Latest updates are highlighted in orange

Margin and Stress Test Simulation

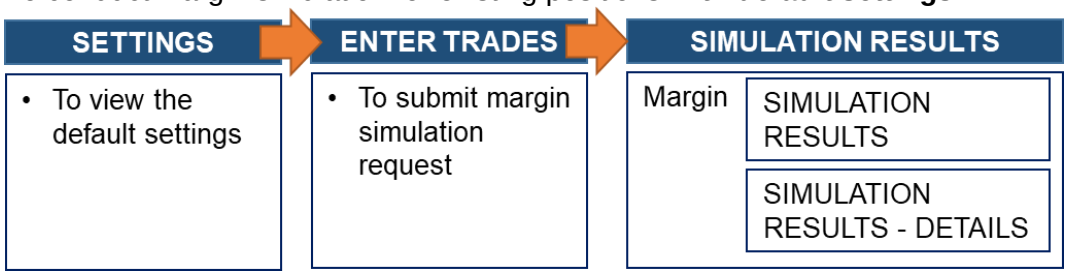
PURPOSE:

To conduct margin and/or stress test simulation for Hong Kong market, with

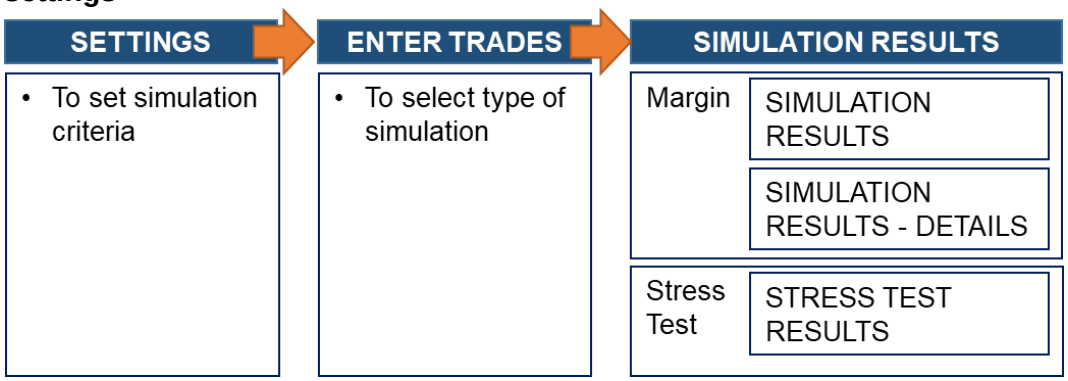
- latest available marginable positions; or
- latest available marginable positions with hypothetical trades; or
- hypothetical trades only

ACCESS PATHS:

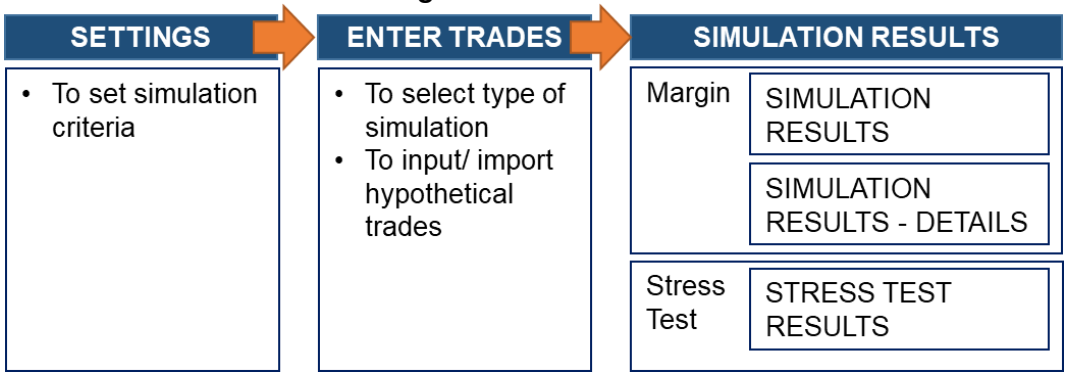
A. To conduct margin simulation for existing positions **with default settings**



B. To conduct margin **and/or stress test** simulation for existing positions **with customised settings**



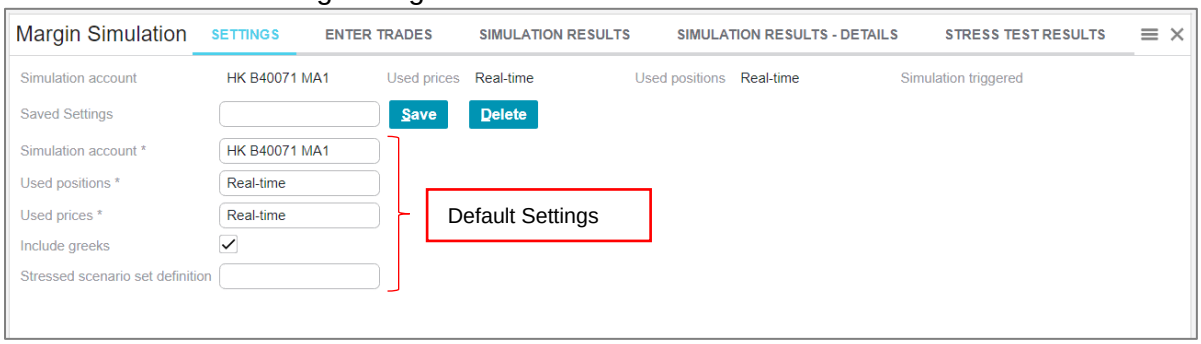
C. To conduct margin **and/or stress test** simulation for existing positions **plus hypothetical trades with customised settings**



4.1 SIMULATION WITH DEFAULT SETTINGS (ACCESS PATH – A)

4.1.1 SETTINGS

Default view after clicking <Margin Simulation> on main view



Field	Description
Simulation account*	• Default as "HK <Part ID> MA1'" ▪ **HK** exchange location ▪ **MA1** marginable "Main Account", to be used for simulation *Applicable to GCP:* Main Account capturing marginable positions of GCP its own and its Non-Clearing Participants.
Used position*	• Default as "Real-time" ▪ **Real-time** use the latest available marginable positions in VaR Online[1] for the simulation
Used prices*	• Default as "Real-time" ▪ **Real-time** use the latest available prices in VaR Online for simulation
Include greeks	*Not applicable for simulation, reserved for future use*
Stressed scenario set definition	• Default as blank • Only applicable to "Stress Test" or "Margin and Stress Test" simulation

