

Circular No.: BCS 355
Date: 29 December, 2004

From : Saudi Arabian Monetary Agency, Head Office, Riyadh
To : All Saudi Banks
Attn. : General Managers and Managing Directors
Subject: **Capital Adequacy Requirements for Market Risk**

In line with SAMA's policy to implement relevant and appropriate international banking supervisory standards, the Agency has decided to commence the implementation of the Basel II Capital Adequacy standard issued in June 2004, by the Basle Committee on Banking Supervision. While Basel II envisages major changes to the calculation of risk weightings and capital in the credit risk and operational risk areas, for market risk the 1996 Proposals will continue to apply. Consequently, SAMA requires all Saudi banks, to implement the 1996 Market Risk proposals from the first quarter of 2005. These rules do not apply to the licensed branches of foreign banks in the Kingdom as SAMA will be coordinating their capital adequacy with their home supervisors.

According to these proposals market risk emanates from trading portfolios, open positions in foreign currencies, derivatives and commodities. Consequently, banks are expected, where applicable, to include a market risk capital charge related to their relevant activities in measuring their capital adequacy.

Initially, banks should use the Standardized Methodology for calculating their total market risk. Subsequently, banks that can meet qualitative and quantitative pre-conditions for internal models may apply to SAMA for approval of their use. These applications should provide in detail information on the pre-conditions for the use of internal models. SAMA will study such applications and validate the models before granting an approval for their use in determining capital adequacy. Following the successful implementation of internal models for the general market risk, in due course, SAMA may permit the use of models for specific risk.

Earlier in May, 2003 the Agency had circulated to all banks a draft of these proposals including guidance notes and prudential returns for calculation of market risk and capital requirements. The banks' comments and the impact of the market risk proposals on their capital adequacy ratio was reviewed by the Agency. These were considered in the finalization of this Circular, Guidance Notes and Prudential returns. In this regard, the Agency is E-Mailing following documents which banks should utilize in implementing this Circular.

1. Detailed guidance notes for maintaining adequate capital against market risk – Attachment-1.
2. Summarized guidelines and instructions to complete prudential returns on market risk – Attachment-2.
3. A set of prudential returns related to market risk–Attachment-3.

SAMA requires all banks to confirm within 10 days by E-mail or Fax No. 466-2119 that they have received attachments 1 to 3 referred to above.

Initially all prudential reporting to SAMA would be in a hard copy form. The Agency will integrate the Q14-A returns with other prudential returns at the time of the next update and enhancement of the ERMS. The specific requirements are as follows:

- All domestic banks must submit their market risk returns on an annual basis i.e. as at Dec. 31 to be due within 20 days after the year end to SAMA. However, the initial annual return as at 31.12.2004 is due on 31.4.2005 to give banks more time for its implementation.
- Quarterly reporting will apply only to a bank where at the end of a calendar year it is determined that its trading portfolio is in excess of 5% of its total assets, or the overall impact on its risk asset ratio by including market risk is in excess of 1%.

Banks should also take note of a major change to the calculation of capital adequacy under credit risk, which should be done in conjunction with the implementation of the Market Risk proposal. From 1st January 2005, banks should use the Replacement Cost methodology instead of the Original Maturity method for determining the credit risk on their derivative positions, which are reported on Q-14. Some banks are already applying this methodology.

If you have any questions or require any further clarifications, please contact Mr. Abbas Hassan at 466-2526.

Best regards,

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ATTACHMENT - 1
Q - 14A

**SAMA's DETAILED GUIDELINES NOTES ON
THE MAINTENANCE OF ADEQUATE CAPITAL
AGAINST MARKET RISK BY SAUDI BANKS**

**SAMA
BANKING SUPERVISION DEPARTMENT
DECEMBER, 2004**

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Capital Adequacy requirements under Basle II issued in June 2004 includes a more comprehensive Capital Risk charge including a market risk charge as called for by the Market Risk Proposals of 1996.

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1. Introduction and Approach

1.1 Overall Framework

The Basle Committee on Banking Supervision issued its Basle II capital adequacy standard in June 2004. The Basle II provides a more risk sensitive a comprehensive framework. This is because it not only includes a more sophisticated methodology to measure credit risk capital charge, but it also includes, capital charges for operational risk and market risk. In this regard for market risk it adopts the 1996 market risk proposal.

In general credit risk is the risk that one party to a financial instrument will fail to discharge an obligation and cause the other party to incur a financial loss. Credit risk is seen as the most significant risk for the non-trading book activities of an institution. The capital requirements that address credit risk are set out in SAMA's prudential return Q-14 and apply to non-trading on-balance sheet assets and off-balance sheet assets such as guarantees, letters of credit, commitments and derivative instruments.

Market risk is the risk of losses in on-and off-balance sheet positions arising from movements in market prices. The market risks pertaining to the regulatory requirements are:

- For instruments in the trading book:
 - Interest rate position risk; and
 - Equity position risk.
- Throughout the bank
 - Foreign Exchange risk; and
 - Commodities risk.

Measurement Approaches

In measuring market risk, Saudi banks may apply the standardized approach, or they may utilize internal models. SAMA's proposed methodology for utilizing internal models is also attached.

If a bank wishes to use its internal models, it should make a formal application for SAMA's approval detailing the nature and description of the model, its market acceptance by other users, intended scope of application, i.e. specific components of market risk it will cover, timing and its ability to meet SAMA's quantitative and qualitative requirements.

1.2 Standardized Approach

The standardized methodology uses a “building-block” approach. The capital charge for each risk category is determined separately. Within the interest rate and equity position risk categories, separate capital charges for specific risk and the general market risk arising from debt and equity positions are calculated. Specific risk is defined as the risk of loss caused by an adverse price movement of a debt instrument or security due principally to factors related to the issuer. General market risk is defined as the risk of loss arising from adverse changes in market condition. A summary of the capital charges by instrument is given below.

This table illustrates a broad indication of capital charges. Specific instrument would be subject to additional charges. For example debt instruments in foreign currencies held in the trading book would be subject to both general market risk charges for interest rate position and Fx risk. The same debt instrument held outside the trading book would be subject to credit default risk and general market risk for Fx.

OVERALL RISK MATRIX EXCLUSIVE OF OPTIONS ⁵

Instruments	Market Risk ¹			Credit Risk ²
	Specific ³ Risk Charge	General Market Risk Charge	Options Risk Charge	Credit Default Risk Charge ¹
Interest rate position risk				
Fixed Rate Instruments	X	X		X
Derivatives related to Interest Rate Market	X ³	X		X
Equity position risk				
Equity instruments ²	X	X		
Equity Derivatives	X	X		X
Foreign exchange risk⁴				
Foreign exchange spot		X		X
Foreign exchange forward		X		X
Commodities risk				
Gold spot		X		X
Gold forward contracts		X		X
Commodity spot		X		X
Commodity forward contracts		X		X

¹ This refers only to trading book instruments.

² This refer to the credit risk as per 1988 Accord.

³ There would be a specific risk charge only if the issuer of the underlying security is a non-government organization.

⁴ Foreign exchange contracts with an original maturity of 14 calendar days or less and/or exchange traded contracts subject to daily margining requirements may be excluded from the capital calculation.

⁵ Option are not included, as they require a special treatment covered in Section # 3.

The standardized approach deals with interest rate, equity position, foreign exchange and commodities risk. A separate section sets out two possible methods for measuring the market risk in options of all kinds i.e. A carve out method, and the delta plus method.

1.3 **Internal Models**

Most internal models cover general market risk exposure, leaving specific risk to be measured through separate credit risk measurement systems i.e. the building block approach of the standardized methodology. Banks may use models for general market risk only for the present after obtaining SAMA's approval. Consequently they will be subject to capital charges for the specific risk not captured by their models.

For banks using internal risk management models to calculate the capital charge(s) there are seven sets of conditions that they must meet. These conditions given below, are also described in detail under chapter 4.

- Certain general criteria concerning the adequacy of the risk management system;
- Qualitative standards for oversight of the use of internal models by management;
- Guidelines for specifying an appropriate set of market risk factors (i.e., the market rates and prices that affect the value of banks positions);
- Quantitative standards setting out the use of common minimum statistical parameters for measuring risk;
- Guidelines for stress testing and back testing;
- Validation procedures for external oversight of the use of models; and
- Rules for banks which use a mixture of models and the standardized approach.

Banks with significant trading activities are encouraged to move towards an internal models approach and to integrate these with value at risk methodologies that are now commonly used by many trading banks.

1.4 **Scope of Application**

These requirements apply to all domestic banks, but exclude foreign banks branches¹ licensed in the Kingdom. While all trading On and Off balance sheet position are subject to market risk, derivative also have credit risk. This is because they face the risk of loss due to;

- Market fluctuations in the value of the underlying instrument;
- Failure of the counterparty to the derivative contract.

¹ SAMA will co-ordinate with Home Supervisors of foreign banks having branches licensed in the Kingdom.

Similarly, on-balance sheet assets held outside the trading book and funded by another currency and un-hedged for foreign exchange exposure are subject to both the market risk (i.e. foreign exchange) and credit risk capital requirements.

Each Banks should have a policy providing a definition of what items should be allocated to the trading book. For example, it may include on-and off-balance sheet positions in financial instruments acquired with the intent to resell in order to profit from short-term price or rate movements (or other price or rate variations). All trading book positions must be marked to market daily and the results reflected in an institution's earnings statement.

For market risk capital purposes, a bank may include in its measure for general market risk certain non-trading book instruments that it deliberately uses to hedge trading positions. Such instruments are not subject to a specific market risk capital charge, but instead, remain subject to the credit risk capital requirements. On the other hand, a bank should exclude instruments used to hedge non-trading positions.

A bank may not include or exclude items in the trading book to manipulate associated capital charges. Consequently, a Bank's policy should include the approval process for moving an item from one book to another and such policy should be consistently applied. Where this occurs there should be a clear trail documenting management's change of intent that will be reviewed, at a minimum by its external auditors and by SAMA.

In the same way as for credit risk, the capital requirements for market risk are to apply on a consolidated basis. SAMA will permit financial entities in a banking group which is running a global consolidated book and whose capital is being assessed on a global basis to report short and long positions in exactly the same instrument (i.e., currencies, commodities, equities or bonds), on a net basis, no matter where they are booked. Nonetheless, there may be circumstances in which individual positions should be taken into the measurement system without any offsetting against positions in the remainder of the group. This may be needed, for example, where there are obstacles to the quick repatriation of profits from a foreign subsidiary or where there are legal and procedural difficulties in carrying out the timely management of risks on a consolidated basis. Bank should document the rationale and procedures for determining when positions should be netted and not netted. These should be available for SAMA's review. Moreover, SAMA will retain the right to monitor the market risks of individual entities on a non-consolidated basis to ensure that significant imbalances within a group do not escape supervision.

1.5 **Capital Requirements**

(a) Definition of Capital

1. The principles form of eligible capital to cover market risks consists of shareholders' equity and retained earnings (tier 1 capital) and supplementary capital (tier 2 capital) as defined in the 1992 SAMA guidelines. But banks may also, at the discretion of SAMA employ a third tier of capital ("tier 3"), consisting of short term subordinated debt as defined in paragraph 2 below for the sole purpose of meeting a proportion of the capital requirements for market risks, subject to the following conditions:
 - Banks would be entitled to use tier 3 capital solely to support market risks. This means that any capital requirement arising in respect of credit and counterparty risk in the terms of the 1992 SAMA regulations including the credit counterparty risk in respect of derivatives in both trading and banking books, would need to be met by the existing definition of capital (i.e. tiers 1 and 2). However, any excess of Tier I and Tier II capital in meeting credit risk could be used to satisfy market risk.
 - Tier 3 capital will be limited to 250% of a bank's tier 1 capital that is required to support market risks. This means that a minimum of about 28% of market risks would need to be supported by tier 1 capital that is not required to support risks in the remainder of the book;
 - Tier 2 elements may be substituted for tier 3 up to the same limit of 250% in so far as the overall limits in the 1992 rules are not breached, that is to say eligible tier 2 capital may not exceed total tier 1 capital, and long term subordinated debt may not exceed 50% of tier 1 capital;
 - In addition total of tier 2 plus tier 3 capital should not exceed total tier 1.
2. For short term subordinated debt to be eligible as tier 3 capital, it needs, if circumstances demand, to be capable of becoming part of a bank's permanent capital and thus be available to absorb losses in the event of insolvency. It must, therefore, at a minimum;
 - Be unsecured, subordinated and fully paid up;
 - Have an original maturity of at least two years;
 - Not be repayable before the agreed repayment date unless the supervisory authority agrees;
 - Be subject to a lock-in clause which stipulates that neither interest nor principal may be paid (even at maturity) if such payment would mean that the bank would fall below or remain below its minimum capital requirements.

(b) Calculation of the Adjusted Capital Ratio

3. In order to ensure consistency in the calculation of the capital requirements for credit and market risks, an explicit numerical link will be created by multiplying the measure of market risk by 12.5 (i.e. the reciprocal of the minimum capital ratio of 8%) and adding the resulting figure to the sum of risk-weighted assets compiled for credit risk purposes from Q-14. The ratio will then be calculated in relation to the sum of the two, using as the numerator only eligible capital.
4. In calculating eligible capital, it will be necessary first to calculate the bank's minimum capital requirement for credit risk, and only afterwards its market risk requirement, to establish how much tier 1 and tier 2 capital is available to support market risk. Eligible capital will be the sum of the whole of the bank's tier 1 capital, plus all of its tier 2 capital under the limits imposed in the 1992 rules. Tier 3 capital will be regarded as eligible only if it can be used to support market risks under the conditions set out in paragraphs 1 and 2 above. The quoted capital ratio will thus represent capital that is available to meet both credit risk and market risk. Where a bank has tier 3 capital, within the limits set out which is not at present supporting market risks, it may report that excess as unused but eligible tier 3 alongside its standard ratio. An example of how this works is set out below.

EXAMPLE # 1

Calculation of Adjusted Capital Ratio

1. If a bank has tier 1 capital of 700, tier 2 capital of 100, tier 3 capital of 600, weighted risk assets for credit risk of 7,500 and a market risk capital charge of 350, it first has to multiply the measure of market risk by 12.5 to create trading book notional risk weighted assets. By doing this the bank creates a numerical link between the calculation of the capital requirement for credit risk, where the capital charge is based on the risk weighted assets, and the capital requirement for market risk, where instead the capital charge itself is calculated directly on the basis of the measurement systems as described. After the calculation of the minimum capital charge, the amount of capital that is eligible for meeting those requirements must be computed, starting with credit risk, covered in this example by 500 tier 1 capital and 100 tier 2 capital. This leaves 200 tier 1 capital available to support the banks market risk requirements, which - because of the 250% rule - means that only 500 of the tier 3 capital is eligible. Because this bank would only need to use 100 tier 1 capital and 250 tier 3 capital to meet its market risk capital requirement, the bank would have 100 tier 1 capital and 250 tier 3 capital that is unused but eligible for future market risk requirements.

2. For calculating the capital ratio, excess tier 1 capital should be taken into account as it can be used to meet credit and/or market risk requirements. Therefore, the capital ratio is calculated by dividing the eligible capital (excluding unused tier 3) by the total (notional) risk assets (1,505/11,875=8.8%). Excess tier 3 capital which is unused but eligible can also be calculated as an excess tier 3 capital ratio (250/11,875=2,1%).

<u>Risk Assets</u>	<u>Minimum Capital Charge</u>	<u>Available Capital</u>	<u>Minimum Capital for Meeting Requirement</u>	<u>Eligible Capital (excluding unused Tier 3)</u>	<u>Unused but Eligible Tier 3</u>	<u>Unused but not eligible Tier 3</u>
Credit 7,500 Risk	600	Tier 1 700 Tier 2 100	Tier 1 500 Tier 2 100			
Market 4,375 Risk (i.e.350 x 12.5)	350	Tier 3 600	Tier 1 100 Tier 3 250		Tier 3 250	Tier 3 100
				Capital Ratio: 1,050/11,875= 8.8%	Excess Tier 3 Capital ratio: 250/11,875 = 2.1%	

1.6 **Capital Monitoring**

Each bank will be expected to monitor and report the level of risk against which a capital requirement is to be applied. The bank's overall minimum capital requirement will be;

- (a) The credit risk requirements, excluding debt and equity securities in the trading book and all positions in commodities; but including the credit counterparty risk on all over-the-counter derivatives whether in the trading or non-trading book; plus
- (b) Either the sum of the capital charges for market risks as determined using the standardized approach; or
- (c) The measure of market risk derived from the models approach; or
- (d) A mixture of (b) and (c) summed arithmetically.

