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Related Documents

Name	Version	Description
Volume PT01 – Post-trade EMAPI Common	1.7	Describes the semantics and syntax of the common or session/admin EMAPI protocol messages
Volume PT02 – Post-trade EMAPI Clearing	1.7	Describes the semantics and syntax of the clearing or application messages of the EMAPI protocol
Inputs and Outputs for JSPAN Report v1.0.xlsx	1.0	The input and output data used in the example in section 6 of this document

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List of Acronyms

ATM Volatility	At the money volatility
CSG	Class Spread Group
CSMR	Class Spread Margining Requirement
EoD	End of Day
IMR	Initial Margin Requirement.
JSE	Johannesburg Stock Exchange
MtM	Marked to Market
P&L	Profit and Loss
PSS	Price Scenario Steps
SSMR	Series Spread Margin Requirement
SSG	Series Spread Group
VSR	Volatility Scanning Range
VSS	Volatility Scenario Step
ITaC	Integrated Trading and Clearing – A program that is the enterprise wide project for the JSE to provide integrated trading and clearing across various markets on a single platform.
RTC	Real Time Clearing – the JSE Post-trade real time system that performs clearing and risk management capabilities for the Exchange. The solution is powered by the Cinnober solution.

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1 INTRODUCTION

1.1 About this document

This document provides guidance on the JSE's JSPAN Margin Methodology and the way it is calculated. The JSE's Initial Margin methodology consists of multiple components that are detailed in the JSEC IM Methodology document. The aim of this document is to specify the calculation framework for the JSPAN component.

After a brief introduction, the document will present how JSPAN is structured and it will go through all the steps necessary to calculate the actual JSPAN value.

The structure of this document is as follows:

- Section 1 - Provides the context for this document
- Section 2 - Introduces relevant Reference Data
- Section 3 - Introduces the concept of Risk Arrays
- Section 4 - Provides a high-level overview of the JSPAN methodology
- Section 5 - Is a detailed explanation of the necessary steps to calculate JSPAN
- Section 6 - Shows the detailed output of the steps in section 5 applied to a portfolio
- Section 7 - Contains an overview of the rounding applied at the various steps of the JSPAN calculation
- Section 8 - Contains technical detail of how to obtain the data from the JSE to calculate the JSPAN requirement on a daily basis

1.2 Introduction to JSPAN

Initial margin (IM) represents the primary prefunded line of defence for JSE Clear (JSEC) in managing the risks associated with clearing financial instruments. IM is calculated at an individual account level. In the event of a default only the IM posted against the exposures held in a particular account can be used to satisfy the losses incurred in liquidating the positions held in that particular account.

Account level IM is made up of three distinct components as shown in the below table:

IMR Component	Description
JSPAN (Base)	<p>The framework used to calculate the base margin requirement for all derivatives contracts cleared by JSEC except swap futures.</p> <p>It should be noted that the JSE intends to replace the JSPAN methodology used for the base IM with a Historical Value at Risk methodology at some point in the future.</p>
Liquidation Period Add-on	<p>The additional margin, to JSPAN, calculated to mitigate the risk associated with positions that will take longer to liquidate than is assumed under the base requirement.</p>
Large Exposure Add-on	<p>The additional margin, to JSPAN, calculated to mitigate the risk presented by exposures which are large enough to put the JSE at risk under extreme but plausible market conditions.</p>

1.3 Markets

The way in which JSPAN is described in this document covers the margin methodology applied to Equity Derivatives, Foreign Exchange Derivatives and common Derivative Products (Futures and Options) traded on the JSE.

It is also worth noting that the JSPAN value produced by the approach in this document is market agnostic. A single margin will be produced based on the client's positions across various markets.

1.4 Changes to JSPAN under ITaC

The way that JSPAN has been implemented under ITaC is described in this section. Certain aspects of the methodology have been changed from how it is used in a pre-ITaC environment. The areas in which changes have been implemented are:

1.4.1 Main reference data changes

Section 2 describes in more detail how instrument reference data is defined under ITaC. Previously an instrument's contract code doubled as its Class Spread Group (CSG) (e.g. MTNQ, ZAUS, ALSI). Under ITaC these two concepts are defined explicitly in separate fields:

- Contract Code : Provides a short description of the contract (e.g. Mar2017 ALSI Fut BASE)
- Alpha Code : Contains the short name of the derivative's underlying spot instrument (e.g. MTN, J200, \$ / R)
- CSG : An offsetting group which JSPAN uses to allow offset of margin requirements for positions in instruments sharing the same underlying

1.4.2 Mini/Maxi Treatment

The JSPAN implementation under ITaC fully incorporates offsetting the margin requirements for instruments that are the same in all respects (CSG, Expiry and settlement type) apart from their contract size. Traditionally this type of offset would apply to the ALSI/ALMI and ZAUS/ZAUM contracts. Under ITaC a more generic approach has been implemented that allows for full offset of margin requirements on these instruments similarly to the pre-ITaC environment. It is described in various sections throughout the document:

- 3.5
- 5.1.1
- 5.2.1
- 5.3.1
- 5.4.1
- 5.6.1

1.4.3 Volatilities used in Risk Arrays

Even though this document does not go into detail on the calculation of risk arrays, section 3 does highlight the main aspects of the risk array methodology. When it is compared to the pre-ITaC approach, the following changes can be identified:

- The Volatility Scenario Step (VSS) is a global risk parameter that is set by the JSE in RTC.
- The VSS parameter determines the number of volatility scenarios by indicating the size of the step of the intervals where volatilities are required between -1 and 1:
 - A VSS of 2 leads to an array of {-1 ; 1}
 - A VSS of 1 leads to an array of {-1 ; 0 ; 1}
 - A VSS of 0.5 leads to an array of {-1 ; -0.5 ; 0 ; 0.5 ; 1}
- At-the-Money volatilities are shifted in parallel fashion for a particular VSS value (as opposed to the previous non-parallel approach)
- The way in which the ATM volatility is adjusted using a VSS of 2 thus simplifies to:
 - Volatility Scenarios = ATM volatility + {-1; 1} x VSR

1.4.4 Rounding

Under ITaC rounding at selected stages of the JSPAN algorithm is performed. This is described in section 7.

2 REFERENCE DATA

As briefly introduced in the previous section, JSPAN is the framework used to calculate the Initial Margin base requirements for all derivatives. This section describes the parameters that feed into the JSPAN algorithm.

2.1 Instrument Reference Data

The following instrument information is needed to apply the JSPAN algorithm:

Description	Definition
Instrument Master ID	The master ID of the instrument ensures that the correct instrument's information can be identified. The Instrument Master ID will be provided by the JSE for each derivative in which a client can have position.
Alpha Code	This attribute states the underlying reference instrument of the derivative.
Expiry Date	This attribute states when the instrument expires. This is needed when instruments are aggregated per CSG and Expiry.
Contract Size	Contract size refers to the quantity of Futures or Options that are included when a single contract is traded on the exchange. Futures trade in various contract sizes (1, 10, 100, 1000, 10000) on the JSE. A Future with a contract size of 10 means that there are 10 shares included when determining the value of the Futures contract. Options on the JSE always have a contract size of 1. However, an Option on a Future with a contract size of 10 means that the Option's payoff is determined by the value of a Future whose price is linked to 10 of the underlying shares.
Contract Size Type	Some JSE contracts are offered in more than one contract size. These contracts are identical in all respects apart from their contract sizes. The JSE uses the <i>Contract Size Type</i> to distinguish between such contracts. The vast majority of instruments listed on the JSE are only available in a single Contract Size Type, namely <i>Base</i> .
Contract Code	The Contract Code is a single field that describes the major aspects of the instrument. It is not needed in order to perform the JSPAN calculation but assists greatly in providing context. The field describes the following aspects of the instrument: Expiry Date; Underlying; Instrument Class (Option or Future); Settlement Type and Contract Size Type.

2.2 JSPAN Parameters

Each futures contract has four parameters associated with it that are exclusively used in the JSPAN margin calculation.

- IMR - Initial Margin Requirement
- CSG - Class Spread Group
- CSMR - Class Spread Margin Requirements
- VSR - Volatility Scanning Range

Options on Futures inherit the JSPAN parameters from their underlying Future. Some of these parameters are used in generating a risk array for each instrument. Risk arrays are required for each instrument and are described in section 3.

Over and above the parameters that are linked to the instruments themselves, others are linked to the CSG:

- SSG - Series Spread Group
- SSMR - Series Spread Margin Requirement

Table 1 shows how parameters needed for JSPAN are assigned to individual Future contracts.