Note: * Mandatory fields

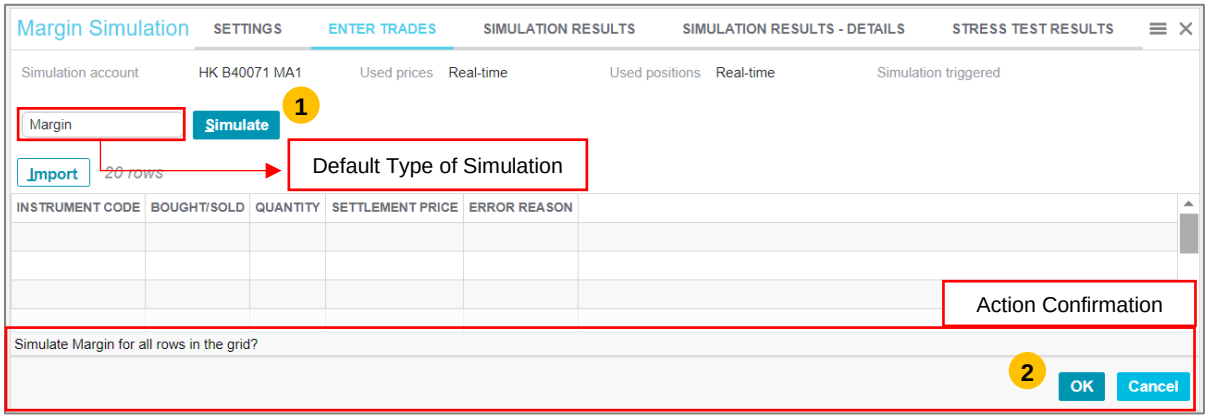
4.1.2 ENTER TRADES

The default type of simulation is "Margin", which is mark-to-market and margin simulation only; results to be displayed via <SIMULATION RESULTS> and <SIMULATION RESULTS – DETAILS> tabs.

[1] During the familarisation programme phase 2, VaR Online will refresh positions at end of day (around 8:30p.m.) and during the day, the marginable positions in VaR Online are normally as of start of day.

The simulation processing time may varies subject to system scheduled jobs.

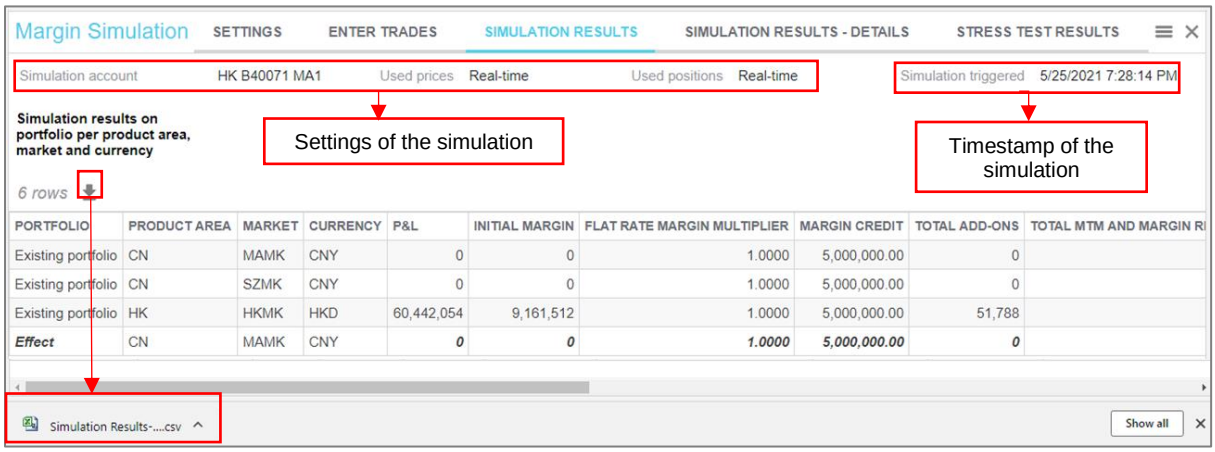
Click <ENTER TRADES> tab and click <Simulate> to proceed the margin simulation



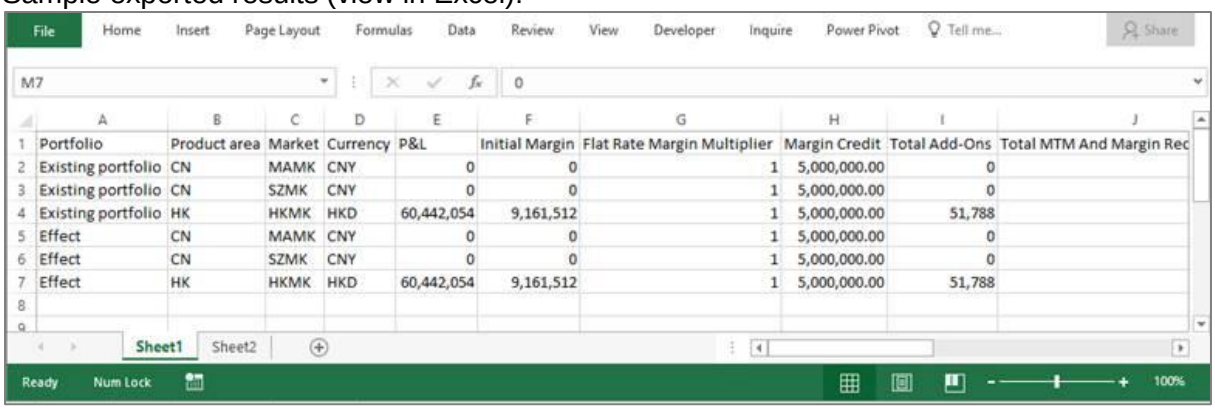
4.1.2.1 TO VIEW MARGIN SIMULATION RESULTS

1. Click < SIMULATION RESULTS> tab, to display the simulation result
2. Click the “Export” button to download the simulation results as a CSV file

Sample screen:



Sample exported results (view in Excel):



Description of fields:

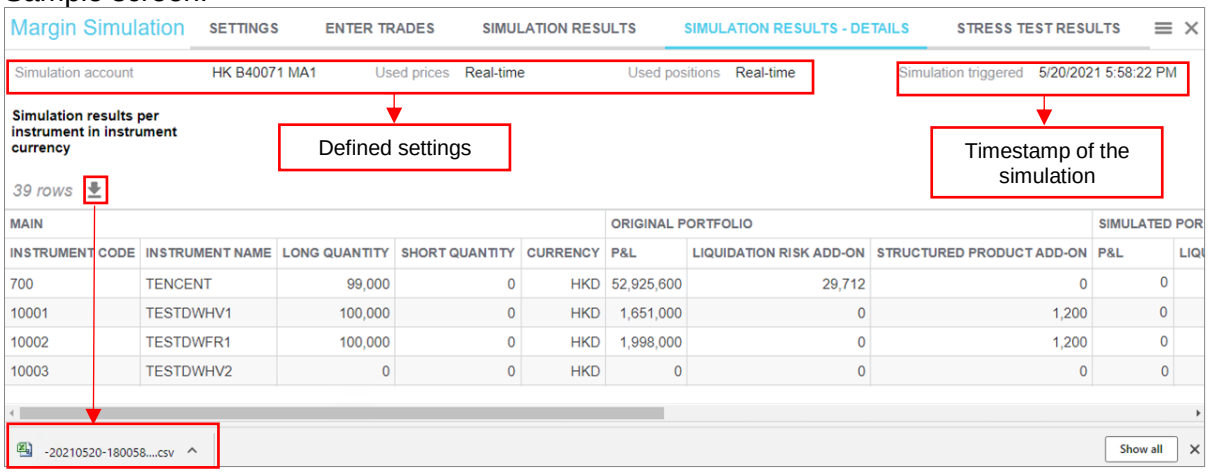
Field	Description
PORTFOLIO	• Existing portfolio: simulation based on existing portfolio (latest available marginable positions in VaR Online) without hypothetical trades
PRODUCT AREA	• Displays the location of the market, i.e. HK – Hong Kong
MARKET	• Displays the market code ▪ HKMK – Hong Kong market ▪ MAMK – Shanghai market ▪ SZMK – Shenzhen market • Simulation is only applicable to Hong Kong market, the results for Shanghai and Shenzhen market are reserved for future use
CURRENCY	• Displays the currency of the simulation results, i.e. HKD – Hong Kong dollar
P&L	• Mark-to-market (MTM), in Hong Kong dollar equivalent ▪ Positive value: unfavorable MTM ▪ Negative value: favorable MTM
INITIAL MARGIN	• Sum of various margins: ▪ portfolio margin + flat rate margin + corporate action position margin
FLAT RATE MARGIN MULTIPLIER	• Flat rate margin multiplier
MARGIN CREDIT	• Margin credit which is granted to each Clearing Participant and applied for Margin calculation
TOTAL ADD-ONS	• Sum of all add-ons. The total add-ons will be included in TOTAL MTM AND MARGIN REQUIREMENT, except default fund add-on
TOTAL MTM AND MARGIN REQUIREMENT	• Total MTM and margin requirement incorporate add-ons, if any, except default fund add-on
AD-HOC ADD-ON	• Ad hoc risk component related to individual CP imposed by HKSCC, if applicable
LIQUIDATION RISK ADD-ON	• Risk component related to the liquidity risk of concentrated positions
HOLIDAY ADD-ON	• Always “0”, reserved for future use, market risk component related to additional risk during holiday period

Field	Description
CREDIT RISK ADD-ON	• Always “0”, reserved for future use, risk component related to individual CP’s credit risk imposed by HKSCC, if applicable
DEFAULT FUND ADD-ON	• Always “0”, reserved for future use, risk component to mitigate excessive risk exposures of individual CP on Default Fund. If any, will be collected separately from Total MTM and Margin Requirement
POSITION LIMIT ADD-ON	• Risk component related to settlement counterparty risk arising from excessive CNS exposure against CP’s apportioned liquid capital
STRUCTURED PRODUCT ADD-ON	• Risk component to handle the huge percentages loss resulting from downward price movement approaching the minimum security prices for long structured product positions

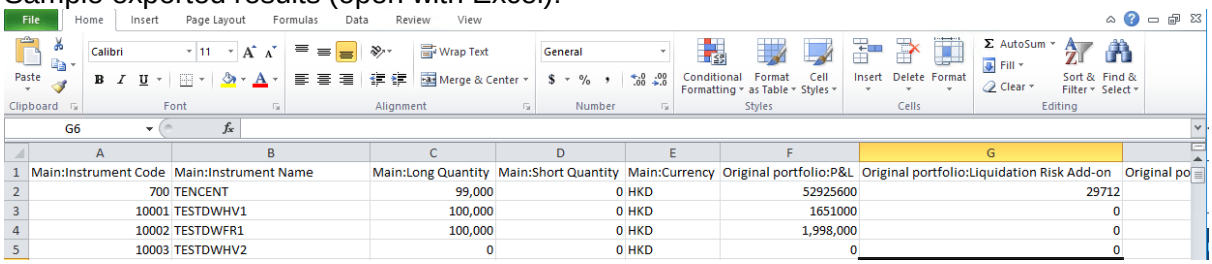
4.1.2.2 TO VIEW MARGIN SIMULATION RESULTS DETAILS

1. Click < SIMULATION RESULTS - DETAILS> tab, to display the simulation result details
2. Click the “Export” button to download the simulation results as a CSV file

Sample screen:



Sample exported results (open with Excel):



	A	B	C	D	E	F	G
1	Main:Instrument Code	Main:Instrument Name	Main:Long Quantity	Main:Short Quantity	Main:Currency	Original portfolio:P&L	Original portfolio:Liquidation Risk Add-on
2	700	TENCENT	99,000	0	HKD	52925600	29712
3	10001	TESTDWHV1	100,000	0	HKD	1651000	0
4	10002	TESTDWFR1	100,000	0	HKD	1,998,000	0
5	10003	TESTDWHV2	0	0	HKD	0	0

Description of fields:

Field	Description
MAIN	
INSTRUMENT CODE	• CCASS stock code
INSTRUMENT NAME	• Name of the CCASS stock
LONG QUANTITY	• Quantity of long position, including allocated quantity
SHORT QUANTITY	• Quantity of short position
CURRENCY	• Currency of the instrument, i.e. HKD – Hong Kong dollar
The following columns are applicable to • **ORIGINAL PORTFOLIO** – *available marginable positions without hypothetical trades* • **SIMULATED PORTFOLIO** – *available marginable positions with hypothetical trades (not applicable to Access Path – A)*	
P&L	• Mark-to-market (MTM) ▪ Positive value as unfavorable MTM ▪ Negative value as favorable MTM • After netting and FX conversion, the sum of the P&L in Hong Kong dollar will be the P&L in <SIMULATION RESULTS> tab
LIQUIDATION RISK ADD-ON	• Risk component related to the liquidity risk of concentrated positions • The liquidation risk add-on of structured products, if any, will be incorporated into the marginable position of the underlying instrument in HKD-equivalent • If no corresponding marginable position of the underlying instrument, a record of the underlying instrument will be shown exclusively for liquidation risk add-on. If the underlying instrument is a non-HKD instrument, the record will be shown in instrument currency while the liquidation add-on will be in HKD-equivalent.
STRUCTURED PRODUCT ADD-ON	• Risk component to handle the huge percentages loss resulting from downward price movement approaching the minimum security prices for long structured product positions

Note: Greeks is reserved for future use, Clearing Participants should ignore these columns: Cash Delta, Cash Gamma (%), Vega, Theta

