

Default Risk Management Working Group

**Uniform CCP Terminology for
Default Management Auctions**

Final Version

4/1/2016

1 INTRODUCTION	3
2 BACKGROUND	4
2.1 ACADEMIC LITERATURE.....	4
2.2 BIDDING FORMATS.....	5
2.3 SINGLE UNIT AUCTIONS	5
2.4 MULTI-UNIT AUCTIONS	7
2.5 MULTI-ASSET AUCTIONS.....	9
2.6 AUCTION LIFECYCLE	10
3 STANDARD TERMINOLOGY AND CONVENTIONS	13
3.1 ACADEMIC REFERENCES TO AUCTION MECHANISMS.....	13
3.1.1 <i>Sealed Bid</i>	13
3.1.2 <i>Single Unit</i>	13
3.1.3 <i>Multi Unit</i>	13
3.1.4 <i>Multi Asset</i>	13
3.1.5 <i>First Price</i>	13
3.1.6 <i>Second Price</i>	14
3.1.7 <i>Discriminatory Price</i>	14
3.1.8 <i>Uniform Price</i>	14
3.1.9 <i>Lowest Accepted Price</i>	14
3.1.10 <i>Highest Rejected Price</i>	14
3.2 CCP AUCTION TYPES.....	14
3.2.1 <i>Single Unit Pay Your Price</i>	15
3.2.2 <i>Multi-Unit Pay Your Price</i>	15
3.2.3 <i>Modified Dutch</i>	15
3.2.4 <i>Selective Bidding</i>	15
3.3 REFERENCES TO GROUPS OF POSITIONS.....	18
3.3.1 <i>Defaulter’s Portfolio</i>	18
3.3.2 <i>Auction Portfolio</i>	18
3.3.3 <i>Offered Package</i>	18
3.4 BIDS AND BID CONSTRUCTION.....	20
3.4.1 <i>Bidding Package</i>	21
3.4.2 <i>Bid Size</i>	21
3.4.3 <i>Price or Level</i>	21
3.4.4 <i>Settlement Method</i>	22
3.4.5 <i>Capital Considerations</i>	22
3.5 CONSTRAINTS AND REQUIREMENTS.....	24
3.5.1 <i>Auction Currency</i>	24
3.5.2 <i>Bid Size Increment</i>	24
3.5.3 <i>Minimum Bid Size</i>	24
3.5.4 <i>Minimum Bid Requirement</i>	24
3.5.5 <i>Price Increment</i>	25
3.5.6 <i>Reserve Price</i>	25
3.5.7 <i>Maximum Price</i>	25
3.6 AWARDS	26
3.6.1 <i>Auction Award</i>	26
3.6.2 <i>Awarded Portfolio</i>	26
3.6.3 <i>Invoice Amount</i>	26
3.6.4 <i>Clearing Price</i>	26

3.7 LIFECYCLE 27
 3.7.1 *Summary Auction Specification* 27
 3.7.2 *Publication Time* 27
 3.7.3 *Bidding Open* 27
 3.7.4 *Bidding Close* 27
 3.7.5 *Bidding Extension Period (optional)* 27
 3.7.6 *Expected Auction Completion Time (optional)* 27
 3.7.7 *Bid Expiration Time* 27
3.8 SUMMARY AUCTION SPECIFICATION TEMPLATE 28
4 BIBLIOGRAPHY 32

1 Introduction

In July of 2015, a group of eight central counterparty clearinghouse (CCP) operators, representing over 15 CCPs, formed a Default Risk Management Working Group (DRMWG), with the aim of fostering cooperation and coordination among CCPs in the preparation for and management of a clearing member default. This document is a product of the DRMWG, related to its Core Principle 5, which states “CCPs should coordinate to standardize auction processes, including auction formats and auction types, and to avoid creation of any structural impediments to the universe of potential auction participants.” A key component of auction standardization is the utilization of common terminology and conventions. The goal of this document is to establish common terminology and conventions across CCPs, so that the market participants in CCP default management (DM) auctions find it easier to understand the rules and conventions of each auction in which they take part, which will lead to more-effective auctions. Establishing common terminology and conventions is intended to minimize errors by auction participants and improve communications between CCPs during any default management related cooperation.

This document is designed to achieve this goal by:

- Presenting and naming the four Standard CCP Auction Types currently used by DRMWG members;
- Establishing a common vocabulary of auction terminology and standardizing bidding conventions;
- Providing a template in a standardized format that may be used by any CCP to communicate the auction specific parameters in concise and efficient manner to potential auction participants.

Section 2 presents the general types of auction contemplated in academic literature and defines common academic terms. Section 3 defines the DRMWG standard CCP terminology and conventions and Table 9 provides the template for Summary Auction Specifications.

For the avoidance of doubt, it is not the goal of this document, or the DRMWG, to standardize auction types, rules or DM procedures in general, across CCPs. It is also not the goal of this document to provide discussion of the purpose, strengths or weaknesses of any of the presented auction types. Rather, the goal of this document is to provide a standardized terminology and conventions.

The success of this document in achieving its goal relies on CCPs consistently adopting presented terminology and conventions when interacting with stakeholders in relation to default management auctions via verbal, written or system communications. The following CCPs worked collaboratively in order to develop the main principles presented in this document:

- CME Group
- Eurex Clearing AG
- Intercontinental Exchange
- The Depository Trust and Clearing Corporation
- The Minneapolis Grain Exchange Clearing House
- The Options Clearing Corporation
- Nasdaq
- The London Metal Exchange

2 Background

2.1 Academic Literature

There are many academic papers on the theory of auctions, many based on the seminal contributions from William Vickrey (Vickrey, 1961), Edward Clarke (Clarke, 1971), and Theodore Groves (Groves, 1973). There have been a number of important and well documented auctions, notably the 2008 auction by the Federal Communications Commission (FCC) for the rights to operate the 700 MHz radio frequency band in the United States (S Brusco, 2009), and the ongoing auctioning of U.S. Treasury securities (Nandi, 1997).

In its most general form, an auction is a market mechanism to allocate assets among a group of bidders. The mechanism defines permitted actions for participants and the rules for determining the assets allocated to each bidder and the associated payments. The mechanism designer sets the rules to achieve a specific objective, such as maximizing the seller's proceeds and/or maximizing the likelihood of allocating all assets. Auctions are especially important in environments in which it is difficult to set a market price (e.g. in time of a large clearing member default) because they can act as an efficient price-discovery mechanisms. The designs of many auction mechanisms are based on seminal contributions from William Vickrey (Vickrey, 1961), Edward Clarke (Clarke, 1971), and Theodore Groves (Groves, 1973). Vickrey designed auction mechanisms that allocate resources efficiently in a wide range of circumstances. Clarke and Groves generalized Vickrey's approach and analyzed auction mechanisms elements that make truthful bidding consistent with individual bidder's interests. Many texts, such as the one published by the pioneer of spectrum auction design (Milgrom, 2004) provide an overview of modern auction theory, which has evolved rapidly since technology advances, such as the internet, have made more elaborate designs practical.

2.2 Bidding Formats

Auctions are either open or sealed bid.

In an open auction, the auctioneer shares information related to the bids provided by auction participants during the bidding process. A common example of an open auction is the ascending open-outcry auction, in which the auctioneer accepts increasingly higher bids from the auction participants until no auction participant is willing to submit a higher bid, at which point they sell the item to the highest bidder at a price equal to the highest bidder's bid.

In a sealed-bid auction, auction participants privately submit their bids to the auctioneer and the auctioneer keeps this information private, such that there is no sharing of bidding information amongst auction participants. Auction participants are only informed whether they have won or lost, and whether the auction failed to award 100% of the assets.

As a general rule, all DRMWG members use sealed-bid auction formats.

2.3 Single Unit Auctions

In a single unit sealed bid auction, only one item is available for sale and there is only one winner for the item. Auction participants bid a price at which they are willing to assume the item available for sale.^{1,2} The winner is the auction participant bidding the highest price. As shown in Figure 1, in the first price version of this type of auction, the winning auction participant pays his or her own price. In the second price version of this type of auction, the winning auction participant pays the price of the participant submitting the second-highest bid.