Contract Name	Alpha Code	Expiry	Instrument Class	IMR	CSG	CSMR	VSR
Mar2017 ALSI Call 45000 Base	J200	16-Mar-17	Option	30 000.00	ALSI	4 500	0
Mar2017 ALSI Fut BASE	J200	16-Mar-17	Future	30 000.00	ALSI	4 500	2.5
Mar2017 ALMI Call 45000 Mini	J200	16-Mar-17	Option	3 020.00	ALSI	4 500	0
Mar2017 ALMI Fut Mini	J200	16-Mar-17	Future	3 020.00	ALSI	4 500	2.5
Sep2017 ALSI Fut BASE	J200	21-Sep-17	Future	488 024.56	ALSI	4 600	2.5
Sep2017 ALSI Put 48000 Base	J200	21-Sep-17	Option	488 024.56	ALSI	4 600	0
Sep2017 ALMI Fut Mini	J200	21-Sep-17	Future	59 647.45	ALSI	4 600	2.5
Sep2017 ALMI Put 48000 Mini	J200	21-Sep-17	Option	59 647.45	ALSI	4 600	0
Mar2017 ZAGB Fut Base	GBP / R	16-Mar-17	Future	116 160.02	ZAGB	245	2
SEP17 GBP/ZAR 22.5497C	GBP / R	15-Sep-17	Option	115 999.09	ZAGB	250	2
SEP17 GBP	GBP / R	15-Sep-17	Future	115 999.09	ZAGB	250	2
Mar2017 \$ / R Call 16.6 Base	\$ / R	16-Mar-17	Option	17 307.84	ZAUS	30	0
Mar2017 ZAUS Fut Base	\$ / R	16-Mar-17	Future	17 307.84	ZAUS	30	2.5
Mar2017 \$ / R Call 16.00 Maxi	\$ / R	16-Mar-17	Option	211 508.04	ZAUS	30	0
Mar2017 ZAUM Fut Maxi	\$ / R	16-Mar-17	Future	211 508.04	ZAUS	30	2.5
Mar2017 MTNQ Fut	MTN	16-Mar-17	Future	17 910.91	MTNQ	140	2.5
Sep2017 MTNS Fut	MTN	21-Sep-17	Future	8 392.00	MTNS	170	2.5
Jun2017 SABG Fut	SAB	15-Jun-17	Future	34 663.12	SABG	255	2.5
Jun2017 SABQ Call 316	SAB	15-Jun-17	Option	29 777.62	SABQ	260	0
Jun2017 SABQ Fut	SAB	15-Jun-17	Future	29 777.62	SABQ	260	2
Jun2017 SABQ Put 316	SAB	15-Jun-17	Option	29 777.62	SABQ	260	0
SEP2017 APPLE PHY	US_APPLE	15-Sep-17	Future	2 997.00	US_APPLE_10	305	3
Sep2017 APPLE PHY	US_APPLE	21-Sep-17	Future	2.23	US_APPLE_11	305	3

Table 1 – JSPAN Parameters

Options are not specifically assigned CSG, CSMR, IMR and VSR values but inherit them from their underlying future contracts.

Table 2 shows the typical link between CSG and SSG. Multiple CSGs can be assigned to a single SSG. An SSMR is assigned to a CSG when it forms part of a SSG.

CSG ID	SSG Name	SSMR
ALSI	ALSI\INDI\FINI\FNDI\RESI\CTOP\DTOP GROUP	9 000
ZAGB	Currency Futures Offset Group	750
ZAUS	Currency Futures Offset Group	490
MTNQ	MTNQ+MTNS Group	140
MTNS	MTNQ+MTNS Group	145
SABG	SABG (Own Group)	-
SABQ	SABQ_Group	250
US_APPLE_10	US_APPLE_10 (Own Group)	-
US_APPLE_11	US_APPLE_11 (Own Group)	-

Table 2 – CSG/SSG links

The JSPAN parameters are described below:

Description	Definition
IMR	<p>The Initial Margin Requirement and it is designed to cover the loss over the liquidation period that the JSE determined can be incurred on the particular Future contract. It represents the total IM payable on a portfolio involving a single position in the contract, no other positions are included. New IMR values are published every two weeks by the JSEC.</p> <p>The IMR is used as one of the pricing inputs into the contracts risk array and is also used in subsequent steps of the margin aggregation.</p>
CSG	<p>The Class Spread Group and it represents a group of highly correlated instruments (Options and Futures). Having the instruments in the same CSG means that margin requirements for individual positions can be offset against one another.</p>
CSMR	<p>The Class Spread Margin Requirements - when trading simultaneously in Futures and Options of the same underlying with different expiries, the margin requirements are lower based on the assumption that the price moves correlate across the contract months. JSPAN is able to adjust the required margin against the net exposure by recognising the risk reducing impact given by long and short positions in different contracts within the same CSG. The CSMR is the amount of offset.</p>
SSG	<p>The Series Spread Group and it represents the group to which a number of CSGs can be assigned. Highly correlated CSGs can be grouped together in Series Spread Groups (SSG); however, each CSG can belong to only one SSG. This will allow offset of the margin across CSGs.</p>
SSMR	<p>The Series Spread Margin Requirement. JSPAN can adjust the margin required against the net exposure by recognising the risk reducing impact given by long and short positions in different CSG within the same SSG.</p>
Risk Array	<p>Risk array is an array of contract level Profit and Losses (P&Ls) under various market conditions. It represents how a specific derivative instrument will gain or lose value from the current point in time to a specific point in the Future for a specific set of market conditions which may occur over this time frame.</p> <p>The smallest (most negative) element of a risk-array for a particular option represents the total IM payable on a portfolio involving a single position in the particular option contract, and no other positions.</p> <p>Risk Array is required in the first step of the JSPAN margin calculation and is described in more detail in section 3.</p>
VSR	<p>Volatility Scanning Range -this parameter is used to determine the extent to which At-the-Money volatilities should be stressed when calculating the risk arrays for Options on the Future.</p> <p>They are used in the calculation of the instrument's risk array but not in the JSPAN margin aggregation. See section 3 for more detail.</p>

3 RISK ARRAYS

A risk array is a group of profit and losses (P&Ls) that can be made on an individual tradable contract. The risk array for a future is obtained by adjusting the price of the future under different scenarios. The risk array of an Option is determined by using the underlying future's risk array as well as adjusted ATM volatilities to revalue the Option with these adjusted inputs.

The adjusted future and volatility scenarios are called "Future Prices Scenarios" and "Volatility Prices Scenarios".

Each contract is exposed to a combination of future price scenarios and volatility price scenarios. The total number of possible permutations is equal to 18 scenarios.

New risk arrays will be published by the JSE at EoD for each tradeable instrument on the JSE's Information Dissemination Portal (IDP).

3.1 Future Price Scenarios

Futures prices scenarios are obtained by adding different portions of the future's IMR to its MTM. This ranges from -100% to 100% of the IMR in 25% increments. This amounts to a total of 9 future price scenarios.

Futures Prices Scenarios								
-1	-0.75	-0.5	-0.25	0	0.25	0.5	0.75	1

The increments of 25% are called the Price Scenario Steps (PSS).

3.2 Volatility Price Scenarios

Volatility price scenarios are obtained by adding different portions of the Future's VSR to its ATM volatility. This ranges from -100% or 100% of the VSR in 200% increments (only 1). This amounts to a total of 2 scenarios.

Volatility Scenarios	
-1	1

This increment of 2 is called Volatility Scenario Step (VSS).

3.3 Risk Array Skeleton

The risk arrays obtained from the Future Prices Scenarios array and the Volatility Prices Scenarios array has the following structure:

	Risk Array 1	Risk Array 2	Risk Array 3	Risk Array 4	Risk Array 5	Risk Array 6	Risk Array 7	Risk Array 8	Risk Array 9	Risk Array 10	Risk Array 11	Risk Array 12	Risk Array 13	Risk Array 14	Risk Array 15	Risk Array 16	Risk Array 17	Risk Array 18
Futures	-1	-0.75	-0.5	-0.25	0	0.25	0.5	0.75	1	-1	-0.75	-0.5	-0.25	0	0.25	0.5	0.75	1
Volatility	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1	1	1

Volatility Prices Scenarios are fixed (increasing from smallest to largest) while Future Prices Scenarios increase from -1 to 1 (smallest to the largest with PSS increments).

In the example above:

- PSS = 0.25
- VSS = 2

These are the parameters within the RTC setup.

Note: The current risk array skeleton will be changed at some point in the future to allow for more granular risk arrays. This will be achieved by changing the PSS and VSS parameters to 0.125 and 0.5 respectively. These parameters will lead to a total of 85 scenario permutations consisting of 17 future scenarios and 5 volatility scenarios.

3.4 Determining the Risk Array

A risk array is calculated in the following way:

1. Valuate each contract at each scenario (price and volatility).
2. Get the latest MTM value of the contract.
3. Subtract the MTM value of the contract from the value of the contract calculated during step1.
4. The calculated risk array is considered the starting point in the calculation of JSPAN.

For every instrument in the portfolio introduced above is a risk array that caters for all 18 possible scenarios.

The risk arrays will be published daily on JSE's Information Dissemination Portal (IDP).

See section 6.1 Risk Arrays for all risk array details for the example portfolio.

3.5 Mini/Maxi Treatment

Each contract has its own risk arrays so 2 or more contracts belonging to a Mini/Maxi Group will have separate risk arrays.

