



---

Busan International Finance Center, 40 Munhyeongeumyung-ro, Nam-gu, Busan, Republic of Korea, 608-828  
Telephone: +82-51-662-2000, www.krx.co.kr

### EXHIBIT C

Document	Description
PFMI Disclosure Framework	Separately attached
URL	<a href="http://eng.krx.co.kr/m7/m7_5/m7_5_8/JHPENG07005_08.jsp">http://eng.krx.co.kr/m7/m7_5/m7_5_8/JHPENG07005_08.jsp</a>

**DISCLOSURE FRAMEWORK OF THE**  
**CPSS-IOSCO**  
**Principles for Financial**  
**Market Infrastructures**

[KOREA EXCHANGE, INC.]

[APRIL2015]



## CONTENTS

---

<b>Glossary</b> .....	3
<b>I. Executive Summary</b> .....	5
<b>II. Summary of major changes since the last update of the disclosure</b> .....	7
<b>III. General background on KRX</b> .....	11
<b>IV. Principle-by-principle summary narrative disclosure</b>	
Principle 1 : Legal basis .....	24
Principle 2 : Governance .....	26
Principle 3 : Framework for the comprehensive management of risks .....	32
Principle 4 : Credit risk .....	36
Principle 5 : Collateral .....	44
Principle 6 : Margin .....	46
Principle 7 : Liquidity risk .....	55
Principle 8 : Settlement finality .....	58
Principle 9 : Money settlements .....	61
Principle 10 : Physical deliveries .....	63
Principle 12 : Exchange-of-value settlement system .....	64
Principle 13 : Participant-default rules and procedures .....	66
Principle 14 : Segregation and portability.....	71
Principle 15 : General business risk.....	74
Principle 16 : Custody and investment risk.....	76
Principle 17 : Operational risk .....	79
Principle 18 : Access and participation requirements.....	83
Principle 19 : Tiered participation arrangements.....	87
Principle 20 : FMI Links .....	90
Principle 21 : Efficiency and effectiveness .....	92
Principle 22 : Communication procedures and standards .....	93
Principle 23 : Disclosure of rules, key procedures, and market data .....	95
<b>V. List of publicly available resources</b> .....	97

---

## GLOSSARY

---

BCP	Business Continuity Plan
BOD	Board of Directors
BOK	Bank of Korea
CSD	Central Securities Depository
CCP	Central Counterparty
CPMI	Committee on Payment and Market Infrastructure
DMC	Default Management Committee
DR	Disaster Recovery
DVP	Delivery versus Payment
ETP	Exchange-traded Products
EVT	Extreme Value Theory
FSCMA	Financial Investment Services and Capital Markets Act
FMI	Financial Market Infrastructures
FSAP	Financial Sector Assessment Program (by IMF-World Bank)
FSC	Financial Services Commission
FSS	Financial Supervisory Service
IMF	International Monetary Fund
IOSCO	International Organization of Securities Commission
JCF	Joint Compensation Fund
KRI	Key Risk Indicator
KSD	Korea Securities Depository
KSFC	Korean Securities Finance Corporation
KRX	Korea Exchange
NPV	Net Present Value
PFMI	Principles for Financial Market Infrastructures
RCSA	Risk & Control Self Assessment
RTO	Recovery Time Objective

---

**Responding institution: The Korea Exchange (KRX)**

**Jurisdiction: Republic of Korea**

**Authorities regulating, supervising or overseeing KRX**

- The Financial Services Commission(FSC)
- The Financial Supervisory Service(FSS)
- The Bank of Korea(BOK)

**The date of this disclosure: April 1, 2015**

**This disclosure can also be found at [www.krx.co.kr](http://www.krx.co.kr)**

**For further information, please contact the person below;**

- Group address (Department of Clearing & Settlement Rules & Regulations, [clearing@krx.co.kr](mailto:clearing@krx.co.kr))
  - Ms. Eun Jean Lee (Manager, Exchange-traded Products Clearing & Settlement, [jean5@krx.co.kr](mailto:jean5@krx.co.kr))
  - Mr. Young Ho Kim (Manager, OTC Derivatives Clearing & Settlement, [zerohob@krx.co.kr](mailto:zerohob@krx.co.kr))
-

## I . Executive Summary

---

Korea Exchange, Inc. (“KRX”) is a self-regulatory organization and a demutualized company owned by 39 shareholders (including treasury stock). KRX is a comprehensive exchange which was established in 2005 by consolidating 3 domestic securities exchanges in Korea (Korea Stock Exchange, KOSDAQ Securities Exchange and Korea Futures Exchange) to become one unified capital market in Korea.

Having its legal ground for incorporation in the Financial Services and Capital Market Act (“FSCMA”), KRX serves as the only exchange and central counterparty (“CCP”) in Korea. KRX is designated as the CCP for the exchange traded products (“ETP”) in the securities and the derivatives market by the Financial Services Commission (“FSC”) in accordance with the Article 378 of the FSCMA, and is authorized as the CCP for the over-the-counter (“OTC”) derivatives in accordance with the Article 323-3 of the FSCMA.

The Korean financial market has made efforts to implement the ‘Principles for Financial Market Infrastructures (‘PFMI’) published by the Committee on Payment and Settlement Systems (“CPSS”) and the Technical Committee of the International Organization of Securities Commissions (“IOSCO”) since its issuance in April 2012. Specifically, the BOK amended the ‘Regulation on Operation and Management of the Payment Systems’ in Dec 2012, to adopt the PFMI as the supervisory criteria. The FSC, the main regulator of the Korean capital market, also declared that it fully supports the PFMI in 2012, and has established the “Business Guideline for Financial Market Infrastructures” based on the PFMI in March 2015.

KRX has a firm legal ground for the finality of its clearing & settlement functions in the case of default or bankruptcy of a participant by the FSCMA and the Debtor Rehabilitation and Bankruptcy Act (“DRBA”), thus securing legal effectiveness without conflicts with other laws.

The governance structure of KRX is designed to promote the stability and efficiency of its market operations and post-trade functions (including clearing & settlement) and to enhance the public interest. For that reason, KRX is legally obliged to implement the Board of Directors (“BOD”) and the Audit Committee. In order for a comprehensive management of risks, KRX established a BOD sub-committee – the Risk Management Committee which consists of 1 standing director and 2 outside directors (1 accounting expert and 1 legal expert). Under this committee, a business unit is dedicated to the overall entity risk management of KRX. In February 2015, KRX established a new business unit specializing in CCP-related risks, the CCP risk management team, which is in charge of monitoring credit and liquidity risks and conducting various tests for identifying risks in the market. All the test results and the CCP-risk policies produced by the CCP risk management team will be reported to the Risk Management Committee through the overall risk management team.

KRX, as a CCP, efficiently measures, monitors and manages the relevant risks, and holds financial resources to cover the potential risks. KRX specifies acceptable collateral in its Business Regulations and sets conservative haircut ratios. Also, KRX efficiently calculates margin requirements and collects margin with a daily check on

---

margin sufficiency. In addition, KRX meets the principle on settlement finality in accordance with PFMI. The finality of real-time and intraday settlement is secured, as cancellation of securities and money transfers are prohibited.

Amongst the diverse products traded in KRX, only 2 products (gold and foreign currency) are subject to physical delivery. Nonetheless, KRX fully observes all the standards and requirements for physical delivery. KRX eliminates or minimizes the capital risk through Delivery versus Payment (“DVP”) mechanism as the Settlement Business Regulation of Korea Securities Depository (“KSD”) stipulates that settlement can be made only if all the other linked obligations are settled.

Having effective and clearly specified regulations and procedures, KRX is prepared with a systematized framework for processing participant-default. In order to cope with extreme but plausible conditions, KRX conducts Business Continuity Plan (“BCP”) tests 3 times per annum, based on various scenarios (power down, system failure of a settlement bank, etc). In November 2014, KRX established a provision in its Derivatives Market Business Regulation stating that KRX should check the operability of the default management procedures on an annual basis (in fact, KRX conducts BCP drills at least 3 times a year). In order to protect the customer position and collateral from participant’s default or insolvency, KRX employs the legal framework for segregation of customer position and account transfer.

KRX holds enough liquid net assets to cover six months of the current operating expenses and, as a going concern, measures and monitors its general business risk. On top of that, KRX measures, monitors and manages operational risks (business risk, investment risk and IT risk) efficiently. KRX provides fair and open access to direct and indirect participants, and manages risks coming from indirect participants through the direct participants. The post-trade functions in the link between the CCP (KRX) and the CSD (KSD) are conducted stably and smoothly in accordance with the process design drawn by the related business regulations of each financial market infrastructure (“FMI”), based on firm legal grounds.

All business of KRX are designed and operated for the purpose of enhancing stability and efficiency of the capital market. KRX sets up standard communication protocols for the transmission of clearing and settlement data, and efficiently shares trade and post-trade data with related parties. KRX provides its participants and the public with information on procedures, rules and regulations regarding market participation, trade and post-trade. KRX stores and manages the trade data generated from its securities markets, the derivatives market, and OTC derivatives clearing, and provides them to the relevant authorities and the public. To keep up with the international commitments for higher transparency in the CCP services, KRX will start disclosing its quantitative information (including the C-factors for both ETP and OTC) in 2016 in accordance with the Public Quantitative Disclosure Standards for CCPs published by CPMI-IOSCO. KRX will establish a technological platform for its disclosure in 2015.

---

## II . Summary of major changes since the last update of the disclosure

---

KRX published its first disclosure framework in line with the FMI disclosure template in July, 2013.

Several rule changes have been made for the implementation of PFMI, particularly for the enhancement of credit risk management. Settlement finality (time point) for ETP clearing was specified in the Derivatives Market Business Regulation in June 2014, and a new provision mandating KRX to obtain an independent validation of its margin models and stress tests was established in November 2014. KRX also set up a provision in the Derivatives Market Business Regulation related to its margin model to limit pro-cyclicality when determining the margin rates in November 2014. KRX also set a concentration limit on cash deposit to settlement banks (collateral custodians). To enhance intraday market risk management, KRX will start calculating and collecting intraday margin in June 2015.

For all such improvements, however, there are remaining tasks in the ETP clearing services such as expansion of financial resources, amendment of the default waterfall, enhancement of collateral management. For this, KRX is setting up a comprehensive implementation plan and has started consultation with its clearing members and the regulator. It is the goal of KRX to resolve major issues regarding financial safeguards, collateral management and calibration of risk exposures within 2015.

KRX has made advancing steps, and will continue making efforts for the implementation of international standards. For the convenience of comparison with the previous disclosure framework (published as of July 2013), changes or revisions made or being made since 2013 are listed below;

### < ETP >

#### 1. Revision of the default waterfall

Unlike OTC Derivatives clearing, the default waterfall in ETP clearing was not in line with the international standards, as the Article 399 of the FSCMA states that KRX should use non-defaulters' joint compensation fund ("JCF") contributions in preference after the defaulter's assets (margins and JCF contribution) are used. Though a non-defaulting clearing member's liability against the CCP in the event of a member's default is limited to its JCF contribution (pursuant to Article 394 of the FSCMA) and the remainder of the loss is fully covered by the CCP, it is undeniable that the existing scheme was far from global practices and standards.

On October 8, 2014, the FSC made the public pre-announcement of legislation of the FSCMA including the revised provisions stating that in case where KRX compensates for damages incurred from a clearing member's default in the ETP markets, KRX shall use its assets (the amount which is to be predetermined by the Enforcement Decree and the KRX Membership Regulation) prior to non-defaulting clearing members' JCF contributions. Since the amendment

---

---

process has already commenced, it is expected to be completed within the first half of 2015, though it is hard to tell exactly when it will be as it is subject to parliamentary procedures. Along with the revision of the FSCMA, the FSC and KRX will amend the subsequent regulations regarding the waterfall such as the Enforcement Decree to the FSCMA and the KRX Membership Regulation in order to specify the details of the default waterfall in line with the global standards. KRX believes that putting its “skin in the game” prior to the non-defaulting members’ JCF will incentivize enhancing its risk management framework. To make a more aligned and balanced loss allocation scheme between the CCP and clearing members, the revised default waterfall may include member assessment after the depletion of the pre-funded resources and a cap period for limitation of member liabilities in the event of multiple defaults during a certain period of time.

## **2. Independent validation of the margin model**

KRX has established a provision in the relevant regulations to stipulate that its ETP margin model shall be periodically validated by an external assessor. An assessment on the margin model is to be conducted starting from 2015 (Article 172 of the Derivatives Market Business Regulation). In addition to the margin model validation, KRX will undertake an external validation of its stress testing model in the first half of 2015, to check the propriety of testing methodologies reflecting the international standards.

## **3. Enhancement of selection criteria for settlement banks and custodians**

In regards to the selection criteria for the settlement banks in ETP clearing, KRX subdivided and strengthened the capital adequacy requirements (heightened to 120% of the previous criteria) and added a new criterion for financial credibility - credit rating requirement (Article 111 of the Derivatives Market Business Regulation)

## **4. Specification of the settlement finality in the Derivatives Market**

KRX has stipulated the point of settlement finality in the derivatives market by establishing a provision in the Derivatives Market Business Regulation stating that when a clearing member has delivered the net cash balance or net underlying asset balance to KRX, the clearing member shall not cancel such delivery (Article 104-2 of the Derivatives Market Business Regulation).

## **5. Shortening the calculation cycle of the substitute prices of listed bonds as collateral**

Formerly, substitute prices of listed bonds deposited as collateral were calculated on a weekly basis unlike other collaterals, as pointed out in the 2013 Financial Sector Assessment Program final report on Korea jointly conducted by the International Monetary Fund (“IMF”) and the World Bank. Consequently, it was likely that the collateral values of

---

---

listed bonds didn't appropriately reflect the market prices. In order to improve the adequacy of collateral assessment, KRX reduced the calculation cycle of the substitute prices of listed bonds from a weekly basis to a daily basis (Article 113 of the Enforcement Rules of KOSPI Market Business Regulation)

#### **6. Determination of the margin rates considering pro-cyclicality**

Provisions related to the margin model in the Derivatives Market Business Regulation didn't specify KRX's obligation to limit pro-cyclicality when deciding the margin rates. KRX revised the related provision in the Derivatives Market Business Regulation to improve compliance with the international standards. KRX henceforth will include the details and matters necessary in the Guideline for the Margin Rate Management (Annex 19 of Enforcement Rules of KOSPI Market Business Regulation).

#### **7. Enforcement of stress tests in ETP clearing**

KRX has conducted stress tests to check the adequacy of financial resources since 2012, and started back testing to validate the margin model on a daily basis in 2013 to enhance the risk management framework in line with the international standards. However, there had not been a legally binding provision which mandates KRX to conduct such stress tests and to report the results to its Risk Management Committee until KRX stipulated the basis for the stress test for calculating the JCF in ETP clearing in the Article 9-2 of the Enforcement Rules of Membership Regulation in November 2014. Also, KRX drafted the Stress Test Guideline including the methodology, applicable scenarios, frequency, reporting obligations, etc. for stress tests.

#### **8. Concentration limit on cash deposit to settlement banks**

Although KRX has in practice avoided the deposit of more than 50% of its cash balance submitted as margin to one settlement bank since March 2014, the related regulations didn't stipulate matters thereof. KRX newly established the related provision stipulating the concentration limit on cash deposit to a particular settlement bank (Article 102-2 of Enforcement Rules of Derivatives Market Business Regulation).

#### **9. Enforcement of default procedure tests**

For all its efforts to improve the operational personnel's response capability for an ETP member's default through periodic BCP drills, the related regulations didn't stipulate matters thereof. For this reason, KRX established a provision stipulating that it shall carry out the BCP test for managing members' settlement default on an annual basis to check the validity and enforceability of the default procedures in accordance with the rules and regulations (Article 112-7 of the Enforcement Rules of Derivatives Market Business Regulation).

---

---

## 10. Discretionary powers for disposition of a defaulting member's collateral

In the event of a member's default, it is crucial for the CCP to fulfill the settlement obligations against the counterparties promptly. To this end, a CCP may well have legal powers to dispose the defaulter's collateral to cover the loss from default, which is a core part of the default procedure. KRX stipulated its disposition right in all applicable market regulations (KOSPI, KOSDAQ and Derivatives Market Business Regulations).

## 11. Enhancement of CCP risk management infrastructure

For the enhancement of CCP risk management infrastructure, the KRX newly established "CCP Risk Management Team" under the Clearing & Settlement departments, which is dedicated to management of CCP risks and design of policies and procedures. Furthermore, KRX establishes "Clearing & Settlement Risk Management Committee" in order to deliberate and approve material matters regarding CCP activities and risk management.

### < OTC >

This is the first disclosure of KRX of its OTC clearing services pursuant to the CPSS-IOSCO Disclosure framework for financial market infrastructures dated December 2012.



### III . General Background on KRX

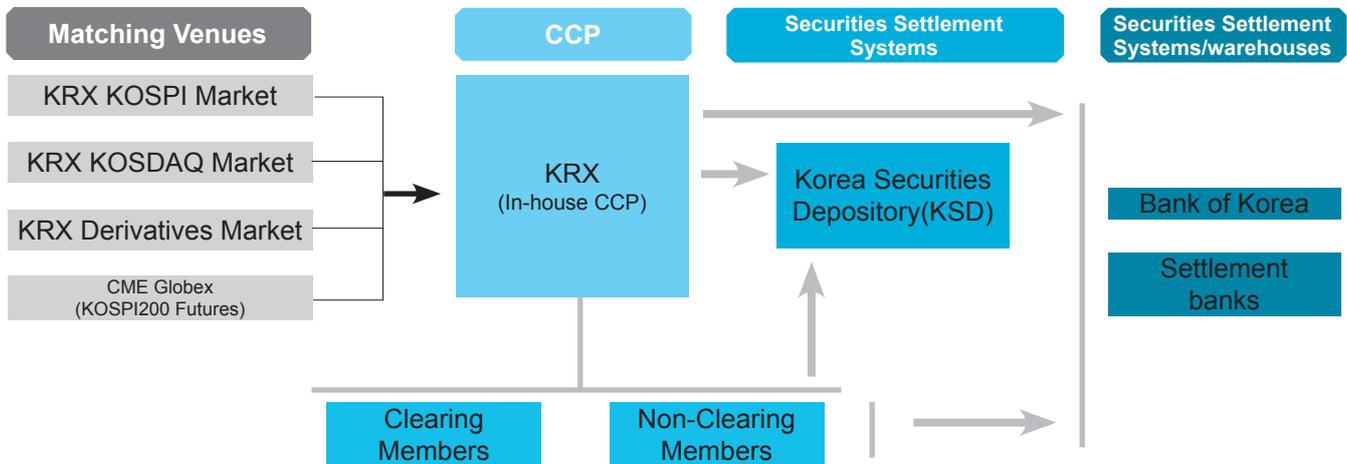
#### 1. General description of KRX and its markets

As prescribed in the FSCMA, KRX provides order-matching, listing examination, corporate disclosure, market surveillance and clearing and settlement services, which means that KRX is a total service provider serving as a trading venue, a self-regulatory organization (“SRO”) in charge of market transparency, and a CCP. By doing so, KRX supports the capital market with one-stop service, and enhances efficiency.

