

# Auction of 3G and BWA spectrum

## Auction rules

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# Outline

- 3G auction format
- Eligibility conditions
- Activity rules
- Provisional winning bidders
- Price increments
- Closing conditions
- Round scheduling and extensions
- Information policy
- Other auctions
- Security of the auction process

# Auction format

- The 3G and BWA auctions will have two stages:
  - In **Stage I - the clock stage** - the winners of a generic lot in each circle are determined
  - In **Stage II - the frequency identification stage** - the specific frequencies allocated to winning bidders in each circle are determined (where there is more than one frequency block available, so not required for the 800MHz auction)
- The clock stage determines a **common winning price** for a generic lot in each circle where spectrum is available
- The frequency identification stage randomly allocates specific frequency blocks to successful bidders in circles where they won a generic lot in the clock stage

# Clock stage – overview I

- There will be **simultaneous bidding** for **generic lots** in each of the 22 circles where spectrum is available
- The clock stage will consist of a number of **clock rounds**
- The first clock round will begin with all lots in a circle being offered at the **reserve price**
- For each circle, bidders will be asked to state whether they wish to bid for **one lot**
- The ability to make bids is subject to the number of **eligibility points** held by bidders, **deposit requirements** and **activity rules** (explained in detail later)
- When the clock round finishes, the bids in each circle will be **ranked** (methodology explained later)
- Where there are  $n$  lots available in a circle, the bidders ranked 1 to  $n$  will be declared **provisional winning bidders**

# Clock stage – overview II

- If **total demand** in a circle is not less than number of lots available, the price of a lot will be increased in the following clock round, with the **price increment** linked to the level of **excess demand**
- In the following clock round, bidders state whether they wish to bid for one lot in each circle at the new prevailing prices
- Clock rounds continue until demand for lots in each circle at current clock price is less than or equal to the number of lots available in that circle (**closing rule** explained in detail later)
- Once the clock stage closes, the current provisional winners are declared **winning bidders**
- The lowest winning bid will determine the **common winning price** for all winners in that circle

# Eligibility to make bids

- Each lot has been assigned a specific number of **eligibility points**, based on the reserve price of licences in that circle

Service area type	Eligibility points
Delhi, Mumbai and Category A	32
Kolkata and Category B	12
Category C	3

- Each bidder has an initial number of eligibility points in the first round based on the Earnest Money Deposit
- A bidder will maintain or lose part or all of its eligibility to bid in subsequent clock rounds depending on its bid in the current clock round and on the auction **activity rules**
- These rules allow bidders flexibility to switch between circles (except if they are currently a provisional winner in any circle, in which case, they can switch from that circle only after they are overbid)

# Deposit requirements

- Each service area has a deposit requirement

<b>Service area type</b>	<b>Deposit required</b>
Delhi, Mumbai and Category A	Rs. 40 Crore
Kolkata and Category B	Rs. 20 Crore
Category C	Rs. 7.5 Crore

- In any round, any bid for a combination of service areas must have a total deposit requirement less than the Earnest Money Deposit made
- Initial eligibility will be determined by the Earnest Money Deposit and will equal the greatest eligibility amongst combinations of service areas for which bids can be made within the deposit requirements
- The Notice will contain full details of these rules

