



# Cash Market Margining

## Model Documentation and Report User Guide

October 2021

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## 1. Introduction

### 1.1. Overview of Approach

Cash Market Margining (CMM) is a 'principal to principal' margin between ASX Clear (ASXCL) and the Clearing Participant (CP) to ensure that in the event of a default of CP, ASXCL can close out the CP's novated obligations with minimal impact on the rest of the market.

The margining approach is based primarily on a Historic Simulation Value at Risk (HSVaR) to calculate the potential losses to ASXCL in the event that the Central Counterparties (CCP) has to close out a defaulting CP's unsettled novated transactions in normal market conditions. The objective on this approach is to:

- enhance the risk management controls of ASXCL and therefore further reduce systemic risk in an increasingly complex Australian cash market environment;
- align with the RBA's stance as outlined in the ASIC/RBA "Review of Participation Requirements in Central Counterparties" and in subsequent RBA Annual Assessments of ASX's CCPs' compliance with the Financial Stability Standards; and
- demonstrate ASXCL's practices to be international best practice.

## 2. Model Specification

### 2.1. Margin Calculation Overview

Margin obligations are calculated for each Clearing Participant (CP), with the calculation based on a CP's net novated settlement obligation across the T+2 settlement cycle<sup>1</sup>. At a high level, the Cash Market Margining Model (CMM) consists of two components:

- Risk Margin; made up of two elements:
  - Historic VaR (HsVaR) Calculation for securities that meet the liquidity requirements set by ASX Clear (ASXCL)
  - Flat Rate Component for Warrant, Interest Rate Securities and less liquid equities
- Mark-to-Market (MTM)
  - Revaluation of a CP's outstanding novated settlement obligation to the current value as at close of business.

Details of how to identify which securities undergo which element of the calculation can be found in [4.2. Security Level Parameters Report](#) of this document.

The nature of the T+2 settlement cycle is such that there is often significant and rapid change to unsettled novated transactions, due to either new trades or the completion of settlement in the daily CHES batch. In light of the liquidity concerns raised during consultation, the CMM model will produce two numbers.

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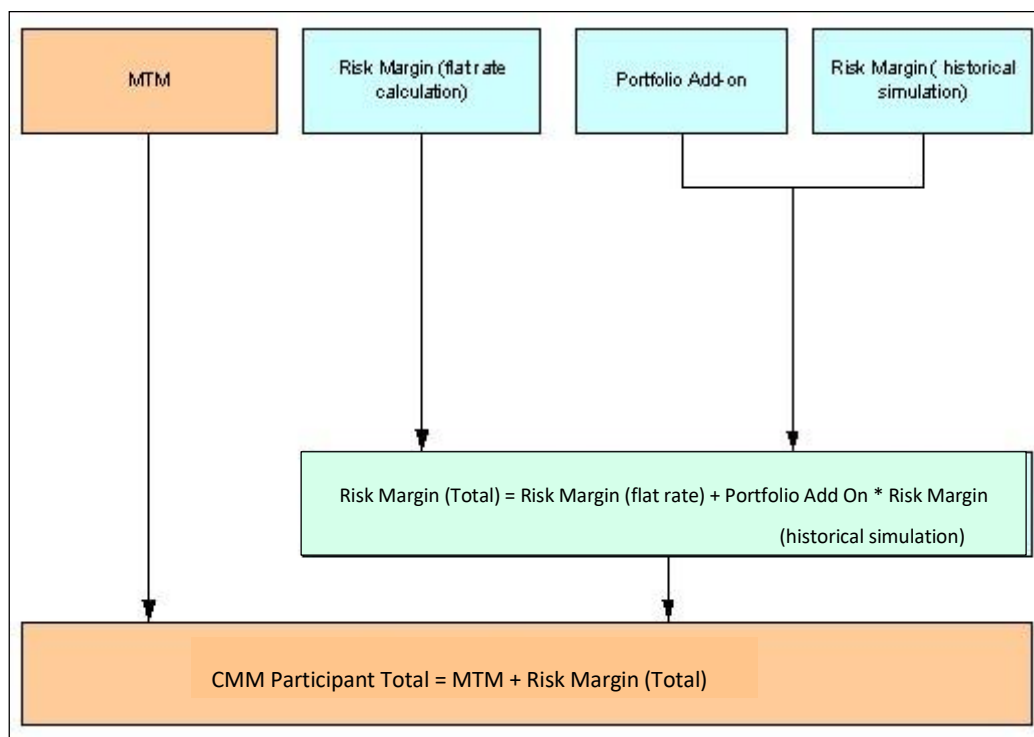
<sup>1</sup> Please note that any settlements outside the normal T+2 settlement cycle, such as deferred settlements, will be included in the Cash Market Margining model calculation

The first number will be a margin calculation based on all outstanding novated settlements at the time, with the second margin calculation excluding any settlements due to settle on the following business day (this second calculation will be referred to as Assumed Settlement). The final amount payable to ASXCL will be the higher of the two calculations.

## 2.2. CMM Model Structure

Figure 1 shows the high level structure of the CMM model risk calculation.

**Figure 1: High level structure of the CMM model risk calculation for each Clearing Participant**



### 2.2.1 Mark-to-Market

The Mark-to-Market (MTM) represents the unrealised profits or losses for a given portfolio of securities and is calculated by taking the difference between the original net settlement obligation and the re-valuation based on end of day settlement prices. MTM is calculated for securities under both HSVaR and Flat Rate calculation models, except the securities with the Risk Configuration Group of Interest Rate (RCG 36) and Default (RCG 37). The details of the Risk Configuration Group and the associated securities can be found in report [Security Level Parameters Report](#) Favourable MTM movements in the CMM model will be reported as negative numbers, offsetting a CP's total cash market margin obligation.

### 2.2.2 Risk Margin

#### 2.2.2.1 HSVaR Parameter

The HSVaR component estimates the potential future move in value from the model reporting date that ASXCL could face when closing out positions in the event of a default. The HSVaR methodology determines a CP's margin requirement by estimating the potential future loss of a portfolio under a range of historical scenarios over a five year lookback by calculating hypothetical changes in the value of a portfolio of securities, using 2-day historical price moves, within a 99.7%

confidence interval. Only securities with continuous price histories, that are also constituents of the S&P/ASX All Ordinaries Index and therefore highly liquid, are included in the HSVaR calculation. The security details can be found in [Security Level Parameters Report](#). The HSVaR is a dynamic calculation, taking into account a moving period of price returns.

HSVaR is calculated on two separate margin groups: securities in the S&P/ASX200 and remaining 300 securities in the S&P/All Ordinaries Index. The HSVaR model uses the following assumptions and parameters:

- Historical simulation is performed across a five year lookback of 1260 days;
- Returns are calculated under a two day Margin Period of Risk (MPOR);
- HSVaR contributions are aggregated for the two groups, Top 200 and Next 300, to determine the total HSVaR contribution for the CP.

### **2.2.2.2 Flat Rate Parameter**

The Flat Rate methodology estimates ASXCL's potential future profit or loss incurred when closing out the CPs positions in the event of a default by grouping securities with similar risk characteristics and determining a flat rate based on the distribution of all prices returns for the constituents of that group. The same "group" flat rate to each constituent. Unlike HsVaR, which factors co-movements and implicit correlations when determining the margin for a given group of securities, the flat rate approach is more conservative as it does not recognise diversification i.e. the flat rate margins in this group ignore any portfolio effect which generally results in higher levels of margins at a portfolio level.

