PC-SPAN TUTORIAL

Contents

Introduction

The Standard Portfolio Analysis of Risk ("PC-SPAN") system is a sophisticated methodology that calculates the margin requirements by analysing the "what-ifs" of virtually any market scenario.

Continually enhanced and elaborated, the PC-SPAN methodology can be used to evaluate risk for the broadest possible range of derivative and physical instruments. Although originally designed for use with derivatives, its extraordinary capabilities have led to its extensive use in assessing risk for many different types of financial instruments.

1. How PC-SPAN Works

PC-SPAN evaluates overall portfolio risk by calculating the worst possible loss that a portfolio of derivative and physical instruments might reasonably incur over a specified time period (typically one trading day – referred to as 'look ahead time'). This is done by computing the gains and losses the portfolio would incur under different market conditions.

Each condition is called a risk scenario. The numeric value for each risk scenario represents the gain or loss that particular contract will experience for a particular combination of price (or underlying price) change, volatility change, and decrease in time to expiration.

These conditions are defined as:-

> ➢ how much the price of the underlying instrument is expected to change over one trading day and,
> ➢ how much the volatility of that underlying price is expected to change over one trading day.

PC-SPAN further uses a standardized definition of the risk scenarios defined in terms of

> ➢ **Price Scan Range:** The Price Scan Range ("PSR") is the probable price change over a one-day period.
>
> ➢ **Volatility Scan Range:** The Volatility Scan Range ("VSR") is the amount by which the implied volatility is changed in each risk array scenario.

1.1 Risk Scenarios

There are 16 risk scenarios in the standard definition. These scenarios are listed as under:

Risk Scenario Number	Price Move in Multiples of Price Range	Volatility Move in Multiples of Volatility Range	Fraction of Loss to be Considered
1.	0	+1	100%
2.	0	-1	100%
3.	+1/3	+1	100%
4.	+1/3	-1	100%
5.	-1/3	+1	100%
6.	-1/3	-1	100%
7.	+2/3	+1	100%
8.	+2/3	-1	100%
9.	-2/3	+1	100%
10.	-2/3	-1	100%
11.	+1	+1	100%
12.	+1	-1	100%
13.	-1	+1	100%
14.	-1	-1	100%
15.	+2	0	35%
16.	-2	0	35%

PC-SPAN calculates the probable premium value at each price scan point for volatility up and volatility down scenario. It then compares this probable premium value to the theoretical premium value (based on last closing value of the underlying) to determine profit or loss.

The maximum loss under any of the scenario (considering only 35% of the loss in case of scenarios 15 and 16) is referred to as the Worst Scenario Loss.

After PC-SPAN has scanned the 16 different scenarios of underlying market price and volatility changes, it selects the largest loss from among these 16 observations. This "largest reasonable loss" is the 'Scanning Risk Charge' for the portfolio - in other words, for all futures and options contracts.

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2. Downloading PC-SPAN Software

Complementary copies of the PC-SPAN software can be downloaded through CME Core by all users. To download a copy:

➢ Log on to CME Core (Link for creating login) with your CME Group Login,
➢ Or create a new one, and download the software.
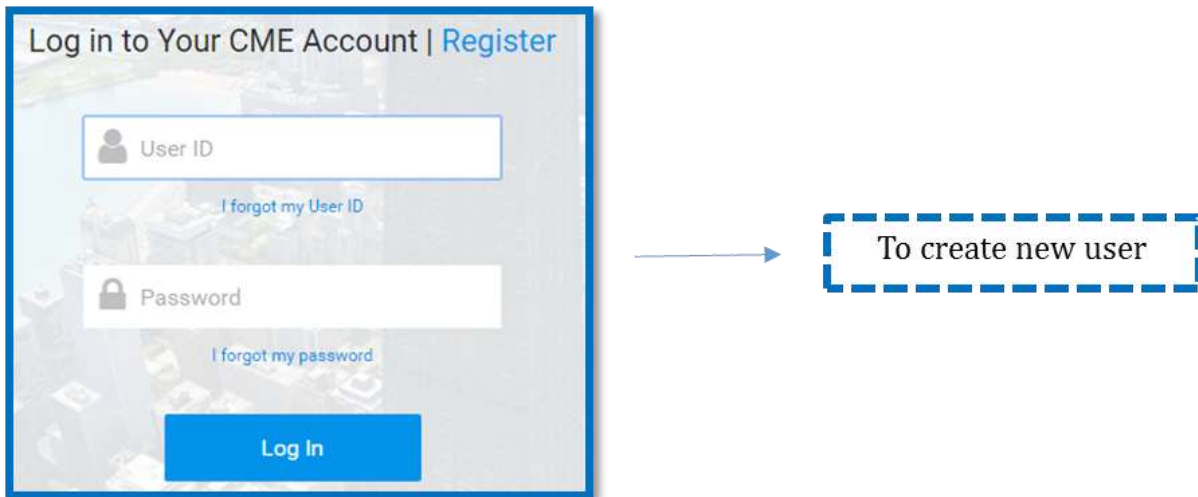
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2.1 Create New User