All transactions, including forward sales and purchases, shall be included in the calculation of capital requirements on a trade date basis. Although regular reporting will take place only [quarterly], banks are expected to manage risks in such a way that the capital requirements are being met on a continuous basis, i.e., at the close of each business day. Banks are also expected to maintain strict risk management systems to ensure that intra-day exposures are not excessive.

1.7 **Externally Managed Diversified Funds**

Arrangements, should be made by banks to get detailed and timely Investments Statements from their External Fund Managers, and accordingly incorporate their risk positions in the relevant component of SAMA's Market Risk Prudential Returns. Alternatively, such Funds are to be assumed as equities in the underlying currency that must closely represents them.

1.8 **Implementation and Frequency of Reporting**

- Initially all reporting is to be in hard copy form. Integration to ERMS will take place in due course.
- While all licensed domestic banks must submit their market risk returns on an annual basis i.e. as at Dec. 31 to be due within 20 days, the initial annual return as at 31.12.2004 will be due on 31.4.2005.
- Quarterly reporting will be applicable to those banks only, where at each calendar year end it is determined that the trading portfolio is in excess of 5% of total asset or the overall impact on risk asset ratio by including market risk is in excess of 1%.

2. **DETAILED APPLICATION OF STANDARDIZED METHOD**

This will apply to position in interest rate, equities, Fx and commodities.

2.1. **Interest Rate Position Risk**

This section describes the way in which a bank will calculate its capital requirement for interest rate positions held in the trading book. The interest rate exposure captured includes exposures arising from interest bearing and discounted financial instruments, derivatives based on the movement of interest rates, and interest rate exposures embedded in derivatives based on non interest related derivatives including foreign exchange forward contracts. The market risk capital charge for interest rate options in a bank-trading book is calculated separately in accordance with section 3.

Convertible bonds, i.e., debt instruments or preference shares that are convertible, at a stated price, into common shares of the issuer, will be treated as debt securities if they trade like debt securities and as equities if they trade like equities.

A bank's interest rate position risk requirement is the sum of the capital required for specific risk and general market risk for each currency in which the institution has a trading book exposure.

2.1.1 **Specific Risk**
Cash Instruments Position

The specific risk capital charge is calculated by multiplying the absolute values of the debt positions in the trading book by their respective risk factors. The risk factors, as set out below in the below Table-1, correspond to the category of the obligor and the residual maturity of the instrument. For this calculation, offsetting of long and short positions is permitted for debt positions in identical issues (including derivative contracts). Even if the issuer is the same, no offsetting is permitted between different issues to arrive at a net holding since differences in currencies, coupon rates, liquidity, call features, etc., mean that prices may diverge in the short run.

TABLE I
Specific Risk Categories and Weights
By Nature of Counterparty

Issuer Category	Remaining Maturity [Contractual]	Factor [In percent]
Government	N/A	0.00
Qualifying	6 months or less	0.25
	6 to 24 months	1.00
	over 24 months	1.60
Others	N/A	8.00

* Refer to counterparty definitions on P. 16.

Derivative Contracts

A specific risk charge will apply to derivative contracts in the trading book only when they are based on an issued underlying instrument. For example, where an interest rate swap is based on floating and fixed rate interest, there will not be a specific risk charge. However, for example, if the underlying security was a AAA rated corporate bond, the derivative will attract a specific risk requirement based on the underlying bond. However, where the derivative was based on an underlying exposure that was an index (e.g., interbank rates), no specific risk would arise. Further, an option based on a corporate bond will generate a specific risk charge. Table - 6 includes examples of derivatives in the trading books that require a specific risk charge and derivatives in the trading book that do not.

The specific risk charge for derivative contracts is calculated by multiplying:

- The market value of the effective notional amount of the debt instrument that underlies an interest rate swap, future or forward;
- by:
- The specific risk factors in Table I that correspond to the category and residual term of the underlying debt instrument.

The effective notional amount of a derivative is the market value of the stated underlying debt instrument.

Issuers Definition

A. Government

The Government category includes all forms of debt instruments, including but not limited to bonds, treasury bills and other short term instruments;

- Issued by, fully guaranteed by or fully collateralized by securities issued by central governments of the GCC and OECD based group of countries ¹.
- Issued by, or fully guaranteed by, non-GCC and non-OECD central governments and denominated in local currency of that government and funded by liabilities booked in that currency.

B. Qualifying

The qualifying category includes debt securities:

- Issued by, or fully guaranteed by, GCC¹ or OECD¹ public sector entities attracting a 20% risk weight under SAMA Guidelines.
- Issued by, or fully guaranteed by, a multilateral development bank ¹.
- Issued by, or fully guaranteed by, GCC or OECD-banks where the instrument does not qualify as capital of the issuing bank
- Issued by regulated securities firms in the G-10 countries (Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, Netherlands, Sweden, Switzerland, United Kingdom and the United States); and

¹ Defined in Attachment # 1.1

- Rated investment grade by at least two nationally recognized credit rating services, or rated investment grade by one nationally recognized credit rating agency and not less than investment grade by any other credit rating agency. to be approved by SAMA.

Nationally recognized credit rating agencies include but are not restricted to:

- Dominion Bond Rating Service (DBRS);
- Canada Bond Rating Service (CBRS);
- Standard & Poor (S&P);
- Fitch - IBCA;
- Japan Credit Rating Agency, LTD (JCR);
- Nippon Investor Services Inc., (NIS); and the Japan Bond Research Institute (JBRI);
- Those unrated securities subject to SAMA's approval but deemed to be of qualifying quality, and the issuer has securities listed on a recognized Stock Exchange.

Table II provides the minimum ratings constituting investment grade for the agencies listed above.

TABLE - II
Example Minimum Ratings Comprising Investment Grade

Minimum Ratings		
Rating Agency	Securities	Money Market
DBRS	BBB low	A-3
CBRS	B++low	R-2
S&P	BBB-	A-3
Fitch IBCA	BBB-	A-3
JCR	BBB-	J-2
NIS	BBB-	a-3
JBRI	BBB-	A-20

- C. Other
The other category includes debt securities not qualifying as government or qualifying securities.

2.1.2 **General Market Risk**

A bank may measure its exposure to general market risk using the maturity method which uses standardized risk weights that approximate the price sensitivity of various instruments. Refer to Table –III or the duration method.

The Maturity Method to calculate General Market Risk

The maturity method uses a maturity ladder that incorporates a series of “time-bands” that are divided into maturity “zones” for grouping together securities of similar maturities. These time bands and zones are designed to take into account differences in price sensitivities and interest rate volatilities across different maturities.

A separate maturity ladder must be constructed for each currency in which a bank has significant positions, and capital requirements must be calculated for each currency separately. No offsetting of positions is permitted between different currencies in which positions are significant.

Positions in currencies that are not significant may be combined into a common maturity ladder, with the net long or short position of each currency entered in the applicable time band. The net positions are to be summed within each time band, irrespective of whether they are positive or negative, to arrive at the gross position.

Opposite positions of the same amount in the same issues (but not different issues by the same issuer), whether actual or notional, may be excluded from the interest rate maturity framework, as well as closely matched swaps, forwards, futures, and forward rate agreements (FRAs) that meet the conditions set out in the relevant sub-section on interest rate derivatives.

General Market Risk Calculation

The total General Market Risk is the aggregate of the following;

1. Basis Risk Charge
 2. Yield Curve Risk Charge
 3. Net Position Charge
-
- | | | |
|---|---|--------|
| - | Basis risk charge (Horizontal Disallowance). | |
| - | Matched weighted position in <u>all</u> time bands | x 10% |
| - | Yield curve risk charge (Vertical Disallowance) ¹ | |
| - | Matched weighted positions <u>in</u> zone 1 | x 40% |
| - | Matched weighted positions <u>in</u> Zone 2 | x 30% |
| - | Matched weighted positions <u>in</u> zone 3 | x 30% |
| - | Matched weighted positions <u>between</u> zones 1 and 2 | x 40% |
| - | Matched weighted positions <u>between</u> zones 2 and 3 | x 40% |
| - | Matched weighted positions <u>between</u> zones 1 and 3 | x 100% |
| - | Net position charge | |
| - | Residual unmatched weighted positions | x 100% |

¹ These risk weights are also provided in Table -IV for further clarification

To calculate the general market risk charge, the bank allocates the long or short position (at current market value) of each debt instrument and other source of interest rate exposure, including derivatives, into the time-bands and three zones of the maturity ladder outlined in Table III. Once all long and short positions are placed into the appropriate time bands, the long positions in each time band are summed and the short positions in each time band are summed. The summed positions are multiplied by the appropriate risk-weight factor (reflecting the price sensitivity of the positions to changes in interest rates) to determine the risk-weighted long and short market risk positions for each time band.

The risk weights for each time band are as given below;

TABLE - III

Maturity Method: Zones, Time-bands and Weights

Zone	Time-Bands For Coupon 3% or more	Time-Bands For Coupon less than 3% and zero coupon bonds	Risks Weights (%)
1	Up to 1 month	Up to 1 month	0.00
	1 up to 3 months	1 up to 3 months	0.20
	3 up to 6 months	3 up to 6 months	0.40
	6 up to 12 months	6 up to 12 months	0.70
2	1 up to 2 years	1 up to 1.9 years	1.25
	2 up to 3 years	1.9 up to 2.8 years	1.75
	3 up to 4 years	2.8 up to 3.6 years	2.25
3	4 up to 5 years	3.6 up to 4.3 years	2.75
	5 up to 7 years	4.3 up to 5.7 years	3.25
	7 up to 10 years	5.7 up to 7.3 years	3.75
	10 up to 15 years	7.3 up to 9.3 years	4.50
	15 up to 20 years	9.3 up to 10.6 years	5.25
	Over 20 years	10.6 up to 12 years	6.00
		12 up to 20 years over 20 years	8.00 12.50

Basis Risk Charge or Vertical Disallowance

A capital requirement is calculated for the matched weighted position in each time band to address basis risk. The capital requirement is 10% of the matched weighted position in each time band, that is, 10% of the smaller of the risk weighted long or risk weighted short position, or if the positions are equal, 10% of either position. For example, if the sum of the weighted longs in a time-band is SR 100 million and the sum of the weighted shorts is SR 90 million, the basis risk charge for the time-band is 10% of SR. 90 million, or SR. 9 million.

If there is only a gross long or only a gross short position in the time band, as basis risk charge is not calculated. The remainder (i.e. the time band) is called the unmatched weighted position for that time band.

The basis risk charges for each time-band are absolute values, that is, neither long nor short. The charges, for all time-bands in the maturity ladder are summed and included as an element of the general market risk capital requirement.

Yield Curve Risk Charge or Horizontal Disallowance (i) Within Zones and (ii) Between Zones

Capital requirements, referred to as the yield curve risk charge, are assessed to allow for the imperfect correlation of interest rates along the yield curve. There are two elements to the yield curve risk charge. The first element is a charge on the matched weighted positions in zones 1, 2 and 3. The second is a capital charge on the matched weighted positions between zones 1,2 and 3.

(i) **Within Zones**

The matched weighted position in each zone is multiplied by the percentage risk factor corresponding to the relevant zone. The risk factors for zones 1,2 and 3 are also provided in Table IV. The matched and unmatched weighted positions for each zone are calculated as follows. Where a zone has both unmatched weighted long and short positions for various time bands. Within a zone, the extent to which the one offsets the other is called the matched weighted position for that zone i.e. for each time zone all long positions are added and all short positions are added. To the extent the long position offsets the short positions or vice versa is the matched position. The remainder (i.e., the excess of the weighted long positions over the weighted short positions, or vice versa, within a zone) is called the unmatched weighted position for that zone. If these are only long positions or exclusively short positions within a given zone there is no yield curve risk within that zone.

(ii) **Between Zones**

The matched weighted positions between zones are multiplied by the percentage risk factor corresponding to the relevant adjacent zones. The risk factors for adjacent offsetting zones are provided in Table IV. To arrive at the matched weighted positions between zones, the unmatched weighted positions of a zone may be offset against positions in other zones as follows.

- (a) The unmatched weighted long (short) position in zone 1 may offset the unmatched weighted short (long) position in zone 2. The extent to which unmatched weighted positions in zones 1 and 2 are offset is described as the matched weighted position between zones 1 and 2.

- (b) After (a), any residual unmatched weighted long (short) positions in zone 2 may then be matched by offsetting unmatched weighted short (long) positions between zone 2 and zone 3. For example, if the unmatched weighted position for zone 1 was long SR. 100 and for zone 2 was short (SR. 200), the capital charge for the matched weighted position between zone 1 and 2 would be 40% of SR. 100, or SR. 40. The residual unmatched weighted position in zone 2 (SR.100) also could have been carried over to offset a long position in zone 3 and would have attracted a 40% charge.
- (c) After (a) and (b) any residual unmatched weighted long (short) positions in zone 1 may then be matched by offsetting unmatched weighted long (short) positions in zone 3. The extent to which the unmatched positions in zones 1 and 3 are offsetting is described as the matched weighted positions between zones 1 and 3.

The yield curve risk charges, like the basis risk charges, are absolute values that are summed and included as an element of the general market risk capital requirement.

TABLE - IV
Zones Disallowance's

Zone	Time-Bands	Within the Zone than	Between Adjacent Zones	Between Zones 1 - 3
1	0-1 month 1-3 months 3-6 months 6-12 months	40%	40%	
2	1-2 years 2-3 years 3-4 years	30%		100%
3	4-5 years 5-7 years 7-10 years 10-15 years 15-20 years Over 20 years	30%	40%	

Net Position Charge to Calculate General Market Risk

The net position charge for interest rate position risk in a currency is the absolute value of the sum of the weighted net open positions in each time band.

Duration Method

Under the alternative Duration method, banks with the necessary capability may, with SAMA's consent, use a more accurate method of measuring all of their general market risk by calculating the price sensitivity of each position separately. Banks must elect and use the method on a continuous basis (unless a change in method is approved by SAMA) and would be subject to supervisory monitoring of the systems used. The mechanics of this method are as follows:

- First calculate the price sensitivity of each instrument in terms of a change in interest rates of between 0.6 and 1.0 percentage points depending on the maturity of the instrument (see Table IV-A P.24).
- Slot the resulting sensitivity measures into a duration-based ladder with the fifteen time-bands set out in Table IV-A.
- Subject long and short positions in each time band to a 5% vertical disallowance designed to capture basis risk;
- Carry forward the net positions in each time-bank for horizontal offsetting subject to the disallowances set out in Table IV.

Table IV-A
Duration method: time-bands and assumed changes in yield

Assumed change in Yield		Assumed change In yield	
Zone 1		Zone 3	
Up to 1 month	1.00	3.6 to 4.3 years	0.75
1 to 3 months	1.00	4.3 to 5.7 years	0.70
3 to 6 months	1.00	5.7 to 7.3 years	0.65
6 to 12 months	1.00	7.3 to 9.3 years	0.60
Zone 2		9.3 to 10.6 years	0.60
1.0 to 1.9 years	0.90	10.6 to 12 years	0.60
1.9 to 2.8 years	0.80	12 to 20 years	0.60
2.8 to 3.6 years	0.75	Over 20 years	0.60

In the case of residual currencies (see paragraph 9 above) the gross positions in each time-band will be subject to either the risk weightings set out in Table III, if positions are reported using the maturity method, or the assumed change in yield set out in Table IV-A, if positions are reported using the duration method, with no further offsets.

Position Reporting for General Market Risk Calculations

Debt Instruments

Fixed rate instruments are allocated according to the remaining term to maturity and floating rate instruments according to the next repricing date. A callable bond that has a market price above par is slotted according to its first call date, while a callable bond with a market price below par is slotted according to remaining maturity. Mortgage-backed securities are slotted according to their final maturity dates.

Interest Rate Derivatives

Debt derivatives and other off-balance sheet positions whose values are affected by changes in interest rates are included in the measurement system described above, except for options in Section 3. A summary of the treatment for debt derivatives is set out below (Table - V).

TABLE - V
Derivative Position Reporting for the Maturity Method

Instrument Types	First Reporting Leg		Second Reporting Leg	
	Amount	Reporting According to:	Amount	Report According to:
<u>Interest Rate Swaps</u>				
Pay Fixed	- NP	Maturity Date	+ NP	Next Settlement Date Pay:
Receive Fixed	+ NP	Maturity Date	- NP	Next Settlement Date Receive
<u>Forward Rate Agreements:</u>				
Buy (i.e., short)	- NP	Maturity Date	+ NP	Value Date
Sell (i.e., long)	+ NP	Maturity Date	- NP	Maturity Date
<u>3-month Future:</u>				
Buy	+ NP	Maturity Date + 3 months	- NP	Maturity Date
Sell	-NP	Maturity Date + 3 months	+ NP	Maturity Date
<u>Govt. Bonds & Notes</u>	+ NP	Maturity Date		
<u>Cross Currency Swaps:</u>				
Received Floating	+ NP	Value Date+ Frequency **		
Pay Floating	- NP	Value Date + Frequency **		
Received Fixed	+ NP	Maturity Date		
Pay Fixed	- NP	Maturity Date		
FX. Forwards	+ NP (Buy)	Value Date	- NP (Sell)	Value Date

Notes: NP = Notional principal in relevant currency;
** Starting with the value date, move forward in intervals according to the frequency of payments (e.g., 3M, 6M, or 1 YR)

Derivatives are converted into positions in the relevant underlying instrument and are included in the calculation of specific and general market risk capital charges as described above. The amount to be included is the market value of the principal amount of the underlying instrument or of the notional underlying. For instruments where the apparent notional amount differs from the effective notional amount, a bank must use the effective notional amount.