The flat rate methodology is applied to three separate margin groups:

- Securities in Top 200 with insufficient price histories, calculated for a distribution of returns (available price information) based on a 2 day MPOR targeting a 99.7% confidence interval.
- Securities in next 300 with insufficient price histories, calculated for a distribution of returns (available price information) based on a 2 day MPOR targeting a 99.7% confidence interval.
- Securities outside the Top 500 (including ETFs), interest rate securities and warrants, based on a 3 day MPOR targeting a 95% confidence interval.

#### **For Securities in Top 200 and Next 300 with insufficient price histories:**

These securities are typically new listings with shorter price histories than the securities in the HsVaR model (with a minimum of 1260 historical prices). When the security has a sufficient price history, it is included in the HsVaR model for margining.

#### **For Securities outside Top 500 (including ETFs), interest rate securities and warrants:**

Equities are grouped into different price groups based on their closing prices. The flat rate margin for each price group targets a 95% confidence interval over a 3-day MPOR. Warrants are grouped by warrant type (e.g. puts/ calls) and all interest rate securities fall into one group. Each security in the group is then assigned the corresponding flat rate margin from the price group. This group of securities outside the Top 500, represents the majority of the margin held under the flat rate approach.

Flat rates are static and only change when the model is reviewed quarterly (or when market conditions fluctuate significantly). Flat rates are applied to either the net novated settlement obligation or the current value of the novated settlement obligation (whichever is largest) for individual security and all security level flat rate contributions are aggregated to determine the total flat rate margin for each CP.

ASX also applies flat rate floors. The key assumption underlying the setting of the flat rate floors is that a single instrument should be floored at a level that represents movements that could occur in normal markets given security specific risks associated with a single name issuer. The floor deals with pro-cyclicality in low volatility or low trading instruments that otherwise might have lower statistical volatility than otherwise would be prudent.

### 2.3. General Model Inputs

General model inputs cover three areas:

- Positions – Cash market transactions representing outstanding net novated settlement obligations;
- Parameters – Consisting of both security level and market level model parameters; and
- Prices – As Cash Market Margining Phase 1 calculates margin obligations at close of business, close of business prices are used.

#### 2.3.1. Positions

The model requires as inputs, for each CP, their novated settlement obligations, netted according to the following criteria:

- By security (using the published ASX Code)
- By settlement date
- By novated buys or sells (i.e. all novated long positions will be netted together (units > 0), and all novated short positions will be netted together (units < 0))

The positions are taken as a snapshot at the time that the CMM model is run. For Phase 1, this will be at close of business.

#### 2.3.2. Parameters

##### 2.3.2.1 Market Level Model Parameters

The CMM model provides a method of applying parameter values to different groups of securities based on their risk characteristics. These groups represent different segments of the cash market as a whole and are referred to by ASXCL as Risk Configuration Groups (RCGs).

Each RCG will have associated with it the fields described below in Table 1. RCG parameters will be reported on a daily basis, with the reports available through ASX Online.

**Table 1: Risk Configuration Group Parameters**

Name	Description	Permitted Values	Example
Market Date	Date of the margin calculation	DD/MM/YY	27/09/2021
RCG ID	Unique ID of the risk configuration group	System generated	RCG 28

Risk Configuration Group	Title description of the group of securities being margined	Alphanumeric.	ASX 200 - HSVaR
Risk Margin Indicator	Indicates whether security is HSVaR or Flat Rate	HSVaR, FR1	HSVaR or FR1
Mark-to-Market Price	Indicates whether the security needs to go through the mark-to-market module of the CMM model or not.	"CLOSING" or NULL.	CLOSING
	<i>Where Mark-to-Market (MTM) price = Closing, MTM will be calculated for the specified group of securities</i>		
Margin Group ID	Where the Risk Margin Indicator is set to HSVaR, the security will have a portfolio add on factor applied, with each Margin Group ID mapping to a unique portfolio add-on value. Note: Where a security Risk Margin Indicator is set to flat rate, no portfolio add-on factor is applied.	Alphanumeric	MG1; MG2
Time Horizon	The number of historical days to be included in the distribution of portfolio returns for the HSVaR calculation.	Number greater than 0.	1260
Confidence Interval	Percentile value used to calculate the HSVaR contribution for the given time horizon.	Decimal equivalent of a percentage.	0.997
Holding Period	Number of days used in calculating returns for HSVaR.	Decimal greater than 0.	2
Portfolio Add-On	Amount that the calculated HSVaR margin component is to be multiplied by to account for statistical uncertainty	Number greater than zero.	1.0
Flat Rate	Percentage applied for flat rate calculations (if Risk Margin Indicator = FR1).	Fractional equivalent of a percentage. Must be between 0 and 1.	0.29

An example of the initial RCG parameters at the launch of CMM Phase 1 is provided in Appendix 3. These parameters will be amended from time to time at the discretion of ASXCL.

### 2.3.2.2 Security Level Parameters

Securities will have assigned a Risk Margin Indicator property to indicate which risk margin calculation they will undergo. Depending on these properties, other accompanying values might be set. These properties are summarised in Table 2 below.

**Table 2: Security Parameters**

<i>Name</i>	<i>Description</i>
ASX Code	Unique identifier of the security.
RCG ID	Risk Configuration Group ID that the security belongs to
Risk Margin Indicator	States whether the flat rate or HSVaR applies. If this is set to HSVaR for a security, any positions associated with this security will undergo the HSVaR calculation.

*Note: Some Risk Configuration Group parameters will be reported in both Market Level and Security Level Parameter reports to provide flexibility to Clearing Participants when building inhouse systems to reconcile CMM margin obligations*

### 2.3.3. Prices

Daily close of business prices are used in each component of the CMM model. For securities that qualify for the HSVaR component, 5-years (1260 days) daily closing prices are required (this time horizon is a configurable parameter and may be subject to change). For the flat rate and MTM components, the most current close of business price is required.

Close of business prices that were used in the HSVaR calculation will be provided in a CSV file accessible through ASX Online.

## 2.4. Algorithm

### 2.4.1. Calculating Model Output: $CMM_{PARTICIPANT}$

This section details the steps in the calculation of the final CMM obligation. This is a top-down approach, starting with the final CMM margin calculation for a Clearing Participant (CP), and then working down through to the first step in the calculations performed at the security level.

Assumed Settlement uses the same calculation, however the basis of the calculation excludes any exposures which are due to settle on the following business day. The final amount payable will be the maximum amount calculated using either all outstanding net novated settlements or assumed settlement.

$$CMM_{PARTICIPANT} = \text{MAX} [ CMM_{PARTICIPANT}(SD_{1+}), CMM_{PARTICIPANT}(SD_{2+}) ]$$

Where  $SD_{1+}$  includes the net novated cash market transaction arising from settlement days 1, 2, 3 and 4 and  $SD_{2+}$  includes the net novated cash market transactions over settlement days 2, 3 and 4



### 2.4.2. Calculating $CMM_{PARTICIPANT}(CPx)$

For a given Clearing Participant, CPx,  $CMM_{PARTICIPANT}$  is defined as follows:

$$CMM_{PARTICIPANT}(CPx) = MTM_{PARTICIPANT}(CPx) + HSVaR_{PARTICIPANT}(CPx) + FLAT RATE_{PARTICIPANT}(CPx)$$

Note: The portfolio names HSVaR<sub>PARTICIPANT</sub> and FLAT RATE<sub>PARTICIPANT</sub> are used here to identify the subsets of cash market transactions attracting risk margin through either the HSVaR calculation or flat rate calculation.

### 2.4.3. Calculating $MTM_{PARTICIPANT}(CPx)$

$$MTM_{PARTICIPANT}(CPx) = \sum MTM_{ACCOUNT}(CPx)$$

$MTM_{ACCOUNT}$  represents the MTM calculated for each account associated with the CP<sup>2</sup>.