4.2 SIMULATION WITH CUSTOMISED SETTINGS (ACCESS PATHS – B & C)

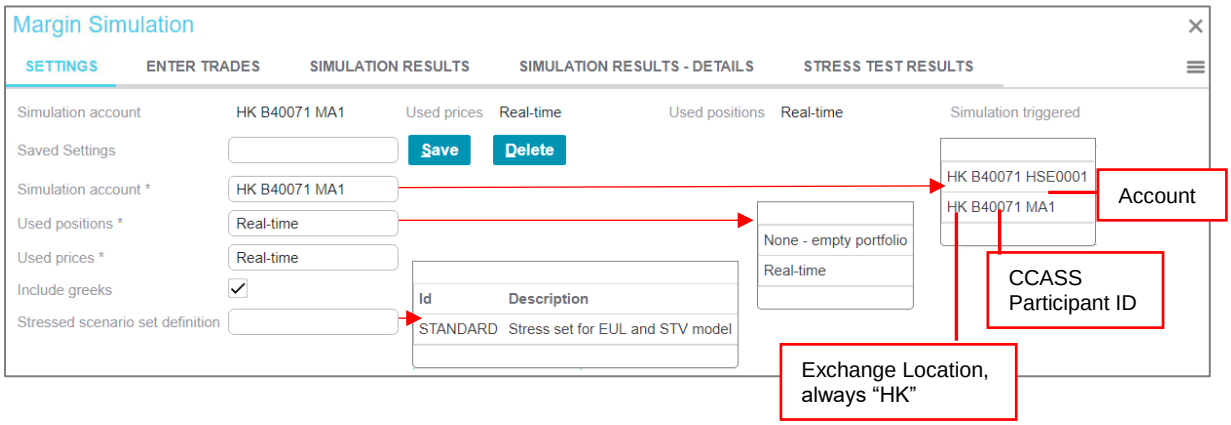
Clearing participants can define the simulation criteria, type of simulation and hypothetical trades in <SETTINGS> and <ENTER TRADES> tabs.

4.2.1 SETTINGS

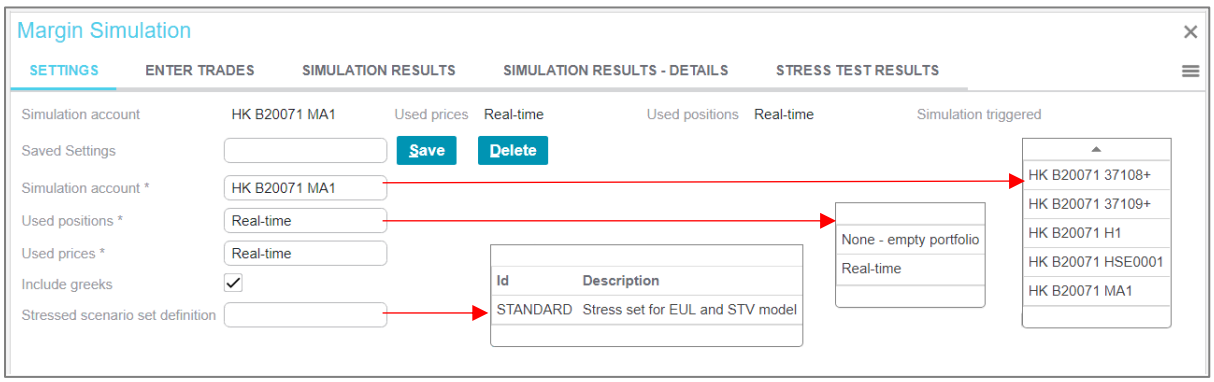
- To define settings for simulation

- To save frequently-used settings for future simulation

Direct Clearing Participant (DCP)'s default view after clicking <Margin Simulation> on main view:



General Clearing Participant (GCP)'s default view after clicking <Margin Simulation> on main view:



Description of fields:

Field	Description
Part A. Save and manage frequent-use settings (optional)	
Saved Settings	• To save new setting or retrieve saved setting for use/deletion • A maximum of 50 settings can be saved per user • To create and save a setting: ▪ Input a name within 30 characters in "Saved Settings" ▪ Refer to Part B to select the settings ▪ Click <Save> button to save the settings • To retrieve a saved setting for simulation or update: ▪ Click on the field and select the saved setting from the dropdown menu ▪ Upon selection, the saved setting will be displayed ▪ Click <ENTER TRADES> tab for simulation or update the saved setting and click <Save> button to save the updates • To delete a saved settings:

Field	Description
	▪ Select the corresponding setting from the dropdown menu and click <Delete> button
Part B. Define single use settings for the simulation	
Simulation account*	• Mandatory field – default as "HK <Part ID> MA1'" ▪ **HK** exchange location ▪ **MA1** marginable "Main Account", to be used for simulation. For GCP, it is capturing all marginable positions of GCP and its Non-Clearing Participants (NCPs) for simulation ▪ ***HSE001*** *collateral "HOUSE" account is NOT applicable for simulation, please ignore* <u>*Applicable to GCP:*</u> Main Account capturing marginable positions of GCP its own (**H1**) and its Non-Clearing Participants (NCPs denoted as **nnnnn+**). GCP may select H1 or nnnnn+ for margin simulation and the time of availability of these accounts are: ▪ **H1** only available in end of day ▪ **nnnnn+** will be updated before intra-day margin call and end of day[2]
Used position*	• Mandatory field – click to select from the dropdown menu ▪ **None – empty portfolio** use only the input/imported hypothetical trades for the simulation ▪ **Real-time** use the latest available marginable positions in VaR Online[3] with or without the input/imported hypothetical trades for the simulation
Used prices*	• Mandatory field – always "Real-time" ▪ **Real-time** use the latest available prices in VaR Online for simulation
Include greeks	*Not applicable for simulation, reserved for future use*
Stressed scenario set definition	• Leave blank for "Margin" simulation only • Mandatory field – for "Stress Test" or "Margin and Stress Test" simulation ▪ Click to select "Standard" from the dropdown menu

4.2.2 ENTER TRADES

To conduct the following 3 types of simulation:

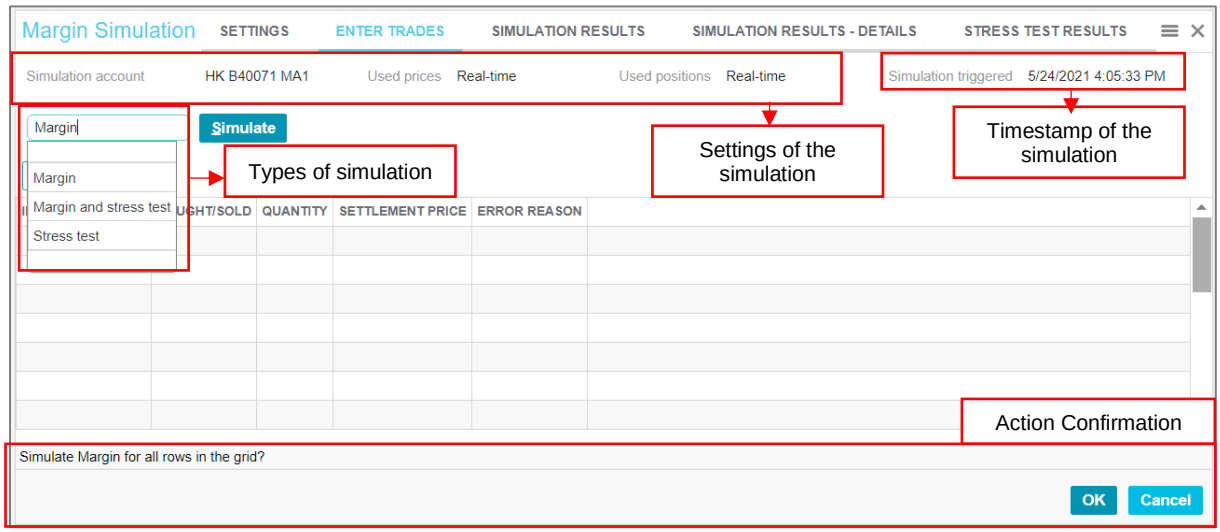
[2] During the familiarisation programme phase 2, simulation of NCP's account is only available in end of day.
[3] During the familarisation programme phase 2, VaR Online will refresh positions at end of day (around 8:30p.m.) and during the day, the marginable positions in VaR Online are normally as of start of day.