Futures and Forward Contracts

Futures and forward contracts (including FRAs) are broken down into a combination of a long position and short position in a notional government security i.e. no specific charge. The maturity of a future or a FRA is the period until delivery or exercise of the contract, plus the life of the underlying instrument. For example, assuming an April 30 reporting date, a long position in a June three months interest rate future is recorded as a long position maturing in five months and a short position maturing in two months. Where a range of instruments may be delivered to fulfill the contract, the bank may choose which deliverable instrument goes into the maturity ladder as the notional underlying instrument. In the case of a future on a corporate bond index, positions are included at the market value of the notional underlying portfolio of securities.

Swaps

Swaps are treated as two notional positions in the relevant instruments with appropriate maturities. The receiving side is treated as the long position and the paying side is treated as the short position.

For example, an interest rate swap under which a bank is receiving floating rate interest and paying fixed is treated as a long position in a floating rate instrument with a maturity equivalent to the period until the next interest reset date and a short position in a fixed-rate instrument with a maturity equivalent to the remaining life of the swap. The separate sides of cross-currency swaps or forward foreign exchange transactions are slotted in the relevant maturity ladders for the currencies concerned.

For swaps that pay or receive a fixed or floating interest rate against some other reference price, for example, an equity index, the interest rate component is slotted into the appropriate repricing maturity category, with the long or short position attributable to the equity component being included in the equity framework.

Banks with a large swap book may, subject to review by SAMA use alternative formulae to calculate the positions to be included in the maturity ladder. For example a bank could first convert the payments required by the swap into present values. For the purpose, each payment would be discounted using zero coupon yields, and the payment's present value entered into the appropriate time-band using procedures that apply to zero (or low coupon bonds). The net amounts would then be treated as bonds, and slotted into the general

market risk framework. Such alternative treatments will, however, only be allowed if (i) SAMA is fully satisfied with the accuracy of the system being used, (ii) the positions calculated fully reflect the sensitivity of the cash flows to interest rate changes; and (iii) the positions are denominated in the same currency.

Repos

It should be noted that, where a security owned by the bank (and included in its calculation of market risk) is repo'd, it continues to contribute to the bank's interest rate or equity position risk calculation.

Offsetting of Identical Derivative Positions

A bank may offset long and short positions (both actual and notional) in identical derivative instruments with exactly the same issuer, coupon, currency, and maturity before slotting these positions into time bands. A matched position in a future and its corresponding underlying may also be fully offset and, thus, excluded from the calculation, except when the future comprises a range of deliverable instruments. However, in cases where, among the range of deliverable instruments, there is a readily identifiable underlying instrument that is most profitable for the trader with a short position to deliver, positions in the futures contract and the instrument may be offset. No offsetting is allowed between positions in different currencies.

In addition, to offsetting a fully matched position, Offsetting positions in the same category of instruments can in certain less than fully offsetting circumstances be regarded as matched and treated by the institution as a single net position which should be entered into the appropriate time-band. To qualify for this treatment the positions must be based on the same underlying instrument, be of the same nominal value, and be denominated in the same currency. The separate sides of different swaps may also be "matched" subject to the same conditions. In addition:

- For futures, offsetting positions in the notional or underlying instruments to which the futures contract relates must be for identical instruments and the instruments must mature within seven days of each other.
- For swaps and FRAs, the reference rate (for floating rate positions) must be identical and the coupon closely matched (i.e. within 15 basis points,) and
- For swaps, FRAs and forwards, the next interest reset date; (interest fixing date) or for fixed coupon, positions or forwards, the remaining maturity must correspond within the following limits.

<u>Remaining Maturity to go Limits</u>	<u>Maturity</u>	<u>Correspondence</u>
Less than 1 month	Same day	
>1 month < 1 YR	within 7 days	
> 1 year	" 30 days	

Interest rate and currency swaps, FRAs, forward foreign exchange contracts and interest rate futures are not subject to a specific risk charge. This exemption also applies to futures on a short-term (e.g., 3-month Bankers Acceptance rate) interest rate index. However, in the case of futures contracts where the underlying is a debt security, or an index representing a basket of debt securities, a specific risk charge will apply according to the category of the issuer. Refer to Table VI (P.30) for specific risk charges derivative.

Table - VI
Summary of Specific and General Market Risk
Charges for Interest Rate Derivatives

Instrument	SPECIFIC RISK CHARGE (Relating to the issuer of the instrument. There remains a separate capital requirement for counterparty credit risk)	General Market Risk Charge
<u>EXCHANGE-TRADED</u>		
<u>FUTURE</u>		
Government Security	No	Yes, as two positions
Corporate debt security	Yes ¹	Yes, as two positions
Index on short-term	No	Yes, as two positions
Interest rates (e.g., Bankers Acceptances)		
<u>OTC FORWARD/FUTURE</u>		
Government security	No	Yes, as two positions
Corporate debt security	Yes ¹	Yes, as two positions
Index on short-term	No	Yes, as two positions
Interest rates		
<u>FRAs, Swaps</u>		
Forward foreign exchange	No	Yes, as two position
	No	Yes, as one position in each currency
<u>Option</u>		
		For each type of transaction, either.
Government security	No	Carve out together with the associated hedging positions <ul style="list-style-type: none"> • Simplified approve • Delta Plus Method • Internal Model
Corporate debt security	Yes ¹	Same as above
Index on short term	No	Same as above
Interest rates		

¹ According to the Risk Category of the issuer of the security refer to Table - 1.

EXAMPLE # 2

Example to Calculate General Market Risk for Debt Instruments using the Maturity Method

A bank has the following trading positions.

- A Qualifying bond SR. 13.33 million market value, remaining maturity 8 years, coupon 8%.
- B Government bond SR. 75 million market value, remaining maturity 2 months, coupon 7%;
- C Interest rate Swap. SR. 150 million, bank receives floating rate interest and pays fixed, next interest reset after 12 months, remaining life of swap is 8 years.
- D Long position in interest rate future. SR. 50 million, delivery date after 6 months, life of underlying government security is 3.5 years (assumes the current interest rate is identical to the one on which the swap is based)

The institution would record these instruments as positions in a maturity ladder as shown below;

Each position would be multiplied by the risk weight corresponding to the time band in which it is recorded. The risk weighted long and risk weighted short positions in each maturity band are the basis of calculating the general market risk capital charges.

		Position for Instruments in SR Millions				Risk Weighted Position		
Zone	Time Band					Risk Weight s (%)	Risk Weighted Long	Risk Weighted (Short)
		A	B	C	D		Positions SR. million	Positions SR. million
1	0-1 mth					0.00	0.15	(0.20)
	1-3 mth	75				0.20		
	3-6 mth					0.40		
	6-12 mth	150				0.70		
<hr/>								
2	1-2 years					1.25	1.125	
	2-3 years					1.75		
	3-4 years	50				2.25		
<hr/>								
3	4-5 years					2.75	0.50	(5.625)
	5-7 years					3.25		
	7-10 years	13.33	(150)		3.75			
	10-15 years					4.50		
	15-20 years					5.25		
	>20 years					6.00		

Basis Risk Charge in each time band

The first step in the process of calculating general market risk is to calculate a 10% basis risk charge on the matched weighted position in each time band. In this example there are partially offsetting long and short positions in the 7 to 10 year time band only. In the other time bands there are no offsetting positions. Consequently, there is no basis risk capital charge in the other time band. The matched portion of the 7 - 10 years is equal to SR. 500,000 (i.e. 0.50 million) Ten percent of this matched position is equal to SR. 50,000. [$10 \times 0.50 = 0.05$ (SR. 50,000)].

BASIS RISK CALCULATION
In SR. Million

Zone	Time-band	Risk Weighted Long Positions	Risk Weighted (Short) Positions	Unmatched Weighted Position	Step 1 10% Basis risk charge of Matched Position
1	0-1 mth	0.15	(0.20)	0.15	n/a
	1-3 mth				(0.20)
	3-6 mth	1.05		1.05	n/a
	6-12 mth			n/a	
2	1-2 years	1.125		1.125	n/a
	2-3 years				
	3-4 years				
3	4-5 years	0.50	(5.625)	(5.125)	0.050
	5-7 years				
	7-10 years				
	10-15 years				
	15-20 years				
	>20 years				
Total					0.05

NA : Since there are no offsetting positions in these time bands, there is no basis risk.

Yield Curve Risk Charges within each Zone

The yield curve risk charge is calculated on the matched weighted position in each zone using the percentage risk factors in Table IV. In this example, a charge would be calculated for zone 1 (step 2(a)). It would be 40% of the total offsetting in the zone -- $40\% \times 0.20 = 0.80$ (SR. 80,000). No charge is required if offsetting does not occur within a zone. Consequently there is no charge for zone 2 and zone 3 as there are either just long position in zone 2 and just short position in zone 3.

Zone	Time-band	Unmatched Weighted Positions	Step 2(a) 30% to 40% of Matched weighted Zone Positions	Step 2 (b) 40% to 100 Matched between Zones
1	0-1 mth	0.15 (0.20) 1.05		
	1-3 mth			
	3-6 mth			
	6-12 mth			
Zone 1 Total		Long 1.20 Short (0.20) Unmatched 1.00	0.08 =0.20x40%	n/a [Zone 1 & 2 net totals are both long]
	1-2 years	1.125		n/a
	2-3 years			
	3-4 years			
Zone 2 Total		Long 1.125	n/a	0.45 = 40% x the lesser of 1.125 and 5.125 charge on the off-setting between zone 2 (Long) and Zone 3 (short)
3	4-5 years	(5.125)		
	5-7 years			
	7-10 years			
	10-15 years			
	15-20 years			
	>20 years			
Zone 3 Total		Short (5.125)	n/a	1.0 = 100% x 1.00 [Charge on the offsetting between Zone 1 and Zone 3]

Yield Curve Risk Charges Between Zones

In step 2(b) the yield curve risk charges on matching between residual unmatched weighted positions in the three zones are calculated. Zone 1 and zone 2 are offset, if possible reducing or eliminating the unmatched weighted positions in zone 1 and zone 2 as appropriate. Zone 2 and zone 3 are then offset, if possible, reducing or eliminating the unmatched weighted position in zone 2 or zone 3 as appropriate. Zone 3 and zone 1 are then offset, if possible, reducing or eliminating the unmatched weighted position in zone 3 and zone 1 as appropriate. A capital requirement is calculated as a percentage of the position eliminated by the inter-zone offsetting.

In the example, the net total for Zone 1 and Zone 2 are both long. Therefore, there is no matching. However, a charge would be calculated for adjacent zones 2 and 3 (step 3). It would be 40% of the matched weighted positions between the zones (-i.e. the lower of long and short positions) - $40\% \times 1.125 = 0.45$ (SR. 450,000)

A charge would be calculated between zones 1 and 3 (step 3). It would be 100% of the matched positions between the zones i.e. the lower of the net long and short position - $100\% \times 1.00 =$ SR. 1,000,000).

Net Position Charge

Step 3 calculates a net position charge equal to the residual unmatched weighted position. In this example this amounts to SR. 3 million (being the absolute value of the sum of $0.15 - 0.20 + 1.05 + 1.125 - 5.125 = 3.00$) and would be included as the net position charge for general market risk.

Tabulation of All General Market Risk Charges

1. Basis risk charge		
- Matched weighted positions in all time bands	SR.	50,000
2. Yield curve risk charge;		
- Matched weighted positions in zone 1		80,000
- Matched weighted positions in zone 2		n/a
- Matched weighted positions in zone 3		n/a
- Matched weighted positions between zones 1 & 2		n/a
- Matched weighted positions between zones 2 & 3		450,000
- Matched weighted positions between zones 1 & 3		1,000,000
3. Net position charge		
- Residual unmatched weighted positions		<u>3,000,000</u>
Total General Market Risk	SR.	<u>4,580,000</u>

2.2 EQUITIES RISK

This section sets out SAMA's minimum capital requirements for a bank for the risk of holding equities in the trading book. Accordingly, it applies to long and short positions in all instruments cash and derivative that exhibit market behavior similar to equities, but not to non convertible preference shares covered by interest rate risk requirement. A bank is exposed to the risk (a) specific risk that the value of individual equity positions relative to the market may move against the bank and (b) the general risk that the equity market as a whole may move against it. The specific risk requirements recognize that individual equities are subject to issuer risk and liquidity risk, and that these risks may be reduced by portfolio diversification. The general risk requirements set out in this section recognize offsetting positions within national markets.

A separate subsection for equity derivatives positions outlines the method for including them in the capital calculation.

Span of coverage of Equity Related Instruments

Equity risk capital requirements will apply to positions and exposures in the trading book on the following instruments; both in the cash and derivative market.

- Common shares;
- Convertible preference shares or securities
- Convertible debt securities which convert into equity instruments and are trading as equities;
- Any other instruments exhibiting equity characteristics; and
- Equity derivatives or derivatives based on above securities.
- Commitments to buy or sell equity securities.

Equity positions should be allocated to the country in which each equity is listed and the calculations outlined below applied to each country. Equity securities listed in more than one country must be allocated to either (i) the country where the issuer is incorporated and listed or (ii) the country where the security was purchased or sold. Switching between countries is not allowed. Conversion into the banks reporting currency should be done at current spot foreign exchange rates.

2.2.1 Specific Risk on Equities

The measurement of specific risk capital requirements is calculated on the basis of the bank's gross equity positions. The gross position is the sum of the absolute value of all short equity positions and all long equity positions, including positions arising from derivatives, calculated at the current market value. Long and short positions in the same share issue may be reported on a net basis. The long or short position in the market must be calculated on a market by market basis i.e. separate calculation has to be carried out for each national market in which the bank hold equities. The specific risk capital requirement is 8% of this sum. However, if the portfolio is both liquid and well-diversified (defined below) the specific risk capital requirement may be 4% of the gross equity position.

Liquid and Well Diversified Portfolio

A portfolio that is both liquid and well-diversified is characterized by a limited sensitivity to price changes of any single equity issue or closely related group of equity issues held in the portfolio. The volatility of the portfolio's value should not be dominated by the volatility of any individual equity issue or by equity issues from any single industry or economic sector.

Individual equities included in the indices listed in "Table VII - Market Indices" are considered to be liquid. SAMA will review the list from time to time and amend it accordingly.

TABLE - VII MARKET INDICES

Australia	All Ordinaries	UAE	EMNEX
Austria	ATX	Kuwait	KSE
Belgium	BEL 20	Oman	MSM
Canada	TSE 35 & 100	Qatar	CBQ
France	CAC 40	Spain	IBEX35
Germany	DAX	Sweden	OMX
Japan	Nikkei 225	Switzerland	SMI
Netherlands	EOE 25	United Kingdom	FTSE 100
Saudi Arabia	NCFEI	United Kingdom	FTSE mid-250
Bahrain	BSE	United States	S&P 500

A portfolio of liquid equities will be considered to be well diversified if the following requirements are met;

- No individual liquid equity position comprises more than 10% of the gross value of the bank's portfolio of equities traded on the markets in each particular country (the "country portfolio"); and
- The portfolio is comprised of securities where no single market sector has a concentration at more than 10% of the total portfolio.
- For market risk sector definition refer to Attachment-1.2 for guidance.

2.2.2 General Market Risk on Equities

To calculate general market risk long and short positions in equity instruments are offset to arrive at a net position. Instruments are valued at current market and a net position must be separately calculated for each country in which the institution holds equity instruments. The capital requirement for general market risk is 8% of the net position for each country.

2.2.3 Equity Derivatives

Equity derivatives and other off balance sheet positions that are affected by changes in equity prices are included in the measurement system (except for equity index options, and the associated underlying). This includes futures and swaps on both individual equities and on equity indices. Equity derivatives should be converted into notional equity positions in the relevant underlying instrument. Where equities are part of a forward contract (both equities to be received or to be delivered), any interest rate or foreign currency exposure from the other side of the contract should be included in the respective measurement systems as appropriate. A summary of the rules for equity derivatives is set out below.

