THAILAND

SELF-ASSESSMENT OF OBSERVANCE OF THE CPSS-IOSCO PRINCIPLES FOR FINANCIAL MARKET INFRASTRUCTURES — BAHTNET

December 2024

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Glossary

AG	BAHTNET Advisory Group
API	Application Program Interface
BAHTNET	Bank of Thailand Automated High Value Transfer Network
BCM	Business Continuity Management
BCP	Business Continuity Plan
BOT	Bank of Thailand
BOTAC	Bank of Thailand Audit Committee
BOTB	Bank of Thailand Board
BOT-CMF	Bank of Thailand-Collateral Management Facilities
BOT-RMS	Bank of Thailand-Risk Management System
BPD	Banknote and Payment Management Department (BAHTNET Operator)
CCP	Central Counterparty
CCPMP	Cross Currency Payment Matching Processor
COSO ERM	COSO Enterprise Risk Management
CPMI	Committee on Payments and Market Infrastructure
CSA	Control Self-Assessment
CSD	Central Securities Depository
CSS	Central Settlement System
DA	Derivatives Act
DC	Data Center
DvP	Delivery Versus Payment
DLT	Distributed Ledger Technology
ECH	Electronic Clearing House
EFS	Electronic Financial Services
EMEAP	Executives' Meeting of East Asia and Pacific Central Banks
ERD	Enterprise Risk Management Department
FMI	Financial Market Infrastructure
FOG	Financial Markets Operations Group
FRD	Financial Risk Management Department
FX	Foreign exchange
HKICL	Hong Kong Interbank Clearing Limited
HKMA	Hong Kong Monetary Authority
HSBC	Hongkong and Shanghai Banking Corporation
HTTPS	Hyper Text Transfer Protocol Secure
IAD	Internal Audit Department
ICAS	Imaged Cheque Clearing and Archive System
ILF	Intraday Liquidity Facilities
IOSCO	International Organization of Securities Commissions

ISIN	International Securities Identification Number
ISMS	Information Security Management System
IT	Information Technology
ITD	Information Technology Department
IWT	Industry Wide Test
KC	Key Consideration
KPI	Key Performance Indicator
KRI	Key Risk Indicator
MAI	Market for Alternative Investments
MFT	Multilateral Funds Transfer
MOU	Memorandum of Understanding
NITMX	National ITMX
ORFT	Online Retail Funds Transfer
OTC	Over-The-Counter
PDP	Potential Debit Position
PFMI	CPSS-IOSCO Principles for Financial Market Infrastructures
PID	Payment Infrastructure and Services Strategy and Development Department
PIG	Payment Infrastructure and Services Group
POC	Proof of Concept
PKI	Public Key Infrastructure Technology
PS	Payment Systems
PSA	Payment Systems Act
PSC	Payment Systems Committee
PSD	Payment Systems and Financial Technology Policy Department (BAHTNET regulator)
PSSVFO	Payment Systems and Stored Value Facilities Ordinance (Hong Kong)
PTI	Post Trade Integrate System
PvP	Payment versus Payment
RCSA	Risk Control Self-Assessment
RDL	RTGS-DVP Linkage
Repo	Repurchase Agreements
RMC	Risk Management Committee
ROC	Risk Oversight Committee
RPO	Recovery Point Objective
RTGS	Real-Time Gross Settlement System
RTO	Recovery Time Objective
SEA	Securities Exchange Act
SEC	Securities and Exchange Commission
SET	Stock Exchange of Thailand
SFI	Specialized Financial Institutions
SI	Settlement Institutions
SIPS	Systemically Important Payment Systems
SLA	Service Level Agreement

SOE	State-Owned Enterprises
SRS	Securities Requirement for Settlement
SSS	Securities Settlement System
STP	Straight Through Processing
SWIFT	Society for Worldwide Interbank Financial Telecommunication
SWIFT BIC	SWIFT Bank Identifier Code
SWIFT CSP	SWIFT Customer Security Program
SWIFTNet	SWIFT Network
TBA	Thai Bankers' Association
TCH	Thailand Clearing House Co., Ltd.
ThaiBMA	Thai Bond Market Association
THB	Thai Baht currency
TSD	Thailand Securities Depository Co., Ltd.
UAT	User Acceptance Test
USD	US Dollar currency
USD CHATS	US Dollar Clearing House Automated Transfer System
VA	Vulnerability Assessment
VAR	Value at Risk
VPN	Virtual Private Network

EXECUTIVE SUMMARY

This publication is the self-assessment for BAHTNET against the Principles for Financial Market Infrastructures (PFMI). The self-assessment is conducted as of December 2024 which is the third self-assessment after the Bank of Thailand (BOT) completed the FSAP mission in November 2018[1].

