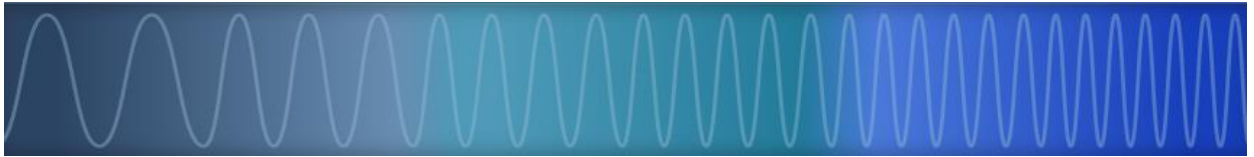




Telecommunications Regulatory Commission
of Sri Lanka



Guideline for Frequency Spectrum Auctions

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TABLE OF CONTENTS

1	Preamble.....	3
2	Legal basis.....	3
3	Consultations.....	3
4	Auction formats and Conditions.....	4
4.1	Single-round sealed-bid auctions.....	4
4.2	Simultaneous multiple-round auctions.....	4
4.3	Clock auctions.....	6
5	Auction design options.....	7
5.1	Specific or generic lots.....	7
5.2	Package bidding.....	8
5.3	Spectrum caps.....	8
5.4	Set-asides.....	8
5.5	Bidding credits.....	8
6	Mock auctions.....	9
7	Reserve prices and Annual spectrum fees.....	9
8	Acronyms.....	9

1 PREAMBLE

Radio frequency spectrum is a scarce national resource that must be used efficiently and effectively.

In accordance with the powers and duties bestowed upon it by the Sri Lanka Telecommunications Act No. 25 of 1991, as amended by the Sri Lanka Telecommunications (Amendment) Act No. 27 of 1996, the Telecommunications Regulatory Commission of Sri Lanka (TRCSL) strives to assign spectrum to ensure the conservation and proper utilization of the radio frequency spectrum by operators and other organizations and individuals who need to use radio frequencies.

To maintain and to promote effective competition between persons engaging commercial activities connected with telecommunication and promote efficiency and economy on the part of such persons, TRCSL may assign spectrum by way of auction in cases where excessive demand exist to ensure transparency and equitable assignment of radio frequency spectrum.

This document describes TRCSL's guideline for spectrum auctions. It will be supplemented by Notices of Assignment (NoA) containing the detailed conditions and procedures for each individual auction.

2 LEGAL BASIS

According to Section 5, Paragraph (v) in Part 1 of the Sri Lanka Telecommunications Act No. 25 of 1991, as amended by the Sri Lanka Telecommunications (Amendment) Act No. 27 of 1996 (hereinafter referred to as "the Act").

Section 22, of the Act, authorises TRCSL to issue licences for the use of frequency spectrum, to levy fees for such licences and to impose conditions and restrictions on them.

3 CONSULTATIONS

Being committed to assigning spectrum through transparent and market based competitive assignment processes, TRCSL will hold public stakeholder consultations before assignments of spectrum that is deemed to have high economic value.

In the case where the demand for such spectrum may exceed the available supply at present or in the near future or in special circumstances, TRCSL will conduct an auction. Otherwise, an administrative assignment will be made on a First-Come-First-Served (FCFS) basis.

Consultation process will be conducted as follows:

1. TRCSL publishes a consultation paper (CP) on its website, describing the planned spectrum assignment. The CP will also be advertised in major national newspapers.
2. Stakeholders will be given an opportunity to request clarifications of the CP within a specified time period. Requests for clarification (RFC) must be submitted in writing to a specified TRCSL email address.
3. Stakeholders will be invited to make submissions in writing to TRCSL in response to the CP within a given time frame.
4. Stakeholders may request extensions of both the RFC period and the submission deadline and TRCSL is the sole authority to accept or decline such extensions.
5. After consideration of the received stakeholder feedback, TRCSL will publish a Notice of Assignment (NoA) on its website, which contains its responses to and decisions on the matters raised in the consultation process, detailed conditions for the assignment process, and instructions.

4 AUCTION FORMATS AND CONDITIONS

TRCSL will determine the most suitable auction format for each assignment on a case-by-case basis.

The following chapters describe the most common auction formats used by TRCSL and the general conditions for each format. These conditions may be modified on a case-by-case basis. Notices of Assignment (NoA), published by TRCSL prior to each auction after taking into account of stakeholder feedback from the public consultations, will specify the selected auction format, detailed conditions, procedures and instructions for bidders.

