

Unofficial Translation prepared by The Foreign Banks' Association

This translation is for the convenience of those unfamiliar with the Thai language. Please refer to the Thai text for the official version.

BANK OF THAILAND

30 December 2003

To Manager

All Commercial Banks*

No. BOT. FPG (21) Wor.2738/2546 Re: Market Risk Supervision Policy of Financial Institutions and Related Reports

1. Objective of the circulation letter

- 1.1 For financial institution (FI) to use as a guideline in implementing its internal control system and to encourage sound market risk management system
- 1.2 For FI to use as a guideline on formulating an appropriate Trading Book Policy
- 1.3 For FI to use as a guideline on assessing market risk in accordance with the quantity and complexity of the transactions in each FI
- 1.4 For FI with significant level of trading book transactions to maintain adequate capital for market risk, one of the important risks faced by FI

2 Scope of the Policy

Market Risk Supervision Policy covers elements of interest rate risk, equity price risk, foreign exchange risk and commodity price risk (in case that the BOT allows FI to undertake transactions related to commodity price) and prescribes guidelines on 8 important issues as follows:

- 2.1 Assessment of Positions in Trading Book
- 2.2 Internal Control for Market Risk Management
- 2.3 Formulation of Trading Book Policy
- 2.4 Market Risk Capital Requirement
- 2.5 Market Risk Assessment: Standardized Approach
- 2.6 Market Risk Assessment: Internal Model Approach
- 2.7 Market Risk Assessment: Mixed Approach
- 2.8 Compilation of Data and Reports

* Excluding BIBF

3 Scope of Application

The Market Risk Supervision Policy asks FI to comply with the following

- 3.1 FI with the level of trading book transactions **at and above the Threshold** as specified by the BOT shall follow the guidelines number 2.1-2.8
- 3.2 FI with the level of trading book transactions **below the Threshold** as specified by the BOT shall follow the guidelines number 2.1-2.3 **as well as measure and maintain** capital charge only for the element concerning commodity price risk in accordance with the related guidelines number 2.4-2.8

4

- 4.1 FI shall comply with the Guideline on Internal Control for Market Risk and Trading Book Policy starting from April 2004.
- 4.2 FI shall assess transactions in trading book starting from the end of July 2004 and submit the related reports in accordance with the specified guidelines.
- 4.3 FI shall assess capital charge against market risk starting from the end of March 2005 and submit the related report in accordance with the specified guidelines.
- 4.4 FI shall maintain capital for market risk from the end of June 2005.

Please be informed and comply with accordingly.

With regards

(M.R. Pridiyathom Devakula)
Governor

Enclosure: Market Risk Supervision Policy and Related Reports, together with Report Completion Instruction

Risk Supervision Policy and Analysis Department

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- Note**
- [X] The BOT will arrange a clarification meeting on 26 Jan 2003 at 13.30 hrs to 17.30 hrs, at the Meeting Room on 7th floor of Building 3, Bank of Thailand. Between 13.30-14.30 hrs, will be the policy summary for management and between 14.30-17.30 hrs, will be the detail for staffs. (FI shall give attendant names by 19 Jan 2004 at Information Management Team, Supervision Policy Group via a facsimile number 0-2356-7504 or telephone numbers 0-2356-7791-2)
- [] No clarification meeting will be arranged

Market Risk Supervision Policy

30 December 2003



By

Risk Supervision Policy Division

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Supervision Policy Group

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Market Risk Supervision Policy

Policy Objectives

1. For financial institution (FI) to use as a guideline in implementing its internal control system and to encourage sound market risk management system
2. For FI to use as a guideline on formulating an appropriate Trading Book Policy
3. For FI to use as a guideline on assessing market risk in accordance with the quantity and complexity of the transactions in each FI
4. For FI with significant level of trading book transactions to maintain adequate capital for market risk, one of the important risks faced by FI

Scope of the policy

5. Market Risk Supervision Policy which comprises market risk elements of interest rate risk, equity price risk, foreign exchange risk and commodity price risk, prescribes prudential guideline in 8 issues as follows:
 - 5.1 Assessment of Positions in Trading Book
 - 5.2 Internal Control for Market Risk Management
 - 5.3 Formulation of Trading Book Policy
 - 5.4 Market Risk Capital Requirement
 - 5.5 Market Risk Assessment: Standardized Approach
 - 5.6 Market Risk Assessment: Internal Model Approach
 - 5.7 Market Risk Assessment: Mixed Approach
 - 5.8 Compilation of Data and Reports

Once BOT allows FI to undertake commodity-related transactions, BOT will specify a guideline on market risk assessment under the Standardized Approach and the Internal Model Approach.

Scope of Application

6. The Market Risk Supervision Policy asks FI to comply with the following:
 - 6.1 FI with the level of trading book transactions **at and above the Threshold** as specified in 7 shall follow the guidelines number 5.1-5.8 **or**
 - 6.2 FI with the level of trading book transactions **below the Threshold** as specified in 7 shall follow the guidelines number 5.1-5.3 as well as measure and maintain capital against only commodity price risk in accordance with the related guidelines number 5.4-5.8.

Essence of Policy Guidelines

Assessing Positions in Trading Book

7. FI shall refer to the level of trading book transactions, which BOT considers as significant (Threshold), in accordance with the guideline specified by BOT. BOT may, from time to time, review the Threshold level to be in line with the market environment and associated accounting standards that may change in the future.
8. **ALL FIs** must assess the level of trading book positions to compare with the Threshold, according to the report specified in 19 every month, for which
 - 8.1 FI with transaction level **at and above the Threshold** shall comply with the guideline in 6.1 until receiving an approval from BOT to terminate such practice, on a case-by-case basis, provided that FI has very good reason. For example, FI has a policy to abort trading book transactions.
 - 8.2 FI with transaction level **below the Threshold** shall comply with the guideline in 6.2, including routinely monitoring its positions. BOT will compare FI's transaction level with Threshold level every 6 months.

FI shall refer to **Guideline on Assessing Positions in Trading Book** for more details

Internal Control for Market Risk Management

9. The board of directors and senior management must establish an internal control system for market risk management in accordance with the guideline specified by BOT. Such internal control system must incorporate the following issues at the minimum:

- 9.1 Role and responsibility of the board of directors and senior management
- 9.2 Guideline on risk measuring, monitoring, and assessment
- 9.3 Guideline on risk controlling and segregation of duties
- 9.4 Guideline on record keeping and internal communication
- 9.5 Guideline on internal audit system and corrective action

FI shall refer to **Guideline on Internal Control for Market Risk Management** for more details

Formulating Trading Book Policy

- 10. FI shall formulate a Trading Book Policy, which correspond to the level and complexity of its transaction, in accordance with the guideline specified by BOT.
 - 10.1 Trading Book comprises positions in debt instruments, equity instruments, and securities resembling debt instrument or equity instrument, which FI holds with Trading Intent or for hedging of other positions in a trading book, as well as all derivatives not held for hedging banking book positions. Instruments in a trading book must not have any limitation in trading, and must be regularly marked to market with proper management.
 - 10.2 FI shall prepare the policy in writing, ready for BOT examiners to investigate upon request, and must at least cover the details of issues specified by BOT. Especially, policy on classifying of financial instruments in a trading book and a banking book, policy on transfer of positions between trading and banking books, specification on holding period of a trading book position, formulation of clear trading strategy and management of positions.
 - 10.3 The policy shall be approved by the board of directors or other committee delegated and communicated to parties involved for implementation.
 - 10.4 Such policies must explicitly specify a period for which they are reviewed to be in line with situations and changes in business. Any major modifications shall be approved by the board of directors or the committee delegated.

FI shall refer to **Guideline on Formulating Trading Book Policy** for more details

Market Risk Capital Requirement

11. FI with positions associated with market risk shall maintain sufficient capital against market risk at all time. Market risk means the risk that FI may incur loss from change in the value of positions both on and off balance sheet due to movements in interest rate, equity price, exchange rate, and commodity price. Changes in interest rate and equity price may arise from General Market Risk factors and/ or Specific Risk factors.
12. FI with the level of trading book transactions **at and above the Threshold** shall maintain capital against market risk in accordance with the component in 12.1 12.2 and 12.3. FI with the level of trading book transactions **below the Threshold** must maintain capital against market risk only for the component in 12.3.
 - 12.1 Interest rate risk and equity price risk **on trading book positions** related to interest rate and equity price
 - 12.2 Foreign exchange risk **on all positions** related to foreign exchange
 - 12.3 Commodity price risk **on all positions** related to commodity
13. BOT may order FI with trading book transactions **below the Threshold** to maintain capital against market risk of all components or any components, in addition to commodity price risk, if BOT contemplates that such order will make the FI more sound. BOT may consider a special order afterwards.
14. FI shall maintain capital fund for credit risk and market risk as follows.
 - 14.1 For credit risk, FIs shall comply with the Bank of Thailand's circular letters No.BOT.FPG (31) Wor 1110/2546 Re: Stipulation on Maintenance of Capital Funds by Thai commercial Banks, No.BOT.FPG (31) Wor 1111/2546 Re: Stipulation on Maintenance of Capital Funds by Branches of Foreign Banks and No.BOT.FPG. (31) Wor 1112/2546 Re: Stipulation on Maintenance of Capital Funds as Percentage of Assets and Liabilities by Financial Companies as well as those announced in the future. **For FIs with the level of trading book transactions at and above threshold, the calculation of capital charge on credit risk excludes financial**

instruments on trading book¹ but includes counterparty risk of derivatives in all books traded through OTC (Over the Counter). For market risk, FIs shall maintain capital requirement with the rules prescribed in 12 and capital requirement can be calculated by one of the following approaches::

- 14.1.1.1 Standardised Approach **or**
- 14.1.2.2 Internal Model Approach **or**
- 14.1.2.3 Mixed Approach between the Standardized Approach and Internal Model Approach

Market Risk Assessment: Standardized Approach

15. FI may choose to assess market risk capital charge by the Standardized Approach, for which capital to be maintained depends on the value a position held and risk weight of the position by risk factors: interest rate risk, equity price risk, foreign exchange risk and commodity price risk. BOT will specify the risk weights. The risk weight for General Market Risk is estimated from Sensitivity of the value of a position to changes in each risk factor, without a consideration of Correlation between those risk factors:

- 15.1 Risk weight for Specific Risk of debt instruments has value between 0 - 8 percent, depending on credit risk of the issuer
- 15.2 Risk weight for Specific Risk of equity instruments has value equal 2 , 4, and 8 percent, depending on liquidity of an equity and diversification of investment
- 15.3 Risk weight for General Market Risk: interest rate has value between 0 – 12.5 percent, depending on the term to maturity or term to next interest rate repricing of that instrument
- 15.4 Risk weight for General Market Risk: equity price has value equal 8 percent
- 15.5 Risk weight for General Market Risk: foreign exchange has value equal 8 percent
- 15.6 Risk weight for General Market Risk: commodity price will be specified later, after BOT has allowed FI to undertake such transaction.

¹ Because credit risk on debt and equity instruments in trading book is already assessed when FIs calculate specific risk of issuers in assessing market risk

FI shall refer to **Guideline on Market Risk Assessment: Standardized Approach** for more detail.

Market Risk Assessment: Internal Model Approach

16. FI shall assess market risk capital charge by the Internal Model Approach, only after it has received an approval from the BOT. To assess risk by this approach, FI must comply with the guidelines and rules as follows:

16.1 Qualitative Standards

16.2 Specification of Market Risk Factors

16.3 Quantitative Standards

16.4 Guideline on Stress Testing

16.5 Guideline on Back Testing and Plus Factor Specification

16.6 Guideline on assessment of Specific Risk by the Internal Model Approach

FI shall refer to **Guideline on Market Risk Assessment: Internal Model Approach** for more detail.

Market Risk Assessment: Mixed Approach

17. FI shall choose to assess market risk capital charge by a mixture of the Standardized Approach and the Internal Model Approach for different component of market risk only. That is, BOT does not allow a combination of 2 approaches in assessing the same risk component, e.g. assessment of interest rate of different instruments by both the Standardized Approach and Internal Model Approach. **Except** for risk assessment of Options or positions that are difficult to assess and already have an approval from BOT.

18. Once FI has used the Internal Model Approach to assess any particular risk component, BOT will not allow the FI to revert to use the Standardized Approach to assess those risk components. Except for the case that BOT has revoked the approval for FI to use an internal model to assess risk. Nevertheless, BOT does not specify a timeframe in which FI can use the Internal Model Approach, together with the Standardized Approach, during the period the model is developed to be able to capture all risk components.

FI shall refer to **Guideline on Market Risk Assessment : Mixed Approach** for more detail.

Compilation of Data and Reports

19. FI shall compile the data and submit reports on transactions in trading book and maintenance of capital for market risk in accordance with the guideline specified by BOT.

FI shall refer to **Guideline on Compilation of Data and Reports** for more details.

Effective Dates

20. FI shall comply with the Market Risk Supervision Policy as follows:
 - 20.1 FI shall comply with the Guideline on Internal Control for Market Risk and Trading Book Policy starting from April 2004.
 - 20.2 FI shall assess transactions in trading book starting from the end of July 2004 and submit the related reports in accordance with the specified guidelines.
 - 20.3 FI shall assess capital charge against market risk starting from the end of March 2005 and submit the related report in accordance with the specified guidelines.
 - 20.4 FI shall maintain capital for market risk starting from the end of June 2005.

Guidelines on Assessing Positions in Trading Book

1. Amount of trading book transactions considered as significant level (Threshold) is
 - 1.1 The amount of baht-equivalent transactions in a trading book of all currencies averaged over the last 6 months of 3,000 million baht onwards **or**
 - 1.2 The proportion of the amount of baht-equivalent transactions in a trading book of all currencies to the total baht-equivalent assets, liabilities, and derivatives averaged over the last 6 months of 5% onwards
 - 1.3 BOT may occasionally consider reviewing the level of Threshold of trading book transactions, to be in line with the market conditions and the associated accounting standard that may change in the future.

2. In calculating the amount of transactions in a trading book for a purpose of assessment according to 1, FI shall combine the on-balance sheet transactions, which is in a trading book, derivatives transactions in a trading book, and all foreign exchange positions of all currencies (the sum of 2.1, 2.2, and 2.3) as follows.
 - 2.1 The sum of Long and Short positions in debt instruments and equity instruments in a trading book, according to the guideline on trading book policy. FI shall report with the Fair Value.
 - 2.2 The amount of derivatives transactions in a trading book means the sum of the notional amount of all derivatives transactions, less the sum of the notional amount of derivatives positions used to hedge positions in a banking book.
 - 2.3 Foreign exchange Aggregate Position means the higher of 1) the Absolute Value of the Sum of all net FX overbought position, converted into baht and 2) the Absolute Value of the Sum of all net FX oversold position, converted into baht

3. For 1.2, the sum of all assets, liabilities, and derivatives means the sum baht-equivalent of all assets, liabilities, and derivatives in all currencies

FI shall refer more additional detail in "Report Completion Instruction for Report on Transactions in Trading Book" for more detail.

Guidelines on Internal Control for Market Risk Management

Role and responsibility of the board of directors and senior management

1. The Board of FI has duties and responsibilities in market risk management as follows:
 - 1.1 Approve and review business strategy and major policy of FI periodically
 - 1.2 Acknowledge and understand types of market risk, and ensure that the market risk management system covers all types of transactions
 - 1.3 Set market risk limit
 - 1.4 Approve the market risk management system and delegate to responsible sub-committees or senior management to set a procedure and implement
 - 1.5 Approve organization structure (involved in the risk management) in order to have checks and balances
 - 1.6 Ensure that senior management has set an adequate and appropriate internal control
2. Senior management has duties and responsibilities in market risk management as follows:
 - 2.1 Implement the strategy and policy approved by the board of directors
 - 2.2 Set a process to identify, assess, control, and monitor market risk of FI
 - 2.3 Adequately allocate resources to support the risk management system
 - 2.4 Clearly specify the framework of responsibilities, line of authority and reporting of data
 - 2.5 Adequately and appropriately set a policy on internal control, including monitor strict compliance to the rules
 - 2.6 Ensure that associated policies are routinely reviewed to be in line with strategy and environment that may change.
 - 2.7 Approve guideline on new products, including objectives and transaction procedure, and relevant market risk factors. There must be an assessment of risks and results that may occur. Approve guideline on assessing, auditing, and controlling those risks, including consideration of related legal, accounting, and tax issues. And report to the board of directors.
3. The board of directors and/or senior management may delegate the line of authority to sub-committees or staffs of less level of seniority to manage or take any action in market risk

management. Since the board and senior management still holds this responsibility, they must closely monitor to ensure that the delegated responsibilities are accurately and effectively carried out.

4. The board of directors and/or senior management must establish a contingency plan for market risk, including a succession plan for a change in the personnel responsible for managing or controlling market risk of the organization in order for continuity of operations.
5. The board of directors or sub-committees should establish an appropriate remuneration policy to induce and retain high quality personnel and maintain the integrity of the personnel. The rate of compensation should not depend too much on the operating performance or profits to prevent an incentive to increase risk to an unacceptable level. The rate of compensation should be based on quality of job compared to an acceptable level of risk, including compliance with the organization's rules and practices on market risk management.
6. The board of directors and/or senior management should ensure that a recruitment process focuses on experience, expertise, and other relevant qualifications of personnel selected for each assignment.
7. The board of directors and/or senior management should provide adequate and regular training for the management and staffs e.g. training on new financial instruments and related laws. In addition, an appropriate periodic job rotation of staffs in various positions should be implemented so that they can replace each other, resulting in a more flexible and effective personnel management.
8. The board of directors and/or senior management is responsible in supporting morale and integrity, by setting prudent policy and procedure to prevent an act that may adversely affect the entity's reputation.
9. The board of directors and/or senior management should develop corporate culture with an emphasis on internal control so that staffs at all level realize and understand their role in internal control process and comply with strictly.

Guideline on risk measuring, monitoring, and assessment

10. FI must establish an effective risk management and internal control system that can continuously measure, monitor, and assess market risk that may adversely affect the success target of FI. Such risk assessment must include risks arising from all types of transactions and must be reviewed periodically to be able to manage new risk factors or other risk factors that have not yet been controlled.

Guideline on risk controlling and segregation of duties.

11. FI should incorporate an internal control system as an important part of operation, by specifying a framework and process in detail at all level of an organization as follows:
 - 11.1 There exists supervision by the board of directors and senior management to monitor effectiveness of the overall supervision of operations.
 - 11.2 There exists a review of operations in various units by management of those units. The frequency and the detail of such review should be higher than that of the board of directors and senior management.
 - 11.3 There exists a physical control that emphasizes security control for important work areas e.g. the dealing room and computer room in order to reduce risk arisen from unauthorized transactions. The security system must include protection of assets such as deposits and financial instruments
 - 11.4 There exists compliance to risk management control of the organization by assigning senior officers or unit with necessary expertise to be responsible for supervision and strict compliance to the rules and regulation of the organization. Detected irregularity or causes of problem in compliance of staffs must be reported to senior management for corrective actions.
 - 11.5 There exists clearly documented line of authority and responsibilities of staffs of various levels, specifying details of authority, delegation of authority, and restriction in delegation of authority.
 - 11.6 There exists verification of transaction details and effectiveness of risk prevention, including reconciliation of various accounts to review in an event of error.
 - 11.7 There exists documented record of agreements with accuracy and completeness, specifying detailed responsibilities of each party. In addition, there is a procedure to

check if that counterparty has an authority to do a transaction according to the rules and regulations, before settling with the deal.

12. Senior management should establish a clear Segregation of Duties, with no repeating or intersecting tasks or opportunity for an action of own interests. In addition, senior management should specify any conflicts of interest and try to prevent or reduce the possibility that such events will occur. Senior management should also monitor independent audit and checks regularly.
13. FI must specify rules or Code of Conduct to be a guideline for relevant staffs, corresponding to business structure, size, and complexity. FI must specify the Ethical Values, for example, acceptance of gifts, avoidance of conflicts of interests or personal benefits, and confidentiality of organization.

Guideline on record keeping and internal communication

14. FI should have an adequate system of record keeping, which entails information of all types of transactions related to the business e.g. financial data, operation, and compliance to regulations by the personnel, including external information on market conditions related to a decision-making process. Such information should be accurate, accessible, and timely and is stored in an appropriate standardized form. In addition, the system must be safely kept and accessible only by involved persons, and should be monitored by independent audit and checks. There should be a Back-up System, and a process to recover the system, in case of an emergency.
15. FI should have a system of controls over accounting of transactions both on and off balance sheet in order to ensure completeness, accuracy, and reliability of accounting information, especially information on treasury transactions and hedging or trading derivatives.
16. FI must have an effective system of internal communication to encourage understanding and compliance to the policy and procedure of the organization and to ensure that information reaches associated staffs accurately and completely.

Guideline on internal audit and corrective action

17. FI should ensure that internal audit is conducted continuously. Audit of important risks that may arise should be a part of business operation of FI, so that problems or errors of internal

controls can be detected and corrected quickly. The result of the internal control system must be reviewed and assessed regularly, corresponding to transaction type, complexity and risks of each FI.

18. FI must ensure that internal auditors have knowledge, ability, experience, and expertise of FI's business. These auditors must understand their roles and responsibilities and must be independent from other business units.
19. FI must report or explain internal control problems or errors detected must be timely reported to associated management in the line of authority. Summary of important problems and errors must also be reported to the board of directors or audit committee and senior management for appropriate corrective acting in a timely manner.
20. FI sets a procedure in handling various complaints, including a timeframe for handling of these complaints. Staffs not directly involved in the objects of complaints should compile, record, and investigate these complaints, and arrange for clarification meeting or giving compensations to the complainer.

Guidelines on Formulating Trading Book Policy

Definitions

1. FI shall refer to the following definitions in formulating a Trading Book Policy².
 - 1.1 **Trading Book** consists of positions in an financial instrument hold with Trading Intent or Hedging of positions in a trading book. Instruments in a trading book must not have any trading limitation. The value of these positions must be routinely revalued with good management.
 - 1.2 **Banking Book** consists of positions in an instrument or other transactions without Trading Intent, or instruments decided initially to hold for a long time period or until maturity.
 - 1.3 **Trading Intent positions** is positions hold for a short period, with an intention to sell and/or to benefit from changes in prices or arbitrage, including FI's proprietary positions, customer driven positions e.g. Matched Principal Brokering of FI and positions from Market Makers.
 - 1.4 **Financial Instruments** in a trading book (example in Attachment 1) should have one of the following characteristics:
 - (a) Debt instruments, equity instruments, and other securities resembling debt instrument or equity instrument that FI hold with Trading Intent or
 - (b) All types of derivatives related to interest rate, equity price, foreign exchange, and commodity price. **Except** derivatives used to hedge positions in a banking book³ or
 - (c) Position from Repo (borrowing of money) or Security Lending Agreement and Reverse Repo (lending of money) or Security Borrowing in the following cases

² Grouping of FI's transactions according to the Market Risk Supervision Policy is not directly related to the grouping according to the Accounting Standard No 40 (see more detail in Attachment 10)

³ Guideline on grouping positions used to hedge banking book positions and vice-versa, both one-on-one hedge or Partial or Portfolio Hedging is explained in Attachment 10.

- The case where Repo Agreement uses an instrument in a trading book as collateral or the case where an instrument in a banking book is used as collateral but for the purpose of using the money for trading book transactions
- The case where Security Lending Agreement intends to use the security received as a collateral for trading book transactions
- The Reverse Repo or Security Borrowing Agreement where FI intends to use the security received as collateral for lending of money or the security borrowed, for other transactions with trading intent e.g. use of bond in Reverse Repo or Security Borrowing Agreement to settle a contract on Short Bond.

Supervision guideline

2. FI shall prepare the trading book policy that corresponds to quantity and complexity of FI's transactions, for which
 - 2.1 FI must prepare the policy in writing, ready for BOT examiners to investigate upon request and must have detail incorporating at the minimum the issues specified in 3.
 - 2.2 FI's board of directors or other committees delegated must approve the policy and publish to parties involved for implementation.
 - 2.3 The policy must clearly specify a period for a review to be in line with the situation and changes in business. Major modifications must be approved by the board of directors or other committees delegated

Guideline on Formulating Trading Book Policy

3. In formulating a trading book policy, FI must specify details, covering the following issues:
 - 3.1 Guideline or policy used to classify financial instrument in a trading book (refer to the definition specified by BOT in 1), including detail of transactions or instruments that FI holds with trading intent and that are usually in a trading book.
 - 3.2 Policy on transferring of positions between a trading book and banking book. The policy must clearly specify persons with approving authority and responsibility,

which are usually sub-committees or senior management responsible for market risk management, and must require appropriate data analysis and reasons to do so.