The application of a single unit auction to a portfolio of positions is straightforward. Each auction participant bids the maximum price they are willing to pay to take ownership of the entire portfolio, and the auctioneer transfers ownership of the entire portfolio to the winning auction participant, as illustrated in Figure 2.

¹ For the avoidance of doubt, prices provided in a Default Management Auction can be either positive, indicating an amount paid by the auction participant to the CCP, or negative, indicating an amount paid by the CCP to the auction participant.

² In cases in which there are multiple auction participants that provide the same winning price, CCPs will follow their, previously communicated, tie breaking procedures in awarding the item available for sale.

FIGURE 1: FIRST AND SECOND PRICE VARIATIONS OF THE SINGLE UNIT SEALED BID AUCTION

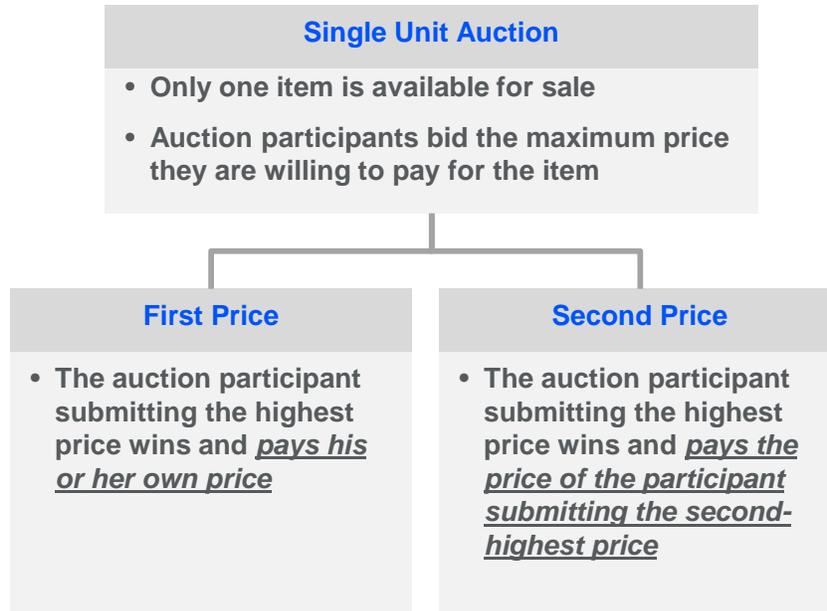
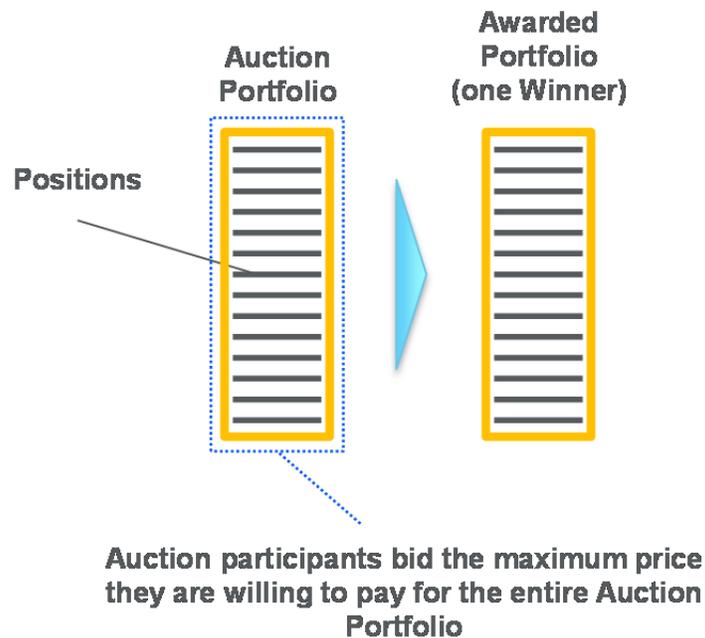


FIGURE 2: ILLUSTRATION OF SINGLE UNIT BIDDING FOR A PORTFOLIO OF POSITIONS



2.4 Multi-Unit Auctions

In a multi-unit auction, multiple identical items are available for sale. Bids consist of a price per item an auction participant is willing to pay or receive for a given number of items. Two variants of the multi-unit auction are the discriminatory price multi-unit auction and the uniform price multi-unit auction, as illustrated in Figure 3.

In the discriminatory price multi-unit auction, the auctioneer sells the identical items at different prices to different winning auction participants. The auctioneer accepts all highest prices until the order is filled and awards based on highest to lowest of winning bids. In a discriminatory **first price** multi-unit auction, the auction participants submitting the highest prices win the number of items they bid for, and pay their own bid prices. In a discriminatory **second price** multi-unit auction, the winning auction participants pay the price submitted by the next-highest bidder.

In the uniform price version of the multi-unit auction, the auctioneer sells the identical items at the same price to all winning auction participants. In a uniform lowest accepted price multi-unit auction, the auction participants submitting the highest prices win the number of items they bid for and pay the lowest price of all winning auction participants. In a uniform highest rejected price multi-unit auction, the winning auction participants pay the highest price of all non-winning auction participants.

Figure 4 illustrates the application of a multi-unit auction to a portfolio of positions. Each auction participant bids for a “slice” (in terms of the percentage of the notional amount or number of contracts) they wish to take ownership of. Winning auction participants receive the “slice” of the portfolio on which they bid.³

³ In cases in which there are multiple auction participants that provide the same winning price, CCPs will follow their, previously communicated, tie breaking procedures in awarding the slice(s) of the portfolio.

FIGURE 3: DISCRIMINATORY AND UNIFORM PRICE VERSIONS OF THE MULTI UNIT SEALED BID AUCTION

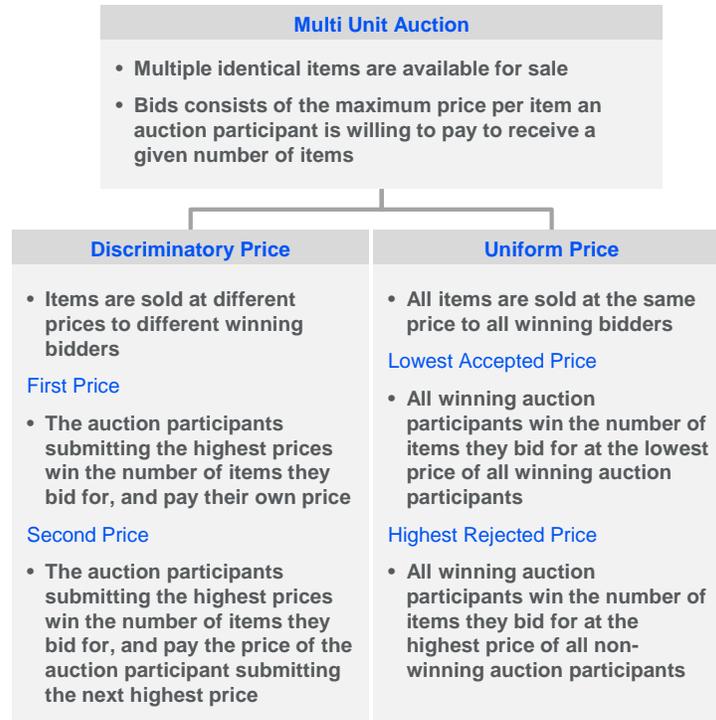
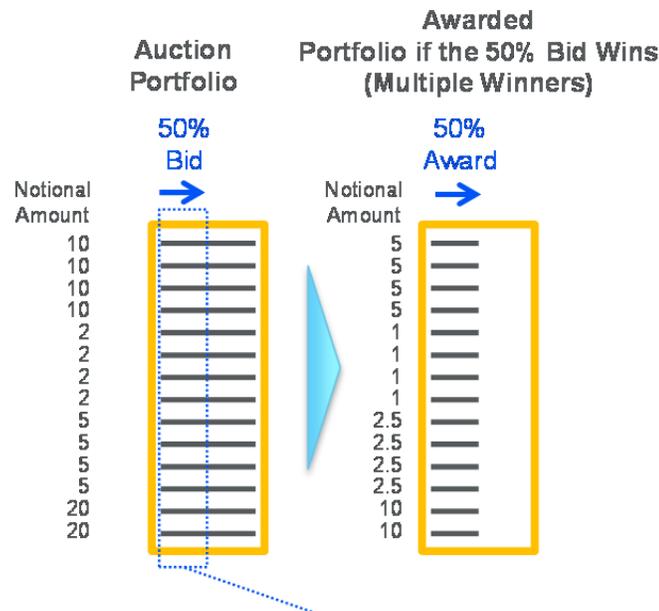