TABLE # VIII
Summary of Specific and General Market Risk
On Equities

Instrument	SPECIFIC RISK CHARGE (Relating to the issuer of the instrument. There remains a separate capital requirement for counterparty credit risk)	General Market Risk Charge
FUTURES, SWAPS, SIMILAR OTC CONTRACTS		
Individual Equity	Yes	Yes, as underlying
Index	2.0%	Yes, as underlying
OPTIONS		
Individual equity	Yes	Carve out from equity Framework together with Associated hedging positions and apply: - Simplified approach; or - Internal models
Index	2.0%	

Calculation of Positions in Derivatives

In order to calculate the specific and general market risk positions in derivatives should be converted into notional equity positions as follows;

- Futures and forward contracts relating to individual equities should be reported at current market price of the underlying.
- Futures relating to stock indices should be reported as the marked-to-market value of the notional underlying equity portfolio.
- Equity swaps are to be treated as two notional positions. For example, an equity swap in which a bank is receiving an amount based on the change in value of one particular equity or stock index, and paying a different index is treated as a long position in the former and a short position in the latter. Where one of the swap legs involves receiving/paying a fixed or floating interest rate, the exposure should be slotted into the appropriate time-bank for interest rate related instruments as set out in Chapter 3. The stock index leg should be covered by the equity treatment as set out in this chapter.

- Equity options should be carved out together with the associated underlyings and treated under Chapter 3 of this guideline.

Risk in Relation to an Index

Matched positions in each identical equity or stock index in each country may be fully offset, resulting in a single net short or long position to which the specific and general market risk charges will apply.

Specific Risk

A specific risk capital charge of 2% applies to the net long or short position in a contract on an index listed in Table VII. This capital charge is intended to cover factors such as divergence from the general market level and execution risk. The 2% risk weight is to apply only to well diversified indices and not, for example, to sectoral indices. Positions in indices not listed in Table VII must either be decomposed into their component shares, or be treated as a single position based on the sum of current market values of the underlying instruments; if treated as a single position, the specific risk requirement is the highest specific risk charge which would apply to any of the index's constituent shares.

General Risk

A bank's position in an index contract is also subject to an 8% general market risk charge.

2.3 FOREIGN EXCHANGE POSITION RISK

This section describes proposed capital that needs to be held to cover for open foreign exchange positions. This is because exchange rates due to their market volatility can lead to losses on short or long positions.

The capital requirement for foreign exchange risk is applied to the entire business, both the trading and non-trading books. Two steps are required to calculate the capital requirement for foreign exchange risk. The first is to measure the exposure in a single currency position. The second is to calculate the capital requirement for the portfolio of positions in different currencies. In summary, the capital charge is 8% of the greater of the sum of (i) the net open long positions of (ii) the net open short positions in each currency, plus the net open position in gold, whatever the sign. Gold is treated as a foreign exchange position rather than a commodity because its volatility is more in line with foreign currencies and institutions manage it in a manner similar to foreign currencies.

Measuring the Exposure in a Single Currency

This procedure is identical to the procedure in SAMA's M-15 except vis-à-vis structured position as described below; Consequently, M-15 may be utilized to complete this steps as described below;

The net open position for each individual currency (and gold) is calculated by summing;

- The net spot position (i.e., all asset items less all liability items, including accrued interest and accrued expenses, denominated in the currency in question);
- The net forward position (i.e., all net amounts under forward foreign exchange transactions, including currency futures and the principal on currency swaps);
- Guarantees (and similar instruments) that are certain to be called and are likely to be irrecoverable;
- Net future income/expenses not yet accrued but already fully hedged (at the discretion of the reporting institution); and
- Any other item representing a profit or loss in foreign currencies.

Options on foreign exchange are treated separately; see section 3 of this document.

Treatment of Composite Currencies

For measuring a bank's open positions, positions in composite currencies, such as the Euro, may be treated either as a currency in their own right or split into their component parts. Banks must be consistent in their treatment of composite currencies.

Treatment of Immaterial Operations

Foreign exchange risk is assessed on a consolidated basis. It may be technically impractical in the case of immaterial operations to include some currency positions. In such cases, the internal limit in each currency may be used as a proxy for the positions, provided there is adequate ex poste monitoring of actual positions complying with such limits. In these circumstances, the limits should be added, regardless of sign, to the net open position in each currency.

The following criteria applies for the treatment of Immaterial Operations.

- Its foreign currency business, defined as the greater of the sum of its gross long positions and the sum of its gross short positions in all foreign currencies, does not exceed 100% of eligible capital.
- Its overall net open position as defined in the paragraph above does not exceed 2% of its eligible capital.

Measurement of Forward Currency Positions

Forward currency positions should be valued at current spot market exchange rates. It would be inappropriate to use forward exchange rates since to some extent they reflect current interest rate differentials.

Treatment of Currencies Not Specified on Return

Currencies that are not specified may be combined together as currencies that are not specified.

Accrued and Unearned Interest, Income and Expenses

Accrued interest, accrued income and accrued expenses should be treated as a position if they are subject to exchange rate fluctuations. Unearned but expected future interest income or expenses may be included provided the amounts are certain and have been fully hedged by forward foreign exchange contracts. Banks must be consistent in their treatment of unearned interest, income and expenses and the institution must have written policies covering the treatment. The selection of positions that are only beneficial to reducing the overall position will not be permitted.

Structural Positions

Structural positions i.e. Not dealing position and related hedges will be exempt from the calculation of net open currency positions. Structural positions may include any of the following;

- Any position arising from an instrument which is purported to protect a bank's capital base due to exchange rate movements.
- Any position entered into in relation to the net investment of a capital nature in foreign operations.
- Investments in foreign operations which are fully deducted from an institution's capital for capital adequacy purposes.

The exclusion of the position is consistently applied with the treatment of the hedging remaining the same for the life of the associated items.

Calculating the Capital Requirement

The net open position in each foreign currency (and gold) is converted at spot rates into Saudi Riyal. The capital is 8% of the overall net open position calculated as the sum of:

- The greater of the sum of the net open short positions or the sum of the net open long positions (absolute values); and

- The net open position in gold, either long or short, regardless of sign.

Example of the Process to Measure Foreign Exchange Risk

Bank A has the following net currency positions. These open positions have been converted at spot rates to the reporting currency, in this case Saudi Riyals (+) signifies a long position and (-) signifies a short position.

Table -IX

YEN	EURO	GB	CHS	US\$	GOLD
+50	+150	+150	-20	-180	-35
+300			-200		-35

In this example the bank has three currencies in which it has long positions, these being the Japanese Yen, the Euro and the British Pound, and two currencies in which it has short position, the Swiss Franc and the U.S. Dollar. The middle line of the above chart shows the net open positions in each of the currencies. The sum of the long positions is +300. The sum of the short positions is -200.

The foreign exchange market risk is calculated using the higher of the summed absolute values of either the net long or short positions, and the absolute value for the position in gold. The capital charge is 8%. In this example, the total long position (300) would be added to the gold position (35) to give an aggregate position of 335. The aggregated amount multiplied by 8% would result in a capital charge of SR. 26.80.

2.4 COMMODITIES RISK

This section provides a minimum capital requirement to cover the market risk of holding or taking positions in commodities including precious metals but excluding gold (gold is treated as a foreign currency). Banks conducting a limited amount of commodities business may use the simplified measurement method that comprises a capital charge on the net and gross position in each category of commodity. This method is set out below. All other banks must adopt an internal model system that conforms to criteria set out under Chapter -4.

SIMPLIFIED APPROACH Net Position Requirement

Under the simplified method, each long and short commodity position (On and Off balance sheet, expressed in terms of the standard unit of measurement such as barrels, kilos, or grams). which are affected by changes in commodity prices should be included. The open positions in each category of commodities are then converted at current spot

rates into Saudi Riyals with long and short positions offset to arrive at the net open position in each commodity.

Commodities that are deliverable against each other or that are close substitutes with a minimum correlation of ninety percent between price movements are considered to be part of the same category. Positions in different categories of commodities may not be offset. The base capital requirement is 15% of the net open position, long or short, in each commodity. When the funding of a commodity position opens a bank to interest rate or foreign exchange exposure the relevant positions should be included in the measures of interest rate and foreign exchange risk.

Gross Position Requirement

To protect in institution against basis risk, interest rate risk, and forward gap risk, each category of commodity is also subject to a 3% capital requirement on the institution's gross positions, long plus short, in the particular commodity.

Calculation of Positions

Commodity derivatives and other off-balance-sheet positions that are affected by changes in commodity prices are included in the measurement system (except for options and the associated underlying instrument - refer to Section -3 a description of their treatment). Commodity derivatives are converted into notional commodity positions using the current spot price.

Futures and forward contracts relating to an individual commodity should be reported as notional amount of the standard measurement unit of that commodity converted at current spot rates. Where a commodity is part of a forward contract (commodities to be received or to be delivered) any interest rate exposure from the other leg of the contract should be reported in Section 2.1. This is the same as for equities as described in Section 2.2 and for foreign exchange risk in Section 2.3.

Commodity swaps where one leg is a fixed price and the other the current market price should be incorporated as a series of positions each equal to the notional amount of the contract, with one position corresponding with each payment on the swap. The positions would be long if the institution is paying fixed and receiving floating, and short if the institution is receiving fixed and paying floating. If one of the legs involves receiving/paying a fixed or floating interest rate that exposure should be reported in Section 2.1.

3. **OPTIONS**

In recognition of the wide diversity of banks activities in options and the difficulties of measuring price risk for options, there are several alternative approaches.

- Those banks which solely use purchased options will be free to use the Simplified Approach- Carve Out.
- Those banks which also write options will be expected to use Delta plus approach or Internal Models as described in Section 4.

In the simplified approach, the positions for the options and the associated underlying, cash or forward, are not be subject to the standardized methodology but rather are “carved-out” and subject to separately calculated capital charges that incorporate both general market risk and specific risk. The risk numbers thus generated are then added to the capital charges assessed for each of the charges for interest rate related instruments, equities, foreign exchange and commodities as described in this document.

3.1 **Simplified Approach (Carve Out)**

Banks which handle a limited range of purchased options only will be free to use the simplified approach set out in Table X for particular trades below;

TABLE X

Simplified approach: Capital charges

Position	Treatment
Long cash (underlying) and Long put Or Short cash (underlying) and Long call i.e. hedged options	The capital charge will be the market value of the underlying security multiplied by the sum of specific and general market risk charges for the underlying less the amount the option is in the money (if any) bounded at zero.
Long call Or Long put i.e. naked option position	The capital charge will be the lessor of: (i) The market value of the underlying security multiplied by the sum of specific and general market risk charges for the underlying . (ii) The market value of the option

Other major Feature of Simplified Approach

In some cases such as foreign exchange, it may be unclear which side is the “underlying security”; this should be taken to be the asset which would be received if the option were exercised. In addition the nominal value should be used for caps and floors where the market value of the underlying instrument could be zero.

Some options (e.g. where the underlying is an interest rate, a currency or a commodity) bear no specific risk but specific risk will be present in the case of options on certain interest rate related instruments (e.g. options on a corporate debt security, (see 2.1) and for options on equities and equity indices (see 2.2). The charge under this measure for currency options will be 8% and for options on commodities 15%.

For options with a residual maturity of more than six months the strike price should be compared with the forward, not current price. A bank unable to do this must take the in the money amount to be zero.

As an example of how the calculation would work, if a holder of 100 shares currently valued SR. 10 each holds in equivalent put option with a strike price of SR. 11, the capital charge would be SR. 1,000 x 16% (i.e. 8% specific plus 8% general market risk)= SR. 160, less the amount the option is in the money (SR. 11 - SR. 10) x 100= SR. 100, i.e. the capital charge would be SR. 60. A similar methodology applies for options whose underlying is a foreign currency, an interest rate related instrument or a commodity.

3.2 Delta-Plus Method

The delta-plus method uses the sensitivity parameters or “Greek letters” associated with options to measure their market risk and capital requirements. Under this method, the delta-equivalent position of each option becomes part of the standardized methodology with the delta-equivalent amount subject to the applicable general market risk charges. Separate capital charges are then applied to the gamma and vega risks of the options positions.

Banks which write options will be allowed to include delta-weighted options positions within the standardized methodology set out in this document covering specific and general risk procedures. Such options should be reported as a position equal to the market value of the underlying multiplied by the delta. However, since “delta” does not sufficiently cover the risks associated with options positions, banks would also be required to measure gamma (which measures the rate of change of delta) and vega (which measures the sensitivity of the value of an option with respect to a change in volatility) sensitivities in order to calculate the total capital charge. These sensitivities would be calculated according to an approved exchange model or to the bank’s proprietary options pricing model subject to SAMA’s approval.

¹ If position not in the trading book i.e. Fx or commodity, book value may be used

Where the underlying is a debt security or an interest rate.

Delta-weighted positions with debt securities or interest rates as the underlying will be slotted into the debt securities time-bands, as set out in Section 2.1, under the following procedure. A two-legged approach should be used as for other derivatives, requiring one entry at the time the underlying contract takes effect and a second at the time the underlying contract matures.

For instance, a bought call option on a June three month interest rate future will in April be considered, on the basis of its “delta” equivalent value, to be a long position with a maturity of five months and a short position with a maturity of two months. The written option will be similarly slotted as a long position with a maturity of two months and a short position with a maturity of five months. Also, for example a two months call option on a bond future where delivery of the bond takes place in September would be considered in April as being long the bond and short a five months deposit, both positions being delta weighted.

Floating rate instruments with caps or floors will be treated as a combination of floating rate securities and a series of European-style options. For example, the holder of a three-year floating rate bond indexed to six month LIBOR with a cap of 15% will treat it as:

- (i) A debt security that reprices in six months; and
- (ii) A series of five written call options on a FRA with a reference rate of 15%, each with a negative sign at the time the underlying FRA takes effect and a positive sign at the time the underlying FRA matures.

Rules applying to closely matched positions for general risk will apply as described in Section 2.12.

Where the underlying is an Equity.

The capital charge for options with equities as the underlying will also be based on the delta weighted positions, which will be incorporated in the measure of market risk described in Section 2.2. For purposes of this calculation each national market is to be treated as a separate underlying.

Where the underlying is foreign exchange on gold.

The capital charge for options on foreign exchange and gold positions will be based on the method set out in Section 2.3. For delta risk, the net delta-based equivalent of the foreign currency and gold options will be incorporated into the measurement of the exposure for the respective currency (or gold) position.

Option on commodities

The capital charge for options on commodities will be based on the simplified approach set out in Section 2.4.

Calculation of Gamma and Vega risk

In addition to the above capital charges arising from delta risk, there will be further capital charges for gamma and for vega risk. Banks using this method would be required to calculate the gamma and vega for each option position (including hedge positions) separately. The capital charges should be calculated in the following way:

Gamma Risk

For each individual option a “gamma impact” should be calculated according to a Taylor series expansion as:

$$\text{Gamma impact} = 1/2 \times \text{Gamma} \times \text{VU}$$

where VU = Variation of the underlying of the option.

VU will be calculated as follows:

- For interest rate options: if the underlying is a bond, the market value of the underlying should be multiplied by the risk weights set out in Table III of Section 2.1. An equivalent calculation should be carried out where the underlying is an interest rate, again based on the assumed charges in the corresponding yield in Table III of Section 2.1
- For options on equities and equity indices; the market value of the underlying should be multiplied by 8%.
- For foreign exchange and gold options; the market value of the underlying should be multiplied by 8%;
- For options on commodities; the market value of the underlying should be multiplied by 15%.

For the purpose of calculating gamma the following positions should be treated as the same underlying.

- For interest rates, each time band as set out in Table 3 Section 2.1. Positions have to be slotted into separate maturity ladders by currency.
- For equities and stock indices, each national market;
- For foreign currencies and gold, each currency pair and gold.
- For commodities, each individual commodity.

Each option on the same underlying will have a gamma impact that is either positive or negative. These individual gamma impacts will be summed, resulting in a net gamma impact for each underlying that is either positive or negative. Only those net gamma impacts that are negative will be included in the capital calculation.

The total gamma capital charge will be the sum of the absolute value of the net negative gamma impacts as calculated above.

Vega Risk

For volatility risk, banks will be required to calculate the capital charges by multiplying the sum of the vegas for all options on the same underlying, as defined above, by a proportional shift in volatility of + 25%.

The total capital charge for vega risk will be the sum of the absolute value of the individual capital charges that have been calculated for vega risk.

The capital charges for delta, gamma and vega risks as described above are in addition to the specific risk capital charges which are determined separately by multiplying the delta-equivalent of each option position by the specific risk weights as indicated in Section-2.1 and 2.2.