While operating both markets for listed securities and listed derivatives, KRX also functions as a clearing and settlement institution that is responsible for the fulfillment of the settlement obligations subsequent to trading. According to the FSCMA, the clearing process performed by KRX include transaction confirmation, assumption of obligation, netting, confirmation of settlement securities, settlement contract, and settlement amount, guarantee for settlement execution, follow-up measures on settlement failure, and settlement instruction for the transactions carried out in the KRX markets. As an in-house CCP, KRX provides clearing services for its own 3 markets\*. Meanwhile, settlement refers to the process of fulfilling delivery obligations confirmed and instructed by the clearing institution. The FSCMA defines the settlement in the Securities Market as the delivery and payment of securities subsequent to transactions on the securities market (Article 297) and the settlement in the Derivatives Market as delivery of instruments and money payment subsequent to transactions on the derivatives market (Article 378).

- \* i) KOSPI Market which is the main board for trading stocks, bonds, ETFs, etc.
- ii) KOSDAQ Market which is a cradle for venture businesses
- iii) Derivatives Market, a trading venue for various types of listed derivatives

The diagram below illustrates the market network in regards to the ETP clearing and settlement process.



## &lt; Exchange Traded Products cleared by KRX &gt;

Category	Products
<b>Securities</b>	
Stock	listed stocks in KOSPI and KOSDAQ markets
Collective investment scheme	Mutual Fund
Warrants	ELW(Equity Linked Warrants)
Warrant/Warrant certificate	CS(Certificates of entitlement to new shares), CW(Company Warrants)
Depository Receipt	DR(Depository Receipts)
Exchange Traded Fund	ETF(Exchange Traded Fund)
Certificate	BC(Beneficiary Certificate)
<b>Bond</b>	
Government bond	3Y/5Y/10Y, trades in the market for Primary Dealers
Municipal bond	Public bonds issued by local governments
Special bond	Bonds with special purpose issued by a public institution and financial institution established by special act (i.e. Monetary Stabilization Securities)
Corporate bond	Listed corporate bonds issued by listed companies, local public corporations, and financial companies
<b>Exchange-traded Derivatives Products</b>	
Futures	Stock price indices: KOSPI200, STAR Individual stock Bond : 3Y/5Y/10Y Government bond, monetary stabilization bonds Currency : Dollar, Yen, Euro, Dollar Flex product : gold, pork
Options	Stock price indices : KOSPI200, STAR Individual stock currency : Dollar

## &lt; Daily Average Trading Value and Settlement Amount &gt;

(Unit: billion KRW)

Category			2014
Securities	Equities	Trading Value	6,714.2
		Settlement Amount	441.7
	General Bond	Trading Value	136.5
		Settlement Amount	48.5
	Government Bond	Trading Value	5,475.6
		Settlement Amount	1,241.6
	Repo	Trading Value	236.2
		Settlement Amount	187.2
	Total	Trading Value	12,562.5
		Settlement Amount	1,919
Derivatives	Trading Value	37,170.9	
	Settlement Amount	64.9	

## &lt; Daily Average Risk Exposure per Market (Parameter VaR) &gt;

(Unit: billion KRW)

Category	2014
Securities market	36.1
Derivatives market	521.9

KRX commenced clearing services for the Korean Won Interest Rate Swap (KRW IRS) transactions in June 2014, as a follow-up measure to the Pittsburgh G20 Summit for enhancing the stability of the global financial market.

< Clearing Eligible KRW IRS Transaction >

		Specifications
Type		Fixed interest rate is exchanged for floating exchange rate for contract amount
Fixed Interest Rate (%)		Within the tenth decimal place
Floating Interest Rate (%)		91-day CD rate (announced by KOFIA)
Rate Fixing Date		Immediately preceding business day of the reset date
Spread		Inapplicable (only CD flat is permitted)
Coupon Payment Frequency		3 months
Effective Date		Following business day of the trade date (T+1)
Business Day Convention of Termination Date		Modified Following
Contract Amount		From KRW 1 billion up to KRW 1 trillion
Maturity		up to 10 yrs(every 3 months)
Day Count Fraction		Actual/365(Fixed)
Payment Date	Business Day Convention	Modified Following
	End of Month	End of Month (EOM) * In case the effective date falls under the end of the month on calendar, in principle, EOM applies.
Adjustment of Calculation Period		Adjusted * Subject to Actual/365(Fixed)
Compounding		Inapplicable
Round off		KRW rounded down to whole Won
Business Days		Seoul, excluding Saturdays (subject to change in the standards as determined by KRX upon clearing)

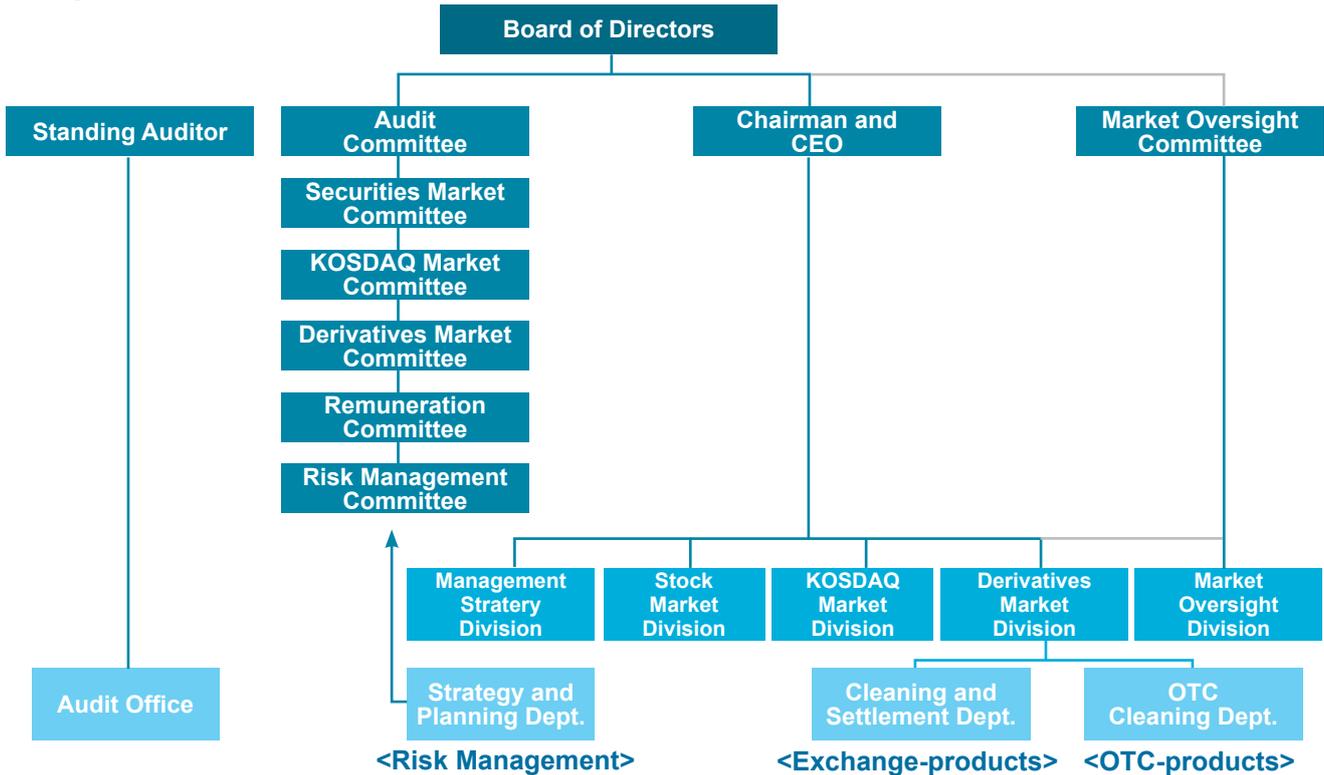
## &lt; OTC Clearing Statistics &gt;

(Unit: billion KRW)

Category	2014
Daily Average Clearing Value	1,032.6
Daily Average Settlement Amount	2.109
Daily Average Market Risk Exposure (Historical VaR)	66.8



## 2. Organization of KRX



As a demutualized company, KRX is managed by the general shareholders’ meeting and the BOD. Under the supervision of the Chairman & Chief Executive Officer (“CEO”), there are 5 divisions functioning as executive bodies of KRX.

### Management Strategy Division

The Management Strategy Division establishes the business strategies and management innovation policies for the exchange, provides a long-term vision to improve the overall management of KRX, and conducts personal affairs, general affairs, advertisement, etc. to support the efficient work process of the three Market Divisions and the Market Oversight Division. As the control tower of the company, this Division includes a Risk Management Team which monitors and manages the enterprise-wide risks, and supports the Risk Management Committee.

---

### **KOSPI Market Division**

The KOSPI Market Division runs the main board of the exchange, KOSPI market and bond markets (government bonds, corporate bonds and Repo transactions). Other than market operation, this Division has business departments providing listing examination, corporate disclosure and other services.

### **KOSDAQ Market Division**

The KOSDAQ Market Division functions as the secondary board for stock transactions. It provides capital raising opportunities for medium-small sized firms(those unable to meet the listing criteria for the KOSPI Market) but with high growth potentials. In 2014, a new market board, the KONEX market was established under this division to support newly established firms with innovative technologies.

### **Derivatives Market Division**

The Derivatives Market Division has emerged as a growth engine for KRX since the new millennium. Having run one of the most active financial derivatives markets in the world, this Division consistently developed new derivative products - various by-product markets throughout the fields including stock index, bond/interest rate, currency, commodity and individual stocks, and has built the foundation for development of financial market. For the past few years, this Division has expanded its product line-up to commodity spots – petroleum, gold and carbon emission rights. On top of that, there are business departments dedicated to the clearing & settlement services providing post-trade services for ETP and OTC derivatives .

### **Market Oversight Division**

As an internal organization of KRX in compliance with the Korea Exchange Regulations, the Market Oversight Division carries out voluntary control of the markets, prevents and controls unfair transactions such as manipulation in the stock and futures market, to maintain a sound market order so that the investors can participate in the market with confidence.

### **Subsidiaries**

KRX has 2 subsidiary companies – Koscom and KSD- that are playing key roles as the main IT arm of the capital market and the central depository, respectively.

---

---

### 3. Legal and regulatory framework

KRX was an exchange holding company established by the Securities & Futures Exchange Law (replaced by Financial Investment Services and Capital Market Act) of Korea in the business of operation of equity, bond, financial derivatives and commodity derivatives markets, market oversight activities for maintenance of market transparency.

As the FSCMA has been amended in May 2013 to allow multiple exchanges, KRX has lost its monopolistic status as the sole trading venue in Korea. However, it remains as the only CCP as it was designated by the FSC as the clearing service provider for securities transactions and clearing and settlement organization for listed derivatives according to the Article 378 of the FSCMA and is the sole authorized CCP for OTC derivatives under Article 323-3 of the FSCMA.

The FSCMA and its Enforcement Decree specifies KRX's organization, roles and responsibilities, business regulations, self regulatory functions, supervision on its business, etc. Pursuant to Part 7 (Exchange), Chapter 3 (Market), KRX establishes various Regulations with the approval from the FSC – the Membership Regulation, Market Business Regulations, Listing Regulation, Disclosure Regulation, etc.

KRX is subject to supervision and oversight of the following authorities;

The FSC serves as the policymaking body for matters pertaining to the supervision of the payment and settlement system operators and providers of payment services. Based upon the FSCMA, the Banking Act and other related laws, the FSC regulates prominent FMI, such as KRX, KSD, and most payment service providers. The Financial Supervisory Service ("FSS") examines the financial institutions and other related institutions as directed or charged by the FSC.

The BOK is in charge of oversight of the payment and settlement systems operating in Korea. In accordance with the Bank of Korea Act, the BOK oversees payment and settlement systems operated by other institutions, including KRX as a CCP. The BOK also participates in the CLS Oversight Committee for cooperative system oversight.

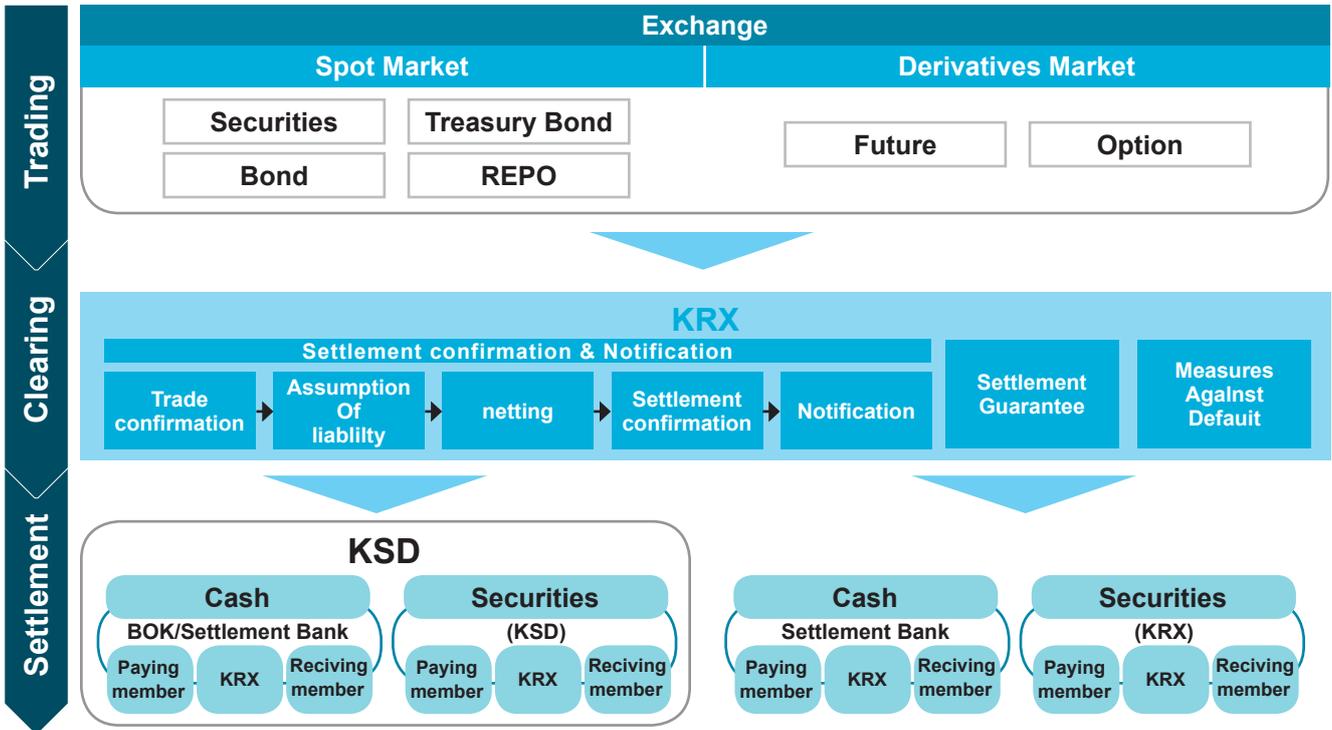
As an SRO, KRX has the obligation to regulate and supervise its members by prescribing and enforcing its rules. This is in accordance with the FSCMA which requires KRX to establish the Membership Regulation in regards to the qualification of members, admission and expulsion of members, rights and obligations of members and other matters necessary for managing members.

---

#### 4. System design and operations

The clearing and settlement process of the securities market and the derivatives market are stipulated in detail in the Business Regulations (Article 72 through Article 76-2 of the KOSPI Market Business Regulation, Article 28 through Article 32-2 of the KOSDAQ Market Business Regulation, Article 33 through Article 50 of the KONEX Market Business Regulation, Article 88 through Article 109-2 of the Derivatives Market Business Regulation)

The diagram below illustrates the workflow of the securities and derivatives markets including trading, clearing and settlement.



#### Trade verification and assumption of liability

Clearing and settlement in the listed securities derivatives market starts with the verification of trading details in each market. KRX as a CCP bears obligations only for the verified transactions. By doing so, KRX takes the responsibility for the fulfilment of the settlement obligation.

---

### **Determination of settlement details through netting**

Size of the liability assumed by KRX through verification of trade and assumption of liability is reduced by netting. Netting helps a clearinghouse to reduce settlement risk by minimizing the settlement size. Normally, a clearinghouse reduces counterparty risk by performing multilateral netting.

### **Notification of fixed settlement details**

KRX notifies the member of the settlement details of the securities and derivatives markets on the trading day. But, as correction of erroneous trade is possible until 15:00pm of the day after the trading day, if this changes the settlement details, KRX notifies the member of the revised settlement details again.

### **Settlement Instruction by KRX**

Settlement by KRX to the receiving member is made through 'settlement instruction' to the institution processing settlement functions. For securities markets, KRX instructs KSD to deliver the securities and make cash payments. Upon receiving the settlement instruction, KSD completes the delivery by account transfer, i.e., transferring the securities to the buyer's account from the seller's account, and in case of cash, sends the settlement instruction to the settlement banks so that the receiving member will receive the settlement amount.

As for the derivatives market, KRX instructs the settlement bank to make cash payment, and in case of physical delivery, gives settlements instruction to the institutions where payment and receipt of related underlying assets are made. In case of currency derivatives, the settlement instruction for the underlying assets - US Dollar, Japanese Yen, Euro - is sent to the foreign exchange settlement banks (foreign exchange banks), and in case of Gold Futures, the settlement instruction is sent to the custodian (KSD) designated by the KRX.

With regards to the receipt of securities and payments in the securities market, the paying member makes the payments by the settlement deadline and KRX delivers the securities and cash to the members that meet the receipt conditions starting from the settlement beginning time. A securities transaction is final at the moment of settlement, which differs per type of instrument:

- Stocks: settlements are conducted on a real time basis from 09:00am to 16:00pm on the settlement day (T+2).
- Government bonds: settlement is made on a real time basis from 09:00am to 16:00pm on the settlement day (T+1).
- Repo and other bonds: settlement is made on a real time basis from 15:00pm to 16:00pm on the trading \ day (T+0).