FIGURE 4: ILLUSTRATION OF MULTI-UNIT BIDDING FOR A PORTFOLIO OF POSITIONS



Auction participants bid the maximum price they are willing to pay for a portfolio containing all positions in the Auction Portfolio, but with each position having a stated percentage of the Auction Portfolio notional amount / contracts

2.5 Multi-Asset Auctions⁴

In a multi-asset auction, multiple non-identical items are available for sale, and auction participants bid for different combinations of the non-identical items. The auctioneer creates groups of the non-identical items, called “offered packages”. Auction participants may bid on combinations of the offered packages and the auctioneer may place constraints on the valid combinations of offered packages available for bidding. A bidding package is the combination of offered packages selected by an auction participant for one of its submitted bids.

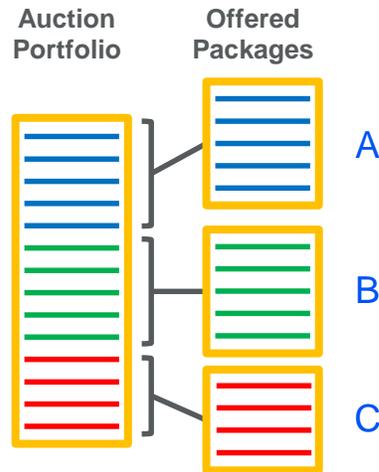
Figure 5 illustrates the application of a multi-asset auction to a portfolio of positions. The auctioneer divides the auction portfolio into multiple separate groups of positions to form the offered packages A, B and C. The auctioneer sets the rules for which combinations of A, B and/or C represent valid bidding packages. For example, valid bidding packages may be defined as A only, B only, C only, and A, B and C jointly. Each auction participant bids the maximum price they are willing to pay to take ownership of a given, valid bidding package. The auctioneer establishes rules for deciding which auction participants receive which offered packages at what price, based on all received bids across different combinations of bidding package.

One example of the use of multi-asset auctions by the DRMWG CCPs is to provide auction participants the ability to bid on an auction portfolio but exclude specific line items that represent undesired or prohibited instruments. In this case, every line item is effectively an offered package, and the participant creates a custom bidding package by submitting a bid for the original offered package minus any identified line items for exclusion. CCPs may place limitations on exclusions (i.e. all derivatives related to an underlying, or a particular product type) in order to prevent “cherry picking.” The auctioneer establishes the algorithm for selecting which auction participants receive which offered packages (line items) and at what price, based on the bids received containing different line item exclusions.

Another example of the use of multi-asset auctions by the DRMWG CCPs is to provide auction participants the ability to bid on either the positions cleared by the defaulting clearing member, the collateral posted by the defaulted clearing member, or both the positions cleared and the collateral posted by the clearing member. In this case the offered packages are A) cleared positions and B) collateral, and the valid bidding packages are A, B, or A and B. Based on this combinatorial bidding, the auctioneer establishes the algorithm for selecting which auction participant receives offered package A and at what price, and which auction participant receives offered package B and at what price.

⁴ In the academic literature, these auctions are referred to as multi-good auctions.

FIGURE 5: ILLUSTRATION OF A MULTI-ASSET AUCTION FOR A PORTFOLIO OF POSITIONS



Bids are accepted on valid combinations of Offered Package A, B and/or C

2.6 Auction Lifecycle

All auctions run by DRMWG CCPs incorporate a similar sequence of activities and information exchange. Figure 6 illustrates a generalized auction lifecycle, which describes all DRMWG auctions.

The CCP must first establish which clearing members, their customers, if any, and non-clearing members, if any, it will invite to participate in a given auction. CCP Rules typically provide for auctions in which clearing members are required to participate (Mandatory Auctions), and/or auctions in which clearing members may optionally participate (Voluntary Auctions). Some CCP Rules allow for clearing members to bid on behalf of their customers (Indirect Participating Customers), for the participation of customers directly in the auction (Direct Participating Customers), and/or for the participation of CCP members that the CCP has not authorized to clear with them.

If non-clearing members or non-member customers wish to be auction participants (Non-Clearing Auction Participants), they typically must first establish a clearing relationship with one or more clearing members and obtain pre-approval from those clearing members, such that the clearing members commit to clear positions awarded to the Non-Clearing Auction Participants. Figure 6 shows this step as “Non-Member Auction Participant Pre-Approval”, which may take place as part of the normal course of business, ahead of any potential default. As part of these activities, the clearing member on-boards the Non-Clearing Auction Participant such that all required systems integrations, legal agreements, training activities, etc. are complete.

As an additional step, some CCPs may disclose high-level characteristics of the auction portfolio to the clearing members and customers and solicit their interest to participate in the auction.

Once the CCP has identified the potential auction participants, it announces details of the upcoming auction to this group so that they can prepare. Figure 6 shows this step as “Notification”. During the Notification period, the CCP provides all potential auction participants with a summary auction specification and any other required information related to the upcoming auction. The summary auction specification includes the date and time at which the CCP will distribute the auction portfolio to auction participants, the date and time at which the CCP begins accepting bids, the date and time at which the CCP stops accepting bids, and the estimated date and time at which the CCP will have communicated all awards and related cash flows, and distributed an auction complete communication to all auction participants.

During the Notification and Portfolio Review periods, clearing members may require time to perform supplementary risk checks before approving Non-Clearing Auction Participants for participation in the given auction. The supplementary risk checks may require information contained in the Summary Auction Specifications, in which case the clearing member may be able to complete its supplementary risk checks during the Notification period. In instances where supplementary risk checks require knowledge of the specific auction portfolio, the clearing member may perform supplementary risk checks during the Portfolio Review period or Bidding Window. It is important to Non-Clearing Auction Participants that clearing members perform supplementary risk checks as quickly as possible, since the time it takes the relevant clearing member to perform these checks can reduce the effective duration of the Portfolio Review period or Bidding Window for non-clearing members.

After the auction is complete, the CCP books any awarded positions and effects any payments to/from auction participants receiving awards. Figure 6 shows these activities occur during the Award Booking period.

FIGURE 6: ILLUSTRATION OF COMMON ELEMENTS IN THE LIFECYCLE OF A CCP DEFAULT MANAGEMENT AUCTION



3 Standard Terminology and Conventions

3.1 Academic References to Auction Mechanisms

Table 1 defines the commonly used terms for describing auction mechanisms. These common terms are primarily to facilitate the definition of the standard CCP auction types in Section 3.2. Given the various alternative terminology in academic literature, it is beneficial to define a standard terminology used by CCPs during discussions with their stakeholders.