Fill the required details –
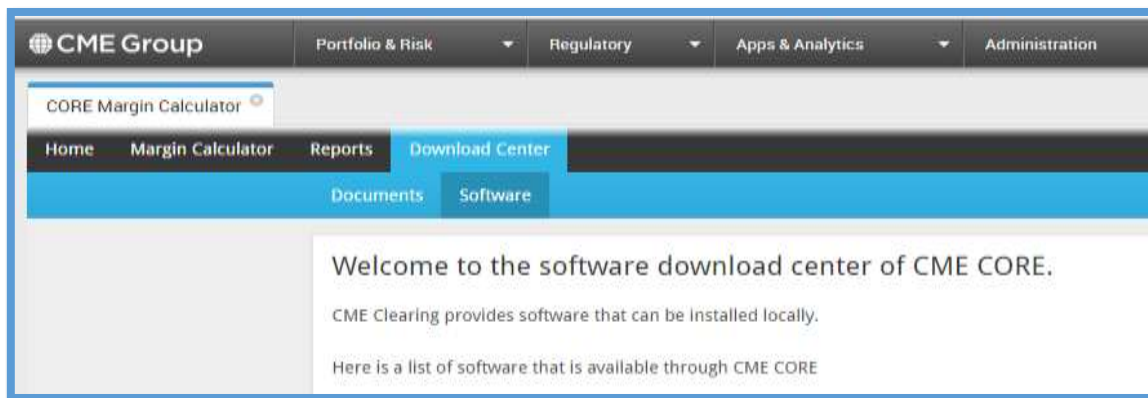

The below message will be displayed. The account needs to be activated and the E-mail ID provided in login credentials needs to be verified.

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2.2 Download Software

Download any one of the LATEST versions depending on the compatibility with your PC (illustration given below):

Additionally download,

File	Version	Description
SPAN Position Converter	1.0.0	This application allows users to transform .csv portfolios into position files for SPAN.

The following icon is created on desktop, post successful installation of PC-SPAN software:

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2.3 Update Software

If you are already a CME Group Login user and have the old version of PC-SPAN, the software will need to be updated.

Link to tutorial on updating PC-SPAN software

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3. Loading PC-SPAN Risk Parameter File

CME Group provides Link to tutorial on Loading PC-SPAN Risk Parameter File

PC-SPAN version 4 supports the following PC-SPAN risk parameter file formats:

1. .par file type
2. .pa2 file type
3. .spn file type.
4. .xml file type.

Any of the above formats will populate on PC-SPAN.

3.1 How to download Risk Parameter Files

3.1.1   Equity Derivatives

BSE provides the PC-SPAN risk parameter file for Equity Derivatives in 2 formats - .spn and .xml (Link for Equity Derivatives Risk Parameter File)

Please select the date range for which you want to search.

Download File		
Date	7 ▼ April ▼ 2017 ▼	
	Go	

T0	T1	Xml File Format	T0	T1	Spn File Format
○	○	Beginning of the Day	○	○	Beginning of the Day
○	○	Intra-Day 01 (At 11:00 a.m.)	○	○	Intra-Day 01 (At 11:00 a.m.)
○	○	Intra-Day 02 (At 12:30 p.m.)	○	○	Intra-Day 02 (At 12:30 p.m.)
○	○	Intra-Day 03 (At 2:00 p.m.)	○	○	Intra-Day 03 (At 2:00 p.m.)
○	○	Intra-Day 04 (At 3:45 p.m.)	○	○	Intra-Day 04 (At 3:45 p.m.)
◉	○	Final (At 4:35 p.m.)	○	○	Final (At 4:35 p.m.)
Download	Reset		Download	Reset	

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3.1.2 Currency Derivatives

Link for Currency Derivative Risk Parameter File

Please select the date range for which you want to search.