- 3.3 Clearly specification of holding period for a trading book position, which should be shorter than that of a banking book position, and in line with a trading book strategy.
- 3.4 Clear trading strategy, policy and management of positions, which should entails the following:
 - (a) Clear trading strategy for positions held, especially strategy for complex financial instruments or set of securities that need special management.
 - (b) Clear procedure on transactions between Trading Desks
 - (c) Appropriate overall market risk limit and limit for each risk component and other sub-limits, including an explicit and adequate monitoring system
 - (d) Scope and responsibility of dealers and persons with different levels of approving authority to undertake transactions and manage positions within the specified risk limit according to a trading strategy
 - (e) A process to assess the value of positions in a trading book at least daily according to market prices or prices from an internal model (Marked to Market or Model) or other appropriate prices; these prices should be used consistently, including assessment of quality and type of Market Input to be used in the valuation process e.g. Market Turnover
 - (f) Guideline on setting Cushion Reserves if market risk of that position is difficult to assess or the market liquidity is low both in terms of prices and turnover.
- 3.5 Procedure and necessary detail for positions used to hedge risk of assets or underlying position. FI must include positions used to hedge risk in the same book as the hedged underlying assets or positions (Hedged items). When the hedging positions are no longer qualified to hedge those positions, they must be transferred back to the original book.
- 3.6 The methodology used by FI to assess market risk, including process and steps involved e.g. delegation of responsible persons, accuracy check, and submission of data to BOT

- 3.7 Clear policy, internal control process, and responsible persons to monitor compliance of the specified trading book policy, especially, grouping of financial instrument or transferring of instruments between books, and monitoring of positions not in accordance with the trading strategy, including arrangement for an Audit Trail as well.

Guidelines on Market Risk Assessment: Standardized Approach

Definitions

- 1 FI shall use the following definitions in assessing market risk capital charge:
 - 1.1 **Market risk** means the risk that FI may incur loss from change in the value of positions both on and off balance sheet due to movements in market rates or prices. Market risk comprises interest rate risk, equity price risk, foreign exchange risk, and commodity price risk. FI conducting transactions in financial markets that involve interest rate, equity price, foreign exchange, commodity price, and derivatives must assess these risks.
 - 1.2 **Debt instrument** means instrument that pays fixed and float interest, transferable CD, non-convertible preferred shares, and convertible debt instruments (e.g. bonds, preferred shares convertible to common shares at any price) with characteristics or trading similar to debt instruments (e.g. specification of fixed dividends, non-voting rights). Convertible debt instruments with characteristics or trading similar to equity shall be categorized as equity instrument.
 - 1.3 **Derivatives with financial instruments as underlying** means derivatives whose value is related to changes in the value of the associated underlying e.g. Forward Bond, Bond Futures, and Equity Swap (in case that the underlying is equity instrument)
 - 1.4 **Derivatives with interest rate as underlying** means derivatives whose value is related to changes in interest rates e.g. Interest Rate Futures, Forward Rate Agreements (FRAs), Cross Currency Swap, Interest Rate Swap, Interest Rate Option, Equity Swap (in case that the underlying is referred to interest rate e.g. LIBOR) and Forward Foreign Exchange Positions
 - 1.5 **Offsetting positions** means exemption of opposite positions in accordance with the guidelines specified by the BOT. Such positions may be excluded from the capital charge calculation; the detail of offsetting of positions in different risk type will be explained later.

Guidelines on Interest Rate Risk Assessment: Standardized Approach

2. FI shall assess interest rate risk by the Standardized Approach for instruments in a trading book as follows: debt instruments, derivatives with debt instruments or interest rate as underlying, hybrid securities that behave like debt instruments e.g. Non-Convertible Preferred Shares (Example of instruments in a trading book that must be included in interest rate risk assessment under the Standardized Approach is shown in Attachment 2)
 - 2.1 Interest rate risk in FI's trading book can be categorized into 2 parts:
 - (a) **Specific Risk** means the risk from changes in the value of a financial instrument due to factors, other than General Market Risk, that are related to an issuer of that instrument e.g. changes in the credit rating of issuer
 - (b) **General Market Risk** means the risk from changes in the value of underlying instrument due to changes in general market factors e.g. interest rate volatility
 - 2.2 The capital charge for interest rate risk under the Standardized Approach equals the sum of 1) Specific Risk capital charge, and 2) General Market Risk capital charge, where Long and Short positions can be offset in each currency.

Guideline on exemption of transactions from the calculation of interest rate risk capital charge

3. FI shall exclude positions in interest rate-related instruments in the interest rate risk assessment of both Specific Risk and General Market Risk if the Long and Short positions can be fully offset as in the following manners: 1) same underlying (including those of derivatives) 2) same issuer 3) same coupon rate 4) same reference currency, and 5) same maturity.
4. FI shall prepare an account of the fully offset positions pursuant to the guidelines in 3 that are excluded from the capital charge calculation, clearly noticable from a trading book position, for a BOT examination.

Guideline on capital charge calculation for Specific Risk

5. Assessment of Specific Risk on interest rate covers both Long and Short positions in debt instruments in a trading book and derivatives with debt instruments⁴ as underlying, specified by type of issuer. In calculating the capital charge against Specific Risk, FI shall multiply the value of a trading book position with an appropriate risk weight in each following group of instruments. The value of an instrument can be 1) the Market Value or the value from the internal model⁵ for debt instruments or debt instruments used as underlying in derivatives and 2) the Delta-weighted Value for Options⁶ on debt instruments as underlying.

(see calculation example in Attachment 3 and 7)

6. In assessing Specific Risk capital charge, FI shall assign the risk weight in accordance with the type of issuer of the instrument in 5 groups as follows:

⁴ Interest Rate and Currency Swap, FRAs, Forward Foreign Exchange Contracts, and Interest Rate Futures are exempted from Specific Risk capital charge as their underlying are not debt instruments and thus do not have an issuer. But they are included in the calculation of General Market Risk capital charge. In addition, derivatives traded Over the Counter must be included in the capital charge calculation for Counterparty Risk as well.

⁵ The market value or internal model value can be assessed from 1) price quoted by an agent and financial market 2) price in an OTC contract if there is no market 3) assessment by the Discounted Cash Flows method, using reference interest rate from the financial market or 4) other methods approved by the BOT

⁶ Please see more details in **Guideline on risk assessment for Options**

Table 1
Specific Risk Weight for Interest Rate Risk

Category	Type of Instruments	Weight
1	Government debt instruments	0.00%
2	Other qualifying debt instruments with residual term to maturity 6 months or less	0.25%
3	Other qualifying debt instruments with residual term to maturity more than 6 months up to 24 months	1.00%
4	Other qualifying debt instruments with residual term to maturity more than 24 months	1.60%
5	Other non-qualifying debt instruments	8.00%

6.1 Instrument in category 1 (government debt instruments) must have the following qualifications:

Investment in securities issued by the following institution or investment in securities accepted, avaled, or guaranteed for both principal and interest without any condition by these institutions:

- (a) Thai government or the Ministry of Finance
- (b) The Bank of Thailand
- (c) Governments or central banks of the countries specified in Appendix 1 of the Notification of the Bank of Thailand (BOT.FPG.(31) Wor. 1110/2546 and 1111/2546 Re: Stipulation on Maintenance of Capital Funds by Locally-incorporated Commercial Banks and Branches of Foreign Banks dated 2 May 2003 and BOT.FPG(31) Wor. 1112/2546 Re: Maintenance of Capital Fund in Proportion to Assets and Contingent Liabilities of Finance Companies, including any changes in the aforementioned notifications that may incur.
- (d) Governments or central banks other than that specified in Appendix 1 of the aforementioned notifications, but the instruments must be

denominated in the local currency and must not exceed the amount
debts that FI has in that particular currency

- (e) Financial Institutions Development Fund (FIDF) and juristic persons
that FIDF has hold shares in full

6.2 **Instrument in Category 2-4** (qualifying instruments) must have one of the
following qualifications:

- (1) Instruments rated investment-grade by at least one international credit rating
agency listed in Attachment 4 **or**
- (2) Instruments rated investment-grade by at least one locally incorporated credit
rating agency approved by the Office of Securities and Exchange Commission,
and the issuers of those instruments must be listed for trading in an authorized
Securities Exchange **or**
- (3) Investment in securities issued by the following institutions or investment in
securities accepted, avaled, guaranteed, or agreed to guarantee credit risk by
the following institutions. Consideration on residual maturity of the contract
must be included as well.
 - (a) Commercial banks
 - (b) Government Housing Bank, Government Savings Bank, Bank for
Agriculture and Agricultural Cooperatives or Export and Import Bank
of Thailand
 - (c) Finance companies, finance and securities companies, credit foncier
companies or Industrial Finance Corporation of Thailand
 - (d) Government entities or State enterprises
 - (e) Commercial banks registered in the countries listed in Appendix 1 of the
aforementioned notifications of the Bank of Thailand
 - (f) Government entities in the countries listed in Appendix 1 of the
aforementioned notifications of the Bank of Thailand
 - (g) International organizations as specified in Appendix 2 of the
aforementioned notifications of the Bank of Thailand

- (h) Commercial banks registered in countries other than those listed in Appendix 1 in the aforementioned notifications of the Bank of Thailand, with residual maturity of no more than 1 year

6.3 **Instruments in Category 5** includes all instruments other than those specified in Category 1-4

Guideline on capital charge calculation for General Market Risk

7. In assessing General Market Risk for interest rate under Standardized Approach, FI may choose one of the 2 methods: 1) Maturity Method and 2) Duration Method. In these two methods, positions in a trading book are allocated into a table according to the residual maturity (Maturity Ladder) or the repricing date, and the capital charge is calculated as the sum of the 4 components as follows:

- 7.1 The net Long and Short positions in the whole trading book (across time bands)
- 7.2 A proportion of offsetting positions in the same time bands (Vertical Disallowance)
- 7.3 A proportion of offsetting positions across different time bands (Horizontal Disallowance)
- 7.4 A net capital charge for positions in Options (if any) (refer to guidelines on risk assessment for Options)

8. Preparation for a report of this section shall cover Long and Short positions in debt instruments, debt instruments used as underlying, and derivatives with interest rate as underlying in a trading book, including interest rate risk from Future Contracts and Forward Positions in equity instruments.

9. FI shall report positions in a maturity ladder table for each currency separately, and calculate the capital charge for each currency separately. Then the capital charges in each currency shall be summed with no offsetting between opposite positions. (please see the detail and an example of transaction allocation in Attachment 3 and 5)

Procedure of capital charge calculation for General Market Risk under Maturity Method

10. FI shall follow the following procedure in calculating capital charge for General Market Risk under the Maturity Method. However, Opposite Positions of the same amount of the

same issue, including Swap, Forwards, Futures, and FRA contracts with very close characteristics pursuant to the guidelines in 13 can be omitted from this calculation.

10.1 **Step 1** FI shall allocate various Long and Short positions into the Maturity Ladder table of each currency⁷, comprising of 13 time bands for instruments with Coupon rate of 3 percent or more, and 15 time bands for instruments with Coupon rate of less than 3 percent, as specified in Table 2. Fixed Rate Instruments shall be allocated according to the residual terms to maturity and Floating Rate Instruments shall be allocated according to the residual terms of next repricing dates.⁸

10.2 **Step 2** Multiply the sum of Long positions and the sum of Short positions in each time band with the risk weight in each time band, using the Weight according to Table 2, reflecting changes in the value of those positions to the changes in the interest rates assumed. Instruments without Coupon or Deep-discount instruments shall be allocated in the time band of column 3 (instruments with Coupon rate of less than 3 percent) of the maturity ladder table as well.

10.3 **Step 3** The weighted positions in each time band can be offset to have net position in each time band. However, since instruments in the same time band which are allowed for offsetting still have differences in type of instrument, and terms to maturity, there remain Basis Risk and Repricing Risk. Therefore, Vertical Disallowance (without a sign +/-) must be added back at the rate of 10 percent of the Offsetting amount in each time band, whether the net position is a long or short position. For example, if in one time band, the sum of the weighted Long position is 100 million baht and the sum of the weighted Short position is 90 million baht, the Vertical Disallowance of that time band will be 10 percent of 90 million baht or 9 million baht.

⁷ Transactions to be allocated in a maturity ladder table of each currency must be converted into baht first (see additional detail in Attachment 3). **FI shall prepare maturity ladder tables in 8 major currencies, namely, THB USD YEN EURO GBP HKD SGD, and MYR ; other currencies may be allocated in a single table.**

⁸ In allocating transactions into a time band, the residual terms to maturity or the residual terms to next repricing must be considered, with no consideration on existing Puts and Calls.

Table 2
Maturity Method : time-bands and weights

Zone	Band – Coupon 3% or more	Band – Coupon less than 3%	Risk Weight	Assumed Change in Yield
1	1 month or less	1 month or less	0.00 %	1.00
	More than 1 – 3 months	More than 1 – 3 months	0.20%	1.00
	More than 3 – 6 months	More than 3 – 6 months	0.40%	1.00
	More than 6 – 12 months	More than 6 – 12 months	0.70%	1.00
2	More than 1 – 2 years	More than 1.0 – 1.9 years	1.25%	0.90
	More than 2 – 3 years	More than 1.9 – 2.8 years	1.75%	0.80
	More than 3 – 4 years	More than 2.8 – 3.6 years	2.25%	0.75
3	More than 4 – 5 years	More than 3.6– 4.3 years	2.75%	0.75
	More than 5 – 7 years	More than 4.3 – 5.7 years	3.25%	0.70
	More than 7 – 10 years	More than 5.7 – 7.3 years	3.75%	0.65
	More than 10 – 15 years	More than 7.3 – 9.3 years	4.50%	0.60
	More than 15 – 20 years	More than 9.3 – 10.6 years	5.25%	0.60
	More than 20 years	More than 10.6 – 12 years	6.00%	0.60
		More than 12 – 20 years	8.00%	0.60
	More than 20 years	12.50%	0.60	

10.4 **Step 4** The calculations in step 1 to 3 will produce 2 sets of number: 1) a net weighted position, Long or Short, in each time band (i.e. 10 million baht from example in Step 3) and 2) Vertical Disallowance with no sign (9 million baht). In this step, FI can offset the Long and Short position across time bands (Horizontal offsetting), by offsetting the net weighted Long and Short position in each time band within the same zone, to get the net Long or Short position in each zone. Then take the net position left from offsetting in the same zone to offset with the net position left from offsetting which has the opposite signs in another zone (both between adjacent zones and non-adjacent zones). **All the offsetting amounts within zone and across zones** must be included in the Horizontal Disallowance calculation by multiplying with the risk weights in Table 3 in order to calculate capital charge. (please see an example in Attachment 3)

Table 3
Summary of Market Risk Capital Requirement (equal the sum of)

1. Net Position	Sum of net long and short weighted positions in each time band (disregard the signs +/-)	x 100%
2. Vertical Disallowances	Offsetting of the sum of net long and short weighted position in each time band	x 10%
3. Horizontal Disallowances	Offsetting of the weighted positions within zone 1	x 40%
	Offsetting of the weighted positions within zone 2	x 30%
	Offsetting of the weighted positions within zone 3	x 30%
	Offsetting between zone 1 and 2 of positions left from offsetting within zone	x 40%
	Offsetting between zone 2 and 3 of positions left from offsetting within zone	x 40%
	Offsetting between zone 1 and 3 of positions left from offsetting within zone	x 100%

Procedure of capital charge calculation for General Market Risk under Duration Method

11. FI with capability may use the Modified Duration⁹ method, which is a more accurate method of calculating capital charge for General Market Risk, by calculating the price or value sensitivity to changes in market yield of each position separately. FI intending to use this method must be approved of the method and the data system from the BOT beforehand. Thereafter, FI should use the method consistently and request for an approval from the BOT if there is any change. FI shall follow the following procedures:

11.1 **Step 1** Weight the Long and Short positions according to price sensitivity of each instrument to change in yield, by multiplying current market price of a position with Modified Duration multiplied by the changes in yields as assumed in the last column of Table 4.

⁹ Modified Duration measure the sensitivity of price or value of a position to the change in a market yield. This method will give a more accurate result than that of the Maturity Method because it takes into account the Time Value of Money and the all the cash flows until maturity date. This method may result in lower capital charge but may be more complicated to calculate. Nonetheless, since it may not be appropriate to use the Duration Method for certain instruments (too complicated or too costly), commercial banks should use the Maturity Method instead, meaning higher capital charge (in the case that FI has not been approved to use the Internal Model)

- 11.2 **Step 2** Enter the calculation result from step 1, both Long and Short positions, in the Duration-based table in the 15 time bands specified in Table 4 to calculate the weighted Long and Short position in each time band. Then calculate the Overall Net Open Positions from all time bands.
- 11.3 **Step 3** Offset the weighted Long and Short from step 2 in each time band to get the net weighted position in each time band. Then add on Vertical Disallowance (with no sign + / -) in the amount of 5 percent of the Offsetting amount to capture Basis Risk and Reprice Risk, similar to the procedure in the Maturity Method.
- 11.4 **Step 4** Offset the net weighted positions in each time band with those in the same zone and across zone (Horizontal offsetting). Then calculate Horizontal Disallowance at the rate and manner as in the Maturity Method.

Table 4
Calculated by Duration Method

Zone	Modified Duration	Assumed Change in Yield
1	1 month or less	1.00%
	More than 1 - 3 months	1.00%
	More than 3 - 6 months	1.00%
	More than 6 - 12 months	1.00%
2	More than 1.0 - 1.9 years	0.90%
	More than 1.9 - 2.8 years	0.80%
	More than 2.8 - 3.6 years	0.75%
3	More than 3.6 - 4.3 years	0.75%
	More than 4.3 - 5.7 years	0.70%
	More than 5.7 - 7.3 years	0.65%
	More than 7.3 - 9.3 years	0.60%
	More than 9.3 - 10.6 years	0.60%
	More than 10.6 - 12 years	0.60%
	More than 12 - 20 years	0.60%
	More than 20 years	0.60%

Guideline on calculation of interest rate risk capital charge for derivatives

Treatment of derivatives transactions

12. In the risk assessment of derivatives with interest rate and debt instrument as underlying, FI shall use the Two Legs Approach, which breaks and records each transaction into 2 transactions, that is, Long position (receiving leg) and Short position (paying leg) in accordance with the relevant underlying of the derivatives (please read additional detail in Attachment 5). This can be summarized as follows:

12.1 Position in Forwards contracts and FRAs (both with financial instrument and interest rate as underlying, excluding foreign exchange) can be treated as 2 transactions. The first leg involves the underlying instrument, with a residual maturity equal the period until delivery or exercise period of the right, plus (if any) the life of the underlying instrument. The other leg involves that derivative where it is recorded as a Zero Coupon Bond with residual maturity equal the period until delivery or exercise period of the right.

12.2 Positions in Futures contracts can generally be separated into a Long and Short positions, and the value to be recorded is similar to that of Forwards.

12.3 Positions in Forward Foreign Exchange can be treated as a Long position (in the currency to receive in the future) and a Short position (in the currency to pay in the future) of 2 transactions of a zero coupon government bonds in 2 currencies, with residual maturity equal life of the Forwards contract.

12.4 Positions in Swap contract can be treated as 2 notional positions with relevant maturity. For example, an Interest Rate Swap for which FI will receive floating-rate interest and pay fixed-rate interest will be treated as 1) a Long position (receiving leg) in a Zero Coupon Bond with the yield equal the floating rate, residual maturity equal the period until the next interest fixing, and 2) a Short position (paying leg) in a Bond with coupon rate equal the fixed rate, residual maturity equal the residual life of the Swap.

Guideline on offsetting of derivatives in the calculation of General Market Risk

13. The general guideline on offsetting of instruments in the calculation of General Market Risk shall refer to the Rule no. 3, and the guideline on treating of derivative transactions shall refer to number 12 (above). In addition, opposite positions between a Long or a Short position in one debt instrument, and a position in an underlying instrument from Futures or Forwards contracts can be fully offset. But the other leg of the Futures or Forwards contract shall be treated as having interest rate risk until the contract matures and must continue to be reported.¹⁰
14. Positions of Futures, Swap, FRAs, and Forwards can be regarded as matched positions and allowed to fully offset each other, if the positions are related to the same underlying, with the same notional value, in the same currency, and satisfy the following conditions:

14.1 For Futures contracts

Opposite positions in the Futures contracts with the same underlying instruments and with maturity within 7 days of each other

14.2 For Swap, FRAs, and Forwards

- (a) The reference rate for floating-rate positions must be identical e.g. LIBOR or SIBOR and the specified contract interest rate must be very close e.g. within 15 basis points.
- (b) The next interest fixing date or maturity date (in case of fixed-coupon instrument or Forwards) or the residual maturity, must correspond with the following conditions:

¹⁰ The offsetting between a Long position in government bond and a sale of Forwards or Futures of the same bond can be treated as 1) a Short position in instrument intended to deliver, with residual maturity equal the residual maturity of the underlying instrument plus the residual maturity of that Forward contract; and 2) a Long position in a Zero Coupon bond with residual maturity equal the period until delivery date. For example, FI has a Long position in US Treasury bond with remaining maturity of 10 years and 3 months (the contract is still effective on the reporting date) and has sold a Forward contract in a 10-year US Treasury bond with the contract maturing in 3 months, the Long and Short positions in that bond (with maturity 10 years and 3 months) can be fully offset, leaving the Long position a Zero Coupon bond from the Forward contract with residual maturity until the contract delivery date (3 months) which must be included in the relevant currency table.

- if either of the instruments to offset each other has an interest fixing date or a residual maturity not more than 1 month, the next interest fixing dates or the maturity dates of both instruments must be the same;
- if either of the instrument to offset each other has an interest fixing date or a residual maturity of more than 1 month up to 1 year, the next interest fixing dates or the maturity dates of both instruments must be within 7 days of each other;
- if either of the instrument to offset each other has an interest fixing date or a residual maturity of more than 1 year, the next interest fixing dates or the maturity dates of both instruments must be within 30 days of each other.

14.3 Example of offsetting positions

- (a) Long or Short positions in FRAs, of the same currency, with the same notional amount, settlement date, and residual maturity can offset each other, and are exempted from the report if the contract interest rates are within 15 basis points.
- (b) Opposite Swap contracts can offset each other if the reference rates for the floating rate legs are both 6-month SIBOR, and the fixed rates are within 15 basis points.
- (c) Various positions can offset each other if the reference dates of the opposite positions e.g. the next interest fixing date or residual maturity are within the period as specified in 14.2 (b).
- (d) Opposite Bond Future contracts can offset each other if the instruments or bonds to be delivered are the same issue and have residual maturity within 7 days of each other.

Table 5
Summary of Guidelines on Treatment of Derivatives Positions

Type of Contracts	Specific Risk Charge	General Market Risk Charge
Exchanged-traded Future - Government debt instruments - Corporate debt instruments - Index on Interest Rates (e.g. LIBOR)	No Yes No	Yes, as two positions Yes, as two positions Yes, as two positions
OTC Forward - Government debt instruments - Corporate debt instruments - Index on Interest Rates (e.g. LIBOR)	No Yes No	Yes, as two positions Yes, as two positions Yes, as two positions
FRAs, Swaps	No	Yes, as two positions
Forward Foreign Exchange	No	Yes, as one position in each currency
Options - Government debt instruments - Corporate debt instruments - Index on Interest Rates (e.g. LIBOR) - FRAs, Swaps	No Yes No No	Choose either (1) Carve out together with the associated hedge positions in - Simplified Approach - Scenario Analysis - Internal Model (CP3) (2) General Market Risk Charge according to the Delta-plus Method (Gamma and Vega should receive separate capital charge)

Guideline on assessment of equity price risk under the Standardized Approach

15. FI shall assess capital charge against equity price risk in a trading book, covering Long and Short positions in all equity instruments and instruments that exhibit market behavior similar to equity instruments. For example, common shares, with or without voting rights, and convertible instruments that behave like equity instruments¹¹ The Long and Short position of equity instruments of the same issuer shall be reported on a net basis. The guideline for treatment of derivatives related to equity instruments, equity price index, and index arbitrage is described in 20.