4 METHODOLOGY OVERVIEW

The JSPAN methodology is based on an approach that uses contract-level margin requirements for the positions in a client's portfolio and aggregates them upwards through various steps. Offset may be allowed for margins at the various levels. This causes the final margin amount to be less than the sum of the margin on the individual positions. This happens as follows:

1. A margin requirement is assigned to each individual position which is based on the risk array linked to each contract.
2. Margins are aggregated for positions where the Expiry and CSG of the instruments are the same. This step effectively puts the Future and all the Options on it into a single CSG\Expiry entity.
3. Margins are aggregated for all CSG\Expiry groups where the CSG is the same. This occurs through several sub steps in which offset can be obtained.
4. Margins are aggregated for all CSG groups that are assigned to the same SSG. This occurs through several sub steps in which offset can be obtained.

The aggregation hierarchy is illustrated in the following diagram.

Client	SSGs	CSGs	Expiry & CSG	Contract
Client A	ALSI\ INDI\ FINI\ FNDI\ RESI\ CTOP\ DTOP GROUP	ALSI CSG	16-Mar-17 ALSI	Mar2017 ALSI Call 45000 Base Mar2017 ALSI Fut BASE Mar2017 ALMI Call 45000 Mini Mar2017 ALMI Fut Mini
			21-Sep-17 ALSI	Sep2017 ALSI Fut BASE Sep2017 ALSI Put 48000 Base Sep2017 ALMI Fut Mini Sep2017 ALMI Put 48000 Mini
	Currency Futures Offset Group	ZAGB CSG	16-Mar-17 ZAGB	Mar2017 ZAGB Fut Base
			15-Sep-17 ZAGB	SEP17 GBP/ZAR 22.5497C SEP17 GBP
		ZAUS CSG	16-Mar-17 ZAUS	Mar2017 \$ / R Call 16.6 Base Mar2017 ZAUS Fut Base Mar2017 \$ / R Call 16.00 Maxi Mar2017 ZAUM Fut Maxi
	MTNQ+MTNS Group	MTNQ CSG	16-Mar-17 MTNQ	Mar2017 MTNQ Fut
		MTNS CSG	21-Sep-17 MTNS	Sep2017 MTNS Fut
	SABG (Own Group)	SABG CSG	15-Jun-17 SABG	Jun2017 SABG Fut
	SABQ (Own Group)	SABQ CSG	15-Jun-17 SABQ	Jun2017 SABQ Call 316 Jun2017 SABQ Fut Jun2017 SABQ Put 316
	US_APPLE_10 (Own Group)	US_APPLE_10 CSG	15-Sep-17 US_APPLE_10	SEP2017 APPLE PHY
	US_APPLE_11 (Own Group)	US_APPLE_11 CSG	21-Sep-17 US_APPLE_11	Sep2017 APPLE PHY

Diagram 1 – JSPAN Overview

5 CALCULATION STEPS

The steps for the JSPAN calculation can be grouped as follows:

1. Risk Arrays
2. Contract Residual Exposure (CREs)
3. Net Residual Exposure (NREs)
4. Deltas
5. Provisional Net Exposure (PREs)
6. Adjusted Net Residual Exposure (Adj NREs)
7. Group Deltas
8. Group PREs
9. Group Adj PREs

The example in section 6 can be referenced for each of the calculation steps.

5.1 Risk Arrays

Risk arrays were introduced in section 3. The entire JSPAN calculation is based on risk arrays.

A risk array is required for each netted position in a client's portfolio. The elements in the risk array must follow the sequence set out in section 3.3. This is also the sequence in which the JSE will publish risk arrays at each EoD.

Risk arrays are published in ZAR to two decimals (cents).

Section 6.1 shows an example of the risk array assigned to each contract in the portfolio in section 6.

5.1.1 Mini/Maxi Treatment

Each contract has its own risk arrays so two or more contracts belonging to a Mini/Maxi Group will have separate risk arrays. Section 6.1 shows that there are separate risk array assigned to instruments that are identical except for their contract size type.

5.2 CREs

The first step in calculating JSPAN is the calculation of the Contract Residual Exposures (CREs). This is done by multiplying the net position in each contract with all the elements in its risk array.

Once the multiplication has taken place there must be a CRE array for each item in the portfolio.

The CRE results are displayed in section 6.2 of the example.

5.2.1 Mini/Maxi Treatment

Apart from multiplying the position in each instrument with its own risk array, no special treatment is required to deal with instruments that might be impacted by a Mini/Maxi group to determine the CREs.

5.2.2 Instruments without a CSG

Certain instruments (e.g. Forward-forwards) might not be assigned a CSG by the JSE. This would be for instruments where JSE Risk does not want their margin to be offset with any other instruments.

Positions in instruments for which no CSG has been assigned need to be specifically catered for within the JSPAN methodology. Positions in instruments without a CSG (and by implication an SSG) need to filter down to all the remaining steps in the JSPAN aggregation. Each of these instruments should effectively be treated as if they had been assigned their own unique CSG and SSG.


5.3 NREs

Net Residual Exposures (NREs) are calculated from CREs based to the CSG linked to each instrument. In the example, the number of arrays can be reduced from 23 to 11 (the number of different CSGs with different expiries).

The process to do so consists of adding together the corresponding elements in the CRE array for instruments with the same CSG and same expiry date. This step effectively creates a single row for a Future and all of its Options.

In the example that is being considered we have the below:

Contract Name	Expiry	CSG
Mar2017 ALSI Call 45000 Base	16-Mar-17	ALSI
Mar2017 ALSI Fut BASE	16-Mar-17	ALSI
Mar2017 ALMI Call 45000 Mini	16-Mar-17	ALSI
Mar2017 ALMI Fut Mini	16-Mar-17	ALSI
Sep2016 ALSI Fut BASE	21-Sep-17	ALSI
Sep2017 ALSI Put 48000 Base	21-Sep-17	ALSI
Sep2016 ALMI Fut Mini	21-Sep-17	ALSI
Sep2017 ALMI Put 48000 Mini	21-Sep-17	ALSI
Mar2017 ZAGB Fut Base	16-Mar-17	ZAGB
SEP17 GBP/ZAR 22.5497C	15-Sep-17	ZAGB
SEP17 GBP	15-Sep-17	ZAGB
Mar2017 \$ / R Call 16.6 Base	16-Mar-17	ZAUS
Mar2017 ZAUS Fut Base	16-Mar-17	ZAUS
Mar2017 \$ / R Call 16.00 Maxi	16-Mar-17	ZAUS
Mar2017 ZAUM Fut Maxi	16-Mar-17	ZAUS
Mar2017 MTNQ Fut	16-Mar-17	MTNQ
Sep2017 MTNS Fut	21-Sep-17	MTNS
Jun2017 SABG Fut	15-Jun-17	SABG
Jun2017 SABQ Call 316	15-Jun-17	SABQ
Jun2017 SABQ Fut	15-Jun-17	SABQ
Jun2017 SABQ Put 316	15-Jun-17	SABQ
SEP2017 APPLE PHY	15-Sep-17	US_APPLE_10
Sep2017 APPLE PHY	21-Sep-17	US_APPLE_11



NREs	
CSG	Expiry
ALSI	16-Mar-17
ALSI	21-Sep-17
ZAGB	16-Mar-17
ZAGB	15-Sep-17
ZAUS	16-Mar-17
MTNQ	16-Mar-17
MTNS	21-Sep-17
SABG	15-Jun-17
SABQ	15-Jun-17
US_APPLE_10	15-Sep-17
US_APPLE_11	21-Sep-17

Table 3 – Aggregating CSGs & Expiries per CSG

This was achieved by summing together the CRE arrays of instruments with same CSG and expiry. The number of arrays drops from 23 (one for each instrument) to 11 NREs arrays (See NREs details in section 6.3 of the example). It means that the example portfolio contains instruments that have a duplicate CSG and expiry.

There are eight Futures that have the ALSI as the CSG and the expiries are on 16 March 2017 and 21 September 2017 respectively. Therefore, only two NRE arrays are necessary for the eight. Similarly, other CRE arrays are reduced when calculating NREs.

5.3.1 Mini/Maxi Treatment

Positions in instruments within a Mini/Maxi Offset group are also aggregated in this way as long as they belong to the same CSG and expiry group.

5.4 Deltas

Deltas are a measure of how many outright Futures contracts the class position behaves like.

Deltas are calculated by considering the difference between two consecutive elements in the NRE array from the same volatility price scenario.

Let's introduce the following notation to make the example clearer:

NRE_i = The value in the "i" position for a specific NRE array and it can be generalised to any array

$IMR_{CSG \& \text{Expiry}}$ = The IMR of a Future of a specific CSG and Expiry and with a Base contract size type.

NRE_{11} = The 11th element for a specific NRE array.

The Delta is then calculated by normalising the difference between 2 consecutive values in the NRE arrays by the IMR of the instrument and a factor (PSS introduced in section 4) and taking the absolute value of the result.

Using the notation we have just introduced we can write the formula below.

$$\mathbf{Delta}_i = \mathbf{Abs} \left(\frac{\mathbf{NRE}_{i+1} - \mathbf{NRE}_i}{\mathbf{PSS} \times \mathbf{IMR}_{\mathbf{CSG \text{ and } Expiry}}} \right)$$

for $i = 1, \dots, 18$ $i \neq 9, 18$

$\mathbf{Delta}_9 = \mathbf{Delta}_{18} = \mathbf{blank}$

Where PSS = 0.25

For each CSG with a different Expiry we will have an array that is 18 elements long.