- **Margin**: mark-to-market and margin simulation only; results to be displayed via <SIMULATION RESULTS> and <SIMULATION RESULTS – DETAILS> tabs
- **Stress test**: stress test simulation only; result to be displayed via <STRESS TEST RESULTS> tab
- **Margin and stress test**: mark-to-market and margin simulation; together with stress test simulation; results to be displayed via <SIMULATION RESULTS>, <SIMULATION RESULTS – DETAILS> and <STRESS TEST RESULTS> tabs

The simulation processing time may varies subject to system scheduled jobs.

4.2.2.1 TO CONDUCT MARGIN AND/OR STRESS TEST SIMULATION WITH LATEST AVALIABLE MARGINABLE POSITIONS ONLY

1. Click <ENTER TRADES> tab, the defined settings will be displayed.
2. Select the type of simulation, i.e. “Margin”, “Margin and stress test” or “Stress test”
3. Click <Simulate> button and click <OK> to confirm the simulation
4. Go to Section 4.2.3 to view the results



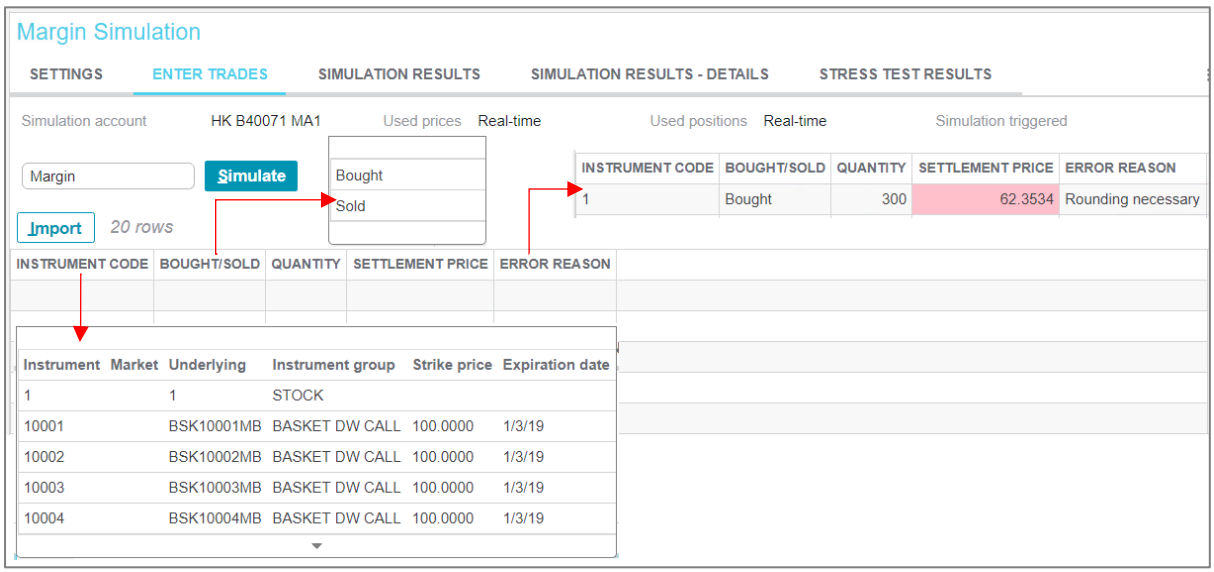
4.2.2.2 TO CONDUCT MARGIN AND/OR STRESS TEST SIMULATION WITH HYPOTHETICAL TRADES

A maximum of **500** hypothetical trades can be used for simulation.

4.2.2.2.1 MANUAL INPUT HYPOTHETICAL TRADES

1. Click <ENTER TRADES> tab, the defined settings will be displayed
2. Select the type of simulation, i.e. “Margin”, “Margin and stress test” or “Stress test”
3. Input up to 20 trades details by clicking the respective data fields to input or select from the dropdown menu. Please refer to Section 4.2.2.2.2 for trades import by Comma Separated Values (CSV) file
4. Click <Simulate> button and then <OK> to confirm the simulation
5. Go to Section 4.2.3 to view the result

Sample screen:



Description of fields:

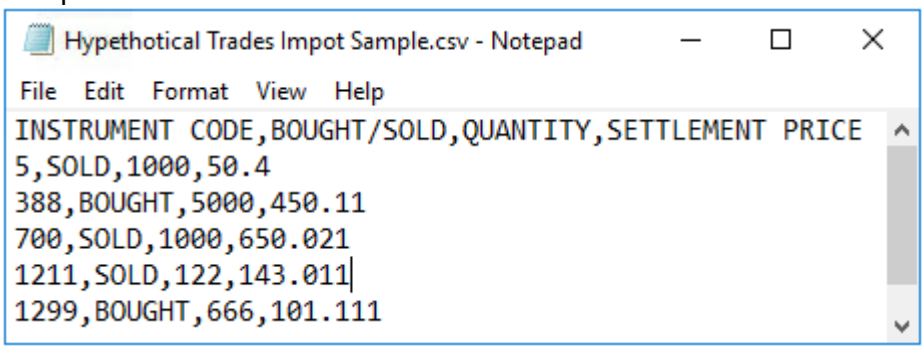
Field	Description
INSTRUMENT CODE	• CCASS stock code • Click and select a valid instrument code from the dropdown menu; or input directly • IPO stock code only valid from listing date onward • Display the instrument code of the hypothetical trades
BOUGHT/SOLD	• Click and select Bought (long CNS position) or Sold (short CNS positions) from the dropdown menu; or input directly • Display the bought or sold of the hypothetical trades
QUANTITY	• Input the quantity of the hypothetical trades • Display the quantity of the hypothetical trades
SETTLEMENT PRICE	• Input the unit price of the hypothetical trades (up to 3 decimal places), i.e. price per share • Display the settlement price of the hypothetical trades
ERROR REASON	• If there is invalid input, error messages will be displayed with the corresponding error highlighted in red shading • Examples of error reasons: ▪ Invalid instrument ▪ Invalid entry, e.g. non numeric quantity or settlement price ▪ Excess decimal input, e.g. settlement price with more than 3 decimal places ▪ Excess the maximum number of hypothetical trades, i.e. 500

4.2.2.2.2 IMPORT CSV FILE WITH HYPOTHETICAL TRADES

1. Click <ENTER TRADES> tab, the defined settings will be displayed.
2. Select the type of simulation, i.e. “Margin”, “Margin and stress test” or “Stress test”
3. Click <Import> button to select a Comma Separated Values (CSV) file for import
4. Click <Simulate> button and then <OK> to confirm the simulation
5. Go to Section 4.2.3 to view the result

The CSV file must come with the correct headers for identifying the corresponding required fields: Instrument code (i.e. CCASS stock code), Bought/Sold, Quantity and Settlement Price.