Changes to BAHTNET since the latest assessment

- **Annual BAHTNET Business Continuity Testing -** To ensure BAHTNET's continued operation during disruptions, an annual test is conducted, involving the switch from the main operational site to the backup sites. In 2023 and 2024, these tests simulated scenarios of ransomware attacks and bomb threats, which could significantly disrupt 'critical level 1 operations' and necessitate a site switch. The results of these tests demonstrated the Bank of Thailand's (BOT) ability to execute its emergency plan and BAHTNET could recover and return to its operation within two hours.
- **Assessment of stakeholders' Readiness for default scenario -** BOT and BAHTNET participants conducted a test on default scenarios as required by the BOT Regulation No.Sor Ror Khor. 1/2561 on Highly Important Payment System's Participant Default Rules and Procedures in the second quarter of each year. These tests employ a rotating methodology: internal table-top and external surveys (S), table-top exercises (M), and full-scale exercises on Industry Wide Test (IWT) environments (L). In 2023, a full-scale (L-size) IWT exercise was conducted with participant involvement. Conversely, 2024 featured the S-size with an internal BOT table-top exercise, supplemented by participant surveys, to assess process knowledge and understanding. Results from both years confirmed that all BAHTNET participants possess adequate procedures for handling default scenarios.
- **BAHTNET Offline (BNO) Project and BAHTNET Lite Implementation -** BOT has implemented a comprehensive Business Continuity Plan (BCP) for a total failure scenario. This plan centers on the BAHTNET Offline (BNO) Project, which features BAHTNET Lite, an operational tool designed for emergency use when all three of primary and backup sites are compromised. After tested with all BAHTNET members, BAHTNET Lite is now ready for operation. To ensure consistent implementation, in 2023, the BOT issued "Guideline for Operation in Case of Total Failure of BAHTNET System (BAHTNET Offline: BNO) using BAHTNET Lite system." This guideline provides BAHTNET members with standardized procedures for activation, operation, and recovery during and after a BNO event.
- **BOT's Revised Collateral Requirements for BAHTNET -** BOT has issued a circular amending its regulations and Notification concerning the use of debt instruments as collateral within the BAHTNET system. These amendments introduce additional conditions for liquidity collateral in BAHTNET, stipulating that eligible debt instruments must not be issued or guaranteed by the lending financial institution itself. Furthermore, the definition of debt instruments issued by state enterprises has been revised. These changes aim to align with international standards

[1] The first self-assessment was conducted as of December 2020

and the BOT's open market operations collateral acceptance criteria and to mitigate credit risk associated with financial institutions.