4.1 Single-round sealed-bid auctions

Single-round sealed bid auction gives bidders only one chance to submit an offer for the spectrum to be assigned. Unlike in multiple-round auctions, there is no price discovery, i.e. bidders have no knowledge of the bids of other bidders. Because of this lack of information, winning bidder can end up paying significantly high value for the spectrum (“the winner’s curse”). It also creates an incentive for bidders to bid lower than their true valuation of the spectrum (“bid shaving”) and thereby running the risk of not being awarded the spectrum despite actually valuing it more.

The winner’s curse can be mitigated by using the second-price rule in a so-called Vickrey auction, which means the highest bid wins, but instead of paying the winning bid amount, the winning bidder pays the second highest bid amount, i.e. the highest losing bid. This auction format also eliminates the incentive for bid shaving, because bid shaving would not reduce the amount paid for the spectrum but would increase the risk of not winning it. However, bidders could still be tempted to bid higher than their true market valuation to increase their chance of winning, hoping that the second-highest bid will be at or below their true valuation.

Despite its disadvantages, the single-round sealed-bid auction (SRSB) is a useful instrument because of its simplicity. It is particularly suitable for assigning small amounts of spectrum, such as unsold lots from a previous auction, and can achieve effective assignments especially when the second-price rule is used. It is also used to resolve ties in Simultaneous multiple-round auctions (SMRA) (see chapter 4.2) and in the assignment stage of clock auctions (see chapter 4.3).

The procedure for a single-round sealed-bid auction with second-price rule is as follows:

1. The auctioneer (a third-party independent auctioneer or TRCSL appointed auction committee) announces the reserve price for each spectrum lot on offer. The reserve prices are the minimum bids TRCSL will accept for the different lots.
2. Within a designated time period, bidders write their bids for the different lots on a bid form – either on paper which is then placed in a sealed envelope and handed to the auctioneer, or via an electronic bidding system where a bidder’s bids are invisible to the other bidders. A bid value of zero must be written for lots that a bidder is not interested in.
3. No withdrawals or changes are permitted once the bids have been submitted.
4. When all bids have been received or when the designated time period for bidding has ended, the auctioneer will evaluate the results.
5. The highest bid for a lot wins that lot, and the winning bidder pays the second highest bid received for that lot. If there is no second highest bid, the winning bid amount is paid.
6. Ties, i.e. identical prices bid for a lot by two or more bidders, are resolved by a lottery.

4.2 Simultaneous multiple-round auctions

Unlike single-round auctions, multiple-round auctions provide price discovery to bidders, which encourages truthful bidding, i.e. in line with bidders’ true valuations of the spectrum.

Simultaneous multiple-round auctions (SMRA) are suitable for auctioning large numbers of spectrum lots that are substitutes or complements, all at the same time, in a series of separate rounds with ascending prices. This approach allows bidders to place bids on those lots they need for their business plan, aggregate complementary lots, or consider substitutes if the prices for some lots rise too high. Because of these synergies among the different lots, a bid on one lot will keep the entire auction open for all lots.

After each round in a SMRA, information about the bids is revealed to all bidders. Another round is then opened to allow counterbids, and the process is repeated until there is a round with no more bids. The highest bid for each lot wins that lot, and a first-price rule is applied which means the winner pays the bid price.

The SMRA format solves the problem of the winner's curse through price discovery, and in addition it removes the incentive for bidders to bid above their true valuation in a Vickrey auction to increase their chance of winning (see chapter 4.1).

However, SMRA auctions are more complex than single-round auctions. In auctions with a large number of lots, bidders may have to evaluate a significant amount of information after each round to determine the best strategy for the next round.

Because a bid on one lot will keep the entire auction open for all lots, SMRA auctions can also take a long time to complete with many consecutive rounds.

The procedure for a SMRA auction is as follows:

1. The auctioneer announces the reserve price for each spectrum lot on offer, typically on a display in an electronic bidding system. The reserve prices are the minimum bids TRCSL will accept for the different lots.
2. In the first round, bidders place their initial bids for the different lots on a bid form, typically through an electronic bidding system where a bidder's bids are invisible to the other bidders, within a designated time period (typically 15 minutes). A bid value of zero must be written for lots that a bidder is not interested in.
3. No withdrawals or changes are permitted once the bids have been submitted.
4. At the end of the first round, the leading bid amount for each lot is disclosed to all bidders, and whether there is a tie, i.e. two or more bids of the same amount for a lot.
5. After a pause (typically 15 minutes) during which the bidders have time to plan their strategy for the next round, the second round is opened and conducted in the same way as the first round, and so on.
6. The duration of the rounds and the pauses between them may be varied, depending on the experience of the bidders and the complexity of the decisions they need to make after each round.
7. The auction ends when there are no bids in a round. The leading bids of the previous round win the respective lots and the winning bid prices are paid (first-price rule).
8. In order to speed up the process, TRCSL may impose minimum bid increments from round to round, typically ranging from 1% to 15% of the leading bids from the previous round, depending on auction progress. The multiple round auction ceases at the point where only single bidder has submitted its offer or none of the bidders are submitting offers to the particular auction round.
9. Ties, i.e. identical prices bid for a lot by two or more bidders at the end of multiple round auction, may be resolved by a subsequent single-round sealed-bid auction (see chapter 4.1) without considering minimum bid increment in above 8.
10. If the single round sealed bid values are identical mentioned in above 9 still identical successful bidder will be chosen by a lottery.