The settlement deadline in the derivatives market is 16:00pm on the settlement day, except for physical delivery of which deadline is 12:00pm.

---

## &lt; Summary of ETP trading, clearing and settlement &gt;

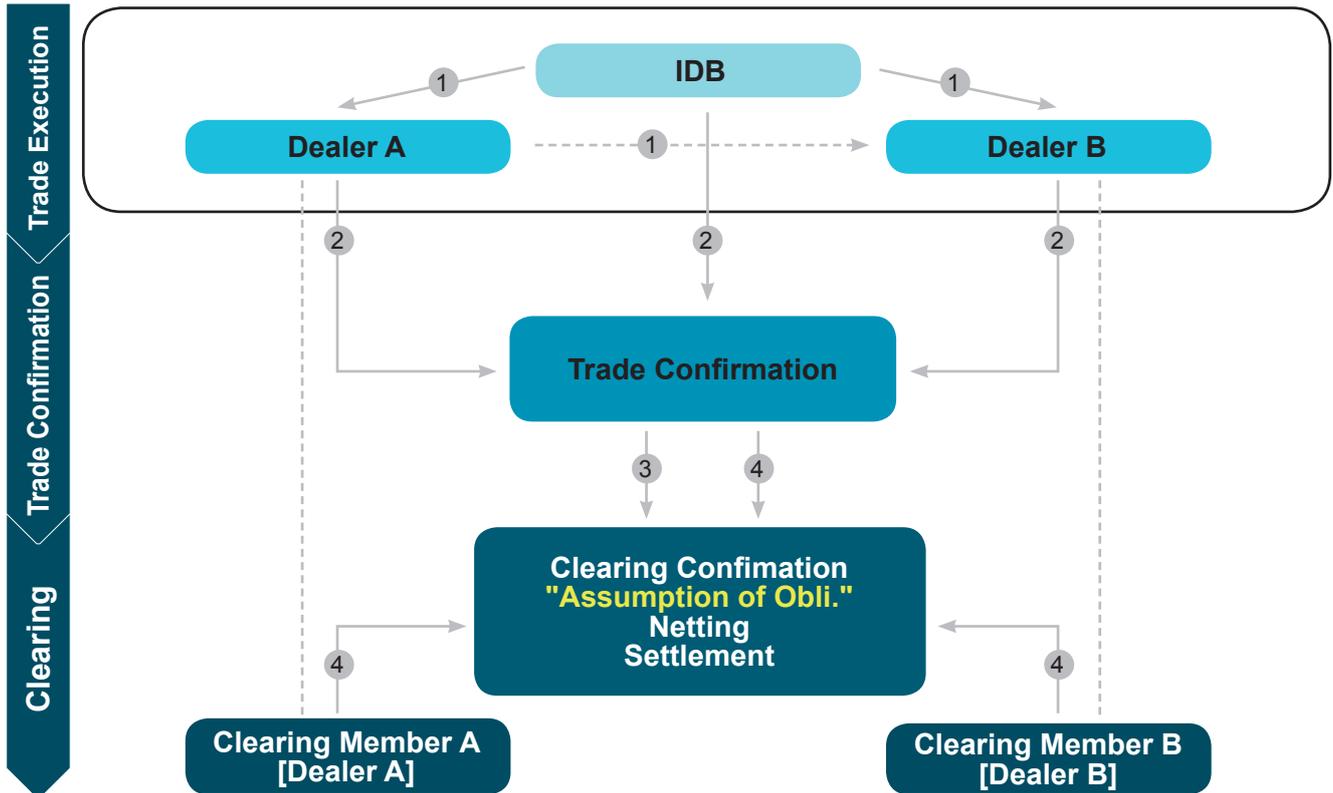
	KOSPI			KOSDAQ	LISTED DERIVATIVES
	Stocks	Government bonds <sup>1)</sup>	General bonds	Stocks	
CCP	KRX	KRX	KRX	KRX	KRX
Securities settlement	KSD	KSD	KSD	KSD	-
Cash settlement	BOKWire+ <sup>2)</sup>	BOK-Wire+	BOK-Wire+ (Except retail bonds)	BOK-Wire+	Settlement banks designated by KRX
DVP model	DVP3	DVP3	DVP3	DVP3	-
Settlement day	T+2	T+1 (T+0 for repos)	T+0	T+2	T+2

1) Government bonds include Korea Treasury Bond, Korea International Bond, Korean National Housing Bond

2) BOK-Wire+ is the real-time gross payment system managed by the Bank of Korea



The following illustrates the OTC clearing and settlement process.



'Trade execution' takes place either between dealers or via an inter-dealer broker (IDB). Then 'Trade Confirmation' occurs via an automated process of either the KRX trade confirmation platform or the KRX designated external confirmation platform, currently MarkitWire.

Following the process of trade execution and trade confirmation, 'Clearing Confirmation', 'Assumption of Obligation' etc. takes place for CCP clearing. KRX checks whether the trade to be cleared meets the clearing requirements, such as the clearing eligibility of the trade, margin requirements and position limit.

## **IV . Principle-by-principle summary narrative disclosure**

**Principle 1: Legal basis**

An FMI should have a well-founded, clear, transparent, and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions.

Summary narrative

**<Legal basis of KRX's CCP business>**

The legal basis of the CCP business of KRX is Articles 378 and 323-3 of the FSCMA for ETP and OTC clearing respectively.

KRX acts as the CCP for the ETP markets and the OTC derivatives market. In case of ETP markets, KRX is designated as the CCP by the FSC. On the other hand, KRX engages in OTC derivatives CCP business with authorization from the FSC under Article 323-3 of the FSCMA.

**<Rules and regulations\* related to CCP business>**

- \* In this document, abbreviations of the relevant rules and regulations are as follows;
- KOSPI Market Business Regulation : KOSPI Regulation
  - KOSDAQ Market Business Regulation : KOSDAQ Regulation
  - Derivatives Market Business Regulation : Derivatives Regulation
  - OTC Derivatives Clearing Business Regulation : OTC Clearing Regulation

KRX's rules and regulations on its CCP business have been established on the basis of the FSCMA. They stipulate the detailed rules, procedures and arrangements delegated by the FSCMA. In case of ETP markets, details for the CCP business such as transactions and business entities subject to clearing or ways of bearing obligations are specified in the Business Regulations of the respective markets and the Membership Regulation as prescribed by Articles 393 and 387 of the FSCMA. Those on the OTC derivatives market clearing are stated in the OTC Clearing Regulation as prescribed by Article 323-11 of the FSCMA. Additionally, KRX established the subordinate Enforcement Rules, Guidelines and Manuals to the above Regulations to support the CCP business.

KRX's regulations are amended when necessary, while taking into account the collective opinions of market participants, market needs and emerging issues in the exchange industry. When amending, the Legal Department and the Risk Management

Department composed of experts such as in-house lawyers review the legal appropriateness. KRX have to obtain a prior approval of the FSC for amending the existing Business Regulation according to Articles 412 and 323-11(2) the FSCMA.

The above-mentioned Regulations, Enforcement Rules and Guidelines of KRX are disclosed on its website and various publications, in both Korean and English ([www.krx.co.kr](http://www.krx.co.kr); [eng.krx.co.kr](http://eng.krx.co.kr)). When its regulations are amended, KRX notifies the market participants of such fact via official documents, etc.

**<Relations with other acts>**

Under relevant laws, an action which KRX takes as a CCP according to the provisions of above-noted Regulations has priority over other claims. In case of bankruptcy of market participants, for instance, any action taken by the CCP has priority over other legal claims pursuant to Article 120 of the DRBA, thereby guaranteeing legal stability.



**Principle 2: Governance**

An FMI should have governance arrangements that are clear and transparent, promote the safety and efficiency of the FMI, and support the stability of the broader financial system, other relevant public interest considerations, and the objectives of relevant stakeholders.

## Summary narrative

**<Outline>**

According to Article 373 of the FSCMA, no one may establish or operate a financial investment instruments market without permission for an Exchange. As not only a CCP but also an exchange, KRX aims to promote fair price formation of securities and exchange-traded derivatives as well as stability and efficiency of other trades, and to protect investors as stipulated in Articles 8-2(2), and 373-2 of the FSCMA. In consideration of such aspect of public interest of KRX, the FSCMA prescribes the limitations on ownership of KRX.<sup>1)</sup>

1) No one shall hold stocks in excess of 5/100 of the total number of outstanding stocks with voting rights issued by an Exchange (Article 406).

No one shall hold stocks issued by a central counterparty in excess of 20/100 of the total number of outstanding voting stocks of the central counterparty. (Article 323-18)

The governance structure of KRX is also generally defined in the FSCMA, in articles such as Article 376 for “Article of Incorporation”, Article 380 for “Executives”, Article 381 for “BOD”, Article 382 for “Qualification for Executives”, Article 384 for “Audit Committee”, Article 385 for “Director Nomination Committee”.

Details of the KRX’s governance structure are specified in the Article of Incorporation, the Regulation on Operation of the BOD, the Regulation on Operation of the Audit Committee and the Regulation on Organization Management. The BOD, the market committees, the audit committee and other organizations of KRX aim to fulfill the KRX’s purposes prescribed in the relevant laws, and to establish trust in the market. The current governance structure of KRX is disclosed on its website ([www.krx.co.kr](http://www.krx.co.kr)).

**<The Board of Directors>**

Article 381 of the FSCMA states that the BOD of KRX shall be composed of 15 directors and the majority of the BOD shall be outside directors. The seven standing directors are: the CEO (Chairman of the BOD), the Standing Audit Commissioner,

the Chairman of the Market Oversight Commission, the President of the Management Strategy Division and the Presidents of three Market Divisions. The outside directors comprises five public directors who represent the public interest and three directors from the financial investment industry.

Details including the composition, authority and the decision making process of the BOD, and matters to be resolved by the BOD are clearly stipulated in the Articles of Incorporation and the Regulation on Operation of the BOD.2)

## **2) Matters to Be Resolved at the Meeting of the Board**

(Article 26(1) of the Articles of Incorporation)

- Establishment of the business objectives, budget and operational plans
- Establishment, amendment and abolition of material regulations relating to the operation and business of the Exchange
- Acquisition, disposal and transfer of the principal assets
- Leasing of major assets and borrowing of long-term cash loans
- Investment in and donation to other corporations
- Establishment of a branch office, outlying office, business office or field office in Korea and abroad, and relocation and closure thereof
- Usage of voluntary reserve
- Matters to be referred to the general shareholders' meeting
- Matters that may have material impact to the Exchange's business, which any director deems the Board's decisions on such matters necessary
- Additionally, the matters that are stipulated in relevant laws, this Article of Incorporation and the regulations of the Exchange.

To prevent conflicts of interest between KRX and the directors, any member who has a special interest in the matter voted on the BOD is prohibited from exercising his/her voting rights as stipulated in Article 27(1) of the Articles of Incorporation, and the BOD has the supervisory authority over the performance of official duties of its directors in accordance with Article 12(1) of the Regulation on Operation of the BOD.

---

**<Qualification of Executives>**

The relevant laws prescribe the qualifications of the CEO and executives of KRX to ensure the morality and professionalism of the BOD. Pursuant to Articles 382(1) and 24 of the FSCMA, anyone who was criminally penalized pursuant to the finance-related laws and the subordinate statutes or was once an executive or employee of a corporation or company whose business permission, authorization or registration was revoked pursuant to the finance-related Acts and subordinate statutes, etc. cannot be an executive of KRX.

The CEO of KRX is required to have good experience and knowledge about finance, not doubted to undermine good management and the fair trading order of the exchange, and to have more than one of the following careers;

1. To have worked for the BOK or institutions subject to inspection under Article 38 of the Act on the Establishment, etc. of Financial Services Commission for 15 years or longer in total;
2. To have been a member of the Senior Civil Service, or who has served as a Grade II or higher public official, in a field related to finance or the economy;
3. To have served in a domestic or foreign university, college, or research institute as an adjunct professor or higher faculty member, or in a position equivalent to such position in a field related to finance or the economy for 15 years or longer in total.

Pursuant to Article 380 of the FSCMA, the CEO of KRX is appointed at a general meeting of shareholders after the recommendation from the director nomination committee under Article 385(1) of the same act from among the persons who have experience and knowledge in finance as prescribed by the Presidential Decree, and who are unlikely to undermine the sound management of KRX and fair trade order.

**<Role of the Management, etc.>**

The Regulation on the Organization Management of KRX clearly stipulates the matters which the CEO delegates to each President of the Market Divisions for the execution of matters that were decided at the BOD.

---

**<Sub-Committees of the BOD>**

Three market committees (the Securities Market Committee, KOSDAQ Market Committee, Derivatives Market Committee), Remuneration Committee, Risk Management Committee and Audit Committee are established as sub-committees under the BOD as stipulated in Article 28 of the Articles of Incorporation and Article 15(1) of the Regulation on Operation of the BOD. As the Risk Management Committee and Audit Committee are ensured their autonomy to fulfill the supervisory and risk managing role over KRX, they are mainly composed of outside directors.

**< Current Sub-Committees of the BOD >**

Committee	Role	Organization
Market Committees	Enactment and amendment of business regulations	Outside directors (representing the public interest and the industry) and Presidents of market divisions
Remuneration Committee	Determination of the executive compensation and its criteria within the limits decided at the general meeting of the shareholders	Outside directors (five persons or less)
Audit Committee	Audit of the operation of KRX ; Right to call a general meeting of the shareholders	- One standing audit committee member - Two outside directors
Risk Management Committee	Determination of risk management policies, Establishment and management of risk limit;  Determination on establishment and operation of risk management framework and its standards	- Two outside directors - President of the Management Strategy Division

The composition, operation and responsibilities of the Risk Management Committee, and the establishment of a dedicated unit specializing in risk management are stated in the Regulation on Operation of the Risk Management Committee. The Risk Management Regulation (Articles 5 through 7) defines the risk management principles and the duties of the dedicated unit specializing in overall risk management. The dedicated risk management unit (the Risk Management Department) establishes and validates the regulations, standards and guidelines with respect to the risk management framework of KRX.

The Audit Committee audits the operation and accounts of KRX as stipulated in Article 23(1) of the Regulation on Operation of the BOD. The Audit Committee conducts audit independent from the BOD and the executives of KRX, and it may install and operate a dedicated audit unit under itself for efficiency in accordance with Articles 5 and 21 of the Regulation on Operation of the Audit Committee. The Audit Committee inspects all aspects of the KRX's businesses, including the governance structure, compliance with laws and regulations, appropriateness and efficiency of market operations, and security. With regards to the fulfillment of CCP functions and responsibilities, the internal control function and propriety of the control system are audited additionally, and the improvement recommendations are made. A department that has received such recommendation from the Internal Audit Unit is required to implement the recommendation within the period prescribed by the Internal Audit Unit, and report the outcome of its implementation to the Internal Audit Unit.

#### **<Disclosure of material issues>**

Decisions on material issues concerning the businesses and managements of KRX, including strategies, regulations, financial management, new businesses, etc., are made with the approval of the BOD or the general meeting of shareholders. The final decisions are disclosed to the relevant stakeholders and the public via mass media, press releases, the KRX website.

#### **<CCP risk management infrastructure>**

The importance of risk management in post-trading services has been greatly emerged. Having realized the needs for a more refined infrastructure for post-trade related risk management in line with PFMIs, KRX established "CCP Risk Management Team" in February, 2015, which specializes in conducting various tests (stress test, back test,

etc.) and managing credit and liquidity risk of KRX as a CCP. This unit is, literally, dedicated to management of CCP risks and design of policies and procedures, where “Risk Management Team”, under the Management Strategy Division is in charge of enterprise-wide risk management. Therefore, policies, procedures and test results, etc. made by CCP Risk Management Team shall be subject to monitoring of and reporting to the Risk Management Team.

On top of that, KRX establishes “Clearing & Settlement Risk Management Committee” which is composed of 9 members (8 outside experts from the academia and the industry) and chaired by an external expert. All the material matters regarding CCP activities and risk management such as risk management policies and procedures established by the CCP Risk Management Team and clearing and settlement rule changes proposed by Clearing & Settlement departments are to be deliberated by this committee. After the matters are deliberated and approved, they are reported to the “Risk Management Team” and finally to the “Risk Management Committee”, which covers overall risks of KRX.

Through such enhancement of governance structure for CCP services, it’s expected to have a more independent, dedicated and specialized risk management framework which is in line with global standards.



**Principle 3: Framework for the comprehensive management of risks**

An FMI should have a sound risk-management framework for comprehensively managing legal, credit, liquidity, operational, and other risks.

## Summary narrative

**<Development of the risk management framework of KRX>**

In November 2008, KRX has set up the Risk Management Committee under the BOD and a dedicated risk management unit under the Management Strategy Division, and established the Regulation on Operation of the Risk Management Committee thereof.

In April 2009, KRX established the Risk Management Regulation. This regulation specifies the types of risks to be managed, responsibilities of the organizations related to risk management, and the principles and procedures of risk management, thus ensuring the reliability and stability of the capital market.

In December 2010, KRX developed and introduced the settlement risk management system for exchange-traded products, which has been running successfully. On top of that, the settlement risk management system for the OTC derivatives clearing was developed and launched in March 2013 for the extensive risk management. KRX has, henceforth, developed a comprehensive risk management system.

**<Classification of risks>**

According to Article 4 of the Risk Management Regulation, KRX classifies the risks to be managed into 4 types; credit, market, liquidity and operation risks.

1. Credit risk is the possibility of KRX's loss due to the breach of contract or changes in the ability to repay its debt of the counterparty.
2. Market risk is the possibility of KRX's loss due to changes in stock prices, interest rates, currency exchange rates, etc.
3. Liquidity risk is the insolvent risk in mismatch of the lead time in operating funds or unanticipated capital outflows and the possibility of KRX's loss due to adverse borrowing conditions or sale of assets under adverse conditions to raise deficient funds.
4. Operational risk is the possibility of KRX's loss due to improper or erroneous internal procedures, personnel, systems and external events, including business risk, IT risk, legal risk and reputation risk.

### <Responsibilities of the risk management organizations>

The Risk Management Committee is the final decision-making organization which resolves the major issues related to risk management.<sup>3)</sup>

#### **3) Matters to Be Resolved at the Risk Management Committee** (Article 5 of the Regulation on Operation of the Risk Management Committee)

- > Important policy decisions for risk management
- > Enactment or amendment of the regulations or guidelines related to risk management
- > Matters related to setting and managing the risk limits or loss limits
- > Establishment of recognition criteria and countermeasures for the crisis situation
- > Matters related to the construction and operation of the risk management system
- > Matters which the BOD or the Risk Management Committee deems the Committee's decisions on such matters are necessary.