TABLE 1: STANDARD TERMINOLOGY FOR DESCRIBING AUCTION MECHANISMS

Term	Description / Comments
3.1.1 Sealed Bid	<ul style="list-style-type: none"> Any auction mechanism where auction participants share their bids with only the auctioneer and the auctioneer makes no information related to its received bids available to auction participants
3.1.2 Single Unit	<p><u>General definition</u></p> <ul style="list-style-type: none"> Any auction mechanism where only one item is available for sale <p><u>Definition in the context of a default management auction</u></p> <ul style="list-style-type: none"> Any auction mechanism in which the auction participants bid for the entire portfolio being auctioned
3.1.3 Multi Unit	<p><u>General definition</u></p> <ul style="list-style-type: none"> Any auction mechanism where multiple identical items are available for sale <p><u>Definition in the context of a default management auction</u></p> <ul style="list-style-type: none"> Any auction mechanism in which auction participants bid for a percentage of the size (e.g., notional amount or number of contracts) or portfolio units of all positions in the portfolio being auctioned
3.1.4 Multi Asset	<p><u>General definition</u></p> <ul style="list-style-type: none"> Any auction mechanism where multiple non-identical items are available for sale and auction participants bid for different combinations of the non-identical items <p><u>Definition in the context of a default management auction</u></p> <ul style="list-style-type: none"> Any auction mechanism in which the CCP divides the portfolio being auctioned into multiple groups of positions, and auction participants are allowed to submit bids for different combinations of the defined groups, at the discretion of the auction participants, within certain combinatorial bidding rules defined by the CCP
3.1.5 First Price	<ul style="list-style-type: none"> A method for determining the price paid by a winning auction participant, in which that winning auction participant pays its own bid price

Term	Description / Comments
3.1.6 Second Price	<ul style="list-style-type: none"> • A method for determining the price paid by a winning auction participant, in which that winning auction participant pays the next lower bid price to its own bid price
3.1.7 Discriminatory Price	<ul style="list-style-type: none"> • A Multi-Unit auction in which the price paid by the various winning auction participants can be different for different auction winners • Common Discriminatory Price auctions use the First Price or Second Price method of determining the price paid by winning auction participants
3.1.8 Uniform Price	<ul style="list-style-type: none"> • A Multi-Unit auction in which the same price is paid by all winning auction participants • Common Uniform Price auctions use the Lowest Accepted Price or Highest Rejected Price method for determining the price paid by winning auction participants
3.1.9 Lowest Accepted Price	<ul style="list-style-type: none"> • A method for determining the price paid by all winning auction participants in a Uniform Price auction, in which the lowest price bid by a winning auction participant is used as the price for all winning auction participants
3.1.10 Highest Rejected Price	<ul style="list-style-type: none"> • A method for determining the price paid by all winning auction participants in a Uniform Price auction, in which the highest price bid by a non-winning auction participant is used as the price for all winning auction participants

3.2 CCP Auction Types

All default management auction mechanism presented by the CCPs in the DRMWG fall into one of four types of auctions defined in Table 2 and illustrated in Figure 7. The DRMWG is recommending a short name for each of the four types of auction as set forth in Table 2.

TABLE 2: STANDARD CCP AUCTION TYPES

Term	Description / Comments
3.2.1 Single Unit Pay Your Price	<ul style="list-style-type: none"> • Single Unit, First Price, Sealed Bid auction, also commonly referred to as a Winner Takes All auction. <i>See Fig. 8.</i>
3.2.2 Multi-Unit Pay Your Price	<ul style="list-style-type: none"> • Multi-Unit, Discriminatory First Price, Sealed Bid auction. <i>See Fig 9.</i>
3.2.3 Modified Dutch	<ul style="list-style-type: none"> • Multi-Unit, Uniform Lowest Accepted Price, Sealed Bid auction. <i>See Fig 10.</i>
3.2.4 Selective Bidding	<ul style="list-style-type: none"> • Multi-Asset, First Price, Sealed Bid auction. • This type of auction has several variants within the DRMWG CCPs <ul style="list-style-type: none"> – Different CCPs have different strategies for splitting the portfolio being auctioned into different offered packages, and different rules for the valid combinations of offered packages on which CCPs may bid – Different CCPs also have different methodologies for determining which auction participants are the winners of each offered package, given the bids received for different combinations of offered package • All variants share the feature that, whichever auction participant is selected as the winner of a given combination of offered packages on which that auction participant bids, pays the price that auction participant bid for that combination of offered packages • The Selective Bidding auctions used by the DRMWG CCPs include the following common variants: <ul style="list-style-type: none"> – The CCP provides the auction participants with a small number of mutually exclusive offered packages. An auction participant may bid on any individual offered package or on all offered packages together. Winning auction participants receive the combination of offered packages they bid on at the price they bid for that combination of offered packages. – The CCP provides the auction participants with the portfolio it wishes to sell. An auction participant bids on the entire portfolio excluding any number of instruments it indicates with its bid. Winning auction participants receive the portfolio without their excluded positions, for the price they bid for the portfolio without these excluded positions.

FIGURE 7: FOUR STANDARD CCP AUCTION TYPES (ANY AUCTION TYPE DISCUSSED AT THE DRMWG FALL INTO ONE OF THESE CATEGORIES)

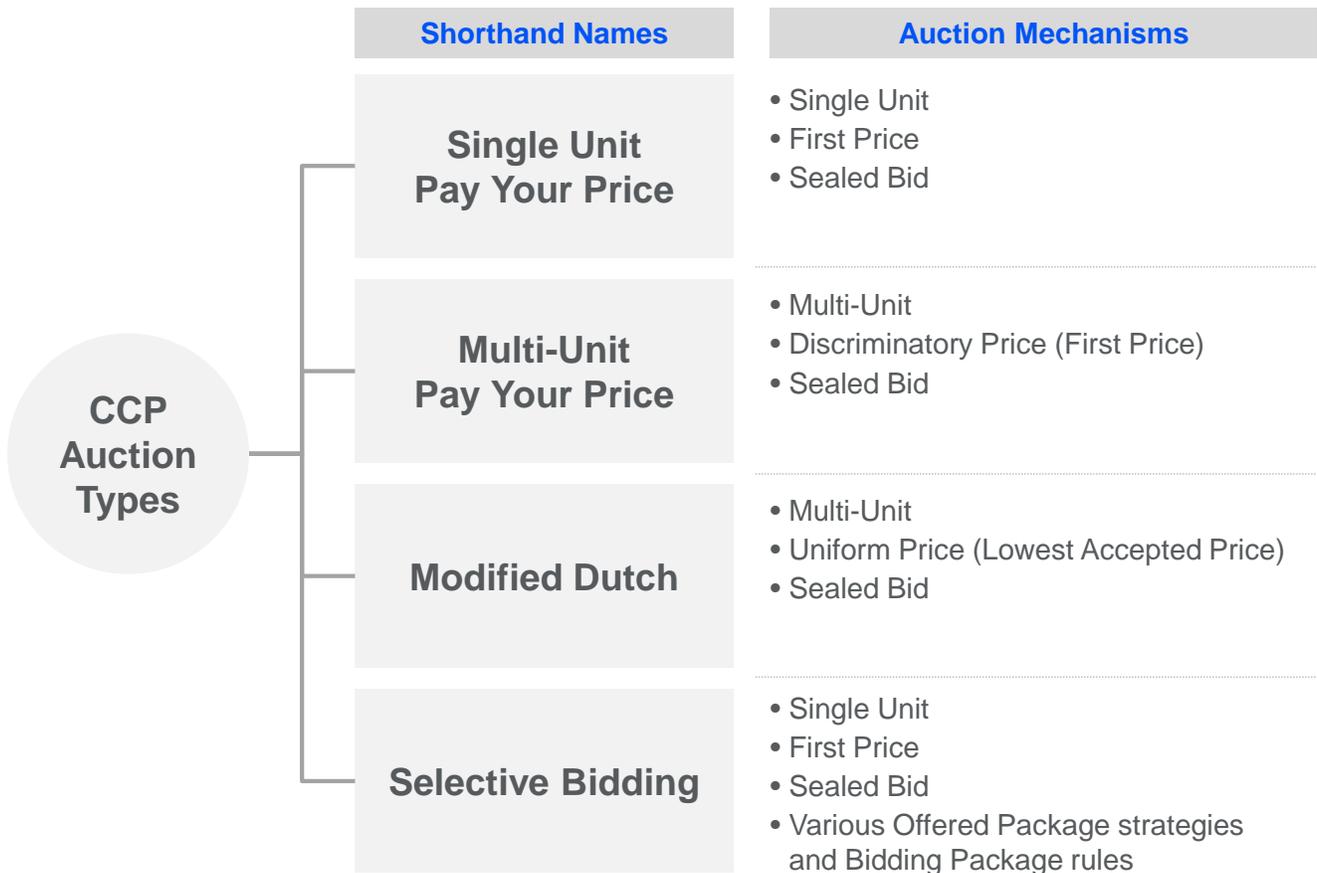


FIGURE 8: EXAMPLE OF A SINGLE UNIT PAY YOUR PRICE AUCTION

BID			AWARDS			
Participant	Price per 100%	CCP Pay / Receive	Participant Award	Cumulative Awards	Invoice Amount	CCP Pay/Receive
A	3,000,000	CCP Receives	100.0%	100.0%	3,000,000	CCP Receives
B	2,000,000	CCP Receives				
C	(1,000,000)	CCP Pays				
D	(1,250,000)	CCP Pays				
E	(2,000,000)	CCP Pays				
F	(2,500,000)	CCP Pays				
G	(3,000,000)	CCP Pays				
H	(5,000,000)	CCP Pays				
I	(50,000,000)	CCP Pays				
			Total		3,000,000	CCP Receives