Download File
Date   7 ▼   April ▼   2017 ▼
Go

| T0	Xml File Format
○	Beginning of the Day
○	Intra-Day 01 (At 11:00 a.m.)
○	Intra-Day 02 (At 12:30 p.m.)
○	Intra-Day 03 (At 2:00 p.m.)
○	Intra-Day 04 (At 3:30 p.m.)
◉	Final (At 5:30 p.m.)

Download   Reset

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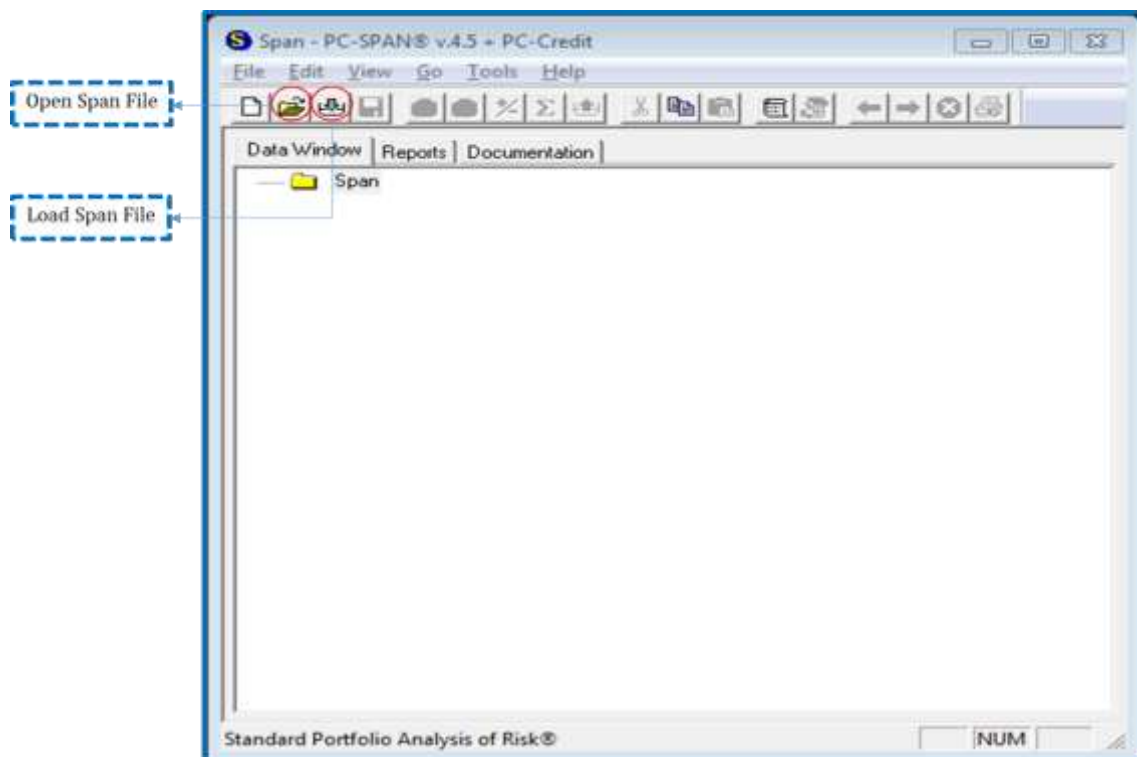
3.2 How to load Risk Parameter Files