The Risk Management Committee comprehensively controls and manages the enterprise-wide risks including credit, market, liquidity and operational risks of each department. The Risk Management Department assists the Risk Management Committee, and performs overall operations for an efficient risk management.<sup>4)</sup>

#### **4) Duties of the Risk Management Department** (Article 7 of the Risk Management Regulation)

1. Execution of the Committee resolutions
2. Enterprise-wide risk measurement, monitoring, evaluation and reporting
3. Management and calculation of proper equity capital scale
4. Analysis and reporting of management activities affecting finance and risk

Departments that have any kind of risks including clearing and settlement business, fund management business, etc., are defined as the Business Departments under Risk Mitigation Regulation, and they carry out risk management at the working level.

### <Procedures of risk management>

In order to operate, maintain and run a proper risk management system in a rapidly changing market environment, the Risk Management Department prepares an annual risk management plan, which is submitted to the Risk Management Committee for its

deliberation. On the basis of the annual plan, the Committee sets the enterprise-wide risk limit and the limits per risk type every year. Within the overall enterprise risk limit, capital is allocated to each Business Department. Then each Business Department manages risks within the range of the allowed risk limit.

Each Business Department periodically reports information about its risk management status to the Risk Management Department. Separately, the Risk Management Department monitors the status and propriety of the risk management of each Business Department. Based on this data, the Risk Management Department analyses the overall risk management of KRX and informs the Risk Management Committee of the results.

#### **<Cooperation with participants and concerned organizations>**

KRX provides member firms with the assessment of settlement risk (credit risk amount, position limit on open interests, etc), so that they can be aware of their exposure on a real time basis. Moreover, KRX has introduced various measures to ensure reliable settlement, such as imposition of punitive damages on settlement delay (Loss Caused by Settlement Delay) and accumulation of the JCF. KRX makes continuous efforts to provide participants of risk indices such as credit risk exposure by the Settlement Risk Management System, and to share the risk management best practice with members by holding risk management seminars and running a workinglevel task force.

KRX has established the criteria for the capital adequacy, designation and termination, etc. for the settlement banks and constantly monitors them. KRX continuously cooperates with other related FMIs such as KSD and the BOK, and exchanges information on risk management.

In 2014, KRX has enhanced the criteria for the selection of settlement banks (custodians) as per the recommendation of IMF made in the course of the 2013 FSAP. Formerly, a bank of which the BIS capital ratio is no less than 8% could be chosen as a settlement bank for cash leg of derivatives transactions. KRX heightened the BIS capital ratio standard for settlement banks to 9.6%, which is 120% higher than before, and added a credibility criterion that requires settlement banks to have the credit rating over double A (“AA”) from the credit rating agencies designated by the FSS.

---

**<Business Continuity Plan>**

In order to respond to a crisis or the urgent situations such as market failure in a timely and orderly manner, KRX has established the BCP. KRX carries out BCP tests 4 times a year, based on various scenarios including power down or computer system errors of settlement banks, etc.

KRX is planning to carry out a comprehensive BCP that encompasses all segments (listed securities, derivatives and OTC derivatives) in coming years. Since KRX has commenced mandatory clearing services for OTC derivatives transactions, it has conducted in November 2014 a fire drill supposing that a member settlement default as occurred.



**Principle 4: Credit risk**

An FMI should effectively measure, monitor, and manage its credit exposures to participants and those arising from its payment, clearing, and settlement processes. An FMI should maintain sufficient financial resources to cover its credit exposure to each participant fully with a high degree of confidence. In addition, a CCP that is involved in activities with a more-complex risk profile or that is systemically important in multiple jurisdictions should maintain additional financial resources sufficient to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the two participants and their affiliates that would potentially cause the largest aggregate credit exposure to the CCP in extreme but plausible market conditions. All other CCPs should maintain additional financial resources sufficient to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would potentially cause the largest aggregate credit exposure to the CCP in extreme but plausible market conditions.

## Summary narrative

**<Outline>**

KRX has a systematized framework for monitoring and managing credit risks caused by participant defaults. The Clearing and Settlement Operations Department, which is in charge of managing the credit risks, reviews the risk management system, and draws up plans for improvement. The Risk Management Committee and the Risk Management Department review regularly (or whenever an important decision has to be made) the management of overall enterprise risk including credit risks. The Audit Committee and the Audit Department (the Internal Audit Unit) verify, as autonomous bodies, the propriety of the risk management system and recommend the related departments for improvements.

**<Definitions of credit risk and credit exposure>**

KRX defines credit risk as "the possibility of KRX's loss due to the breach of contract or changes in the ability to repay its debt of a counterparty" in Article 4 of the Risk Management Regulation. So, the source of KRX's credit risk is the member's current or future risk exposure that may cause a settlement default, and the financial soundness that shows the member's ability to meet its financial obligations. Credit exposure might be defined as "KRX's loss that might be incurred by fulfilling the defaulting member's obligations as the CCP". Credit exposure consists of current exposure and future potential exposure. In order to reduce the current exposure, KRX carries out net settlements for the day's trade. Also, KRX receives an amount higher than the potential exposure as margin to reduce the future potential exposure.

---

**<Credit Risk Management in ETP clearing>**

In order to reduce the current exposure in exchange traded derivatives clearing, KRX performs net settlement for futures (receives and delivers the settlement difference for the day's trade or the previous day's open interests), and members have to deposit the option premium margin revaluated with the latest base price for options. For potential exposure, KRX uses COMS (Composite Optimized Margin System) as the margin model to measure the future potential risk of the daily member position at market-close, and collects the amount that covers such risk as member margin. Because this margin may not be able to cover the future exposure in the event of emergencies due to a sudden change in market, etc., KRX conducts daily stress tests, and examines the propriety of the JCF, settlement reserve, etc. As per the guidance of the PFMI, KRX is preparing an independent validation of its margin model by an external body which will be conducted on a regular basis onwards. To make this enforceable, KRX prescribed it in the relevant regulation in 2014, and is conducting the first independent validation in 2015.

To monitor the ETP market members' default risks in advance, KRX measures the risk monitoring indicators such as the financial conditions and settlement fund sizes of members on a daily basis. The ETP clearing members are required to submit to KRX its financial data (consolidated statement of financial position, consolidated income statement, reports on net capital ratio, short-term liquidity ratio) every month, and the risk monitoring indicators are updated by these data.

Article 154 of the Derivatives Regulation sets the position limit to prevent a certain member or a customer from being exposed to excess risk; the system automatically measures the member and customer positions real-time, and examines the position limit breach.

To calculate the credit exposure in a crisis situation, KRX performs daily stress tests based on historical scenarios of crisis situations. The stress test result using the historical scenario with the most volatility, the bankruptcy of Lehman Brothers, is used to calculate the credit exposure amount in a crisis situation; the financial resources of KRX is to cover the one biggest member credit exposure with the propriety of the current financial resources (margin, JCFs, settlement reserve and other financial

---

resources) examined in comparison to the biggest member exposure. Apart from such official 'Cover-1' based stress test, KRX also conducts 'Cover-2' stress test for assessing its financial readiness and future expansion, though it is not deemed as a systemically important CCP and doesn't have interoperability with other CCPs.

< Financial Resources for Settlement for Listed Products (as of 2014) >

Category	Securities	Derivatives	Source
Settlement Reserve	400 bil.KRW		KRX
JCF	200 bil.KRW	200 bil.KRW	Clearing Members
Fidelity Guarantee Money	1 mil.KRW per member	1 mil.KRW per member	All Members
Margin	-	7,949.2 bil. KRW	Clearing Members
Other CCP Capital	1,701 bil.KRW		-

The volatility of the main variables (stock prices, foreign exchange rates, interest rates) in a historical crisis situation is measured considering the period of decrease in market liquidity and changes in the main variables and volatility to set a scenario on a crisis situation. Major crisis situation scenarios assume extreme but plausible situations such as the financial crisis in '97, 9·11 attacks in '01, U.S. sub-prime mortgage crisis in '07, bankruptcy of Lehman Brothers in '08. These crisis situations are such periods that financial institutions in Korea have suffered difficulties due to asset prices falling, liquidity crunches, and that many have gone bankrupt or went under court receivership. The crisis situation scenarios are designed selecting the period with the highest volatility and changes in the main variables (stock prices, foreign exchange rates, interest rates).

Stress test results are regularly sent to the Risk Management Department; this department calculates and manages the appropriate equity capital using those results in accordance with Article 7 of the Risk Management Regulation. The Risk Management Committee makes the final decision in the related matters.

For an effective management of credit risk, KRX annually conducts a comprehensive analysis on the stress test scenarios, models, assumptions and variables used and develops possible improvements. The volatility of the main variables is monitored everyday; the current assumptions on the crisis situation scenarios and the propriety of the parameters are regularly examined and the new scenarios to be added are reviewed. After the Settlement Risk Management System for the ETP markets was put in place in December 2010, the stress test scenarios were added, and improvement plans to strengthen the risk analysis were developed in 2011; the propriety of the settlement risk indicators were examined and system improvements were implemented in 2012.

The default waterfall to compensate for the loss in the event of a clearing member's default in the ETP markets is stipulated in Article 399 of the FSCMA and Article 362 of its Enforcement Decree and Article 25 of the Membership Regulation.

When a settlement default occurs, currently the financial resources for settlement are used in the order of "Assets of the default clearing member (JCF, margin, fidelity guarantee money, etc.) → JCFs of non-default clearing members → Settlement Reserve of KRX → Other assets of KRX". However, as such waterfall has discrepancies with the international standards, KRX is in the process of amending the related provisions to partially put in the settlement reserve of KRX (so called 'skin-in-the-game') before using the non-defaulting members' JCF.

The FSC has made the pre-announcement of the legislative procedures for the amendment of the FSCMA introducing the CCP's skin-in-the-game in ETP clearing. Also, KRX is planning to strengthen its loss allocation scheme by introducing 'member assessment powers' in line with skin-in-the-game. Indeed, clearing members will have capped liabilities against the CCP for the fund contribution and member assessment.

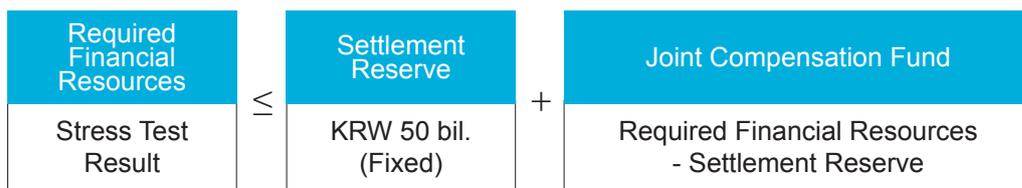
#### **<Credit Risk Management in the OTC derivatives clearing>**

To reduce the current exposure, KRX performs multilateral netting on the gain and loss of cleared transactions and mark-to-market on every business day. The future exposure is covered by member margin (the maximum possible loss when the interest

rate moves within the margin rate), the KRX Settlement Reserve and members' JCF. Member margin is imposed at the level that covers the 99.7% of the five-day risk using the interest rate curve of the last 1,250 business days; the exposure from paying the net cash settlement amount on the next day is removed by including the net cash settlement amount following the daily net settlement in member margin.

The required financial resources for settlement is calculated through daily stress tests to cover the potential loss in an extreme but plausible crisis situation; the amount deducting the KRX settlement reserve from the required financial resources for settlement is imposed to members and collected at the beginning of every month as JCF. During the month, when the amount allotted to each clearing member after deducting the KRX settlement reserve from the required financial resources for settlement exceeds 115% of the required JCF amount as of the beginning of the month, such excess amount is collected as part of the member margin as "OTC derivatives joint compensation fund adjustment amount". Hence, KRX holds resources higher than the required financial resources for settlement as KRX settlement reserve and member's JCF, and this fact is reported to the person in charge according to the Official Authorization Table prescribed in the Enforcement Rules of Regulation on Organization Management.

< Funding the Required Financial Resources for KRW-IRS Settlement >



The stress test to measure the required financial resources for settlement is calculated by adding the two biggest amount of the maximum amount between one day maximum risk exposure amount and margin excessive risk equivalent amount of clearing members. The daily maximum risk exposure amount is the maximum loss at risk due to a day's change in interest rate for the past 1,250 days; margin excessive risk equivalent amount is the amount calculated by subtracting the member net exposure margin on the calculation day from the maximum risk exposure amount for 5 days for each clearing member. As of July 31th 2014, the required financial resources for settlement were approximately 43.5 billion KRW.

- Stress test result = Max (one day maximum risk exposure amount, margin excessive risk equivalent amount)
- One day maximum risk exposure amount = Max(a, b, c)
  - o a : maximum change in KRW IRS NPV due to a day's change in interest rate for the past 1,250 business days
  - o b : maximum change in KRW IRS NPV due to a day's change in interest rate in a historical crisis situation such as the 2008 financial crisis
  - o c : one day value at risk calculated according to EVT (Extreme Value Theory)
- Margin excessive risk equivalent amount = Max(a', b', c') - d
  - o a' : maximum change in KRW IRS NPV due to a 5-day change in interest rate for the past 1,250 business days
  - o b' : maximum change in KRW IRS NPV due to a 5-day change in interest rate in historical crisis situation such as the 2008 financial crisis
  - o c' : 5 day value at risk calculated according to EVT (Extreme Value Theory)
  - o d : member net exposure margin

Clearing members also have reporting obligations (monthly, quarterly or as frequent) of financial statements, reports related to capital adequacy and matters affecting credit risk. KRX has established OTC derivatives risk management system to monitor the settlement capability of clearing members; financial indicators are monitored and when they are below certain standards, a monitoring report is created, and analysis on the financial conditions and extensive monitoring on the settlement status are carried out. KRX monitors reports on clearing members' financial conditions and matters that may have a material effect on credit risk with a news article search program; KRX may conduct fact inquiry on clearing members.

[< Risk Monitoring Indicators of Clearing Members >](#)

Monitoring Purpose	Indicator	Calculation Method	Period
Financial Soundness	Net Operating Capital Ratio	(Net Operating Capital) / (Total Risk)	Monthly
	Total Equity	(Assets)-(Liabilities)	Monthly
Short-term Settlement Ability	Settlement Resource GAP	(Short-term Capital)-(10-Day Average Settlement Amount)	Daily
Insolvency Risk	Credit Rating	Credit Agency Published Credit Rating	Frequent

※ **Matters to be Designated as a Closely Monitored Member**

- Case of becoming insolvent or possibly becoming insolvent;
- Case where a bill or check issued is dishonored or the transaction with the banks has been suspended or prohibited;
- Case where the request for commencement of rehabilitation procedures was made, the decision on the request for commencement of rehabilitation procedures has been made or the decision was made to cancel the commencement of rehabilitation procedures (in case of a foreign company, it shall include the case where there is an equivalent incident pursuant to the foreign laws).
- Case where there is an application for bankruptcy;
- Case where the cause of dissolution has occurred;
- Case where the measures such as the cancellation of authorization for investment brokering, investment dealing or collective investment business or measures such as the suspension of investment brokering, investment dealing or collective investment business have been imposed;
- Case of suspending, resuming or closing down the business of headquarters or branch offices;
- Case where there has been a merger, discontinuation of business, or transfer or acquisition of the whole or a main part of business;
- Case where a significant loss has occurred or it became difficult to carry out the normal business operation due to a natural disaster or electronic system failure;
- Case of becoming part of a lawsuit that has a significant impact on the business operation;
- Case of being imposed of disciplinary action because of tax delinquency or being imposed of disciplinary action because of infringing the laws and decrees related to the taxation;
- Case where the clearing member and its officers have been disciplined as a result of violating the measures taken by the administrative agencies pursuant to the laws and decrees;
- In relation to the clearing of OTC derivatives transaction, case of having acquired or withdrawn the clearing membership of foreign CCP, or case where the foreign CCP has imposed such measures as the discontinuation of request for assumption of obligation;
- In addition, case where an incident that has considerable influence on the fulfillment of obligations of concerned clearing member has occurred;
- Case where the clearing member does not respond to the KRX request for inquiry of matters by the time and methods specified by KRX

Also, to prevent concentration of credit risk exposure to a certain clearing member, position limits are in place; when members exceed the limits based on the ① total KRW IRS notional ② member net exposure margin, or ③ equity capital, they may be imposed of extra member margin, or be rejected the registration of assumption of obligation.

## &lt; KRW IRS Position Limits&gt;

Criteria	Limit
Notional Amount <sup>1)</sup>	Above 20% of the total member notional amount
Member Net Exposure Margin <sup>1)</sup>	Above 20% of the total member net exposure margin
Equity Capital <sup>2)</sup>	Below 40% of the member net exposure margin

1) To be implemented from January 2016, when there are enough KRW IRS positions

2) Currently in effect

KRX fulfills settlement when a clearing member does not do so within the settlement deadline; when the financial resources in possession are not able to be liquidated right away, KRX may finalize settlement using the settlement reserve, JCF and credit lines. After the default clearing member's position is resolved through hedging transactions or auctions, the amount of loss per financial resources is confirmed; then by exercising indemnity all or a part of the loss caused by settlement default is compensated in the reverse order of the default waterfall. To compensate for the financial resources used during crisis situations, KRX may request for additional contribution to JCF as soon as the cap period<sup>5)</sup> is lapsed.

5) It is to be 30 days from the occurrence of a settlement default, extended extra 30 days when another settlement default occurs during such period.

※ **Default Waterfall of OTC Clearing**

- Cash or securities that the default clearing member deposited in KRX, such as member margin
- JCF contribution amount of the default clearing member
- The junior tranche of CCP's skin-in-the-game (25 bil.KRW)
- JCF contribution amount of non-defaulting clearing members
- The senior tranche of CCP's skin-in-the-game (25 bil.KRW)
- Member assessment of non-defaulting clearing members (the amount notified by KRX within 100% of the last notified required JCF contribution amount)
- Variation margin gains haircut (net cash settlement amount of the clearing member whose the receivable net cash settlement amount is higher than the payable net cash settlement amount during the period between the date of settlement default and the date when the settlement loss was confirmed through resolution of the default clearing member position)

**Principle 5: Collateral**

An FMI that requires collateral to manage its or its participants' credit exposure should accept collateral with low credit, liquidity, and market risks. An FMI should also set and enforce appropriately conservative haircuts and concentration limits.

## Summary narrative

**<Acceptable collateral>**

For both ETP and OTC clearing, KRX takes into account the stability, liquidity, convenience of management, and ease of valuation in choosing the acceptable collateral, and restricts that to assets with low risk in credit, liquidity and market. Aside from cash, KRX currently accepts as margin, substitute securities, foreign currencies and foreign securities. As for JCF contribution, government bonds and monetary stabilization bonds listed in KRX are acceptable as collateral.