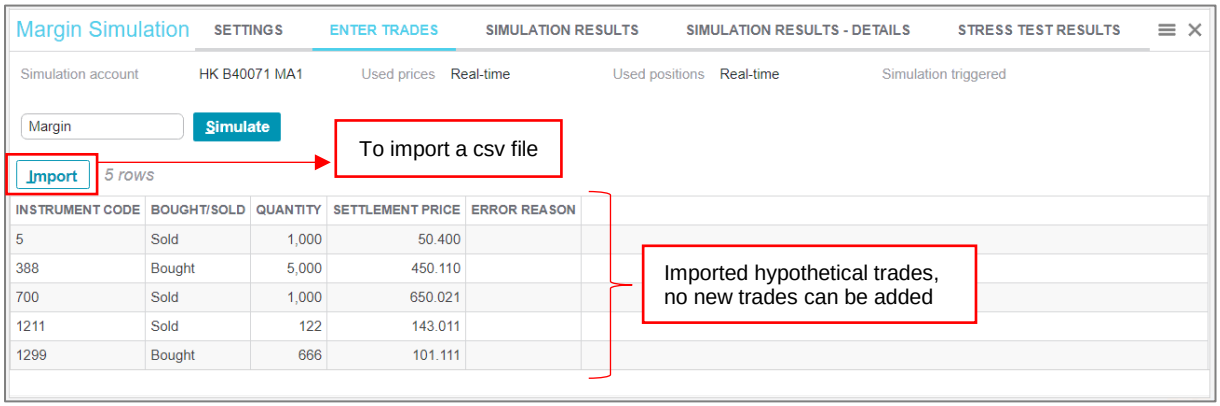
Sample CSV file:



The imported CSV file will replace all existing hypothetical trades. You may further amend the hypothetical trades but for adding more trades, you should import another CSV file.

Currently, this import function supports up to **500** trades.

Sample screen:



4.2.3 SIMULATION RESULTS

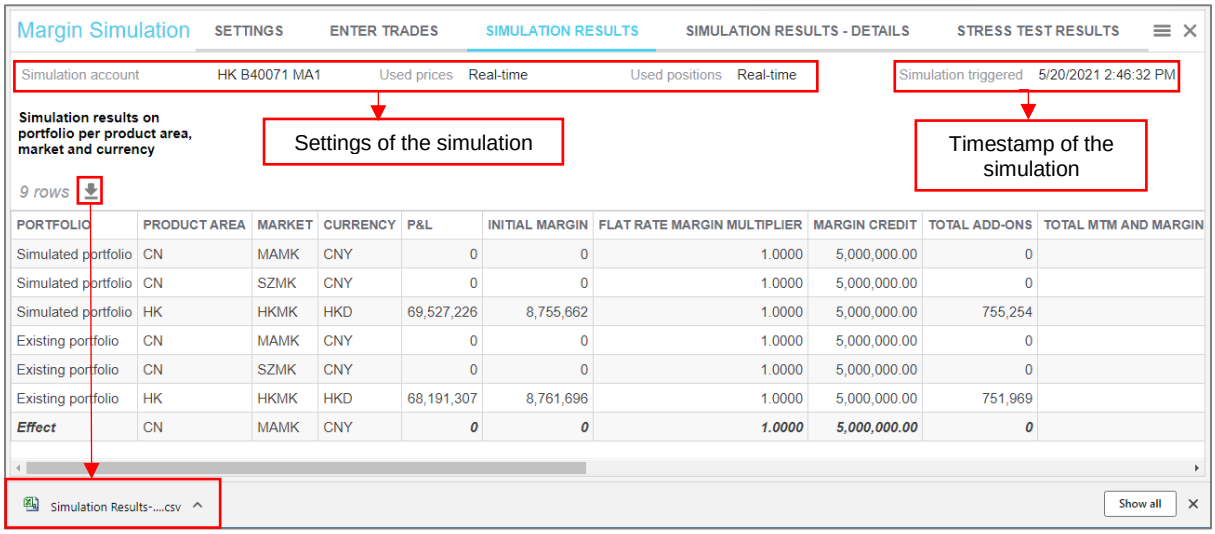
To view and export the simulation results for Hong Kong market. The simulation results for Shanghai and Shenzhen markets are reserved for future use.

4.2.3.1 TO VIEW MARGIN SILUMATION RESULTS

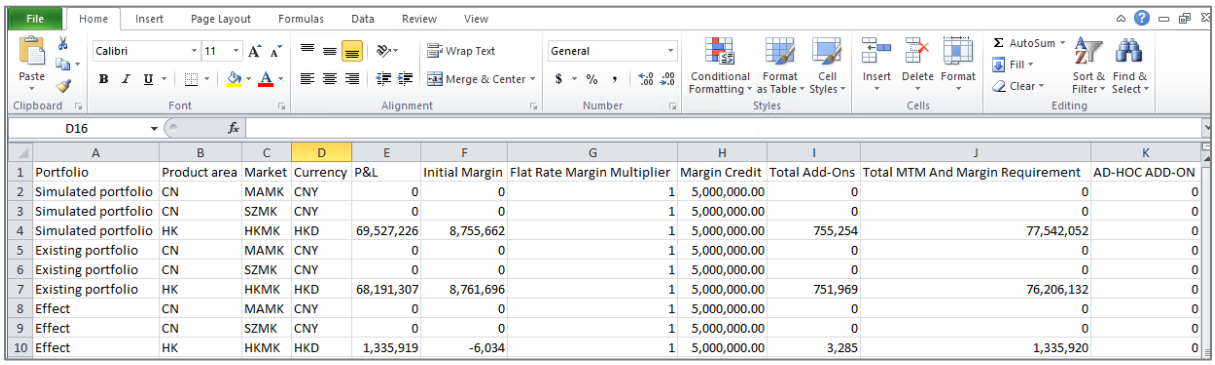
1. Click < SIMULATION RESULTS> tab, to display the simulation result

2. Click the "Export" button to download the simulation results as a CSV file

Sample screen:



Sample exported results (view in Excel):