Capital requirements for market risk for options, using the delta-plus method are as follows:

1. Specific risk capital charges.
2. Delta risk capital charges.
3. Gamma and vega capital charges.

EXAMPLE ON DELTA-PLUS METHOD FOR OPTIONS

1. Assume a bank has an European short call option on a commodity with an exercise price of 490 and a market value of the underlying 12 months from the expiration of the option at 500; a risk-free interest rate at 8% per annum, and the volatility at 20%. The current delta for this position is according to the Black-Scholes formula - 0.721 (i.e. the price of the option changes by 0.721 if the price of the underlying moves by 1). The gamma is -0.0034 (i.e. the delta changes by - 0.0034 - from -0.721 to -0.7244 - if the price of the underlying moves by 1). The current value of the option is 65.48.
2. The following example shows how the capital charges will be calculated according to the delta-plus method:
 - (a) The first step under the delta-plus method is to multiply the market value of the commodity by the absolute value of the delta.
$$500 \times 0.721 = 360.5$$
The delta-weighted position then has to be incorporated into the measure described in 2.4. If the bank uses the simple approach and no other positions exist the delta-weighted position has to be multiplied by 0.15 to calculate the capital charge for delta.
$$360.5 \times 0.15 = 54.075$$

- (b) The capital charge for gamma has to be calculated according to the formula set out in Section 3.

$$1/2 \times 0.0034 \times (500 \times 0.15)^2 = 9.5625$$

- (c) The capital charge for vega has to be calculated. The assumed current (implied) volatility is 20%. As only an increase in volatility carries a risk of loss for a short call option, the volatility has to be increased by a relative shift of 25%. This means that the vega capital charge has to be calculated on the basis of a change in volatility of 5 percentage points from 20% to 25% in this example. According to the Black-Scholes formula used here the vega equals 168. Thus a 1% or 0.01 increase in volatility increases the value of the option by 1.68. Accordingly a change in volatility of 5 percentage points increases the value by $5 \times 1.68 = 8.4$ which is the capital charge for vega risk.

4. PROPOSED MODELS

1. Overview
2. General Criteria
3. Qualitative Standards
4. Specification of market risk factors
5. Quantitative standards
6. Specific Risk Calculation
7. Stress Testing
8. External validation of models
9. Combination of internal models and the standardized methodology.
10. Letter of model recognition

4.1. OVERVIEW

1. The standardized methodology uses a “building-block” approach in which the specific risk and the general market risk arising from debt and equity positions are calculated separately. The focus of most internal models is a bank’s general market risk exposure, typically leaving specific risk (i.e. exposures to specific issuers of debt securities and equities) to be measured largely through separate credit risk measurement systems. Banks using models are subject to separate capital charges for the specific risk not captured by their models, which will be calculated by the standardized methodology. Specific risk¹ arrived at using internal models should be in no case less than half the specific risk calculated according to the standardized methodology.

¹ Option to calculate specific risk using internal model not currently available.

2. As an alternative to the Standardized Approach for the measurement of market risks and subject to the explicit prior approval of SAMA, banks will be allowed to use Internal Models to measure market risk in part or as a whole. Following are the seven sets of conditions that should be met before a bank is allowed to use the internal models approach.
 - i) Compliance with as described in Sec. 4.2 General criteria regarding the adequacy of the risk management system;
 - ii) Qualitative standards for internal oversight of the use of models, notably by senior management;
 - iii) Guidelines for specifying an appropriate set of market risk factors (i.e., the market rates and prices that affect the value of the bank's positions);
 - iv) Quantitative standards setting out the use of common minimum statistical parameters for measuring risk;
 - v) Guidelines for stress testing.
 - vi) External validation
 - vii) Rules for banks, which use a mixture of the internal models approach and the standardized approach.
3. While the models recognition criteria described in this chapter are primarily intended for comprehensive Value-at-Risk (VaR) models, nevertheless, the same set of criteria will be applied, to the extent that it is appropriate, to other valuation models the output of which is fed into the standardized measurement system, e.g. option pricing models (for the calculation of the delta, gamma and vega sensitivities).

4.2. **GENERAL CRITERIA**

The use of internal models will be conditional upon the explicit approval of SAMA. Where a bank carries out national trading activities in more than one jurisdiction, the home and host authorities will co-ordinate in the process of approving the bank's model.

The Agency will give its approval if at the minimum it is satisfied with the following.

- (i) That the bank's management system is conceptually sound and is implemented with integrity;
- (ii) That the bank has, in SAMA's view, sufficient numbers of staff skilled in the use of sophisticated models not only in the trading area but also in the risk control, audit and the back office areas;

(iii) That the bank's models have, in the SAMA's judgment, a proven track record of reasonable accuracy in measuring risk. SAMA recognizes that the use of internal models is, a relatively new development and, therefore, it is difficult to establish a track record of reasonable accuracy. SAMA, therefore, will require a period of initial monitoring and live testing of a bank's internal model before it is used for supervisory capital purposes.

(iv) That the bank regularly conducts stress tests.

4.3. **QUALITATIVE STANDARDS**

It is important that SAMA is able to assure itself that banks using models have market risk management systems that are conceptually sound and implemented with integrity. Accordingly, the SAMA is specifying a number of qualitative criteria that banks would have to meet before they are permitted to use a models based approach. The extent to which banks meet the qualitative criteria may influence the level at which SAMA will set the multiplication factor referred to in quantitative standard. **Only those banks whose models are in full compliance with the qualitative criteria will be eligible for application of the minimum multiplication factor. (Refer Paragraph 718 (Lxxiv) BCBS Basel II guidelines.)** ~~Only those banks whose models are in full compliance with the qualitative criteria will be eligible for application of the minimum multiplication factor.~~

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The qualitative criteria include;

- (a) The bank should have an independent risk control unit that is responsible for the design and implementation of the bank's risk management system. The unit should produce and analyze daily reports on the output of the bank's risk measurement model, including an evaluation of the relationship between measures of risk exposure and trading limits. This unit must be independent from business trading units and should report directly to senior management of the bank.
- (b)¹ The unit should conduct the initial and on-going validation of internal models and a regular back-testing program, i.e. an ex-post comparison of the risk measure generated by the model against actual daily changes in portfolio value over longer periods of time, as well as hypothetical changes based on static positions.
- (c)² Board of directors and senior management should be actively involved in the risk control process and must regard risk control as an essential aspect of the business to which significant resources need to be devoted. In this regard, the daily reports prepared by the independent risk control unit must be reviewed by a level of management with sufficient seniority and authority to enforce both reductions of positions taken by individual traders and reductions in the bank's overall risk exposure.

¹Further guidance regarding the standards that SAMA will expect can be found in paragraph 718 (xcix) of Revisions to the Basel II market risk framework – December 2010.

²The report, Risk management guidelines for derivatives, issued by the Basel Committee in July 1994 further discusses the responsibilities of the board of directors and senior management.

- (d) The bank's internal risk measurement model must be closely integrated into the day-to-day risk management process of the bank. Its output should accordingly be an integral part of the process of planning, monitoring and controlling the bank's market risk profile.
- (e) The risk measurement system should be used in conjunction with internal trading and exposure limits. In this regard, trading limits should be related to the bank's risk measurement model in a manner that is consistent over time and that is well understood by both traders and senior management.
- (f)¹ A routine and rigorous program of stress testing ~~in place as a supplement to the risk analysis based on the day-to-day output of the bank's risk measurement model. The results of stress testing should be reviewed periodically by senior management and should be reflected in the policies and limits set by management and the board of directors. Where stress tests reveal particular vulnerability to a given set of circumstances, prompt steps should be taken to manage those risks appropriately (e.g. by hedging against that outcome or reducing the size of the bank's exposures).~~ **(SAMA will wish to see that they follow the general lines set out in paragraphs 718(Lxxvii) to 718(Lxxviii) of BCBS Basel II guidelines) should be in place as a supplement to the risk analysis based on the day-to-day output of the bank's risk measurement model. The results of stress testing should be reviewed periodically by senior management, used in the internal assessment of capital adequacy, and reflected in the policies and limits set by management and the board of directors. Where stress tests reveal particular vulnerability to a given set of circumstances, prompt steps should be taken to manage those risks appropriately (e.g. by hedging against that outcome or reducing the size of the bank's exposures, or increasing capital).**
- (g) Banks should have a routine in place for ensuring compliance with a documented set of internal policies, controls and procedures concerning the operation of the risk measurement system. The bank's risk measurement system must be well documented, for example through a risk management manual that describes the basic principles of the risk management system and that provides an explanation of the empirical techniques used to measure market risk.

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- (h) An independent review of the risk measurement system should be carried out regularly in the bank's own internal auditing process. This review should include both the activities of the business trading units and of the independent risk control unit. A review of the overall risk management process should take place at regular intervals (ideally not less than once a year) and should specifically address, at a minimum:
- The adequacy of the documentation of the risk management system and process;
 - The organization of the risk control unit;

¹Though banks will have some discretion as to how they conduct stress tests, SAMA will wish to see that they follow the general lines set out in paragraphs 718(Lxxvii) to 718(Lxxxiii) of Revisions to the Basel II market risk framework – Dec 2010^f (Refer to Paragraph 718(Lxxiv) of Revisions to the Basel II market risk framework – Dec 2010)

- The integration of market risk measures into daily risk management;
- The approval process for risk pricing models and valuation systems used by front and back-office personnel;
- The validation of any significant change in the risk measurement process;
- The scope of market risks captured by the risk measurement model;
- The integrity of the management information system;
- The accuracy and completeness of position data;
- The verification of the consistency, timeliness and reliability of data sources used to run internal models, including the independence of such data sources;
- The accuracy and appropriateness of volatility and correlation assumptions;
- The accuracy of valuation and risk transformation calculations;
- The verification of the model's accuracy through frequent back-testing as described in (b) above and in the accompanying Basle Committee's document attached and entitled: Supervisory framework for the use of the backtesting in conjunction with the internal models approach to market risk capital requirements.

4.4 **SPECIFICATION OF MARKET RISK FACTORS**

An important part of a bank's internal market risk measurement system is the specification of an appropriate set of market risk factors, i.e. the market rates and prices that affect the value of the bank's trading positions. The risk factors contained in a market risk

measurement system should be sufficient to capture the risks inherent in the bank's portfolio of on-and of-balance sheet trading positions. Although banks will have some discretion in specifying the risk factors for their internal models, the following guidelines should be fulfilled.

- (a) For interest rates, there must be a set of risk factors corresponding to interest rates in each currency in which the bank has interest-rate-sensitive on-or off-balance sheet positions.
- The risk measurement system should model the yield curve using one of a number of generally accepted approaches, for example by estimating forward rates of zero coupon yields. The yield curve should be divided into various maturity segments in order to capture variation in the volatility of rates along the yield curve; there will typically be one risk factor corresponding to each maturity segment. For material exposures to interest rate movements in the major currencies and markets, banks must model the yield curve using a minimum of six risk factors. However, the number of risk factors used should ultimately be driven by the nature of the bank's trading strategies. For instance, a bank with a portfolio of various types of securities across many points of the yield curve and that engages in complex arbitrage strategies would require a greater number of risk factors to capture interest rate risk accurately.
 - The risk measurement system must incorporate separate risk factors to capture spread risk (e.g. between bonds and swaps). A variety of approaches may be used to capture the spread risk arising from less than perfectly correlated movements between government and other fixed income interest rates, such as specifying a completely separate yield curve for non government fixed income instruments (for instance, swaps or municipal securities) or estimating the spread over government rates at various points along the yield curve.
 - (a) Factors that are deemed relevant for pricing should be included as risk factors in the value-at-risk model. Where a risk factor is incorporated in a pricing model but not in the value-at-risk model, the bank must justify this omission to the satisfaction of SAMA . In addition, the value-at-risk model must capture nonlinearities for options and other relevant products (e.g. mortgage-backed securities, tranch exposures or n-th-to-default credit derivatives), as well as correlation risk and basis risk (e.g. between credit default swaps and bonds). Moreover, SAMA has to be satisfied that proxies are used which show a good track record for the actual position held (i.e. an equity index for a position in an individual stock).

(Refer to Paragraph 718(Lxxv)(a) of Revisions to the Basel II Market Risk Frameworks – Dec 2010)

- (b) For exchange rates (which may include gold), the risk measurement system should incorporate risk factors corresponding to the individual foreign currencies in which the bank's positions are denominated. Since the value-at-risk figure calculated by the risk measurement system will be expressed in the bank's domestic currency, any net position denominated in a foreign currency will introduce a foreign exchange risk. Thus, there must be risk factors corresponding to the exchange rate between the domestic currency and each foreign currency in which the bank has a significant exposure.
- (c) For equity prices, there should be risk factors corresponding to each of the equity markets in which the bank holds significant positions;
- At a minimum, there should be a risk factor that is designed to capture market wide movements in equity prices (e.g. a market index). Positions in individual securities or in sector indices could be expressed in "beta-equivalents" ¹ relative to this market -wide index;
 - A somewhat more detailed approach would be to have risk factors corresponding to various sectors of the overall equity market (for instance, industry sectors or cyclical and non-cyclical sectors). As above, positions in individual stocks within each sector could be expressed in beta-equivalents relative to the sector index;
 - The most extensive approach would be to have risk factors corresponding to the volatility of individual equity issues.

The sophistication and nature of the modeling technique for a given market should correspond to the bank's exposure to the overall market as well as its concentration in individual equity issues in that market.

- (d) For commodity prices, there should be risk factors corresponding to each of the commodity markets in which the bank holds significant positions:
- For banks with relatively limited positions in commodity-based instruments, a straightforward specification of risk factors would be acceptable. Such a specification would likely entail one risk factor for each commodity price to which the bank is exposed. In cases where the aggregate positions are quite small, it might be acceptable to use a single risk factor for a relatively broad sub-category of commodities for instance, a single risk factor for all types of oil;

- For more active trading, the model must also take account of variation in the “convenience yield” between derivatives positions such as forwards and swaps and cash positions in the commodity.
2. The convenience yield reflects the benefits of direct ownership of the commodity. For example the ability to profit from temporary market **shortages stages**. This is also affected by both market condition and factors such as physical storage cost.

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¹ A beta equivalent position would be calculated from a market model of equity price return such as the Capital Asset pricing model by regressing the return on the individual stock sector index on the risk free rate of return and the return on the market induct.

4.5. QUANTITATIVE STANDARDS

Banks will have flexibility in devising the precise nature of their models, but the following minimum standards will apply for the purpose of calculating their capital charge, **individual banks or their supervisory authorities SAMA will have discretion to apply stricter standards.**

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- “Value-at-risk” must be computed on a daily basis.
- In calculating the value-at-risk, a 99th percentile, one-tailed confidence interval is to be used.
- In calculating value-at-risk, an instantaneous price shock equivalent to a 10 days movement in prices is to be used, i.e. the minimum “holding period” will be ten trading days. Banks may use value-at-risk numbers calculated according to shorter holding periods scaled up to ten days by the square root of time (for the treatment of options, also see (h) below). A bank using this approach must periodically justify the reasonableness of its approach to the satisfaction of SAMA .
- ¹ The choice of historical observation period (sample period) for calculating value-at-risk will be constrained to a minimum length of one year. For banks that use a weighting scheme or other methods for the historical observation period, the “effective” observation period must be at least one year (that is, the weighted average time lag of the individual observations cannot be less than 6 months).
- Banks **must should** update their data sets no less frequently than once every **three months** and should also reassess them

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whenever market prices are subject to material changes. This updating process must be flexible enough to allow for more frequent updates. SAMA may also require a bank to calculate its value-at-risk using a shorter observation period if, in the SAMA's judgment, this is justified by a significant upsurge in price volatility.

- (f) No particular type of model is prescribed. So long as each model used captures all the material risks run by the bank, as set out in Section 4.4, banks will be free to use models based on variance-covariance matrices, historical simulations, or Monte Carlo simulations.
- (g) Banks will have discretion to recognize empirical correlation within broad risk categories (e.g. interest rates, exchange rates, equity prices and commodity prices, including related options volatilities in each risk factor category). SAMA authority

¹A bank may calculate the value-at-risk estimate using a weighting scheme that is not fully consistent with (d) as long as that method results in a capital charge at least as conservative as that calculated according to (d).

may also recognize empirical correlation across broad risk factor categories, provided it is satisfied that the bank's system for measuring correlation is sound and implemented with integrity.

- (h) Banks' models must accurately capture the unique risks associated with "options" within each of the broad risk categories. The following criteria apply to the measurement of "options risk":
 - Banks' models must capture the non-linear price characteristics of options positions;
 - Banks are expected to ultimately move towards the application of a full 10 day price shock to options positions or positions that display option-like characteristics. In the interim, banks can adjust their capital measure for options risk through other methods, e.g. periodic simulations or stress testing, **with prior permission from SAMA;**
 - Each bank's risk measurement system must have a set of risk factors that capture the volatilities of the rates and prices underlying option positions, i.e. vega risk. Banks with relatively large and/or complex options portfolios should have detailed specifications of the relevant volatilities. This means that banks should measure the volatilities of options positions broken down by different maturities.