FIGURE 9: EXAMPLE OF A MULTI-UNIT PAY YOUR PRICE AUCTION

BID					AWARDS				
Participant	Size	Price per given Size	Price per 100%	CCP Pay / Receive	Participant Award	Cumulative Awards	Invoice Amount	CCP Pay/Receive	
A	15.0%	450,000	3,000,000	CCP Receives	15.0%	15.0%	450,000	CCP Receives	
B	15.0%	300,000	2,000,000	CCP Receives	15.0%	30.0%	300,000	CCP Receives	
C	15.0%	(150,000)	(1,000,000)	CCP Pays	15.0%	45.0%	(150,000)	CCP Pays	
D	15.0%	(187,500)	(1,250,000)	CCP Pays	15.0%	60.0%	(187,500)	CCP Pays	
E	15.0%	(300,000)	(2,000,000)	CCP Pays	15.0%	75.0%	(300,000)	CCP Pays	
F	15.0%	(375,000)	(2,500,000)	CCP Pays	15.0%	90.0%	(375,000)	CCP Pays	
G	30.0%	(900,000)	(3,000,000)	CCP Pays	10.0%	100.0%	(300,000)	CCP Pays	
H	15.0%	(750,000)	(5,000,000)	CCP Pays					
I	15.0%	(7,500,000)	(50,000,000)	CCP Pays					
							Total	(562,500)	CCP Pays

FIGURE 10: EXAMPLE OF A MODIFIED DUTCH AUCTION

BID					AWARDS			
Participant	Size	Price per given Size	Price per 100%	CCP Pay / Receive	Participant Award	Cumulative Awards	Invoice Amount	CCP Pay/Receive
A	15.0%	450,000	3,000,000	CCP Receives	15.0%	15.0%	(450,000)	CCP Pays
B	15.0%	300,000	2,000,000	CCP Receives	15.0%	30.0%	(450,000)	CCP Pays
C	15.0%	(150,000)	(1,000,000)	CCP Pays	15.0%	45.0%	(450,000)	CCP Pays
D	15.0%	(187,500)	(1,250,000)	CCP Pays	15.0%	60.0%	(450,000)	CCP Pays
E	15.0%	(300,000)	(2,000,000)	CCP Pays	15.0%	75.0%	(450,000)	CCP Pays
F	15.0%	(375,000)	(2,500,000)	CCP Pays	15.0%	90.0%	(450,000)	CCP Pays
G	30.0%	(900,000)	(3,000,000)	CCP Pays	10.0%	100.0%	(300,000)	CCP Pays
H	15.0%	(750,000)	(5,000,000)	CCP Pays				
I	15.0%	(7,500,000)	(50,000,000)	CCP Pays				
Clearing Price:			(3,000,000)		Total		(3,000,000)	CCP Pays

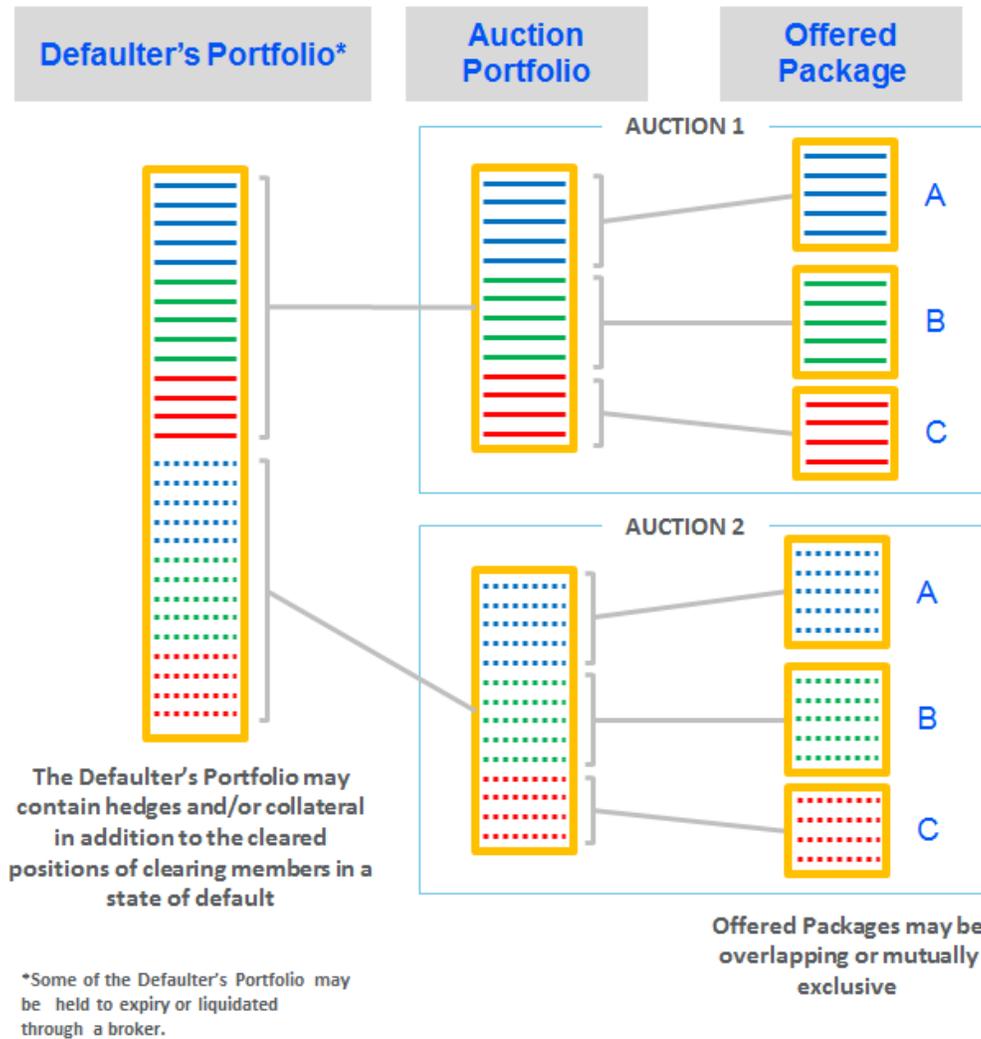
3.3 References to Groups of Positions

Table 3 defines the standard terminology adopted by the DRMWG to reference groups of positions related to default management auctions. Figure 11 provides an illustration of this terminology.

TABLE 3: STANDARD TERMINOLOGY TO DESCRIBE GROUPS OF AUCTION-RELATED POSITIONS

Term	Description / Comments
3.3.1 Defaulter's Portfolio	<ul style="list-style-type: none"> • The portfolio of one or more clearing members in a state of default, which becomes the responsibility of the CCP to liquidate and/or port in order to return to a balanced book • The Defaulter's Portfolio contains primarily cleared positions at the time of default, but can also contain: <ul style="list-style-type: none"> - Hedges (risk reducing transactions) - Collateral posted by one or more defaulting clearing member
3.3.2 Auction Portfolio	<ul style="list-style-type: none"> • A sub-set of (or all) positions in the Defaulter's Portfolio that the CCP wishes to liquidate in a given auction • In some auctions, the CCP obscures the directionality of the Defaulter's Portfolio by adding a mirror Auction Portfolio, which is identical to one of the real Auction Portfolios but has the directionality of all positions reversed
3.3.3 Offered Package	<ul style="list-style-type: none"> • Offered Packages define the sub-sets of the Auction Portfolio that auction participants can choose to bid for, in combination and/or individually, as part of a Selective Bidding auction • Offered packages do not have to be mutually exclusive

FIGURE 11: RELATIONSHIP BETWEEN A DEFAULTER'S PORTFOLIO, AUCTION PORTFOLIO AND OFFERED PACKAGES



3.4 Bids and Bid Construction

Table 4 defines the standard DRMWG terminology related to the components of an auction participant's bid.