➢ The files will download as zip compressed (zipped) folders
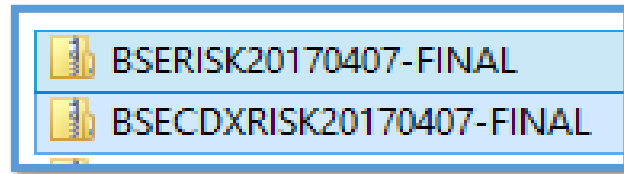
➢ The risk files need to be copied from this zipped folder to the desired location
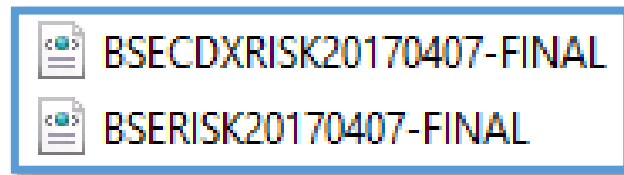
➢ From the location where the files are saved they can be loaded to PC-SPAN using the below option in PC-SPAN
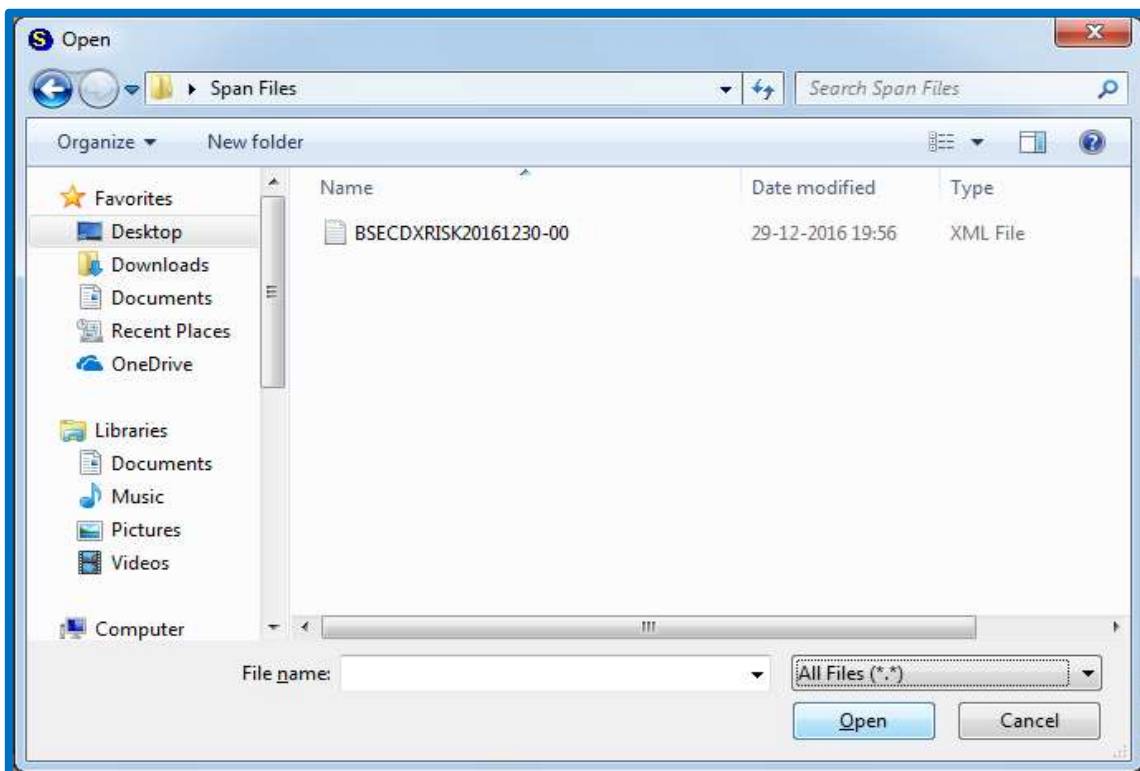