- **Conceptual Study for Automated Collateral in BAHTNET -** The BOT has initiated a conceptual study for an automated collateral management system to minimize participants' opportunity costs. To optimize this function, the BOT is actively exploring various models, including automated partial selling of intraday liquidity facilities (ILF) and collateral pooling. Discussions with participants revealed a strong preference among larger institutions for a fully automated process that eliminates the need for manual intraday liquidity management throughout the day. The BOT will synthesize the study's findings and integrate this innovation into the planned BAHTNET Modernization project, scheduled for implementation in 2029.
- **Mitigation of FMIs Interdependency Risks -** To mitigate risks related to interdependencies among Financial Market Infrastructures (FMIs), as recommended by the FSAP, the Bank of Thailand (BOT) and Thailand Clearing House (TCH) have developed and tested offline systems and processes to ensure service continuity in dual disruption scenarios. A joint test conducted in Q3 2024 successfully demonstrated TCH's ability to transition to its CCP Offline (CCPO) system and BAHTNET's operation via BAHTNET Offline (BNO), confirming their capacity to maintain critical services despite a simulated simultaneous failure.
- **BOT Reorganization 2024** - In 2024, the Bank of Thailand (BOT) reorganized its Payment Infrastructure and Services Group to enhance BAHTNET's efficiency and risk management through a refined three-lines-of-defense model. This involved splitting the former Payment and Bond Department into: 1) the Banknote and Payment Management Department (BPD) as the 1st-line BAHTNET operator, and 2) the Payment Infrastructure and Service Strategy and Development (PID) as the 1.5-line for development and risk control. The Enterprise Risk Management Department (ERD) serves as the 2nd line, and the Internal Audit Department (IAD) functions as the 3rd-line BOT auditor.
- **Annual Independent Review of Haircuts -** Beginning in December 2020, BOT implemented an internal independent review process for haircuts. The Financial Risk Management Department establishes the methodology and procedures, while the Enterprise Risk Management Department conducts annual reviews and tests. The most recent review and test, completed in November 2024, involved adjusting the haircut calculation method to better reflect current market conditions and align with international standards.
- **Securities Protection at TSD -** Thailand Securities Depository Company Limited (TSD) enhances safeguards for the securities balances of participants and investors held by TSD, clarifying ownership rights and bolstering asset protection in the event of TSD insolvency. In December 2024, the draft amendments to the Securities Act regarding above protection received approval from the Council of State and are currently undergoing public consultation prior to submission to the Cabinet for legal endorsement.
- **The BAHTNET NextGen Project –** BOT is undertaking the BAHTNET NextGen project to improve the BAHTNET system's stability and reduce dependence on international networks by developing an API-based domestic network. This project, divided into three phases, aims to enhance resiliency using API technology (2024 - 2027), strengthen infrastructure components (2025), and modernize BAHTNET's functionality (2026 – 2029).

SELF ASSESSMENT REPORTS

A. BAHTNET assessment against the PFMI

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.	
Key consideration 1	**The legal basis should provide a high degree of certainty for each material aspect of an FMI's activities in all relevant jurisdictions.**
Description	The material aspects of BAHTNET's activities that provide a high degree of legal certainty to achieve finality, irrevocability, and to mitigate systemic risks that could pose to the country's payment systems are as follows: **Designation of BAHTNET as Highly Important Payment System** Section 44 of the Bank of Thailand Act B.E. 2485 (1942) and the amendments (BOT Act) empowers the BOT to establish and operate the payment systems including conduct any activities in accordance with the rules and regulations specified by the BOT to maintain payment system stability. The Payment Systems Committee (PSC) is established under Section 28/12 of the BOT Act to formulate the policies relating to payment systems under the BOT supervision and interbank clearing system with an aim to maintain the country's payment system efficiency and stability. The PSC is also responsible for monitoring and overseeing payment systems operated by the BOT. In the PSC meeting No. 3/2556 (2013), BAHTNET is designated as a highly important payment system since it serves as the country's payment system infrastructure for high value interbank payment system among participants, which, if disrupted, could pose systemic risk to the country's payment systems. BAHTNET is designated as a highly important payment system under the Payment Systems Act B.E.2560 (PSA) which has clear provisions on settlement finality protection as well as collateral asset protection for transactions settled through BAHTNET. This is to ensure that settled transactions will not be affected from the "zero hour rule" and are irrevocable, in the event of a participant's insolvency. Moreover, the BOT is empowered by Section 7 of the PSA to oversee the highly important

	payment system and to establish rules and regulations to ensure that the system is operated in an efficient, safe and sound manner, including: • Operating procedure as well as rules and regulations regarding settlement finality • Participation access criteria • Right, obligation and responsibility of important payment system operator and participants • Risk management framework • Security framework • Contingency plan • Other matters that the BOT stipulates **Authorization of Participants** The BOT, as the BAHTNET operator, has set out regulations to specify both access and exit criteria for participants. Financial institutions or other institutions that would like to participate in the system must meet the qualifications as specified in the BAHTNET Regulation and Notifications. They have to comply with other requirements such as having appropriate computer systems and business continuity plan (BCP) in line with the acceptable standards as well as having dedicated staffs or relevant experts available to participate in a training or testing arranged by the BOT. The Letter of Agreement for BAHTNET Service Usage signed by participants legally binds participants with the BAHTNET's rules, regulations and operating procedures as specified by the BOT. Moreover, in order to obtain the rights to access BAHTNET functions, participant institutions are required to sign Letter of Agreement to get permission from the BOT to have access to the Electronic Financial Services (EFS), the BOT's financial platform. **Settlement Finality** As an RTGS, funds are immediately transferred to the receiving institution's account as specified in the payment instruction when there is sufficient funds in the sending institution's account. When funds transfer is complete, the transaction is deemed final and irrevocable. Participants cannot revoke the transaction after settlement to ensure that systemic risk will not be posed into the system. Settlement finality is achieved according to Article 40 and 41 of the BAHTNET regulation. Moreover, Section 9 of the PSA provides a comprehensive legislative framework for settlement finality protection. It is stipulated that any funds transfer order, clearing or settlement instruction submitted to BAHTNET before the court's rehabilitation order or the court's receiving order can continue to be processed until the end of day in accordance with the