Guideline on calculation of capital charge for equity price risk

16. Similar to interest rate risk, equity price risk arisen in FI's trading book can be categorized into 2 parts: 1) **Specific Risk** is a risk that the value of equity instrument issued by a company may change in such a way that it has an adverse impact on the FI. Specific Risk can be mitigated through a Portfolio diversification, and 2) **General Market Risk** is a risk that the overall movement in the equity market has an adverse impact on the FI. FI must maintain a minimum capital requirement for both risk categories, for which the capital shall be calculated by country.

Guideline on calculation of capital charge for Specific Risk

17. FI shall multiply the Gross Equity Position¹² (the sum of Long and Short positions in equity instruments) in a trading book with the capital charge rate, currently at 8 percent. However, for a liquid and well diversified portfolio, whose Specific Risk has reduced, the capital charge rate can be at 4 percent under the following conditions:

- 17.1 The positions must have a liquid secondary market for investors to easily trade without incurring a loss due to wide spread. FI shall refer to the list of securities exchanges and equity indices considered to be liquid in Attachment 6, including

¹¹ Should there be any doubt concerning other special instruments that may fall under this conditions, FI shall consult the BOT for a guideline on how to treat those instruments.

¹² An equity position for Specific Risk means the Net Long and Short Position of equity instruments of an individual company. Therefore, assessment of the gross position includes the net positions, which may be Long or Short positions, of many companies combined.

equity instruments that comprise the equity indices listed in the Attachment as well (this list may be modified periodically).

- 17.2 A portfolio of liquid equity instruments is considered to be well diversified if the following conditions are met:
- (a) The value of each individual equity instrument does not exceed 10 percent of the gross value of the Portfolio of equity instruments in each particular country (Gross Value equal the sum of Long and Short Positions) and
 - (b) The sum of equity positions whose proportion are between 5 percent up to 10 percent of the gross value does not exceed 50 percent of the gross value of the portfolio in that particular country.
- 17.3 If a country portfolio does not fall under the above conditions, FI may split the portfolio into 2 sub-Portfolios: 1) the qualifying group shall apply the capital charge rate of 4 percent, and 2) the non-qualifying group shall apply the capital charge rate of 8 percent. FI must report the transactions in each sub-portfolio for an explicit capital calculation.

Procedure in calculation of capital charge for General Market Risk

18. Since this risk depends on the value of equity positions, the calculation of capital charge for General Market Risk shall multiply the net position of the sum of Long positions and the sum of Short positions in all equity instruments, with the capital charge rate of 8 percent. The calculation shall be separated for each national market.
19. In case that FI holds instruments that are considered to be capital fund of another FI, those positions are excluded from the calculation of market risk capital charge. This is because the fair value of those positions may already been deducted from the capital fund of FI that holds the positions in accordance with the BOT's guideline on maintenance of capital fund, except that the BOT will specify otherwise.

Guideline on risk assessment of derivatives with equity instruments and equity indices as underlying, and the equity index arbitrage

20. Equity derivatives such as Futures Forwards Swaps and other off balance sheet positions with equity instruments or equity indices as underlying¹³, except for Options (mentioned in the guideline on treatment of Options) shall be treated according to the guideline on calculation of positions and capital charge for equity price risk as follows.

Calculation of positions

21. Derivative positions shall be converted into notional equity positions for the calculation of Specific and General Market Risk under the Standardized Approach as follows:
- 21.1 Futures or Forwards contracts with individual equity instruments as underlying must be reported as the current market price of those equity instruments.
 - 21.2 Future contracts with equity indices as underlying must be reported as the fair value of Portfolio of these underlying equity instruments on a pro-rata basis, or using the index value according to the calculation of the index specified by the Securities Exchange of that particular country.
 - 21.3 Equity Swaps are treated as two positions. The receiving leg based on the receiving return calculated from the change in value of a particular equity instrument or equity index shall be treated as a Long position. The paying leg based on the paying return calculated from the change in value of another equity instrument or equity index shall be treated as a Short position.

Offsetting guideline

22. Opposite positions in an identical equity instrument or equity index in the same market can be fully offset, resulting in a net long or net short position in that equity instrument or equity index, to be used in the calculation of capital charge for Specific Risk and General

¹³ In recording these derivative positions for equity price risk, FI shall refer to the value of equity instrument to receive or to deliver only. At the same time, interest rate risk or foreign exchange risk from these derivative positions that involve receipt or payment of fixed or floating interest rate, receipt or payment of foreign exchange shall be included in the calculation of capital charge against interest rate risk or foreign exchange risk.

Market Risk. For example, a Futures contract to buy/sell one particular equity instrument in the future can offset with an opposite physical position in that equity instrument.¹⁴

Guideline on calculation of capital charge for index related positions

23. For index related positions, in addition to capital charge for General Market Risk, the capital charge for Specific Risk of 2 percent must be applied, only for the liquid equity indices as listed in Attachment 6. For equity indices not listed in Attachment 6, the following guideline shall be applied for the calculation of capital charge for Specific Risk.

23.1 Positions in an equity index must be proportionately decomposed into components of the market value of each equity and apply the capital charge for Specific Risk to each equity instrument¹⁵ or

23.2 Treat the position as one position which is equal 1) the sum of the current market value of component equity instruments in the index or 2) the value on that index calculated by the method specified by the Securities Market of that country. Then use the value from 1) or 2) to calculate the capital charge for Specific Risk by applying the highest specific risk charge rate for an equity instrument constituted that equity index.

¹⁴ The offsetting is only for the equity price risk. However, this position still has to be included in the calculation of capital charge for interest rate risk or foreign exchange in a relevant table.

¹⁵ After decomposing the components, **the equity instrument considered to be liquid** (is a component of equity indices according to the Attachment), **and in a Portfolio considered to be well diversified** (positions in those equity indices can either be a Portfolio whose risk is considered to be well diversified or not.) can apply the capital charge for Specific Risk at the rate of 4 percent; other than this, FI shall apply the rate of 8 percent.

Guideline on calculation of capital charge for Index Arbitrage¹⁶

24. In assessing capital charge for a position from an index arbitrage, FI shall proceed as follows:

In case that FI undertakes an index arbitrage that uses a Futures contract on only one equity index:

24.1 FI that takes an opposite position in the same equity index, but with different delivery dates or different markets shall apply the Specific Risk capital charge of 2 percent (as explained in 23) to only one index. The opposite position will be exempted from the calculation of capital charge for both Specific Risk and General Market Risk.

In case that FI undertakes an index arbitrage that uses a Futures contract on an index broadly matched with a basket of shares:

24.2 FI may proportionately decompose the components of an equity index and a basket of shares into positions of a component equity. Then record the value of both portions of equities with opposite positions into a Portfolio of each country. Each equity position in a basket can be netted with a position in the same equity from an equity index provided that the transaction meets the following conditions:

- (a) The trade has been considered carefully and is appropriately controlled **and**
- (b) After decomposing into components, the proportion of each equity in a basket share represents at least 90 percent¹⁷ of the index, or has a correlation of at least 0.9 over the minimum period of 1 year.

¹⁶ If the value of a position from the arbitrage strategy is equal that of a Long and Short position in Futures contract and the underlying instrument does not have General Market Risk, calculation of General Market Risk is not needed, only Specific Risk or Counterparty Risk.

¹⁷ In calculating the proportion, FI must compare the proportion of each component equity in a basket share, with the proportion of the same component equity in an index. The percentage difference combined, without any netting (use the value with no sign) must not exceed 10 percent. For example, equity ABC has its proportion in an index of 5 percent but has its proportion in an index of 4.5 percent, the difference is therefore equal 0.5 percent. The combined differences of all equities should not exceed 10 percent. In case that an equity is a component in an index but not in a basket shares, the difference is the proportion of an equity in the index.

24.3 The capital charge for such transaction is equal 2 percent of the value of basket shares and the values of the opposite Futures contract (a total of 4 percent). Any excess value of equities comprising the basket shares compared to the value of Futures contract or the excess value of the Futures contract compared to the value of the basket shares is treated as a Long or a Short position and should apply the capital charge as explained in 24.4.

24.4 In case that the arbitrage strategy does fall under the conditions in 24.2 or in case of the Long or Short position left as in 24.3, FI shall follow the following guideline for capital charge calculation; (1) the part related to a position in an index should use the capital calculation for an equity index in 23 and (2) the part related to a basket shares should be proportionately decomposed into individual positions in component equities and included into the calculation of capital charge for Portfolio of each country according to 16 - 19

Instrument	Specific Risk	General Market Risk
Exchange-traded or OTC Futures		
- Individual Equity	/	/
- Securities Indices	2%	/
Options		
- Individual Equity	/	- Simplified Approach
- Securities Indices	2%	- Intermediate Approach
		- Internal Model Approach

Guideline on assessment of foreign exchange risk under the Standardized Approach

25. FI shall refer to the Notification of the Bank of Thailand in the circulation letter No. BOT. FPG. (21) Wor. 167/2546 Re: Submission of Policy Guideline for Maintaining Foreign Exchange Positions and Relevant Report Forms dated 21 January 2003 (please refer to any changes in this notification in the future). In calculating capital charge for foreign exchange risk, FI shall multiply the Aggregate position of foreign exchange positions (of the Aggregate position report form) with the capital charge of 8 percent.

Guideline on risk assessment for Options

26. In calculating market risk capital charge for Options, FI shall proceed as follows:
 - 26.1 FI with purchased options positions only can use the Simplified Method.
 - 26.2 FI with written options positions should use either one of the Intermediate Approaches, namely, the Delta-Plus Method and the Contingent Loss Method¹⁸ or the Internal Model Approach. The more complex of the transactions, the more complex of the risk assessment method should be used.
 - 26.3 FI with positions in Exotic Options may need to use the Contingent Loss Method or Internal Model Approach to better measure their risk.
 - 26.4 In addition to capital charge for Specific Risk and General Market Risk, a purchase of Options from an OTC market need to have additional capital charge for Counterparty Risk which may incur because a counterpart cannot fulfil the contracted obligations.
 - 26.5 The method used to assess risk for Options must be in accordance with the guideline prescribed by the BOT.

Guideline on calculation of capital charge for Options by the Simplified Method

27. This method is suitable for FI with **purchased** Options positions only. The purchased options positions include the case where FI has written Options and fully hedged the position by holding the Long Position in the identical Options in an amount equivalent to or higher so that the hedged proportion has no market risk capital charge. The excess Long position is treated as a purchased Option position, which can apply the Simplified Method.
28. In the risk calculation by the Simplified Method, the Options positions and the associated underlying instruments are not subject to the Standardized Method but are "carved-out" by decomposing the associated instruments into basic components to be measured for General Market Risk and Specific Risk under the special procedure as follows. The risk calculated

¹⁸ The calculation of capital charge for Specific Risk by the Delta-Plus Method and Contingent Loss Method is determined by multiplying the Delta-equivalent amount of each Option with the risk weight, set out in the sections Interest Rate Risk and Equity Position Risk.

from this method shall be incorporated with the capital charge for the associated risk component, that is, interest rate risk, equity price risk, foreign exchange risk and commodity price risk according to the risk assessment guidelines mentioned before.

29. Report of net position that is a purchased Options position, whether or not there is a holding of the underlying instruments, is summarized the calculation in the table below. The capital to be maintained equal the sum of the capital calculation for each Option and the underlying instrument as follows.

Table 6
Summary of Capital Calculation for Options

Position	Treatment
Long Cash and Long put Or Short Cash and Long Call	The capital charge equals the market value of the underlying security multiplied by the sum of specific risk weight and general market risk weight for that underlying security less (if any) the amount the option is in the money or zero*
Long call or Long put	The capital charge equals the lesser of (i) the market value of the underlying security multiplied by the sum of specific risk weight and general market risk weight of that underlying security and (ii) the market value of the options **

* For Options with residual maturity of more than six months, the strike price should be compared with forward price, not current market price, in the calculating "in the money amount". If FI cannot do this, it must use "zero" as the in the money amount.

** In case that the market price or the price from the model cannot be calculated easily due to high complexity and cost, FI may use the book value instead. For example, certain transaction is not in the trading book (e.g. Options on foreign currency)

30. FI shall refer to this example for capital calculation for Options by the Simplified Method as follows.

Assuming that FI holds equity ABC in S&P 500 of 1,000 shares at equivalent market price of 250 baht per share, while holding an equivalent amount of Long put Option position in that equity, with an equivalent strike price of 260 baht per share. The capital charge is equal

1,000 x 250 x 16% = 40,000 baht (16% is from 8% for Specific Risk and 8% for General Market Risk) deducted by the In the Money amount (260 - 250) x 1,000 = 10,000 baht. Therefore, the total capital charge is 40,000 - 10,000 = 30,000 baht. A similar calculation method can be applied to Options with interest rate or debt instruments as underlying.

Table 7
Summary of Capital Requirements for Options

Underlying Instrument	Specific Risk Charge	General Market Risk Charge
Debt Instruments*		
Government debt instruments	0.00%	Apply the rates in Table 2: for fixed interest rate-- use residual term to maturity for floating interest rate-- use term to next interest rate Repricing
Qualifying debt instruments and		
- residual term to maturity 6 months or less	0.25%	
- residual term to maturity more than 6 months up to 24 months	1.00%	
- residual term to maturity more than 24 months	1.60%	
Non-qualifying debt instruments	8.00%	
Other underlying instrument on interest rates	0.00%	
Equity*	2.00, 4.00, 8.00%	8.00%

* More details in the Section Calculation of Specific Risk Capital Charge

Guideline on calculation of capital charge for Options by the Delta-Plus Method

31. This method uses the Sensitivity Parameters or "Greeks" associated with the Options to calculate the market risk capital charge. The capital to be maintained for Options under this method equals the sum of
 - 31.1 capital charge for Specific Risk, by multiplying the Delta-equivalent amount of each option position with the associated risk weight, set out in the section Interest Rate Risk and Equity Position Risk, and
 - 31.2 capital charge for General Market Risk, by taking the Delta-equivalent amount of each option position to measure the General Market Risk according under related methods of the associated risk, e.g. interest rate risk and equity price risk, and

- 31.3 additional capital charge for Gamma and Vega risk of the Options position.
32. FI shall refer to the following guideline in the calculation of capital charge for Options by the Delta-Plus Method
- 32.1 FI with a net **written** Options position may be allowed to use the Delta-weighted Options positions in calculating capital charge for Specific and General Market Risk under the Standardized Approach for the interest rate and equity price risk assessment as explained in section 2 and 3. Such Options positions will be recorded as a Delta weighted position of underlying instruments, which is equivalent to the market value of the underlying instruments multiplied by the Absolute Value of Delta (see Attachment 3 and 7)
- 32.2 As Delta does not cover all risk associated with Options, FI must additionally calculate Gamma risk (measuring the rate of change of Delta) and Vega risk (measuring the sensitivity of the value of Options with respect to a change in Volatility of the underlying instrument) in the capital charge calculation. These Sensitivities should be calculated from 1) an Internal Pricing Model approved by the authorized market in G10 countries, or 2) FI's own Option Pricing Model according to the guideline specified by the BOT.
- 32.3 In calculating General Market Risk, the Delta-weighted Options position on debt instrument or interest rate will be slotted into the corresponding Time band (as explained in the section Interest Rate Risk) by the following procedure.
- (a) Apply the Two-legged Approach as used for other derivatives. The first leg will have a maturity equal the month FI enters into a contract until the month the contract matures; the other leg will have a maturity equal the month FI enters into a contract until the month the contract takes effect¹⁹. For example, in the case of a purchased Call Option of June Three-month Bill Future in April, the option will be reported with the Delta-weighted Value, separated into a Long position in Three-month Bill with a maturity of 5 months and a

¹⁹ In case of Options on Futures or Forwards, the true underlying instrument is the underlying instrument of Futures or Forwards. For example, the true underlying of a purchased Option on June Three-month Bill Future is a Three-month Bill.

Short position in Zero Coupon Bond with a maturity of 2 months²⁰. Similarly, a written Call Options will be reported with opposite positions: the first leg is a Long position in Zero Coupon Bond with maturity of 2 months and the other leg is a Short position in Three-month bill with maturity of 5 months.

- (b) Caps and Floors will be treated as European-style Options, whose right can be exercised on the maturity date only. For example, a buyer of a 2 year Cap with semi-annual resets and the Cap Rate of 15 percent should treat the cap as a series of 3 purchased Call Options on a FRA (there will be only 3 resets in the 2 year period, that is, FRA [6,12], [12,18], [18,24]) with an interest rate of 15 percent.

32.4 The capital charge for Options on equity instruments as underlying will be calculated from the Delta-weighted Position which will be used to calculate the market risk, both Specific Risk and General Market Risk, as already explained in the section Equity Position Risk.

32.5 The capital charge for Options on foreign exchange will be based on the method explained in the section Foreign Exchange Risk, by incorporating in the calculation of associated currencies.

Calculation of capital charge for Gamma and Vega risk by the Delta-Plus Method

33. In addition to the capital charge for Delta risk, FI must maintain additional capital for Gamma and Vega risk. The Gamma and Vega risk of each option shall be calculated separately.

34. FI must refer to the following guideline in calculating capital charge for Gamma risk:

34.1 Refer to this formula: $\text{Gamma Impact} = \frac{1}{2} \times \text{Gamma} \times (\text{VU})^2$

where VU denotes the variation in the price of the underlying instrument of the option, calculated as follows:

²⁰ The case of 2-month Call Option on 10 year Bond Future with delivery date in September, the recorded transaction in April will be a Long Bond Position with a maturity of 10 years and 5 months, and a Short Position with a maturity of 5 months. Both legs must use the Delta-weighted Position.

- (a) For Options on bonds, the market value of the underlying instrument must be multiplied by the Risk Weight specified in Table 2 of section Interest Rate Risk. Similarly, this method can be applied to Options on interest rate, by using the Assumed Changes in Yield in Table 2.
- (b) For Options on equity instruments or equity indices, the market value of the underlying instrument must be multiplied by 8 percent.
- (c) For Options on foreign exchange, the market value of the underlying instrument must be multiplied by 8 percent.

34.2 For calculating the Gamma Impact, the following guideline shall be used to determine if the instruments have the same underlying.

- (a) **For interest rate**²¹ - Instruments in the same Time Band as specified in Table 2 of section Interest Rate Risk for FI using the Maturity Method, and instruments in the same Time Band as specified in Table 4 for FI using the Duration Method are treated as the same underlying instrument.
- (b) **For equity instruments and equity indices** - equity instruments or equity indices of the same country can be treated as the same underlying instrument.
- (c) **For foreign exchange** - each currency pair is treated as the same underlying.

34.3 Each Option on the same underlying instrument may have a gamma impact either positive or negative. The Gamma Impact of each type of underlying can offset each other, resulting in the Net Gamma Impact of that underlying instrument which can be either position or negative. Only the negative Net Gamma Impact shall be included in the capital calculation.

34.4 The capital charge for Gamma Impact equals the sum of the absolute value of the negative Net Gamma Impacts of each underlying instrument calculated from 34.3.

35. FI shall follow the following guideline in calculating the capital charge for Vega. FI must multiply the Vega of each Option with 25 percent to reflect an increase in the option's current volatility. The results will be summed under the same underlying instrument and the capital for Vega risk is equal the sum of the absolute value of Vega of all types of underlying instruments.

²¹ Positions must be calculated by currency.

**Guideline on calculation of capital charge for Options by the Scenario Analysis or
Contingent Loss Method**

36. The capital charge for Options calculated by the Scenario Analysis or Contingent Loss Approach is equal
- 36.1 Capital charge for Specific Risk, for which the Delta-equivalent of each Option is multiplied by the relevant risk weight, as mentioned in section Interest Rate Risk and Equity Risk;
- 36.2 Capital charge for General Market Risk will apply the Contingent Loss Matrix Analysis which measures change in the value of Options Portfolio with respect to a simultaneous changes in the level and volatility²² of the Rates or Prices of associated underlying options. The capital charge for **General Market Risk under this method equals the maximum loss in the Scenario Matrix** under this Analysis .
37. FI may choose this method to calculate capital charge for Options Portfolio and the associated hedging positions, by using the Contingent Loss Matrix Analysis after receiving an approval from the BOT. The guideline is as follows:
- 37.1 Explicitly specify the range of the changes in risk factors of the Options Portfolio (e.g. price or rate, and volatility of the price or rate) and calculate the change in the value of Options Portfolio according to the changes in risk factors specified in the Matrix.
- 37.2 In the capital calculation, more than one matrices may be needed. Each matrix for the same type of underlying according to 34.2 (the part on calculation of Gamma) in order to assess the impact of a simultaneous change in price or rate of the underlying instruments of Options and volatility of the associated price or rate to the value of that Options

²² To measure the Volatility, FI may use 2 methods, that is, 1) estimate from Historical Data, using historical data of at least 1 year or 250 business days, and 2) Implied Volatility from Option Pricing Model, which require an Iterative search procedure. As for the weights of historical data, FI can use any appropriate Weighting Scheme e.g. Equally or Exponentially weight or GARCH (1,1). With this respect, FI must be able to explain the reason to an examiner.

37.3 **The first dimension of the Matrix** is specified by a change in prices or rates of underlying instrument of Options, which affects the value of the Options and/ or the associated hedging positions. The range of changes in prices or interest rates, equity prices, foreign exchange rates, and commodity prices should at least be divided into 7 equal intervals. Changes in prices or rates in each time band are specified as follows:

- (a) **For Options on interest rate**, the range of changes in interest rates must correspond to the Assumed Change in Yield in Table 2 of the guideline on interest rate risk assessment by the Standardized Approach. If FI has many Options on interest rate, it may group the Options into Time Bands of **at least** 6 sets, each set must not have more than 3 time bands combined. The change in interest rates equals the highest Assumed Change in Yield in those 3 Time Bands²³.
- (b) **For Options on equity instrument or foreign exchange**, the range of changes in prices or rates must be in the range of + and - 8 percent.
- (c) **For Options on commodity**, the range of changes in prices or rates must be in the range of + and - 15 percent.

(See example in Attachment 7)

37.4 **The second dimension of the Matrix** entails a change in volatility of rates or prices of the underlying instruments, which affects the value of Options. The rate of change in the volatility of the rates or prices of the underlying instruments is in the range of + and - 25 percent. This is expected to be sufficient in most cases.

37.5 After calculating the effect on Option Portfolio and the associated hedging positions in various matrices, the results are combined in one summary Matrix, in which each Cell indicates the net profit or loss of the Options Portfolio and the associated hedging positions. The capital charge is equal the largest loss in the summary Matrix.

²³ Example from Table 2: If FI combines the Time Band 3 - 4 years, 4 - 5 years, and 5 - 7 years, the change in interest rates for the 7 equal intervals will be equal the highest Assumed Change in Yield in the 3 Time Bands, which is 0.75.

37.6 Nevertheless, BOT may specify a different rate of change in volatility or may request for an additional calculation for any point in a Matrix.

38. FI intending to use this method in assessing risk of Options, together with the Standardized Approach in assessing interest rate risk, equity price risk, foreign exchange risk and commodity price risk, must receive a prior approval from the BOT with respect to the procedure and analysis under this method²⁴. In addition, such FI must also comply with the qualitative standards specified in the Market Risk Supervision Policy under Internal Model Approach to cope with the complexity of the business.
39. In addition to the Options risk mentioned above, the BIS acknowledges other risks associated with options e.g. Rho (the rate of change of the value of the option with respect to the change in interest rate). Although BOT has not yet stipulated FI to maintain capital fund against this type, FI that involves in many Options transactions must closely monitor this risk and, FI may incorporate Rho risk into the capital charge for interest rate risk if it wishes to do so.

²⁴ This is because this method is more complicated than the Simplified Method and the Delta-Plus Method.

Guidelines on Market Risk Assessment: Internal Model Approach

General Guidelines on Market Risk Supervision under Internal Model Approach

1. FI intending to use an internal model to assess capital requirement for market risk must receive an approval from the BOT beforehand by submitting a request for approval, together with the minimum required documents specified by the BOT (Attachment 9) to Supervision Group, Bank of Thailand. In this respect, the BOT may request additional data or documents from FI. To allow FI to use the internal model, BOT will consider the following minimum requirements:
 - 1.1. FI must have an effective risk management system and must strictly comply with the specified guidelines of the system. In addition, FI must have sufficient numbers of skilled staffs to undertake the tasks that involve a sophisticated model, for the purpose of trading, risk controlling, and auditing, including effective Back Office functions.
 - 1.2. FI must prove that it can fully comply with the guidelines specified by the BOT in No. 2-11 (including No. 12-22, if FI uses the internal model to assess Specific Risk). In addition, FI must have a procedure to monitor the internal risk management system and the use of internal model for sufficiently long period of time so that the BOT examiners can use such information to consider granting an approval.