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➢ Select "All Files" option in the drop-down menu.
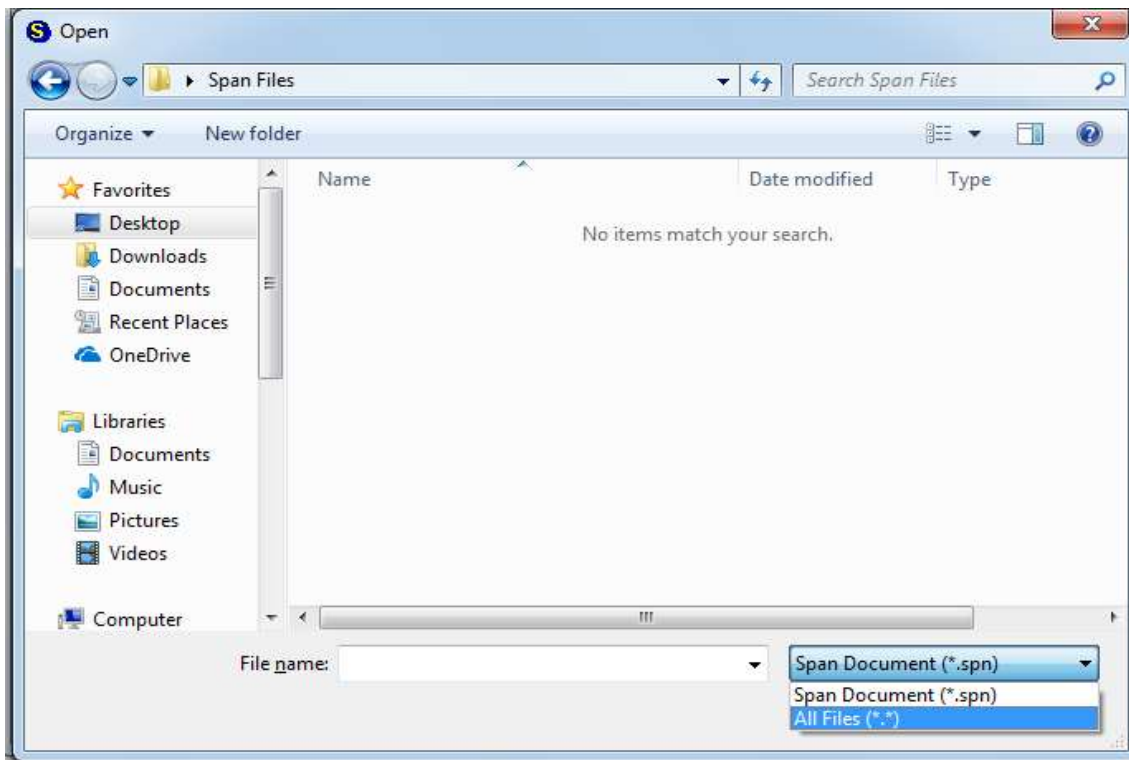
➢ The below .xml format file will populate once the file is loaded.

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4. Conversion of File Format from XML to SPN Format

- ➢ As per the steps detailed above (3.2 How to Load Risk Parameter Files), open the .xml format file in PC-SPAN