**Acceptable collateral as margin**

- Substitute securities<sup>6)</sup>: listed securities, ETFs, listed bonds, etc.

6) Despite being listed, administrative issues or issues scheduled to be delisted are excluded from acceptable collateral due to high risk or low liquidity

- Foreign currencies : USD, JPY, EUR, GBP, HKD, AUD, SGD, CHF, CAD

- Foreign securities<sup>7)</sup> : US T-bill, US T-note, US T-bond

7) To ensure certainty of rights and ease of disposal, the deposit and withdrawal of foreign securities are made by a transfer between a member account and that of KRX at KSD

**<Collateral valuation>**

The substitute price for collateral valuation is calculated by multiplying the base price of collateral assets by the assessment ratio. To guarantee the collateral value on disposal, the assessment ratio (=100%-haircut ratio) is determined through careful consideration of liquidity in a crisis situation, price volatility, liquidation procedures, etc. The value of collateral is marked to market every day. In accordance with Article 92-2 of the Derivatives Regulation, when it is deemed necessary to restrict change of collateral value or for market management, KRX might change the base market price and haircut ratio after discussions with the supervisory authority. In this case, KRX verifies the adequacy of base price and haircut ratio through monitoring the price volatility and market liquidity for a certain period in the past.

To avoid frequent changes<sup>8)</sup> of haircut ratios according to market conditions, which may lead to increase in market volatility, KRX sets haircut ratios conservatively assuming volatility in periods of market stress.

8) To raise haircut ratios in periods of high market stress or to lower them in periods of low market stress

**Assessment ratios of collateral**

- **Substitute securities**

- ° Listed securities : 60~80%
- ° ETFs : 70~95%
- ° Listed bonds : 80~95%

- **Foreign currencies** : 95%

- **Foreign securities**

- ° US T-bill, and T-note/T-bond with maturity period shorter than one year : 92%
- ° T-note/T-bond : 88% if maturity is shorter than 10 years; 84% if maturity is 10 years or longer.

To get rid of wrong-way risk, Article 89(3) of the Derivatives Regulation and Article 95(3) of the OTC Clearing Regulation forbid that a member deposit securities that itself has issued as member margin. Additionally, to avoid concentration of collateral, KRX doesn't recognize the validity of substitute securities for the excess in the OTC derivatives clearing if the ratio of the same listed securities issued by a company exceeds 10%. Article 95(2)2 of the OTC clearing Regulation and Article 65(2) of its Enforcement Rules.

**<Collateral management>**

KRX manages collateral through the self-developed clearing & settlement system. When a member deposits assets as collateral, the KRX's system automatically checks whether the member's collateral is eligible, and notifies the member of the result. The electronic systems are interconnected between KRX and KSD, or KRX and the settlement banks for collateral. Accordingly, the deposit, withdrawal and exchange of collateral are carried out on a real-time basis right after a member's request for them is submitted.

Reusing collateral (re-hypothecation) is strictly prohibited. Substitute securities of members are deposited at KSD, and KRX just attains the right of pledge for the deposited securities.

**Principle 6: Margin**

A CCP should cover its exposure to its participants for all products through an effective margin system that is risk-based and regularly reviewed.

## Summary narrative

**Margin for ETP Clearing****<Legal basis>**

Pursuant to Article 396 of the FSCMA, when trading products listed on the derivatives market, a clearing member is obliged to deposit margin according to the Derivatives Regulation to guarantee the payment of obligation to KRX.

According to Article 88(1) of the Derivatives Regulation, members have to deposit, as member margin, an amount per derivatives accounts no less than the maximum net loss that may possibly result in the event that the price, value or volatility of underlying asset varies by a certain level as of market close. Also, KRX may impose additional margin at a specific time during the regular trading session in accordance with Article 93-2 of the Derivatives Regulation.

**<Types of margin>**

According to the calculation time, margin is classified into member margin and intraday margin. Member margin is calculated as of market close and a member has to deposit it at KRX by 12:00pm of the next business day. Intraday margin is calculated at 12:00pm during the regular trading session, and KRX decides whether to impose intraday margin at 13:00pm based on the total deposit amount of that time. KRX shall immediately make a margin call and then members who meet the criteria must deposit it within 2 hours from receiving the additional margin call.

**<Calculation of margin>**

The method for calculating margin is prescribed in Annex 18 of the Enforcement Rules of Derivatives Regulation. The margin requirements are determined by adding the option premium margin to the larger amount between the sum of price volatility margin, futures spread margin, delivery margin, margin before the final settlement price determination, and the minimum net exposure margin.

**Margin requirement** (Net exposure margin or the amount equivalent to maximum net loss)

= Max ( A\*, minimum net exposure margin ) + option premium margin

\* A : price volatility margin + futures spread margin + delivery margin + margin before final settlement price determination

- (Price volatility margin) The highest of the amounts calculated for the quantity of the open interests of derivative trades per sequence of margin interval value
- (Futures spread margin) The smaller of the amounts determined by multiplying the margin per futures spread contract by the quantity of open interests for each delivery month contract per bid-side and ask-side for futures whose underlying assets are the same
- (Physical delivery margin) The amount equivalent to the loss that may be sustained for the final settlement quantity when the price of the underlying asset fluctuates.

This is calculated by adding the sum of the margin for delivery price and the margin for delivery price volatility calculated for the trades that have the same underlying assets.

- (Margin before the final settlement price determination) The amount equivalent to the loss incurred for the final settlement quantity of the trade, for which the final settlement difference is paid/received after three trading days counting from the last trading day.

This is calculated by aggregating the margin before the final settlement price determination per underlying asset for the trades that have the same underlying assets.

- (Minimum net exposure margin) The amount obtained by adding the amounts calculated by multiplying the minimum margin per contract by the quantity of open interests, final settlement quantity and exercise settlement quantity of the trades in the same product group.

- (Option premium margin) The sum of the option premium margins calculated per contract for the quantity of open interests in option trade.

Member margin is calculated in consideration of the quantity of open interests, final settlement quantity, quantity of option exercised and allotment quantity as of the market closing time.

KRX constitutes a product group with products that have a similar price movement between underlying assets. For each product group, KRX imposes, as margin, an amount of the maximum loss that may result in case where prices of the underlying assets are changed adversely for two days at the confidence level of 99.7 percent.

When calculating margin, KRX uses the latest price data transmitted from the trading system. In case where no execution price is available or the price data improperly reflects the market<sup>9)</sup>, KRX uses a theoretical price, calculated through pricing formulas widely accepted by market participants.

9) Where a closing execution is abnormally estranged from a theoretical price, etc.

KRX has made 42 scenarios based on the change of prices and volatility of the underlying assets per product group. Margin is determined by the biggest among losses on disposition of a member's positions for each scenario. If the prices of the different underlying assets within the same product group are correlated, the margin reduction<sup>10)</sup> is possible by taking into account the price correlation coefficient of underlying assets. For this reason, KRX measures correlations between products using historical price data and constitutes a product group with highly correlated products.

10) So far, KRX has not entered into any arrangement for interoperability with another CCP for provision of joint settlement to a specific exchange, so there is no margin reduction with regards to products of a foreign Exchange.

When calculating margin, KRX considers a closeout period, a reasonably expected period to cancel out open interests of a member. Given that the derivatives market of KRX has high liquidity, KRX assumes that two days are required for clearing from the time of settlement failure to the time to close off open interests. Nonetheless, more time might be necessary to dispose of the members' positions in market stress. For

this reason, when setting scenarios for stress tests, KRX uses volatility of price of more than five days after considering various factors such as market liquidity, adverse effects of position concentration, and KRX's hedging capability.

#### **<Margin rates>**

KRX has established the Guideline for the Margin Rate Management to appraise the adequacy of margin rates. In accordance with the guideline, KRX measures the price volatility of underlying assets on a daily basis and analyzes the validity of margin rates by comparing it with margin rates. Also, KRX adjusts and optimizes margin rates each quarter or any time it is deemed necessary because of a sudden change in markets, etc.

When adjusting margin rates, KRX uses both short-period samples (20 and 60 days) and long-period samples (120 and 250 days). Through this, KRX reflects recent market volatility as well as that of the past, thus limiting the need for destabilizing procyclical changes. To avoid deteriorating market conditions, KRX considers not only the objective factors such as the volatility of the underlying assets but also the subjective ones including the prospects for volatility subsequent to system improvements, volatility distribution, and the impacts of margin rates adjustments on settlement stability, etc.

#### **<Backtesting and sensitivity analysis>**

As margin is a virtual loss derived from the estimated volatility of an underlying asset price, it is necessary to confirm whether it properly covers possible losses. For this, KRX has introduced and has been conducting backtesting and sensitivity analysis for the margin system validation in 2013.

Backtesting is a methodology to verify the adequacy of margin model through the comparison of ㉠ margin calculated by applying a margin model and ㉡ real loss and gain determined from the market prices. To examine its margin model, KRX conducts backtesting on a daily basis, counts the number of times that real loss exceeds the margin amount, and checks if the margin amount covers real losses and gains.

Furthermore, for the positions subject to imposition of margin, sensitivity analyses per scenarios are conducted each day. Through comparison of risk exposure and margin

for each scenario, KRX tests to what extent the current level of margin can cover the market conditions.

KRX regularly examines parameters for the margin model, and if it is necessary to make a change related to parameters, it shall go through a deliberation of the Derivatives Market Committee.

#### **<Margin in the securities markets>**

Members are not required to deposit member margin in the securities markets. However, members may collect customer margin from its customers to prepare for their non-fulfillment of settlement obligations pursuant to the KRX Business Regulation. A member may autonomously determine rates and collection methods of customer margin.

Aside from customer margin, KRX measures the possible amount of its loss due to a securities market member's default using stress tests and the VaR model. In order to compensate for the damages incurred from settlement failure in the securities markets, KRX requires clearing members to accumulate JCF<sup>11)</sup> and holds the settlement reserve funded by its equity capital (400 billion KRW).

11) The amount of JCF for the securities and derivatives markets are 200 billion KRW respectively.

#### **Margin for OTC derivatives products**

##### **<Legal basis>**

Pursuant to Article 323-13 of the FSCMA, to guarantee fulfillment of the settlement obligations to the CCP, an OTC clearing member is required to deposit clearing margin in cash and other financial instruments as specified by the OTC Clearing Regulation.

KRX defines net exposure margin as the maximum net loss that may result in case where the interest rate for the cleared transactions varies by a certain level. According to Article 81 of the OTC Clearing Regulation, KRX imposes as member margin, the amount that is no less than the amount resulting from adding the net cash settlement amount<sup>12)</sup> and OTC derivatives JCF adjustment amount<sup>12)</sup> to net exposure margin.

12) If the amount on a daily basis, allocated to each clearing member after subtracting the settlement reserve of KRX from the required amount of financial resources for settlement exceeds 115% of the required JCF contribution imposed as of the end of last month, the OTC derivatives JCF adjustment amount is imposed.

A clearing member is required to deposit member risk margin with cash, substitute securities, foreign currency and foreign securities by 12:00pm of the next business day. If a member does not, KRX designates that member as a defaulting member, and takes necessary measures such as denial of the request for an assumption of obligation.

#### <Calculation of margin>

The method for calculating margin is prescribed in Appendix 6 of the Enforcement Rules of OTC Clearing Regulation.

Net exposure margin is determined at the level that covers the 99.7% of the five-days risks using the interest rate curve of the last 1,250 business days, and composed of ㉠ net value variation margin, ㉡ spread margin, ㉢ margin reduction and ㉣ liquidity risk margin.

㉠ (Net value variation margin) The sum total of the individual net value variation margin amount per margin reference maturity that is calculated by multiplying the fixed rate net paying contract amount per margin reference maturity and the fixed rate net receiving contract amount to the net value

㉡ (Spread margin) The risk exposure equivalent that may arise from the netted contract amount within the same margin reference maturity due to inconsistencies in change in value level between the cleared transactions having the same margin reference maturity, calculated by multiplying the netted contract amount out within the same margin reference maturity by the net value variation margin rate, spread margin rate and 2.

㉢ (Margin reduction) The risk exposure equivalent that may be set off between margin reference maturities considering the correlation of a change in value between margin reference maturities

㉣ (Liquidity risk margin) The risk exposure equivalent necessary for hedging transaction, unwinding of a cleared transaction, etc., which is the sum of each contract amount multiplied by liquidity risk margin rate by reference maturity.

<Composition of member risk margin>

Net exposure margin		Net cash settlement amount		JCF adjustment amount
Net value variation margin + Spread margin + Liquidity risk margin - Margin reduction	+	The settlement amount to be deposited on the next business day of calculation	+	The excess if the required amount of JCF contribution on a daily basis exceeds 115% of the JCF contribution amount imposed as of the end of last month

As KRW IRS is an OTC derivative, unlike ETP, it isn't traded in an organized exchange where immediate disposal of positions are possible. Therefore, the closeout period of OTC derivatives clearing is set at five days, whereas two days are considered for calculation of margin in ETP clearing.

Clearing members may submit requests for the assumption of obligation of clearing eligible transactions from 09:00am to 16:20pm each day, and then KRX registers members' requests at reference time of assumption of obligation, which is 17:00pm. Members must deposit in advance, margin for request for assumption of obligation and margin for registration of assumption of obligation. If members do not deposit margin, KRX refuses to accept the requests for assumption of obligation.

Margin for request for assumption of obligation, which consists of ① member risk margin and ② cumulative outstanding margin, is calculated right after the submission of requests. Cumulative outstanding margin is the net present value (NPV) of the transactions if the assumption of obligation is requested after the effective date and the NPV of the transactions, evaluated by the settlement rate of the previous business day of the request of assumption of obligation is negative.

< Composition of the margin for request for assumption of obligation >

<b>Member risk margin</b>	+	<b>Cumulative outstanding margin</b>
Net exposure margin + Net cash settlement amount + JCF adjustment amount		The negative sum of the NPV of transactions of which the assumption of obligation is requested after the effective date

Margin for registration of assumption of obligation is calculated at 16:20pm and composed of ① member risk margin, ② cumulative outstanding margin, ③ total value variation margin and ④ negotiated settlement amount. Total value variation margin amount is the sum of the amounts calculated by multiplying the contract amount of each clearing eligible transaction of clearing members that are submitted to KRX before the deadline for requesting the assumption of obligation by the total value variation margin rate per margin reference maturity.

< Composition of the margin for registration of assumption of obligation >

<b>Member risk Margin excluding net Settlement amount</b>	+	<b>Cumulative Outstanding Margin</b>	+	<b>Total value variation margin</b>	+	<b>Negotiated Settlement Amount</b>
Net exposure margin + JCF adjustment amount		Refer to the Description given in the above		$\sum\{(\text{contract amount of each transaction}) \times (\text{total value variation margin rate})\}$		The amount which both parties to the contract have agreed to receive and deliver by cost of early termination or change of the contract

In order to cover losses that may result from a sudden change in interest rate, intraday margin has been introduced. A member must deposit the amount higher than intraday member margin by 14:00pm if the total deposit amount of the member margin calculated at 12:00pm of each business day is less than the member maintenance margin.

Like ETP clearing, KRX has introduced backtesting and sensitivity analysis for the OTC derivatives clearing. KRX conducts them every day in order to examine whether margin properly covers losses that might occur.

Backtesting is carried out by counting the number of times that real losses for five days exceed the actual member margin imposed, and assessing its adequacy. KRX conducts sensitivity analysis by comparing margin with risk exposure for each scenario according to the change in interest rate, and testing to what extent the current level of margin can cover market conditions.

KRX regularly examines parameters for the margin model, and KRX makes changes related to parameters when necessary. When KRX changes an important part of the member margin calculation methodologies, it shall have an independent and capable external institution review its propriety, etc. pursuant to Article 50-2 of the Enforcement Rules of OTC Clearing Regulation



**Principle 7: Liquidity risk**

An FMI should effectively measure, monitor, and manage its liquidity risk. An FMI should maintain sufficient liquid resources in all relevant currencies to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would generate the largest aggregate liquidity obligation for the FMI in extreme but plausible market conditions.

## Summary narrative

**<Outline>**

The Risk Management Regulation defines liquidity risk as "the insolvent risk of mismatch of the lead time in operating funds or unanticipated capital outflows and the possibility of the KRX's loss due to adverse borrowing conditions or sale of assets under adverse conditions arising from raising deficient funds". Liquidity risk mostly arises when a clearing member doesn't fulfill its settlement obligation.

Meanwhile, liquidity exposure may be defined as "the required liquidity amount that shall be supplied for settlement in case of member's settlement delay". In the event that a member delays or fails to deliver the settlement securities and amounts by the settlement deadline, KRX supplies liquidity using the financial resources for settlement. KRX measures liquidity exposure on a daily basis.

**<Organizations for liquidity risk management>**

As the department in charge of managing liquidity risk, the Clearing & Settlement Operations Department checks the current state of risk management, and reviews improvement plans. The Risk Management Committee and the Risk Management Department regularly review the framework for overall risk management including liquidity risk. Also, the Audit Committee and the Audit Department examine the propriety of risk management at an independent position, and recommend improvements when necessary.

For proper management of financial resources for liquidity, pursuant to Article 8 of the Risk Management Regulation, KRX sets 'the establishment and changes of credit lines and the settlement reserve' as liquidity management indicators, and requires the Clearing & Settlement Operations Department to manage them and report related

information to the Risk Management Department regularly. The Risk Management Department analyzes members' settlement amounts and liquid resources comprehensively, and reports the results to the Risk Management Committee.

**<Framework for liquidity risk management>**

In order to measure, monitor and manage the liquidity risks, KRX has developed and introduced the Settlement Risk Management System for the ETP clearing in December 2010, and for the OTC clearing in March 2013.

Settlement amounts that members have to pay are automatically calculated and notified through the clearing and settlement system. Then, KRX performs real-time monitoring of the settlement progress. Because the computer systems of KRX and settlement banks are interconnected, a member's transfer of settlement amounts is registered in the system so that KRX is able to verify the settlement cash flow. Right after all members have completed settlement payments, KRX in turn pays them to members to whom they are due.

KRX regularly validates the sufficiency of liquid resources through stress testing. Specifically, the liquidity required for cash payment in a crisis situation is determined in the following way:

Liquidity exposure for ETP clearing in a crisis situation is calculated considering the two following figures;

- > the settlement amount estimated under the assumption that the member, which has paid the largest settlement amounts in a real financial crisis of the past, delays or fails to deliver settlement cash and securities;
- > the extreme value of a clearing member's settlement amount calculated using the Extreme Value Theory (EVT).