# Activity rules

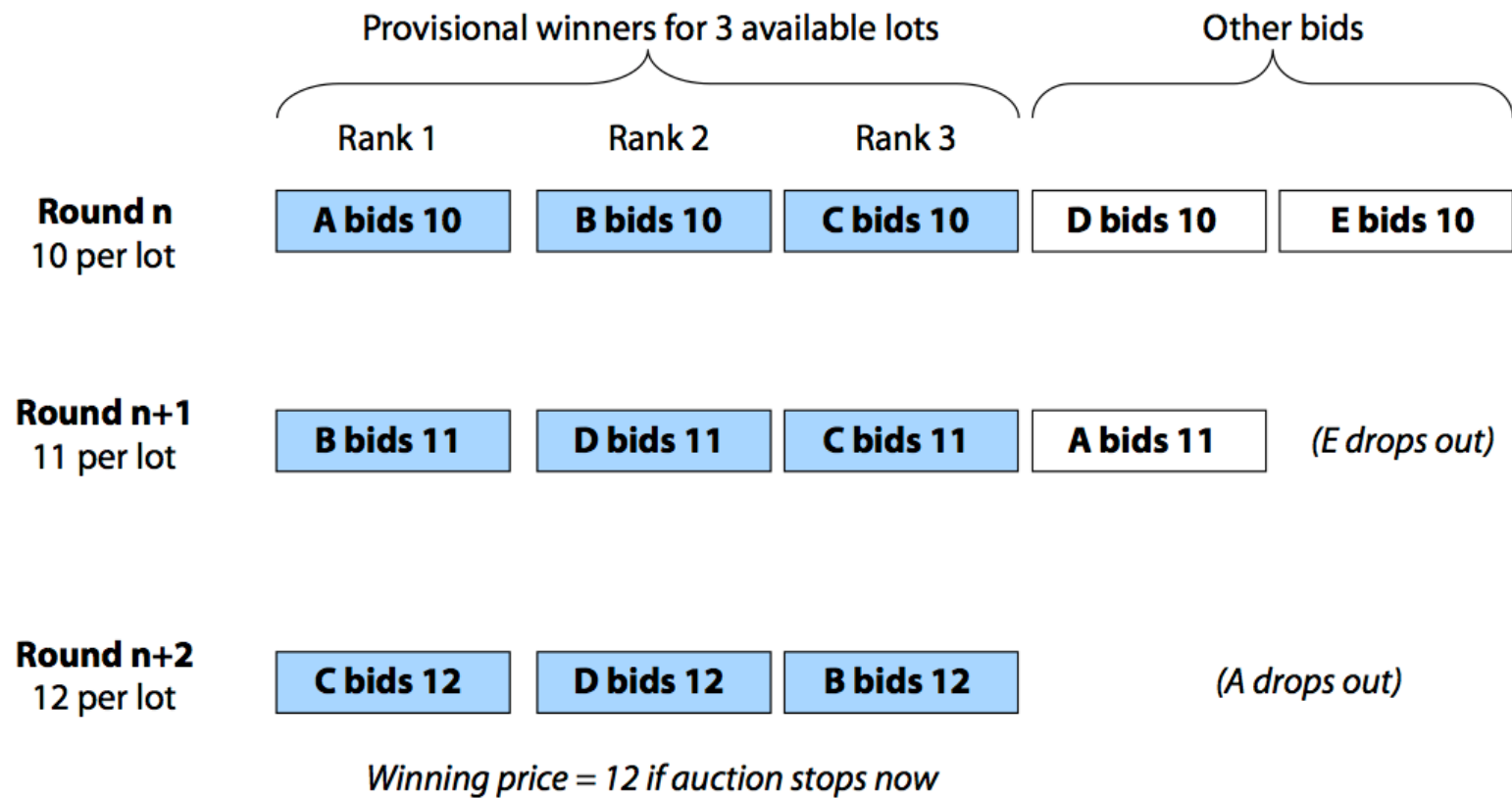
- A bidder's **activity** in a clock round is the sum of:
  - the number of eligibility points associated with circles in which the bidder has been determined to be a **provisional winner** at the end of the last completed clock round; and
  - the eligibility points associated with circles where the bidder has made **new bids** (i.e. bids where it was not a provisional winner in the previous round)
- A bidder must demonstrate bid activity in each clock round that equals or exceeds a certain percentage of its eligibility, otherwise its eligibility will be reduced proportionately in the following round
- This percentage (**auction activity requirement**) will increase over the duration of clock stage, moving from 80% to 90% and then to 100%
- These increases will be made by the auctioneer as overall bidding activity across all circles declines