	systems' rules and regulations. Such transactions are deemed final and irrevocable. **Netting** BAHTNET also provides Multilateral Funds Transfer (MFT) function that allows a number of simultaneous debit/credit funds transfers for daily settlements through Central Settlement System (CSS), which is a sub-system in BAHTNET. The settlement agents (i.e. NITMX, TSD) can submit MFT instructions for settlement of net clearing positions from retail payment systems. The MFT transaction is deemed final and irrevocable. The net clearing positions from retail payment systems are enforceable as it is a result of clearing process, which is done by a payment system provider regulated under the PSA. The "Clearing" means the calculation of the balance of creditor's or debtor's into the final net position of the members of such Payment System Provider. So netting arrangement is recognized under the definition of "Clearing" in PSA. MFT submitted into BAHTNET is regulated under the BOT Regulation and Notifications as follows: • BOT Notification for Multilateral Funds Transfer Service (Sor Ror Khor. 7/2551) • BOT Notification for Multilateral Funds Transfer Service (first amendment) (Sor Ror Khor. 2/2556) • BOT Notification for Multilateral Funds Transfer Service (second amendment) (Sor Ror Khor. 2/2558) • BOT Notification for Multilateral Funds Transfer Service (third amendment) (Sor Ror Khor. 5/2558) • BOT Regulation for Securities Requirement for Settlement (SRS) (Sor Ror Khor. 1/2557) Besides, netting is recognized under Thailand's Civil and Commercial Code B.E. 2486 (1943) as counterparties who have obligations are subject to netting contract that they agree to do, in particular, the netting derived from interbank transactions of securities, equities or retail payments.

	Intraday Liquidity Facilities (ILF) The BOT provides intraday liquidity which is fully collateralized, given that participants can sell their eligible securities in the form of repurchase transactions to the BOT at the beginning of the day to obtain the ILF. By the end of day, participants are required to buy back their securities. Should participants fail to buy back their securities, the ILF will turn to overnight loans with penalty rates. And should participants fail to buy back securities by noon of the next business day, participants will lose the right to buy back and the BOT will seize their securities. ILF aims to ensure sufficient liquidity to smooth daily settlements in BAHTNET. Both direct and associate participants who are financial institutions under the BOT's supervision are allowed to use ILF to support their liquidity management. As ILF is a repo-transaction, it needs legal binding between parties. ILF is regulated under the BOT Regulations and notifications as follows: • BOT Regulation for Intraday Liquidity Facilities (ILF) No. Sor Ror Khor. 2/2552 • BOT Regulation for Intraday Liquidity Facilities (ILF) (Amendment 1) No. Sor Ror Khor. 2/2556 • BOT Regulation for Intraday Liquidity Facilities (ILF) (Amendment 2) No. Sor Ror Khor. 1/2558 • BOT Notification for Other Institutions that could use ILF service No. Sor Ror Khor. 6/2552 • BOT Notification for Guideline for Qualify Bonds Used for ILF Service (Amendment 1) No. Sor Ror Khor. 3/2558 • BOT Notification for Fee and Fine Related to ILF Service No. Sor Ror Khor. 6/2559 • BOT Notification for Required Proportion of ILF to Maintain During the Day No. Sor Ror Khor. 7/2559 • BOT Notification on Additional Criteria on Purchase of Debt Instruments Issued by State-Owned Enterprises or Financial Institutions Established under a Specific Law and the Use of Debt Instruments for which the BOT is Not a Registrar as Collateral No.Sor Ror Khor. 8/2562 Moreover, Section 10 of the PSA provides protection over collaterals that participants reserve for ILF or SRS or any other activities in BAHTNET in case of participant default. Specifically, these collaterals will not be subject to liquidation for paying other debtors so that the BOT can make a claim on these collaterals in the amount equal to the participant's obligations to BAHTNET.