As for OTC clearing, liquidity exposure is calculated in the same way as done for ETP clearing, but two members are taken into account when assuming the members' defaults and using the EVT.

KRX estimates liquidity exposure on a daily basis and compares it with current liquid resources. Through this, KRX assesses the liquidity adequacy and reviews the need to increase the financial resources when necessary.

**<Liquid resources>**

The Guideline for Use of Financial Resources for Providing Liquidity specifies the types of financial resources, sequence of use, and procedures for the use or appropriation of resources, etc. KRX maintains sufficient liquid resources to cover the potential payment obligations arising from at least two participants. To solve the liquidity problem due to settlement failure of members, KRX holds JCF and settlement reserve as assets which can be liquidated immediately. Also, KRX has opened a line of credit with Korean Securities Finance Corporation (“KSFC”) and three commercial banks with creditworthy BIS ratios. Furthermore, by making the Stock Secured Loan Arrangement of 1 trillion KRW with KSFC, KRX is able to provide sufficient liquidity.

**< Credit-line and secured loan arrangements (KRW) >**

	Credit line				secured loan
<b>Institutions</b>	KSFC	Shinhan Bank	Woori Bank	KEB <sup>a)</sup>	KSFC
<b>Amount</b>	1 trillion	0.5 trillion	0.5 trillion	0.5 trillion	1 trillion

a) Korea Exchange Bank

Requirements for eligible financial institutions with which KRX can open credit lines are prescribed in the Enforcement Rules of Fund Management Regulation. They are the same as requirements for the eligible financial institutions for deposit (refer to Principle 16 on custody and investment risks).

Even if a specific bank fails to supply liquidity due to operational problems, KRX enables settlement to be completed by scattering the credit lines to several banks. KRX checks the financial status of liquidity providers to verify their eligibility. Moreover, pursuant to the Bank of Korea Act, the BOK may supply emergency liquidity for KRX in case of deterioration of liquidity conditions, etc.

**Principle 8: Settlement finality**

An FMI should provide clear and certain final settlement, at a minimum by the end of the value date. Where necessary or preferable, an FMI should provide final settlement intraday or in real time.

## Summary narrative

**<Settlement deadline>**

The KRX Business Regulations clearly defines the point at which settlement is final in the respective markets (KOSPI Regulation §75-2(1); KOSDAQ Regulation §31-2(1); Derivatives Regulation §103(4); OTC Clearing Regulation §66(2)). Settlement deadlines are also disclosed at the KRX website.

**Settlement deadlines of each market**

- **Securities**

- > KOSPI, KOSDAQ stocks, etc.: 16:00pm (T+2)
- > Government bonds: 16:00pm (T+1)
- > Debt securities (excluding the government bond): 16:00pm (T+0)

- **Listed derivatives**

- > Cash settlement (including settlement difference for the day's trade and previous day's open interests and option premium): 16:00 pm (T+1)
- > Physical delivery (futures for gold and foreign currency): 12:00 pm (T+2)

- **OTC derivatives: 16:00pm (T+1)**

**<Introduction of the Intraday Settlement>**

For diversification of securities settlement throughout the settlement day, KRX moved up the settlement start time for stocks and government bonds from 16:00pm to 9:00am in 2011. Accordingly, a member who has fulfilled its settlement obligation is able to receive settlement securities and amount at any time of the settlement day. The implementation of the settlement advancement resulted in reducing settlement delays and putting forward time for the settlement completion.<sup>13)</sup> Especially in government bonds, KRX supplies liquidity using the BOK's money by reselling the securities to the BOK (intraday Repo), so that a selling member can receive payment right after the delivery of the securities. Intraday settlement is also implemented in listed derivatives. When all members with delivery obligations complete the delivery of the net cash (or underlying asset) balance, the members to whom the delivery is due from KRX can

be paid even before the settlement deadline.

13) The average settlement completion time has been shortened by about 2 hours in the stocks market and about 30 minutes in the government bond market.

#### <Methods to mitigate the settlement risks in the securities markets>

KRX eliminates principal risk by using DvP in all of the securities markets. Additionally, KRX minimizes settlement size and risk by carrying out netting. However, the ways of netting vary depending on the types of the securities markets. Especially in the stock market, KRX has introduced the Continuous Net Settlement (CNS)<sup>14)</sup> and Buy-in<sup>15)</sup>, and prevents settlement delay or settlement failure arising from a member's non-delivery of settlement securities.

14) **(CNS)** The member, who has failed to deliver the stocks by settlement deadline (16:00pm T+2), have to pay the deferred settlement amount in place of the undelivered stocks to KRX. In this case, KRX pays the deferred settlement amount to the clearing member who has not received the stocks (Article 75-9 of the KOSPI Regulation).

15) **(Buy-in)** With regard to the issue that has a possibility of settlement deferment or failure due to non-delivery of stocks, KRX may purchase the concerned issue and transfer it to the clearing member who has failed to deliver the stocks Article 75-10 of the KOSPI Regulation.

#### <Settlement finality>

Settlement finality means that once the transfers of settlement securities and funds are completed, neither the participants nor KRX is allowed to request such transfers to be cancelled. KSD and KRX, which are the settlement institutions in the securities markets and the derivatives market respectively, ensure settlement finality in their regulations.<sup>16)</sup> In addition, pursuant to Article 120 of the DRBA, even if there is a participant default or bankruptcy, it cannot affect any actions taken by KRX as a CCP, so that settlement finality is legally secured.

16) In June 2014, KRX established a provision in the Derivatives Regulation (Article 104-2) to articulate the settlement finality in the derivatives market, as per the recommendation of IMF.

※ **Regulations on Settlement Service for Securities, Etc. (KSD)**

**Article 14-2 (Finality of Settlement)** (1) In the event that book-transfer entry for settlement securities has been made in KSD Securities Settlement Account and Settlement Member Securities Settlement Account, neither the Securities Exchange Settlement Member nor the Exchange may request that such book-transfer entries be cancelled. (2) In the event that details of funds transfer of settlement funds have been entered in KSD Cash Settlement Account and Settlement Member Cash Settlement Account, neither the Securities Exchange Settlement Member nor the Exchange may request that such funds transfer be cancelled.

※ **Derivatives Regulation (KRX)**

**Article 104-2 (Settlement Finality of Net Cash Balance and Net Underlying Asset Balance)** When the clearing member has delivered the net cash balance or net underlying asset balance to the Exchange pursuant to [§104], the clearing member shall not cancel such delivery.

※ **OTC Clearing Regulation (KRX)**

**Article 69-2 (Settlement Finality of Net Cash Settlement Amount)** Clearing members may not cancel the net cash settlement amounts after they are transferred to the account of the Exchange at the settlement bank pursuant to [§69(1)].

**Principle 9: Money settlements**

An FMI should conduct its money settlements in central bank money where practical and available. If central bank money is not used, an FMI should minimize and strictly control the credit and liquidity risks arising from the use of commercial bank money.

## Summary narrative

**<Settlement banks>**

The settlement system of the central bank (BOK-wire) is used for money settlement in stocks, government bonds and Repo markets. In general, the central bank's credit risk is lower, while it has higher liquidity, so it is possible to mitigate credit and liquidity risks. In the case of the general bond market and the derivatives market, settlements are carried out through the systems of commercial banks designated as settlement banks by KRX

[< List of commercial settlement banks >](#)

Type of market		Settlement Banks					
		Shinhan Bank	Woori Bank	Korea Exchange Bank	Busan Bank	Nonghyup Bank	Kookmin Bank
<b>General bond market</b>		O	O				
ETP derivatives market	KRW Settlement	O	O	O	O	O	O
	Foreign Currency settlement	O	O	O	O	O	
<b>OTC derivatives market</b>		O	O	O	O		

**<Management of settlement banks>**

In order to mitigate risks arising from settling in commercial banks and to conduct stable settlement, KRX has established the selection criteria for settlement banks with a conservative approach and stipulates such criteria in related regulations (Article 101-2 of the Enforcement Rules of KOSPI Regulation, Article 111 of the Enforcement Rules of Derivatives Regulation, Article 43 of the Enforcement Rules of OTC Clearing Regulation).

Furthermore, KRX keeps managing the credit and liquidity risks by monitoring financial status of settlement banks. KRX terminates the designation of settlement bank in case where a settlement bank doesn't meet requirements for designation, or there is a recommendation, request or order for the management improvement against the bank from the FSC (Article 111(2) of the Enforcement Rules of Derivatives Regulation).

< Qualifications for the designated settlement bank >

Items	Requirements
<b>Common equity capital ratio, basic equity capital ratio, total equity capital ratio</b>	These shall be no less than 1.2 times of the minimum ratios pursuant to [§26(1)1] of the Regulations on Supervision of Banking Business
<b>Credit rating</b>	The lowest one of credit ratings from the eligible credit rating agencies designated by the FSS shall be equivalent to or higher than 'AA'
<b>Won currency current ratio (only for OTC clearing)</b>	Higher than 1.1 times the minimum ratios pursuant to [§26(1)1] of the Regulations on Supervision of Banking Business



**Principle 10: Physical deliveries**

An FMI should clearly state its obligations with respect to the delivery of physical instruments or commodities and should identify, monitor, and manage the risks associated with such physical deliveries.

## Summary narrative

**<Products to be delivered physically>**

Among diverse products cleared by KRX, securities are settled by book- entry between the Securities Settlement Accounts in KSD. Derivatives are settled by delivering and receiving cash. However, currency futures (USD, JPY and EUR Futures) and gold futures are subject to physical delivery.

Details on physical delivery are stated in the Derivatives Regulation. (Article 104(2) for delivery obligation; Article 48 and 61 for detailed processes of physical delivery of currency futures and gold futures respectively)

**<Risks rising from physical delivery>**

Foreign currency doesn't have delivery risk because its delivery is made through account transfer. In case of gold, however, loss could be incurred due to the deficient weight, physical loss or damage of gold bar in the process of delivery.

For this reason, the relevant regulations stipulate the details on physical delivery risk. For example, according to Article 35(2) of the Enforcement Rules of the Derivatives Regulation the warehouse operator is responsible for the compensation against the deficient weight, physical loss or damage of gold bar which he/she is storing. If the gold bar has a defect or is suspected of having a defect in the process of delivery, the member receiving the gold bar may file complaints with KRX. In the event that the result of examination by the special testing agency reveals that the gold bar has a defect, the delivering member is responsible for the loss and all expenses. However, if it is deemed that the warehouse operator has caused the defect of the gold bar, he/she is responsible for loss instead of the delivering member.

**Principle 12: Exchange-of-value settlement systems**

If an FMI settles transactions that involve the settlement of two linked obligations (for example securities or foreign exchange transactions) it should eliminate principal risk by conditioning the final settlement of one obligation upon the final settlement of the other.

Summary narrative

**<Securities markets>**

KRX manages principal risk by using DvP in all of the securities markets. That is, KRX allows a member to receive settlement securities and the amount only when the member has fulfilled its settlement obligation. Thus principal risk that a seller of the securities would irrevocably deliver the asset but not receive payment is eliminated. However, there are some differences of the DvP methods depending on the type of settlement securities. DvP3 is applicable to the stocks<sup>17)</sup>, Repo and general bond markets, while 'modified DvP3<sup>18)</sup> is adopted in the government bond market.

17) In the stock markets, netting is carried out by means of DvP3 but the settlement is performed after 9:00am on T+2 day in case that the cash leg and securities leg are ready (securities netting is performed on per-issue basis, whereas cash netting is on a gross basis).

18) Securities netting is carried out between the same issue of securities and cash netting is done between payment amounts of the same issue.

**< Necessary conditions for securities transfers and cash payments >**

Market	Securities transfers	Cash payments
Stocks	(1) When a member makes full delivery of the settlement securities and payments that it is obliged to deliver or (2) when its maximum quantity of receivable issue exceeds the appraisal value of settlement securities	(3) When a member makes full delivery of settlement securities (or deferred settlement amount) that it is obliged to deliver
Government bond	When a member completes the deposit of settlement payment of the specific issue (referring to the settlement payment determined by dividing into 10 billion KRW)	When a member completes the delivery of specific settlement security (referring to the settlement security determined by splitting into 10 billion KRW)
Repo & General bond	When all members complete the delivery of specific settlement security that they are obliged deliver & when condition (1) is met	When all members complete the deposit of settlement payment of all securities & when condition (3) is met

**<Derivatives market>**

In the listed derivatives market in which trades are settled by delivering and receiving the net cash balance, settlement mechanisms like DvP isn't adopted. Instead, KRX gets rid of principal risk by making payments to the members to whom delivery is due only when all members obliged for payments complete the delivery. As for physically delivered products (currency futures and gold futures), however, a settlement mechanism is similar to DvP is applicable.



**Principle 13: Participant-default rules and procedures**

An FMI should have effective and clearly defined rules and procedures to manage a participant default. These rules and procedures should be designed to ensure that the FMI can take timely action to contain losses and liquidity pressures and continue to meet its obligations.

## Summary narrative

**<Legal basis>**

KRX has a clear legal basis for the settlement guarantee in case of a member's non-fulfillment of settlement obligations. For ETP clearing, the FSCMA states KRX's repayment of a defaulting member's debt (Article 398) and KRX's liability for damages incurred from violation of transaction contracts by any member (Article 399), and that KRX has to maintain financial resources for settlement, such as fidelity guarantee money (Article 395), joint compensation fund (Article 394), member margin or guarantee margin for clearing (Article 396(2)). For OTC clearing, the reserve, use, etc. of JCF and order of repayment are stipulated in Article 323-14 and 323-15, and member margin in Article 323-13. Article 54(2) of the Articles of Incorporation of KRX prescribes the KRX settlement reserve for clearing.

**<Participant default procedures>**

Procedures of a member's default are specified in each of the Business Regulations and the Membership Regulation. Authorities and responsibilities for actions to be taken in case of settlement failure are prescribed in the official authorization table in accordance with Article 5 of the Enforcement Rules of Regulation on Organization Management §5.

## &lt; Participant default procedures &gt;

Actions to be taken	Relevant Provisions
<b>Liquidity provision for fulfillment of settlement obligation</b>	<b>(KOSPI)</b> §75-4 <b>(Derivatives)</b> §105 <b>(OTC)</b> §73
<b>Decision of non-fulfillment of settlement</b>	<b>(KOSPI)</b> §76(2) <b>(Derivatives)</b> §107(2) <b>(OTC)</b> §101(2)
<b>Measure against a defaulting member</b> (Suspension of trading privileges, securities delivery or cash payment, and clearing participation, etc.)	<b>(KOSPI)</b> §76(1) <b>(Derivatives)</b> §107(1) <b>(OTC)</b> §101(1)
<b>Settlement execution by KRX</b>	<b>(KOSPI)</b> §76(3) <b>(Derivatives)</b> §107(3) <b>(OTC)</b> §101(3)
<b>Use of the financial resources for settlement</b>	<b>ETP : (Membership)</b> §25 <b>(OTC)</b> §112
<b>Canceling out open interests of a defaulting member</b>	<b>(Derivatives)</b> §109 <b>(OTC)</b> §102
<b>Actions against a defaulting member</b> <ul style="list-style-type: none"> <li>&gt; Exercise of a right to indemnity</li> <li>&gt; Assistance for the efficient settlement by posting KRX's employee to the defaulting member</li> <li>&gt; Disciplinary measures against a defaulting member</li> </ul>	<ul style="list-style-type: none"> <li>&gt; <b>(FSCMA)</b> §399(3), §323-14(4)</li> <li>&gt; <b>(KOSPI)</b> §76(8), <b>(Derivatives)</b> §107(6) <b>(OTC)</b> §101(5)</li> <li>&gt; <b>(Membership)</b> §35~§36</li> </ul>

In case of OTC clearing, actions below might also be taken.

- > **(Assessment)** If it is not possible to fully compensate the loss caused by settlement default through the JCF of non-defaulting members and settlement reserve of KRX, KRX may request non-defaulting members to re-accumulate the OTC derivatives JCF. The amount of assessment that a non-defaulting member is required to accumulate is limited to the amount of required contribution to JCF most recently notified by KRX to clearing members before the start of cap period (Article 114 of the OTC Clearing Regulation).

- 
- > **(Default Management Committee)** To seek advice on hedging transactions or auction for cleared transactions of a defaulting member, KRX may operate the DMC consisting of the representatives of KRX and clearing members (Article 106 of the OTC Clearing Regulation).
  - > **(Hedging transaction)** When it deems necessary in view of the composition, size, price, etc. of cleared transactions of a defaulting member, KRX may carry out hedging transaction to avoid all or a part of the loss that could result from the cleared transactions of the concerned clearing member, until all cleared transactions of the concerned member are closed out (Article 107 of the OTC Clearing Regulation).
  - > **(Auction)** KRX may close out, by auction, proprietary transactions of a defaulting member, or client clearing transactions that were not transferred to another general clearing member within fifteen days from the settlement default (Article 108 of the OTC Clearing Regulation).
  - > **(General meeting of clearing members)** When compensating for the loss of the default clearing member using the collection of net cash settlement amounts, if a majority of the clearing members requests KRX to close down the clearing operation in writing, KRX calls a general meeting of clearing members without delay (Article 110 of the OTC Clearing Regulation).
  - > **(Close-out netting)** In case of any of the following items, KRX commences the close-out netting procedure for cleared transactions with all clearing members and terminates the clearing operation from the commencement day. If KRX hasn't commenced close-out netting despite the occurrence of the following items, a clearing member can commence closing-out netting of cleared transactions of which the concerned member is the counterparty (Article 111 of the OTC Clearing Regulation).
-

- ① Case where KRX has not completed its payment obligation with regard to cleared transactions without justifiable causes;
- ② Case where the bill or check issued by KRX has been defaulted or KRX has been prohibited or suspended from the transaction with bank;
- ③ Case where the FSC has taken an action to issue an order of closing-out netting or to cancel the authorization of KRX;
- ④ Case where KRX files for suspension of payment, reorganization commencement, and bankruptcy pursuant to the DRBA;
- ⑤ Case where after a person other than KRX files for reorganization commencement or bankruptcy of KRX pursuant to the DRBA, the cause thereof has not been resolved within a month from the time of such filing or the commencement of reorganization or bankruptcy declaration has been decided by the court;
- ⑥ Case where the decision has been made at the general meeting of clearing members to close the clearing operation of KRX

#### <Default waterfall>

> **(ETP Markets)** In case of a member's settlement default, financial resources for settlement are used in the order of "assets of the concerned member (JCF, margin, etc.) → JCF of non-defaulting members → settlement reserve of KRX → other assets of KRX". If it is not easy to make a timely use of the defaulting member's assets due to low liquidity, KRX may first use its settlement reserve to facilitate efficient settlement (Article 25(5) of the Membership Regulation). In this case, KRX restores the amount used with the defaulting member's financial resources without delay.