### 2.4.4. Calculating $MTM_{ACCOUNT}(CPx)$

$$MTM_{ACCOUNT}(CPx) = \sum_{position=1}^n MTM_{POSITION}$$

Calculated for all securities with the MTM flag set to “Closing”.

### 2.4.5. Calculating $MTM_{POSITION}$

The Mark-to-Market value of a position in a particular security is the difference between its current value of the netted cash market transactions and the original net novated settlement obligation. This is calculated as follows:

$$MTM_{POSITION} = (Price_{SECURITY} \times Units_{POSITION} \times -1) - NSO_{POSITION}$$

Where:

- SECURITY is the security in which the participant has taken a position (e.g. BHP),
- Price is the most current close of business price for that security,
- Units is the net number of units outstanding in the current net novated settlement obligation,
- NSO is the dollar value of the net novated settlement obligation in that security.

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<sup>2</sup> CMM Phase 1 will treat all positions as House account positions. Under later phases of the initiative ASX may seek to extend this to facilitate either client omnibus or segregated reporting.

#### 2.4.6. Calculating $HSVaR_{PARTICIPANT}(x)$

The HSVaR of the participant is equal to the sum of the HSVaR across all positions in associated CP accounts.

$$HSVaR_{PARTICIPANT}(CPx) = \sum_{acc} [HSVaR_{acc}(CPx)]$$

where acc = house and client omnibus account.

#### 2.4.7. Calculating $HSVaR_{acc}(CPx)$

The total set of cash market transactions in each account will only have a subset of securities that meet the HSVaR eligibility criteria. The securities that qualify for the HSVaR component have an associated Risk Margin Indicator of “HsVaR”. For each account controlled by the CP, the risk margin arising from this HSVaR portion of the portfolio is calculated as follows:

$$HSVaR_{acc}(CPx) = \sum_{i=1}^N \text{Add On Factor}_i \times (HSVaR_{MARGIN\ GROUP})_i$$

where  $i$  is the  $i$ -th margin group and  $N$  is the total number of margin groups. Each HSVaR margin group is allocated a unique add-on factor represented by the term Add-On Factor <sub>$i$</sub>  in the calculation above.

#### 2.4.8. Calculating $HSVaR_{MARGIN\ GROUP}$

As opposed to MTM and FR calculations, VaR is calculated on a portfolio of securities. A portfolio will consist of cash market transactions in securities that belong to the same margin group.

Currently there are two margin groups. The first (MG1) calculates HsVaR contributions on securities in the S&P/ASX 200 index, while the second margin group performs the HsVaR calculation on the remaining securities in the S&P/All Ordinaries index. Any extension of these margin groups will be notified to Clearing Participants through and ASXCL market notice.

To calculate the HSVaR contributions, the following steps are required:

##### Step 1

For each security eligible for the HsVaR calculation, a valid price history is required. The number of prices required historically will depend on the time horizon associated with each margin group. The initial time horizon for each margin group is 1260 days (5-years). Each day in the required time horizon will have a close of business price for each HsVaR security.

##### Step 2

Calculate the net number of units per security by adding together the traded units in each security for all settlement dates (transactions in the same security but for different settlement days are netted together into a single number of net traded units. Assumed settlement excludes any units due to settle on the following business day).

##### Step 3

Calculate simple historical returns for each security for each day using the provided price history.

$$\text{Historical Price Return} = \frac{\text{Closing price}_{\text{day } d} - \text{Closing price}_{\text{day } (d-y)}}{\text{Closing price}_{\text{day } (d-y)}} \times -1$$

Where d = close of business date for which a return is sought and y is the holding period assumption. For example, if the holding period assumption is 2 days then use d – 2. If no holding period has been set, it shall default to 1.

#### Step 4

Multiply each historical price return by the current price and current units (from Step 2) of the security that the return relates to.

#### Step 5

For each close of business day in the price history, add together the total dollar historical returns across all securities as calculated in Step 4.

#### Step 6

Take the nth Percentile value, where n is the Confidence Interval specified for the relevant margin group.

An example of the HSVaR contribution for a set of positions is provided in Appendix 2.

### 2.4.9. Calculating $FLAT\ RATE_{PARTICIPANT}(CPx)$

For each house or client omnibus account, Flat Rate<sub>Participant</sub> is calculated for all securities that failed the HSVaR eligibility criteria. These securities will have a Risk Margin Indicator set to FR1.

$$FLAT\ RATE_{PARTICIPANT}(CPx) = \sum_{acc} [FLAT\ RATE_{acc}(CPx)]$$

where acc = house or client omnibus account.

### 2.4.10. Calculating $FLAT\ RATE_{acc}(CPx)$

The  $FLAT\ RATE_{acc}(CPx)$  is equal to the sum of flat rates calculated across all securities arising from cash market transactions in securities with a Risk Margin Indicator set to FR1.

$$FLAT\ RATE_{acc}(CPx) = \sum_{SECURITY} FLAT\ RATE_{SECURITY}$$

### 2.4.11. Calculating $FLAT\ RATE_{SECURITY}$

This method is used to determine a pre-set margin percentage per security.

For each security attracting a flat rate calculation but having no mark-to-market component<sup>3</sup> (i.e. the securities with the Risk Configuration Group of Interest Rate (RCG 36) and Default (RCG 37)), the total margin obligation generated by flat rates and arising from any net buy (long) transactions is to be no greater than the associated net novated settlement obligation.

For each security allocated a Risk Margin Indicator of FR1,  $FLAT\ RATE_{SECURITY}$  is calculated as follows:

$$FLAT\ RATE_{SECURITY} = \begin{cases} a) \text{ MIN } [ ABS(NSO), Units \times Price \times FR\% ]; \text{ Units } > 0, \text{ MtM Flag } = N/A \\ b) \text{ MAX } [ ABS(NSO), ABS(Units) \times Price ] \times FR\%; \text{ Units } \leq 0, \text{ MtM Flag } = N/A \\ c) \text{ ABS(Units) } \times Price \times FR\%; \text{ MtM Flag } = \text{ Closing} \end{cases}$$

Where:

- Price = current close of business price for the security;
- Units is the number of securities in the net buy (long) or sell (short) cash market transaction for each security;
- NSO is the dollar amount of the net novated settlement obligation for the security;
- MtM Flag is the value of the Real Risk MTM Price indicator for the security, and
- FR% is the applicable flat rate per cent for the security.

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<sup>3</sup> Mark-to-Market (MTM) component will be set to N/A when zero price is found. In other words, when the zero price is not caused by the economic valuation (i.e. stock delisting), MTM margin will not be applied. The Flat Rate margin will be then calculated in method a) or b).

### 3. ASX Online User Access

Users are able to access Phase 1 reporting for CMM via the ASX Online Market Information portal at <http://www.asxonline.com.au> or <https://www.asxonline.com/Marketinfo/Login> using valid login credentials. Initially, each user will have to identify a primary ASX Online user associated with the CMM initiative, who will act as the account administrator. Credentials are provided by ASX and if additional assistance is required while trying to login, please contact Market Information via the following email: [marketdata.admin@asx.com.au](mailto:marketdata.admin@asx.com.au).

Subsequent to receiving login credentials, users will be able to manually download required reports, or automatically download reports using the ASX supported Java application. Users running an in-house application to calculate CMM Obligations are able to use the available files, and process according to the model specifications provided in previous sections of this document.

#### Manual Browsing Access

Users will be able to access reports through the following URL - <https://www.asxonline.com/Marketinfo/Login>

Once logged on, a folder for each subscribed product will be displayed on the left; this may include a range of market data products as well as the Cash Market Margining files. Users can either have the CMM product added to an existing ASX Online Market Information account or have a dedicated account created.