Qualitative Standards

2. An internal model to use in assessing market risk capital charge must be applied in the risk management procedure efficiently and must comply with the following minimum qualitative standards. BOT will also use this guideline to approve the use of internal model in accordance with the result of an On-site Examination.
 - 2.1. FI must have a Risk Controlling Unit, responsible for proposing a risk management system of FI and implementing of the risk management system. The Unit should produce the analysis from the internal model used in the risk assessment. The Unit must be independent from a Trading Unit or Risk Taking Unit and must report directly to FI's board of directors or other associated committees.

- 2.2. The Risk Controlling Unit must conduct a regular Back Testing program in accordance with the guideline specified by the BOT.
- 2.3. The board of directors and senior management must be involved in the process of market risk management as specified in the guideline on internal control for market risk management.
- 2.4. The internal model must be a part of normal risk management process of FI.²⁵ Therefore, reports from the internal model should also be used in conjunction with planning, monitoring, and controlling of FI's market risk.
- 2.5. The internal model used must correspond to the complexity of the trading book transactions, and the Limit specified by FI.
- 2.6. Stress Testing program should be conducted in accordance with the guideline specified by the BOT. The results should reflect the risk that may incur from a trading book policy and effectiveness of the Limits. The results of Stress Testing should be routinely reported to the board of directors and senior management or any other associated committees.
- 2.7. FI should have a process to monitor compliance with the internal control policy and procedures concerning the operation of risk assessment of the internal model. Moreover, FI must prepare documents concerning risk management, for example, a risk manual that explains the risk management system, procedures, and methods or techniques in managing FI's risk so the parties involved can use as a supplementary document, for knowledge, and as a reference in the operations.
- 2.8. An audit of risk management system must be part of an internal control process. The audit must include the operations of trading units and the risk-controlling unit. The audit should be done by a unit independent of both the aforementioned units and must take place at least once a year. Additional issues specified in the guideline on internal control for market risk management and other additional issues are as follows:

²⁵ FI may use different data or variables in the calculation of VaR for the purpose of internal risk management from the quantitative criteria specified by the BOT due to different purposes (please read "questions-answers of key issues in Attachment 10)

- (a) Approval process of Valuation Systems and Pricing Model used by staffs of Front Office and Back Office
- (b) Accuracy of major changes in the internal model
- (c) Scope of market risks captured by the internal model
- (d) Accuracy of the Management Information System concerning market risk
- (e) Accuracy and completeness of position details, valuation, and implementation on risk assessment by the internal model
- (f) Verification of the consistency, timeliness, integrity, and independence of the Input data sources used in the model
- (g) Accuracy and appropriateness of Volatility and Correlations
- (h) Verification of the model through a Back Testing program in accordance with the guideline specified by the BOT

Specification of Market Risk Factors

3. An important part of the use of internal model to assess market risk is to specify appropriate market risk factors. For example, market prices affect the value of FI's Trading Positions. The market risk assessment system must therefore incorporate various factors related to a Trading Portfolio in both on and off balance sheet. The internal model must at least incorporate the following risk factors.

Interest rates

- 3.1. The internal model must entail risk factors corresponding to interest rates in each currency related to a trading book position, which is sensitive to a change in interest rate in both on and off balance sheet.
- 3.2. The risk assessment system should be able to construct one of the generally accepted Yield Curve. The Yield Curve should be divided into Maturity Segments in order to capture variation in the volatility of interest rates in each maturity segment along the Yield Curve. Interest rate risk in major markets and currencies must comprise at least 6 maturity segments on the Yield Curve.
- 3.3. The risk management system should incorporate risk factors that can capture Basis Risk. In assessing Basis Risk between government bonds and other fixed rate instruments, FI can use various methods, for example, the use of different Yield

Curves for government bonds and other fixed rate instruments, or an estimation of Spread of other fixed rate instrument over the government bond Yield Curve.

Equity prices

- 3.4. The model should incorporate risk factors in equity markets in which FI has a significant proportion of investment.
- 3.5. The internal model must at least incorporate risk factors that can capture the change in overall equities in the market (Market Index) and can assess equity price risk of each individual instrument in the form of Beta-Equivalent, relative to the Market Index.
- 3.6. FI may also specify the risk factors that capture a change in equity prices of in various sectors (Sector index). Positions in each equity instrument in each sector can be assessed in the form of Beta-equivalent relative to that particular Sector index.
- 3.7. FI should have risk factors that correspond to the volatility of each equity instrument.
- 3.8. The technique and sophistication of the internal model of each FI should correspond to the overall risk in each market and the concentration of each equity instrument in that market.

Foreign exchange

- 3.9. The internal model should incorporate risk factors that capture foreign exchange risk of all currencies, which FI has hold a significant position in.

Quantitative Standards

4. FI is allowed to select or develop the internal model to calculate market risk capital charge, corresponding to the quantity and complexity of transactions of each FI. However, FI must comply with the following guidelines:
 - 4.1. The internal model must compute VaR on a daily basis.
 - 4.2. In calculating VaR, a 99th percentile, One-tailed Confidence Interval must be used.
 - 4.3. In calculating VaR, at the minimum, a 10-day-Holding Period must be used. FI may use VaR from the calculation of a shorter period, such as 1 day, then scale up to 10 days by multiplying with the square root of 10 days (The Square Root of Time).
 - 4.4. In calculating VaR, FI must use historical data with the minimum period of one year (or 250 business days). If FI uses a Weighted Scheme to weight the historical period, the weighted average of time must be at least 6 months (or 125 business days).
 - 4.5. FI must update the Correlation data at least every quarter²⁶ or whenever there is a material change in the market prices. The BOT may request FI to calculate VaR with the updated data over a shorter period, if such action is deemed to better reflect the material change in volatility of the prices.
 - 4.6. The internal model must compute VaR based on the Parametric Approach, Historical Simulations, or Monte Carlo Simulations, and must be able to assess market risk, covering all risk factors specified in 3.
 - 4.7. In calculating VaR, FI can have discretion to use Correlations within the same type of risk (e.g. interest rate, foreign exchange, and equity price, including Options related to these risks) and /or Correlations across risk types.
 - 4.8. The internal model must be able to accurately capture Unique Risks associated with Options within each type of risk. The following guideline must be complied with in assessing Options risk.
 - (a) The internal model must be able to capture the Non-linear Price Characteristics of Options.

²⁶ The data sets that must be updated at least every quarter are, for example, Correlation Matrix. The data set on Volatility must be updated daily.

- (b) The internal model must be developed to be able to assess the risk by a 10-day Price Shock to Options or other positions with similar characteristics.
 - (c) The internal model must capture various Risk Factors that reflect the Volatilities of the Rates and Prices of the underlying assets of Options e.g. Vega Risk. FI with complex and large Option Portfolio must calculate more detailed volatilities.
- 4.9. FI must maintain capital fund, at the end of each business day, according to the computed amount of the higher of:
- 4.9.1. An average of daily VaR over the last 60 days, multiplied by Scaling Factor, which consists of 1) Multiplication Factor and 2) Plus Factor and
 - 4.9.2. VaR of the previous day.
- 4.10. **Multiplication Factor** ranges between 3 to 4 depending on 1) assessment of the quality of risk management and 2) the Stress Testing process, and **Plus Factor** ranges between 0 to 1 depending on the result of Back testing according to the guidelines specified in 9-11.
- 4.11. FI must maintain additional capital against Specific Risk for positions related to debt instrument and equity instrument that has Specific Risk. FI can find additional detail in **guideline on assessment of Specific Risk by the Internal Model Approach**.

Guidelines on Stress Testing

- 5. FI that uses the internal model approach to assess market risk capital requirement must have a concrete plan to develop an efficient stress testing. Under such plan, the stress scenarios used must cover various factors that can result in extraordinary losses or gains or difficulty in controlling risk in trading book. These factors can be events with low probability but high impact in all types of market risk. Therefore, the stress scenarios must reflect the impact of such events with both Linear and Non-linear Price Characteristics (e.g. Options and instruments with option-like characteristics)
- 6. Stress testing plan has both qualitative and quantitative elements, incorporating both market risk and liquidity aspects of market disturbances. Quantitative criteria should identify plausible stress scenarios that can incur adverse impact on FI. Qualitative criteria should emphasize the two major goals of stress tests; that is, 1) to evaluate the adequacy of FI's

capital funds to absorb potential large losses and 2) to identify possible measures for FI to reduce these risk so as to avoid negative impact on its capital. These goals should be incorporated in FI's risk management strategy and the results of stress testing should be routinely reported to senior management and periodically to the FI's board of directors.

7. FI must conduct a Stress Testing program based on the Supervisory Scenario, as well as the stress scenarios developed by FI to reflect market risk from Portfolio of each FI. As such, the BOT requires FI to prepare the result of stress testing in the following 3 scenarios:

7.1. FI shall prepare the largest Actual Loss of at least 5 days during the reporting quarter.

BOT may use the information on the losses to compare with the level of capital computed from FI's internal model to see how many days the capital computed from VaR can absorb these losses.

- 7.2. FI shall conduct Stress testing by using Supervisory Scenario**, which can be carried out in 2 ways:

(a) Historical Perspective Scenarios

The BOT may specify Volatilities of various risk factors or specify the periods in which major fluctuations in the market occurred in the past e.g. the 1987 Equity Crash or ERM crisis in 1992 and 1993 or the 1997 Asian Financial Crisis. FI can use various variables such as Volatilities and Correlations during those periods as input data in conducting a Stress Testing for current positions of FI.

(b) Forward Looking Scenarios

The BOT may require that FI test the impact of changes in one risk factor or many risk factors simultaneously to the value of FI's positions. BOT may ask FI to prepare and submit the results to BOT from time to time.

BOT will inform FI of the detail of how FI can prepare for (a) and (b) later, the results of which must be submitted to BOT every quarter.

7.3. FI should consider developing its own Scenarios for risk assessment.

In addition to Stress testing as described in 7.1 and 7.2, FI should develop its own scenarios to capture the specific characteristics of its portfolio. The scenario should identify the worst event that may occur e.g. a case where FI invests a large proportion in instruments of a country that has a high tendency to have a serious political and economic crisis, or the case where FI has a large proportion of Written Options. FI must prepare the data, description of the methodology used to select various cases and scenarios in Stress Testing, including an explanation of the impact of those scenarios. Upon a request, FI shall be ready to provide the related information for BOT examiners to audit.

8. The results of the Stress Testing should be reviewed periodically by senior management and should be incorporated in the formulation of policy and limits set by management and the board of directors of FI. If there is a case or scenario, where the Stress Testing results indicate that FI has taken the excessive risk beyond the limit, the BOT may ask that FI to take an appropriate action against that risk. For example, FI may use hedging instruments to protect the risk from that scenario or any measure to reduce the exposure of that risk.

Guideline on Back Testing and Plus Factor Specification

9. FI shall comply with the following guideline in conducting a Back Testing
 - 9.1. FI shall conduct a Back Testing at least every quarter, using the historical data of the past 250 business days, to compare the daily VaR with losses due to the hypothetical change changes²⁷ of the Portfolio value, calculated from loss that incurs from changes in market prices of that day with the Portfolio position at the end of the previous day.

²⁷ Comparison of VaR from the model with the loss from Hypothetical Change of the Portfolio value will give a more accurate result than the use of Actual Losses. This is because actual profits/losses not only result from trading book transactions, but also fees and other income not directly related to trading book transactions. Hence, BOT stipulates that FI use hypothetical loss (loss due to Hypothetical Change) in the Back Testing so that the result is more accurate and that all FIs are using the same standard.

10. Integrity of the internal model considered from a result of Back Testing will depend on the number of Exceptions, resulting from the fact that VaR computed from Portfolio position of the previous day exceed the hypothetical loss (loss due to hypothetical change). Integrity of the model can be categorized in 3 levels, according to the number of exceptions, as follows:
 - 10.1. **Acceptable level** is a level indicating no problem in integrity of the internal model that FI uses.
 - 10.2. **Inconclusive level** is a level, which cannot be clearly concluded whether the result of Back Testing may relate to integrity of the model or not. BOT examiners may ask for additional information for considering to issue a corrective order and
 - 10.3. **Non-acceptable level** is a level clearly indicating that there is an integrity problem in the internal model of FI. FI must clarify and give additional information immediately.
11. In imposing the Plus Factor, FI must proceed as follows.
 - 11.1. FI shall use the Plus Factor from "number of exceptions" specified in the Table, then add it with the Multiplication Factor to get Scaling Factor for the calculation of capital charge in the following quarter, **except that** BOT will order otherwise.
 - 11.2. FI shall analyze the causes of each exception and submit all the related data for BOT examiners to audit.
 - 11.3. FI shall submit related data or documents to the BOT for a case-by-case consideration of granting an exemption of the back testing result of a certain day if there are reasonable reasons to believe that an exception of that day is of temporary nature, a one-time event, or results from an error of an investment unit or an individual staff, or is an insignificant error of the model or from the process of Back Testing only.

Table 8

Evaluation of Back Testing Result

	Number of "Exceptions"	Plus Factor
<u>Acceptable level</u>	4 or less	0.00
	5	0.40
	6	0.50
<u>Inconclusive level</u>	7	0.65
	8	0.75
	9	0.85
<u>Not Acceptable level</u>	10 or more	1.00

Guideline on assessment of Specific Risk by the Internal Model Approach

Definition of Specific Risk

12. FI shall refer to the following definitions for the use of internal model to assess capital charge for Specific Risk of instruments.
 - 12.1. **Specific Risk** is the risk incurred from a change in the value of instrument due to changes in factors, other than General Market Factors, that relate to the issuer of that instrument, for example, a change in credit rating of the issuer. Specific Risk can be decomposed into 2 components:
 - a) **Idiosyncratic Risk** is the risk that the change in the price of an instrument does not correspond with the change in General Market Benchmark. Such change occurs continuously, not abruptly, and hence the historical data on prices of an instrument will reflect both the Idiosyncratic Risk and General Market Risk.
 - b) **Event and Default Risk** is the risk that the change in the price of an instrument occurs abruptly in a direction and size not correspond with the change in General Market Benchmark. Such risk rarely occurs and not continuous and may directly relate to the issuer of that instrument e.g. change in credit rating of the issuer of an instrument. Hence, the historical data on prices of an instrument will not clearly reflect this type of risk.

Additional criteria for the use of internal model to assess Specific Risk

13. The internal model to be used in assessing Specific Risk must satisfy the guidelines on assessing General Market Risk, both the quantitative and qualitative standards as specified by the BOT, and additional criteria specified in 14-22. FI whose model does not satisfy these additional criteria shall use the Standardized Approach in calculating capital charge against Specific Risk for interest rate risk and equity price risk.
14. FI shall maintain capital against Specific Risk for both Idiosyncratic Risk and Event and Default Risk.
15. The internal model to be used in assessing the Idiosyncratic Risk component of Specific Risk must have the following characteristics.

- 15.1. Explain the historical price variation of the portfolio²⁸.
 - 15.2. Capture concentration of the portfolio both in terms of size and change in its components (FI should demonstrate that the model is sensitive to changes in portfolio construction, that is, capital charge is higher for portfolio with higher level of concentration).
 - 15.3. Reflect the impact from adverse environment of instruments²⁹ and
 - 15.4. Be validated by Back Testing that reflects its effectiveness in accurately assessing the Idiosyncratic Risk.
16. If FI's internal model satisfies the criteria for assessing the Idiosyncratic Risk but does not accurately assess the Event and Default Risk, FI must add a Surcharge to the capital charge calculated from the internal model. The Surcharge is designed to treat deficiency in the internal model for Specific Risk from the result of Back Testing. That is, the Surcharge is one of the factor to be added in the Scaling Factor for the calculation of capital charge for Specific Risk. If FI is able to demonstrate that it has a methodology to adequately assess Event and Default Risk, it will be exempted from adding the aforementioned Surcharge. However, the Surcharge does not replace the Plus Factor based on Back Testing results.
17. FI whose internal model cannot accurately capture the Event and Default Risk, the capital charge will equal the Scaling Factor (according to the detail in 4.9) multiplied by **VaR for General Market Risk and Specific Risk** computed from the model, plus the Surcharge which equals

²⁸ A primary measure of model quality is "Goodness-of-fit" measure, which demonstrates the ability of the model to explain historical variations. Another popular measure is an R-squared measure from a regression. If FI uses this measure, the model should be able to explain the historical price variation in a high percentage, e.g. 90 percent, or there should be an Estimates of the Residual Variability, not captured in the factors in the regression in a consideration. FI intending to use other techniques, which may not be able to calculate a Goodness-of-fit measure, must consult with the BOT on a case by case basis.

²⁹ FI must demonstrate that the internal model can give rising risk measures in an adverse environment of the instrument. This can be done by specifying estimation period of the model to include at least one full credit cycle in the model to ensure that the result from the model is accurate in the downward portion of the cycle, or by simulating historical or possible worst-case scenarios.

- 17.1. VaR measure of Specific Risk, in case that the model can separate assessment of Specific Risk from General Market Risk, or
 - 17.2. VaR measure of Sub-portfolios of debt and equity instruments related positions which contains Specific Risk
18. Techniques for separating General Market Risk and Specific Risk according to 17.1 are as follows.
- 18.1. For interest rate related instruments, the market factors for General Market Risk may be specified by a relevant Reference Curve, for example, a Government Bond Yield Curve, a yield curve of bonds with the same rating, or a Swap Curve. The reference curve should be based on a liquid and well-established market, which is widely accepted by the concerned parties.
 - 18.2. For equity instruments, the market factors for General Market Risk may be specified by a factor that is a representative of the market as a whole. For example, a widely accepted equity index in that country e.g. SET Index, S&P 500. FI that uses Factor Models may assign a Single Linear Combination of Factors in the market factor model as well.
19. Acceptable techniques for assessing the Value-at-Risk (VaR) measure for Specific Risk include
- 19.1. Use of an Incremental Increase in VaR computed from the Specific Risk model,
 - 19.2. Use of the difference between VaR measure from a Portfolio and the VaR measure calculated by substituting each equity position with a Representative Index, or
 - 19.3. Use of an Analytic Separation between General Market Risk and Specific Risk implied by a Particular Model.

Conducting a Back Testing for the internal model of Specific Risk

20. FI intending to use the internal model of Specific risk must conduct a Back Testing to assess accuracy of the model. If FI uses Sub-portfolios to assess only Specific risk, FI must separately conduct Back testing with daily data on sub-portfolios, comprising mostly debt instrument and equity instrument position in a trading book. However, if FI divides the Trading Portfolio into sub-categories such as instruments of emerging markets, corporate

debt instruments, and others, FI must keep these distinctions in a sub-portfolio structure for the purpose of Back testing of these Portfolios. If FI wishes to change the sub-portfolios, it must explain its reasons to the BOT.

21. FI must have a methodology or a process to analyze Exceptions from the Back Testing of Specific Risk. Such process serves as a fundamental way to help FI correct the model.
22. If the level of Exceptions at the sub-portfolio level is not acceptable (Red Zone) (according to the criteria in 9-11), BOT will presume that the internal model is not acceptable for assessing Specific Risk. FI must take immediate actions to improve the model and demonstrate to the BOT that FI still has sufficient capital fund for the risk that cannot be adequately captured by the model.

Guidelines on Market Risk Assessment: Mixed Approach

Guideline on market risk assessment by a mix approach between the Standardised Approach and the Internal Model Approach

1. In assessing risk by the Internal Model Approach, in the early stage FI may use an internal model to assess some types of market risk. In the long run, FI should develop the system to be able to assess all types of market risk. **Once FI has used the internal model to assess any particular types of market risk, BOT will not allow the FI to revert to use the Standardized Approach in assessing those types of risk**, except for the case that BOT has revoked the approval for FI to use an internal model in assessing risk. However, the BOT does not specify a timeframe in which FI can assess the risk by using the Internal Model Approach, together with the Standardized Approach, during the period the model is developed to be able to capture all types of market risk.
2. FI intending to use the Internal Model Approach together with the Standardized Approach must comply with the following guidelines.
 - 2.1 FI must assess each type of risk (e.g. interest rate risk, equity price risk, foreign exchange risk, and commodity price risk) by one approach only. In principle, BOT will not allow a combination of 2 approaches in assessing the same risk type or even the same risk type arising from different business units³⁰, **except** Options, they are allowed to be assessed by the Standardized Approach or the Internal Model Approach, which may differ from the Approach used to assess their underlying instruments.
 - 2.2 FI intending to modify the Mixed Approach must receive an approval from the BOT beforehand, and there must be adequate reasons for such modification.

³⁰ In case that FI may possess risk from positions that are sophisticated or their risk cannot be measured by the model, for example, positions in new instruments, or positions in very remote locations or in negligible business areas. Such risks may be assessed by the Standardized Approach or be cushioned by Reserve instead, depending on BOT consideration.

- 2.3 FI must assess all types of associated market risk, whether by the Standardized Approach or the Internal Model Approach.
- 2.4 The capital charge is equal the sum of all types of market risk calculated by the Standardized Approach and those calculated by the Internal Model Approach, with no offsetting.

Guidelines on Compilation of Data and Reports

Related Reports

1. Reports for Market Risk Supervision Policy comprise
 - 1.1 Report on Volume of Trading Book Transactions
 - 1.2 Report on Maintenance of Capital for Market Risk and supplementary tables
 - 1.3 Report on Maintenance of Capital for Credit Risk and Market Risk

Compilation of Data by Type of FI

2. FI shall prepare the data and submit the reports related to assessment of trading book transactions and maintenance of capital for market risk to the BOT as follows:
 - 2.1 FI with the level of trading book transactions **at and above the Threshold** shall prepare and submit the report number 1.1, 1.2, and 1.3.
 - 2.2 FI with the level of trading book transactions **below the Threshold** shall prepare and submit the report number 1.1, and the report number 1.2 and 1.3 only for the part concerning commodity price risk

For additional detail, FI shall refer to **Related Reports and Report Completion**

Instruction

Timeframe on Compilation and Submission of Reports to the BOT

3. FI shall prepare and submit reports to the BOT in accordance with the following guideline:
 - 3.1 Reports pursuant to number 1.1 shall be prepared monthly and submitted to the BOT every 6 months, by sending to the BOT within 21 days from the last day of June and December
 - 3.2 Reports pursuant to number 1.2 and 1.3 shall be prepared monthly and only the report (not the supplementary tables) must be submitted to the BOT every month, and the whole set including supplementary tables must be submitted every quarter, by sending to the BOT within 21 days from the last day of the reporting month or quarter

BOT will send a letter to FI to inform the forms and method of report submission later.

Example: Financial Instruments that may be included in Trading Book

1. all types of transferable financial instruments
2. transferable unit trust trading in an authorized market or OTC
3. short-term money market instruments e.g. Treasury Bills, transferable CDs and Commercial Paper e.g. B/E
4. Financial Future Contracts, including Cash Settled Instruments
5. Forward Interest Rate Agreements
6. Interest Rate, Currency, and Equity Swaps
7. Options, Warrants
8. Repo Agreement where an instrument in a trading book is used as collateral or where an instrument in a banking book is used as collateral but FI uses its proceed to conduct trading book transactions
9. Security Lending Agreement where FI intends to use the security received as collateral for conducting trading book transactions
10. The Reverse Repo or Security Borrowing Agreement where FI intends to use the security received as collateral for lending of money or the security borrowed, for other transactions with trading intent e.g. use of bond in Reverse Repo or Security Borrowing Agreement to settle a contract on Short Bond
11. Other derivatives not used for hedging banking book positions

Example: Instruments in a Trading Book that must be included in

Interest Rate Risk Assessment under Standardized Approach

- all types of debt instruments e.g. bonds, debentures, FRN, FRCD
- non-convertible preferred shares
- convertible securities with characteristics resembling debt instruments e.g. preferred shares, bonds with an option
- transferable certificate of deposit
- bankers' acceptance
- all derivatives not used for hedging of banking book positions

Guideline for instruments different from the above or with complex structures

- Each FI should specify a treatment of associated risk calculation in the document pertaining policy on allocating and recording assets in a proprietary account.
- In certain cases, the treatment of each type of instruments may differ. For example, in the case of bonds whose coupon payment depends on an equity index, risk of the position can be separated into parts of market risk components, that is, equity price risk, interest rate risk, and foreign exchange risk.
- Interest rate risk from dividends of equity instrument will be mentioned in "equity price risk"
- Should there be any doubt or in case that FI has traded an instrument with unique characteristic for the first time, FI should consult with the BOT in a case-by-case basis.