It is important to note the following:

- Delta values are not calculated across different volatility scenarios. This is the reason why the 9th and the 18th elements are blank. When the PSS is changed, other elements will be blank.
- When the IMR value is zero, the impacted Delta values are zero.

The maximum delta value in the delta array also needs to be identified and is rounded to 2 decimals.

The results for the example portfolio are displayed in section 6.4

5.4.1 Mini/Maxi Treatment

When determining the deltas, JSPAN requires an IMR value assigned to each CSG/Expiry combination. Since the portfolio contains positions in instruments from a Mini/Maxi group it means that different futures are represented in the group. Each of these futures will have its own IMR value assigned. The IMR value used for the group must be from the future with the *Base* contract size type.

5.5 PREs

Provisional Net Exposures (PREs) are arrays calculated from CREs. The total number of PREs is equal to the number of unique CSGs within the portfolio.

The way PREs differ from NREs is that while NREs are calculated by summing together CREs with same CSG and expiry, PREs are calculated by summing together CREs with the same CSG (expiry condition dropped).

In the example that is being considered, PREs are required for the following the following CSGs:

CSG
ALSI
ZAGB
ZAUS
MTNQ
MTNS
SABG
SABQ
US_APPLE_10
US_APPLE_11

In the portfolio we have 11 NREs (different CSG and different expiry) which are reduced to 9 PREs, one per every unique CSG.

See section 6.5 for PREs details of the portfolio that are based on the CREs results in section 6.2 and the NREs results in section 6.3.

5.6 PRE-Quantities

To proceed in the calculation of the JSPAN some quantities need to be introduced. The calculations of these fields are described below and the results can be viewed in section 6.6 of the example.

BEFORE	This represents the minimum NRE element per array for each CSG/Expiry combination multiplied by -1.
AFTER PLACE	This represents the position of the element in the PRE-array with the minimum value for each CSG/Expiry combination.
AFTER	This represents the value of the element in the NRE array corresponding to the AFTER PLACE for each CSG/Expiry combination multiplied by -1.
BENEFIT	This represents the difference between the “BEFORE” and the “AFTER” values.
POTENTIAL SLACK	Is equal to the “BEFORE” value when the “BENEFIT” is zero and the “BEFORE” is not equal to zero. Is equal to one when the “BENEFIT” is zero and the “BEFORE” is zero. Otherwise, the “POTENTIAL SLACK” it is zero. This is calculated for each CSG/Expiry combination.
TOTAL BEFORE	This is the sum across the “BEFORE” values sharing the same CSG. It is calculated per CSG.
TOTAL BENEFIT	This is the sum across the “BENEFIT” values sharing the same CSG. It is calculated per CSG.
TOTAL POTENTIAL SLACK	This is the sum across the “SLACK” values sharing the same CSG. It is calculated per CSG.
ACTUAL SLACK	This is the minimum between the “TOTAL BENEFIT” and the “TOTAL POTENTIAL SLACK”. It is calculated per CSG.
OFFSET PROPORTION	This is the ratio between the “ACTUAL SLACK” and the “TOTAL POTENTIAL SLACK”. In case the “TOTAL POTENTIAL SLACK” is zero, it is set to the value of 1. It is calculated per CSG. Rounded to 6 decimals
QUE	If the CSG/Expiry combination’s “POTENTIAL SLACK” is greater than zero then the CSG/Expiry combination’s “QUE” is inherited from its CSG’s “OFFSET PROPORTION”. However, if the CSG/Expiry combination’s “POTENTIAL SLACK” is zero, then its “QUE” becomes 1. The QUE is calculated for each CSG/Expiry combination.
CSM	This is the product between CSMR, “Max Delta” and “QUE”. It is calculated per CSG/Expiry combination. The CSMR is obtained from the Base Future in the CSG/Expiry combination. Rounded to 0 decimals
TOTAL SPREAD MARGIN	This is the sum across the “CSM” values sharing the same CSG. It is calculated per CSG.

5.6.1 Mini/Maxi Treatment

The CSM value is dependent on the CSMR of one of the contracts in the CSG/Expiry combination. Where there are also Mini or Maxi contracts in the portfolio, the CSG/Expiry combination will include both the “Base” and “Mini” or “Maxi” contracts. In this event the CSM must always be calculated using the CSMR of the “Base” instrument even if the “Base” instrument is not in the client’s portfolio.

5.7 Adj NREs

Adjusted Net Residual Exposures (Adj NREs) differ from NREs because the number of items is reduced based on them having the same CSG.

The number of NRE arrays in the previous section is 11. The number of Adj NREs arrays drop to 9 because there are 2 NRE arrays that share the same CSG.

In the example that is being considered, Adj NREs are required for the following the following CSGs:

CSG
ALSI
ZAGB
ZAUS
MTNQ
MTNS
SABG
SABQ
US_APPLE_10
US_APPLE_11

Adj NRE’s array elements are calculated for each CSG as the maximum value between:

1. The difference between the CSG’s corresponding element in the PRE-array and the “TOTAL SPREAD MARGIN” as calculated in the PREs Quantities section
2. The negative of the “TOTAL BEFORE” as calculated in the PREs Quantities section.

Each element of the Adj NRE array is calculated in the same way.

Adj NREs arrays details are shown in section 6.7 of the example.

5.8 Group Deltas

Group Deltas are calculated for each CSG by determining the difference between consecutive elements in the Adj NREs array, normalising the result by a factor and taking the absolute value of the result. This factor is the product of the PSS and the minimum IMR per CSG. Only the IMRs of Base contracts are considered.

Using the notations previously introduced we can write the formula below:

$$\text{Group Delta}_i = \text{Abs} \left(\frac{\text{Adj NRE}_{i+1} - \text{Adj NRE}_i}{\text{PSS} \times \text{IMR}_{\text{Min}}} \right)$$

for $i = 1, \dots, 18$ $i \neq 9, 18$

Delta₉ = Delta₁₈ = blank

Where the minimum IMR per CSG across all active expiries (not just those in the client’s portfolio) is indicated by IMR_{Min} and $PSS = 0.25$.

When the IMR value is zero, the impacted Delta values are zero. The maximum Group Delta value in the array also needs to be identified and is rounded to 2 decimals.

Group Delta values calculated for the example can be viewed in section 6.8.

5.9 Group PREs

Similarly, to the way PREs were calculated (section 5.5), Group PREs are arrays whose elements are calculated as the sum of the elements in the Adjusted NREs arrays which have the same SSG. Group PREs are calculated per SSG by summing together Adj NREs which have the same SSG.

From section 6 we know that:

CSG	SSG Name	SSMR
ALSI	ALSI \INDI \FINI \FNDI \RESI \CTOP \DTOP GROUP	9 000
ZAGB	Currency Futures Offset Group	750
ZAUS	Currency Futures Offset Group	490
MTNQ	MTNQ+MTNS Group	140
MTNS	MTNQ+MTNS Group	145
SABG	SABG (Own Group)	-
SABQ	SABQ_Group	250
US_APPLE_10	US_APPLE_10 (Own Group)	-
US_APPLE_11	US_APPLE_11 (Own Group)	-

Table 4 –SSMRs per CSG

Notice that the below CSGs are linked to the same SSG:

- ZAGB and ZAUS
- MTNQ and MTNS

Based on the definition of Group PREs they share a Group PRE-array. This means that there should be nine Group PRE-arrays. Group PRE-values calculated for the example can be viewed in section 6.8.1.

5.10 Group PREs Quantities

Similarly, to the way in which section 5.6 was set out, certain quantities need to be introduced to proceed with the calculation of JSPAN. These quantities have the same names as the ones introduced previously and are strongly correlated to them.

BEFORE	This represents the minimum value in the Adj NRE array multiplied by -1. This is calculated for each CSG.
AFTER PLACE	This represents the position of the minimum element in the Group PREs array. The AFTER PLACE is calculated per SSG and then assigned to each of its CSGs.
AFTER	This represents the value of the Adj NRE element corresponding to the position of the CSG's "AFTER PLACE" multiplied by -1. This is calculated for each CSG.
BENEFIT	This represents the difference between the "BEFORE" and the "AFTER" values. This is calculated for each CSG.
POTENTIAL SLACK	This is equal to the "BEFORE" value when the "BENEFIT" is zero and the "BEFORE" is not equal to zero. Is equal to one when the "BENEFIT" is zero and the "BEFORE" is equal zero. Otherwise, the "POTENTIAL SLACK" it is zero. This is calculated for each CSG.
TOTAL BEFORE	This is the sum across the "BEFORE" values sharing the same SSG. This is calculated for each SSG.
TOTAL BENEFIT	This is the sum across the "BENEFIT" values sharing the same SSG. This is calculated for each SSG.
TOTAL POTENTIAL SLACK	This is the sum across the "SLACK" values sharing the same SSG. This is calculated for each SSG.
ACTUAL SLACK	This is the minimum between the "TOTAL BENEFIT" and the "TOTAL POTENTIAL SLACK". This is calculated for each SSG.
OFFSET PROPORTION	This is the ratio between the "ACTUAL SLACK" and the "TOTAL POTENTIAL SLACK". In case the "TOTAL POTENTIAL SLACK" is zero the value is set to 1. This is calculated for each SSG. Rounded to 6 decimals
QUE	If the CSG's "POTENTIAL SLACK" is greater than zero then the CSG's "QUE" is inherited from its SSG's "OFFSET PROPORTION". However, if the CSG's "POTENTIAL SLACK" is zero, then its "QUE" becomes 1. The QUE is calculated for each CSG.
SSM	This is the product of the CSG's SSMR, "Max Group Delta" and "QUE". This is calculated for each CSG. Rounded to 0 decimals
TOTAL SPREAD MARGIN	This is the sum across the "SSM" values for each CSG that share the same SSG. This is calculated for each SSG.