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- (i) ~~Each bank must meet, on a daily basis, a capital requirement expressed as the higher of (i) its previous day's value-at-risk number measure according to the parameters specified in this section and (ii) an average of the daily value-at-risk measures on each of the preceding sixty business days, multiplied by a multiplication factor.~~

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In addition, a bank must calculate a 'stressed value-at-risk' measure. This measure is intended to replicate a value-at-risk calculation that would be generated on the bank's current portfolio if the relevant market factors were experiencing a period of stress; and should therefore be based on the 10-day, 99th percentile, one-tailed confidence interval value-at-risk measure of the current portfolio, with model inputs calibrated to historical data from a continuous 12-month period of significant financial stress relevant to the bank's portfolio. The period used must be approved by SAMA and regularly reviewed. As an example, for many portfolios, a 12-month period relating to significant losses in 2007/2008 would adequately reflect a period of such stress; although other periods relevant to the current portfolio must be considered by the bank.

- (j) As no particular model is prescribed under paragraph (f) above, different techniques might need to be used to translate the model used for value-at-risk into one that delivers a stressed value-at-risk. For example, banks should consider applying anti-thetic¹ data, or applying absolute rather than relative volatilities to deliver an appropriate stressed value-at-risk. The stressed value-at-risk should be calculated at least weekly.
- (k) Each bank must meet, on a daily basis, a capital requirement expressed as the sum of:
- The higher of (1i) its previous day's value-at-risk number measured according to the parameters specified in this section (VaR_{t-1}); and (2ii) an average of the daily value-at-risk measures on each of the preceding sixty business days (VaR_{avg}), multiplied by a multiplication factor (m_c); plus.
 - The higher of (1) its latest available stressed-value-at-risk number calculated according to (i) above (sVaR_{t-1}); and (2) an average of the stressed value-at-risk numbers calculated according to (i) above over the preceding sixty business days (sVaR_{avg}), multiplied by a multiplication factor (m_s).

Therefore, the capital requirement (c) is calculated according to the following formula:

$$c = \max \{ VaR_{t-1}; m_c \cdot VaR_{avg} \} + \max \{ sVaR_{t-1}; m_s \cdot sVaR_{avg} \}$$

- (l) The multiplication factors m_c and m_s will be set by SAMA on the basis of their assessment of the quality of the bank's risk management system, subject to an absolute minimum of 3 for m_c and an absolute minimum of 3 for m_s. Banks will be required to add to these factors a "plus" directly related to the ex-post performance

of the model, thereby introducing a built-in positive incentive to maintain the predictive quality of the model. The plus will range from 0 to 1 based on the outcome of so-called “backtesting.” The backtesting results applicable for calculating the plus are based on value-at-risk only and not stressed value-at-risk. If the backtesting results are satisfactory and the bank meets all of the qualitative standards set out in paragraph 718(Lxxiv), Revisions to the Basel II Market Risk Frameworks – Dec 2010, the plus factor could be zero. The Annex 10a of this Framework (International Convergence of Capital Measurement and Capital Standards – June 2006) presents in detail the approach to be applied for backtesting and the plus factor. SAMA will have national discretion to require banks to perform backtesting on either hypothetical (i.e. using changes in portfolio value that would occur were end-of-day positions to remain unchanged), or actual trading (i.e. excluding fees, commissions, and net interest income) outcomes, or both.

¹Firms should consider modelling valuation changes that are based on the magnitude of historic price movements, applied in both directions – irrespective of the direction of the historic movement.

(m) Banks using models will also be subject to a capital charge to cover specific risk (as defined under the standardised approach for market risk) of interest rate related instruments and equity securities. The manner in which the specific risk capital charge is to be calculated is set out in paragraphs 718(Lxxxvii) to 718(xcviii) , Revisions to the Basel II Market Risk Frameworks – Dec 2010

(Refer to Paragraph 718(Lxxvi) of Revisions to the Basel II Market Risk Frameworks – Dec 2010)

4.6 **Treatment of Specific Risk**

Where a bank has a VaR measure that incorporates specific risk from equity risk positions and where the supervisor has determined that the bank meets all the qualitative and quantitative requirements for general market risk models, as well as the additional criteria and requirements set out in paragraphs 718(Lxxxviii) to 718(xci-2-) Revisions to the Basel II market risk framework – Dec 2010, the bank is not required to subject its equity positions to the capital charge according to the standardised measurement method as specified in paragraphs 718(xix) to 718(xxviii) Revisions to the Basel II market risk framework – Dec 2010.

For interest rate risk positions other than securitisation exposures and n-th-to-default credit derivatives, the bank will not be required to subject these positions to the standardised capital charge for specific risk, as specified in paragraphs 709(ii) to 718, Revisions to the Basel II market risk framework – Dec 2010, when all of the following conditions hold:

- The bank has a value-at-risk measure that incorporates specific risk and SAMA has determined that the bank meets all the qualitative and quantitative requirements for general market risk models, as well as the additional criteria and requirements set out in paragraphs 718(Lxxxviii) to 718(xci-2-), Revisions to the Basel II market risk framework – Dec 2010; and
- SAMA is satisfied that the bank's internally developed approach adequately captures incremental default and migration risks for positions subject to specific interest rate risk according to the standards laid out in paragraphs 718(xcii) and 718(xciii), Revisions to the Basel II market risk framework – Dec 2010.

The bank is allowed to include its securitisation exposures and n-th-to-default credit derivatives in its value-at-risk measure. Notwithstanding, it is still required to hold additional capital for these products according to the standardised measurement methodology, with the exceptions noted in paragraphs 718(xcv) to 718(xcviii) , Revisions to the Basel II market risk framework – Dec 2010.

The criteria for supervisory recognition of banks' modelling of specific risk require that a bank's model must capture all material components of price risk Banks need not capture default and migration risks for positions subject to the incremental risk capital charge referred to in paragraphs 718(xcii) and 718(xciii) Revisions to the Basel II market risk framework – Dec 2010) and be responsive to changes in market conditions and compositions of portfolios. In particular, the model must:

- Explain the historical price variation in the portfolio; (The key ex ante measures of model quality are "goodness-of-fit" measures which address the question of how much of the historical variation in price value is explained by the risk factors included within the model. One measure of this type which can often be used is an R-squared measure from regression methodology. If this measure is to be used, the risk factors included in the bank's model would be expected to be able to explain a high percentage, such as 90%, of the historical price variation or the model should explicitly include estimates of the residual variability not captured in the factors included in this regression. For some types of models, it may not be feasible to calculate a goodness-of-fit measure. In such instance, a bank is expected to work with SAMA to define an acceptable alternative measure which would meet this regulatory objective.)
- Capture concentrations (magnitude and changes in composition); (The bank would be expected to demonstrate that the model is sensitive to changes in portfolio construction and that higher capital charges are attracted for portfolios that have increasing concentrations in particular names or sectors.)

- Be robust to an adverse environment; (The bank should be able to demonstrate that the model will signal rising risk in an adverse environment. This could be achieved by incorporating in the historical estimation period of the model at least one full credit cycle and ensuring that the model would not have been inaccurate in the downward portion of the cycle. Another approach for demonstrating this is through simulation of historical or plausible worst-case environments.)
- Capture name-related basis risk; (Banks should be able to demonstrate that the model is sensitive to material idiosyncratic differences between similar but not identical positions, for example debt positions with different levels of subordination, maturity mismatches, or credit derivatives with different default events.)
- Capture event risk; (For equity positions, events that are reflected in large changes or jumps in prices must be captured, e.g. merger break-ups/takeovers. In particular, firms must consider issues related to survivorship bias.)
- Be validated through backtesting (Aimed at assessing whether specific risk, as well as general market risk, is being captured adequately.)

The bank's model must conservatively assess the risk arising from less liquid positions and/or positions with limited price transparency under realistic market scenarios. In addition, the model must meet minimum data standards. Proxies may be used only where available data is insufficient or is not reflective of the true volatility of a position or portfolio, and only where they are appropriately conservative.

Further, as techniques and best practices evolve, banks should avail themselves of these advances.

1- Banks which apply modelled estimates of specific risk are required to conduct backtesting aimed at assessing whether specific risk is being accurately captured. The methodology a bank should use for validating its specific risk estimates is to perform separate backtests on sub-portfolios using daily data on sub-portfolios subject to specific risk. The key sub-portfolios for this purpose are traded-debt and equity positions. However, if a bank itself decomposes its trading portfolio into finer categories (e.g. emerging markets, traded corporate debt, etc.), it is appropriate to keep these distinctions for sub-portfolio backtesting purposes. Banks are required to commit to a sub-portfolio structure and stick to it unless it can be demonstrated to SAMA that it would make sense to change the structure.

2- Banks are required to have in place a process to analyse exceptions identified through the backtesting of specific risk. This process is intended to serve as the fundamental way in which banks correct their models of specific risk in the event they become inaccurate. There will be a presumption that models that incorporate specific risk are

“unacceptable” if the results at the sub-portfolio level produce a number of exceptions commensurate with the Red Zone as defined in Annex 10a of this Framework (International Convergence of Capital Measurement and Capital Standards – June 2006). Banks with “unacceptable” specific risk models are expected to take immediate action to correct the problem in the model and to ensure that there is a sufficient capital buffer to absorb the risk that the backtest showed had not been adequately captured.

In addition, the bank must have an approach in place to capture in its regulatory capital default risk and migration risk in positions subject to a capital charge for specific interest rate risk, with the exception of securitisation exposures and n-th-to-default credit derivatives, that are incremental to the risks captured by the VaR-based calculation as specified in paragraph 718(Lxxxviii) of Revisions to the Basel II market risk framework – Dec 2010 (“incremental risks”). No specific approach for capturing the incremental **default** risks is prescribed; The Committee provides guidelines to specify the positions and risks to be covered by this incremental risk capital charge meets its aim.

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The bank must demonstrate that the approach used to capture incremental risks meets a soundness standard comparable to that of the internal-ratings based approach for credit risk as set forth in this Framework, under the assumption of a constant level of risk, and adjusted where appropriate to reflect the impact of liquidity, concentrations, hedging, and optionality. A bank that does not capture the incremental **default** risks through an internally developed approach must use the specific risk capital charges under the standardised measurement method as set out in paragraphs 710 to 718 and 718(xxi) of Revisions to the Basel II market risk framework – Dec 2010 / International Convergence of Capital Measurement and Capital Standards – June 2006 (for paragraph not superseded by Revisions to the Basel II market risk framework, 2010).

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Subject to SAMA’s approval, a bank may incorporate its correlation trading portfolio in an internally developed approach that adequately captures not only incremental default and migration risks, but all price risks (“comprehensive risk measure”). The value of such products is subject in particular to the following risks which must be adequately captured:

- the cumulative risk arising from multiple defaults, including the ordering of defaults, in tranching products;
- credit spread risk, including the gamma and cross-gamma effects;
- volatility of implied correlations, including the cross effect between spreads and correlations;
- basis risk, including both:
 - the basis between the spread of an index and those of its constituent single names; and
 - the basis between the implied correlation of an index and that of bespoke portfolios;

- recovery rate volatility, as it relates to the propensity for recovery rates to affect tranche prices; and
- to the extent the comprehensive risk measure incorporates benefits from dynamic hedging, the risk of hedge slippage and the potential costs of rebalancing such hedges.

The approach must meet all of the requirements specified in paragraphs 718(XCiii), 718(XCvi) and 718(xcvii) of Revisions to the Basel II market risk framework – Dec 2010. This exception only applies to banks that are active in buying and selling these products. For the exposures that the bank does incorporate in this internally developed approach, the bank will be required to subject them to a capital charge equal to the higher of the capital charge according to this internally developed approach and 8% of the capital charge for specific risk according to the standardised measurement method. It will not be required to subject these exposures to the treatment according to paragraph 718(XCiii) of Revisions to the Basel II market risk framework – Dec 2010. It must, however, incorporate them in both the value-at-risk and stressed value-at-risk measures.

For a bank to apply this exception, it must

- Have sufficient market data to ensure that it fully captures the salient risks of these exposures in its comprehensive risk measure in accordance with the standards set forth above;
- Demonstrate (for example, through backtesting) that its risk measures can appropriately explain the historical price variation of these products; and
- Ensure that it can separate the positions for which it holds approval to incorporate them in its comprehensive risk measure from those positions for which it does not hold this approval.

In addition to these data and modelling criteria, for a bank to apply this exception it must regularly apply a set of specific, predetermined stress scenarios to the portfolio that receives internal model regulatory capital treatment (i.e., the 'correlation trading portfolio'). These stress scenarios will examine the implications of stresses to (i) default rates, (ii) recovery rates, (iii) credit spreads, and (iv) correlations on the correlation trading desk's P&L. The bank must apply these stress scenarios at least weekly and report the results, including comparisons with the capital charges implied by the banks' internal model for estimating comprehensive risks, at least quarterly to SAMA. Any instances where the stress tests indicate a material shortfall of the comprehensive risk measure must be reported to SAMA in a timely manner. Based on these stress testing results, SAMA may impose a supplemental capital charge against the correlation trading portfolio, to be added to the bank's internally modelled capital requirement. For guidance on conducting stress tests for correlation trading portfolio, refer Annex of Revisions to the Basel II market risk framework – Dec 2010.

A bank must calculate the incremental risk measure according to paragraph 718(xcii) of Revisions to the Basel II market risk framework – Dec 2010, and the comprehensive risk measure according to paragraph 718(xcv) of Revisions to the Basel II market risk framework – Dec 2010, at least weekly, or more frequently as directed by SAMA . The capital charge for incremental risk is given by a scaling factor of 1.0 times the maximum of (i) the average of the incremental risk measures over 12 weeks; and (ii) the most recent incremental risk measure. Likewise, the capital charge for comprehensive risk is given by a scaling factor of 1.0 times the maximum of (i) the average of the comprehensive risk measures over 12 weeks; and (ii) the most recent comprehensive risk measure. Both capital charges are added up. There will be no adjustment for double counting between the comprehensive risk measure and any other risk measures. (Refer to Paragraph 718(xc) of Revisions to the Basel II market risk framework – Dec 2010)

4.7. **STRESS TESTING**

1. Banks that use the internal models approach for meeting market risk capital requirements must have in place a rigorous and comprehensive stress testing program. Stress testing to identify events or influences that could greatly impact banks is a key component of a bank's assessment of its capital position.
2. Banks' stress scenarios need to cover a range of factors that can create extraordinary losses or gains in trading portfolios, or make the control of risk in those portfolios very difficult. These factors include low-probability events in all major types of risks, including the various components of market, credit, and operational risks. Stress scenarios need to shed light on the impact of such events on positions that display both linear and non-linear price characteristics (i.e. options and instruments that have options-like characteristics).
3. Banks' stress tests should be both of a quantitative and qualitative nature, incorporating both market risk and liquidity aspects of market disturbances. Quantitative criterion should identify plausible stress scenarios to which banks could be exposed. Qualitative criteria should emphasize that two major goals of stress testing are to evaluate the capacity of the bank's capital to absorb potential large losses and to identify steps the bank can take to reduce its risk and conserve capital. This assessment is integral to setting and evaluating the bank's management strategy and the results of stress testing

should be routinely communicated to senior management and, periodically, to the bank's board of directors.

4. Banks should use a variety of stress scenarios as given below, to reflect their specific risk characteristics and accordingly SAMA may ask the banks to provide the results.
 - (a) **Supervisory Scenarios** requiring no simulations by the bank.
 5. Banks should have information on the largest losses experienced during the reporting period available for review by SAMA. This loss information could be compared to the level of capital that results from a bank's internal measurement system. For example, Bank should provide SAMA with a picture of how many days of peak day losses would have been covered by a given value-at-risk estimate.
 - (b) Scenarios requiring a simulation by the bank.
 6. Banks should subject their portfolios to a series of simulated stress scenarios and provide SAMA with the results. These scenarios could include testing the current portfolio against past periods of significant disturbance, for example, the 1987 equity crash, the Exchange Rate Mechanism crises of 1992 and 1993 or, the fall in bond markets in the first quarter of 1994, the 1998 Russian financial crisis, the 2000 bursting of the technology stock bubble or the 2007/2008 sub-prime crisis, incorporating both the large price movements and the sharp reduction in liquidity associated with these events. A second type of scenario would evaluate the sensitivity of the bank's market risk exposure to changes in the assumptions about volatilities and correlations. Applying this test would require an evaluation of the historical range of variation for volatilities and correlations and evaluation of the bank's current positions against the extreme values of the historical range. Due consideration should be given to the sharp variation that at times has occurred in a matter of days in periods of significant market disturbance. For example, the above-mentioned situations involved correlations within risk factors approaching the extreme values of 1 or -1 for several days at the height of the disturbance.
(Refer to Paragraph 718 (Lxxxii) of Revisions to the Basel II Market Risk Frameworks – Dec 2010)
 - (c) Scenarios developed by the bank itself to capture the specific characteristics of its portfolio.
 7. In addition to the scenarios prescribed by SAMA under (a) and (b), a bank should also develop its own stress tests which it identifies as most adverse based on the characteristics of its portfolio (e.g. problems in a key region of the world combined with a sharp move in oil prices). Banks should provide SAMA

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with a description of the methodology used to identify and carry out the scenarios as well as with a description of the results derived from these scenarios.