To reduce the chances of erroneous submissions and/or erroneous interpretation of submissions, CCPs will collect bids in a format that follows standard market conventions. CCPs with similar product types should strive to follow the same bidding formats and conventions. Generally, CCP should collect bids in terms of a Price representative of the selected Bidding Package along with the Size desired. The Auction Participant should not adjust its submitted Price for its desired Size. For auctions in which bidders are required to provide Levels or provide a Price per given unit Size (rather than the standard 100% of the selected Bidding Package), the CCP may compute the equivalent Price (per 100% size) and provide it to the Auction Participant for reference.

Some CCPs might maintain auction formats in the framework of which they require Auction Participants to provide a two-way quote for a Bidding Package. In such case, the required quote must consist of a Price to buy and a Price to sell the Bidding Package, whereas the CCP reserves the right to define a maximum spread allowable between these two Prices.

In the definitions adopted by the DRMWG, the Price includes a sign that indicate whether associated Invoice Amounts (see 3.6.3) will be positive or negative from the bidder's perspective. Specifically, if the Price submitted for a Bidding Package is positive, the associated Invoice Amount will be positive and the Auction Participant will be required to pay the CCP. Conversely, if the Price submitted is negative, the associated Invoice Amount will be negative and the CCP will be required to pay the Auction Participant.

Payment of the Invoice Amount associated with a winning bid at a given Price is in addition to any other business-as-usual payments between the CCP and Auction Participant, including those related to the transfer of the defaulter's positions to the Auction Participant's portfolio, such as end-of-day mark-to-market payments and initial margin payments. Bidders therefore need to remain cognizant of the settlement method used to transfer the awarded positions. Because of the importance of settlement method in pricing an auction submission, the DRMWG recommends that CCPs specify the settlement method at the time they request submissions. An Auction Participant may adjust the Price of its submission below market value if it requires compensation related to incurred costs associated with a potential auction award, or adjust the Price of its bid above market value if it wishes to pay a premium to increase the probability of receiving the desired portfolio.

Table 5 provides stylized examples of how an Auction Participant may construct its bid for various positions and settlement methods. This table is not intended to be comprehensive and it does not include all bid construction scenarios, but rather illustrates the concept.

TABLE 4: STANDARD TERMINOLOGY AND CONVENTIONS FOR AUCTION BIDDING

Term	Description / Comments
3.4.1 Bidding Package	<ul style="list-style-type: none"> • The Bidding Package associated with an Auction Participant’s bid identifies the specific sub-set of Auction Portfolio positions on which it is bidding • The Auction Participant specifies the Bidding Package in terms of a valid combination of the Offered Packages provided by the CCP, as per the clearinghouse’s instructions for Offered Package selection • The Auction Participant’s bid need only identify a Bidding Package for Selective Bidding auctions, for the other three standard CCP auction types (see Figure 7) the Bidding Package is implicitly the entire Auction Portfolio
3.4.2 Bid Size	<ul style="list-style-type: none"> • The Bid Size associated with an Auction Participant’s bid identifies the portion of the Auction Portfolio notional amounts / number of contracts on which it is bidding, and it is subject to minimum bid size (<i>see 3.5.3</i>) and bid size increment (<i>see 3.5.2</i>) • The Auction Participant specifies Size in terms of a single percentage, which applies to the notional amounts / number of contracts of all Auction Portfolio positions on which the Auction Participant is bidding, or in terms of number of portfolio units.
3.4.3 Price or Level	<p><u>Price</u></p> <ul style="list-style-type: none"> • The Price associated with an Auction Participant’s bid specifies the maximum CCP invoice amount, in the Auction Currency, that the Auction Participant would accept for receiving the sub-set of Auction Portfolio positions on which it is bidding, at a Bid Size of 100% or at a Bid Size which satisfies minimum bid size and bid size increment criteria • If a CCP applies two-way bidding, Auction Participants are required to provide both a Price to buy and a Price to sell, in the Auction Currency for the specified sub-set of Auction Portfolio. • The invoice amount is the payment to/from the Auction Participant associated with a winning bid • A positive invoice amount (and therefore a positive Price) represent payment from the Auction Participant to the CCP • A negative invoice amount (and therefore a negative Price) represents payment from the CCP to the Auction Participant • The invoice amount is in addition to any other “business-as usual” payments (positive and/or negative) between the CCP and Auction Participant related to the transfer of positions from the defaulter’s portfolio to the Auction Participant’s portfolio, such as end-of-day mark-to-market payments and initial margin payments • In order for Auction Participants to take into consideration, when pricing their bids, any business-as-usual payments associated with a winning bid, as part of an auction’s specification the CCP outlines the settlement method for resulting awards and provides a summary of the types of business-as-usual payment that will be associated with taking on the awarded positions <p><u>Level</u></p> <ul style="list-style-type: none"> • If a CCP is requesting bids for positions in individual instruments (i.e., offered packages are for individual positions rather than a sub-portfolio of

	<p>positions), then the CCP may request Auction Participants to provide the worst execution level they are willing to accept for receiving their stated Size in the given position</p> <ul style="list-style-type: none"> • The CCP computes the invoice amount associated with an auction award following market convention and/or the CCP’s stated methodology for computing profit or loss (P/L) from the execution level, size and directionality of the awarded position • The CCP defines the units in which an Auction Participant must state the execution level associated with its bid, typically following market conventions for the given instrument (e.g., Credit Default Swap spread level in bps, etc.)
<p>3.4.4 Settlement Method</p>	<ul style="list-style-type: none"> • The Settlement Method specified by the CCP in relation to a given auction describes any economic or operational details related to its transfer of awarded positions from the Auction Portfolio to winning Auction Participants’ portfolios, that may be relevant to Auction Participants in the formulation of their bids • One element of the Settlement Method that is important for certain asset classes is whether the CCP transfers the positions are at zero or at last mark <ul style="list-style-type: none"> – If the CCP transfers the positions at the last mark, the CCP computes the business-as-usual mark-to-market payments associated with each position in the transferred portfolio based on the difference between the previous day’s marks and the marks at the next settlement cycle (i.e. end-of-day or intraday) following the auction – If the CCP transfers the positions at zero, the CCP computes the business-as-usual mark-to-market payments associated with each position in the transferred portfolio based on the difference between zero and the marks at the of the next settlement (i.e. end-of-day or intraday) cycle following the auction • Another important element of the Settlement Method is the operational process for payment of the invoice amount associated with an auction award <ul style="list-style-type: none"> – One example is a “one-off” settlement made by Delivery Versus Payment (DVP), most commonly used in the transfer of awarded collateral positions in which the collateral is transferred when specific payment for the invoice amount is received – Another example is for the CCP to combine the payment for the invoice amount associated with the auction award with all other business-as-usual payments between the CCP and a winning Auction Participant, such that the winning Auction Participant and the CCP exchange one net cash flow through their established business-as-usual settlement cycle
<p>3.4.5 Capital Considerations</p>	<ul style="list-style-type: none"> • The Capital Considerations outlined by the CCP in relation to a given auction serve as a reminder to Auction Participants of their obligations to the CCP should they receive an auction award • Typical Capital Considerations for winning Auction Participants include: <ul style="list-style-type: none"> – Impact on risk requirements including Initial Margin, Variation Margin and Guaranty Fund requirements – The business-as-usual timing for meeting increased risk requirements – Any implications for Auction Participant not meeting their obligations