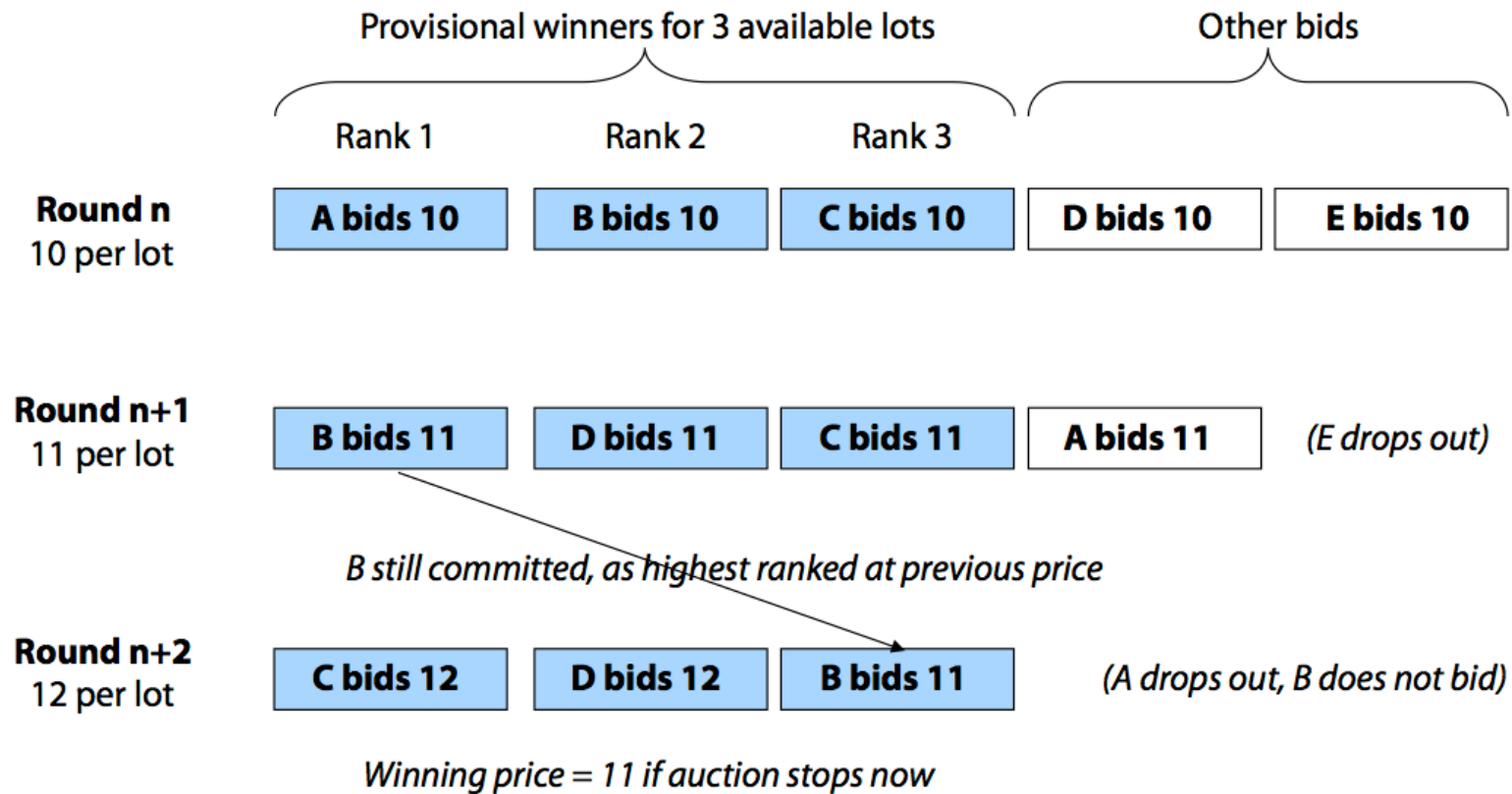
# Provisional winning bidders and prices

- At the end of a clock round, and for each circle, each bidder's highest bid made *so far in any round* is taken and these bids are ranked by the following criteria (listed in order of precedence):
  - value of bid in that circle
  - round in which bid was made (earlier ranked higher)
  - total value of bids across all circles
  - randomly
- The relative ranking of any bids carried over from previous rounds will be preserved
- Where there are  $n$  lots available in a circle, bidders ranked 1 to  $n$  will be declared provisional winning bidders
- The provisional winning price associated with these bids will be equal to the lowest clock round price at which the provisional winning bidders submitted their bids

# Stylised example of round dynamics (I)



# Stylised example of round dynamics (II)



# Price increments

- **Excess demand** in a circle is defined as
  - the total demand for lots in that circle at the *current* clock round price in the last completed clock round **minus**
  - the number of lots available in that circle
- If excess demand is **negative**, the clock round price in the following clock round will remain **unchanged**
- If excess demand is **zero or positive**, the price set for the following clock round will be the current clock round price plus a **price increment** related to the level of excess demand
- *Proposing a variation from the price rule in Revised IM (to be confirmed in the Notice)*