8. The results should be reviewed periodically by senior management and should be reflected in the policies and limits set by management and the board of directors. Moreover, if the testing reveals particular vulnerability to a given set of circumstances, SAMA would expect the bank to take prompt steps to manage those risks appropriately (e.g. by hedging against the outcome or reducing the size of its exposures).

4.8. **MODEL VALIDATION**

The validation of models' accuracy by internal and external auditors should at a minimum include the following steps. SAMA may carry out additional steps if deemed necessary.

- (a) Verifying that the internal validation process described in Section-4.3 (h) are operating in a satisfactory manner;
- (b) Ensuring that the formulae used in the calculation process as well as for the pricing of options and other complex instruments are validated by a qualified unit, which in all cases should be independent from the trading area;
- (c) Checking that the structure of internal models is adequate with respect to the bank's activities and geographical coverage;
- (d) Checking the results of the banks' back-testing of its internal measurement system (i.e. comparing value-at-risk estimates with actual profits and losses) to ensure that the model provides a reliable measure of potential losses over time.
- (e) Making sure that model specifications and parameters data flows and processes associated with the risk measurement system are transparent and accessible.

The external auditors should carry out their mandatory validation procedures on an annual basis. Based on the above procedures, the external auditors shall make a report, on the accuracy of the bank's models, including all significant findings of their work. The report shall be addressed to the board of directors of the bank, and a copy of the report shall be made available to SAMA. SAMA will inform the exact timing of the validation procedures, and reporting thereto.

Banks are instructed to ensure that auditors and the SAMA representatives are in a position to have easy access, whenever they judge it necessary and under appropriate procedures, to the models specifications and parameters as well as to the results, and the underlying inputs to, their value-at-risk calculations.

4.8.1 **Model Validation Standards**

It is important that banks have processes in place to ensure that their internal models have been adequately validated by suitably qualified parties independent of the development process to ensure that they are conceptually sound and adequately capture all material risks. This validation should be conducted when the model is initially developed and when any significant changes are made to the model. The validation should also be conducted on a periodic basis but especially where there have been any significant structural changes in the market or changes to the composition of the portfolio which might lead to the model no longer being adequate. More extensive model validation is particularly important where specific risk is also modelled and is required to meet the further specific risk criteria. As techniques and best practices evolve, banks should avail themselves of these advances. Model validation should not be limited to backtesting, but should, at a minimum, also include the following:

(a) Tests to demonstrate that any assumptions made within the internal model are appropriate and do not underestimate risk. This may include the assumption of the normal distribution, the use of the square root of time to scale from a one day holding period to a 10 day holding period or where extrapolation or interpolation techniques are used, or pricing models;

(b) Further to the regulatory backtesting programmes, testing for model validation should be carried out using additional tests, which may include, for instance:

- Testing carried out using hypothetical changes in portfolio value that would occur were end-of-day positions to remain unchanged. It therefore excludes fees, commissions, bid-ask spreads, net interest income and intra-day trading;
- Testing carried out for longer periods than required for the regular backtesting programme (e.g. 3 years). The longer time period generally improves the power of the backtesting. A longer time period may not be desirable if the VaR model or market conditions have changed to the extent that historical data is no longer relevant;
- Testing carried out using confidence intervals other than the 99 percent interval required under the quantitative standards;
- Testing of portfolios below the overall bank level;

(c) The use of hypothetical portfolios to ensure that the model is able to account for particular structural features that may arise, for example:

- Where data histories for a particular instrument do not meet the quantitative standards in paragraph 718(Lxxvi) and where the bank has to map these positions to proxies, then the bank must ensure that the proxies produce conservative results under relevant market scenarios;

- Ensuring that material basis risks are adequately captured. This may include mismatches between long and short positions by maturity or by issuer;
- Ensuring that the model captures concentration risk that may arise in an undiversified portfolio.
- (Refer to Paragraph 718(xcix) of Revisions to the Basel II market risk framework – Dec 2010)

4.9. **COMBINATION OF INTERNAL MODELS AND THE STANDARDIZED METHODOLOGY**

Unless a bank's exposure to a particular risk factor, such as commodity prices, is insignificant, the internal models approach will in principle require banks to have an integrated risk measurement system that capture the broad risk factor categories (i.e. interest rates, exchange rates (which may include gold), equity prices and commodity prices, with related options volatilities being included in each risk factor category). Thus, banks which start to use models for one or more risk factor categories will, over time, be expected to extend the models to all their market risks. A bank which has developed one or more models will no longer be able to revert to measuring the risk measured by those models according to the standardized methodology (unless the SAMA authority withdraws approval for that model). However, pending further experience regarding the process of changing to a models based approach, no specific time limit will be set for banks which use a combination of internal models and the standardized methodology to move to a comprehensive model.

The following conditions will apply to banks using such combinations:

- (a) Each broad risk factor category must be assessed using a single approach (either internal models or the standardized approach), i.e. no combination of the two methods will in principle be permitted within a risk category or across banks' different entities for the same type of risk.
- (b) All the criteria laid down in Section 4 will apply to the models being used;
- (c) Banks may not modify the combination of the two approaches they use without justifying to SAMA that they have a good reason for doing so;
- (d) No element of market risk may escape measurement, i.e. the exposure for all the various risk factors, whether calculated according to the standardized approach or internal models, would have to be captured;
- (e) The capital charges assessed under the standardized approach and under the models approach are to be aggregated according to the simple sum method.

However, banks may incur risks in positions which are not captured by their models, for example, in remote locations, in minor currencies

or in negligible business areas. Such risks should be measured according to the standardised methodology.
(Refer to Paragraph 718(Lxxxvi) of Revisions to the Basel II market risk framework – Dec 2010)

4.10 **APPROVAL OF MODEL BY SAMA**

Bank should submit their detailed proposals to SAMA. SAMA will review these proposals, and upon ensuring that the banks internal models meet all the criteria and conditions for recognition set out under these guidelines and after satisfying itself with the results of validation procedures carried out by the internal and external auditors and/or by itself, will issue a letter of approval to the bank.

SAMA's prior written approval should be obtained for any modifications proposed to be made to the models previously recognized. In cases where a bank proposes to apply the model to new but similar products, there will be a requirement to inform SAMA and obtain prior approval.

SAMA may withdraw its approval granted for any bank's model if it believes that the conditions based on which the approval was granted are no longer valid or have changed significantly.

ATTACHMENT – 1.1

1. **GCC Countries**

Saudi Arabia, Qatar, Bahrain, UAE, Oman, Kuwait.

2. **OECD Countries currently comprise:**

Countries belong to the Organization for Economic Co-operation and Development (OECD) are listed below and those countries which have concluded special lending arrangements with the International Monetary Fund associated with the Fund's General Agreements to Borrow (at present only Saudi Arabia) but exclude any country which has rescheduled its external sovereign debt, whether to central government or non-central government creditors within the previous 5 years.

Australia	Germany	Mexico	Sweden
Austria	Greece	Netherlands	Switzerland
Belgium	Hungary	New Zealand	Turkey
Canada	Iceland	Norway	U.S.A
Czech Republic	Irish Republic	Poland	U. K.
Denmark	Italy	Portugal	
Finland	Japan	South Korea	
France	Luxembourg	Spain	

Detailed offsetting rules applicable to the reporting of positions are set out in the relevant part of the detailed guidelines.

3. List of Multilateral Development Banks
African Development Bank (AfDB)
Arab Bank for Economic Development in Africa (ABEDA)
Arab Monetary Fund (AMF)
Asian Development Bank (AsDB)
Bank for International Settlements (BIS)
Caribbean Development Bank (CDB)
Council of European Resettlement Fund (CERF)
European Bank for Reconstruction and Development (EBRD)
European Investment Bank (EIB)
Inter-American Development Bank (IADB)
International Bank for Reconstruction and Development (IBRD)
International Finance Corporation (IFC)
International Monetary Fund (IMF)
Islamic Development Bank (IDB)
Kuwait Fund for Arab Economic Development (KFAED)
Nordic Investment Bank (NIB)

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ATTACHMENT-1.2

MAJOR MARKET SECTOR

- Agricultural
- Banking and Financial Service
- Cement
- Electrical Equipment
- Industrial
- Services
- Telecommunications
- Food Processing and Beverages
- Mining and Gas
- Petro-chemicals
- Retailers
- Transportation
- Information Technology
- Building Material and Construction

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ATTACHMENT - 2

Q-14A

**SAMA's SUMMARISED GUIDELINES AND
INSTRUCTIONS TO COMPLETE RETURNS
ON MARKET RISK ASSUMED BY
LICENCED BANKS IN
SAUDI ARABIA**

**SAMA
BANKING SUPERVISION DEPARTMENT
DECEMBER, 2004**

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PACKAGE DESCRIPTION**

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1.2. Interest rate risk exposure on debt securities and other debt related derivatives – General Risk.	Q -14A Section 2.12
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SECTION # 1: INTRODUCTION AND APPROACH

Market Risk can be calculated either by using the Standardized approach or by the Internal Models or a combination of these two approaches. For the present banks can use internal models to capture the general market risk only after getting SAMA's approval, with specific risk to be calculated by the standardized methodology by all banks.

If banks are following the Standardized Approach only they are required to complete returns contained in Section 2 and 3. Banks which have obtained the SAMA approval to adopt their internal value-at-risk models to calculate their general market risk capital charge should complete the return pertaining to Section 4. The capital charge for the risk categories measured under the Internal Models Approach should be reported in Section 4 while that for the other risk categories measured under the Standardised Approach should be reported in the relevant sections of Section 2 and 3 returns. This combination of the Standardised Approach and the Internal Models Approach is allowed for the present. Banks, which adopt the modelling alternative will be expected over time to move towards a comprehensive model capturing all market risk categories. Banks which adopt the Internal Models Approach will not be permitted, except in exceptional circumstances, to revert to the Standardised Approach.

The return and these completion instructions should be read in conjunction with SAMA's Detailed Guideline on the Maintenance of Adequate Capital Against Market Risk.

Both the adjusted capital adequacy ratio (Q-14A) and the risk asset capital adequacy ratio as calculated in the Return Q - 14 should be report to SAMA on a quarterly basis

All licensed banks are required to complete these quarterly return Q-14A series on a consolidated basis.

The returns should show the position as at the last calendar day of each quarter.

Current market value should be used for reporting. This is the valuation of the relevant position with reference to prices quoted by dealers and exchanges or, for over-the-counter contracts for which there are no ready market prices, the valuation based on current market transaction rates.

Amounts are to be shown to the nearest thousand in SR equivalents. In the case of foreign currency items the closing middle market rates prevailing at the reporting date should be used for conversion purposes.

Securities transactions are to be reported on a "trade-date" basis.

Market risk is defined as the risk of losses in on and Off-balance sheet positions arising from movements in market prices. The risks subject to this reporting requirement are;

- (a) the risks pertaining to interest rate related instruments and equities in the banks trading book;
- (b) foreign exchange risk and commodity risk throughout the bankbook.

The return should include the reporting banks positions in on-balance sheet financial instruments (cash) and off-balance sheet derivatives, the latter being defined as financial contracts whose values depend on the values of one or more underlying assets or indices.

Banks are expected to have an established policy for allocating transactions to the trading or non-trading (i.e. banking) book, as well as procedures to ensure compliance with such policy. There must be a clear audit trail at the time each transaction is entered into and the SAMA will examine the adequacy of such policy and procedures and their consistent implementation when it is considered necessary. For this purpose, banks which engage in trading activities should submit to the SAMA a policy statement covering;

- (a) the definition of trading activities;
- (b) the financial instruments which can be traded or used for hedging the trading book portfolios; and
- (c) the principles for transferring positions between the trading and the banking books.

In general, the SAMA will have regard to the Banks intention in entering into a particular transaction when determining whether such transaction should fall into the trading book. Transactions to likely be considered in the trading book.

- (a) the positions arising from the transactions are marked to market on a daily basis as part of the internal risk management process;
- (d) the positions are not (or not intended to be) held to maturity; or for resale and
- (c) the positions satisfy other criteria the Banks applies to its trading portfolio on a consistent basis.

Countries belong to the Organization for Economic Co-operation and Development (OECD) are listed and defined in Attachment 1.1 of the detailed guidance notes.

Detailed offsetting rules applicable to the reporting of positions are set out in the relevant part of the detailed guidelines.

SECTION 2

DETAILED APPLICATION OF THE STANDARDIZED METHOD AND SPECIFIC INSTRUCTIONS OR REPORTING REQUIREMENT FOR INDIVIDUAL ITEM ON EACH RETURN *

2.1 Interest Rate Exposure (Trading Book)

The minimum capital requirement is expressed in terms of two separately calculated charges, one applying to the “specific risk” of each trading book absolute position in debt securities or debt derivatives; whether it is a short or long position, and the other to the overall interest rate risk in the trading book portfolio (termed “general market risk”) where long and short positions in different securities or derivatives can be offset subject to certain “disallowance’s”.

2.1.1. Instruction to Complete Return on Debt securities and debt related derivatives- specific risk. Return # Q14A - 2.1.1.

Report at market value in this part the long and short positions in the underlying security of debt securities and debt derivatives (e.g. bond futures and bond options) in the trading book by category of the issuer. item 1.2 to 1.7 as defined in the Detailed Notes in Item 2.1.1. Offsetting will be allowed between long and short positions in identical issues (including positions in derivatives) with exactly the same issuer, coupon, currency and maturity.

Positions should be slotted into the appropriate time bands specified in the return according to the residual maturities of the debt securities (or the underlying securities in case of debt derivatives).

For details on derivatives refer item 2.1.1 and to Table # 6 of the Detailed Notes.

- The specific risk charge is calculated by multiplying the absolute value of debt position in the trading book by respective risk factor
- Risk weights for specific risk charges are described on the detailed Notes. (Table # 1) and identified on this return.

Interest rate and currency swaps, FRAs, forward foreign exchange counteracts and interest rate futures will not be subject to a specific risk charge. In the case of futures contracts where the underlying is a debt security, a specific risk charge will apply according to the issuer (and the remaining maturity).

* Exclusive of options which are covered in Section 3.

2.1.2 **Instructions to Completes Return on Debt securities, debt related derivatives and interest rate derivatives-general market risk. Return # Q-14A 2.1.2.**

General market risk

General market risk applies to positions in all debt securities, debt derivatives and interest rate derivatives, subject only to an exemption for fully or very closely matched positions in identical instruments. The capital charge is the sum of the following components: as identified on this return.

- (a) The net short or long weighted position in the whole trading book;
- (b) A proportion of the matched position in each time band as described in Detailed Notes as "Basis risk".
- (c) A proportion of the matched positions in and between different time-zone as described in Detailed Notes as yield curve risk.

A Maturity Method is adopted for the reporting of these positions as detailed on the Return and Detailed Notes under Section 2.1.2. In the maturity ladder, one for each currency, first calculate the weighted positions by multiplying the positions reported in each time band by a risk factor according to the Table-III described in Detailed Notes; and identified on the Return.

Report in this part the long and short trading book positions in debt securities and debt derivatives as described in Section 2.1.2 of Detailed Notes as well interest rate exposures arising from futures contracts and forward positions in equities and commodities.

Positions should be reported separately for each currency, i.e. banks should use separate sheets to report positions of different currencies. Long and short position are slotted into the time bands of the maturity ladder by remaining maturity if fixed rate and by the period to the next reproaching date if floating rate. The market risk capital charge is then calculated for each currency according to risk weight identified on the return or in the detailed guidance notes in Table -III. Risk weighted position long and short are separately arrived at in the last column of the return. Thereafter components a, b and c as identified above are calculated.

- (a) A net short or long weighted position in the whole trading book is calculated.

(b) Basis Risk Charge Calculation

The weighted longs and shorts in each time band will be offset resulting in a single short or long position for each band. A 10% capital charge will be levied on the smaller of the offsetting positions, be it long or short. Thus, if the sum of the weighted longs in a time band is \$ 100 million and the sum of the weighted shorts is \$90 million, the vertical disallowance to address basis risk would be 10% of \$ 90 million (i.e., \$9 million).