The relevant law currently states that JCF of non-defaulting members shall be used prior to settlement reserve of the CCP (Article 399(2) of the FSCMA). As covered in Principle 4, however, the default waterfall for ETP clearing has discrepancies with the international standards, so KRX is in the process of amending the related provisions to put in a part of the settlement reserve of KRX before using non-defaulting members' JCF.

> **(OTC derivatives market)** When a clearing member hasn't fulfilled its settlement obligation, financial resources for settlement are used in the following order;

- ① assets of the defaulting member → ② a part of the settlement reserve of KRX (up to 50% of it) → ③ JCF of non-defaulting members → ④ the remainder of settlement reserve → ⑤ assessments of non-defaulting members → ⑥ variation margin gains haircuts

> **(Details on financial resources)** Aside from the above-stated matters, details on financial resources, such as management and operation, allocation of operation proceeds, supplement of financial resources, are specified in the Guideline for Use of Financial Resources for Providing Liquidity, the Guideline for Management of Joint Compensation Funds and the Guideline for Management of Settlement Reserves, etc.

On top of that, KRX has established the Business Manual for the securities and derivatives clearing to deal with settlement default appropriately, and is making an effort to improve operational personnel's response capability for settlement defaults through periodic BCP drills. Lastly, the above-noted rules and procedures on participant default are disclosed at the KRX website, etc.



**Principle 14: Segregation and portability**

A CCP should have rules and procedures that enable the segregation and portability of positions of a participant's customers and the collateral provided to the CCP with respect to those positions.

## Summary narrative

**<Legal basis>**

Articles 74 and 75 of the FSCMA state the segregated deposit of money and securities deposited by investors. Therefore, an investor's assets are protected in any case including a default or bankruptcy of an investor brokerage company. A clearing member has to separate investors' good faith deposit<sup>19)</sup> from its proprietary assets, and place them in a deposit or trust account with the following designated institutions, excluding member margin and expenses such as brokerage commissions.

19) (Good faith deposit) Cash or securities which a member receives from its customers for the fulfillment of settlement obligation (=customer margin)

- Substitute securities : KSD (Article 75 of the FSCMA)
- Cash : KSFC (Article 74 of the FSCMA)
- Foreign currency : FX banks (Article 7-38, 7-42 of the Foreign Exchange Transaction Regulations)

**<ETP markets>**

- > **(Segregation of assets)** For the protection of customer assets from the beginning of the transaction process, Article 9 of the KOSPI Regulation and Article 48(1) of the Enforcement Rules of Derivatives Regulation require a member to input the quotation by specifying whether such quotations are for a customer account trading or for proprietary account trading. Especially in the derivatives market in which member margin is applicable, when depositing margin, a member has to separate margin into the member's own asset and customer's asset (Article 88(5) of the Derivatives Regulation). Furthermore, a member is prohibited to use assets deposited by a customer for purposes other than settlement and deposit of member margin which are related to the trades of the concerned customer (Article 139 of the Derivatives Regulation).
- > **(Account transfer)** The securities markets and the derivatives market of KRX maintain customer position and collateral in individual customer accounts, thereby

protecting each customer from peer risk. A customer with accounts in one clearing member may choose another member on his/her discretion, and have his/her assets including collateral transferred to the newly selected member.

When trading is suspended following settlement failure by a member, KRX may have that clearing member's open interests transferred to another clearing member designated by KRX, thus protecting customer's property (Article 109(3) of the Derivatives Regulation and Article 113 of its Enforcement Rules). In this case, the transfer of open interests is accomplished by way of the suspended member entering into a trading agreement with the member designated by KRX, for the quantity of open interests to be transferred. In order to prevent the regular member's loss caused by taking over open interests in the own account of the defaulting member, KRX allows the defaulting member to spontaneously cancel out the open interests it holds within a certain period of time (generally 2 weeks) as stipulated in Article 109(1) of the Derivatives Regulation. Historically, all the open interests were dissolved or cleared out within 2 weeks by defaulting members from the time of trading suspension and there has been no forced transfer of the open interests so far.

#### <OTC derivatives market>

- > **(Segregation of assets)** As Article 46 of the OTC Clearing Regulation states, members' accounts to record and manage margin, settlement amount, etc. are opened for each party which entrusts clearing (hereinafter referred to as "client"). A clearing member has to deposit with KRX the entire amount of client margin collected from its clients (Article 89(2) of the OTC Clearing Regulation), and when a clearing member deposits the cash, foreign currency or foreign securities including those of the client as margin, KRX segregates them from the member's proprietary assets, and distinguishes them into the clearing member's own asset and the client's asset. Additionally, KRX manages the asset of non-clearing members by breaking it down for each client as stipulated in Article 86 of the OTC Clearing Regulation.
- > **(Account transfer)** A client may request the transfer of the entire quantity of cleared transactions to another clearing member not only in the settlement failure of the clearing member which was entrusted with his/her transactions but also in normal situations (Articles 100 and 103 of the OTC Clearing Regulation). In case

where it deems necessary for the protection of clients of a settlement defaulting member, KRX may act on behalf of that member for up to the period designated by the Default Management Committee (“DMC”) within 30 days from the day of clearing member's default. The client of the defaulting member may transfer the cleared transactions in his/her own account to the transferee clearing member that itself has designated. A client intending to transfer the cleared transactions shall enter into a written Clearing Entrustment Agreement with the transferee (Article 54 of the OTC Clearing Regulation). When transferring cleared transactions, a client shall input the request using the OTC derivative clearing system from 17:00pm to 17:20pm.



**Principle 15: General business risk**

An FMI should identify, monitor, and manage its general business risk and hold sufficient liquid net assets funded by equity to cover potential general business losses so that it can continue operations and services as a going concern if those losses materialise. Further, liquid net assets should at all times be sufficient to ensure a recovery or orderly wind-down of critical operations and services.

## Summary narrative

**<Management of the general business risk>**

KRX has a risk management system to identify, monitor and manage its general business risk. In case where a business department intends to make decisions on the matters including new business or acquisition of stocks of other companies, which could have a significant effect on management, the Risk Management Committee reviews the business plan to assess its risk assessment (Article 15(1) of the Risk Management Regulation). Also, when a business department incurs cost exceeding a certain amount, it is required to go through the internal control procedures such as pre-review of the Planning Department, internal audit and the approval for execution of the Accounting Department.

※ **Risk control procedures**

**(Business Department)** Submits to the Risk Management Department of the Application for Risk Review containing the feasibility analysis of the business and influence on the financial status of KRX (Article 15 of the Risk Management Regulation and Article 7 of its Enforcement Rules).

**(Risk Management Department)** Analyzes the risk factors of business activities which could affect the financial status of KRX and reports it to the Risk Management Committee (Article 15 of the Risk Management Regulation and Article 7 of its Enforcement Rules).

**(Risk Management Committee)** Examines the proposed business of the business department, makes the final decision for matters regarding general business risk and allocation of risk capital according to the Risk Limit (Article 5 of the Regulation on Operation of the Risk Management Committee, Article 12 of the Risk Management Regulation).

**<Financial status of KRX>**

On the basis of the long-term business plan, KRX selects major projects to be conducted, and develops the capital plan annually. To hold current assets for

performing a reliable and stable business, KRX establishes an annual financial plan and manages funds in accordance with the relevant regulations.

In order to cover losses which might be incurred by general business and continue providing services as a going concern, KRX holds sufficient liquid net assets. As of the end of 2014, KRX holds total equity of 2,153 billion KRW and current assets of 1,854 billion KRW. As the majority of current assets are cash and cash equivalents or short-term financial instruments, it is possible to liquidate assets immediately without loss when necessary. Moreover, KRX meets the international standards that require FMIs to hold liquid net assets equal to at least six months of current operating expenses.

※ **Comparison of liquid net assets with operating expenses**

- **Liquid net assets\* as of the end of 2014** : 1,769 billion KRW

\* Current assets minus current liabilities

- **6 months of operating expenses\*\*** : 131 billion KRW

\*\* Calculated by dividing total operating expenses of 2014 by 2



**Principle 16: Custody and investment risks**

An FMI should safeguard its own and its participants' assets and minimise the risk of loss on and delay in access to these assets. An FMI's investments should be in instruments with minimal credit, market, and liquidity risks.

## Summary narrative

**<Custody of participants' assets>**

A member of KRX can deposit member margin with cash, substitute securities, foreign currency or foreign securities, whereas contribution to JCF may be made by cash, or government bonds and monetary stabilization bonds listed on the KOSPI Market. Of the assets submitted by KRX's members, substitute securities are held at KSD, and cash or foreign currency is deposited at the settlement banks.

- > **(Korea Securities Depository)** KSD is the sole legal depository in Korea. It maintains an internal control system, and is supervised and regulated by FSC.
- > **(Settlement banks)** In order to prevent excessive concentration of cash deposit to a particular bank, KRX designated, as settlement banks, several banks which meet the requirements<sup>20)</sup> prescribed in the Business Regulations. To safeguard participants' assets, KRX monitors cash and foreign currency deposited at custodian banks on a daily basis. Moreover, KRX continuously checks the evaluation ratings for the management status and the capital ratios of settlement banks

20) ① Common stock capital ratio, basic equity capital ratio and total equity capital ratio shall be no less than 1.2 times of the minimum ratios pursuant to [§26(1)] of the Regulations on Supervision of Banking Business, ② the lowest one of credit ratings from the eligible credit rating agencies designated by the FSS shall be equivalent to or higher than 'AA', and ③ for OTC clearing, 1.1 times the won currency current ratio noted in [§26(1)] of the Regulations on Supervision of Banking Business.

**<Management of participants' assets>**

For efficient and reliable management of member margin and JCF, KRX has established the Guideline for the Management of Joint Compensation Funds (hereinafter referred to as "JCF Management Guideline") and the Guideline for Cash

Management of Member Margin (hereinafter referred to as "Margin Management Guideline").

The management of member margin and JCF shall give priority consideration to the safety so that the operational risk can be minimized, while taking into account such factors as the liquidity and profitability. It is strictly prohibited to directly invest cash margin and JCF in shares or in derivatives. Instead, cash deposited by members is invested in risk-free assets including government bonds, etc. through general management or special management as stipulated in Article 3(4) of the JCF Management Guideline and Article 4(2) of the Margin Management Guideline.

- **(General management)** Deposit of cash into the financial products allowing deposit and withdrawal on demand at settlement banks (Article 4-2 of the JCF Management Guideline and Article 5 of the Margin Management Guideline)
- **(Special management)** Purchase of risk-free or nearly risk-free bonds such as the government bonds, municipal bonds, monetary stabilization bonds, guaranteed bonds and KSFC bonds, or deposit into a commercial bank (Article 5 of the JCF Management Guideline, Article 7 of the Margin Operating Guideline)

Cash or foreign currency of participants is deposited into the account under the name of KRX at settlement banks, and for substitute securities, KRX attains the right of pledge. Through connecting the clearing & settlement system of KRX to the substitute securities management system of KSD and the firm banking systems of settlement banks, KRX ensures prompt access to participants' assets.

#### <Management of KRX's own assets>

KRX operates its proprietary assets in accordance with the principle of pursuit of safety, liquidity and profitability pursuant to the Fund Management Regulation. For this, the Fund Management Committee develops a fund management plan annually and develops a detailed investment strategy quarterly. For the soundness and profitability of fund management, KRX requires a financial institution that wants to receive KRX's money on deposit, to meet requirements prescribed in the following table.

## &lt; Requirements for deposit eligible financial institutions &gt;

Market	Securities transfers
<b>A financial investment business entity</b> (excluding a collective investment business entity)	As of the end of the latest fiscal year, ① it shall be a company (excluding a foreign company) of which the equity capital amount reaches or exceeds 700 billion KRW, and ② the net operating capital ratio is no less than 500%, or the net capital allowance amount* is no less than 1 trillion KRW. * Net capital minus total risk amount
<b>A bank</b>	As a bank of which the head office is in Seoul or Busan, ① the equity capital amount at the end of the latest fiscal year is no less than 8 trillion KRW, ② the BIS equity ratio at the end of the latest fiscal year reported by the FSS is no less than 10%, and ③ the delinquency rate on loans is no more than 4%.
<b>A collective investment business entity</b>	①The total amount of entrusted funds (limited to funds related stocks, bonds and MMF) at the end of the latest fiscal year is no less than 1 trillion KRW, ② the return on equity of recent three years is no less than 5%.
<b>Others</b>	KSFC or a main creditor

Pursuant to the relevant regulations, material decisions that could have a significant impact on financial structure of KRX shall be resolved by the Risk Management Committee and the BOD.

KRX discloses its investment strategies and holding resources to the public by publishing "KRX Clearing & Settlement Report" annually and displays the management details to participants via an electronic system quarterly.

**Principle 17: Operational risk**

An FMI should identify the plausible sources of operational risk, both internal and external, and mitigate their impact through the use of appropriate systems, policies, procedures, and controls. Systems should be designed to ensure a high degree of security and operational reliability and should have adequate, scalable capacity. Business continuity management should aim for timely recovery of operations and fulfilment of the FMI's obligations, including in the event of a wide-scale or major disruption

## Summary narrative

**<Definitions>**

Article 4 of the Risk Management Regulation of KRX defines operational risk as the possibility of the KRX's loss due to improper or erroneous internal procedures, personnel, systems and external events. Operational risk includes business risk, IT risk, legal risk and reputation risk.

- > **(Business risk)** The possibility of KRX's loss due to business processing errors, accidents (including natural disasters and external events) and corruptions
- > **(IT risk)** The possibility of KRX's loss due to incidents in the IT system including a halt and errors of IT system and criminal activities
- > **(Legal risk)** The possibility of KRX's loss due to a violation of laws and regulations, or inadequate response to various legal disputes
- > **(Reputation risk)** The possibility of KRX's loss due to market management failure, internal corruption and fraud, business slump and public criticism

**<Operational risk management system>**

In order to identify and control operational risk arising from performing its business, KRX has developed and introduced the operational risk management system. For management of operational risk, KRX first establishes the company-wide risk management policies and draws risk profiles per business division. Then, KRX conducts operational risk management procedures including RCSA (Risk & Control Self Assessment), management of KRI (Key Risk Indicator) and loss events, and reporting.

- > **(RCSA)** Each business department registers the kinds of operational risks that might occur in its business and the activities that are necessary for controlling and preventing these risks<sup>21)</sup>. Then the business departments conduct self-assessment of operational risk and their controlling activities.

21) Each Business Department is required to appoint a risk manager.

- > **(Management of KRI)** For each business process, the business departments set KRIs that are able to be measured, and manages the KRI values.
- > **(Loss event management)** The business departments record and manage the details of the loss event in case of the financial or non financial loss occurring caused by computer errors, business processing miscarriages, etc.
- > **(Reporting)** The business departments regularly report the RCSA, KRIs and Loss events to the Risk Management Department and the Risk Management Committee.

The Risk Management Committee makes major policies for the management of operational risk, determines limits<sup>22)</sup> to the operational risks, and regularly checks the structure and operation of the risk management system.

22) The operational risk limit measured and allocated based on the average operating profit of the recent three years.

#### <Operation of KRX computer system>

Since 2009, KRX has been operating the trading system and clearing & settlement system based on EXTURE (the KRX computer system). As for the trading system, KRX has launched EXTURE+ in 2014, called as "a next-generation system", equipped with advanced technology of high-speed performance, thus improving the trade execution speed and promoting the stability of operating markets. Although KRX is basically responsible for the overall management of the computer system, routine operations on the system are performed by KOSCOM, its IT arm. KOSCOM is obliged to comply with the Computational Business Management Regulation and other Guidelines, etc. of KRX<sup>23)</sup>.

23) KOSCOM carries out its business in accordance with the Computational Business Management Regulation of KRX and the Agreements on Computer System Service between KRX and it.

**<Physical and information security>**

Pursuant to the Enforcement Regulations of Security Operation of the FSC, KRX has established the Security Operation Regulation and the Information Protection Management Regulation, and has been managing physical and information security in accordance. KRX made checklists for compliance with the relevant security regulations, and introduced systems for the physical and information security on the basis of those checklists.

> **(Physical security)** Introduction of the firewall, IPS<sup>24)</sup> and VPN<sup>25)</sup>, and operation of the closed network

24) Intrusion Prevention System

25) Virtual Private Network

> **(Information security)** Control of access to the computer systems and database, Integrated Security Management Solutions, etc.

KRX performs self-review of security status. Additionally, KRX is making an effort to take into account the international and national standards for physical and information security, thus reflecting necessary matters to its security policies.

The IT system and the information security system of KRX undergo regular internal audits as well as the external inspection by the FSS, and the fitness of systems is assessed as the audit result is reported to the BOD and the high level management. Furthermore, as KRX is designated as an important national infrastructure, the KRX is subject to various inspections and appraisals related to information security pursuant to the Information Technology Infrastructure Protection Act, including the occasional security appraisals by the government and the inspections of information security management by the National Intelligence Service.

### <Business continuity plan (BCP)>

To secure operational stability and continuity through DR (disaster recovery) in a crisis situation, KRX has established the BCP. In the event of a halt or disruption in critical IT systems, KRX switches all operations to the DR system and aims to ultimately enable the system to resume operation within three hours following a disruptive event. The DR systems are located in a secondary site<sup>26)</sup>, which is geographically far enough from the primary site where the basic system is, and have processing capacities equivalent to those of the primary ones.

26) Trading systems for the stocks and bonds markets, Information distribution system, Clearing and Settlement system

: **(primary)** in Seoul **(secondary)** in Busan

Trading system for the listed derivatives market

: **(primary)** in Busan **(secondary)** in Seoul

Based on various scenarios<sup>27)</sup>, KRX conducts mock exercises (BCP drills) to test the appropriateness of measures and procedures four times a year, so that KRX has operational personnels improve their working abilities and provide stable clearing and settlement services in a crisis situation. Through BCP drills, KRX checks if clearing & settlement services can be restored within RTO (Recovery Time Objective), which is currently 3 hours<sup>28)</sup>. Furthermore, KRX maintains and strengthens the business collaboration and association with related institutions through such activities as the BCP drills, workshops and meetings on payment settlement and working-level meetings.

27) Clearing & Settlement system errors, power down, computer system errors of settlement banks, etc.