Excess demand	Proportional price increment
0	1% (currently 2% in IM)
1	2% (currently 5% in IM)
2	5%
3 or more	10%

Service area type	Maximum absolute increment
Delhi, Mumbai and Category A	Rs. 40 Crore
Kolkata and Category B	Rs. 20 Crore
Category C	Rs. 7.5 Crore

# Closing rule

- The final clock round will be the first clock round in which
  - for each circle, the number of bids at the current clock round price is less than or equal to the number of lots available in that circle; **and**
  - the auction activity requirement is 100%
- This rule means that a current provisional winner is not guaranteed to become a winner unless:
  - it raises its bid to the next clock price; **or**
  - there is another provisional winner with a strictly lower bid

*(In the latter case, there is no excess demand and the next round will have the same clock price as the current round)*

# Round scheduling and extensions

- Default timetable for clock rounds:
  - Clock round start times Monday - Friday, between 09.00 and 17.30
  - Minimum round length of 20 minutes
  - Minimum time between rounds of 20 minutes
- Given this, bidders will have the ability to extend rounds
  - Extension budget of 4 hours (proposed increase from 2 hours in the revised IM) held by each bidder
  - Extension budget reduced in 10-minute intervals
  - Bidders can extend any one clock round by a maximum of 1 hour (proposed increase from 30 minutes in the revised IM)

# Contingency measures

- Bids must be made through the electronic auction system and will not be accepted by any other means
- Extensions are available to safe-guard against minor technical problems and bidders should consider carefully the implications of deliberately using the extension budget to buy time for their decisions
- In the event of any widespread technical problem affecting multiple bidders, the auctioneer may exceptionally:
  - Defer the end of a round in progress and re-announce a new closing time
  - Cancel and re-run a round provided no results have been released
- Bidders will be given opportunity to access the electronic auction system prior to the auction and check that their systems work
- Bidders are recommended to have multiple computers on independent Internet connections available in different locations

# Information policy for the clock rounds

- Limited transparency of bids during the auction
- Before the relevant auction the following information will be made public about each bidder
  - Ownership structure
  - Amount of Earnest Money Deposit submitted
- At the end of each clock round (and for each circle) information circulated to all bidders will be confined to:
  - Clock round price in the round
  - Aggregate demand in the round
  - Excess demand in the round
  - Clock round price in the following round
- At the end of the clock round, the Auctioneer will announce the winning bidders and the common winning price in each circle
- At the end of the auction, all information about bids, bidders and frequencies awarded will be released



# Frequency identification stage

- The Frequency Identification Stage will allocate specific frequency blocks to successful bidders in circles where they have won a generic lot in the clock stage
- The assignment of frequencies will be done randomly by the auction software
- The Government reserves the right to change this allocation over the duration of the licence period where this may promote spectrum efficiency

# Other auctions after 3G

## **BWA auction**

- The BWA auction has identical rules to the 3G auction
- Differences are:
  - Number of lots available in each circle
  - Reserve prices and corresponding maximum price increments

## **800MHz auction**

- The 800MHz auction has almost identical rules to the 3G auction
- Main difference is that there is only one lot in each case so bidders in a circle are bidding for the only available frequency block in that circle (that is, bids in a circle are for a specific frequency block)
- Other differences are:
  - Reserve prices and corresponding maximum price increments

# Simultaneous running of BWA and 800MHz auctions

- These auctions will be run in parallel
- Bidders will be given separate login credentials for each auction
- Bidders are recommended to use two separate computers to make bids for the two auctions

# Security measures

- Security of electronic auction system will be protected by SSL encryption, digital certificates and various passwords
- Qualified bidders will be give a digital certificate to authenticate themselves on the electronic auction system
- The certificate will be supplied as an encrypted file and a separate password will be needed to access the digital certificate
- Any computer used to access the auction system will need to have this digital certificate installed to be able to access the auction system
- In addition, a login password will be required
- It is only possible to have one active session on the electronic auction system for security reasons
- Nevertheless, it is possible to log off and then log in from another computer and pick up the session at the same point

