all bidder1's bids are set to zero, the maximum value across all candidate plans would be NOK 20,000 (achieved with plan i);
- the sum of bids by other bidders for their options in the winning frequency assignment plan is also NOK 20,000;
- therefore, the minimum price for the group of bidder1 is NOK 0.

We can do the corresponding calculations for bidder2 and bidder3 to obtain that their individual minimum price is also NOK 0.

The minimum price for the group of bidders {bidder1 & bidder2} is calculated as follows:

- if all the bids from bidder1 and bidder2 are set to zero, the maximum value across all candidate plans would be NOK 10,000 (achieved with plan i or plan ii);

- the sum of bids by other bidders (bidder3) for their options in the winning frequency assignment plan is also NOK 10,000;
- therefore,, the minimum price for the group of {bidder1 & bidder2} is NOK 0.

We can do the corresponding calculations for the groups {bidder1 & bidder3}, {bidder2 & bidder3}, and {bidder1 & bidder2 & bidder3} to obtain that the minimum price for these groups is also NOK 0.

Therefore, the second and third conditions for the frequency assignment prices simply require that prices cannot be negative. There is only one set of prices that satisfies the first three conditions which achieves the smallest sum of prices, which is that in which all frequency assignment prices are zero. Therefore, in this example all bidders obtain their preferred option in this band without having to pay anything extra.

Conversely, consider the case where bids are:

- bidder1: NOK 1,000 for A1-A4, NOK 0 for its other options;
- bidder2: NOK 10,000 for A1-A4, NOK 0 for its other options; and
- bidder3: NOK 10,000 for A9-A14, NOK 0 for its other options.

And the winning plan is plan ii.

The minimum price for bidder1 is still NOK 0, as this bidder wins an option for which it has not made a positive bid:

- if all bidder1's bids are set to zero, the maximum value across all candidate plans would be NOK 20,000 (achieved with plan ii);
- the sum of bids by other bidders for their options in the winning frequency assignment plan is also NOK 20,000;
- therefore, the minimum price for the group of bidder1 is NOK 0.

The minimum price for bidder3 is also still NOK 0, as:

- if all bidder3's bids are set to zero, the maximum value across all candidate plans would be NOK 10,000 (still achieved with plan ii, as bidder2 has made a higher bid for A1-A4 than bidder1);
- the sum of bids by other bidders for their options in the winning frequency assignment plan is also NOK 10,000;
- therefore, the minimum price for the group of bidder3 is NOK 0.

However, the minimum price for bidder2 is now NOK 1,000:

- if all bidder2's bids are set to zero, the maximum value across all candidate plans would be NOK 11,000 (achieved with plan i, in which bidder1 would be assigned A1-A4);
- the sum of bids by other bidders for their options in the winning frequency assignment plan is also NOK 10,000 (only from bidder3, as bidder1 had bid NOK 0 for the option it is assigned);
- therefore, the minimum price for the group of bidder2 is NOK 11,000 – NOK 10,000 = NOK 1,000.

We can run the calculations for groups of bidders to obtain that the minimum price is only positive for the group {bidder2 & bidder3}, where it is the same as for bidder2 individually.

Therefore, the second condition for the frequency assignment prices requires that the price for bidder2 must be at least NOK 1,000, and for other bidders prices cannot be negative. The third condition is automatically satisfied if the second condition is satisfied, as if the price for bidder2 is at least NOK 1,000 then the sum of prices for bidder2 and bidder3 is also at least NOK 1,000.

There is only one set of prices that satisfies the first three conditions which achieves the smallest sum of prices, which is that in which the price for bidder2 is NOK 1,000 and the prices for bidder1 and bidder3 are zero. Therefore, in this example bidder2 obtains its preferred option, but in doing so it denies this option to bidder1, and thus the price for bidder2 is at the amount that is needed to outbid bidder1.

#### *Example 9: Determination of frequency assignment prices*

##### **11.3.5 End of the frequency assignment stage**

At the end of the frequency assignment stage, Nkom will inform each bidder of:

- the frequencies it will be assigned in each band in which it has won lots; and
- the frequency assignment price (if any) it has to pay for each of the bands.

The auction will then end.

##### **11.4 End of the auction**

At the end of the auction Nkom will inform all bidders of:

- the frequencies assigned to each bidder;
- the winning frequency assignment plan for each band; and
- the total price for each of the bands that each bidder will be required to pay for its assignment.

The award process will then proceed to the payment and issuing of licences.

### **11.5 In the event of unsold spectrum – reservation for reassignment**

If one or more lots in the 2.6 GHz and/or the 3.6 GHz band remain unsold when the auction ends, Nkom reserves the right to reassign frequencies assigned in this auction.

Reassignment/adjustment of placement of frequencies will be done to ensure efficient spectrum management. Nkom aims on an overall basis to ensure that each licensee in each band can be assigned contiguous frequencies. Any potential costs incurred by licensees arising from a possible reassignment of frequencies will need to be borne by each licensee and will not be covered by Nkom or by the auction revenue.