4.3 Clock auctions

Clock auctions (CA) are another form of multiple-round auction. It is more suitable for auctioning spectrum lots that are essentially alike (in terms of their physical characteristics and/or licence conditions attached to them) and therefore have identical or near-identical value.

A clock auction consists of two stages: The clock stage with generic spectrum lots (i.e. lots not tied to a specific frequency, see chapter 5.1) for price discovery, followed by the assignment stage in which specific lots are assigned.

In each round of the clock stage, ascending prices per identical lot are shown on a price “clock” and bidders state their demand at this price (the “clock price”), i.e. how many lots they would buy at this price. As long as the aggregate demand exceeds the available supply, another round with a higher clock price will follow. The clock stage ends when demand at a given clock price equals supply or falls below it.

The assignment of specific lots to the winning bidders may be done administratively by TRCSL or by a subsequent auction in the assignment stage, typically a single-round sealed-bid (see chapter 4.1).

The procedure for the clock stage in a clock auction is as follows:

1. In the first round, the price shown on the clock (the clock price) is the reserve price per lot, i.e. the minimum price TRCSL will accept per lot. The number of available lots is announced by the auctioneer.
2. Within a designated time period (typically 10 minutes), bidders state their demand at the clock price, i.e. how many lots they would buy at this price – either on paper which is then placed in a sealed envelope and handed to the auctioneer, or via an electronic bidding system where a bidder’s stated demand is invisible to the other bidders.
3. A demand of zero must be written to state that a bidder is exiting the auction. Such a bidder will not be eligible to bid in subsequent rounds.
4. In the first round, bidders must also specify their Minimum Spectrum Requirement (MSR), which is the minimum number of lots they need. This is to ensure that bidders will not win an amount of spectrum they consider insufficient¹ when the lots are distributed among the winning bidders at the end of the clock stage (see below).
5. At the end of the first round the bidders are told whether the aggregate demand exceeds the available supply or not, either verbally by the auctioneer or on an electronic display, without disclosing the individual bids.
 - a. If the aggregate demand equals or is less than the available supply, this is the end of the clock stage and the lot quantities will be assigned to the bidders according to their expressed demand.
 - b. If the aggregate demand exceeds the available supply, another round with a higher clock price will follow.
6. If the aggregate demand exceeds the available supply at the reserve price, the clock price is increased for the second round. Clock price increments from round to round may vary depending on auction progress, typically ranging from 5% to 15%.
7. The second round is opened after a pause (typically 10 minutes) during which the bidders have time to plan their strategy for the next round.

¹ For example, a bidder may need at least two lots of spectrum for implementing his business plan, a single lot would not be sufficient. He will then set his MSR to 2. This will ensure that the bidder will not be assigned less than two lots, even if his last bid in the auction would be sufficient to win one lot. That single lot will instead be assigned to the next highest bidder.

8. In the second round, bidders are again invited to state their demand (the number of lots they would buy at the new clock price) within a designated time period. They may state the same demand as in the first round or less, they cannot increase demand.
9. In the second round and subsequent rounds, “intra-round bidding” may be allowed, which means bidders can express demand not only at the current clock price, but at any price between the current and the last clock price². However, they must express demand at the current clock price to be eligible to bid in the next round.
10. The duration of the rounds and the pauses between them may be varied, depending on the experience of the bidders and the complexity of the decisions they need to make after each round.
11. No withdrawals or changes of bids are permitted once the bids have been submitted.
12. The clock stage ends when the aggregate demand at the clock price in a round equals the available supply or falls below it.
 - a. If demand at the clock price equals supply at the end of the last round, the available lots will be distributed among the bidders according to their expressed demand.
 - b. If demand at the clock price fell below supply in the last round, lots will be assigned to the bidders according to their expressed demand, in descending price order, taking each bidder’s last bids and MSR into account.
13. To assign lots that may have remained unsold at the end of the clock stage, a single-round sealed-bid auction (see chapter 4.1) with second-price rule will be used, with a reserve price that is equal to the last clock price at which demand was exceeding supply.