# IT requirements

- Most commonly used operating systems and web browsers will work
  - Windows XP SP3 or better with IE7 or better
  - Windows XP SP3 or better with Firefox
  - Mac OSX with Firefox or Safari
  - Linux with Firefox
- Client must have Java 1.5 or better installed
- Strongly recommend a clean installation guaranteed free from viruses and trojans and that computer is not used to access other websites
- Recommend that any computer with digital certificates installed is kept physically secure
- Full requirements will be specified in software manual for bidders
- Bidders should have a reliable Internet connection as there is a security requirement that a live “heartbeat” is maintained between client and server otherwise a session will be automatically terminated
- Bandwidth requirements are modest
- Backup systems essential

# Auction of 3G and BWA spectrum

## An illustration

*(Note that price increment policy is as in the revised IM)*

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# Assumptions

- Seven bidders: A - G
- Service areas: I, II, III, IV
  - All service areas have the same eligibility points per lots
- Focus on service area I in the illustration
  - Three lots available
  - Six bidders (A-F) competing, but drop out as price rises
- Service areas II
  - Three competitors (B,F and G) for two lots
- Service area III
  - Bidder F only bids with two lots available
  - Illustrates the role of the total bid across service areas in determining the ranking of bidders
- Ignore service area IV until the last round

# Service area I bids

Clock Round	Clock Round price	Bids submitted by	Provisional Winning Bidders and bids	Provisional Winning Price	Excess Demand	Price Increment
1	320.00	A, B, C, D, E, F	F (320.00), B (320.00), A (320.00)	320.00	3	10%
2	352.00	A, B, D, C	B (352.00), D (352.00), C (352.00)	352.00	1	5%
3	369.60	A, F, E	F (369.60), A (369.60), E (369.60)	369.60	0	2%
4	376.99	B, D	B (376.99), D (376.99), F (369.60)	369.60	-1	0%
5	376.99	F, E	B (376.99), D (376.99), F (376.99)	376.99	1	5%
6	395.84	E	E (395.84), B (376.99), D (376.99)	376.99	-2	0%
7	395.84	F, D	E (395.84), F (395.84), D (395.84)	395.84	0	2%
8	403.76	F	F (403.76), E (395.84), D (395.84)	395.84	-2	0%
9 (Final Clock Round)	403.76	E, B	F (403.76), E (403.76), B (403.76)	403.76	0	No further Price Increments



# Service area II bids

Clock Round	Clock Round price	Bids submitted by	Provisional Winning Bidders and bids	Provisional Winning Price	Excess Demand	Price Increment
1	320.00	B, F, G	F (320.00), B (320.00)	320.00	1	5%
2	336.00		F (320.00), B (320.00)	320.00	-2	0%
3	336.00	G	G (336.00), F (320.00)	320.00	-1	0%
4	336.00	B	G (336.00), B (336.00)	336.00	0	2%
5	342.72	F, G	F (342.72), G (342.72)	342.72	0	2%
6	349.57	F	F (349.57), G (342.72)	342.72	-1	0%
7	349.57		F (349.57), G (342.72)	342.72	-1	0%
8	349.57		F (349.57), G (342.72)	342.72	-1	0%
9 (Final Clock Round)	349.57		F (349.57), G (342.72)	342.72	-1	No further Price Increments

# Service area III bids

<b>Clock Round</b>	<b>Clock Round price</b>	<b>Bids submitted by</b>	<b>Provisional Winning Bidders and bids</b>	<b>Provisional Winning Price</b>	<b>Excess Demand</b>	<b>Price Increment</b>
1	320.00	F	F (320.00)	320.00	-1	0%
2	320.00		F (320.00)	320.00	-1	0%
3	320.00		F (320.00)	320.00	-1	0%
4	320.00		F (320.00)	320.00	-1	0%
5	320.00		F (320.00)	320.00	-1	0%
6	320.00		F (320.00)	320.00	-1	0%
7	320.00		F (320.00)	320.00	-1	0%
8	320.00		F (320.00)	320.00	-1	0%
9 (Final Clock Round)	320.00		F (320.00)	320.00	-1	No further Price Increments