The top level folder contains the file for the current day, and the subfolder entitled “History” contains files for the previous 5 business days. Clicking the files presents the user with a choice to either download the file or open it in an associated application (i.e. MS Excel for XLS or CSV files, and Adobe Acrobat Reader for PDF files).

#### Automatic Data Access (for downloading)

Users of this service can automatically download the CMM Phase 1 reporting files using the java application available on ASX Online. Supporting documentation on how this can be done is available through:

<https://www.asxonline.com/marketinfo/help.shtm#a3>.

- Connection details need to be added to the configuration file, entitled **ami.ini**
- Products to be downloaded, as well as the destination all files are to be downloaded to, need to be added to the file entitled **products.ini**
- The java app may then be scheduled to run at any time.

Once a new file becomes available on the site it will be downloaded to the location stipulated in the products.ini file.

Users looking to download the CMM files should schedule the java app to run at the following time(s): 10.30pm

## 4. Reporting Specification

These below specified reports will provide information pertaining to the model parameter inputs, security parameter inputs, position information and pricing used by ASXCL to calculate cash market margin obligations. In addition to this, headline reports are provided to assist in identifying key drivers of margin obligations. All reports made available represent margin obligations calculated at close of business.

The following reports will assist CPs in reconciling their own CMM Obligation:

- 4.1 Market Level Model Parameters
- 4.2 Security Level Parameters
- 4.3 Novated Cash Market Net Settlement Obligations
- 4.4 HsVaR Prices

The remaining reports listed below, will aid in identification of key portfolio drivers and provide time series snapshots of margin obligations:

- 4.5 Monthly Margins
- 4.6 Daily Margins
- 4.7 Change in Top 10 Security Margin Contributions

### Margin Requirement Drivers

#### 1. Portfolio Size

Size of gross settlement affects the value of risk margin. Increases in the gross settlement are historically a result of:

- Increased trading
- Trading in securities that are in deferred settlement

#### 2. Portfolio Composition

Portfolio composition affects the risk margin methodology.

- Shift from equity concentration in ASX 200 index to stocks outside ASX All Ord's.
- Portfolio-wide buys/sells e.g. arbitrage activity or portfolio rebalancing.
- Increased volatility in equity prices directly affects the MTM component of the Cash Market Margining figures.

#### 3. Model Parameters

Changes to the model parameters driven by a change in market conditions, typically associated with higher volatility. Changes will be made to:

- Flat rate percentage based on historic volatility
- Close out assumptions (Holding period), currently at 1 day for liquid products and 3 days for remaining securities.
- Confidence level, i.e. static parameter currently at 99.7% for securities in the ASX 200 and Next 300.

### 4.1. Market Level Model Parameters

This report identifies the current Risk Configuration Groups (RCGs) and associated parameters set by ASXCL. This report will be used by CP's and BOSP's to understand the values attached to each RCG.

As these settings apply for all clearing participants, this will be made available through an ASX Online folder which all users will have access to.

#### 4.1.1. General Description

<b>Short Report Name</b>	CMM Market Level Model Parameters
<b>Recipients</b>	Clearing Participants, Back-Office Service Providers
<b>Format</b>	CSV

#### 4.1.2. Data

Field Name	Format	Example
Market Date	Date	The market date for which the parameters apply.
Risk Configuration Group ID	Text	RCG 28, RCG 677
Risk Configuration Group	Alphanumeric	ASX 200 - HSVAR, Non - Flat <=0.050. This is the descriptor for the Risk Configuration Group.
Risk Margin Indicator	Text	HsVaR; FR1
Marked-To-Market Price	Text	Closing; N/A
Time Horizon	Numeric	The number of historical days to be included in the distribution of portfolio returns.
Confidence Interval	Decimal	0.997
Holding Period	Numeric	2; N/A The number of days used in the HsVaR returns calculation N/A if it is security under Flat Rate calculation.
Portfolio Add-On	Alphanumeric	1.0; 1.5; N/A
Flat Rate	Alphanumeric	N/A, 0.19. N/A if HSVaR security, otherwise a decimal if it is a Flat Rate security

### 4.1.3. Example



## CMM Market Level Model Parameters

Market Date	Risk Configuration Group ID	Risk Configuration Group	Risk Margin Indicator	Marked to Market Price	Time Horizon	Confidence Interval	Holding Period	Portfolio Add-on	Flat Rate
12/07/12	RCG 10	Next 300 - Flat DTE	FR1	Closing	N/A	N/A	N/A	N/A	0.07
12/07/12	RCG 12	Next 300 - Flat MLD	FR1	Closing	N/A	N/A	N/A	N/A	0.05
12/07/12	RCG 13	ASX 200 - Flat QRN	FR1	Closing	N/A	N/A	N/A	N/A	0.04
12/07/12	RCG 14	Next 300 - Flat KGD	FR1	Closing	N/A	N/A	N/A	N/A	0.06
12/07/12	RCG 15	ASX 200 - Flat WRT	FR1	Closing	N/A	N/A	N/A	N/A	0.03
12/07/12	RCG 16	Next 300 - Flat EPW	FR1	Closing	N/A	N/A	N/A	N/A	0.05
12/07/12	RCG 17	Next 300 - Flat TGZ	FR1	Closing	N/A	N/A	N/A	N/A	0.05
12/07/12	RCG 18	Next 300 - Flat CUP	FR1	Closing	N/A	N/A	N/A	N/A	0.05
12/07/12	RCG 19	ASX 200 - Flat AQQ	FR1	Closing	N/A	N/A	N/A	N/A	0.06

## 4.2. Security Level Parameters Report

This report provides a summary of the parameters applied to each security being margined under cash market margining. This report will be primarily used by CPs and BOSPs to understand the allocation of securities to the various Risk Configuration Groups.

As these settings apply for all clearing participants, this will be a generic market wide report.

### 4.2.1. General Description

<b>Short Report Name</b>	CMM Security Level Parameters Report
<b>Recipients</b>	Clearing Participants, Back-Office Service Providers
<b>Format</b>	CSV

### 4.2.2. Data

Field Name	Format	Example
Market Date	Date	27/09/2021. The market date for which the parameters apply.
ASX Code	Text	BHP: The security code of the security
Product Type	Text	CASHEQ, CASHIR, CASHWR: The product group that the security belongs to.
Risk Configuration Group ID	Text	RCG 28; RCG 677
Risk Configuration Group	Alphanumeric	ASX 200 - HSVAR: The description of the RCG that the security belongs to.



Risk Margin Indicator	Text	HSVaR, FR: Denotes which risk margin calculation a security will undergo
Marked to Market Price	Text	Closing, N/A; Denotes whether a security will undergo the MTM Calculation. Any security with a Marked to Market Price = 'Closing' will have MTM contributions calculated
Time Horizon	Numeric	1260; Number of historical close of business prices required for the security if it undergoes the HsVaR risk margin calculation
Confidence Interval	Decimal	0.997; The confidence interval parameter that applies to the RCG the security belongs to
Holding Period	Numeric	2; Refers to the number of days used in the returns calculation
Portfolio Add-on	Decimal	1.0, 1.5, N/A; The portfolio add on applied to the margin group the security belongs to
Flat Rate %	Numeric	N/A, 0.29; The flat rate per cent to be applied if the security undergoes the flat rate risk margin calculation