	Arrangement for DvP The DVP linkage is between the BOT and TSD/TCH for government securities and equity settlement. For OTC securities transaction, after participants send their instructions to be matched in the Post Trade Integrate (PTI) system of the SET, TSD will hold those securities and send the funds transfer request to BAHTNET in order to effect the cash leg settlement simultaneously on gross basis. For equity settlement, TSD will hold equity and TCH will send Multilateral Funds Transfer (MFT) to BAHTNET in order to effect cash leg settlement derived from net position of equity trading. The settlements are done on net basis and the transactions are deemed final and irrevocable to ensure that systemic risk will not be posed into the system. For the DvP linkage, securities/equity leg is considered final and irrevocable as stipulated in Clause 57 of the Notification of the Capital Market Supervisory Board No. Tor Thor. 32/2559 Re: Rules, Conditions, and Procedures for Operation of Securities Clearing Houses and Central Securities Depositories. Furthermore, the transactions will be regulated by Article 405.2 (Validity of a Transfer of Securities) of Chapter 400 (Securities Accounts, Deposit, Withdrawal, Transfer and Cancellation of a Deposit of Securities) of the TSD Rule Book. For cash leg, the settlement is deemed final and irrevocable as stipulated in the *BOT Notification for Linkage Service for Securities Settlement*. **Arrangement for PvP** The PvP linkage for Thai Baht - US Dollar settlement is between BAHTNET and the HKMA's USD CHATS for Thai Baht - US Dollar settlement. Once the Thai Baht payment instruction sent to BAHTNET is matched with the US Dollar payment instruction sent to USD CHATS, both transactions will be simultaneously settled in the RTGSs and the transactions are deemed final and irrevocable to ensure that that FX settlement risk is properly mitigated. In addition to relevant domestic jurisdictions, there is one overseas jurisdiction involved in PvP linkage between BAHTNET and Hong Kong's USD CHAT for FX settlement. The PvP – US Dollar transaction is deemed final and irrevocable according to the HKMA's legal framework as stated in the Payment Systems and Stored Value Facilities Ordinance (PSSVFO - Chapter 584 of the Laws of Hong Kong). The PvP – Thai Baht transaction is deemed final and irrevocable according to the *BOT Notification*

	No. Sor Ror Khor. 4/2557 *(Article 5.2.4) for Linkage between BAHTNET and USD CHATS for FX settlement.* In addition, the MOU on cooperative oversight between the BOT and HKMA addresses material aspects of BAHTNET's activities via the linkage, including responsibilities, cooperation, communication, incident handing and crisis management. For example, when an incident such as operation or network disruption occurs, the incident's root cause will be analyzed and information regarding the cause, resolution and prevention methods will be shared with the other authority. **Participant Default** If a participant appeals or is appealed to the court for rehabilitation, Section 8 of the PSA stipulates that the participant promptly notify the BOT and the BOT will notify other participants in accordance with the rules and procedures prescribed by the BOT. The BOT Regulations and Notifications related to participant default also stipulate actions to be taken by the BOT and the defaulting participant. Additionally, Section 9 of the PSA requires that, in case of participant bankruptcy, transactions submitted by that participant before the court's bankruptcy order can continue to be processed until the end of day in accordance with the systems' rules and regulations. These transactions are deemed final and irrevocable. **TSD Default** To ensure operational resilience, even under stressed conditions like TSD bankruptcy, the BOT and TSD have developed a robust and adaptable collateral management system. Besides the strong system, amendments to the Securities Act (Sections 223/5 and 225) provide enhanced safeguards for participant and investor securities held by TSD, clarifying ownership rights and bolstering asset protection during insolvency. The draft amendments, having received Council of State approval in December 2024, are now in public consultation prior to Cabinet submission for legal endorsement. **Additional Information** **Authority of the BOT to operate payment systems** The BOT's responsibilities as the BAHTNET regulator and operator are specified in the BOT Act in:

	• Section 7 and 8(6) - Authority to operate and conduct any activities to maintain payment system stability • Section 17(4) – Authority to establish committees to designate the policy for each aspect of financial services including payment systems • Section 28/11 and 28/12 – Authority to establish Payment Systems Committee (PSC) • Section 44 and 45 – Responsible to support the establishment of payment systems **Applicability of BAHTNET regulations** By virtue of Section 5, 28, and 40 of the BOT Act, BAHTNET regulation B.E. 2549 (2006) was issued to facilitate services available therein so as to ensure common understanding among all concerned towards the operational process in the BAHTNET system. **Others** Contracts and agreement between the BOT and BAHTNET participants are binding under Thailand's Civil and Commercial Code B.E. 2486 (1943) – Contract and Agreement BAHTNET is subject to Thai laws. For settlement of Thai Baht – US Dollar transaction via the Payment Versus Payment linkage between BAHTNET and HKMA's USD CHATS, the transactions are deemed final and irrevocable: the Thai Baht leg is considered final in Thailand as specified by the PSA, while US Dollar leg is considered final in Hong Kong as specified by the HKMA's Payment Systems and Stored Value Facilities Ordinance. The PSA and legal framework related to BAHTNET provides a high degree of legal certainty for each material aspect of BAHTNET's activities. For legal basis on netting arrangement and settlement finality, please see below. 1. The legal basis that supports enforceability of netting arrangement in BAHTNET is governed under Section 9 of the PSA. Finality of MFT is enforced under Article 13 of the *BOT Notification for Multilateral Funds Transfer Service (Sor Ror Khor. 7/2551)* which specifies that MFT instructions via the Central Settlement System are complete once the BOT debits or credits funds to deposit accounts of the sending / receiving institutions according to the amount specified in the MFT instructions. 2. The legal basis that supports finality of BAHTNET transactions is governed under the following provisions:

	• Settlement finality is achieved in accordance with Article 40 and 41 of the BAHTNET regulation which specifies that funds transfer via BAHTNET are complete once the BOT debits funds from an account of the transferring institution and credits funds to an account of the receiving institution. When funds transfer is completed, the transferring institution cannot revoke the transfer. In addition, Section 9 of the PSA stipulates settlement finality to transactions settled in BAHTNET. In case of participant's bankruptcy, the transactions submitted by that participant before the court's bankruptcy decision can continue to be complete until the end of day. These transactions are deemed final and irrevocable.
Key consideration 2	**An FMI should have rules, procedures, and contracts that are clear, understandable, and consistent with relevant laws and regulations.**
Description	BAHTNET rules and regulations are issued by the BOT. Participants have to sign the Letter of Agreement for BAHTNET Service Usage to legally bind themselves by the rules, regulations and procedures as specified by the BOT. Relevant laws and regulations are clearly stated and understandable with definitions and concepts of the terms, and are legally in effect according to the domestic legal framework. Furthermore, relevant regulations and notifications are written in a clear and transparent format which includes objective of the regulations/notifications, legal power, amendment or cancellation of the previous regulations/notifications (if any), scope, content, transitional provisions (if any) and effective date, respectively. Prior to release of a regulation or notification, the BOT will arrange consultation session with stakeholders including the BAHTNET AG (Advisory Group) and participants' representative to elaborate the objectives of the relevant regulation and take comments and concerns from the participants to further improve the regulation or notification. In addition, the BOT will arrange a consultation session with the internal Legal Department to obtain legal opinion before proposing the final draft of regulation or notification to seek final approval from top management. After that, the BOT will disclose and publish the regulation or notification on the BOT website (www.bot.or.th), as well as circulate the letter to all participants. Modifications of relevant rules and regulations are promptly notified to participants through circular letters and are published on the BOT website[2].