(c) Yield Curve Risk Calculation

2 rounds of “horizontal offsetting” to address yield curve risk charge will then be conducted, first between the net positions in each of 3 zones (zero to 1 year, 1 year to 4 years and 4 years and over), and subsequently between the net positions in the 3 different zones. For details refer to detailed guidance notes.

Derivatives

Derivatives should be treated as combinations of long and short positions as described in Table 5 of the detailed guidance notes The maturity of an interest rate future or a forward rate agreement will be the period until delivery or exercise of the contract, plus - where applicable - the life of the underlying instrument. For example a long position in a June 3-month interest rate future taken in December is to be reported at market value at end of December as a long position government security in that particular currency with a maturity of 9 months and a short position in a government security with a maturity of 6 months.

For forward foreign exchange positions in the trading book, they should be treated as long and short positions in a zero government security of the two currencies with the same maturity as the forward contract.

Swaps will be treated as two positions in securities with the relevant maturities. For example, an interest rate swap under which a bank receiving floating rate interest and paying fixed will be treated as a long position in a floating rate instrument of maturity equivalent to the period until the next interest fixing, and a short position in a fixed-rate instrument of maturity equivalent to the residual life of the swap. The market values of the two instruments should be reported.

For swaps that pay or receive a fixed or floating interest rate against some other reference price, e.g. an equity price, the interest rate component should be slotted into the appropriate maturity category, with the equity component being included in the equity framework.

The separate legs of cross-currency swaps are to be reported in the relevant maturity ladders for the currencies concerned.

Banks can offset long and short positions in identical instruments cash and derivative with exactly the same issuer, coupon, currency and maturity for general market risk purposes. For details refer to detailed guidance note.

Opposite positions in the same category of derivatives instruments (including the delta-equivalent value of options where the delta-plus approach for options is adopted - can in certain circumstances be regarded as matched and allowed to offset fully. The separate legs of different swaps may also be "matched" subject to the same conditions.

2.2 Instruction to Complete Return on Equity Exposures. Q-14A Section 2.2

As with interest rate exposure, for equity exposure the capital charge is levied in two aspects to cover both the specific risk and the general market risk. Calculation is done on an individual market basis. The capital charge for specific risk will be 8% on the gross (i.e. long plus short) positions. A 4% specific risk charge for liquid and well diversified portfolio will apply. For definition refer to detailed guidance note. The general market risk charge will be 8% on the net position. Net long and short positions in different markets cannot be offset for the purpose calculating the general market risk charge.

For guidance also refer to Detailed Notes under Section 2.2.

Report in this part the long and short positions in equities and equity derivatives in the trading book, including instruments that exhibit market behavior similar to equities. The instruments covered include common stock (whether voting or non-voting), convertible bonds (i.e. debt issues or preference shares that are convertible, at a stated price, into common shares of the issuer), instruments which trade like equities and commitments to buy or sell equity securities. Equity derivatives includes forwards, futures and swaps on both individual equities and on stock indices. Options should be included subject to the specific instructions set out in Section 3. Long and short positions in the same issue may be reported on a net basis.

The positions are to be reported on a market-by-market basis. For overseas markets, bank should indicate the specific country where the market is located in the space provided.

Equity derivatives are to be converted into positions in the relevant underlying. Futures and forward contracts relating to an individual equity should be reported at current market values. For detail refer to Table # 8 of detailed guidance notes. Futures relating to equity indices can be reported at the market-to-market value of the notional underlying equity portfolio.

Matched positions in each identical equity or index (same delivery months) in each market may be fully offset, resulting in a single net short or long position. A future in a given equity may be offset against an opposite cash position in the same equity but the interest rate exposure arising out of the equity futures should be reported in Section 2.1.2. For example, a short future contract on a specific equity with delivery 3 months from the reporting date can be offset against a long position in the underlying equity. However, the interest rate exposure arising out of the equity futures should be reported as a long position in the "1 to 3 months" time band of the equity denominated currency in Section 2.1.2. The position should be reported as the current market value of the equity.

An equity swap obligates an institution to receive an amount based on the change in value of a particular equity or equity index and also to pay an amount based on the change in a value of a different equity or equity index, Swap contract should be reported as a long and a short position respectively. For an equity swap contract which involves a leg relating to a financial instrument other than equities or equity derivatives, for example, receiving/paying a fixed or floating interest rate, that exposure should be slotted into the appropriate maturity band in Section 2.1.2. Where equities are part of a forward contract (equities to be received or to be delivered) any interest rate exposure from the other leg of the contract should be reported in Section 2.1.2

2.3 Instruction to Complete Return to Capture Foreign Exchange Exposure. Return Q-14A Section 2.3

Report in this part the amount of long (short) position in each currency and category as identified on the return for H. O., subsidiaries and branches and gold. Structural positions taken deliberately to hedge against the effects of exchange rate movements on the capital adequacy are to be excluded. Return M - 15 can be utilized to arrive at open position by currency.

The overall open position is measured by aggregating:

- the sum of long/short positions for each category of foreign currencies. The greater of the net long and net short position is taken and identified on the return.
- the net position (short or long) in gold, regardless of sign.

The capital charge will be 8% of the overall open position.

- For details refer to detailed guidance notes Section 2.3

2.4 Instruction to Complete Return on Commodity Exposures Return. Q-14A Section 2.4.

A simple framework is adopted for calculating the commodities risk capital charge. This will be 15% of the net position, long or short, in each commodity; plus an additional capital charge equivalent to 3% of the institution's gross positions, long plus short, in each commodity, to cover basis risk, interest rate risk and forward gap risk.

A commodity is defined as a physical product which is or can be traded on a secondary market, e.g. precious metals, agricultural products and minerals (including oil) etc. Gold is included under foreign exchange and hence not treated as precious metals.

Report in this return the holding or taking of positions in commodities. Long and short positions in each commodity may be reported on a net basis for the purposes of calculating open positions. However, offsetting is not allowed for positions in different types of commodities. The gross position (long and short) in each commodity in terms of the standard unit of measurement will be converted at current spot rates into Saudi Riyal for reporting.

All commodity derivatives and off-balance-sheet positions which are affected by changes in commodity prices should be included. These include forwards, futures and swaps. Options should be reported subject to the specific instructions in Section -3. Futures and forward contracts relating to an individual commodity should be reported as notional amount of the standard measurement unit of that commodity converted at current spot rates. Where a commodity is part of a forward contract (commodities to be received or to be delivered) any interest rate exposure from the other leg of the contract should be reported in Section 2.1.2. This is the same as for equities as described in Section 2.2.

Commodity swaps where one leg is a fixed price and the other the current market price should be incorporated as a series of positions each equal to the notional amount of the contract, with one position corresponding with each payment on the swap. The positions would be long if the bank is paying fixed and receiving floating, and short if the bank is receiving fixed and paying floating. If one of the legs involves receiving/paying a fixed or floating interest rate that exposure should be reported in Section 2.1.2. This is similar to the treatment for equities as described in Section 2.2.

SECTION # 3: INSTRUCTIONS TO COMPLETE RETURN ON OPTIONS

Report in this part positions of option contracts which are related to the risk categories reported in Section 2, using either the Simplified Approach or the Delta Plus Approach.

3.1 For banks that purchase options only - Simplified Approach. Return Q-14A Section 3.1.

Only the outstanding long (purchased) options are covered by the this approach, which is also called the CARVE - Out approach..

Treatments for purchased options with and without related cash positions are summarised. The capital charge should be calculated separately for each individual option (together with the related cash position), banks should then report the sum of the capital charges accordingly calculated as given below.

Position	Treatment
Long cash and Long put or Short cash and Long call	The capital charge will be the market value of the underlying of the option multiplied by the sum of specific and general market risk charges for the underlying less the amount the option is in the money (if any), with the reduced capital charge bounded at zero. ¹
Long call or Long put	The capital charge will be the lesser of: (a) the market value of the underlying of the option multiplied by the sum of specific and general market risk charges for the underlying; and (b) the market value of the option. ²

1. For options with a residual maturity of more than six months the strike price should be compared with the forward, not current price. A bank unable to do this must take the in the money amount to be zero.
2. Where the position does not fall within the trading book (i.e., options on certain foreign exchange or commodities positions not belonging to the trading book), it is acceptable to use the book value instead.

The market risk capital charges to be applied for the purpose of the above paragraph are indicated below;

Underlying	Specific risk charge	General market risk charge
Debt instruments : Government Qualifying (with residual maturity)	0.00%	As per the risk weights in Table III, ¹ according to the residual maturity (fixed rate) or next repricing (floating rate).
6 months or less	0.25%	
Over 6 months to 24 months	1.00%	
Over 24 months	1.60%	
Others	8.00%	
Interest rate (non-debt related)	0.00%	
Equity	8.00%	8.00%
Foreign Exchange	0.00%	8.00%
Commodity	0.00%	15.00%

¹Detailed Notes

In some cases such as foreign exchange where it may be unclear which currency is the “underlying” of the option, this should be taken to be the asset which would be received if the option were exercised. In addition the nominal value should be used for items where the market value of the underlying instrument could be zero, e.g. caps and floors, swaptions, etc.

For guidance refer to detailed Guidance Notes.

3.2 For Banks that write options-Delta Plus Approach Return Q-14A Section 3.2

Only banks that write option should apply this approach. Banks that write options should report in Section 3.2 the relevant delta-weighted positions of all their outstanding options, i.e. the market value of the underlying of the option multiplied by the option delta. The relevant negative gamma and vega sensitivities of these options should also be covered in order to capture the delta sensitivity and volatility risk of these options.

Delta Weighted Position

Delta-weighted option positions with debt securities or interest rates as the underlying will be slotted into the interest rate time bands, as set out in Section 2.1.1 and 2.1.2. A two-legged approach should be used as for other derivatives, requiring one entry at the time the underlying contract takes effect and a second at the time the underlying contract matures. In other words the reporting mechanism would be the same as those for the positions in the underlying instruments of the options as presented in Section 2, as a whole

except that the market value of the underlying instruments will be adjusted by the delta ratios of the relevant options for reporting under this approach. For instance;

- (a) A bought call option on a June three-month interest-rate future will in March be considered, on the basis of its delta-equivalent value, to be a long position with a maturity of six months and a short position with a maturity of three months. The written option will similarly be slotted as a long position with a maturity of three months and a short position with a maturity of six months.
- (b) A two months purchased call option on a bond future where delivery of the bond takes place in September would be considered in March as being long the deliverable bond with a maturity of 8 months and short a six month government security in the same currency, both positions being delta-weighted.

The reporting for options with equities as the underlying will also be based on the delta weighted positions which will be incorporated in Section 2.2 of the return. For purposes of this calculation each national market is to be treated as a separate underlying. For options on foreign exchange and gold positions, the net delta based equivalent of the foreign currency and gold options will be incorporated into the measurement of the exposure for respective currency (or gold) position. These delta positions will be reported in Section 2.3. Options on commodities will be covered in Section 2.4. The delta weighted positions will be incorporated into the respective commodity positions reported in that part.

Negative Gamma Positions and Vega Positions

The net negative gamma positions and vega positions of all outstanding options (purchased or written) should also be reported in Section 3.2. This is in addition to the delta positions being reported in Section 2.

The net negative gamma positions should be reported in the following way:

- (a) For each individual option a “gamma impact” should be calculated by the following formula:

$$\text{Gamma impact} = \frac{1}{2} \times \text{Gamma} \times \text{VU}^2$$

where VU = Variation of the underlying of the option

- (b) VU will be calculated as follows:
- for debt and interest rate options of which the delta-equivalent position is reported in Section 2.12, the market value of the underlying or notional underlying multiplied by the risk weights in Table III for the appropriate time bands as identified in this section.
 - for options on foreign exchange and gold: the market value of the underlying multiplied by 8%;
 - for options on equities and equity indices: the market value of the underlying multiplied by 8%;
 - for options on equities and equity indices: the market value of the underlying multiplied by 8%;
 - for options on commodities: the market value of the underlying multiplied by 15%.
- (c) For the purpose of this calculation the following positions should be treated as the same underlying:
- for interest rate instruments, each time band as set out in Section 2.1.2.
 - for equities and equity indices, each national market;
 - for foreign currencies and gold, each currency pair and gold;
 - for commodities, each individual commodity.
- Banks with options relating to more underlyings than the space provided should report their positions in additional sheets.
- (d) Each option on the same underlying will have gamma impact that is either positive or negative. These individual gamma impacts will be summed, resulting in a net gamma impact for each underlying that is either positive or negative. Only those net gamma impacts that are negative should be reported.

The vega positions should represent the risk in a proportional shift in volatility of +25% for the underlying. For example, an increase in volatility carries a risk of loss for a short option of which the assumed current (implied) volatility is 20%. With a proportional shift of 25%, the vega position has to be calculated on the basis of an increase in volatility of 5 percentage points from 20% to 25%. If the vega is calculated as 1.68, i.e. a 1% increase in volatility increases the value of the option by 1.68, then the above change in volatility of 5 percentage points will increase the value of the option by 8.4 (1.68 x 5) which represents the vega position to be reported.

SECTION # 4: INTERNAL MODELS APPROACH. RETURN Q-14A
SECTION 4

Only those bank which have obtained the SAMA's approval to adopt their internal value-at-risk models to calculate their market risk capital charges are required to report in this part. For guidance refer to Section # 4 of the detailed Guidance Notes.

Value-at-risk results

Report in this part the value-at-risk results (VaR) as at the last trading day of the reporting quarter in column (a) and the average VaR over the most recent 60 trading days of the reporting quarter in column (b), both for each individual market risk category, i.e. item 1.1 to 1.4 and for the aggregate of all risk categories, i.e. item 1.5.

The VaR for the aggregate of all risk categories will not necessarily be equal to an arithmetic sum of the VaR for the individual risk category due to co-relation.

Number of Back Testing Exceptions

Report in this part the number of back testing exceptions for the past 250 trading days (from the reporting quarter end going backwards), based on.

- actual daily changes in portfolio value, in item 1.5 column (c), and
- hypothetical changes in portfolio value that would occur were end-of-day positions to remain unchanged during the 1 day holding period, in item 1.5 column (d), for the aggregate of the broad risk categories.

Multiplication Factor

The multiplication factor to be reported in item 1.5 column (e) is the summation of the following three elements:

- (a) the minimum multiplication factor of 3;
- (b) the "plus" factor ranging from 0 to 1 based on the number of back testing exceptions (i.e. the larger of item 1.5 column (c) and item 1.5 column (d) for the past 250 trading days as set out in Table below, or the backtesting "plus" factor agreed with SAMA; and
- (c) any additional "plus" factor as agreed with SAMA.

**“Plus” Factor Based on the Number of Backtesting
Exceptions for the Past 250 Trading Days**

	Number of exceptions	“Plus” factor
Green zone	0	0.00
	1	0.00
	2	0.00
	3	0.00
	4	0.00
Yellow zone	5	0.40
	6	0.50
	7	0.65
	8	0.75
	9	0.85
Red zone	10 or more	1.00

Capital charge for general market risk calculated by internal models reported in item 1.7 is the larger of:

- (a) Item 1.5 column (a), i.e. VaR for the aggregate of all risk categories, as at the last trading day of the reporting quarter; or
- (b) Item 1.6, i.e. the average VaR for the last 60 trading days of the reporting quarter (item 1.5 column (b) times the multiplication factor (item 1.5 column (e)).

Specific Risk

Refer to Detailed Notes Section # 4.6

3. Largest daily losses over the quarter

Report in this part in descending order (i.e. the largest loss first) the 5 largest daily losses over the reporting quarter and their respective VaR for the risk exposures which are measured by the internal models approach. If the number of daily losses during the quarter is less than 5, only report all such daily losses.

SECTION # 6: “ADJUST” CAPITAL ADEQUACY RATIO. RETURN Q-14A
SECTION 5.

- Market risk capital charges using the standardized approach are for each section ranging from section 2.1.1 to section 3.2 as applicable are summed up as A.
- Market risk capital charges using the internal models is arrived at from section 4 as B.
- The market risk capital charges arising from Section 2 to 4 are aggregated and converted to market risk weighted exposure. The capital base and total (credit) risk weighted exposures are extracted from Form Q-14.
- For on-balance-sheet debt securities and equities in the trading book as well as on-balance-sheet commodities included in Section 2 to 3 of this return, the (credit) risk weighted exposures reported in Form Q-14 should be excluded in calculating the “adjusted” ratio. The market risk capital charges for these positions calculated in this return cover all the capital requirements for absorbing potential losses arising from carrying such positions.

ATTACHMENT – 3

Q 14-A

**PROPOSED PRUDENTIAL RETURNS
TO CAPTURE MARKETS RISK**

**SAMA
BANKING SUPERVISION DEPARTMENT
DECEMBER, 2004**

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6.12.04

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