#### 4.2.3. Example

### CMM Security Level Parameters

Market Date	ASX Code	Product Type	Risk Configuration Group ID	Risk Configuration Group	Risk Margin Indicator	Marked to Market Price	Time Horizon	Confidence Interval	Holding Period	Portfolio Add-on	Flat Rate
13/07/12	AAA	CASHEQ	RCG 31	Non - Flat GT 10	FR1	N/A	N/A	N/A	N/A	N/A	0.29
13/07/12	AAC	CASHEQ	RCG 29	Next 300 - HSVaR	HsVaR	Closing	502	0.99	1	1.75	N/A
13/07/12	AAD	CASHEQ	RCG 28	ASX 200 - HSVAR	HsVaR	Closing	502	0.99	1	1.30	N/A
13/07/12	AAE	CASHEQ	RCG 30	Non - Flat LTE 10	FR1	N/A	N/A	N/A	N/A	N/A	0.29
13/07/12	AAEDA	CASHEQ	RCG 30	Non - Flat LTE 10	FR1	N/A	N/A	N/A	N/A	N/A	0.29
13/07/12	AAI	CASHEQ	RCG 31	Non - Flat GT 10	FR1	N/A	N/A	N/A	N/A	N/A	0.29
13/07/12	AAJ	CASHEQ	RCG 30	Non - Flat LTE 10	FR1	N/A	N/A	N/A	N/A	N/A	0.29

### 4.3. Novated Cash Market Net Settlement Obligations

This report provides CPs with their net novated settlement obligations, broken down to the ASX Code and Settlement date. Net novated settlement obligations form the basis of the CMM calculation.

This report will be used by CPs in reconciling cash market obligations as well as in conducting internal analysis.

#### 4.3.1. General Description

<b>Short Report Name</b>	CMM Novated Cash Market Net Settlement Obligations Report
<b>Recipients</b>	Clearing Participants, Back-Office Service Providers
<b>Format</b>	CSV

#### 4.3.2. Data

Field Name	Format	Example
ASX Code	Text	BHP; The security code.
Risk Configuration Group Name	Text	ASX 200 - HSVAR: The description of the RCG that the security belongs to.
Novated Net Settlement Obligation	Numeric	-12000.00, 34579.50; Total dollar value for each settlement obligation by ASX code and settlement date. <i>Note: negative settlement values indicate that the CP is delivering funds, positive indicates that the CP is receiving funds.</i>
Units	Numeric	1000000, -300; Total number of units for each settlement obligation by ASX code and settlement date. <i>Note: negative values represent that the CP is delivering units, positive indicates that the CP is receiving units</i>
Settlement Bucket	Alphanumeric	SD1, SD2, SD3, DEFERRED; Represents the transactions position in the T+3 settlement cycle. SD <sup>Deferred</sup> includes anything that is due to settle outside the T+3 settlement cycle. <i>SD1, represents the next settlement day.</i>
Settlement Date	Date	29/09/2021: The date on which the securities are scheduled to settle.

#### 4.3.3. Example



#### CMM Novated Cash Market Net Settlement Obligations

Asx Code	Risk Configuration Group Name	Novated Net Settlement Obligation	Units	Settlement Bucket	Settlement Date
AAA	Non - Flat GT 10	5,616.00	-112.00	SD1	20/04/12
AAA	Non - Flat GT 10	1,463,092.00	-29,168.00	SD2	23/04/12
AAC	Next 300 - HSVaR	21,154.00	-16,291.00	SD1	20/04/12
AAC	Next 300 - HSVaR	28,636.00	-22,037.00	SD2	23/04/12
AAC	Next 300 - HSVaR	-5,678.00	4,529.00	SD3	24/04/12
AAD	ASX 200 - HSVAR	-78,568.00	63,297.00	SD1	20/04/12
AAD	ASX 200 - HSVAR	170,651.00	-135,285.00	SD2	23/04/12
AAD	ASX 200 - HSVAR	40,733.00	-31,979.00	SD3	24/04/12

#### 4.4. HsVaR Prices

This report will provide a list of the historical prices used as input in the HsVaR calculation. This report can be used by CPs to reconcile the HsVaR component of their cash market margin obligation.

#### 4.4.1. General Description

<b>Short Report Name</b>	CMM Historical Security Prices Report
<b>Recipients</b>	Clearing Participants, Back-Office Service Providers
<b>Format</b>	CSV

#### 4.4.2. Data

Field Name	Format	Example
Date	Date	27/09/2021; Date of the close of business price.
ASX Code	Text	BHP, NAB; The security code for which the price is being supplied.
Price Field	Numeric	36.60, 27.09; The close of business price for each ASX code

#### 4.4.3. Example



### CMM HsVaR Prices

Historical Market Date	Asx Code	Closing Price
19/04/12	AAC	1.29
18/04/12	AAC	1.30
17/04/12	AAC	1.30
16/04/12	AAC	1.29
13/04/12	AAC	1.30
12/04/12	AAC	1.29
11/04/12	AAC	1.32

#### 4.5. Monthly Margins Report

The purpose of this report is to show cash market margin obligations on a daily basis over a one month period. The report will provide margin contributions broken down by the various Risk Configuration Group types<sup>4</sup>.

<sup>4</sup> RCG Types represent a collection of like RCGs i.e. all securities that have an individual flat rate have been grouped into one RCG Type; Individual Security Flat Rates



The report will allow users to become familiar with their margining profile as well as to allow them to undertake a trend analysis of their own margin figures. Each Clearing Participant will be provided with their own confidential report each month.

#### 4.5.1. General Description

<b>Short Report Name</b>	CMM Monthly Margins Report
<b>Recipients</b>	Clearing Participants, Back-Office Service Providers
<b>Format</b>	CSV

#### 4.5.2. Data

Field Name	Format	Example
Market Date	Date	01/07/2021; The date of the individual business day in the month of the report.
Clearing Participant	Text	XYZ Limited; The name of the Clearing Participant for which the report applies.
Cash Market Obligation (\$)	Numeric	309,560,759
Assumed Settlement Flag	Text	Y, N; This is an indication of whether the Cash Market Obligation is a result of assumed settlement (Yes) or not (No).
Novated Net Settlement Obligation (\$)	Numeric	921,554,875; The Outstanding net Novated Settlement Amount for the Clearing Participant for that date in the month.
		<i>Note: If CMM Obligations are as a result of assumed settlement, settlement amounts shown exclude the value of any SD1 transactions. Negative settlement amounts indicate that a CP is delivering funds. Positive amounts indicate the CP is receiving funds.</i>
MTM (\$)	Numeric	7,985,554; Represents the MTM contribution on each business day.
ASX 200 (\$)	Numeric	132,478, 411; Represents the margin contribution from those securities in the S&P/ASX 200 index that have met the eligibility criteria for the HsVaR component.
Next 300 (\$)	Numeric	132,478, 411; Represents the margin contribution for the remaining securities in the S&P/All Ordinaries index that have met the eligibility criteria for the HsVaR component.

Individual Security Flat Rates (\$)	Numeric	1,841,013; Represents the flat rate contribution for all securities that have been assigned to an individual RCG. <i>Note: Securities are generally assigned an individual flat rate if they are part of either the S&amp;P/ASX 200 or S&amp;P/All Ordinaries index but do not meet the eligibility criteria for the HsVaR component of the CMM model.</i>
Warrants (\$)	Numeric	16,094,825; represents the flat rate contributions for all warrant products.
Security Interest Rate (\$)	Numeric	16,094,825; Represent the margin contribution for all Interest Rate security products.
Non All Ords <=10c Flat Rate Contribution (\$)	Numeric	124,727,197; Represents the margin contributions for all securities outside the S&P/All Ordinaries index that have a close of business price <= 10c.
Non All-Ords >10c Flat Rate Contribution(\$)	Numeric	124,727,197; Represents the margin contribution for all securities outside the S&P/All Ordinaries index that have a close of business price >10c.