5 AUCTION DESIGN OPTIONS

TRCSL may use the following options in auction design:

5.1 Specific or generic lots

Spectrum lots in an auction may be offered as specific lots, i.e. tied to a specific frequency, or as generic lots not tied to a specific frequency.

The former (specific lots) is always the case in a SMRA auction (see chapter 4.2).

The latter (generic lots) is always the case in the clock stage of a clock auction (see chapter 4.3) and may also be used in a single-round sealed-bid auction (see chapter 4.1). The conversion of generic lots won in an auction into specific lots may be done by administrative assignment or by a subsequent auction as described in the respective chapters.

An administrative assignment of specific lots to auction winners will be done in a way that maximises spectrum efficiency by minimising band fragmentation. Should there be more than one possible solution for an assignment resulting in minimal band fragmentation, the spectrum users concerned will be invited to reach an agreement, failing which a lottery will decide how the specific lots are distributed among the auction winners.

² Intra-round bidding reduces the likelihood of bidders exiting the auction with a demand of zero, and thereby reduces the likelihood of lots remaining unsold in the clock stage, which would require a second auction of the unsold lots.

5.2 Package bidding

TRCSL may allow package bidding in some auctions, which means bidders may not only bid for individual spectrum lots but also express preferences for certain groups of spectrum lots.

Package bidding can lead to more efficient assignments when there are strong synergies among lots being auctioned and strong and divergent preferences among bidders for different combinations. In other words, spectrum lots may be worth more to some bidders as a package than individually, and other bidders may have preferences for different packages. Package bidding allows bidders to assemble their desired spectrum portfolio without being exposed to aggregation risk, i.e. the risk of winning only part, but not all, of a preferred package, and spending more for individual lots than they are worth to the bidder by themselves.

For example, a bidder may place a higher value on winning two lots of spectrum than on winning only one of those lots. He would then place a bid on the package of two lots that is higher than the sum of his bids for the two individual lots. Or he may not be interested in the spectrum at all if he can obtain only one lot, in which case he would bid only for the package of two lots and not for the individual lots.

TRCSL may offer predefined packages of spectrum lots or allow any combination of lots.

Each bidder's bids are mutually exclusive, i.e. only one of them can win. Whichever set of bids for individual lots or packages yields a higher bid amount will determine the winning bid.

5.3 Spectrum caps

TRCSL may set spectrum caps in auctions.

Spectrum caps limit the amount of spectrum a bidder can win in an auction. They are a tool to ensure an equitable distribution of spectrum and to prevent market distortions by an undue concentration of spectrum in the hands of one or a few operators.

Caps may be applied to spectrum of a particular type, e.g. sub-1GHz spectrum, and/or to the total amount of spectrum a bidder can win in an auction.

5.4 Set-asides

TRCSL may use set-asides in spectrum auctions.

Parts of the available spectrum may be set aside for various purposes, such as encouraging participation by new market entrants, or encouraging new business models, e.g. private networks.

Incumbent operators are excluded from bidding for set-aside spectrum, to guarantee that new entrants will win at least that part of the available spectrum.

5.5 Bidding credits

TRCSL may grant bidding credits to auction participants.

Bidding credits are discounts on spectrum prices. They can be used to help smaller operators compete with bigger ones, or to attract new entrants into the market.

6 MOCK AUCTIONS

Following the public consultation process prior to a spectrum auction by TRCSL (see chapter 3), a series of mock auctions may be conducted in the weeks before the actual auction.

Mock auctions are practice runs for bidders to familiarise themselves with the auction procedures in detail and with the handling of the auction software (if used). Different scenarios and bid constellations will be simulated so that bidders can prepare for them occurring during the actual auction and practice how they would react to them.

7 RESERVE PRICES AND ANNUAL SPECTRUM FEES

Bidders in spectrum auctions are bidding for the Radio Frequency Spectrum reservation Fee

The reserve prices, i.e. the starting price in the auction and the minimum price TRCSL will accept, is what the Radio Frequency Spectrum Access Fee would be in an administrative assignment, i.e. calculated according to the gazette Radio Frequency License Fees Rules.

The Annual Frequency License Fee and Annual Station Licence Fee will be calculated according to the Radio Frequency License Fees Rules, regardless of the auction result. In other words, these two fees will not change, regardless of how much is bid for the Radio Frequency Spectrum Access Fee in the auction.

8 ACRONYMS

CA: Clock auction

CP: Consultation paper

FCFS: First-come-first-served

MSR: Minimum Spectrum Requirement

NoA: Notice of Assignment

RFC: Request for clarification

RFSL: Radio frequency spectrum licensing

SMRA: Simultaneous multiple-round auction

SRSB: Single-round sealed-bid

TRCSL: Telecommunications Regulatory Commission of Sri Lanka