- ➢ Click on the Risk Parameter File. Then Go to File->Save As. A dialogue box will appear
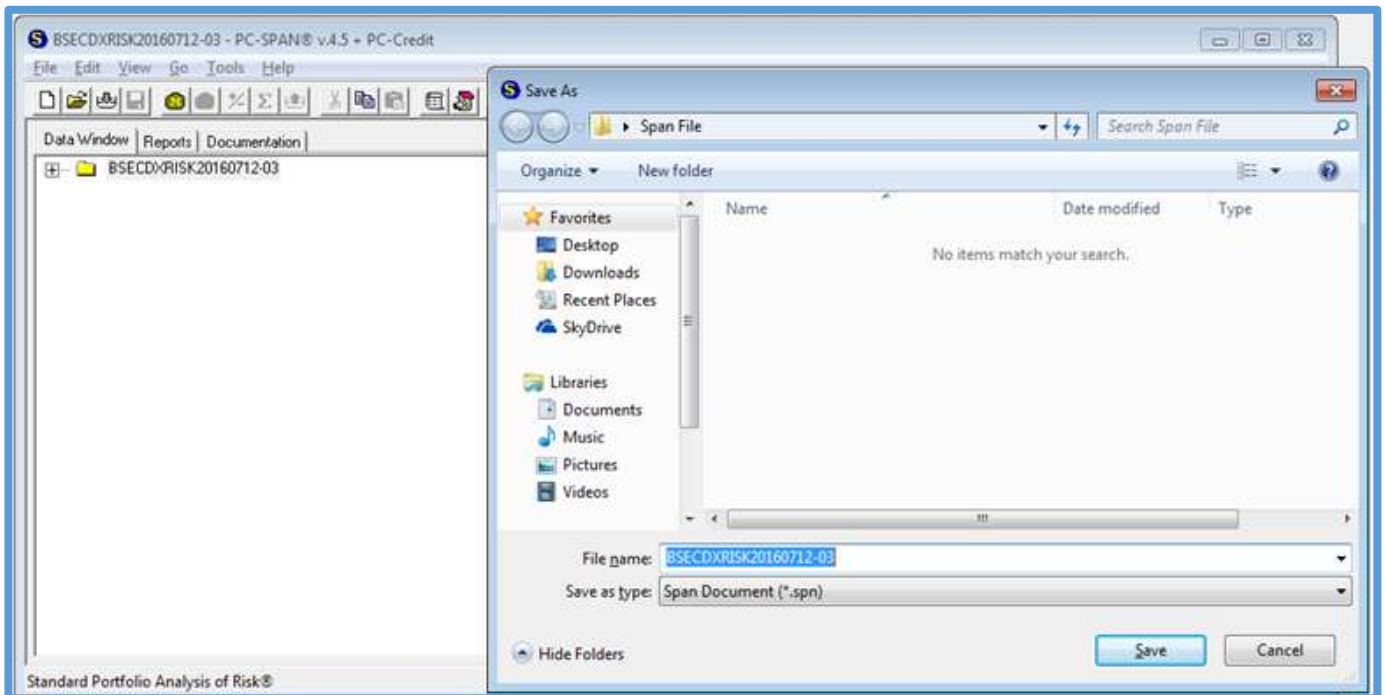
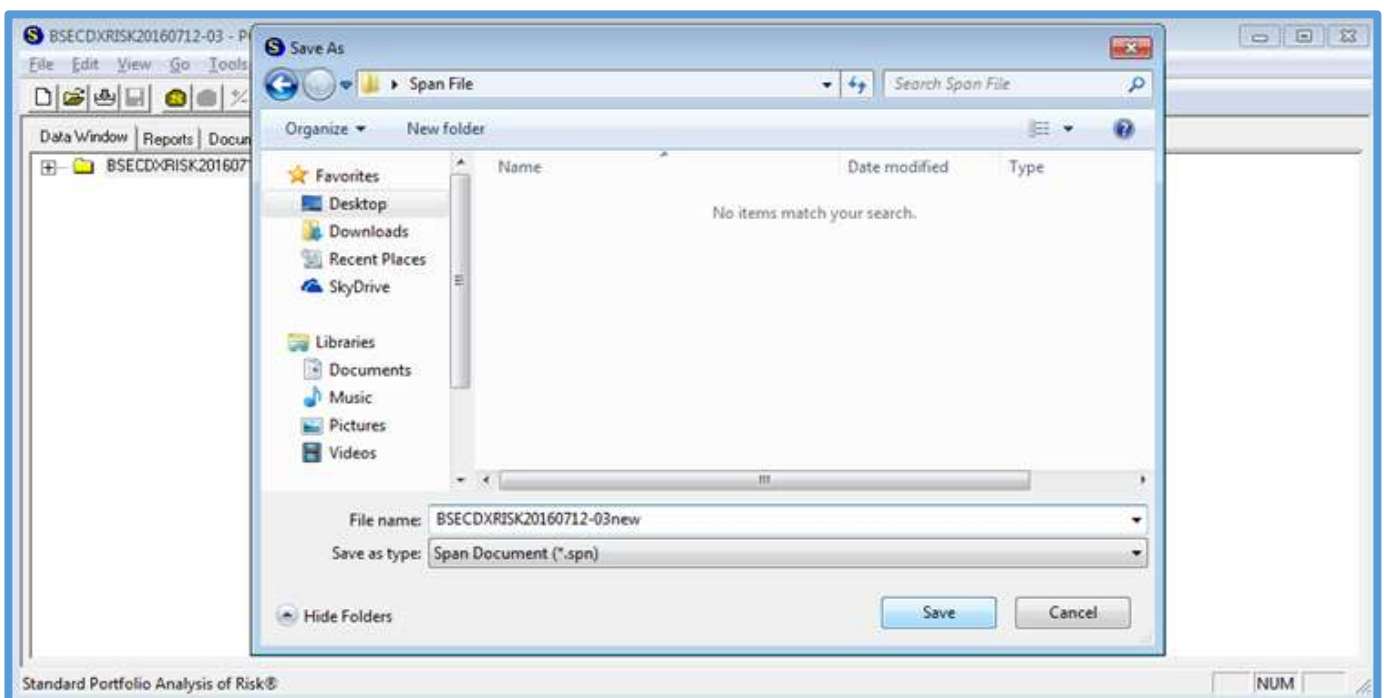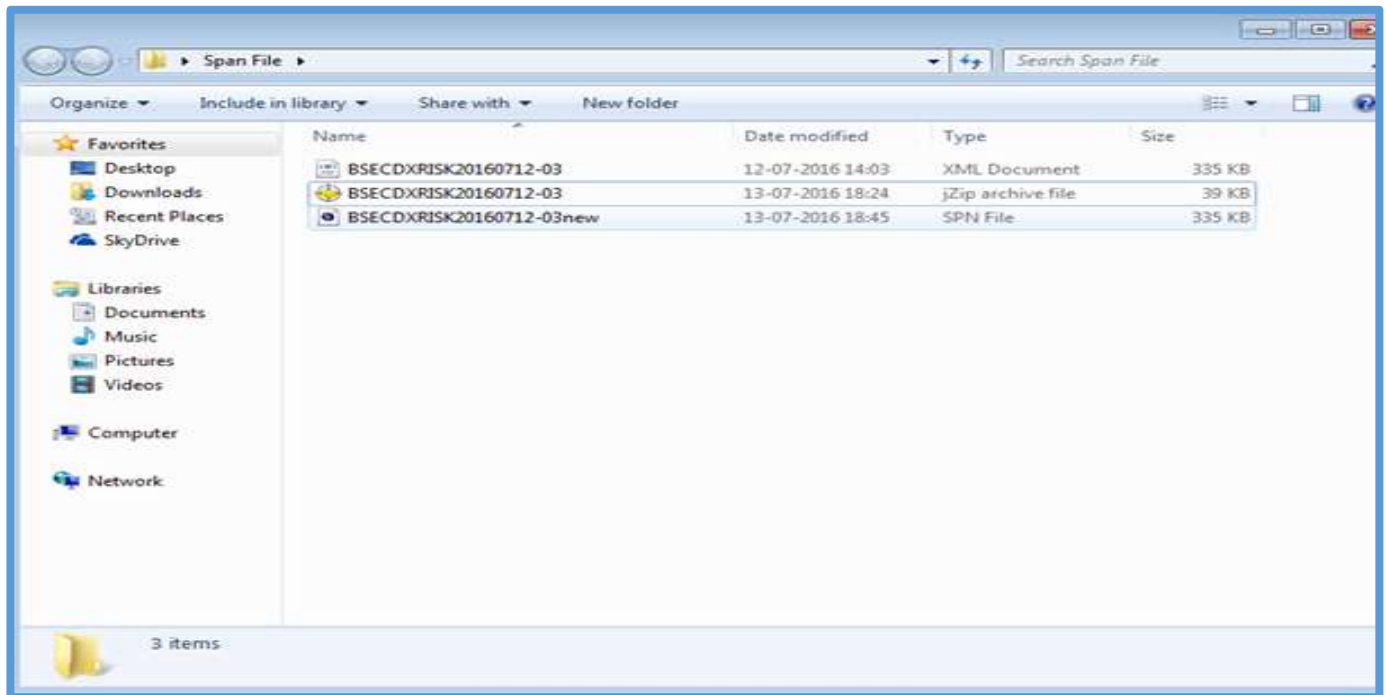

- ➢ Save it as a new file in PC-SPAN (.spn) format

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> ➢ The file is saved in PC-SPAN (.spn) format

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5. Additional guidance available on CME website

1. Calculating Performance Bond Requirements – [Link on CME website](#)

2. Defining Portfolios - [Link on CME website](#)

3. Defining Positions - [Link on CME website](#)

4. PC-SPAN Reports - [Link on CME website](#)

5. PC-SPAN Risk Manager - integrates risk management features with core margin calculation abilities to deliver a flexible and intuitive system for full portfolio risk management. Its powerful features and intuitive design allow for true portfolio analytics through multi-variant stress testing and option exposures – [Link on CME website](#)

6. A guide to Risk Parameter Reports on PC-SPAN – [Link on CME website](#)