**Example: Treatment of Positions under Standardized Method
for Interest Rate Risk in Maturity Method
Equity Price Risk and Options Risk in Delta-Plus Method**

Assuming that an FI has the following transactions in a trading book as at the end of December 2002:

(let the current exchange rate THB/USD equal 42 baht/USD; all transactions in the table must be converted into baht-equivalent amount)

Example 1 a Long position in a US Treasury bond in US dollars, coupon rate is 7.5 percent per annum, face value of the bond is equivalent to 43,000 thousands baht, residual maturity of 8 years, the accounting value and the market value is equivalent to 44,000 thousands baht (at current exchange rate)

Treatment of position (interest rate risk only)

Report the market value (baht equivalent) of the Long position into 2 parts. 1) in the Specific Risk table for US Treasury bond with Capital Charge of 0, and 2) in the General Market Risk's Maturity Ladder table for US dollar, according to the residual maturity of the coupon at the rate higher than 3 percent in the time band 7-10 years, as a Long position in the amount 44,000 thousands baht.

Example 2 A Long position in a floating rate bill with no credit rating. The coupon rate is 6.5 percent per annum. The bill is issued by a US corporate (denominated in US dollar), with face value equivalent to 40,000 thousand baht. The next interest repricing is in 9 months. The market value is equivalent to 40,732 thousand baht

Treatment of position (interest rate risk only)

Report the market value of the Long position in the bill into 2 parts. 1) in the Specific Risk table for non-rating corporate bonds (non-qualifying category) with Capital Charge of 8 percent, and 2) in the General Market Risk's Maturity Ladder table for US dollar, the coupon rate of higher than 3 percent in the time band of 6-12 months, as Long position in the amount of 40,732 thousands baht.

Example 3 A Long position in 10 Future contract, each contract's underlying is a 5-year US Treasury bills, with 100,000 USD face-value. Each contract will be delivered in 3 months (Debt Derivative). The chosen instrument to be delivered is a US Treasury bills, with a coupon rate of 6.375 percent, remaining maturity of 5 years, Quoted Price at 100.0625 (%), and the Conversion factor is equal 0.9423

Treatment of position (interest rate risk only)

1. Calculate the market value to be reported as
$$\text{USD } 100,000 \times 10 \times 100.0625\% / 0.9423$$
$$= \text{USD } 1,061,896 \text{ or THB } 44,599,650$$
2. Report in the Specific Risk Charge table (Government bonds) = 0
3. Report in the USD table for General Market Risk in 2 parts:
 - 3.1 A Short position in a zero coupon instrument, residual maturity of 3 months in the time band of 1 – 3 months,
 - 3.2 A Long position in bills, with coupon rate greater than 3%, residual maturity of 5.25 years in the time band 5 – 7 years

Example 4 A position of Single Currency Interest Rate Swap (Interest Rate Derivative) with notional value denominated in HKD equivalent to 150,000 thousands baht, residual maturity of 2.5 years. FI receives floating interest rate annually, and pays fixed interest rate of 8 percent per year. Currency the annual floating rate is at 5.5 percent and the next interest repricing is in 6 months

Treatment of position (interest rate risk only)

1. Calculate the value to be reported, using the Present Value method (The Internal Model Approach) as follows: assuming the HKD Zero Coupon Yields is

<u>Maturity</u>	<u>Yields</u>
1M	5.31
3M	5.36
6M	5.81
1Y	6.16
2Y	6.69
3Y	7.07

(these Yields may be derived from a Zero Coupon Bond, Cash Rates or Swap Rates)

Cash flows from Swap transaction can be separated into 2 legs as follows:

(1.1) Pay Fixed Rate Bond

8% of 150,000 thousands baht in 6 months

8% of 150,000 thousands baht in 18 months

108% of 150,000 thousands baht in 30 months

the Zero Rates for 18 months can be derived from the Linear Interpolation of Rates between 1 ปี and 2 ปี, which is equal

$$\text{Zero Rate (18 months)} = (6.16 + 6.69) / 2 = 6.425\%$$

Similarly,

$$\text{Zero Rate (30 months)} = (6.69 + 7.07) / 2 = 6.88\%$$

Therefore PV of the leg "Pay Fixed Rate" is equal THB 159,766 thousands, using the Present Value formula for ordinary Discounted Cash Flows of 3 cash flows according to the maturity 6 18 and 30 months.

(1.2) Receive Floating Rate Paper

105.5% of 150,000 thousands baht in 6 months

Therefore PV of the leg "Receive Floating Rate" is equal THB 153,783 thousands, using the Present Value formula for ordinary Discounted Cash Flows.

2. For Specific Risk Charge, as the Interest Rate Derivative has interest rate as underlying, which is an instrument without an Issuer, there is no Specific Risk.
3. For General Market Risk Charge, report in the HKD table as follows:
 - 3.1 Report the value **THB 153,783 thousands baht**, the leg "Receive Floating Rate" as a Long position in 6-month instrument, in the time band 3-6 months.
 - 3.2 Report the value **THB 159,766 พันบาท**, the leg "Pay Fixed Rate" as a Short position in a 2.5-year instrument with a coupon rate of 8 percent, in the time band 2 -3 years.

Example 5 A Long position in Interest Rate Future, the underlying is a 3-month HIBOR, 1 contract, the value of each contract in HKD is equivalent to THB 50,000 thousands, exercising period is in 6 months

Treatment of position (interest rate risk only)

1. Because it is an Interest Rate Derivative with interest rate as underlying, there is no issuer of instrument. Hence there is no Specific Risk.

2. For General Market Risk Charge, report in 2 legs in the HKD table as follows:

2.1 A Long position in a 9-month zero coupon instrument, in the time band 6 - 12 months

Calculate the value to be reported by PV as follows:

$$\text{Zero Rate (9 months)} = (5.81 + 6.16) / 2 = 5.985 \% \text{ (9M x 0.75, 6M x 0.5)}$$

PV of THB 50,000 thousands over 9 months equals

$$= \text{THB } 50,000 \text{ thousands} / (1 + (0.05985 \times 0.75)) = \text{THB } 47,850 \text{ thousands}$$

2.2 A Short position in a 6 month zero coupon instrument, in the time band 3 - 6 months

Calculate the value to be reported by PV as follows:

$$\text{Zero Rate (6 months)} = 5.81\%$$

PV of THB 50,000 thousands over 6 months equals

$$= \text{THB } 50,000 \text{ thousands} / (1 + (0.0581 \times 0.5)) = \text{THB } 48,598 \text{ thousands}$$

Example 6 A Long in FRA (9, 15) on 6-month HIBOR, with notional value in HKD equivalent to THB 20,000 thousands, exercise period is in 9 months

Treatment of position (interest rate risk only)

1. Because it is an Interest Rate Derivative with interest rate as underlying, there is no issuer of instrument. Hence there is no Specific Risk.

2. For General Market Risk Charge, report in 2 legs in the HKD table as follows:

2.1 A Long position in a 15-month zero coupon instrument, in the time band 1.0 - 1.9 years

$$\text{ZR (15 months)} = 6.16 + ((6.69-6.16) \times 0.25) = 6.2925 \%$$

PV of THB 20,000 thousands over 15 months equals

$$= \text{THB } 20,000 \text{ thousands} / (1 + 0.062925)^{1.25} = \text{THB } 18,532 \text{ thousands}$$

2.2 A Short in a 9-month coupon instrument, in the time band 6 - 12 months

PV of THB 20,000 thousands over 9 months equals

$$= \text{THB } 20,000 \text{ thousands} \times 0.957 = \text{THB } 19,140 \text{ thousands}$$

Example 7 A Written Cap on 6 month LIBOR, with value GBP 2 million, with a Cap rate of 8 percent, the next interest repricing is within 6 months, the remaining maturity is 2 years (assuming that the transaction date is the same as the reporting date)

Treatment of position (interest rate risk only)

1. Because it is an Interest Rate Option with interest rate as underlying, there is no issuer of instrument. Hence there is no Specific Risk.
2. For General Market Risk Charge, assuming that the Delta-plus Method is used, report in the GBP table as follows:
 - 2.1 Separate the Cap position into a Short of 3 Call Options 3 on 6-month FRA e.g. 6 against 12, 12 against 18, and 18 against 24 (since the interest rate in the first 6 months is already specified on the reporting date, that particular Option is already expired)

Assume that the Delta Ratios of those Options equal

6 against 12	0.055
12 against 18	0.17
18 against 24	0.225

Assume that the Discounting Factors equal

6M	0.9674
12M	0.9346
18M	0.9009
24M	0.8673

Assume that the THB/GBP exchange rate= 60

Report value of the first Option

- (1) A Long position over 6 - 12 months, with the value equals
$$= \text{GBP } 2\text{M} \times 0.055 \times 0.9346$$
$$= \text{THB } 6,170 \text{ thousands (approximate)}$$

- (2) A Short position over 3 – 6 months, with the value equals
- $$= \text{GBP } 2\text{M} \times 0.055 \times 0.9674$$
- $$= \text{THB } 6,385 \text{ thousands (approximate)}$$

Report value of the second Option

- (1) A Long position over 1 – 1.9 years (Cap Rate is greater than 3 percent),
with the value equals
- $$= \text{GBP } 2\text{M} \times 0.17 \times 0.9009$$
- $$= \text{THB } 18,380 \text{ thousands (approximate)}$$
- (2) A Short position over 6 – 12, with the value equals
- $$= \text{GBP } 2\text{M} \times 0.17 \times 0.9346$$
- $$= \text{THB } 19,065 \text{ thousands (approximate)}$$

Report value of the last Option

- (3) A Long position over 1.9 – 2.8 years (Cap Rate is greater than 3 percent),
with the value equals
- $$= \text{GBP } 2\text{M} \times 0.225 \times 0.8673$$
- $$= \text{THB } 23,415 \text{ thousands (approximate)}$$
- (4) A Short position over 1.0 – 1.9 years, with the value equals
- $$= \text{GBP } 2\text{M} \times 0.225 \times 0.9009$$
- $$= \text{THB } 24,325 \text{ thousands (approximate)}$$
- (Calculation of Gamma and Vega is not mentioned here)

Example 8 A Long position in Interest Rate Future contract, with the underlying of US Treasury bonds, maturity 3.5 years, coupon rate of 5 percent, the equivalent market value is 50,000 thousands baht, exercise period is in 6 months.

Treatment of position (interest rate risk only)

1. Use the market value which is equivalent to 50,000 thousands baht
2. Because it is a Debt-related Derivative, with government instrument as underlying, there is an issuer of the instrument. Hence Specific Risk must be measured, but the Risk weight is equal 0.
3. For General Market Risk Charge, report in 2 legs in the USD table as follows:

- 3.1 A Long position in a coupon instrument with coupon rate greater than 3 percent, maturity 4 years, in the time band 3 – 4 years
- 3.2 A Short position in a 6-month zero coupon instrument, in the time band 3-6 months

Example 9 A Long position in Forward Foreign Exchange Position of US dollars in the amount of USD 1 million, exchanged with Bath in the amount of 43,000 thousands baht, residual maturity of 3 months

Treatment of position (interest rate risk only)

- 1. Because it is Non-Debt Derivative with foreign exchange as underlying, there is no issuer of instrument. Hence there is no Specific Risk.

- 2. For General Market Risk Charge, report in 2 legs as follows:

- 2.1 A Long position in the USD table on a 3-month zero coupon instrument, in the time band 1-3 months

Assume that the 3-month Zero Rate in USD equals 3.25 percent

The value to be recorded = USD 1,000,000 / (1 + (0.0325x0.25))

= USD 991,940 or THB 41,662 thousands

(42 THB/USD)

- 2.2 A Short position in THB table on 3 month zero coupon instrument, in the time band 1 - 3 months

Assume that the 3-month Zero Rate in THB equals 2.25 percent

The value to be recorded = THB 43,000,000 / (1 + (0.0225x0.25))

= THB 42,760 thousands

Example 10

A Long position in Thai equity A of the amount 10,000 thousands baht, a Short position in Thai equity A of the amount 15,000 thousands baht

A Long position in Thai equity B of the amount 7,500 thousands baht, a Short position in Thai equity B of the amount 2,000 thousands baht

A Long position in Thai equity C of the amount 8,000 thousands baht, a Short position in Thai equity of the amount 10,000 thousands baht

Treatment of positions (equity price risk only)

1. Calculate the net position of each equity
 - (a) Net position in equity A = $10,000 - 15,000 = - 5,000$ thousands baht
 - (b) Net position in equity B = $7,500 - 2,000 = 5,500$ thousands baht
 - (c) Net position in equity C = $8,000 - 10,000 = -2,000$ thousands baht
2. Report the total net Long positions of 5,500 thousands baht, and the total net Short positions of 7,000 thousands baht in item 1 of the Thai column.

Example 11 A Long position in AAA-rated US equity of the amount 10,000 shares, the equivalent market value of the shares is 4,200 thousands baht

Treatment of position (equity price risk only)

Report the equivalent value of 4,200 thousands baht in the equity price risk table, item 1, US column.

Example 12 A Long position in BBB-rated Hong Kong equity of the amount 50,000 shares. The position is hedged with a Long position in 25 contracts of Put Options on the same equity (each contract gives the right to sell common stocks in the amount of 1,000 shares). The book value of the equity (market value of the book) is equal 30 baht. The exercise price of the all Options is equivalent to 33 baht.

Treatment of positions

1. Report the market value of 25,000 shares equivalent to 750,000 baht in the equity price risk table, item 1, Hong Kong column.
2. Report the market value for 25,000 shares hedged with the put option in the Options table, with the value to be reported equals
$$= (25,000 \times 30 \text{ THB} \times 16\%) - [25,000 \times \text{THB} (33-30)] = \text{THB } 45,000$$

(16% is from Specific Risk and General Market Risk, 8% each, according to the Simplified Method for Options)

Example 13 A Short position in Hang Seng Index Futures contract with delivery date in 3 months. Currently the Index is at 10,000 (Assuming the exchange rate as at the end of December 2003 is equal 5 THB / HKD)

Treatment of position

1. Report the market value for the Short Future (HKD 50 per index point) of 500,000 HKD or 2,500 thousands baht in the equity price risk table, item 2, HK column.
2. Report the market value of Future (Interest rate derivative) of the amount 2,500 thousands baht as a Long position in a zero coupon instrument, in section 1 of Interest rate risk table for HKD, in the time band 1 – 3 months.

Example 14 A Long position on March S&P 500 Futures contract in the amount of USD 300,000 and a Short position in June S&P 500 Futures contract in the amount of USD 300,000

Treatment of positions

1. The value to be reported equal 12,600 thousands baht
2. For equity price risk
Capital calculation for Futures-Related Arbitrage –capital charge for Specific Risk at the rate of 2 percent for one position only in the amount of 12,600 thousands baht.
The opposite position is exempted from the capital charge for both General Market Risk and Specific Risk.
3. For interest rate risk
 - 3.1 Long March S&P 500 Futures can be decomposed to an interest-related transaction of a Short position in a 3-month zero coupon instrument, in the USD table in the time band 1 – 3 months, interest rate derivatives column
 - 3.2 Short June S&P 500 Futures can be decomposed to an interest-related transaction of a Long position in a 6-month zero coupon instrument, in the USD table in the time band 3 – 6 months, interest rate derivatives column

Names of Recognized Credit Rating Agencies

For All Issuers

1. Moody's Investor Services
2. Standard & Poors Corporation
3. Fitch IBCA

For Thai Issuers

4. Companies recognized by the Office of Securities Exchange Commission

For Issuers which are Commercial Banks and Subsidiaries

5. Thomson Financial Bank Watch

For Canadian Issuers

6. Canadian Bond Rating Service
7. Dominion Bond Rating Service

For Japanese Issuers

8. Japan Credit Rating Agency, Ltd.
9. Japan Rating and Investment Information Inc
10. Mikuno & Co
11. Fitch Investors Services Inc

For American Issuers

12. Duff & Phelps Inc
13. Fitch Investors Services Inc

Guidelines on Treatment of Derivatives Positions

Derivatives will be treated as 2 positions, Long and Short (The Two Legs Approach) by separating the relevant underlying of the derivatives as follows:

- (1) Positions in Forwards contracts and FRAs (both with financial instrument and interest rate as underlying, excluding foreign exchange) can be treated as two transactions. The first leg involves the underlying instrument, with a residual maturity equal the period until delivery or exercise period of the right, plus (if any) the life of the underlying instrument (**if the underlying instrument has a coupon, a coupon rate should be considered in the treatment of transaction as well**).³¹

The other leg involves that derivative where it is recorded as a **Zero Coupon Bond** with residual maturity equal the period until delivery or exercise period of the right (see Example 5, 6, and 7 in Attachment 3). For example, if FI has a Long position in Forward Bond, it must record the transaction as follows. 1) a Long position in instrument intended to deliver, with a maturity equal the residual period until delivery according to the Forward contract, plus the life of the Bond, for which the value to be recorded equals market value or the value according to the internal model of the instrument to be delivered. 2) a Short position in a Zero Coupon instrument, with residual maturity equal the delivery date according to the Forward contract, for which the value to be recorded equal Present Value of Face Value.

- (2) Positions in Future contracts can generally be treated as a Long and Short position. The value to be recorded is the same as the case of Forwards for a Cash Settlement case, or a settlement with instrument specified in the contract. However, if the Exchange allows other instruments to be delivered in place of the instrument specified in the Futures contract, FI should take into account of any Conversion Factor of the instrument to be delivered into the calculation.³²

³¹ That is, interest rate risk is correlated with the life of underlying instrument. Therefore, the life of the underlying instrument must also incorporate the life of derivatives and the life of underlying instrument (if any).

³² An example of transaction treatment where a range of deliverable instruments may be delivered in place of the instruments specified in the contract and Conversion Factor is specified already: the recorded value for both transactions equal the Face Value of the instrument in the future contract divided by Conversion Factor, then

- (3) Positions in Forward Foreign Exchange can be treated as a Long position (in a currency to receive in the future) and a Short position (in a currency to pay in the future) of 2 transactions of a zero coupon government bonds in 2 currencies, with residual maturity equal life of the Forward contract, for which the value to be recorded can be the value according to the internal model (Present Value Method) (see Example 9 in Attachment 3)
- (4) Positions in Swap contract can be treated as 2 notional positions with relevant maturity. For example, an Interest Rate Swap for which FI will receive floating-rate interest and pay fixed-rate interest will be treated as 1) a Long position (**receiving leg**) in a Zero Coupon Bond with the yield equal the floating rate, residual maturity equal the period until the next interest fixing, and 2) a Short position (**paying leg**) in a Bond with coupon rate equal the fixed rate, residual maturity equal the residual life of the Swap (see Example 4 in Attachment 3). The value to be recorded can be the value according to the internal model (Present Value Method). For a Swap contract that pays or receives a fixed or floating interest rate against some other reference price e.g. a stock price, the interest rate component shall be slotted into the relevant residual maturity ladder table; whereas the equity component shall be included in equity price risk table in accordance with the equity price risk assessment method. The various transactions under Cross-Currency Swap shall be reported in the relevant interest rate risk assessment table for the currencies concerned.
- (5) Positions in Repo agreement (borrowing of money) or Securities lending agreement and a Reverse Repo (lending of money) or Securities borrowing agreement can be recorded by market value or the value according to the internal model.

multiplied by current market price of instrument to be delivered. For example, a Long position in Bond Future is treated as 1) a Long position the instrument to be delivered, taking into account of any Conversion Factor specified, and 2) a Short position in instrument with no coupon, with residual maturity equal the delivery date of the Future contract. (See Example 3 in Attachment 3)

- (a) Repo or Securities Lending agreement shall be treated as a Short position (receiving cash first with an obligation to deliver or pay in the future) in the underlying instrument, with residual maturity equal the life of the contract, a coupon rate equal the borrowing rate under Repo agreement (or discount rate of Repo), and the contract value equal the market price or the value according to the internal model.
- (b) Reverse Repo or Securities Borrowing agreement shall be treated as a Long position (receiving cash in the future) in the underlying instrument, with residual maturity equal life of the contract, a coupon rate equal the lending rate under the Reverse Repo agreement, and the contract value equal the market price or the value according to the internal model.
- (c) The underlying instrument shall be allocated in the same account and will be assessed its risk according to the type of the account.

Names of Countries and Securities Indices Considered to be Liquid

Australia	All Ordinaries	Netherlands	EOE 25
Austria	ATX	Spain	IBEX 35
Belgium	BEL 20	Sweden	OMX
Canada	TSE 35	Switzerland	SMI
France	CAC 40	Thailand	SET 50
Germany	DAX	UK	FTSE 100
Hong Kong	Hang Seng	UK	FTSE mid-250
Italy	MIB-30	USA	S&P 500
Japan	Nikkei 225		

**Example: Risk Calculation of Options (Standardised Approach)
in Delta-Plus Method and Scenario Analysis**

Example of Risk Calculation by the Delta-Plus Method

Assuming that 1) AUD is a Local Currency and 2) FI holds the following portfolio of Options on foreign exchange.

Option	Currency pair	Market Value of underlying (AUD)	Delta	Gamma	Vega	Assumed volatility (%)
1	AUD/USD	100	-0.803	0.0018	1.84	5
2	AUD/USD	600	-0.519	-0.0045	-3.87	20
3	AUD/USD	200	0.182	-0.0049	-0.31	20
4	AUD/USD	300	0.375	0.0061	4.97	10
5	GBP/JPY	100	-0.425	0.0065	5.21	10
6	GBP/JPY	50	0.639	-0.0016	-4.16	7
7	GBP/JPY	75	0.912	0.0068	3.15	5

(a) Step 1 Multiply the Delta with the market value of the underlying currency, then calculate the net position in each currency (see the table below)

USD -242.80
 GBP +57.85
 JPY -57.85

Assuming that FI does not have any other foreign exchange positions, inclusion of these positions into the calculation as specified in the guideline on maintenance of capital for foreign exchange risk will result in an Open Position of 300.65, with Capital Charge of 24.05 (300.65 x 0.08)

(b) Step 2 Calculate the Gamma impact as follows:

from the formula: $\frac{1}{2} \times \text{Gamma} \times (\text{Market Value of underlying} \times 0.08)^2$
 for each pair of currencies, the net Gamma impact is equal
 AUD/USD -4.00
 GBP/JPY +0.32

Only the negative Gamma impacts are included in the capital calculation, hence the capital charge for Gamma risk is 4.00

Option	Currency pair	Delta x Market Value of underlying	Gamma Impact
1	AUD/USD	-80.30	0.0576
2	AUD/USD	-311.40	-5.1840
3	AUD/USD	36.40	-0.6272
4	AUD/USD	112.50	1.7568
5	GBP/JPY	-42.50	0.2080
6	GBP/JPY	31.95	-0.0128
7	GBP/JPY	68.40	0.1224

(c) **Step 3** Capital charge for Vega risk is based on the Implied volatilities of each Option. Calculate the Assumed Price Changes by multiplying the assumed Volatilities shift of 25 percent for each Option with Vega. These are then summed for each currency pair (see the table below).