These quantities are calculated in a very similar way to what was done before. The only difference is that NREs and Deltas are now replaced by Adj NREs and Group Deltas respectively.

The elements for the Group PREs Quantities arrays are available in section 6.10 of the example.

5.11 Group Adj PREs

For each SSG a Group Adj PRE-array is required. Each element belonging to the Group Adj PREs array is calculated as the max between two quantities:

1. The difference between the corresponding Group PREs element and the “TOTAL SPREAD MARGIN” as calculated in the Group PREs Quantities section.
2. The negative of the “TOTAL BEFORE” as calculated in the Group PREs Quantities section.

The minimum Group Adj PRE for each SSG is also required.

All Group Adj PRE-values are shown in section 6.11 of the example.

5.12 Final JSPAN Margin

The JSPAN Margin is defined as the aggregation of the minimum values across the Group Adj PREs. It is floored at zero. These are shown in section 6.12 of the example.

6 EXAMPLE

Section 5 explained how each of the steps in JSPAN is calculated. This section presents a detailed example of the calculations. The example is based on a client having a portfolio that includes the following range of instruments:

- Futures
 - Index
 - Single Stock Equity
 - Forex
- Options on
 - Index
 - Forex

Note: All input and output data mentioned in this example has been attached to this document in the *JSPAN Excel Details v1.4.xlsx*-file.

The portfolio is made up as follows:

Contract Code	Alpha Code	Expiry	C/P/F	Strike	Position	Correct CSG	Mini/ Maxi Indicator	Contract Size Test
Mar2017 ALSI Call 45000 Base	J200	16-Mar-17	C	45500	-256	ALSI	BASE	1
Mar2017 ALSI Fut BASE	J200	16-Mar-17	F		-355	ALSI	BASE	10
Mar2017 ALMI Call 45000 Mini	J200	16-Mar-17	C	45500	2500	ALSI	MINI	1
Mar2017 ALMI Fut Mini	J200	16-Mar-17	F		10000	ALSI	MINI	1
Sep2017 ALSI Fut BASE	J200	21-Sep-17	F		800	ALSI	BASE	10
Sep2017 ALSI Put 48000 Base	J200	21-Sep-17	P	48000	-900	ALSI	BASE	1
Sep2017 ALMI Fut Mini	J200	21-Sep-17	F		-8000	ALSI	MINI	1
Sep2017 ALMI Put 48000 Mini	J200	21-Sep-17	P	48000	-9000	ALSI	MINI	1
Mar2017 ZAGB Fut Base	GBP / R	16-Mar-17	F		-600	ZAGB	BASE	1000
SEP17 GBP/ZAR 22.5497C	GBP / R	15-Sep-17	C	22.5497	1515	ZAGB	BASE	1
SEP17 GBP	GBP / R	15-Sep-17	F		833	ZAGB	BASE	1000
Mar2017 \$ / R Call 16.6 Base	\$ / R	16-Mar-17	C	16.6	-1413	ZAUS	BASE	1
Mar2017 ZAUS Fut Base	\$ / R	16-Mar-17	F		2025	ZAUS	BASE	1000
Mar2017 \$ / R Call 16.00 Maxi	\$ / R	16-Mar-17	C	16	-555	ZAUS	MAXI	1
Mar2017 ZAUM Fut Maxi	\$ / R	16-Mar-17	F		-150	ZAUS	MAXI	10000
Mar2017 MTNQ Fut	MTN	16-Mar-17	F		55	MTNQ	BASE	100
Sep2017 MTNS Fut	MTN	21-Sep-17	F		-40	MTNS	BASE	100
Jun2017 SABG Fut	SAB	15-Jun-17	F		500	SABG	BASE	100
Jun2017 SABQ Call 316	SAB	15-Jun-17	C	316	130	SABQ	BASE	1
Jun2017 SABQ Fut	SAB	15-Jun-17	F		-400	SABQ	BASE	100
Jun2017 SABQ Put 316	SAB	15-Jun-17	P	316	150	SABQ	BASE	1
SEP2017 APPLE PHY	US_APPLE	15-Sep-17	F		-833	US_APPLE_10	BASE	100
Sep2017 APPLE PHY	US_APPLE	21-Sep-17	F		840	US_APPLE_11	BASE	100

Table 5 – Example Portfolio

However, the following active instrument in the system, that is not part of the client's portfolio, also impacts the JSPAN calculation. Its IMR value is used in 6.8 when the minimum IMR of the ZAGB CSG is identified.

Contract Code	Alpha Code	Expiry	C/P/F	Strike	Correct CSG	Mini/ Maxi Indicator	Contract Size Test	IMR
Oct2017 ZAGB Fut Base	GBP / R	2017-10-30	FUTURE		ZAGB	BASE	100	114 5

Table 6 – Active instruments not in the client's portfolio

The following JSPAN Parameters are assigned to the futures:

Contract Code	Alpha Code	Expiry	Correct CSG	IMR	CSMR	VSR
Mar2017 ALSI Fut BASE	J200	16-Mar-17	ALSI	30 000.00	4 500	2.5
Mar2017 ALMI Fut Mini	J200	16-Mar-17	ALSI	3 020.00	4 500	2.5
Sep2017 ALSI Fut BASE	J200	21-Sep-17	ALSI	488 024.56	4 600	2.5
Sep2017 ALMI Fut Mini	J200	21-Sep-17	ALSI	59 647.45	4 600	2.5
Mar2017 ZAGB Fut Base	GBP / R	16-Mar-17	ZAGB	116 160.02	245	2
SEP17 GBP	GBP / R	15-Sep-17	ZAGB	115 999.09	250	2
Mar2017 ZAUS Fut Base	\$ / R	16-Mar-17	ZAUS	17 307.84	30	2.5
Mar2017 ZAUM Fut Maxi	\$ / R	16-Mar-17	ZAUS	211 508.04	30	2.5
Mar2017 MTNQ Fut	MTN	16-Mar-17	MTNQ	17 910.91	140	2.5
Sep2017 MTNS Fut	MTN	21-Sep-17	MTNS	8 392.00	170	2.5
Jun2017 SABG Fut	SAB	15-Jun-17	SABG	34 663.12	255	2.5
Jun2017 SABQ Fut	SAB	15-Jun-17	SABQ	29 777.62	260	2
SEP2017 APPLE PHY	US_APPLE	15-Sep-17	US_APPLE_10	2 997.00	305	3
Sep2017 APPLE PHY	US_APPLE	21-Sep-17	US_APPLE_11	2.23	305	3

Table 7 – JSPAN Parameters for example portfolio

Option contracts do not have these parameters directly linked to them. The options assume the parameters of the underlying future contracts.

i.e. Mar2017 ALSI Call 45000 Base will inherit the parameters below from J200 Mar2017 ALSI Fut Base:

IMR	CSG	CSMR	VSR
30 000	ALSI	4 500	2.5

The CSGs in the portfolio are linked to the following SSGs. Every CSG assigned to an SSG also gets an SSMR value.

CSG	SSG Name	SSMR
ALSI	ALSI \ INDI \ FINI \ FNDI \ RESI \ CTOP \ DTOP GROUP	9 000
ZAGB	Currency Futures Offset Group	750
ZAUS	Currency Futures Offset Group	490
MTNQ	MTNQ+MTNS Group	140
MTNS	MTNQ+MTNS Group	145
SABG	SABG (Own Group)	0
SABQ	SABQ Group	250
US_APPLE_10	US_APPLE_10 (Own Group)	0
US_APPLE_11	US_APPLE_11 (Own Group)	0