# Round 1 ranking for Service Area I

<b>Bidder</b>	<b>Clock round at which bid was submitted</b>	<b>Clock round price associated with bid (Rs Crore)</b>	<b>Total value of bids submitted plus unraised provisional winning bids held by bidder when the bid was submitted (Rs Crore)</b>	<b>Random Index</b>
A	1	320.00	320.00	1
B	1	320.00	640.00	5
C	1	320.00	320.00	6
D	1	320.00	320.00	3
E	1	320.00	320.00	2
F	1	320.00	960.00	4

Ranking of provisional winners at the end of round 1 is:

F (1) B(2) A(3)

# Round 2 for service area I

- F, B and A are provisional winners at the end of round 1 with bids at Rs. 320.00 crore
- New bids invited at Rs. 352.00 crore
- A, B, C and D make bids at the new level
- Tie-break amongst A, B, C and D
- B, D and C become provisional winners

<b>Bidder</b>	<b>Clock round at which bid was submitted</b>	<b>Clock round price associated with bid (Rs Crore)</b>	<b>Total value of bids submitted plus unraised provisional winning bids held by bidder when the bid was submitted (Rs Crore)</b>	<b>Random Index</b>
A	2	352.00	352.00	5
B	2	352.00	672.00	1
C	2	352.00	352.00	3
D	2	352.00	352.00	2

# What happens in subsequent rounds?

- The price per lot continues to rise for service area I, but competitors fall away as the price increases
- We will skip forward to the last two rounds to look at the auction closing conditions

# Round 8

- Round price now at Rs. 403.76 crore per lot
- Only F submits a bid at this new level
- Provisional winners are:
  - F at Rs. 403.76 crore
  - E at Rs. 395.84 crore (the previous round price)
  - D at Rs. 395.84 crore (the previous round price)
- No excess demand as only one bid at the current round price
- Round 9 will have the same price as round 8
- If there was no excess demand in any other circle, the auction would close and the winning price would be Rs. 395.84 crore
- Suppose, to the contrary, that the auction did not end in this round because of competition elsewhere (say excess demand in some service area IV)

# Round 9 (last round)

- Price for round 9 still at Rs. 403.76 crore as no excess demand in round 8
- Bids submitted at this price by:
  - E (raising its provisional winning bid from round 8)
  - B (say, switching activity from some other service area)
- Three bids now at the current price
  - E, B this round
  - F from last round
- Auction can close as, by assumption no excess demand in other circles
- Although D had a provisional winning bid in round 8, it does not win and will not have an opportunity to bid again

# **Annex: Information available during the auction**



# Data available during the auction

- During each of the auctions, there will be a number of data files available for download through the electronic auction system:
  - ‘Round data’ files, which contain the status and value of a bidder’s bids in a particular completed clock round;
  - ‘Auction history’ files, which contain for each completed round and for each service area aggregate demand information, round prices and information on the status of a bidder’s own bids at the start and at the end of the round; and
  - ‘Decision summary’ files, which contain aggregate information on a bidder’s own bids across all service areas for all completed rounds.
- The following will shortly be available from the DoT website:
  - A document setting out when during the auctions these files will be available and updated, how to download them, a description of the file types, the fields that each of these files will include and the format of outputs populating these fields; and
  - Sample files corresponding to those described in the document. All data files will be in tab-separated value format with Windows-style line breaks. It should be possible to open these in a text editor, spreadsheet or database programme.

# Data file ability and form

- 'Round data' files
  - Available from when the current round is scheduled until the round closes
  - Form: '**RoundData\_X.tsv**' where **X** is the number of the clock round for which data on the status and value of the bidder's bids are included
- 'Auction history' files (including data relating to the most recent completed clock round)
  - Available from when the round is closed and the round results have been approved by the Auctioneer
  - Form: '**AuctionHistory\_X.tsv**' where **X** is the number of the most recent clock round for which auction data are included
- 'Decision summary' files (including data relating to the most recent completed clock round)
  - Available from when the clock round is closed and the round results have been approved by the Auctioneer
  - Form: '**DecisionSummary\_X.tsv**' where **X** is the number of the most recent clock round for which data on the bidder's clock round bids are included