The net Vega impact is equal

AUD/USD -6.18

GBP/JPY +9.68

Since capital charge for Vega does not allow netting of opposite signs, the total capital charge is equal the sum of the Vega impacts, without a sign, which is $6.18 + 9.68 = 15.86$

Finally, all capital charges calculated from (a)-(c) is summed to $24.05 + 4.00 + 15.86 = 43.91$

Option	Currency pair	Assumed volatilities (%)	Vega	Volatility shift (percentage points)	Change in Value (AUD)
1	AUD/USD	5	1.84	1.25	2.30
2	AUD/USD	20	-3.87	5.00	-19.35
3	AUD/USD	20	-0.31	5.00	-1.55
4	AUD/USD	10	4.97	2.50	12.43
5	GBP/JPY	10	5.21	2.50	13.03
6	GBP/JPY	7	-4.16	1.75	-7.28
7	GBP/JPY	5	3.15	1.25	3.94

Example: Risk calculation using Scenario Analysis or Contingent Loss Approach

Suppose FI holds Portfolio of 2 stocks and 2 associated Options as follows:

	Number of stocks	Current price (USD)
Long AAA	100	19.09
Short BBB	50	1.79

Options	No. of stocks	Option Type	Maturity (year)	Strike price	Volatility (%)
Long AAA	50	Call	0.45	20	0.15
Short BBB	20	Put	0.36	2.25	0.42

Step 1 Calculate the change in the value of Portfolio of equities (USD) by applying the price movement over the range of +/- 8 percent (at least 7 equal interval of shifts) as follows:

	Assumed price change (%)						
	-8.00	-5.33	-2.67	0.00	2.67	5.33	8.00
AAA	-152.72	-101.81	-50.91	0	50.91	101.81	152.72
BBB	7.16	4.77	2.39	0	-2.39	-4.77	-7.16

Step 2 Calculate the change in the value of the AAA Call Options and BBB Put Options positions using the Matrix of changes in price and Volatility (the value must be assessed by an appropriate pricing model).

AAA Call Options – Change in value (assume that the value is from an Option Pricing Model)

Assumed Volatility Change (%)	Assumed price change (%)						
	-8.00	-5.33	-2.67	0.00	2.67	5.33	8.00
+25	-8.26	-4.38	0.98	8.02	16.93	27.78	40.58
0	-12.10	-9.63	-5.73	0	7.88	18.13	30.81
-25	-14.30	-13.27	-11.12	-7.20	-0.83	8.52	21.08

BBB Put Options – Change in value (assume that the value is from an Option Pricing Model)

Assumed Volatility Change (%)	Assumed price change (%)						
	-8.00	-5.33	-2.67	0.00	2.67	5.33	8.00
+25	-2.81	-2.07	-1.36	-0.68	-0.02	0.62	1.22
0	-2.32	-1.52	-0.75	0	0.72	1.41	2.08
-25	-1.88	-0.96	-0.04	0.89	1.81	2.73	3.65

Step 3 Calculate the sum of changes in the Portfolio value, including the underlying equities and Options from Step 1 and 2 to have the Contingent Loss Matrix as follows:

Assumed Volatility Change (%)	Assumed price change (%)						
	-8.00	-5.33	-2.67	0.00	2.67	5.33	8.00
+25	-156.62	-103.49	-48.91	7.35	65.43	125.43	187.36
0	-159.98	-108.19	-54.99	0	57.12	116.59	178.45
-25	-161.74	-111.27	-59.68	-6.31	49.50	108.29	170.28

In sum The capital charge is the largest amount of loss in the Contingent Loss Matrix, in this case is 161.74.

**Example: Calculation of Market Risk Capital Requirement
(using Internal Model to calculate Specific Risk)**

General specifications (1) 99% confidence level

(2) the averaged daily VaR over the last 60 days

Assumptions (1) Multiplication factor from assessment of qualitative standards equals 3.4
(x = 3.4)

(2) Plus Factor from assessment of Back testing equals 0 (y = 0)

(4) Scaling Factor equals Multiplication Factor (3.4) + Plus Factor (0) = 3.4

(5) The model can assess the Idiosyncratic Risk only

(6) Specific risk of each issuer is not correlated and

(7) General market risk and Specific risk is not correlated.

Case 1: The model can measure VaR of (GR) **together with** Specific risk (SR), only the Idiosyncratic Risk, **not the Event and Default Risk**. Hence the **Surcharge** must be added. In this case (assessed together) **equals VaR of General market risk and Specific risk** according to the guidelines in 16 and 17.2 in the **guideline on assessing Specific Risk by the Internal Model**

Approach

Given that

Stock	Market Value	Volatility per annual (S.D)	Correlation
A	10,000	38%	0.18262
B	10,000	49%	

Calculation method

	(1)	(2)	(3) = (2)/ 250 ^{1/2}	(4)	(5)
Stock	Market Value	Volatility p.a. (S.D.)	Volatility per day (S.D.)	Correlation	Z score at 99%
A	10,000	38%	2.403%	0.18262	2.33
B	10,000	49%	3.099%		

Total risk

Stock	Individual VaR = (1)*(3)*(5)	VaR of the equity portfolio = VaR (GR+SR _{Idio}) _{portfolio}
A	559.98 ----- (6)	$\{(6)^2 + (7)^2 + 2[(4)*(6)*(7)]\}^{1/2}$ = 991.286 ----- (8)
B	722.07 ----- (7)	

Therefore, FI must maintain capital for market risk calculated by the Internal Model Approach of the amount [VaR (GR +SR) * Scaling Factor] + Surcharge [= VaR (GR+SR)], which equals

$$[991.286*3.4] + 991.29 = 4,361.658 \text{ หรือ } [991.286*4.4] = 4,361.65$$

Case 2: The model can measure VaR of General market risk **separate from** VaR of Specific Risk, only the Idiosyncratic Risk, **not the Event and Default Risk**. Hence, the **Surcharge** must be added. In this case (assessed separately) equals **VaR of Specific risk** only, according to the guidelines in 16 and 17.1 of **the guideline on assessing Specific Risk by the Internal Model Approach**

Given that

	(1)	(2)	(3)	(4) = (3)/ 250 ^{1/2}	(5)
Stock	Market Value	β(share/Index)	Volatility SET p.a	Volatility SET p.d	ค่า Z ที่ 99%
A	10,000	0.5873	29.70%	1.878%	2.33
B	10,000	1.3822			

The formula used to calculate the Residual volatilities of each equity is

$$\delta_{res} = \sqrt{\delta_{Share}^2 - \beta^2 \delta_{Index}^2} \quad (\text{refer to CAPM theory})$$

Calculation method

(2.1) Use CAPM to calculate the General market risk

Stock	(6) = (1)*(2)
A	5,873
B	13,822
Total	19,695 => (7)

Hence, General market risk equals (7)*(4)*(5) = 861.98 ----- (A)

(2.2) Use Residual Volatilities to calculate Specific risk (only the Idiosyncratic risk)

$$\delta_{res} = \sqrt{\delta_{Share}^2 - \beta^2 \delta_{Index}^2}$$

	(8)	(9)	(10)	(11)	(12)
Stock	Market Value	Volatility p.a.	Residual volatility p.a. = $\{(9)^2 - (2)^2 * (3)^2\}^{1/2}$	Residual volatility p.d. = $(10)/250^{1/2}$	Idiosyncratic risk = $(8)*(11)*(5)$
A	10,000	38%	34%	2.135%	497.50 ----- (13)
B	10,000	49%	27%	1.692%	394.26 ----- (14)

The Correlation between equity A and equity B is 0 (by assumption),

So that the Total Idiosyncratic Risk is equal $\{(13)^2 + (14)^2\}^{1/2} = 634.7761$ ----- (B)

And the Total Risk is equal $\{(A)^2 + (B)^2\}^{1/2} = 1,070.492523$

Hence, FI must maintain capital for market risk calculated by the Internal Model Approach of the amount

[[VaR (GR) + VaR (SR)] * Scaling Factor] + Surcharge [= VaR (SR)], which is equal

$$[1,070.4925 * 3.4] + 634.7761385 = 4,274.450717$$

Supporting Documents and Data for Applying to use Internal Model

FI must submit documents and information as specified below, together with a letter to request for an approval to use an internal model to assess market risk capital charges. The BOT may request for additional information or documents for the consideration.

Qualitative information associated with market risk management and internal control

1. List of committees that involves in market risk management, including the role, responsibility and frequency of a meeting
2. Organization structure, lines of authority / reporting, role, responsibility, and approving authority of the treasury unit and the risk controlling unit
3. Trading book policy
4. Management and staffs involved in the internal model development: specify education background and relevant experiences, including the detail of training on the model and the result from the model
5. The detail of the approval process for use of the internal model of FI and a process to report any material change in the model to the management
6. A guideline or method used in setting various Limits, for example, Limits the overall market risk of FI, Limits by risk factors or by type of instruments, or Limits for staffs of each level and the person with approving authority, including frequency of a review of Limits
7. Important statistics or reports, that is, cancellation report, correction report, confirmation report, exception report, and off-hour transactions
8. Internal audit report or external audit report, including a report of special audit report on a dealing room, a risk controlling unit, and an operation unit
9. Detail of the computer system and the network system in a dealing room, a risk controlling unit, and an operation unit.
10. Contingency plan and business continuity plan when the system fails to operate

Detail on the internal model

1. The Methodology used to measure the Value at Risk (VaR) of the internal model, together with the following information:
 - 1.1 The level of Confidence Interval
 - 1.2 The Holding Period
 - 1.3 The period of historical data used in a calculation of volatilities, and the Weighting Scheme used in the calculation
 - 1.4 Other relevant assumptions
 - 1.5 Scaling factor
2. Detail of other models associated, e.g. CAPM Model and Option Pricing Model, and the Interface of those models with VaR model
3. Correlation between market risk factors
4. The methodology used to assess Specific Risk in the internal model
5. The methodology used to value and assess risks of Non-linear financial instruments
6. The methodology used to value and assess risks of instruments with no market prices or illiquid instruments
7. Calculation frequency of the model and the computation time period

Input and Use of Output of the model

1. Calculation of various positions, including sources of input, and assumptions used in pricing
2. List of instruments / financial instruments that use the internal model to assess risk
3. Back Testing Report
4. Stress Test Report and the Scenarios
5. Reports from risk assessment by the Internal Model Approach, Report on the associated risk Limits, including sample of important reports prepared by the risk controlling unit and the operation unit, frequency and receivers of these reports.
6. Profit/ loss report of each Trading Desk over the last 12 months

Example: Questions-Answers on Key Issues

Guideline on Assessing Positions in Trading Book

Question 1 How to compute a 6-month average of transactions in a trading book?

Answer The average trading book transactions is calculated by averaging the trading book transactions as at the end of Jan-June and Jul-Dec with 6 months in order to compare with the trading book Threshold.

Question 2 Why does the BOT require that FI set a guideline to separate Trading Book transactions and Banking Book transactions, though FI already does this in accounting practice?

Answer The objectives of separating between Trading Book and Banking Book according to the policy are for FI to manage the market risk properly, and for FI with significant level of transactions to maintain sufficient capital. So the objectives are different from booking a transaction according to the accounting standard, which is a broader guideline, compared to this guideline of BOT. Nevertheless, the basic concept should be in accord.

Question 3 From the report on trading book transaction item 6: should the assets, liabilities, and off-balance sheet transactions be denominated in baht only?

Answer They should include all currencies converted into baht equivalent amounts.

Question 4 If FI has an averaged transactions above the Threshold in the first period (Jan-Jun) and has submitted the report to BOT, but the averaged transactions in the second period is lower than the Threshold, FI does not submit the report the BOT?

Answer Once FI has the level of transactions above the Threshold, it indicates that the FI is an FI with significant level of transactions, therefore it must comply with this guideline both in terms of report and capital calculation, until it receives an approval from the BOT to be exempted from this guideline.

Question 5 How many FIs have the level of transactions above the Threshold of 3,000 million baht?

Answer BOT's current data on transactions level is an initial estimate from the existing reports and questionnaire from FIs, not a true data, since the guidelines has not yet been in effect. Later on, once FIs starts submitting actual data, BOT will be able to review the Threshold so that it is suitable with the market condition. In this respect, BOT may consider using a fair value for derivative transactions, if most FIs are ready to do so.

Question 6 Are back-to-back transactions with customers considered to be a trading book transaction?

Answer Derivative transactions of customers are considered as a trading book transaction (except derivatives used for hedging banking book transactions). Hence a 100% back-to-back transaction to hedge a derivative transaction of customers is considered to be a trading book transaction as well. Both legs of the transactions must be accounted for, when compared with the Threshold. However in assessing the capital charge for both legs can be netted out.

Guideline on Formulating Trading Book Policy

Question 7 Why does BOT include Available for Sale instruments (according to Accounting Standard No. 40) in a Trading book, according to the Market Risk Supervision Policy (please refer to BOT's definition)?

Answer The objective of the trading book policy is for the Market Risk Supervision Policy only, not directly related to separation of accounts according to the Accounting Standard No. 40. This policy considers a true trading behavior of an instrument: an Available for Sale instrument with a true trading behavior as that of a trading book will be accounted for as a trading book instrument in accordance with the Market Risk Supervision Policy.

Question 8 What should be a Holding period of instruments in a Trading Book?

Answer Each FI should specify its own Holding period to be in line with its business strategy and the market risk management policy. An examiner will monitor whether FI acts in accordance with the policy or not. A Holding period is not a residual maturity of an instrument but is the period from purchasing the instrument until selling it out. In addition, FI can specify different Holding Periods for different instruments. BOT does not explicitly specify the time period but

allows FI to specify itself as appropriated. However, a long holding period means FI has a tendency to have instruments in a Trading Book, for which market risk capital must be maintained.

Question 9 What should an FI do, if it wishes to have its own policy guidelines, different from that of BOT, and may be scattered in other documents?

Answer FI should formulate a policy guideline that is in line with the minimum requirement specified by BOT and organize them in groups so that BOT examiners can review them.

Question 10 How should FI treat a position that hedges a trading book position, according to the policy guideline?

Answer Principle is to transfer Hedging Instruments/transaction to the same book (trading book or banking book) as the Hedged Instruments

Therefore, this issue can be considered as follows:

1. If an instrument in a trading book is used to hedge market risk of a position in a banking book, one-on-one hedge (fully or partly)

Answer that instrument must be transferred to a banking book with the value used to hedge a position in a banking book, and does not have to comply with the Market Risk Supervision Policy on a trading book

Example a position in a Banking Book of the amount 100 baht, which is hedged by an instrument in trading book with value 80 baht, the position in a banking book of the value 80 baht will be considered as in a banking book

2. If an instrument or a position in a banking book is used to hedge the risk of a position in a trading book, one-on-one hedge (fully or partly)

Answer the General market risk of that instrument must be transferred to a trading book and is calculated according to the associated risks e.g. interest rate risk should be considered as a position in a Zero coupon bond in the relevant table. Counterparty risk (risk from a situation where a counterparty cannot fulfil the contract or a default) of that instrument will be assessed in accordance with a credit risk guideline for a banking book. Nevertheless, capital charge for Specific risk in a banking book will already be included.

3. If an instrument in a trading book is used to hedge many positions in a banking book simultaneously (Portfolio hedging) or vice versa (which may be a Partial hedging)

Answer

(1) If an instrument in a trading book is used for a Partial hedging of transactions in a banking book or for hedging of Portfolio of banking items, the instrument must be transferred to a banking book.

(2) If an instrument in a banking book for a Partial hedging of transactions in a banking or for hedging of Portfolio of trading items, the General market risk must be proportionately transferred to a trading book and calculated according to the associated risks.

Question 11 Which instruments should be included in the calculation of trading book transactions?

Answer Summarized as follows: 1) debt instrument and equity instruments in a trading book and 2) all derivatives transactions not used for hedging positions in a banking book

Question 12 How can BOT be sure that each FI follows the same standard in allocating groups of financial instruments?

Answer BOT has already specified the guideline on Trading Book Policy for each FI.

Question 13 How can BOT solve problems such as those from Marked to market e.g. Improvement of the data system, higher expenses and cost from the system, whereas certain instruments cannot be marked to market easily.

Answer BOT acknowledges that kind of problem, so that BOT specifies the level of trading book transactions considered to be significant. FI with the level of trading book transactions at and below the significant level will be supervised differently, so that it will be a burden to the FI, especially small FI with a few transactions. However, these institutions must have a system to timely and appropriately monitor their positions. FI with high level of and complex transactions must have a more complex system to measure and manage the risk, in accordance with an international standard. Higher expenses from improvement of the system will be beneficial to FI as it will result in a more efficient risk management system and more stability. Such will contribute to better credit worthiness from investors, Rating Agency, and analysts both domestic and overseas, and may help reduce cost of fund and/or improve the equity value.

Guideline on Market Risk Assessment by the Standardized Approach

Question 14 If one unit of FI has a position that may be allocated in a trading book, but closes the position with an Internal deal, how should market risk be assessed?

Answer Internal deals transactions between Trading desks or between internal units may or may not be recorded in a Trading Book. If FI chooses to record the Internal Deals, it shall consistently record all deals.

Question 15 The fact that BOT requires that instruments to be qualified as investment grade must be rated by at least 2 recognized credit rating agencies, since most Thai instruments are rated by only one of these credit rating agencies, will there be a problem in practice?

Answer BOT has already modified that guideline, for which an instrument to be qualified as Investment-grade can be rated by 1) at least 1 recognized international credit rating agency listed in Attachment 4 or 2) at least 1 credit rating agency locally incorporated, which has been approved from the Office of Securities Exchange Commission and the issuer company must registered its securities with an authorized exchange.

Question 16 How to record a Swap position that exchanges between 1) Floating rate + Fixed Spread and 2) Fixed rate?

Answer FI can offset these fixed rates before calculating the market risk. FI must consistently use such approach with other similar transactions, including the offsetting of opposite positions according to the specified guideline, for example, an exchange of LIBOR + 1.5 and fixed rate of 4 percent will be treated as an exchange of LIBOR and fixed rate of 2.5. However, such approach must be carried out for all transactions, both Long and Short positions.

Question 17 How to assess the risk of an investment in a Unit Trust of fund management companies?

Answer Treat unit trusts in all types of funds as securities resembling equity instruments, and thus their risk should be assessed according to the guideline on equity. That is, use market price equal the net asset value of that unit trust. Specific Risk Charge and General Market Risk Charge is at the rate of 8 percent.

Guideline on Market Risk Assessment by Internal Model Approach and Mixed Approach

Question 18 What is a procedure in applying to use its own model, in case that FI has its own internal model?

Answer To apply to use an internal model, FI must submit a letter of intention to use an internal model to assess market risk capital charge, including the minimum required documents as specified by the BOT (Attachment 9) to the Supervision Group. These documents must show that FI can comply with the guideline, both quantitative and qualitative. BOT will examine FI's internal model of before approving the use of internal model to calculate capital charge.

Question 19 Does FI have to submit the Risk Management Manual to BOT?

Answer No, but it should prepare the documents for BOT examiners.

Question 20 How should an approval procedure for a Pricing Model be?

Answer In line with the policy or rules specified by the board of directors, e.g. who has approving authority, what is a procedure, which products to use a Pricing Model.

Question 21 What guideline does BOT use to consider the accuracy and appropriateness of volatilities and correlations?

Answer Academically correct, correspond to specification of market risk factors and associated quantitative criteria

Question 22 In specification of interest rate risk factors, where FI must divide the time band on a yield curve into at least 6 intervals, is this specification too stringent?

Answer Not too stringent as BOT allows FI to decide on how to divide the 6 time intervals itself so as to correspond with types of transactions, strategy of FI, and liquidity position of each time band.

Question 23 According to the qualitative standard No. 4.6, page 57, FI has requested that phrase types of internal model to be used "are" to "such as" to give more flexibility.

Answer Currency BOT allows FI to calculate VaR according to the 3 methods specified. FI that wants to use other methods must ask for an approval from the BOT on a case-by-case basis.

Question 24 In footnote, page 57, which data set that FI must update daily?

Answer Volatility data must be updated every day.

Question 25 In conducting Back Testing, FI must use historical data of the last 250 calendar days or 250 business days

Answer 250 business days

Question 26 For the guideline that stipulates FI to conduct Stress Testing, how often does FI need to do this?

Answer Initially, FI must conduct Stress Testing at least every quarter or every time FI or BOT considers that an abnormal situation may causes an unacceptable level of risk.

Question 27 How can equity price risk of newly issued stocks be assessed, since there are not enough historical data for the calculation of Volatilities and Correlation

Answer FI may assess that risk by 1) Standardised Approach or 2) use Proxy of other equity with similar characteristics

Question 28 If FI has chosen to use the Internal Model Approach to assess risk and has a complex instrument that cannot be assessed by the internal model for the same component of risk, what should FI do? Can it revert to use the Standardized Approach?

Answer FI shall consult BOT on a case-by-case basis.

Question 29 Should maintenance of capital against market risk be adjusted every quarter since currently maintenance of capital against credit risk is adjusted every 6 months? If FI has to adjust every quarter, it must put some capital aside.

Answer The initial guideline requests that FI report capital fund for market risk every quarter; the report includes capital fund for credit risk in every quarter as well. However, this does not affect regulatory capital until the period of 6 months.

Question 30 In conducting Back Testing, which value between Hypothetical P&L and Actual P&L should FI use to compare with VaR from the model?

Answer BOT requires that FI use Hypothetical P&L because it can measure integrity of the model better than Actual P&L. However, Actual P&L should be used to compare with the impact of intra-day transactions.

Question 31 Can FI use the Volatility data from the averaged weekly price changes over a period of more than 1 years, in place of the daily averaged of at least 1 year ?

Answer BOT may consider allowing of FI to calculate the Weekly VaRs, using the data on weekly price changes over the past 257 business days or more. But in calculating capital charge, FI must convert the Weekly VaRs to VaR from price changes over 10 days, according to the specified guideline. In that case, FI must conduct Back Testing accordingly too.

Reports and Completion Instructions

Content of Reports related to Market Risk Supervision Policy

1. Report on Transactions in Trading Book

2 Report on Maintenance of Capital for Market Risk

Table Number

	<u>Standardized Method</u>
1	Summary of Capital for Interest Rate Risk Specific Risk
2	Summary of Capital for Interest Rate Risk General Market Risk
3	Summary of Capital for Equity Price Risk
4	Summary of Capital for Exchange Rate Risk
5	Summary of Capital for Commodity Price Risk Calculated by Simplified Method
6	Summary of Capital for Commodity Price Risk Calculated by Maturity Ladder Method
7	Summary of Capital for Option Risk Calculated by Simplified Method
8	Summary of Capital for Option Risk Calculated by Delta plus Method
9	Summary of Capital for Option Risk Calculated by Contingent Loss Method
	<u>Internal Model Approach</u>
10	Summary of Capital for Market Risk Calculated by VaR
11	Summary of Five Largest Daily Losses in the Quarter
	<u>Stress Testing</u>
12	Interest Rate (Change in Yield Curve)
13	Interest Rate (Change in Volatility)
14	Equity Price
15	Exchange Rate
16	Commodity Price

3 Report on Maintenance of Capital for Credit Risk and Market Risk

Bank Name
Report on Transactions in Trading Book
for the 6 month period from Jan (Jul).....to Jun (Dec).....Year:

	January to June (or July to December)						Average Proportion (%)
	Jan (Jul)	Feb (Aug)	Mar. (Sept.)	Apr. (Oct)	May (Nov.)	Jun (Dec.)	
1. Proportion of transactions in trading book (% to sum of total assets, liabilities, and derivatives transactions)							

Unit: thousands baht

2 On balance sheet transactions in trading book	Amount at month end						Average
2.1 Debt instruments position							
2.2 Repo /Reverse Repo and Security Borrowing /Lending position							
2.3 Equity position							
Total on balance sheet transactions in trading book							

3 Derivatives transactions in trading book	Amount at month end						Average
3.1 Interest rate and debt instrument related derivatives							
3.2 Equity price and equity index related derivatives							
3.3 Foreign Exchange related derivatives							
3.4 Commodity price related derivatives							
Total derivatives transactions in trading book							

4 Foreign exchange position of all currencies							
--	--	--	--	--	--	--	--

5 Total transactions in trading book							
---	--	--	--	--	--	--	--

6 Total assets, liabilities, and Derivatives transactions	Amount at month end						Average
6.1 Total assets							
6.2 Total liabilities							
6.3 Derivatives transactions in trading book							
6.4 Derivatives transactions in banking book							
Total assets, liabilities, and derivatives transactions							

Report Completion Instruction Report on Transactions in Trading Book

A. General Instruction

1. This is a report on transactions in a trading book of financial institution (FI). It aims to separate FI into 2 groups, that is, 1) FI with trading transaction amount at and above the threshold level and 2) FI with trading transaction amount below the threshold level, in order to specify the implementation scope of the Market Risk Supervision Policy. This report categorizes type of trading book transactions to be reported as follows 1) proportion of transactions in trading book pursuant to the guidelines specified by the BOT to total assets, liabilities, and derivatives transactions 2) On-balance sheet transactions in trading book 3) Derivatives transactions in trading book 4) Foreign exchange position of all currencies 5) Total transactions in trading and 6) Total assets, liabilities, and derivatives transactions. The amount to be reported must be in accordance with the guidelines and procedures prescribed by the BOT in the Market Risk Supervision Policy: Guidelines on Assessing Positions in Trading Book. FI must prepare supporting documents used in the preparation of the report, including arrange for an audit trail for the BOT examiners as well.