#### 4.5.3. Example



#### CMM Monthly Margins

Market Date	Clearing Participant Name	Cash Market Obligation (\$)	Result From Assumed Settlement	Novated Net Settlement Obligation (\$)	MTM (\$)	ASX 200 (\$)	Next 300 (\$)	Individual Security Flat Rate (\$)	Warrants (\$)	Security Interest Rate (\$)	Non All Ords <= 10c Flat Rate Contribution (\$)	Non All Ords > 10c Flat Rate Contribution (\$)
23/05/12	CP XYZ	1,840,181.37	No	3,549,723.11	0.00	1,718,800.37	121,381.00	0.00	0.00	0.00	0.00	0.00
24/05/12	CP XYZ	32,892,051.56	No	-218,359,129.11	16,404,270.07	8,259,985.58	109,402.16	161,207.09	155,243.63	81,534.27	220,329.33	7,500,079.42
25/05/12	CP XYZ	29,819,334.49	No	-178,572,023.88	16,497,507.60	6,559,926.69	95,358.86	149,114.73	190,299.36	61,776.23	251,953.99	6,013,397.03
25/06/12	CP XYZ	11,227,729.27	No	-29,844,509.71	-1,366,921.09	1,402,148.66	220,816.85	151,199.05	246,699.84	143,584.12	306,634.95	10,123,566.89
27/06/12	CP XYZ	7,329,073.97	No	-21,997,851.87	-1,056,340.94	1,283,735.39	191,990.63	207,623.22	56,139.65	105,190.31	289,470.59	6,251,265.11

#### 4.6. Daily Margins Report

This report will provide a breakdown of margins by each Risk Configuration Group (RCG) type. The report will also provide a three-day window of margin contributions for each RCG type. This report will mainly assist CPs in understanding their current margin contribution breakdown by RCG type.

##### 4.6.1. General Description

<b>Short Report Name</b>	CMM Daily Margins Report
<b>Recipients</b>	Clearing Participants, Back-Office Service Providers
<b>Format</b>	PDF

##### 4.6.2. Data

Field Name	Format	Example
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Clearing Participant	Text	XYZ Limited; The name of the Clearing Participant for which the report applies.
Date	Date	27/09/2021; The COB date for the report.
Assumed Settlement	Text	Yes, No; This is an indication of whether the Cash Market Obligation is a result of assumed settlement (Yes) or not (No).
Risk Configuration Group	Text	Margin Requirement broken down by Risk Configuration Group type.
HSVaR	Numeric	249,745, 0; Represents the HsVaR risk margin contribution broken down by RCG type.
Flat Rate	Numeric	50,000, 0; Represents the flat rate risk margin contribution broken down by RCG type.
MTM	Numeric	200,390, 0; Represents the MTM contribution broken down by RCG type.
Current Day Total Margin by RCG (\$) – dd/mm/yy	Numeric	300,295, 0; Represents the total margin contribution by RCG type for the most recent business date.
Previous Day Total Margin by RCG (\$) – dd/mm/yy	Numeric	90,000; Represents the total margin contribution by RCG type for the second most recent business day.
Previous Day -1 Total Margin by RCG (\$) – dd/mm/yy	Numeric	90,000; represents the total margin contribution by RCG for the third most recent business day.

### 4.6.3. Example



## CMM Daily Margins

Clearing Participant Name:	CP.XYZ
Date:	25/05/12
Assumed Settlement Indicator:	No

Risk Configuration Group	HsVaR (\$)	Flat Rate (\$)	MTM (\$)	Current Day Total Margin by RCG (\$) - 25/05/12	Previous Day Total Margin by RCG (\$) - 24/05/12	Previous Day - 1 Total Margin by RCG (\$) - 23/05/12
ASX 200	207,900.52	0.00	64,844.25	272,744.77	457,692.09	378,717.34
NEXT 300	31,643.22	0.00	-1,101.25	30,541.97	51,582.70	43,849.55
Individual Security Flat Rate Contributions	50,958.61	1,388.10	-36,633.48	-15,713.23	123,931.38	0.00
Non All Ords <= 10c Flat Rate Contribution	0.00	48,113.96	0.00	48,113.96	117,455.14	0.00
Non All Ords > 10c Flat Rate Contribution	0.00	606,290.93	0.00	606,290.93	452,213.48	0.00
Warrants	0.00	4,633.54	0.00	4,633.54	576.55	0.00



\*This chart shows the total CMM Obligations over the last three business days\*

### 4.7. Change in Top 10 Security Margin Contributors

Change in Top 10 Security Margin Contributors provides users with a list and graph of the ten largest security contributions for each component of the CMM model on the most recent business day. The report will also display the change in margin contributions for those securities over a two day window. The report will contain three tabs, the first tab shows the top ten HsVaR security contributions, the second tab shows the top ten MTM contributions and the third tab shows the top ten Flat Rate contributions.

This report will assist CP to quickly isolate security level drivers affecting the change in their cash market margin obligation.

#### 4.7.1. General Description

<b>Short Report Name</b>	CMM Change in Top 10 Security Margin Contributors
<b>Recipients</b>	Clearing Participants
<b>Manual/Auto</b>	External
<b>Format</b>	PDF

#### 4.7.2. Data

##### Page 1: HsVaR Contributions

Field Name	Format	Example
Clearing Participant	Alphanumeric	XYZ Limited; The Clearing Participant for which the report applies.
Market Date	Date	27/09/2021; The business date for which the report applies.
Assumed Settlement	Text	Yes, No; This is an indication of whether the Cash Market Obligation is a result of assumed settlement (Yes) or not (No).
Product Group	Text	CASHEQ, CASHWR, CASHIR; The Product Group that the security belongs to.
ASX Code	Text	ANZ, BHP
HSVaR Contribution (\$) dd/mm/yy	Numeric	1,172,200; The HsVaR contribution by security for the specified business day.
Novated Settlement Obligation (\$) dd/mm/yy	Numeric	<p>– 24,366,877; The net novated settlement amount for each security on the specified business date.</p> <p><i>Note: If CMM obligation for a particular business day are as a result from Assumed Settlement, then settlement amounts will exclude the value of any SD1 settlement amounts.</i></p> <p><i>Negative values indicate that a CP is to deliver funds, positive values indicate that a CP is receiving funds.</i></p>

##### Page 2: MTM Contributions

Field Name	Format	Example
Clearing Participant	Alphanumeric	XYZ Limited; The Clearing Participant for which the report applies
Market Date	Date	27/09/2021; The business date for which the report applies.
Assumed Settlement	Text	Yes, No; This is an indication of whether the Cash Market Obligation is a result of assumed settlement (Yes) or not (No).
Product Group	Text	CASHEQ, CASHWR, CASHIR; The Product Group that the security belongs to.