# 'Round data' files: Content

Field	Form of output
Service area	Name of the service area
Round price (Rs Crore)	Number with two decimal places, e.g. 342.72, 30.00
Provisional winning price at start of round (Rs Crore)	Number with two decimal places, e.g. 342.72, 30.00
Provisional winning bid held at start of round	'yes' or 'no'
Provisional winning bid at start of round (Rs Crore)	<i>If 'Provisional winning bid held' is 'yes':</i> Number with two decimal places, e.g. 342.72, 30.00 <i>If 'Provisional winning bid held' is 'no':</i> 'n/a' (not applicable)
Provisional winning bid ranking at start of round	<i>If 'Provisional winning bid held' is 'yes':</i> Number <i>If 'Provisional winning bid held' is 'no':</i> 'n/a' (not applicable)
Provisional winning bid at start of round equal to round price	<i>If 'Provisional winning bid held' is 'yes':</i> 'yes' or 'no' <i>If 'Provisional winning bid held' is 'no':</i> 'n/a' (not applicable)

# 'Auction history' files: Content I

Field	Form of output
Round	Number
Service Area	Name of Service Area
Round price (Rs Crore)	Number with two decimal places, e.g. 342.72, 30.00
Aggregate demand	Number e.g. 6, 4
Excess demand	Number e.g. 2, -1
Provisional winning price at start of round (Rs Crore)	Number with two decimal places, e.g. 342.72, 30.00
Provisional winning bid held at start of round	'yes' or 'no'
Provisional winning bid at start of round (Rs Crore)	<i>If 'Provisional winning bid held' is 'yes':</i> Number with two decimal places, e.g. 342.72, 30.00 <i>If 'Provisional winning bid held' is 'no':</i> 'n/a' (not applicable)
Provisional winning bid ranking at start of round	<i>If 'Provisional winning bid held' is 'yes':</i> Number <i>If 'Provisional winning bid held' is 'no':</i> 'n/a' (not applicable)

# 'Auction history' files: Content II

Field	Form of output
Provisional winning bid at start of round equal to round price	<i>If 'Provisional winning bid held' is 'yes':</i> 'yes' or 'no' <i>If 'Provisional winning bid held' is 'no':</i> 'n/a' (not applicable)
Decision	Bid OR No bid
Provisional winning price at end of round (Rs Crore)	Number with two decimal places, e.g. 342.72, 30.00
Provisional winning bid held at end of round	'yes' or 'no'
Provisional winning bid at end of round (Rs Crore)	<i>If 'Provisional winning bid held' is 'yes':</i> Number with two decimal places, e.g. 342.72, 30.00 <i>If 'Provisional winning bid held' is 'no':</i> 'n/a' (not applicable)
Provisional winning bid ranking at end of round	<i>If 'Provisional winning bid held' is 'yes':</i> Number <i>If 'Provisional winning bid held' is 'no':</i> 'n/a' (not applicable)
Provisional winning bid at end of round equal to next round price (if applicable)	<i>If 'Provisional winning bid held' is 'yes':</i> 'yes' or 'no' <i>If 'Provisional winning bid held' is 'no':</i> 'n/a' (not applicable)

# 'Decision summary' files: Content

Field	Form of output
Round	Number
Action	'Decision submitted' OR 'No decision submitted' If the decision has been edited or voided by the Auctioneer (e.g. following telephone or fax bidding), the corresponding message (- edited by the Auctioneer OR - voided by the Auctioneer) will be appended to the above
Extensions used	Number between 0 and 12 (corresponding to the number of 10-minute extension periods used so far)
Extensions carried forward	Number between 0 and 12
Eligibility	Number between 0 and 335/198/350
Activity requirement (%)	80 or 90 or 100
Activity required to preserve eligibility	Number between 0 and 335/198/350
Total activity	Number between 0 and 335/198/350
Activity Level associated with Service Areas in which you were a provisional winner at start of round	Number between 0 and 335/198/350
Activity Level associated to New Bids	Number between 0 and 335/198/350
Eligibility Points carried forward	Number between 0 and 335/198/350
Total value of bids placed in round plus unchanged provisional winning bids (Rs Crore)	Number with one decimal places, e.g. 18,783.72, 30,356.08
Total value of provisional winning bids at end of round (Rs Crore)	Number with two decimal places, e.g. 18,783.72, 30,356.08