2. FI must prepare the report on transactions in trading book on a consolidated basis (all offices) for the last day of the month every month. The report must be submitted to the Data Provider Relations: Financial Institutions, Data Management Group, Bank of Thailand every 6 months by sending it to the BOT within 21 days from the last day of June and December. The reported amount shall be in thousands, with “,” after a thousandth and millionth digit.

3. FI must prepare the report in the form and procedure specified by the BOT, for which the BOT will send the letter to specify the form and manner to FI.

4. Should there be any questions regarding this report, please contact the Risk Supervision Policy and Analysis Department, Financial Institutions Policy Department, Bank of Thailand, Tel. 0-2283-6821, 0-2283-5483, 0-2356-7688 and 0-2283-5804

B. Item Definition

This is a report on transactions in a trading book, which is an item supporting the consideration on the implementation scope of the Market Risk Supervision Policy of FI. FI must report the amount of monthly transactions in a trading book for 6 months (starting January to June or July to December) and the averaged 6-month transactions (sum of 6 month outstanding divided by 6), and submit to the BOT. FI must categorize items by type of transactions and type of position in a trading book as follows:

1. Proportion of transactions in trading book pursuant to the guidelines specified by the BOT (to total assets, liabilities, and derivatives transactions) means the ratio of total transactions in a trading book of FI calculated as a percentage of total assets, liabilities, and derivatives transactions of FI ($\text{item 5} \times 100 / \text{item 6}$)

2. On-balance sheet transactions in trading book can be categorized by type of position as follows:

2.1 Debt instruments position means the sum of fair value of all Long and Short positions in debt instruments hold by FI in a trading book in accordance with the Trading Book Policy

2.2 Position from Repo (borrowing of money) or Security Lending Agreement and Reverse Repo (lending of money) or Security Borrowing of various items from the said transactions in the following cases:

(1) The case where Repo Agreement uses an instrument in a trading book as collateral or the case where an instrument in a banking book is used as collateral but for the purpose of using the money for trading book transactions

(2) The case where Security Lending Agreement intends to use the security received as a collateral for trading book transactions

(3) The Reverse Repo or Security Borrowing Agreement where FI intends to use the security received as collateral for lending of money or the security borrowed, for other transactions with trading intent e.g. use of bond in Reverse Repo or Security Borrowing Agreement to settle a contract on Short Bond

2.3 Equity position means the sum of fair value of all Long and Short positions in equity instruments hold by FI in a trading book in accordance with the Trading Book Policy.

Instruction for Trading Booking Report

Total on-balance sheet transactions in trading book means the sum of trading book transactions arisen from debt instruments position, Repo/ Reverse Repo and Security Borrowing/Lending position and equity position of FI (the sum of item 2.1 to 2.3)

3. Derivatives transactions in trading book means the sum of Notional Amount of all derivatives transactions in a trading book of FI, categorized by type of derivatives as follows:

3.1 Interest rate and debt instrument related derivatives means the sum of the notional amount of derivatives transactions with interest rate or debt instrument as underlying which FI undertakes for itself or for customers e.g Forward Bond, Bond Options, Interest Rate Swap, Interest Rate Options. Excluding derivatives transactions that FI undertakes to hedge positions in a banking book in accordance with the guidelines specified by the BOT.

3.2 Equity price and equity index related derivatives means the sum of notional amount of derivatives transactions with equity price or equity price index as underlying which FI undertakes for itself or for customers, e.g Equity Swap. Excluding derivatives transactions that FI undertakes to hedge positions in a banking book in accordance with the guidelines specified by the BOT.

3.3 Foreign Exchange related derivatives means the sum of notional amount of derivatives transactions with foreign exchange rate as underlying that FI undertakes for itself or for customers in accordance with the guidelines specified by the BOT e.g F/X Forward/Future, F/X Swap, Cross Currency Swap.

3.4 Commodity price related derivatives means the sum of notional amount of derivatives transactions with commodity price as underlying which FI undertakes for itself or for customers in accordance with the guidelines specified by the BOT

Total derivatives transactions in trading book means the sum of all derivatives transactions with interest rate, equity price, equity index, foreign exchange rate, or commodity price as underlying in a trading book of FI (the sum of item 3.1 to 3.4)

4. Foreign exchange position of all currencies (Aggregate Position) means the higher amount between 1) the Absolute Value of the Sum of all net FX overbought position converted into baht and 2) the Absolute Value of the Sum of all net FX oversold position converted into baht.

5. Total transactions in trading book means the sum on-balance sheet transactions in trading book, derivatives transactions in trading book, and foreign exchange position of all currencies (the sum of item 2, item 3, and item 4)

6. Total assets, liabilities, and Derivatives transactions means the sum of all assets, liabilities, and derivatives transactions

6.1 Total assets means the outstanding of all FI' s assets

6.2 Total liabilities means the outstanding of all FI' s liabilities

6.3 Derivatives transactions in trading book means the sum of notional amount of all derivatives transactions in a trading book of FI (equals item 3)

6.4 Derivatives transactions in banking book means the sum of notional amount of all derivatives transactions in a banking book of FI

Total assets, liabilities, and Derivatives transactions means the sum of total assets, total liabilities, derivatives transactions in trading book, and derivatives transactions in banking book (the sum of item 6.1 to 6.4)

Confidential

Bank Name.....

Reports of Maintenance of Capital for Market Risk

as of Date.....

Standardized Approach

unit: thousands baht

1. Capital for Interest Rate Risk

1.1 Capital for Specific Risk (from Table 1)	
1.2 Capital for General Market Risk (from Table 2)	
1.3 Capital for Interest Rate Option Risk Calculated by Simplified Method (from Table 7)	
1.4 Capital for Interest Rate Option Risk Calculated by Delta Plus Method (from Table 8)	
1.5 Capital for Interest Rate Option Risk Calculated by Contingent Loss Method (from Table 9)	
Total Capital for Interest Rate Risk	

2 Capital for Equity Price Risk

2.1 Capital for Specific Risk (from Table 3)	
2.2 Capital for General Market Risk (from Table 3)	
2.3 Capital for Equity Option Risk Calculated by Simplified Method (from Table 7)	
2.4 Capital for Equity Option Risk Calculated by Delta Plus Method (from Table 8)	
2.5 Capital for Equity Option Risk Calculated by Contingent Loss Method (from Table 9)	
Total Capital for Equity Price Risk	

3 Capital for Foreign Exchange Risk

3.1 Capital for Exchange Rate Risk (from Table 4)	
3.2 Capital for Foreign Exchange Option Risk Calculated by Simplified Method (from Table 7)	
3.3 Capital for Foreign Exchange Option Risk Calculated by Delta Plus Method (from Table 8)	
3.4 Capital for Foreign Exchange Option Risk Calculated by Contingent Loss Method (from Table 9)	
Total Capital for Exchange Risk	

4 Capital for Commodity Price Risk

4.1 Capital for Commodity Price Risk Calculated by Simplified Method (from Table 5)	
4.2 Capital for Commodity Price Risk Calculated by Maturity Ladder Method (from Table 6)	
4.3 Capital for Commodity Option Risk Calculated by Simplified Method (from Table 7)	
4.4 Capital for Commodity Option Risk Calculated by Delta Plus Method (from Table 8)	
4.5 Capital for Commodity Option Risk Calculated by Contingent Loss Method (from Table 9)	
Total Capital for Commodity Price Risk	

Internal Model Approach

1. Capital According to VaR (from Table 10)	
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Total Capital for Market Risk	
--------------------------------------	--

Table 1 Summary of Capital for Interest Rate Risk-- Specific Risk Standardized Approach

unit: thousands baht

	Type of Instrument	Position		Gross Position	Specific Risk Weight	Capital Charge
		Long	Short			
1	Government debt instruments				000%	
2	Other qualifying debt instruments with residual term to maturity 6 months or less				025%	
3	Other qualifying debt instruments with residual term to maturity more than 6 months up to 24 months				100%	
4	Other qualifying debt instruments with residual term to maturity more than 24 months				160%	
5	Other non-qualifying debt instruments				800%	
Total capital charge						

Table 2 Summary of Capital for Interest Rate Risk-- General Market Risk Standardized Approach

Method

unit: thousands baht

Time Band		Position (Baht)		Position (All Foreign Currency)		Capital Charge
Interest Rate 3% or More	Interest Rate less than 3% or if Calculated by Duration method	Long	Short	Long	Short	
1 month or less	1 month or less					
More than 1 - 3 months	More than 1 - 3 months					
More than 3 - 6 months	More than 3 - 6 months					
More than 6 - 12 months	More than 6 - 12 months					
More than 1 - 2 years	More than 1.0 - 1.9 years					
More than 2 - 3 years	More than 1.9 - 2.8 years					
More than 3 - 4 years	More than 2.8 - 3.6 years					
More than 4 - 5 years	More than 3.6 - 4.3 years					
More than 5 - 7 years	More than 4.3 - 5.7 years					
More than 7 - 10 years	More than 5.7 - 7.3 years					
More than 10 - 15 years	More than 7.3 - 9.3 years					
More than 15 - 20 years	More than 9.3 - 10.6 years					
More than 20 years	More than 10.6 - 12 years					
	More than 12 - 20 years					
Total Capital						

Table 3 Summary of Capital for Equity Price Risk Standardized Approach

unit: thousands baht

Country	Gross Position for Specific Risk			Total Capital for Specific Risk	Net Position for General Market Risk	Total Capital for General Market Risk 800%	Capital
	Positions with Specific Risk of 800%	Positions with Specific Risk of 400%	Positions with Specific Risk of 200%				
Thailand							
United States							
Japan							
England							
Germany							
Hong Kong							
Malaysia							
Singapore							
Others							
Total Capital							

Table 4 Summary of Capital for Foreign Exchange Risk: Standardized Approach

unit: thousands baht

Currency	Net Position	Long Position	Short Position
US Dollar			
Yen			
Pound Sterling			
Euro			
Hong Kong Dollar			
Ringgit			
Singapore Dollar			
Others			
฿			
Total Capital (the greter amount between the sum of the Long and Short positions of all currencies, multiplied by risk weight of 8%)*			

* The greater amount between

- 1) Sum of all net FX overbought position of all currencies converted into baht and
- 2) Sum of all net FX oversold position of all currencies covered into baht

Table 5 Summary of Capital for Commodity Price Risk Calculated by Simplified Method Standardized Approach

unit: thousands baht

Type of Commodity	Long Position	Short Position	Net Position	Gross Position	Capital Charge (1500% of Net Position plus 300% of Gross Position)
Total Capital					

Table 7 Summary of Capital for Option Risk Calculated by Simplified Method

unit: thousands baht

Position	Interest Rate	Equity Price	Foreign Exchange	Commodity Price
Purchased put & long underlying				
Purchased call & short underlying				
Purchased put				
Purchased call				
Total Capital Charge				

Table 8 Summary of Capital for Option Risk Calculated by Delta plus Method Method

unit: thousands baht

Position	Interest Rate	Equity Price	Foreign Exchange	Commodity Price
Gamma Impact				
Vega Impact				
Total Capital Charge				

Table 9 Summary of Capital for Option Risk Calculated by Contingent Loss Method

unit: thousands baht

Option type	Interest Rate	Equity Price	Foreign Exchange	Commodity Price
Total Capital Charge				

Table 10 Summary of Capital for Market Risk Calculated by Internal Model Approach

unit: thousands baht

	VaR End of quarter	VaR average over the past 60 days	Backtesting exceptions	Scaling Factors		Scaled Average VaR	Capital charge
			Based on hypothetical profit & loss	Multiplicative factor	Plus Factor		
Interest Rate							
General market risk							
Specific risk							
Total							
Equity Price							
General market risk							
Specific risk							
Total							
Exchange Rate							
Commodity Price							
Total							
Total Capital Charge							

Table 11 Summary of Five Largest Daily Losses in the Quarter

unit: thousands baht

	Date	Actual Loss	VaR
1			
2			
3			
4			
5			

Table 12 Summary of Stress Testing Interest Rate (Change in Yield Curve)

Currency	Scenario 1	Scenario 2	Scenario 3
Thailand			
United States			
Japan			
England			
Germany			
Hong Kong			
Malaysia			
Singapore			
Others			

* BOT will inform of the specified scenarios.

Table 13 Summary of Stress Testing Interest Rate (Change in Volatility)

Currency	Change in Volatility (%)		
	Scenario 1	Scenario 2	Scenario 3
Thailand			
United States			
Japan			
England			
Germany			
Hong Kong			
Malaysia			
Singapore			
Others			

* BOT will inform of the specified scenarios.

Table 14 Summary of Stress Testing Equity Price

Country	Change in Volatility (%)		
Thailand			
United States			
Japan			
England			
Germany			
Hong Kong			
Malaysia			
Singapore			
Others			

* BOT will inform of the specified scenarios.

Table 15 Summary of Stress Testing Foreign Exchange

	Change in Volatility (%)		
Currency			
Thailand			
United States			
Japan			
England			
Germany			
Hong Kong			
Malaysia			
Singapore			
Others			

* BOT will inform of the specified scenarios.

Table 16 Summary of Stress Testing Commodity Price

	Change in Volatility (%)		
Type of Commodities			

* BOT will inform of the specified scenarios.

Report Completion Instruction

Report on Maintenance of Capital for Market Risk

A. General Instructions

1. This is a report on maintenance of capital for market risk, which categorizes capital items by 3 different approaches of risk assessment, namely, 1) Standardized Approach 2) Internal Model Approach and 3) Mixed Approaches between Standardized and Internal Model Approach. It covers 4 types of market risks: interest rate risk, equity price risk, Foreign Exchange Risk, and commodity price risk, pursuant to the guidelines and rules specified in the Notification of the Bank of Thailand Re: Maintenance of Capital for Market Risk of Financial Institutions (FI). In this respect, FI must prepare supporting documents in assessing all types of risk in all approaches, as well as provide an audit trail for BOT examiners.

2. FI must prepare the report on maintenance of capital for market risk on a consolidated basis (all offices) for the last day of the month every month. The report must be submitted (only the report, excluding supplementary tables) in 2 copies to the Data Provider Relations: Financial Institutions, Data Management Group, Bank of Thailand within 21 days from the last day of the reporting month. The amount of capital categorized by calculation approaches, and type of capital to absorb risk shall be in thousands, with “,” after a thousandth and millionth digit.

3. FI must prepare the report in the form and procedure specified by the BOT, for which the BOT will send the letter to specify the form and manner to FI.

4. Should there be any questions regarding this report, please contact the Risk Supervision Policy and Analysis Department, Financial Institutions Policy Department, Bank of Thailand, Tel. 0-2283-6821, 0-2283-5483, 0-2356-7688 and 0-2283-5804

B. Items Definitions

This is a report on maintenance of capital for market risk of FI, which categorizes the items by different capital calculation approaches for different types of risks as follows:

Standardized Approach

1. Capital for interest rate risk means capital charge against interest rate risk calculated by the Standardized Approaches, namely, debt instruments, derivatives with debt instrument or interest rate as an underlying, including securities resembling debt instruments. The report can be categorized by types and methods of risk calculation under the Standardized Approach as follows:

1.1 Capital for Specific Risk means the sum of capital charge against Specific Risk in trading book positions that have interest rate risk and are calculated by the Standardized Approach. Excluding Specific Risk in Interest Rate Option positions calculated by the Simplified Method.

1.2 Capital for General Market Risk means the sum of capital charge against General Market Risk of trading book positions that have interest rate risk and are calculated by the Standardized Approach. Excluding General Market Risk of Interest Rate Option positions calculated by the Simplified Method and the Contingent Loss Method. FI can choose two methods in the calculating General Market Risk under the standardized Approach: 1) Maturity Ladder Method and 2) Duration Method. Once FI has chosen either one of these methods, it must consistently use that method, unless an approval from the BOT is obtained.

1.3 Capital for Interest Rate Option Risk Calculated by Simplified Method means the sum of capital charge against the risk of Interest Rate Option position in a trading book. Such calculation of capital charge against Specific Risk and General Market Risk is separate from the Standardized Approach in 1.1 and 1.2.

1.4 Capital for Interest Rate Option Risk Calculated by Delta-Plus Method means the sum of capital charge against the risk of Interest Rate Option positions in a trading book, calculated by Delta-Plus Method for Gamma and Vega risk only. Therefore FI must include the calculation of Specific Risk and General Market Risk of the underlying instruments in 1.1 and 1.2 too.

1.5 Capital for Interest Rate Option Risk Calculated by Contingent Loss

Method means the sum of capital charge against the risk of Interest Rate Option positions in a trading book calculated by Contingent Loss Method, which is the method to calculate General Market Risk only. Therefore FI must include the calculation of Specific Risk of the underlying instruments in 1.1 too.

Total Capital for Interest Rate Risk means the sum of capital charge against interest rate risk both Specific Risk and General Market Risk of all positions in a trading book calculated by the Standardized Approach as specified by the BOT (the sum of 1.1 to 1.5)

2. Capital for Equity Price Risk means capital charge against equity price risk calculated by the Standardized Approach, namely, equity instruments, derivatives with equity price or equity index as an underlying including securities resembling equity. The report can be categorized by types and methods of risk calculation under the Standardized Approach as follows:

2.1 Capital for Specific Risk means the sum of capital charge against Specific Risk of trading book positions that have equity price risk and are calculated by the Standardized Approach. Excluding Specific Risk of Equity Option positions calculated by the Simplified Method

2.2 Capital for General Market Risk means the sum of capital charge against General Market Risk of trading book positions that have equity price risk and are calculated by the Standardized Method. Excluding General Market Risk of Equity Option positions calculated by the Simplified Method and the Contingent Loss Method

2.3 Capital for Equity Option Risk Calculated by Simplified Method means the sum of capital charge against the risk of Equity Option in a trading book that FI chooses to use the Simplified Method. Such calculation of capital charge against Specific Risk and General Market Risk is separate from the Standardized Approach in 2.1 and 2.2.

2.4 Capital for Equity Option Risk Calculated by Delta-Plus Method means the sum of capital charge against the risk of Equity Option positions in a trading book calculated by the Delta-Plus Method for Gamma and Vega risk only. Therefore FI must include the calculation of Specific Risk and General Market Risk of the underlying instruments in 2.1 and 2.2 too.

2.5 Capital for Equity Option Risk Calculated by Contingent Loss Method means the sum of capital charge against the risk of Equity Option positions in a trading book

calculated by the Contingent Loss Method, which is the method to calculate General Market Risk only. Therefore FI must include the calculation of Specific Risk of the underlying instruments in 2.1 too.

Total Capital for Equity Price Risk means the sum of capital charge against equity price risk both Specific Risk and General Market Risk of all positions in a trading book calculated by the Standardized Approach as specified by the BOT (the sum of 2.1 to 2.5)

3. Capital for Foreign Exchange Risk means capital charge against foreign exchange risk -- General Market Risk calculated by the Standardized Approach, namely, various derivatives with exchange rate as an underlying. The report can be categorized by types and methods of risk calculation under the Standardized Approach as follows:

3.1 Capital for Foreign Exchange Risk means the sum of capital against foreign exchange risk -- General Market Risk of all positions hold by FI calculated by the Standardized Approach. Excluding General Market Risk of Foreign Exchange Option positions calculated by the Simplified Method and the Contingent Loss Method

3.2 Capital for Foreign Exchange Option Risk Calculated by Simplified Method means the sum of capital charge against the risk of Foreign Exchange Option in a trading book that FI chooses to use the Simplified Method. Such calculation of capital charge against General Market Risk is separate from the Standardized Approach in 3.1.

3.3 Capital for Foreign Exchange Option Risk Calculated by Delta-Plus Method means the sum of capital charge against the risk of Foreign Exchange Option positions in a trading book calculated by the Delta-Plus Method for Gamma and Vega risk only. Therefore FI must include the calculation of General Market Risk of the underlying instruments in 3.1 too.

3.4 Capital for Foreign Exchange Option Risk Calculated by Contingent Loss Method means the sum of capital charge against the risk of Foreign Exchange Option positions in a trading book calculated by the Contingent Loss Method, which is the method to calculate General Market Risk only.

Total Capital for Foreign Exchange Risk means the sum of capital charge against foreign exchange risk of all positions calculated by the Standardized Approach as specified by the BOT (the sum of 3.1 to 3.4)

4 Capital for Commodity Price Risk means capital charge against commodity price risk calculated by the Standardized Approach, namely, commodities and derivatives with commodity as an underlying. The report can be categorized by types and methods of risk calculation under the Standardized Approach as follows:

4.1 Capital for Commodity Price Risk Calculated by Simplified Method means the sum of capital charge against the risk of positions with commodity price risk -- General Market Risk calculated by the Simplified Method. Once FI has chosen the Simplified Method, it must consistently use it, unless an approval from the BOT is obtained. (if FI chooses the method in 1, there is no need to report the calculation according to the method in 2)

4.2 Capital for Commodity Price Risk Calculated by Maturity Ladder Method means the sum of capital charge against the risk of positions with commodity price risk -- General Market Risk calculated by the Maturity Ladder Method. Once FI has chosen the Maturity Ladder Method, it must consistently use it, unless an approval from the BOT is obtained. (if FI chooses the method in 2, there is no need to report the calculation according to the method in 1)

4.3 Capital for Commodity Option Risk Calculated by Simplified Method means the sum of capital charge against Commodity Option risk in a trading book that FI chooses to use the Simplified Method. Such calculation of capital charge against General Market Risk is separate from the Standardized Approach in 4.1 or 4.2.

4.4 Capital for Commodity Option Risk Calculated by Delta-Plus Method means the sum of capital charge against Commodity Option positions in a trading book calculated by the Delta-Plus Method for Gamma and Vega risk only. Therefore FI must include the calculation of General Market Risk of the underlying instruments in 4.1 or 4.2 too.

4.5 Capital for Commodity Option Risk Calculated by Contingent Loss Method means the sum of capital charge against the risk of Commodity Option positions in a trading book calculated by the Contingent Loss Method, which is the method to calculate General Market Risk only.

Total Capital for Commodity Price Risk means the sum of capital charge against commodity price risk all positions hold by FI calculated by the Standardized Approach as specified by the BOT (the sum of 4.1 to 4.5)

Internal Model Approach

1. Capital According to VaR means capital charge against market risk, both Specific Risk or General Market Risk, for trading book positions hold by FI. VaR shall cover interest rate risk, equity price risk, Foreign Exchange Risk, and commodity price risk, which FI has calculated by the Internal Model according to the guidelines and methods as specified by the BOT.

Total Capital for Market Risk means the sum of capital charge against market risk, both Specific Risk and General Market Risk of trading book positions that have interest rate risk, equity price risk, Foreign Exchange Risk, and commodity price risk. The methods of calculation approved by the BOT are Standardized Approach, Internal Model Approach, and Mixed Approach.

Table 1 Summary of Capital for Interest Rate Risk-- Specific Risk Standardized Approach

This is a summary table on calculation of capital charge for interest rate risk-- Specific Risk calculated by the Standardized Approach for trading positions hold by FI, including debt instruments, derivatives with debt instruments or interest rate as an underlying, and securities resembling debt instruments. But excluding Specific Risk of Option positions calculated by the Simplified Method. FI must report the following items:

1. Report the instruments or the underlying instruments by types as follows: 1) government debt instruments 2) Other qualifying debt instruments with residual term to maturity 6 months or less 3) Other qualifying debt instruments with residual term to maturity more than 6 months up to 24 months 4) Other qualifying debt instruments with residual term to maturity more than 24 months and 5) Other non-qualifying debt instruments

2. Report all trading book positions obtaining Specific Risk with the position value in accordance with the valuation method specified by the BOT. Including the underlying instruments obtaining Specific Risk from Option positions, which use the Delta- Plus Method and the Contingent Loss Method (Delta value multiplied by value of underlying instrument) as their risk calculation. Fill in the table by type of position (Long or Short)

3. Multiply the sum of each type of position by the risk weight (for Specific Risk), which depends on type of instruments or underlying instruments as specified by the BOT, i.e. 0%, 0.25%, 1.00%, 1.60% and 8.00%. The multiplication result is capital charge against interest rate risk-- Specific Risk calculated by the Standardized Approach for each type of instruments.