	A	B	C	D	E	F	G	H	I	J	K
1	Portfolio	Product area	Market	Currency	P&L	Initial Margin	Flat Rate Margin Multiplier	Margin Credit	Total Add-Ons	Total MTM And Margin Requirement	AD-HOC ADD-ON
2	Simulated portfolio	CN	MAMK	CNY	0	0	1	5,000,000.00	0	0	0
3	Simulated portfolio	CN	SZMK	CNY	0	0	1	5,000,000.00	0	0	0
4	Simulated portfolio	HK	HKMK	HKD	69,527,226	8,755,662	1	5,000,000.00	755,254	77,542,052	0
5	Existing portfolio	CN	MAMK	CNY	0	0	1	5,000,000.00	0	0	0
6	Existing portfolio	CN	SZMK	CNY	0	0	1	5,000,000.00	0	0	0
7	Existing portfolio	HK	HKMK	HKD	68,191,307	8,761,696	1	5,000,000.00	751,969	76,206,132	0
8	Effect	CN	MAMK	CNY	0	0	1	5,000,000.00	0	0	0
9	Effect	CN	SZMK	CNY	0	0	1	5,000,000.00	0	0	0
10	Effect	HK	HKMK	HKD	1,335,919	-6,034	1	5,000,000.00	3,285	1,335,920	0

Description of fields:

Field	Description
PORTFOLIO	• Existing portfolio: simulation based on existing portfolio (latest available marginable positions in VaR Online) without hypothetical trades • Simulated portfolio: simulation based on existing portfolio, together with hypothetical trades (latest available marginable positions plus hypothetical trades) • Effect: Net changes from existing portfolio results to simulated portfolio results
PRODUCT AREA	• Displays the location of the market, i.e. HK – Hong Kong
MARKET	• Displays the market code ▪ HKMK – Hong Kong market ▪ MAMK – Shanghai market ▪ SZMK – Shenzhen market

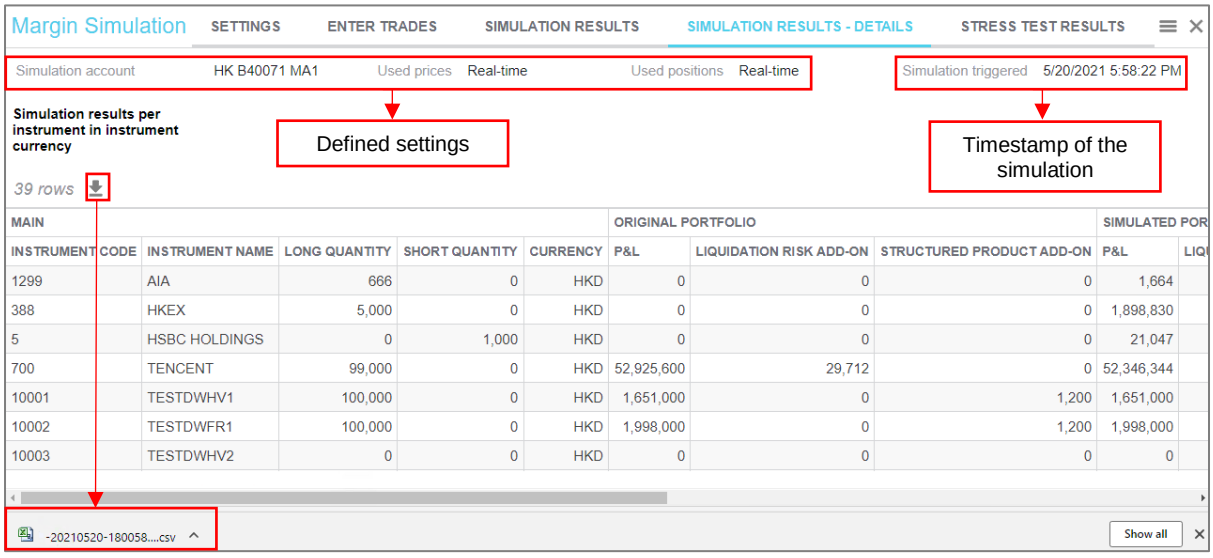
Field	Description
	• Simulation is only applicable to Hong Kong market, the results for Shanghai and Shenzhen market are reserved for future use
CURRENCY	• Displays the currency of the simulation results, i.e. HKD – Hong Kong dollar
P&L	• Mark-to-market (MTM), in Hong Kong dollar equivalent ▪ Positive value: unfavorable MTM ▪ Negative value: favorable MTM
INITIAL MARGIN	• Sum of various margins: ▪ portfolio margin + flat rate margin + corporate action position margin
FLAT RATE MARGIN MULTIPLIER	• Flat rate margin multiplier
MARGIN CREDIT	• Margin credit which is granted to each Clearing Participant and applied for Margin calculation
TOTAL ADD-ONS	• Sum of all add-ons. The total add-ons will be included in TOTAL MTM AND MARGIN REQUIREMENT, except default fund add-on
TOTAL MTM AND MARGIN REQUIREMENT	• Total MTM and margin requirement incorporate add-ons, if any, except default fund add-on
AD-HOC ADD-ON	• Ad hoc risk component related to individual CP imposed by HKSCC, if applicable *Applicable to Main Account (MA1) only*
LIQUIDATION RISK ADD-ON	• Risk component related to the liquidity risk of concentrated positions *Applicable to Main Account (MA1) only*
HOLIDAY ADD-ON	• Always “0”, reserved for future use, market risk component related to additional risk during holiday period *Applicable to Main Account (MA1) only*
CREDIT RISK ADD-ON	• Always “0”, reserved for future use, risk component related to individual CP’s credit risk imposed by HKSCC, if applicable *Applicable to Main Account (MA1) only*

Field	Description
DEFAULT FUND ADD-ON	• Always "0", reserved for future use, risk component to mitigate excessive risk exposures of individual CP on Default Fund. If any, will be collected separately from Total MTM and Margin Requirement *Applicable to Main Account (MA1) only*
POSITION LIMIT ADD-ON	• Risk component related to settlement counterparty risk arising from excessive CNS exposure against CP's apportioned liquid capital *Applicable to Main Account (MA1) only*
STRUCTURED PRODUCT ADD-ON	• Risk component to handle the huge percentages loss resulting from downward price movement approaching the minimum security prices for long structured product positions *Applicable to Main Account (MA1) only*

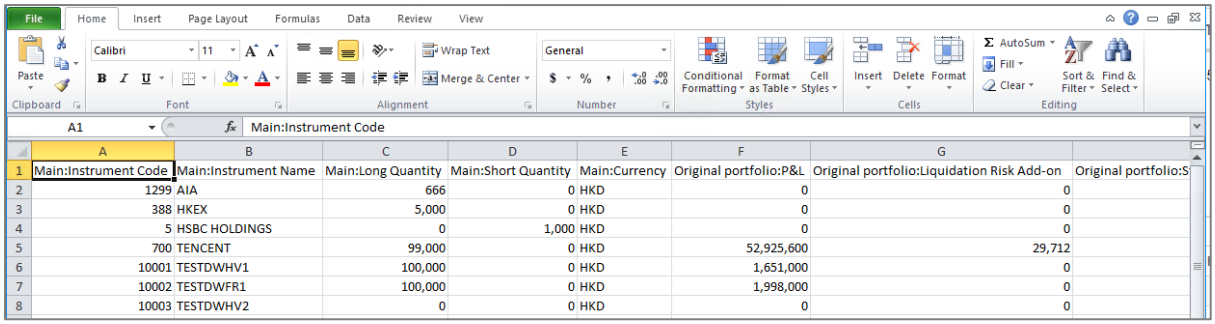
4.2.3.2 TO VIEW MARGIN SIMULATION RESULTS DETAILS