[2] Rules, regulations and guidelines in general are publicly disclosed on the BOT Website (www.bot.or.th) under topic - Our Roles → Payment Systems → BAHTNET → BAHTNET related services

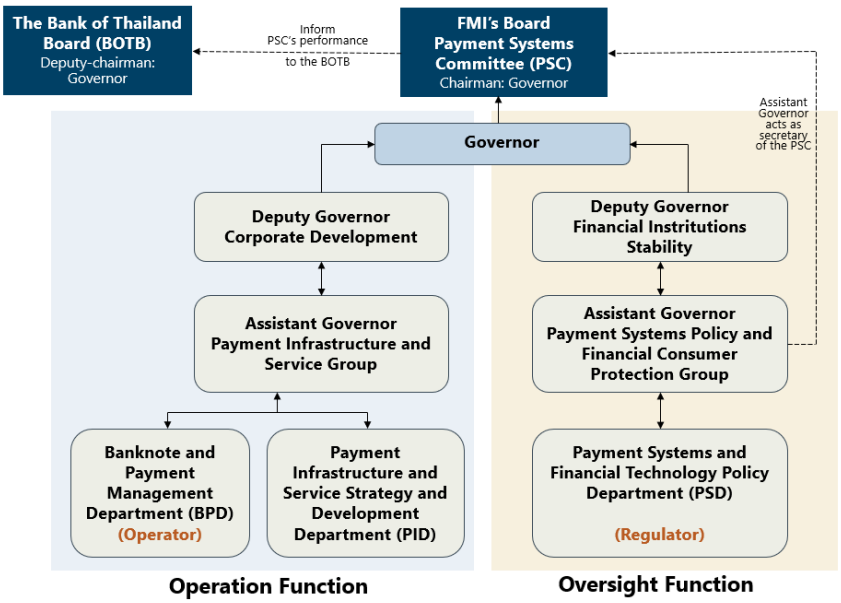
	During the drafting of rules, procedures and contracts, the BOT regularly consults with the internal Legal Department to seek legal opinion in order to ensure consistency with relevant laws and regulations. Moreover, the BOT hosts meetings and hearing sessions with participants to obtain their comments and concerns before issuing the regulations. The Internal Audit Department is also responsible for reviewing the rules, procedures and contracts to be in line with the BOT's responsibilities. After hearing sessions with participants, rules, procedures and contracts will become in effect when they get approval by the BOT's top management. The approval processes are as follows: 1) For new regulations or notifications, the final draft will be reviewed and approved by the BOT Governor. 2) For circular letter and operating guidelines, the final draft will be reviewed and approved by BPD/PID senior director.
Key consideration 3	**An FMI should be able to articulate the legal basis for its activities to relevant authorities, participants, and, where relevant, participants' customers, in a clear and understandable way.**
Description	Section 44 of the Bank of Thailand Act B.E. 2485 (1942) and the amendments explicitly grants the Bank of Thailand the authority to establish and operate payment systems. This includes the power to undertake any activities necessary to maintain payment system stability. Furthermore, Section 28/12 of the BOT Act establishes PSC. The PSC is responsible for formulating policies related to payment systems under the BOT's supervision. The primary objective of the PSC is to ensure the efficiency and stability of Thailand's payment system. The PSC also has the responsibility of monitoring and overseeing payment systems operated by the BOT.
Key consideration 4	**An FMI should have rules, procedures, and contracts that are enforceable in all relevant jurisdictions. There should be a high degree of certainty that actions taken by the FMI under such rules and procedures will not be voided, reversed, or subject to stays.**
Description	*Enforceability of rules, procedures and contracts* BAHTNET participants are subject to Thai laws. The BOT seeks legal advice from the internal Legal Department and arrange hearing sessions when drafting the rules, procedures and contracts as well as consult the industry before putting them into effect. For linkage with other jurisdiction, the rules, procedures and contracts related to its operations are enforced under that jurisdictions' laws. For example, the rules and procedures to process PvP transaction in THB is subject to the BOT Notification No. Sor Ror Khor. 4/2557 whereas the rules