FI may separate the calculation of Specific Risk in more than one table, but FI must report the summary of all tables in table 1 and keep supplementary tables and supporting documents of the table for BOT examiners.

The sum of capital charge against Specific Risk in table 1 must be reported in item 1.1 Capital for Specific Risk of the Report on Maintenance of Capital for Market Risk.

Table 2 Summary of Capital for Interest Rate Risk -- General Market Risk Standardized Approach

This is a summary table on calculation of capital charge for interest rate risk -- General Market Risk calculated by the Standardized Approach with the Maturity Ladder Method or Duration Method for trading book positions, including debt instruments, derivatives with debt instrument or interest rate as underlying and securities resembling debt instruments. Excluding General Market Risk of Option positions calculated by the Simplified Method and the Contingent Loss Method. FI must report the following items:

1. Specify the method used to calculate General Market Risk and the currency of instruments or underlying instruments, and report all trading book positions obtaining General Market Risk by baht and foreign currency (sum of all currencies converted into baht)

2. Report various positions into the Time Band and the associated interest rates with the position values as specified by the BOT, including underlying instruments with General Market Risk from holding Option positions, which FI uses the Delta-Plus Method (Delta multiplied by value of underlying instruments) to calculate risk

3. Calculate both Vertical Disallowance and Horizontal Disallowance pursuant to the guidelines specified by the BOT, to have the total capital charge against General Market Risk Standardized Approach

If FI has instruments or underlying instruments in many currencies, it must prepare supplementary tables for the calculation of interest rate risk -- General Market risk by 7 major currencies, namely, US dollar, yen, pound sterling, Euro, Hong Kong dollar, Ringgit, Singapore dollar, and other currencies. The General Market Risk calculation results from the supplementary tables shall be summarized in Table 2. FI must keep the supplementary tables and supporting documents of the table for BOT examiners.

The sum of capital charge against General Market Risk in table 2 must be reported in item 1.2 Capital for General Market Risk of the Report on Maintenance of Capital for Market Risk

Table 3 Summary of Capital for Equity Price Risk Standardized Approach

This table is a summary table on calculation of capital charge against equity price risk, both Specific and General Market Risk calculated by the Standardized Approach for trading book positions, including equity instruments, derivatives with equity instruments or equity market indices as underlying and securities resembling equity instruments. Excluding Specific Risk of Option positions calculated by the Simplified Method and General Market Risk of Option Position calculated by the Contingent Loss Method FI must report the following items:

1. Report all types of equity instrument positions in a trading book in the calculation of equity price risk, categorized by country of equity instrument or equity market indices, that is, Thailand, United States, Japan, England, Germany, Malaysia, Singapore, and others

2. For Specific Risk, report the equity position by Gross Position according to valuation method specified by the BOT, including underlying instruments with Specific Risk from Equity Option positions using the Delta-Plus Method and the Contingent Loss Method (Delta multiplied by value of underlying instruments) as risk calculation

3. Calculate Specific Risk according to risk weight of instruments or underlying instruments, which is 8%, 4%, and 2%, to calculate Specific Risk of equity instruments pursuant to the guidelines and procedures specified by the BOT

4. For General Market Risk, report equity instrument positions by Net Position according to valuation method specified by the BOT, including underlying instruments with General Market Risk from Equity Option positions that FI uses the Delta-Plus Method to calculate risk

5. Calculate equity price risk -- General Market Risk as 8 percent of the Net Position of Long and Short position

If FI uses many supplementary tables in the calculation of equity price risk -- Specific and General Market risk, either by countries or others, FI must summarize the risk calculation into table 3. FI must keep the supplementary tables and supporting documents of the table for BOT examiners.

The sum of capital charge against equity price risk -- Specific Risk must be reported in item 2.1: Capital Charge for Specific Risk, and the sum of equity price risk -- General Market Risk must be reported in item 2.2: Capital for General Market Risk in the Report on Maintenance of Capital for Market Risk

Instruction for Capital Maintenance Report

Table 4 Summary of Capital for Foreign Exchange Risk Standardized Method

This is a summary table on calculation of foreign exchange risk calculated by the Standardized Approach, including foreign exchange, derivatives with exchange rate as underlying Excluding General Market Risk of Foreign Exchange Option positions calculated by the Simplified Method and the Contingent Loss Method. FI must **report the following items**

1. Report foreign exchange position by 7 major currencies, namely, US dollar, yen, pound sterling, Euro, Hong Kong dollar, Ringgit, Singapore dollar, and other currencies, according to valuation method prescribed by the BOT, including underlying instruments with General Market Risk from Option positions, which FI uses the Delta-Plus Method (Delta multiplied by contract amount) to calculate risk

2. Calculate capital charge against foreign exchange risk as 8 percent of the higher of 1) the Sum of all net FX overbought position of all currencies converted into baht or 2) the Sum of all net FX oversold position of all currencies converted into baht

If FI uses many supplementary tables in the calculation of foreign exchange risk, FI must summarize the risk calculation from the supplementary tables into table 4. FI must keep the supplementary tables and supporting documents of the table for BOT examiners.

The sum of capital charge against foreign exchange risk must be reported in item 3.1: Capital Charge for Foreign Exchange Risk in the Report on Maintenance of Capital for Market Risk.

Table 5 Summary of Capital for Commodity Price Risk Calculated by Simplified Method

This table is a summary table on calculation of commodity price risk calculated by the Simplified Method of commodity position hold by FI, including commodities, derivatives with commodity price or commodity price index as underlying. Excluding General Market Risk of Option positions calculated by the Simplified Method and the Contingent Loss Method FI must report the following items:

1. Report commodity positions by type of commodity according to the valuation method specified by the BOT, including underlying commodity with General Market Risk from Option positions that FI uses the Delta-Plus Method (Delta multiplied by contract amount) to calculate risk
2. Calculate capital charge against commodity price risk as 15 percent of net position plus 3 percent of the sum of gross Long and Short positions of each commodity type

If FI uses many supplementary tables in the calculation of commodity price risk, FI must summarize the risk calculation from the supplementary tables, categorized by commodity type, into table 5. FI must keep the supplementary tables and supporting documents of the table for BOT examiners.

The sum of capital charge against commodity price risk must be reported in item 4.1: Capital Charge for Commodity Price Risk Calculated by Simplified Method in the Report on Maintenance of Capital for Market Risk

Table 6 Summary of Capital for Commodity Price Risk Calculated by Maturity Ladder Method

This table is a table on commodity price risk assessment calculated by the Maturity Method for positions specified by the BOT to hold capital charge against, including commodity, derivatives with commodity price as underlying Excluding General Market Risk of Option positions calculated by the Simplified Method and the Contingent Loss Method FI must report the following items:

1. Report commodity positions by type of commodity and terms to maturity of the commodity or derivatives with commodity price as underlying according to the valuation method specified by the BOT, including underlying instrument with General Market Risk from Option positions that FI uses the Delta-Plus Method (Delta multiplied by contract amount) to calculate risk
2. Calculate capital charge against commodity price risk as 3 percent of Matched Position of the same time band
3. Calculate capital charge as 0.6 percent per time band for net position left from offsetting in the same time band and carried forward for offsetting of the next time band
4. For the net position left from offsetting of the last time band, FI must maintain capital in the proportion of 15 percent, in accordance with the guidelines and procedures prescribed by the BOT

If FI uses many supplementary tables in the calculation of commodity price risk, FI must summarize the risk calculation from the supplementary tables, categorized by commodity type, into table 6. FI must keep the supplementary tables and supporting documents of the table for BOT examiners.

The sum of capital charge against commodity price risk must be reported in item 4.2 in the Report on Maintenance of Capital for Market Risk

Table 7 Summary of Capital for Option Risk Calculated by Simplified Method

This table is a summary table on calculation of option risk by the Simplified Method, a standardized approach which FI chooses to calculate risk in Option positions with interest rate risk, equity price risk, foreign exchange risk and commodity price risk, only for certain positions as follows:

1. Purchased Put & Long Underlying means the sum of capital charge against Put Option position that FI buys while FI has a Long position in the particular underlying instrument. The capital charge calculated by the Simplified Method is the underlying value according to the valuation method specified by the BOT, multiplied by the sum of risk weights for Specific Risk (if any) and General Market Risk of that underlying instrument, less the In the Money Amount of that Option (if any), according to the guidelines and procedures specified by the BOT

2. Purchased Call & Short Underlying means the sum of capital charge against Call Option position that FI buys while FI has a Short position in that particular underlying instrument, calculated by the Simplified Method as described in 1.

3. Purchased Put means the sum of capital charge against Put Option that FI buys with no position in the underlying instrument calculated by the Simplified Method. The capital charge is the lesser of the value of underlying instrument multiplied by the sum of risk weights for Specific Risk (if any) and General Market Risk of that underlying instrument, compared to the market value of the Options

4. Purchased Call means the capital charge against Call Option position that FI buys with no position in the underlying instrument calculated by the Simplified Method as describe in 3.

FI must summarize the calculation of capital charge against Option positions calculated by the Simplified Method by type of risk in the Option positions, that is, interest rate risk, equity price risk, foreign exchange risk, and commodity price risk. The sum of capital charge against Option positions of each risk type must be reported in the Report on Maintenance of Capital for Market Risk as follows:

1. The sum of capital for Option positions with interest rate risk must be reported in item 1.3: Capital for Interest Rate Option Risk Calculated by Simplified Method in the Report on Maintenance of Capital for Market Risk

2. The sum of capital for Equity Option risk must be reported in item 2.3: Capital for Equity Option Risk Calculated by Simplified Method in the Report on Maintenance of Capital for Market Risk

3. The sum of capital for Option positions with foreign exchange risk must be reported in item 3.2: Capital for Foreign Exchange Option Risk Calculated by Simplified Method in the Report on Maintenance of Capital for Market Risk

4. The sum of capital for Option positions with commodity price risk must be reported in item 4.3: Capital for Commodity Option Risk Calculated by Simplified Method in the Report on Maintenance of Capital for Market Risk

If FI uses many supplementary tables categorized by type of risk in calculating Option Risk by the Simplified Method, FI must summarize the risk calculation from the supplementary tables into table 7. FI must keep the supplementary tables and supporting documents of the table for BOT examiners.

FI with Option positions other than those allowed by the BOT must use the Simplified Method to calculate risk in Option positions in according with the calculation procedures specified by the BOT.

Table 8 Summary of Capital for Commodity Option Risk Calculated by Delta-Plus Method

This table is a summary table on calculation of option risk by the Delta-Plus Method, a standardized approach which FI chooses to calculate risk for Option positions with interest rate risk, equity price risk, foreign exchange risk and commodity price risk. By calculating the Gamma and Vega risk in addition to Specific Risk (if any) and General Market Risk, calculated by the Standardized Approach specified by the BOT, and report in the table for Specific Risk and General Market Risk for each calculation table for each risk type as mentioned above.

FI must report risk in Option positions calculated by the Delta-Plus Method as follows:

1. Gamma Impact means the sum of capital charge against Gamma risk calculated by the formula: $\text{Gamma Impact} = \frac{1}{2} \times \text{Gamma} \times (\text{VU})^2$, whereas VU is the volatility of market value of the underlying instrument of Option, calculated in accordance with the guidelines specified by the BOT

2. Vega Impact means the sum of capital charge against Vega risk calculated by multiplying Vega of each Option position by 25 percent to reflect an increase in current volatility, the result of this must be summed across the same underlying instrument. The capital charge for Vega risk is the sum of Absolute Value of Vega across type of underlying instrument.

FI must calculate capital charge against Option positions calculated by the Delta-Plus Method by type of risk of the Option positions, that is, interest rate risk, equity price risk, foreign exchange risk, and commodity price risk. The sum of capital charge against Option position of each risk type must be reported in the Report on Maintenance of Capital for Market Risk

1. The sum of capital charge against Option position with interest rate risk must be reported in 1.4 Capital for Interest Rate Option Risk Calculated by the Delta-Plus Method in the Report on Maintenance of Capital for Market Risk

2. The sum of capital charge against Option position with equity price risk must be reported in 2.4 Capital for Equity Option Risk Calculated by the Delta-Plus Method in the Report on Maintenance of Capital for Market Risk

3 The sum of capital charge against Option position with foreign exchange risk must be reported in 3.4 Capital for Foreign Exchange Option Risk Calculated by the Delta-Plus Method in the Report on Maintenance of Capital for Market Risk

4 The sum of capital charge against Option position with commodity price risk must be reported in 4.4 Capital for Commodity Option Risk Calculated by the Delta-Plus Method in the Report on Maintenance of Capital for Market Risk

If FI uses many supplementary tables categorized by type of risk in calculating Option Risk by the Delta-Plus Method, FI must summarize the risk calculation, calculated by type of risk, from the supplementary tables into table 8. FI must keep the supplementary tables and supporting documents of the table for BOT examiners.

Table 9 Summary of Capital for Option Risk Calculated by Contingent Loss Method

This table is a summary table on calculation of option risk by the Contingent Loss Method for trading book Option positions with interest rate risk, equity price risk, foreign exchange risk and commodity price risk. FI must also report Specific Risk of Option position if the Option has Specific Risk included in Table 1: Summary of Capital for Interest Rate Risk -- Specific Risk by reporting the following items:

1. The sum of capital charge against Option position with interest rate risk calculated by the Contingent Loss Method according to the guidelines and procedures specified by the BOT must be reported in 1.5 Capital for Interest Rate Option Risk Calculated by the Contingent Loss Method in the Report on Maintenance of Capital for Market Risk

2. The sum of capital charge against Option position with equity price risk calculated by the Contingent Loss Method according to the guidelines and procedures specified by the BOT must be reported in 2.5 Capital for Equity Option Risk Calculated by the Contingent Loss Method in the Report on Maintenance of Capital for Market Risk

3. The sum of capital charge against Option position with foreign exchange risk calculated by the Contingent Loss Method according to the guidelines and procedures specified by the BOT must be reported in 3.4 Capital for Foreign Exchange Option Risk Calculated by the Contingent Loss Method in the Report on Maintenance of Capital for Market Risk

4. The sum of capital charge against Option position with commodity price risk calculated by the Contingent Loss Method according to the guidelines and procedures specified by the BOT must be reported in 4.5 Capital for Commodity Option Risk Calculated by the Contingent Loss Method in the Report on Maintenance of Capital for Market Risk

The capital charge against various risks in Option must be calculated from Maximum Loss of Options calculated by specifying changes in the price and volatility of the underlying instruments and assessing the impact on value of Options, the Maximum Loss is then used to calculate capital charge in accordance with the guidelines and procedures specified by the BOT.

If FI uses many supplementary tables to calculate Option Risk by the Contingent Loss Method, FI must summarize the risk calculation from the supplementary tables, which calculates the risk in Option risk according to the Contingent Loss Method into table 9. FI must keep the supplementary tables and supporting documents of the table for BOT examiners.

Instruction for Capital Maintenance Report

Table 10 Summary of Capital for Market Risk Calculated by Internal Model Approach

This is a summary table on capital charge against market risk calculated by the Internal Model Approach for positions with interest rate risk, equity price risk, foreign exchange risk and commodity price risk of FI obtaining the approval from the BOT to use the internal model to calculate market risk. FI must report capital charge against market risk according to the Internal Model Approach as follows:

1. Separate detail of the risk calculation by the internal model for various risks as approved by the BOT. The risk can be categorized into 1) interest rate risk: Specific Risk and General Market Risk 2) equity price risk: Specific Risk and General Market Risk 3) foreign exchange risk and 4) commodity price risk

2. FI that does not use the internal model to calculate Specific Risk must calculate Specific Risk by the Standardized Approach as specified above, both for interest rate and equity price risk. The calculation must be in Table 1 and Table 2 and the summary of Capital for Specific Risk – interest rate risk in 1.1 and equity price risk in 2.1 in the Report on Maintenance of Capital for Market Risk

3. Report the Value at Risk (VaR) of the last day of the quarter and the VaR averaged over the past 60 days, starting from the last day of the quarter, calculated from the internal model approved by the BOT

3. Conduct and show the result of Back Testing by comparing the Hypothetical P&L with VaR to come up with Scaling factor (Multiplicative Factors and Plus Factors) in calculating Scaled Average VaR (last-60-day averaged VaR multiplied by Scaling Factor) as specified by the BOT

4. Capital charge is the higher between VaR as at the last day of the quarter and the Scaled Average VaR (last-60-day averaged VaR multiplied by Scaling Factor)

Total capital charge for market risk calculated by the internal model must be reported in the Report on Summary of Capital for Market Risk Calculated by the Internal Model Approach – item 1 Capital According to VaR

FI that uses the internal model to calculate capital charge against market risk either in one or all of the risks must prepare the summary table on the 5 largest daily losses in the quarter and the summary table on Stress testing (Table 11- Table 16)

Table 11 Summary of Five Largest Daily Losses in the Quarter

This table is a supplementary table for FI that uses the internal model to calculate capital charge against market risk, for which FI must summarize the five largest daily losses in the reporting quarter and must report VaRs on the days that these losses incur as well.

Table 12 Summary of Stress Testing Interest Rate (Change in Yield Curve)

This is a summary of the impact of Stress Testing on VaR for trading book positions with interest rate risk, for which FI must prepare the summary table categorized by currency of instrument or underlying instrument, and must specify the scenario number and the conditions under that scenario e.g. change in Yield Curve as specified by the BOT

Table 13 Summary of Stress Testing Interest Rate (Change in Volatility)

This is a summary of the impact of Stress Testing on VaR for trading book positions with interest rate risk, for which FI must prepare the summary table categorized by currency of instrument or underlying instrument, and must specify the scenario number and the conditions under that scenario e.g. change in Volatility as specified by the BOT

Table 14 Summary of Stress Testing Equity Price

This is a summary of the impact of Stress Testing on VaR for trading book positions with equity price risk, for which FI must prepare the summary table categorized by country of instrument or underlying instrument, and must specify the scenario number and the conditions under that scenario e.g. change in Volatility as specified by the BOT

Table 15 Summary of Stress Testing Foreign Exchange

This is a summary of the impact of Stress Testing on VaR for trading book positions with foreign exchange risk, for which FI must prepare the summary table categorized by currency of instrument or underlying instrument, and must specify the scenario number and the conditions under that scenario e.g. change in Volatility as specified by the BOT

Table 16 Summary of Stress Testing Commodity Price

This is a summary of the impact of Stress Testing on VaR for trading book positions with commodity price risk, for which FI must prepare the summary table categorized by type of commodity or commodity price index, and must specify the scenario number and the conditions under that scenario e.g. change in Volatility as specified by the BOT

Confidential

Bank Name.....

Report on Maintenance of Capital for Credit Risk and Market Risk

as of Date.....

unit: thousands baht

Item		Amount	
1. Total Capital (2+3+4)			
2 Tier 1 Capital			
3 Tier 2 Capital			
4 Tier 3 Capital			
Item	Credit Risk	Market Risk	Sum of Credit Risk and Market Risk
5 Risk Weighted Assets			
6 Total Capital: Risk Weighted Assets (1/5)			
7 Tier 1 Capital: Risk Weighted Assets (2/5)			
8 Tier 2 Capital: Risk Weighted Assets (3/5)			
9 Tier 3 Capital: Risk Weighted Assets (4/5)			

Report Completion Instruction
Report on Maintenance of Capital for Credit Risk and Market Risk

A. General Instruction

1. This is a report on maintenance of capital for credit risk and market risk of financial institution (FI). It aims to specify the amount of capital charge against credit risk and market risk in accordance with the guidelines prescribed by the BOT, calculated as the proportion of risk weighted assets according to credit risk and market risk.

2. FI must prepare the report on maintenance of capital for credit risk and market risk on a consolidated basis (all offices) for the last day of the month every month. The report must be submitted to the Data Provider Relations: Financial Institutions, Data Management Group, Bank of Thailand within 21 days from the last day of the reporting month. The reported amount shall be in thousands, with “,” after a thousandth and millionth digit.

3. FI must prepare the report in the form and procedure specified by the BOT, for which the BOT will send the letter to specify the form and manner to FI.

4. Should there be any questions regarding this report, please contact the Risk Supervision Policy and Analysis Department, Financial Institutions Policy Department, Bank of Thailand, Tel. 0-2283-6821, 0-2283-5483, 0-2356-7688 and 0-2283-5804

B. Item Definition

This is a report on maintenance of capital for credit risk and market risk as prescribed by the BOT. It is categorized by type of capital and type of risk as follows:

1. Total capital means the sum of Tier 1, Tier 2 and Tier 3 capital of FI.

2. Tier 1 capital means FI's total Tier 1 in accordance with the guidelines and procedures for calculating Tier 1 capital in the Notification of the Bank of Thailand in a circulation No.BOT.FPG(31) cir. 1110/2546 and 1111/2546 Re: Maintenance of capital for commercial banks incorporated in Thailand and branches of foreign bank dated 2 May 2546 and No.BOT.FPG(31) cir. 1112/2546 Re: Maintenance of capital in proportion to assets and contingent liabilities of finance companies, including any changes in the above notifications to be made in the future.

3. Tier 2 capital means FI's total Tier 2 capital in accordance with the guidelines and procedures for calculating Tier 2 capital in the 3 Notifications of the Bank of Thailand mentioned in 2, including any changes in the aforementioned notifications to be made in the future.

4. Tier 3 capital means FI's total Tier 3 capital in accordance with the guidelines and procedures for calculating Tier 3 capital to be announced by the BOT.

5. Risk weighted assets means total risk weighted assets of FI categorized by type of risk and transactions as follows:

5.1 risk weighted assets according to credit risk means FI's total risk weighted assets according to credit risk calculated by the guidelines and procedures to calculate capital in accordance with the 3 Notifications of the Bank of Thailand mentioned in 2, including any changes to be made in the future.

5.2 risk weighted assets according to market risk means the multiplication of 12.5 and FI's total capital charge against market risk as reported in the Report on Maintenance of Capital for Market Risk, item: "Total Capital for Market Risk"

5.3 risk weighted assets according to credit risk and market risk means the sum of risk weighted assets according to 5.1 and risk weighted assets according to 5.2

6. Total capital : Risk weighted assets means the ratio of total capital to FI's risk weighted assets categorized by the following items:

6.1 Total capital: risk weighted assets according to credit risk means the ratio of total capital to FI's risk weighted assets according to credit risk (item 1 * 100/ item 5.1)

6.2 Total capital: risk weighted assets according to market risk means the ratio of total capital to FI's risk weighted assets according to market risk (item 1 * 100/ item 5.2)

6.3 Total capital: risk weighted assets according to credit risk and market risk means the ratio of total capital to FI's risk weighted assets according to credit risk and market risk (item 1 * 100/ item 5.3)

7. Tier 1 capital: Risk weighted assets means the ratio of total Tier 1 capital to FI's risk weighted assets categorized by the following items:

7.1 Tier 1 capital: risk weighted assets according to credit risk means the ratio of Tier 1 capital to FI's risk weighted assets according to credit risk (item 2 * 100/ item 5.1)

7.2 Tier 1 capital: risk weighted assets according to market risk means the ratio of Tier 1 capital to FI's risk weighted assets according to market risk (item 2 * 100/ item 5.2)

7.3 Tier 1 capital: risk weighted assets according to credit risk and market risk means the ratio of total Tier 1 capital to FI's risk weighted assets according to credit risk and market risk (item 2 * 100/ item 5.3)

8. Tier 2 capital: Risk weighted assets means the ratio of total Tier 2 capital to FI's risk weighted assets categorized by the following items:

8.1 Tier 2 capital: risk weighted assets according to credit risk means the ratio of Tier 2 capital to FI's risk weighted assets according to credit risk (item 3 * 100/ item 5.1)

8.2 Tier 2 capital: risk weighted assets according to market risk means the ratio of Tier 2 capital to FI's risk weighted assets according to market risk (item 3 * 100/ item 5.2)

8.3 Tier 2 capital: risk weighted assets according to credit risk and market risk means the ratio of total Tier 2 capital to FI's risk weighted assets according to credit risk and market risk (item 3 * 100/ item 5.3)

9. Tier 3 capital: Risk weighted assets means the ratio of total Tier 3 capital to FI's risk weighted assets categorized by the following items:

9.1 Tier 3 capital: risk weighted assets according to market risk means the ratio of Tier 3 capital to FI's risk weighted assets according to market risk (item 4 * 100 / item 5.2)