Table 8 – SSGs per CSG for portfolio

6.1 Risk Arrays

Contract Code	CSG	Expiry	C/P/F	Strike	MTM	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10	Scenario 11	Scenario 12	Scenario 13	Scenario 14	Scenario 15	Scenario 16	Scenario 17	Scenario 18
Mar2017 ALSI Call 45000 Base	ALSI	16-Mar-17	C	45 500.00	167 262	-29 936	-22 488	-15 026	-7 554	-73.36	7 412	14 902	22 395	29 890	-29 728	-22 324	-14 897	-7 453	4.23	7 472	14 948	22 430	29 916
Mar2017 ALSI Fut BASE	ALSI	16-Mar-17	F		62 214	-30 000	-22 500	-15 000	-7 500	0.00	7 500	15 000	22 500	30 000	-30 000	-22 500	-15 000	-7 500	0.00	7 500	15 000	22 500	30 000
Mar2017 ALMI Call 45000 Mini	ALSI	16-Mar-17	C	45 500.00	8 113	-2 765	-2 126	-1 465	-786	-91.05	617	1 335	2 062	2 795	-2 606	-1 983	-1 339	-676	4.21	698	1 404	2 119	2 842
Mar2017 ALMI Fut Mini	ALSI	16-Mar-17	F		53 326	-3 020	-2 265	-1 510	-755	0.00	755	1 510	2 265	3 020	-3 020	-2 265	-1 510	-755	0.00	755	1 510	2 265	3 020
Sep2017 ALSI Fut BASE	ALSI	21-Sep-17	F		50 416	-488 025	-366 018	-244 012	-122 006	0.00	122 006	244 012	366 018	488 025	-488 025	-366 018	-244 012	-122 006	0.00	122 006	244 012	366 018	488 025
Sep2017 ALSI Put 48000 Base	ALSI	21-Sep-17	P	48 000.00	58 294	405 573	283 567	161 561	39 555	-3 958	-31 152	-46 429	-53 166	-56 075	405 573	283 567	161 561	39 555	3 299	-24 741	-41 853	-50 256	-54 339
Sep2017 ALMI Fut Mini	ALSI	21-Sep-17	F		61 619	-59 647	-44 736	-29 824	-14 912	0.00	14 912	29 824	44 736	59 647	-59 647	-44 736	-29 824	-14 912	0.00	14 912	29 824	44 736	59 647
Sep2017 ALMI Put 48000 Mini	ALSI	21-Sep-17	P	48 000.00	3 257	42 771	27 859	12 948	2 203	-356	-2 202	-2 879	-3 120	-3 207	42 771	27 859	12 948	2 910	298	-1 770	-2 636	-2 994	-3 144
Mar2017 ZAGB Fut Base	ZAGB	16-Mar-17	F		120	-116 160	-87 120	-58 080	-29 040	0.00	29 040	58 080	87 120	116 160	-116 160	-87 120	-58 080	-29 040	0.00	29 040	58 080	87 120	116 160
SEP17 GBP/ZAR 22.5497C	ZAGB	15-Sep-17	C	22.55	7 746	-7 746	-7 746	-7 746	-7 746	-0.28	28 999	57 999	86 999	115 998	-7 746	-7 746	-7 746	-7 746	0.26	28 999	57 999	86 999	115 998
SEP17 GBP	ZAGB	15-Sep-17	F		100.00	-10 000	-10 000	-10 000	-10 000	0.00	29 000	58 000	86 999	115 999	-10 000	-10 000	-10 000	-10 000	0.00	29 000	58 000	86 999	115 999
Mar2017 \$ / R Call 16.6 Base	ZAUS	16-Mar-17	C	16.60	1 521	-1 521	-1 521	-1 521	-1 521	-54.01	4 087	8 413	12 740	17 067	-1 521	-1 521	-1 521	-1 521	7.60	4 088	8 413	12 740	17 067
Mar2017 ZAUS Fut Base	ZAUS	16-Mar-17	F		17.88	-17 308	-12 981	-8 654	-4 327	0.00	4 327	8 654	12 981	17 308	-17 308	-12 981	-8 654	-4 327	0.00	4 327	8 654	12 981	17 308
Mar2017 \$ / R Call 16.00 Maxi	ZAUS	16-Mar-17	C	16.00	58 507	-58 507	-58 507	-58 507	-50 058	-5.41	52 870	105 747	158 624	211 501	-58 507	-58 507	-58 507	-49 341	1.19	52 870	105 747	158 624	211 501
Mar2017 ZAUM Fut Maxi	ZAUS	16-Mar-17	F		21.85	-211 508	-158 631	-105 754	-52 877	0.00	52 877	105 754	158 631	211 508	-211 508	-158 631	-105 754	-52 877	0.00	52 877	105 754	158 631	211 508
Mar2017 MTNQ Fut	MTNQ	16-Mar-17	F		185	-17 911	-13 433	-8 955	-4 478	0.00	4 478	8 955	13 433	17 911	-17 911	-13 433	-8 955	-4 478	0.00	4 478	8 955	13 433	17 911
Sep2017 MTNS Fut	MTNS	21-Sep-17	F		190	-8 392	-6 294	-4 196	-2 098	0.00	2 098	4 196	6 294	8 392	-8 392	-6 294	-4 196	-2 098	0.00	2 098	4 196	6 294	8 392
Jun2017 SABG Fut	SABG	15-Jun-17	F		358	-34 663	-25 997	-17 332	-8 666	0.00	8 666	17 332	25 997	34 663	-34 663	-25 997	-17 332	-8 666	0.00	8 666	17 332	25 997	34 663
Jun2017 SABQ Call 316	SABQ	15-Jun-17	C	316.00	2 266	-2 266	-2 266	-2 266	-2 266	-159	5 789	12 261	19 376	26 717	-2 266	-2 266	-2 266	-2 266	113	6 035	12 412	19 450	26 750
Jun2017 SABQ Fut	SABQ	15-Jun-17	F		308	-29 778	-22 333	-14 889	-7 444	0.00	7 444	14 889	22 333	29 778	-29 778	-22 333	-14 889	-7 444	0.00	7 444	14 889	22 333	29 778
Jun2017 SABQ Put 316	SABQ	15-Jun-17	P	316.00	3 104	27 511	20 067	12 622	5 178	-159	-1 656	-2 628	-2 957	-3 060	27 511	20 067	12 622	5 178	113	-1 410	-2 477	-2 883	-3 028
SEP2017 APPLE PHY	US_APPLE_10	15-Sep-17	F		100.00	-2 997	-2 248	-1 499	-749	0.00	749	1 499	2 248	2 997	-2 997	-2 248	-1 499	-749	0.00	749	1 499	2 248	2 997
Sep2017 APPLE PHY	US_APPLE_11	21-Sep-17	F		119	-2.23	-1.67	-1.11	-0.56	0.00	0.56	1.12	1.67	2.23	-2.23	-1.67	-1.11	-0.56	0.00	0.56	1.12	1.67	2.23

6.4 Deltas

CSG	Expiry	IMR	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10	Scenario 11	Scenario 12	Scenario 13	Scenario 14	Scenario 15	Scenario 16	Scenario 17	Scenario 18	Max Scenario	
ALSI	16-Mar-17	30 000	610	617	623	628	632	635	638	640		606	613	619	624	628	632	635	637		640	
ALSI	21-Sep-17	488 025	1 822	1 822	1 515	332	159	15.17	110	150		1 822	1 822	1 463	282	182	12.31	89.36	137		1 822	
ZAGB	16-Mar-17	116 160	600	600	600	600	600	600	600	600		600	600	600	600	600	600	600	600	600		600
ZAGB	15-Sep-17	115 999	0.00	0.00	0.00	692	2 348	2 348	2 348	2 348		0.00	0.00	0.00	692	2 348	2 348	2 348	2 348	2 348		2 348
ZAUS	16-Mar-17	17 308	192	192	892	6 707	7 942	8 003	8 003	8 003		192	192	984	6 636	7 922	8 003	8 003	8 003		8 003	
MTNQ	16-Mar-17	17 911	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00		55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00		55.00	
MTNS	21-Sep-17	8 392	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00		40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00		40.00	
SABG	15-Jun-17	34 663	500	500	500	500	500	500	500	500		500	500	500	500	500	500	500	500		500	
SABQ	15-Jun-17	29 778	550	550	550	471	326	307	282	274		550	550	550	461	327	310	285	275		550	
US_APPLE_10	15-Sep-17	2 997	833	833	833	833	833	833	833	833		833	833	833	833	833	833	833	833		833	
US_APPLE_11	21-Sep-17	2.23	844	844	829	844	844	844	829	844		844	844	829	844	844	844	829	844		844	

6.5 PREs

Correct CSG	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10	Scenario 11	Scenario 12	Scenario 13	Scenario 14	Scenario 15	Scenario 16	Scenario 17	Scenario 18	Min Scenario
ALSI	-681 996 045	-455 096 157	-228 144 790	-38 658 742	6 558 480	30 697 568	33 612 061	24 947 331	11 453 791	-681 651 676	-454 781 317	-227 861 848	-44 764 114	-5 640 722	21 229 071	27 469 042	21 327 585	9 434 661	-681 996 045
ZAGB	49 631 110	32 207 104	14 783 104	-2 640 902	-424.20	50 666 272	101 333 741	152 001 195	202 668 670	49 631 110	32 207 104	14 783 104	-2 640 902	393.90	50 666 272	101 333 741	152 001 195	202 668 670	-2 640 902
ZAUS	31 297 820	32 128 363	32 958 905	29 100 092	79 319	-34 286 950	-68 916 535	-103 546 727	-138 176 920	31 297 820	32 128 363	32 958 905	28 702 262	-11 399	-34 288 730	-68 916 535	-103 546 727	-138 176 920	-138 176 920
MTNQ	-985 100	-738 825	-492 550	-246 275	0.00	246 275	492 550	738 825	985 100	-985 100	-738 825	-492 550	-246 275	0.00	246 275	492 550	738 825	985 100	-985 100
MTNS	335 680	251 760	167 840	83 920	0.00	-83 920	-167 840	-251 760	-335 680	335 680	251 760	167 840	83 920	0.00	-83 920	-167 840	-251 760	-335 680	-335 680
SABG	-17 331 560	-12 998 670	-8 665 780	-4 332 890	0.00	4 332 890	8 665 780	12 998 670	17 331 560	-17 331 560	-12 998 670	-8 665 780	-4 332 890	0.00	4 332 890	8 665 780	12 998 670	17 331 560	-17 331 560
SABQ	15 743 093	11 648 669	7 554 248	3 459 824	-44 534	-2 473 588	-4 755 715	-6 858 044	-8 896 895	15 743 093	11 648 669	7 554 248	3 459 824	31 587	-2 404 694	-4 713 536	-6 837 184	-8 887 750	-8 896 895
US_APPLE_10	2 496 501	1 872 376	1 248 251	624 125	0.00	-624 125	-1 248 251	-1 872 376	-2 496 501	2 496 501	1 872 376	1 248 251	624 125	0.00	-624 125	-1 248 251	-1 872 376	-2 496 501	-2 496 501
US_APPLE_11	-1 873	-1 403	-932.40	-470.40	0.00	470.40	940.80	1 403	1 873	-1 873	-1 403	-932.40	-470.40	0.00	470.40	940.80	1 403	1 873	-1 873