ASX Code	Text	ANZ, BHP
MTM Contribution (\$) dd/mm/yy	Numeric	1,172,200; The MTM contribution by security for the specified business day
Novated Settlement Obligation (\$) dd/mm/yy	Numeric	– 24,366,877: The net novated settlement amount for each security on the specified business date. <i>Note: If CMM obligation for a particular business day are as a result from Assumed Settlement, then settlement amounts will exclude the value of any SD1 settlement amounts.</i>
		<i>Negative values indicate that a CP is to deliver funds, positive values indicate that a CP is receiving funds.</i>

### Page 3: Flat Rate Contributions

Field Name	Format	Example
Clearing Participant	Alphanumeric	XYZ Limited; The Clearing Participant for which the report applies.
Market Date	Date	27/09/2021; The business date for which the report applies.
Assumed Settlement	Text	Yes, No; This is an indication of whether the Cash Market Obligation is a result of assumed settlement (Yes) or not (No).
Product Group	Text	CASHEQ, CASHWR, CASHIR; The Product Group that the security belongs to.
ASX Code	Text	ANZ, BHP
Flat Rate Contribution (\$) dd/mm/yy	Numeric	1,172,200; The flat rate contribution by security for the specified business day.
Novated Settlement Obligation (\$) dd/mm/yy	Numeric	– 24,366,877: The net novated settlement amount for each security on the specified business date. <i>Note: If CMM obligation for a particular business day are as a result from Assumed Settlement, then settlement amounts will exclude the value of any SD1 settlement amounts.</i> <i>Negative values indicate that a CP is to deliver funds, positive values indicate that a CP is receiving funds.</i>

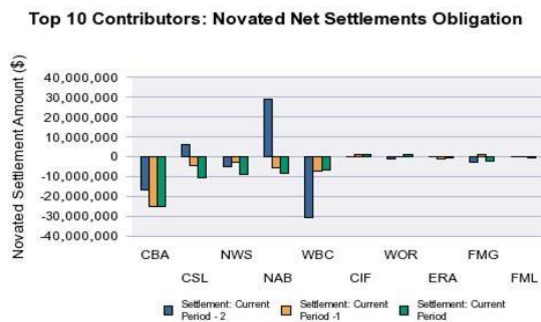
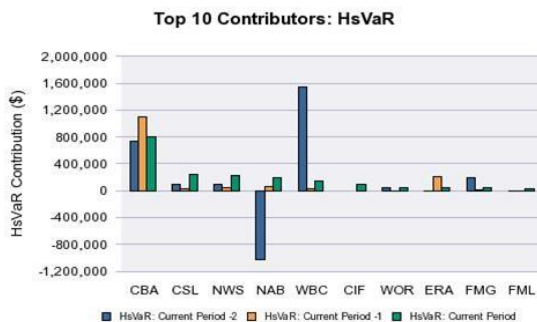
### 4.7.3. Example



### CMM Change in Top 10 Security Margin Contributors

Clearing Participant Name:	CP XYZ
Date:	27/06/12
Assumed Settlement Indicator:	No

Product Group	ASX Code	HsVaR Contribution (\$) 27/06/12	HsVaR Contribution (\$) 25/06/12	HsVaR Contribution (\$) 25/05/12	Novated Net Settlement Obligation (\$) 27/06/12	Novated Net Settlement Obligation (\$) 25/06/12	Novated Net Settlement Obligation (\$) 25/05/12
CASHEQ	CBA	799,881.04	1,107,105.00	743,251.69	-25,308,733.19	-25,242,330.84	-16,651,275.94
CASHEQ	CSL	250,542.92	33,938.60	97,608.46	-10,358,522.07	-4,540,492.34	5,901,031.35
CASHEQ	NWS	225,273.34	51,223.85	103,123.50	-9,153,426.08	-2,709,374.37	-5,142,070.41
CASHEQ	NAB	196,367.90	67,148.11	-1,030,321.11	-8,321,472.74	-5,604,747.39	29,208,822.08
CASHEQ	WBC	145,817.62	21,275.20	1,539,879.33	-6,636,486.70	-7,448,282.61	-30,636,005.25
CASHEQ	CIF	88,147.14	0.00	-112.42	1,380,589.89	1,380,553.36	7,193.58
CASHEQ	WOR	53,508.25	508.21	48,099.00	990,747.80	-106,595.32	-972,625.93
CASHEQ	ERA	48,973.04	202,274.47	-4,802.02	-775,093.82	-1,039,556.45	94,067.84
CASHEQ	FMG	44,472.67	18,978.62	187,347.87	-2,359,020.46	1,276,700.94	-2,673,885.60
CASHEQ	FML	34,680.83	-864.00	1,748.58	-419,898.34	15,553.48	-69,636.37



### 4.8. CMM All Prices

The purpose of this report is to capture all closing prices used in the CMM model. The report will be provided in CSV format and will display the current day's price for all cash market securities, including equities, warrants, interest rate securities and Australian Government securities.

#### 4.8.1. General Description

<b>Short Report Name</b>	CMM All Prices
<b>Recipients</b>	Clearing Participants
<b>Manual/Auto</b>	External
<b>Format</b>	CSV

#### 4.8.2. Data

Field Name	Format	Example
ASX Code	Character	"ABC"; ASX code associated with the cash market security.
Market Date	Date	27/09/2021; The business date price was captured.
Closing Price	Numeric	"3.812"; Closing price used in the CMM model.

#### 4.8.3. Example

Asx Code	Market Date	Closing Price
14D	28/09/2021 0:00	0.1
1AD	28/09/2021 0:00	0.091
1AG	28/09/2021 0:00	0.035
1ST	28/09/2021 0:00	0.015
1VG	28/09/2021 0:00	0.23
29M	28/09/2021 0:00	2.36
2BE	28/09/2021 0:00	0.049
2BEO	28/09/2021 0:00	0.003
360	28/09/2021 0:00	9.03
3DA	28/09/2021 0:00	0.46
3DP	28/09/2021 0:00	0.465
3MF	28/09/2021 0:00	0.15
3PL	28/09/2021 0:00	1.24

### 4.9. Exercised Deals Report

As exercised option positions are only reported to CHES the day after exercise, with an as at date of the previous business day, this report is designed to distinguish exercised option positions that are included in the CMM model from other cash market transactions on the day ETO positions are exercised.

This report should be used for informational purposes only as the Novated Cash Market Net Settlement Report will contain a consolidated view of all cash market transactions (including exercised ETO positions) and should be used for any internal reconciliation.

#### 4.9.1. General Description

<b>Short Report Name</b>	Exercised Deals Report
<b>Recipients</b>	Clearing Participants
<b>Manual/Auto</b>	External
<b>Format</b>	CSV

#### 4.9.2. Data

Field Name	Format	Example
ASX Code	Character	"ABC"; ASX code associated with the cash market security.
Risk Configuration Group	Character	"RCG 28"; Risk Configuration Group the security belongs to.
Net Novated Settlement Obligation	Numeric	-15,625; 15,625: The net novated settlement amount associated with all exercised transactions for a particular ASX Code.
Units	Numeric	-2,500; 2,500: The net number of units associated with all exercised transactions for a particular ASX Code.
Settlement Bucket	Alphanumeric	SD1, SD2, SD3; Represents the transactions position in the T+3 settlement cycle. <i>SD1, represents the next settlement day.</i>
Settlement Date	Date	16/09/2021: The date on which the transactions are scheduled to settle.

#### 4.9.3. Example

Asx Code	Risk Configuration Group ID	Settlement Amount	Units	Settlement Bucket	Settlement Date
A2M	RCG 28	500000	800	SD2	20/09/2021
AGL	RCG 28	100000	70	SD2	20/09/2021
ALD	RCG 28	3000	500	SD2	20/09/2021
ALL	RCG 28	3000000	200	SD2	20/09/2021
APT	RCG 581	1000	30	SD2	20/09/2021
ASX	RCG 28	200000	70	SD2	20/09/2021
AWC	RCG 28	2000	50	SD2	20/09/2021
AZJ	RCG 28	200	1000	SD2	20/09/2021