## **12 Payment and issuing of licences**

### **12.1 Notification**

After the auction has been concluded, winning bidders will receive a notification from Nkom stating which frequencies the bidder will be assigned and the total price for each of the bands the bidder will be required to pay. The winning bidders will be given a few weeks from receiving this notification to report back to Nkom on which option for payment, see Section 12.2.2, the bidder opt for.

### **12.2 Payment of bids**

#### **12.2.1 Payment information**

Unless Nkom inform the winning bidders otherwise, payment shall be made to:

Nasjonal kommunikasjonsmyndighet  
Postboks 93  
N-4791 Lillesand  
Norway  
DNB - acc.nr. 7694 05 01632

In case of international money transfers, the following additional information must be included:



IBAN: NO 79 7694 05 01632

SWIFT: DNBANOKKXXX

Bank: DNB

### 12.2.2 Payment options

The total price for the winning bidders assignment in each band may be paid in full or in equal instalments in accordance with option 1 or 2 below.

Options	Payment periode	Interest
1	5 years	0 %
2	20 years	6 %

*Table 4 – Payment options in instalments of the total price for each of the bands*

Once the winning bidder has decided on a payment option it is not possible to switch to another payment option.

### 12.2.3 Deadline for payment

The winning bidders shall pay the total price for the assignment in the **3.6 GHz band** in full or the first instalment of their total price for the assignment in that band by [date].

The winning bidders shall pay the total price for the assignment in the **2.6 GHz band** in full or the first instalment of their total price for the assignment in that band by **15 December 2022**.

The Authorities must receive payment for the full amount or the first instalment of the winning bidder's assignment price for the band the licence applies to, before the licence is issued.

For winning bidders who are paying in instalments over five or 20 years, the rest of the total price for each band shall be paid in accordance with the spectrum licences.<sup>5</sup>

### 12.2.4 Reduction in the total price in accordance with optional coverage obligation

The total price for each band the winning bidder are required to pay may be subject to a reduction in accordance with the coverage obligation in the draft licences and appendix 1 to the draft licences.

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<sup>5</sup> See draft licence for the 2.6 GHz band Section 10 and draft licence for the 3.6 GHz band Section 12

### **12.3 Cover under the bank guarantee**

In the case of non-payment, delayed or incomplete payment by a bidder of the total price or the first instalment of the total price for its assignment in each band following Section 12.2, Nkom has the right to demand payment under the guarantee to cover the price(s) in full or any unpaid portion of the price(s).

If delayed payment is caused by events constituting force majeure under Norwegian law, Nkom will prolong the deadline for payment accordingly.

Nkom may claim damages under the guarantee.

### **12.4 Return of the bank guarantee**

The guarantee is returned to the bidder in the case where:

- the application to register for the auction is rejected;
- the auction procedure has been completed and the bidder had no licence assigned; or
- the auction procedure has been completed and the bidder has paid the full amount or the first instalment of the total price for its assignment in each band and had all their licences assigned.

### **12.5 Issuing of licences**

The licences in the 2.6 GHz and 3.6 GHz bands will be issued separately, when a winning bidder has paid the full amount or the first instalments of the total price it is liable for its assignment in the relevant frequency band.

## **13 Announcement and publication of results**

After winning bidders have been notified with the result of the auction, Nkom will make a public announcement with the following information:

- The number of participants in the auction
- The identity of winning bidders
- The frequencies assigned to the winning bidders
- The total prices for the assignment in each frequency band that each bidder will be required to pay for its assignment (including the totals and a breakdown for the lot assignment stage and the frequency assignment stage)
- Which bidders opted for the coverage obligation and the reduction in the total price for each band each bidder will be granted

All participants and licensees in the band will be notified before Nkom makes the public announcement.

The participants in the action shall not announce or publish information about the auction before Nkom has made the above-mentioned public announcement.

Public disclosure of identity of participants and bids is subject to Norwegian Public Administration Act and the act relating to public access to documents in the public administration (Freedom of Information Act).

Nkom will not publish information about losing bids, but assess the grounds for confidentiality for bid data and identity of participants if there are requests for disclosure.

## **14 Communication with Nkom**

### **14.1 Questions made in writing**

Questions concerning the auction rules and the auction process can be addressed to Nkom. All interested parties are entitled to submit questions to Nkom. Questions and other communication should be made in writing to [firmapost@nkom.no](mailto:firmapost@nkom.no) with a copy to [avi@nkom.no](mailto:avi@nkom.no) and [yvk@nkom.no](mailto:yvk@nkom.no). Mark the e-mail "Questions – spectrum assignment 2021".

Questions should be submitted in Norwegian with an English translation. The estimated response time to questions could be up to five working days. Nkom reserves the right not to answer questions received within the last five working days before the auction.

Nkom will publish all questions submitted and Nkom's answers on Nkom's website. The identity of the party who submitted the question will not be published.

### **14.2 Telephonic communication with Nkom**

A dedicated phone number at Nkom will be provided for qualified bidders for use during scheduled check of login credentials, test auction and the real auction in case a bidder needs to contact Nkom, for example if the bidder should experience technical problems.

Nkom will provide bidder's representative(s) with caller codes. When contacting Nkom or if Nkom needs to contact the bidder's representative(s), the caller will need to request that the other party state a code according to the caller codes in order to identify the caller as the bidder's representative or Nkom.