6.6 PREs Quantities

CSG & Expiry	Before	After Place	After	Benefit	Potential Slack	CSG	Total Before	Total Benefit	Total Potential Slack	Actual Slack	Offset Proportion	Que	SSM	Tot Spread Margin
ALSI 16Mar2017	18 798 614.72	1	18 798 614.72	0.00	18 798 614.72	ALSI	681 996 044.72	0.00	681 996 044.72	0.00	0.00	0.00	0.00	0.00
ALSI 21Sep2017	663 197 430.00	1	663 197 430.00	0.00	663 197 430.00							0.00	0.00	
ZAGB 16Mar2017	69 696 012.00	4	-17 424 000.00	87 120 012.00	0.00	ZAGB	89 760 914.15	87 120 012.00	20 064 902.15	20 064 902.15	1.00	1.00	147 000.00	734 000.00
ZAGB 15Sep2017	20 064 902.15	4	20 064 902.15	0.00	20 064 902.15							1.00	587 000.00	
ZAUS 16Mar2017	138 176 919.87	9	138 176 919.87	0.00	138 176 919.87	ZAUS	138 176 919.87	0.00	138 176 919.87	0.00	0.00	0.00	0.00	0.00
MTNQ 16Mar2017	985 100.05	1	985 100.05	0.00	985 100.05	MTNQ	985 100.05	0.00	985 100.05	0.00	0.00	0.00	0.00	0.00
MTNS 21Sep2017	335 680.00	9	335 680.00	0.00	335 680.00	MTNS	335 680.00	0.00	335 680.00	0.00	0.00	0.00	0.00	0.00
SABG 15Jun2017	17 331 560.00	1	17 331 560.00	0.00	17 331 560.00	SABG	17 331 560.00	0.00	17 331 560.00	0.00	0.00	0.00	0.00	0.00
SABQ 15Jun2017	8 896 894.60	9	8 896 894.60	0.00	8 896 894.60	SABQ	8 896 894.60	0.00	8 896 894.60	0.00	0.00	0.00	0.00	0.00
US_APPLE_10 15Sep2017	2 496 501.00	9	2 496 501.00	0.00	2 496 501.00	US_APPLE_10	2 496 501.00	0.00	2 496 501.00	0.00	0.00	0.00	0.00	0.00
US_APPLE_11 21Sep2017	1 873.20	1	1 873.20	0.00	1 873.20	US_APPLE_11	1 873.20	0.00	1 873.20	0.00	0.00	0.00	0.00	0.00

6.7 Adj NREs

CSG	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10	Scenario 11	Scenario 12	Scenario 13	Scenario 14	Scenario 15	Scenario 16	Scenario 17	Scenario 18	Min Scenario
ALSI	-681 996 045	-455 096 157	-228 144 790	-38 658 742	6 558 480	30 697 568	33 612 061	24 947 331	11 453 791	-681 651 676	-454 781 317	-227 861 848	-44 764 114	-5 640 722	21 229 071	27 469 042	21 327 585	9 434 661	-681 996 045
ZAGB	48 897 110	31 473 104	14 049 104	-3 374 902	-734 424	49 932 272	100 599 741	151 267 195	201 934 670	48 897 110	31 473 104	14 049 104	-3 374 902	-733 606	49 932 272	100 599 741	151 267 195	201 934 670	-3 374 902
ZAUS	31 297 820	32 128 363	32 958 905	29 100 092	79 319	-34 286 950	-68 916 535	-103 546 727	-138 176 920	31 297 820	32 128 363	32 958 905	28 702 262	-11 399	-34 288 730	-68 916 535	-103 546 727	-138 176 920	-138 176 920
MTNQ	-985 100	-738 825	-492 550	-246 275	0.00	246 275	492 550	738 825	985 100	-985 100	-738 825	-492 550	-246 275	0.00	246 275	492 550	738 825	985 100	-985 100
MTNS	335 680	251 760	167 840	83 920	0.00	-83 920	-167 840	-251 760	-335 680	335 680	251 760	167 840	83 920	0.00	-83 920	-167 840	-251 760	-335 680	-335 680
SABG	-17 331 560	-12 998 670	-8 665 780	-4 332 890	0.00	4 332 890	8 665 780	12 998 670	17 331 560	-17 331 560	-12 998 670	-8 665 780	-4 332 890	0.00	4 332 890	8 665 780	12 998 670	17 331 560	-17 331 560
SABQ	15 743 093	11 648 669	7 554 248	3 459 824	-44 534	-2 473 588	-4 755 715	-6 858 044	-8 896 895	15 743 093	11 648 669	7 554 248	3 459 824	31 587	-2 404 694	-4 713 536	-6 837 184	-8 887 750	-8 896 895
US_APPLE_10	2 496 501	1 872 376	1 248 251	624 125	0.00	-624 125	-1 248 251	-1 872 376	-2 496 501	2 496 501	1 872 376	1 248 251	624 125	0.00	-624 125	-1 248 251	-1 872 376	-2 496 501	-2 496 501
US_APPLE_11	-1 873	-1 403	-932.40	-470.40	0.00	470.40	940.80	1 403	1 873	-1 873	-1 403	-932.40	-470.40	0.00	470.40	940.80	1 403	1 873	-1 873

6.8 Group Deltas

CSG & Expiry	Min IMR in CSG*	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10	Scenario 11	Scenario 12	Scenario 13	Scenario 14	Scenario 15	Scenario 16	Scenario 17	Scenario 18	Max Scenario
ALSI 16Mar2017	30 000	30 253	30 260	25 265	6 029	3 219	388.60	1 155	1 799		30 249	30 256	24 413	5 216	3 583	832.00	818.86	1 586		30 260
ZAGB 16Mar2017	114 500	608.70	608.70	608.70	92.24	1 770	1 770	1 770	1 770		608.70	608.70	608.70	92.27	1 770	1 770	1 770	1 770		1 770
ZAUS 16Mar2017	17 308	191.95	191.95	891.81	6 707	7 942	8 003	8 003	8 003		191.95	191.95	983.75	6 636	7 922	8 003	8 003	8 003		8 003
MTNQ 16Mar2017	17 911	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00		55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00		55.00
MTNS 21Sep2017	8 392	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00		40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00		40.00
SABG 15Jun2017	34 663	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00		500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00		500.00
SABQ 15Jun2017	29 778	550.00	550.00	550.00	470.74	326.29	306.56	282.40	273.88		550.00	550.00	550.00	460.51	327.26	310.14	285.27	275.45		550.00
US_APPLE_10 15Sep2017	2 997	833.00	833.00	833.00	833.00	833.00	833.00	833.00	833.00		833.00	833.00	833.00	833.00	833.00	833.00	833.00	833.00		833.00
US_APPLE_11 21Sep2017	2.23	843.77	843.77	828.70	843.77	843.77	843.77	828.70	843.77		843.77	843.77	828.70	843.77	843.77	843.77	828.70	843.77		843.77

6.8.1 Minimum IMR of Base contracts of the ZAGB CSG

The ZAGB CSG has a minimum IMR of 114 500 across all active base contracts.