	related to receiving auction awards
--	-------------------------------------

TABLE 5: STYLIZED EXAMPLE OF BID CONSTRUCTION

Term	Description / Comments
<p>Auction Type:</p> <ul style="list-style-type: none"> • Single Unit Pay Your Price <p>Settlement Method:</p> <ul style="list-style-type: none"> • Transfer at last mark • Invoice Amount included in end-of-day net payment cycle 	<p>Assumptions:</p> <ul style="list-style-type: none"> • <i>Auction Portfolio:</i> Net position of 20 long Futures contract with a multiplier of 100 • Previous day settlement price = 2040 • Price as of the time of the auction = 2038 • End-of-day settlement price = 2039 <p>Bid Construction:</p> <ul style="list-style-type: none"> • The Auction Participant is willing to take on the position at market value (without charging a premium for costs associated with taking on the portfolio) • The price at the time of the auction is 2038, so the Auction Participant submits a Price of -\$4,000, representing an invoice amount payable from the CCP to the Auction Participant, should the Auction Participant win the auction: the Auction Participant calculates the bid Price as: $(2038-2040) * 100 * 20$ <p>Settlement:</p> <ul style="list-style-type: none"> • The Auction Participant wins the auction and is awarded the 20 long Futures contracts for an invoice amount of -\$4,000 (CCP pays Auction Participant) • The invoice amount of -\$4,000 is included in the end-of-day net payment cycle • Because the CCP transferred the position at last mark, the CCP’s business-as-usual processing generates a mark-to-market payment associated with the awarded position of -\$2,000 (Auction Participant pays CCP, calculated as: $(2039- 2040) * 100 * 20$) • The net of the invoice amount and first mark-to-market payment is -\$2,000 (CCP Pays Auction Participant, calculated as $-\$4,000 + \$2,000$) • Should the Auction Participant have held the same position on the prior day and not benefitted from the invoice amount, its mark-to-market payment would not have been offset and the Auction Participant would have paid \$2,000 to the CCP as part of the end-of-day net payment cycle • As part of its business-as-usual processes, the CCP re-calculates the risk requirements for the winning Auction Participant’s cleared portfolio, which now includes the transferred Futures contracts, and includes any required payments to/from the CCP for risk margining or guaranty fund purposes in the relevant business-as-usual payment cycle
<p>Auction Type:</p> <p>Single Unit Pay Your Price</p> <p>Settlement Method:</p> <ul style="list-style-type: none"> • Transfer at zero • Invoice Amount included in end-of-day net payment cycle 	<p>Assumptions</p> <ul style="list-style-type: none"> • <i>Auction Portfolio:</i> Net position short 15 call options with a multiplier of 100 • Previous day settlement price = 2.35 • Price as of the time of the auction = 2.50 • End-of-day settlement price = 2.60 <p>Bid Construction:</p> <ul style="list-style-type: none"> • The Auction Participant requires a \$75 premium for taking on the portfolio • The price at the time of the auction is 2.50, so the Auction Participant submits a Price of

	<p>-\$3,825 (CCP Pays Auction Participant, calculated as: $(2.50 * 100 * -15) - 75$)</p> <p>Settlement:</p> <ul style="list-style-type: none"> • The Auction Participant wins the auction and is awarded the 15 short call options for an invoice amount of -\$3,825 (CCP pays Auction Participant) • The invoice amount of -\$3,825 is included in the end-of-day net payment cycle • The CCP’s business-as-usual processing computes the daily change in Net Liquidating Value (NLV) for the positions transferred to the winning Auction Participant. Because the positions were transferred at zero, the NLV is \$3,900 (Auction Participant pays CCP, calculated as: $(2.60 - 0) * 15 * 100$) • For the winning Auction Participant, the net of the invoice amount and its “first” NLV payment related to the transferred positions is \$75 (Auction Participant pays CCP, calculated as $-\$3,825 + \$3,900$) • As part of its business-as-usual processes, the CCP re-calculates the risk requirements for the winning Auction Participant’s cleared portfolio, which now includes the transferred Options contracts, and includes any required payments to/from the CCP for risk margining or guaranty fund purposes in the relevant business-as-usual payment cycle
--	---

3.5 Constraints and Requirements

Table 6 defines standard terminology for the constraints and requirements placed on auction participant bids by CCPs.

TABLE 6: STANDARD TERMINOLOGY FOR AUCTION CONSTRAINTS AND REQUIREMENTS

Term	Description / Comments
3.5.1 Auction Currency	<ul style="list-style-type: none"> • Currency in which auction participants must specify the Invoice Amount
3.5.2 Bid Size Increment	<ul style="list-style-type: none"> • Bid Size must be specified in terms of integer multiples of the Bid Size Increment • Sets a lower limit on the material difference between any two auction participant’s bid Sizes
3.5.3 Minimum Bid Size	<ul style="list-style-type: none"> • If an auction participant provides a bid, the Bid Size must be greater than or equal to the Minimum Bid Size to be considered a valid bid • The Minimum Bid Size must be an integer multiple of the Bid Size Increment • Sets a lower-limit on the materiality of any bid received from an auction participant
3.5.4 Minimum Bid Requirement	<ul style="list-style-type: none"> • The smallest cumulative Bid Size, across all valid bids provided by a given auction participant, that is required of that auction participant by the CCP • Auction participants not meeting their Minimum Bid Requirement may be subject to penalties by the CCP

Term	Description / Comments
3.5.5 Price Increment	<ul style="list-style-type: none"> • Price must be specified in terms of integer multiples of the Price Increment
3.5.6 Reserve Price	<ul style="list-style-type: none"> • The lowest Price (smallest payment to the CCP per unit / largest payment to the auction participant per unit) that the CCP considers a valid bid • Established an upper-limit on the amount CCP will pay winning auction participants per unit of the Auction Portfolio • Reserve prices may be private (i.e., known only to the CCP), or provided to all auction participants as part of the CCP’s auction specification • When a CCP sets a private Reserve Price ahead of an auction, or sets no Reserve Price ahead of an auction, the CCP may, subject to its Rules and procedures, set or revise its Reserve Price based on received bids. This enables a CCP to award less than 100% of its Auction Portfolio if it observes a significant decrease in Price in the last several potentially winning bids, and believes it may achieve a better Price for that residual component in a separate auction or using some other liquidation mechanism. • The CCP should state its public Reserve Price, if applicable, or state “Private” or “None”. If the CCP has the ability under its Rules and procedures to set or revise a private Reserve Price after receiving bids, it should also state, “Reserve Price subject to revision based on received bids.”
3.5.7 Maximum Price	<ul style="list-style-type: none"> • The highest Price (largest payment to the CCP per unit / smallest payment to the auction participant per unit) that the CCP considers a valid bid • Provides the CCP with a mechanism with which to protect auction participants from grossly over-paying (or being grossly under-paid) for a given Auction Award – as might result from erroneous bids • The CCP may, subject to its Rules and procedures, set no Maximum Price, set a private Maximum Price, publish a Maximum Price prior to the auction, or revise or set a Maximum Price after receiving all bids, such that the CCP may eliminate obviously erroneous bids.

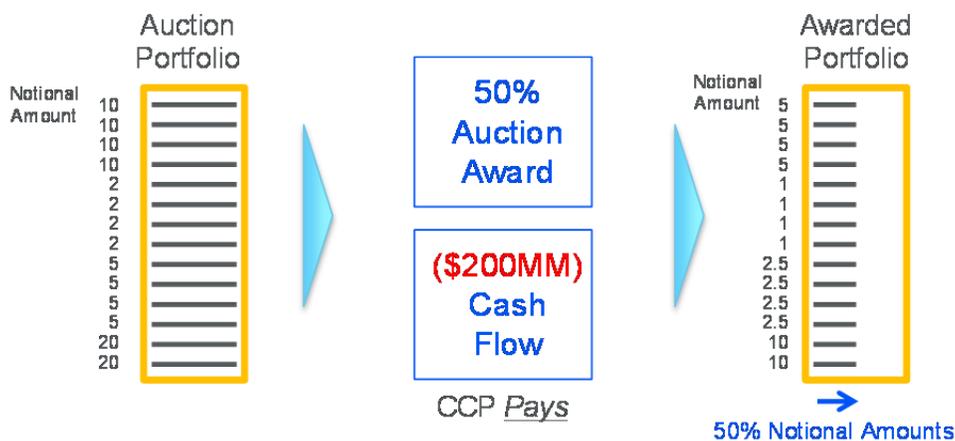
3.6 Awards

Table 7 defines the standard terminology related to auction awards. Figure 12 provides an illustration of the relationship between Auction Portfolio, Auction Award and Awarded Portfolio.