## 5. Appendices

### 5.1. Appendix 1: Definitions and Acronyms

Acronym/Term	Definition
ASXCL	ASX Clear Limited
CP	Clearing Participant
SINS	Settlement Instructions File provided by CHESS containing the outstanding settlements for each CP, by settlement day and buy/sell position.
NSO	Net Settlement Obligations – dollar value amount payable/receivable by the CP as per the CHESS SINS file.
CMM	Cash Market Margining - name of the project. Calculation of margin for instruments such as equities, warrants and interest rate products.
COB	Close of business date. Historical date for which prices are sourced, used for VaR calculations.
EXIGO	In the CMM context, the payment system in which funds to cover margin obligations will be settled.
HSVAr	In the CMM context, an approach for measuring a portfolio's potential for dollar losses by assessing what the losses may have been, had the same portfolio been held every day for a given period of time (i.e. 5 years)
MES	Margin Engine Service specific to Cash Market Margining.
SDn	Settlement day n, where n is a number between 1 and 3 inclusive.
SDn+	Group of settlement days including day n and above.
RCG ID	Unique ID of the risk configuration group
Risk Configuration Group	Title description of the group of securities being margined
Risk Margin Indicator	Indicates whether security is HSVAr or Flat Rate
Mark-to-Market Price	Indicates whether the security needs to go through the mark-to-market module of the CMM model or not. <i>Where Mark-to-Market (MTM) price = Closing, MTM will be calculated for the specified group of securities</i>
Margin Group ID	Where the Risk Margin Indicator is set to HSVAr, the security will have a portfolio add-on factor applied, with each Margin Group ID mapping to a unique portfolio add on value. Note: Where a security Risk Margin Indicator is set to flat rate, no portfolio add-on factor is applied.
Time Horizon	The number of historical days to be included in the distribution of portfolio returns for the HSVAr calculation.
Confidence Interval	Percentile value used to calculate the HSVAr contribution for the given time horizon.
Holding Period	Number of days used in calculating returns for HSVAr.
Portfolio Add-On	Amount that the calculated HSVAr margin component is to be multiplied by to account for statistical uncertainty
Flat Rate	Percentage applied for flat rate calculations (if Risk Margin Indicator = FR1).

## 5.2. Appendix 2: HSVaR Methodology Percentile example

Using ALL Outstanding Settlement Obligations

	BHP	ANZ	RIO	CBA	Portfolio returns
Day1	\$ 4.86	\$ 47.25	-\$ 28.50	-\$ 105.00	89.39
Day2	-\$ 135.00	\$ 31.05	\$ 37.62	-\$ 46.20	112.53
Day3	-\$ 126.00	-\$ 29.70	-\$ 36.48	\$ 44.80	147.38
Day4	\$ 18.00	\$ 40.50	-\$ 22.80	-\$ 98.00	62.30
Day5	\$ 5.40	-\$ 44.55	-\$ 26.22	\$ 102.20	36.83
Day6	\$ 3.60	\$ 43.20	\$ 25.08	\$ 100.80	172.68
Day7	\$ 18.00	\$ 27.00	-\$ 34.20	\$ 42.00	52.80
Day8	\$ 4.86	\$ 33.75	-\$ 39.90	\$ 49.00	47.71
Day9	\$ 1.80	\$ 41.85	-\$ 23.94	\$ 99.40	119.11
Day10	\$ 7.20	\$ 45.90	-\$ 27.36	\$ 103.60	129.34
Day11	\$ 131.40	\$ 28.35	-\$ 35.34	\$ 43.40	167.81
Day12	\$ 129.60	\$ 32.40	-\$ 38.76	\$ 49.00	172.24

Current Day units and prices are used to evaluate what would have been potential dollar value losses/gains if the CP had held the same portfolio everyday for the last n days.

The var estimate is based on y% of the portfolio returns (not security returns)

Portfolio Returns \$ 169.36	Where Y= 85%
With Portfolio Add-On \$ 220.17	Where add-on = 1.3

Using Assumed Settlement - no SD 1 settlements

(in this simple example, let's assume CBA was settling tomorrow)

	BHP	ANZ	RIO	CBA	Portfolio returns
Day1	\$ 4.86	\$ 47.25	-\$ 28.50	\$ -	23.61
Day2	-\$ 135.00	\$ 31.05	\$ 37.62	\$ -	66.33
Day3	-\$ 126.00	-\$ 29.70	-\$ 36.48	\$ -	192.18
Day4	\$ 18.00	\$ 40.50	-\$ 22.80	\$ -	35.70
Day5	\$ 5.40	-\$ 44.55	-\$ 26.22	\$ -	65.37
Day6	\$ 3.60	\$ 43.20	\$ 25.08	\$ -	71.88
Day7	\$ 18.00	\$ 27.00	-\$ 34.20	\$ -	10.80
Day8	\$ 4.86	\$ 33.75	-\$ 39.90	\$ -	1.29
Day9	\$ 1.80	\$ 41.85	-\$ 23.94	\$ -	19.71
Day10	\$ 7.20	\$ 45.90	-\$ 27.36	\$ -	25.74
Day11	\$ 131.40	\$ 28.35	-\$ 35.34	\$ -	124.41
Day12	\$ 129.60	\$ 32.40	-\$ 38.76	\$ -	123.24

Portfolio Returns \$ 89.86	Where Y= 85%
With Portfolio Add-On \$ 116.81	Where add-on = 1.3

New 85th Percentile, without CBA in portfolio.

Historical Price Returns Series	CP Portfolio			
	BHP	ANZ	RIO	CBA
Day1	0.027	0.35	0.25	-0.75
Day2	-0.75	0.23	-0.33	-0.33
Day3	-0.7	-0.22	0.32	0.32
Day4	0.1	0.3	0.2	-0.7
Day5	0.03	-0.33	0.23	0.73
Day6	0.02	0.32	-0.22	0.72
Day7	0.1	0.2	0.3	0.3
Day8	0.027	0.25	0.35	0.35
Day9	0.01	0.31	0.21	0.71
Day10	0.04	0.34	0.24	0.74
Day11	0.73	0.21	0.31	0.31
Day12	0.72	0.24	0.34	0.35

Current Units	4	5	-3	5
Current Price	45	27	38	28

Daily Returns are calculated using a simple returns formula:  

$$\frac{I_{current} - I_{current-x}}{I_{current-x}}$$
 where x = the holding day period time horizon

### 5.3. Appendix 3: Initial Risk Configuration Groups

Note: does not include all possible RCG groupings for the implementation phase (e.g. Market Cap > or Market < a certain value, GICS Code etc.). New RCG's may be created and/or amended from time to time, and notified to the market via a Market Notice.

Product Type	Product Grouping	Price History or Price Level Grouping	Methodology		Mark-to-Market Type
			Risk Margin Type	Flat Rate	
Equities	ASX 200	With 5 years of price history	Historic simulation VaR based on a 2 day price movement targeting a 99.7% confidence interval with a portfolio add-on of 1.0.	N/A (VaR)	Closing Price
	ASX 200	Without 5years of price history	Flat rate per stock based on a 2 day price movement targeting a 99.7% confidence interval	>= 10%	Closing Price
	Other All Ord's (Next 300)	With 5 years of price history	Historic simulation VaR based on a 2 day price movement targeting a 99.7% confidence interval with a portfolio add-on of 1.0.	N/A (VaR)	Closing Price
	Other All Ord's (Next 300)	Without 5 years of price history	Flat rate per stock based on a 2 day price movement targeting a 99.7% confidence interval	>=10%	Closing Price
	Non-All Ords	Price >5c	One flat rate based on a 3 day price movement targeting a 99.5% confidence interval, excluding zero price moves.	>=10%	Closing Price
	Non-All Ords	Price <= 5c	One flat rate based on a 3 day price movement targeting a 99.5% confidence interval, excluding zero price moves.	=50%	Closing Price
Warrants	Instalments	Instalments	One flat rate based on a 3 day price movement targeting a 99.5% confidence interval, excluding zero price moves.	>=10%	Closing Price
		Call/Puts	Call/Puts		>=10%
	Barriers	Barriers		>=10%	
	Others	Others		>10%	
Interest Rate Products	All products	All products	One flat rate based on a 3 day price movement targeting a 99.5% confidence interval, excluding zero price moves.	>=10%	None