Contract Name	Alpha Code	Expiry Date	Instrument Class	Contract Size	Contract Size Type	IMR	CSG
Mar2017 ZAGB Fut Base	GBP / R	2017-03-16	FUTURE	1 000	BASE	116 160.02	ZAGB
SEP17 GBP	GBP / R	2017-09-15	FUTURE	100	BASE	115 999.09	ZAGB
SEP17 GBP/ZAR 22.5497C	GBP / R	2017-09-15	OPTION	1	BASE	115 999.09	ZAGB
Oct2017 ZAGB Fut Base	GBP / R	2017-10-30	FUTURE	100	BASE	114 500	ZAGB

6.9 Group PREs

Ssg	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10	Scenario 11	Scenario 12	Scenario 13	Scenario 14	Scenario 15	Scenario 16	Scenario 17	Scenario 18	Min Scenario
ALS\IND\FIN\FND\RES\IC\TOP\VD\TOP_GROUP	-681 996 045	-455 096 157	-228 144 790	-38 658 742	6 558 480	30 697 568	33 612 061	24 947 331	11 453 791	-681 651 676	-454 781 317	-227 861 848	-44 764 114	-5 640 722	21 229 071	27 469 042	21 327 585	9 434 661	-681 996 045
Currency Futures Offset Group	80 194 930	63 601 467	47 008 009	25 725 190	-655 106	15 645 322	31 683 206	47 720 467	63 757 750	80 194 930	63 601 467	47 008 009	25 327 360	-745 005	15 643 542	31 683 206	47 720 467	63 757 750	-745 005
MTNQ+MTNS Group	-649 420	-487 065	-324 710	-162 355	0.00	162 355	324 710	487 065	649 420	-649 420	-487 065	-324 710	-162 355	0.00	162 355	324 710	487 065	649 420	-649 420
SABG (Own Group)	-17 331 560	-12 998 670	-8 665 780	-4 332 890	0.00	4 332 890	8 665 780	12 998 670	17 331 560	-17 331 560	-12 998 670	-8 665 780	-4 332 890	0.00	4 332 890	8 665 780	12 998 670	17 331 560	-17 331 560
SABQ_Group	15 743 093	11 648 669	7 554 248	3 459 824	-44 534	-2 473 588	-4 755 715	-6 858 044	-8 896 895	15 743 093	11 648 669	7 554 248	3 459 824	31 587	-2 404 694	-4 713 536	-6 837 184	-8 887 750	-8 896 895
US_APPLE_10 (Own Group)	2 496 501	1 872 376	1 248 251	624 125	0.00	-624 125	-1 248 251	-1 872 376	-2 496 501	2 496 501	1 872 376	1 248 251	624 125	0.00	-624 125	-1 248 251	-1 872 376	-2 496 501	-2 496 501
US_APPLE_11 (Own Group)	-1 873	-1 403	-932.40	-470.40	0.00	470.40	940.80	1 403	1 873	-1 873	-1 403	-932.40	-470.40	0.00	470.40	940.80	1 403	1 873	-1 873

6.10 Group PREs Quantities

CSG	Before	After Place	After	Benefit	Potential Slack	SSG	Total Before	Total Benefit	Total Potential Slack	Actual Slack	Offset Proportion	Que	SSM Per CSG	Tot Spread Margin
ALSI	681 996 044.72	1	681 996 044.72	0.00	681 996 044.72	ALSINNDIFINIFNDRESICTOPDTOP GROUP	681 996 044.72	0.00	681 996 044.72	0.00	0.00	0.00	0.00	0.00
ZAGB	3 374 902.15	14	733 606.10	2 641 296.05	0.00	Currency Futures Offset Group	141 551 822.02	140 806 816.67	0.00	0.00	1.00	1.00	1 327 530.00	5 249 172.00
ZAUS	138 176 919.87	14	11 399.25	138 165 520.62	0.00							1.00	3 921 641.50	
MTNQ	985 100.05	1	985 100.05	0.00	985 100.05	MTNQ+MTNS Group	1 320 780.05	671 360.00	985 100.05	671 360.00	0.68	0.68	5 247.67	11 048.00
MTNS	335 680.00	1	-335 680.00	671 360.00	0.00							1.00	5 800.00	
SABG	17 331 560.00	1	17 331 560.00	0.00	17 331 560.00	SABG (Own Group)	17 331 560.00	0.00	17 331 560.00	0.00	0.00	0.00	0.00	0.00
SABQ	8 896 894.60	9	8 896 894.60	0.00	8 896 894.60	SABQ_Group	8 896 894.60	0.00	8 896 894.60	0.00	0.00	0.00	0.00	0.00
US_APPLE_10	2 496 501.00	9	2 496 501.00	0.00	2 496 501.00	US_APPLE_10 (Own Group)	2 496 501.00	0.00	2 496 501.00	0.00	0.00	0.00	0.00	0.00
US_APPLE_11	1 873.20	1	1 873.20	0.00	1 873.20	US_APPLE_11 (Own Group)	1 873.20	0.00	1 873.20	0.00	0.00	0.00	0.00	0.00

6.11 Group Adj PREs

SSG	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10	Scenario 11	Scenario 12	Scenario 13	Scenario 14	Scenario 15	Scenario 16	Scenario 17	Scenario 18	Min Adj NRE
ALSINNDIFINIFNDRESICTOPDTOP GROUP	-681 996 045	-455 096 157	-228 144 790	-38 658 742	6 558 480	30 697 568	33 612 061	24 947 331	11 453 791	-681 651 676	-454 781 317	-227 861 848	-44 764 114	-5 640 722	21 229 071	27 469 042	21 327 585	9 434 661	-681 996 045
Currency Futures Offset Group	74 945 758	58 352 295	41 758 837	20 476 018	-5 904 278	10 396 150	26 434 034	42 471 295	58 508 578	74 945 758	58 352 295	41 758 837	20 078 188	-5 994 177	10 394 370	26 434 034	42 471 295	58 508 578	-5 994 177
MTNQ+MTNS Group	-660 468	-498 113	-335 758	-173 403	-11 048	151 307	313 662	476 017	638 372	-660 468	-498 113	-335 758	-173 403	-11 048	151 307	313 662	476 017	638 372	-660 468
SABG (Own Group)	-17 331 560	-12 998 670	-8 665 780	-4 332 890	0.00	4 332 890	8 665 780	12 998 670	17 331 560	-17 331 560	-12 998 670	-8 665 780	-4 332 890	0.00	4 332 890	8 665 780	12 998 670	17 331 560	-17 331 560
SABQ_Group	15 743 093	11 648 669	7 554 248	3 459 824	-44 534	-2 473 588	-4 755 715	-6 858 044	-8 896 895	15 743 093	11 648 669	7 554 248	3 459 824	31 587	-2 404 694	-4 713 536	-6 837 184	-8 887 750	-8 896 895
US_APPLE_10 (Own Group)	2 496 501	1 872 376	1 248 251	624 125	0.00	-624 125	-1 248 251	-1 872 376	-2 496 501	2 496 501	1 872 376	1 248 251	624 125	0.00	-624 125	-1 248 251	-1 872 376	-2 496 501	-2 496 501
US_APPLE_11 (Own Group)	-1 873	-1 403	-932.40	-470.40	0.00	470.40	940.80	1 403	1 873	-1 873	-1 403	-932.40	-470.40	0.00	470.40	940.80	1 403	1 873	-1 873

6.12 Final JSPAN

SSG	Min Scenario from Group Adj PREs
ALSMIND\FIN\FND\RES\CTOP\DTOP GROUP	R -681 996 044.72
Currency Futures Offset Group	R -5 994 177.35
MTNQ+MTNS Group	R -660 468.05
SABG (Own Group)	R -17 331 560.00
SABQ_Group	R -8 896 894.60
US_APPLE_10 (Own Group)	R -2 496 501.00
US_APPLE_11 (Own Group)	R -1 873.20
Total	R -717 377 518.92

6.13 Data in Excel Format

This file has an Excel-file attached (JSPAN Excel Details v1.4.xlsx) which contains the data referred to in the annexure.

7 ROUNDING

This section gives a summary of how rounding should be applied to the various values that are calculated in the JSPAN methodology. The table below states to how many decimal places each item needs to be rounded.

Section	JSPAN Measure	Decimals
Risk Arrays	Risk Array element	2
Deltas	Maximum Delta values	2
PRE Quantities	Offset proportion	6
	CSM	0
Group Deltas	Maximum Group Delta value	2
Group PRE Quantities	Offset proportion	6
	SSM	0

It can be assumed that unless it is specifically stated above, no rounding should take place (e.g. PREs & Group PREs).

8 SOURCE DATA FOR JSPAN

The JSE's Real-time Clearing system (RTC) provides an application programming interface called EMAPI which members can use to obtain data needed to replicate the JSPAN calculations.

Note: Please refer to the EMAPI Specifications on the [JSE ITaC website](#) for more details; in particular refer to Volume PT01 – Post-trade EMAPI Common and Volume PT02 – Post-trade EMAPI Clearing for details on how to interface to RTC EMAPI.

The following table shows which EMAPI messages can be used to obtain the input data required to calculate JSPAN:

Input Data	EMAPI Message	EMAPI Field
Portfolio / Account	AccountPositionEvent (10032) PositionAccount (10045)	
Risk Arrays	GetRiskArrayReq (10270) GetRiskArrayRsp (10271) The risk array is contained in the sub-message Contract (10272)	
Instruments	TradableInstrument (296)	
IMR	TradableInstrument (296)	10088 = imrOfficial
CSMR	TradableInstrument (296)	10065 = classSpreadMarginRequirement
VSR	TradableInstrument (296)	10061 = volatilityScanningRange
Contract Size Type	TradableInstrument (296)	10130 = contractSizeType
CSG ID	TradableInstrument (296)	10064 = classSpreadGroup
CSG	ClassSpreadGroup (10158)	
SSG ID	ClassSpreadGroup (10158)	9 = ssgId
SSG	SeriesSpreadGroup (10159)	

Note: The calculate JSPAN values are published regularly by RTC in the [RiskNodeEvent \(10033\)](#) message (37 = jspanValue).