TABLE 7: STANDARD TERMINOLOGY AND CONVENTIONS FOR AUCTION AWARDS

Term	Description / Comments
3.6.1 Auction Award	<ul style="list-style-type: none"> Portion of an Auction Portfolio / Bidding Package for which ownership will be transferred from the CCP to a winning auction participant
3.6.2 Awarded Portfolio	<ul style="list-style-type: none"> Actual positions for which ownership will be transferred from the CCP to a winning auction participant Includes the result of rounding on the notional amounts / number of contracts for each position <ul style="list-style-type: none"> For example, if three auction participants are awarded 1/3 of an Auction Portfolio containing one position with a notional amount of \$100 million, rounding awarded notional amounts to the nearest dollar and allocating any remainder amongst the winners results in two of the three winners receiving a position with a notional amount of \$33,333,333.00 and one winner receiving a position with a notional amount of \$33,333,334.00
3.6.3 Invoice Amount	<ul style="list-style-type: none"> The required payment between the CCP and a winning auction participant related to a given Auction Award <ul style="list-style-type: none"> Negative = CCP pays auction participant Positive = Auction participant pays CCP
3.6.4 Clearing Price	<ul style="list-style-type: none"> For a Modified Dutch auction, the clearing price is the lowest price bid by a winning auction participant, i.e. the worst winning price from CCP perspective.

FIGURE 12: RELATIONSHIP BETWEEN AUCTION PORTFOLIO, AUCTION AWARD AND AWARDED PORTFOLIO



3.7 Lifecycle

Table 8 defines the standard terminology related to the auction lifecycle. Figure 13 provides stylized illustration of the auction lifecycle.

TABLE 8: STANDARD TERMINOLOGY AND CONVENTIONS RELATED TO THE AUCTION LIFECYCLE

Term	Description / Comments
3.7.1 Summary Auction Specification	<ul style="list-style-type: none"> • A table provided to potential auction participants by the CCP, which defines the terms of an auction using a standard format and standard terminology, as defined by the DRMWG
3.7.2 Publication Time	<ul style="list-style-type: none"> • The date and time that the Auction Portfolio will be made available by the CCP to auction participants
3.7.3 Bidding Open	<ul style="list-style-type: none"> • The date and time that the CCP will begin accepting bids
3.7.4 Bidding Close	<ul style="list-style-type: none"> • The date and time that the CCP will stop accepting bids
3.7.5 Bidding Extension Period (optional)	<ul style="list-style-type: none"> • Maximum period of time by which the CCP may extend the Bidding Close
3.7.6 Expected Auction Completion Time (optional)	<ul style="list-style-type: none"> • The date and time by which the CCP estimated it will have communicated auction results to auction participants
3.7.7 Bid Expiration Time	<ul style="list-style-type: none"> • The time or duration after Bidding Close for which bids are actionable. It should generally be longer than (but may be equal to) the Expected Auction Completion Time.

FIGURE 13: STYLIZED EXAMPLE OF THE AUCTION LIFECYCLE



3.8 Summary Auction Specification Template

Table 9 provides an illustration of the Summary Auction Specification template in tabular form. For each item in the template, Sections 3.8 (a) through (x) either provides the appropriate definition or provides a reference to the relevant definition elsewhere in this document.

a. Related Default Event

The CCP may provide a short description of the circumstances leading to the auction, for example “Lehman Brothers Bankruptcy”.

b. Auction Reference

A unique reference for the auction, so that stakeholders can use it on subsequent communications to avoid confusion with other ongoing auctions.

c. Clearing Service

CCP name, or, if the CCP divides its clearing business into separate business lines by asset class, geography, or otherwise, the CCP identifies the relevant characteristics. Clearing business lines often have separate clearing memberships and default funds.

d. Auction Portfolio

Short description of the positions in the Auction Portfolio, for example “Sovereign Single Name CDS”.

e. Publication Time

Date and time from which it will make the Auction Portfolio available to approved auction participants.

f. Standard CCP Auction Type

“Single Unit Pay Your Price”, “Multi-Unit Pay Your Price”, “Modified Dutch” or “Selective Bidding”.

g. Tie Break Rules

The CCP provides the rules that it will use in tie breaking situations when it receives multiple bids of the same Price and, due to the bids received at a higher price, cannot award all auction participants submitting those same-Price bids their requested Size. Examples include “Pro-rata based on Size”, “Random Selection” and “First Received Bid”.

h. Bidding Open

See 3.7.3.

i. Bidding Close

See 3.7.4.

j. Bidding Extension Period (optional)

See 3.7.5.

k. Expected Auction Completion Time

See 3.7.6.

l. Bid Expiration Time

See 3.7.7.

If CCP wants to extend the Bid Expiration Time, it should confirm with bidders that their bids are still actionable. If bids are no longer actionable, CCP may have to rerun the auction.

m. Participant Type

The CCP states the type of participation for the given auction participant. The type of participation may be “Clearing Member - Voluntary”, “Clearing Member - Mandatory”, “Direct Participating Customer - Voluntary”, “Direct Participating Customer - Mandatory”. If a clearing member and/or the CCP has yet to complete required approvals for the participation of a Direct Participating Customer, the CCP should also state “Subject to final CCP / clearing member approvals”, or similar language.

n. Minimum Bid Requirement

See 3.5.4.

o. Auction Currency

See 3.5.1.

p. Offered Packages (Selective Bidding Auctions only)

All Offered Packages available in a Selective Bidding auction.

q. Bidding Package Selection Rules (Selective Bidding Auctions only)

Description of the valid combinations of Offered Packages that an auction participant may bid on.

r. Minimum Bid Size

See 3.5.3.

s. Bid Size Increment

See 3.5.2.

t. Price Increment

See 3.5.5.

u. Reserve Price

See 3.5.6.

v. Maximum Price

See 3.5.7. The CCP should state its public Maximum Price, if applicable, or state “Private” or “None”. If the CCP has the ability under its Rules and procedures to set or revise a private Maximum Price after receiving bids, it should also state, “Maximum Price subject to revision based on received bids”.

Optional Items:

w. Bidding Incentives

The CCP provides a high-level description of any mechanism that it will use in the auction to incentivize participation and/or competitive bidding, for example “Default funds subject to juniorization if Minimum Bid Requirement is not met”.

x. Participant Funds Subject to Bidding Incentives

The CCP provides the value of the auction participant’s default resources that it will expose to bidding incentive in the given auction.

TABLE 9: STANDARD AUCTION SPECIFICATION TEMPLATE

Item	Specification
Related Default Event	• _____
Auction Reference	• _____
Clearing Service	• _____
Auction Portfolio	• _____
Publication Time	• _____
Standard CCP Auction Type	• _____
Tie Break Rules	• _____
Bidding Open	• _____
Bidding Close	• _____
Expected Auction Completion Time	• _____
Bidding Expiration Time	• _____
Participant Type	• _____
Minimum Bid Requirement	• _____
Auction Currency	• _____

Item	Specification
Offered Packages	• _____
Bidding Package Selection Rules	• _____
Minimum Bid Size	• _____
Bid Size Increment	• _____
Price Increment	• _____
Reserve Price	• _____
Maximum Price	• _____

<i>If applicable:</i>	
Bidding Incentives	• _____
Participant Funds Subject to Bidding Incentives	• _____

4 Bibliography

Clarke, E. (1971). Multi-part Pricing of Public Goods. *Public Choice*, 11(1), 17 - 33.

Groves, T. (1973). Incentives in Teams. *Econometrica*, 41(4), 617 - 631.

Herodotus. (circa. 500 B.C.). Babylon and Babylonia. *I:196*.

Milgrom, P. (2004). *Putting Auction Theory to Work*. Cambridge: Cambridge University Press.

Nandi, S. (1997). Treasury Auctions: What do the Recent Models and Results Tell Us? *Federal Reserve Bank of Atlanta Economic Review*, 4 - 15.

S Brusco, G. L. (2009). The 'Google Effect' in the FCC's 700 MHz auction. *Information Economics and Policy*, 21(2), 101 - 114.

Vickrey, W. S. (1961). Counterspeculation, Auctions, and Competitive Sealed Tenders. *Journal of Finance*, 16(1), 8-37.