1. Click < SIMULATION RESULTS - DETAILS> tab, to display the simulation result details
2. Click the "Export" button to download the simulation results as a CSV file

Sample screen:



Sample exported results (open with Excel):



	A	B	C	D	E	F	G	
1	Main:Instrument Code	Main:Instrument Name	Main:Long Quantity	Main:Short Quantity	Main:Currency	Original portfolio:P&L	Original portfolio:Liquidation Risk Add-on	Original portfolio:S
2	1299	AIA	666	0	HKD	0	0	
3	388	HKEX	5,000	0	HKD	0	0	
4	5	HSBC HOLDINGS	0	1,000	HKD	0	0	
5	700	TENCENT	99,000	0	HKD	52,925,600	29,712	
6	10001	TESTDWHV1	100,000	0	HKD	1,651,000	0	
7	10002	TESTDWFR1	100,000	0	HKD	1,998,000	0	
8	10003	TESTDWHV2	0	0	HKD	0	0	

Description of fields:

Field	Description
MAIN	
INSTRUMENT CODE	• CCASS stock code
INSTRUMENT NAME	• Name of the CCASS stock
LONG QUANTITY	• Quantity of long position, including allocated quantity
SHORT QUANTITY	• Quantity of short position
CURRENCY	• Currency of the instrument, i.e. HKD – Hong Kong dollar
The following columns are applicable to • **ORIGINAL PORTFOLIO** – *available marginable positions without hypothetical trades* • **SIMULATED PORTFOLIO** – *available marginable positions with hypothetical trades*	
P&L	• Mark-to-market (MTM) ▪ Positive value as unfavorable marks ▪ Negative value as favorable marks • After netting and FX conversion, the sum of the P&L in Hong Kong dollar will be the P&L in <SIMULATION RESULTS> tab
LIQUIDATION RISK ADD-ON	• Risk component related to the liquidity risk of concentrated positions • The liquidation risk add-on of structured products, if any, will be incorporated into the marginable position of the underlying instrument in HKD-equivalent • If no corresponding marginable position of the underlying instrument, a record of the underlying instrument will be shown exclusively for liquidation risk add-on. If the underlying instrument is a non-HKD instrument, the record will be shown in instrument currency while the liquidation add-on will be in HKD-equivalent. *Applicable to Main Account (MA1) only*

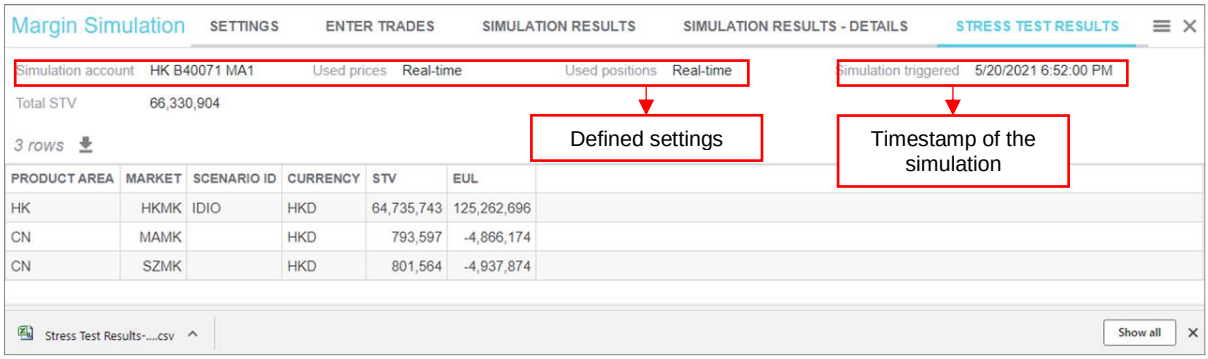
Field	Description
STRUCTURED PRODUCT ADD-ON	• Risk component to handle the huge percentages loss resulting from downward price movement approaching the minimum security prices for long structured product positions *Applicable to Main Account (MA1) only*

Note: Greeks is reserved for future use, Clearing Participants should ignore these columns: Cash Delta, Cash Gamma (%), Vega, Theta

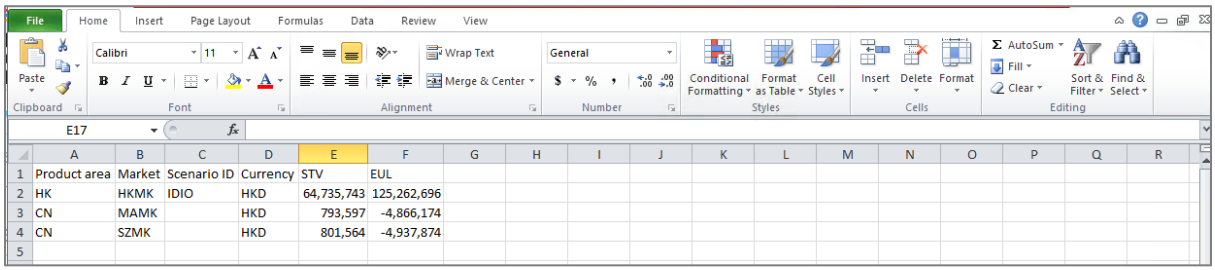
4.2.3.3 TO VIEW STRESS TEST SIMULATION RESULTS

1. Click < STRESS TEST RESULTS> tab, to display the stress test result
2. Click the "Export" button to download the simulation results as a CSV file

Sample screen:



Sample exported results (open with Excel):



Description of fields:

Field	Description
PRODUCT AREA	• Display the location of the market, i.e. HK – Hong Kong
MARKET	• Displays the market code, i.e. HKMK – Hong Kong market
SCENARIO ID	• Scenario of the stress test, e.g. IDIO – idiosyncratic, being the scenario that resulted in the worst case stress test value
CURRENCY	• HKD – Hong Kong dollar

Field	Description
STV	• Stress test value[4] of the portfolios
EUL	• Expected Uncollateralized Loss • EUL estimation will use both actual collateral on hand and required collateral requirement calculated from margin simulation. If interested in this number, you should select "Margin and stress test" as the type of simulation in <ENTER TRADE> tab *Applicable to simulation with no hypothetical trade only*

[4] Please refer to the Stress Test Value Calculation Guide available on HKEX website.