28) The RTO recommended by PFMI is 2 hours. KRX acknowledges that the current RTO is not in line with it and is willing to shorten the RTO in a long term. Being connected with external systems of member firms, depository, custodians and regulators, it will need a massive sized expansion of system functionality and capacity.

**Principle 18: Access and participation requirements**

An FMI should have objective, risk-based, and publicly disclosed criteria for participation, which permit fair and open access.

## Summary narrative

KRX's member is composed of ETP Markets participants (clearing members and non-clearing members) and OTC derivatives clearing participants (general clearing members and proprietary clearing members).

**<Participation requirements for ETP clearing>**

> **(Qualifications of a member)** An entity that has obtained the license to engage in the investment trading or investment brokerage business pursuant to the FSCMA is eligible to be an ETP market member of KRX (Article 4(1) of the Membership Regulation). Article 12(1) of the FSCMA states that an entity that wishes to engage in the investment trading or investment brokerage business shall meet the requirements including the following items;

- To be a stock company under the Commercial Act or one of the financial institutions specified by Presidential Decree of the FSCMA
- To have its own equity capital equivalent to or more than the amount set for each authorized business unit
- To have a feasible and sound business plan
- To be equipped with human resources, an electronic computer system, and other physical facilities adequate for running financial investment business in which it intends to engage

Details on qualifications of a KRX's member are specified in Article 6 of the Membership Regulation. A member shall satisfy the financial criteria<sup>29)</sup>, be equipped with adequate facilities including computer equipments, etc., have adequate manpower that has the expertise and integrity necessary for conducting business, and have sufficient social credibility.

29) **(Clearing members)** Net Capital Ratio (referring to the ratio of net capital to required maintenance) shall be at least 100% and equity capital shall be no less than 10 billion KRW.

**(Non-clearing members)** Net Capital Ratio shall be at least 100%.

- > **(Management of a member's settlement risk)** An applicant for membership is obligated to pay the admission fee, contribute to the JCF for the securities markets and the Derivatives Market, and deposit the Fidelity Guarantee Money.

A member shall report its financial status to KRX by submitting the reports on net operating capital ratio, business reports and financial statements. In case where a member's net capital ratio or net worth falls below or may possibly fall below the ratio of the admission criteria, the concerned member shall submit a daily report on the amount entrusted by customers, the amount receivable from customers, the changes in valuation profit and loss, etc. KRX may request such member to increase the capital or dispose the assets pursuant to Article 30 of the Membership Regulation. In addition, regular monitoring is carried out using the settlement risk management system.

#### <Participation requirements for OTC derivatives clearing>

- > **(Qualifications of a member)** Only the entities that have been authorized for OTC derivatives trading business are allowed to become an OTC derivatives clearing member of KRX. Among business entities subject to clearing, those that are not the clearing member of KRX might participate in OTC clearing by entrusting clearing of transactions to a general clearing member. Through this, KRX provides all market participants with fair and open access. Details on clearing member admission are stipulated in Articles 10 and 11 of the OTC Clearing Regulation. The OTC derivatives market is considered to be more risky than the ETP markets, so the qualifications for OTC clearing membership are relatively stringent. To be specific, OTC clearing members are required to meet the following criteria.

## &lt; Criteria for OTC clearing member admission &gt;

Items	General clearing member	Proprietary clearing member
<b>Common requirements</b>	It shall be authorized for investment trading business of OTC derivatives	
<b>Financial Status</b>	<b>(1) Equity capital</b> - no less than 500 billion KRW	(1) Equity capital - no less than 50 billion KRW
	<b>(2) Capital ratio</b> - <b>(banks)</b> above the ratio stated in Article 34(1)(i) of the Regulation on Supervision of Banking Business - <b>(non-banks)</b> above the ration stated in Articles 166-2(1)(iii) of the Act and Appendix 10-2(1)(a) of the Regulation on Financial Investment Business	
<b>Facilities</b>	It shall be equipped with equipment and facilities necessary for the efficient accomplishment of tasks of clearing member	
<b>Human resources</b>	It shall have human resources sufficient to carry out the tasks of clearing member in a reliable and efficient manner	
<b>Social credibility</b>	It shall not have been imposed by the FSC any measures heavier than the suspension of investment trading business of OTC derivatives of which the underlying asset is an interest rate.	

> **(Management of a member's settlement risk)** KRX monitors if members comply with the criteria including the maintenance requirements for OTC clearing membership qualifications. For this, the OTC Clearing Regulation stipulates the members' obligations to report financial conditions and other important matters<sup>30)</sup> (Articles 35 and 36), KRX's power to require members to verify the matters that have a material influence on the financial status of members (Article 72), actions against members that do not meet requirements for the OTC clearing membership, etc.(Articles 40 through 44).

30) Insolvency, dishonor of a bill or check, suspension of transaction with bank, initiation of rehabilitation procedures, an application for bankruptcy, etc.

Actions against clearing members include expulsion from the membership, suspension of membership or clearing participation, imposition of fine less than 1 billion KRW, notice of warning and notice of caution (Article 40 of the OTC Clearing Regulation). These actions are determined by the resolution of the BOD<sup>31)</sup> and are publicly disclosed when they are taken.

31) Some actions are resolved by the Market Supervision Committee under Article 402 of the FSCMA



**Principle 19: Tiered participation arrangements**

An FMI should identify, monitor, and manage the material risks to the FMI arising from tiered participation arrangements.

## Summary narrative

**<Meaning and risks of tiered participation>**

Tiered participation arrangements mean relationships between an FMI and a party which is not directly bound to the FMI Regulations but of which the transactions are cleared, settled and recorded by the FMI<sup>32)</sup>. Risks related to tiered participation arise in case where the trading volume of an indirect participant is larger than that of a direct participant or rules and procedures regarding an indirect participant's default isn't established.

32) Examples> **(ETP)** A customer ↔ A clearing member ↔ KRX

**(OTC derivatives)** A client ↔ A clearing member ↔ KRX

**<Management of tiered participation risks in ETP clearing>**

KRX is aware of tiered participation risks, and clearly defines the measures and procedures to manage indirect participants' risks in the Business Regulations. When a customer (indirect participant) enters into an agreement for opening a trading account with a member (direct participant), he/she has to endorse a 'Service Agreement' including matters below (Article 78 of the KOSPI Regulation, Article 111 of the Derivatives Regulation);

※ **Matters to be stipulated in the Service Agreement**

- > Matters stating that, when trading in the Market, the customer shall comply with the relevant laws, decrees, regulations governing businesses of the Exchange and other measures of the Exchange
- > Matters relating to the members' refusal to receive an entrustment of order or any restriction that the member may impose on order entrustment

- > Matters relating to the collection of good faith deposit
- > Matters relating to the measures to be taken in the case of non-fulfillment of settlement obligations
- > Other matters to be deemed necessary

A clearing member may collect good faith deposit to prepare for a customer's non-fulfillment of settlement obligations in accordance with KRX's Business Regulations and the Service Agreement. In the event of a customer's settlement failure, the clearing member can take necessary actions for the fulfillment of settlement obligation.

Although a member may autonomously determine the rate and collection method of the good faith deposit, its rate shall be within 1.5 times the member margin rate in the derivatives market as stipulated in the Guideline for Management of Margin Rate in the Derivatives Market. KRX helps members to manage customer's collateral by prescribing the assessment (haircut) ratios of substitute securities to be deposited as customer margin.

In the Derivatives Market, KRX has an additional system to manage customer risks. The qualified institutional investors, which are subject to ex-post customer margin, are required to keep the risk exposure amount within the "risk exposure limit"<sup>33)</sup>, which shall not be larger than five times the total deposit amount. When the risk exposure amount of a qualified institutional investor exceeds the risk exposure limit, the member shall inform such fact to its customer without delay (Article 133 of the Derivatives Regulation). Moreover, KRX monitors the account of a customer which has a lot of settlement amount by monitoring the open interest and margin for each account.

33) The maximum risk exposure amount that the customer can hold during the session for each ex-post customer margin account

### <Management of tiered participation risks in OTC derivatives clearing>

A business entity, which is subject to clearing but isn't a clearing member of KRX, is able to participate in OTC clearing as a client (indirect participant) who entrusts clearing of transactions to a general clearing member (direct participant). In case of intending to accept the clearing entrustment from a client, a general clearing member shall enter into a written Clearing Entrustment Agreement. Pursuant to Article 54 of the OTC Clearing Regulation, when a member intends to execute a clearing entrustment agreement or to change the details thereof, it shall notify such details to KRX at least ten business days in advance.

As being exposed to credit risk like a member, a client is obliged to deposit to the clearing member client margin calculated for each client's account. In addition, a clearing member has to manage its holding size of cleared transactions not to exceed the "position limit ratio(20%)"<sup>34)</sup> based on the contract amount or net exposure member margin.

34) **(position limit ratio based on contract amount)** the ratio of total contract amount of cleared transactions of the concerned clearing member to the total contract amount of cleared transactions of all clearing members

**(position limit ratio based on net exposure member margin)** the ratio of net exposure member margin of the concerned clearing member to the net exposure member margin of all clearing members

If a client has failed to fulfill its settlement obligation or to deposit the client margin, or there is concern that the client may fail to fulfill its settlement obligations, an entrusted clearing member may take measures including the suspension of delivery of payments that the client is expected to receive from the member, restriction of entrustment of clearing transactions, closing out the client's clearing transactions, etc (Article 105 of the OTC Clearing Regulation). Additionally, a member shall reject the request for clearing entrustment if the client's total deposit is less than the amount of client margin or if there has been the client's settlement failure (Article 62 of the OTC Clearing Regulation).

**Principle 20: FMI Links**

An FMI that establishes a link with one or more FMIs should identify, monitor, and manage link-related risks

## Summary narrative

**<Links with KSD>**

The FSCMA states that KRX acts as a clearinghouse for the securities markets and the listed derivatives market, and that KSD acts as a settlement institution for the securities markets. In addition, the FSCMA stipulates the business areas and roles of the CCP (KRX) and the CSD (KSD). The detailed matters necessary to perform businesses of both KRX and KSD are specified in their own regulations as delegated by the FSCMA. In order to prevent link-risks that might arise from discrepancies between rules and regulations of both institutions, KRX and KSD shall take prior cross-checks before amending their regulations.

**<Computer system links>**

By nature, computer systems of KRX and KSD are connected to each other. When KRX determines the settlement securities and amounts by carrying out netting, and transmits the settlement details via its clearing and settlement system, they are notified to the settlement system of KSD (SAFE+). KRX monitors the extent of settlement fulfillment on a real-time basis using its system, and takes appropriate measures in the event of settlement delay or settlement failure.

KRX has also established a link with KSD for the collateral management including member margin. For cross-checking credit and liquidity risks in the post-trade process, KRX conducts real-time monitoring of collateral through both institutions' systems. KRX's regulations clearly define the scope of a link related to collateral by stating that the deposit of substitute securities shall be made in such manner that KRX attains the right of pledge for the deposited securities which have been registered in the depositor account in KSD, and the withdrawal shall be made by way of terminating the concerned right of pledge (Article 91(1) of the Derivatives Regulation and Article 85(1) of the OTC Clearing Regulation).

KRX has also established a link with the BOK, and is closely collaborating with it for the stability of settlement. KRX makes use of intraday Repo arrangements with the BOK for liquidity provision in government bonds. In addition, KRX conducts money settlements in BOK's funds in stocks, government bonds and Repo.

When necessary, all of the FMIs concerned (KRX, KSD and the BOK) are involved in improving the clearing and settlement systems. Through sufficient testing prior to opening the systems, KRX mitigates risks that might occur from the process of the link between FMIs.



**Principle 21: Efficiency and effectiveness**

An FMI should be efficient and effective in meeting the requirements of its participants and the markets it serves.

## Summary narrative

**<Communications with market participants>**

As one of the core financial infrastructures in Korea, KRX aims to promote the stability and efficiency of the Korean financial market.

For this, KRX makes an effort to listen to and communicate with the market participants. Especially when intending to amend its regulations and introduce or change its clearing and settlement system, KRX holds a meeting with the industry and an open seminar for the market participants, thus trying to accept the participants' needs. For example, in March 2013, KRX made up a task force team for OTC derivatives clearing services in collaboration with the industry, checked the readiness of opening of OTC clearing, and reflected the opinions of the market participants.

On top of that, KRX has set up the Clearing and Settlement Committee composed of specialists such as professors and industry representatives, and the consultative body comprised of working-level settlement officials of its member companies.

**<Framework for reviewing the efficiency and effectiveness>**

In order to assess the efficiency and effectiveness of the clearing and settlement function of KRX, the internal audit is annually conducted by the Audit Committee. KRX is obliged to undergo assessments of the adequacy of the business performance by the FSC, and the FSS. Regarding the observance of the international standards such as PFMI as a CCP, KRX is assessed by the international organizations including IMF.

**Principle 22: Communication procedures and standards**

An FMI should use, or at a minimum accommodate, relevant internationally accepted communication procedures and standards in order to facilitate efficient payment, clearing, settlement, and recording.

## Summary narrative

**<ETP clearing>**

KRX currently uses the self-developed communication standard (KRX Message Protocol) in exchanging and transmitting data and information on clearing and settlement with KSD and the BOK in ETP clearing. The reason why KRX has not adopted an internationally used standard (SWIFT, FIX, etc.) in ETP clearing is because of cost-efficiency considerations. The self-developed standard is technologically compatible with the internationally used ones, though it may incur relatively less costs in operating relevant systems. Nonetheless, KRX is fully aware that an internationally accepted communications standards are used in the OTC derivatives clearing, and that it is likely for global CCPs to introduce the clearing linkage for the cross-border trades of OTC derivatives. So KRX is reviewing the need for the introduction of the international communication standard such as SWIFT, etc. in ETP clearing in the future.

**<OTC derivatives clearing>**

Due to the nature of OTC derivatives products and clearing participants, it is necessary to exchange transactions information between the CCP and a multinational financial institution through an internationally accepted communication standard. Therefore, KRX has developed an interface with MarketSERV (which operates the transaction verification system for OTC derivatives clearing) using FpML, so that a number of foreign banks using the system of MarkitSERV could handle clearing and settlement process.

※ **FpML**(Financial products Markup Language)

- > A business information exchange standard that the ISDA established for electronic dealing and processing of financial derivatives instruments
- > **(Businesses subject to FpML)** Confirmation, Reporting, Transparency, Recordkeeping
- > **(Products subject to FpML)** IRD, CD, Equity, Commodities, FX, Bond Option, Loan
- > After being initially established in November 14, 2001, the version 5.7 of FpML is now used.



**Principle 23: Disclosure of rules, key procedures, and market data**

An FMI should have clear and comprehensive rules and procedures and should provide sufficient information to enable participants to have an accurate understanding of the risks and fees and other material costs they incur by participant in the FMI. All relevant rules and key procedures should be publicly disclosed.

## Summary narrative

**<Establishment and amendment of the Business Regulations>**

When establishing and amending regulations on CCP business, KRX collects the opinions of the relevant parties such as market participants, relevant industry groups, etc. Thereafter, regulations are formulated and amended through the internal reviews of the Legal Department, Risk Management Department and the Audit Department, resolutions of the Market Committees, and the final approval of the FSC.

**<Development of the computer system>**

KRX makes an effort to reflect the needs of the industry when planning to develop the systems related to its businesses. When necessary, KRX provides training to staff of its members on the overall operation of its systems including the trading system, listing and disclosure system, clearing and settlement system, and market oversight system.

**<Disclosure of rules and procedures>**

When there is a change or an amendment of the regulations, policies and systems on KRX's businesses, KRX discloses the related matters through press release, open seminars, etc. To provide the detailed information for each business sector, KRX has opened and is operating about 30 sub-pages<sup>35)</sup> other the main website(www.krx.co.kr).

<sup>35)</sup> otcccp.krx.co.kr, kind.krx.co.kr, etc.

For the convenience of foreign users, KRX is operating an English website (eng.krx.co.kr), on which the rules, regulations and guidelines of KRX are made public. However, there are some regulations and guidelines that are not publicly available in English, mainly because they're on internal procedures, so there have not been

demands of such regulations and guidelines from the external parties.

In order for the members and investors to easily contact with teams and the staff of KRX in charge of each businesses, KRX also provides the contact information on its website.

**<Disclosure of market data and fees>**

KRX disseminates market data of all products traded in its markets (stocks, derivatives, ETF, ELW and bonds, etc.) via its website. To provide broad and in-depth information to market participants, KRX has especially opened the Internet Portal for Financial Market Statistics ([stats.krx.co.kr](http://stats.krx.co.kr)) where one can search for statistics and data on KRX's products.

For the services which KRX provides to market participants, it charges fees including transaction fees, clearing & settlement fees, process fees and listing fees. The rates are determined by the BOD of KRX after going through a deliberation of the government authorities. Current rates and fees are open to the public on KRX's website.

On top of that, in the 4th quarter of 2014, KRX has established a plan for the disclosure of quantitative information in line with the relevant international guidelines and to start disclosing key information including various test results, statistics of financial safeguards, etc.

## V. List of publicly available resources

### 1. General description of KRX and its markets

NO.	Rules & Regulations
1	Articles of Incorporation
2	KOSPI Market Business Regulation
3	Enforcement Rules of KOSPI Market Business Regulation
4	KOSDAQ Market Business Regulation
5	Enforcement Rules of KOSDAQ Market Business Regulation
6	Derivatives Market Business Regulation
7	Enforcement Rules of Derivatives Market Business Regulation
8	OTC Derivatives Clearing Business Regulation
9	Enforcement Rules of OTC Derivatives Clearing Business Regulation
10	Regulation on Operation of the Board of Directors
11	Regulation on operation of Audit Committee
12	Regulation on Function of Audit Committee
13	Enforcement rules of Regulation on Function of Audit Committee
14	Membership Regulation
15	Criteria for Member Admission
16	Guideline for Managing Margin Rate in the derivatives Market (Korean Version available only, KRX is working on English Version)

## 2. Available resources in publication (provided by request)

NO.	Rules & Regulations
1	Risk Management Regulation
2	Enforcement Rules of Risk Management Regulation
3	Regulation on Operation of Risk Management Committee
4	Guideline for Use of Financial Resources for Providing Liquidity
5	Guideline for Management of Joint Compensation Fund
6	Guideline for Management of Settlement of Settlement Reserve
7	Regulation on Asset Management
8	Guideline for the Business Day Announcement (OTC Derivatives Clearing)
9	Guideline for the Operation of the KRX Trade Confirmation System (OTC Derivatives Clearing)
10	Guideline on Calculating the Capital Requirements for Default Fund Exposures (OTC Derivatives Clearing)