	and procedures to process PvP transaction in USD is subject to the provision as stated in the HKMA's Payment Systems and Stored Value Facilities Ordinance (PSSVFO). There is no circumstance that BAHTNET's actions under its rules, procedures or contracts could be voided or reversed since they are enforced under relevant laws. Moreover, to achieve a high degree of certainty, the enacted Payment Systems Act contains provisions about oversight and supervision information for payment systems and services, especially the section about payment finality. The PSA has come into effect since 16th April 2018. No court has ever held any of the BAHTNET activities under its rules and procedures to be unenforceable. Also, there has been no precedent transactions settled in BAHTNET being challenged in a court.
Key consideration 5	**An FMI conducting business in multiple jurisdictions should identify and mitigate the risks arising from any potential conflict of laws across jurisdictions.**
Description	At present, BAHTNET is not conducting business in multiple jurisdictions, with only bilateral linkage with Hong Kong jurisdiction. In 2014, the BOT signed the license agreement with HKMA for usage of the THB Cross Currency Payment Matching Processor (CCPMP) to facilitate the matching of PvP transaction between BAHTNET and USD CHATS. Furthermore, in 2017, the formal MOU was signed by the BOT and HKMA for FX settlement via linkage with USD CHATS. The MOU addresses all material aspects of BAHTNET's activities in the context of responsibilities, cooperation, communication, incident handling and crisis management. The MOU also facilitates the BOT and HKMA to have dialogue and share information for conducting cooperative oversight of the linkage with an aim to ensure safety, reliability and efficiency of the PvP link.
Key conclusions	The BOT Act, the Letter of Agreement for BAHTNET Service Usage signed by participants to comply with BAHTNET regulations, and the PSA articulate the legal basis for the material aspects of BAHTNET activities. The rules and regulations are revealed to participants and the public in a clear and understandable manner. They are enforceable and are in accordance with relevant laws. BAHTNET rules, procedures and contracts have never been subject to any judicial controversy and have not been voided or unenforceable by any jurisdiction. For the PvP linkage with the HKMA, the rules, procedures and contracts related to its operations are enforced under each jurisdictions' laws.

	The Payment Systems Act has come into effect since April 16, 2018. It consists of provisions about oversight and supervision information for payment systems and services, with the explicit provision on payment finality and protection of collaterals in case of participant default.
Assessment of Principle 1	**Observed**
Recommendations and comments	

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.	
Key consideration 1	**An FMI should have objectives that place a high priority on the safety and efficiency of the FMI and explicitly support financial stability and other relevant public interest considerations**
Description	As a central bank, the BOT has main responsibilities to maintain financial stability, financial institution system stability as well as payment system stability according to Section 7 of the BOT Act. On payment system stability, BAHTNET is established with the objectives to serve as a financial market infrastructure for Real-Time Gross Settlement (RTGS) of interbank large value funds transfer to support financial activities and promote payment systems stability. It is owned, operated and overseen by the BOT under segregation of responsibilities and accountabilities of Banknote and Payment Management Department (BPD), Payment Infrastructure and Services Strategy and Development Department (PID) and Payment Systems and Financial Technology Policy Department (PSD). BAHTNET places high priority on safety and efficiency. The performance and its smooth operations are assessed against the operational objectives of target system availability, which are approved by the Payment Systems Committee (PSC) on an annual basis. Recently, BAHTNET's availability targets were 99.90% in both 2023 and 2024. The system availability is required to report to the PSC at every meeting. Additionally, BAHTNET set its Recovery Time Objective at 2 hours without any information loss (Recovery Point Objective = 0). The BOT continuously monitors and keeps record for effectiveness of the system by

	using KPI scoring**.** The cost and pricing policies are reviewed every 2 years or when there are significant changes to the BAHTNET environment. The PSC has placed high priority on safety and efficiency of the BAHTNET by designating BAHTNET as a systemically important payment system and requiring its compliance with the Principles for Financial Market Infrastructures (PFMI). Besides, the Risk Management Framework for BAHTNET has been established and approved by the PSC. BPD an operator of BAHTNET, is required to adopt the Framework to establish internal risk management framework and BPD has to regularly report operational availability performance and major incidents to the PSC which acts as the FMI's board. As BAHTNET is owned and operated by the BOT, it is clear that BAHTNET is established and operated to support financial stability since it is one of the BOT's responsibilities. BAHTNET has disclosed information to its participants regarding measurable and quantifiable efficiency in terms of target system availability and recovering times for the system as well as operation cost which is reviewed on a regular basis. In addition, BAHTNET and its participants regularly exercise the BCM/BCP testing under various scenarios such as major disasters, political unrests, epidemic in order to be well-prepared and achieve recovery time objective during emergency events. For safety and soundness, BAHTNET operator has implemented several policies to ensure that the system meets security standard as follows: a. Compliance with IT & Cyber framework including practices and guidelines which are in line with relevant domestic laws and international standards. b. Utilization of Public Key Infrastructure technology (PKI) which consists of private and public key for authentication of both senders and receivers. This technology would ensure data confidentiality, data integrity and non-repudiation. In addition, the BOT has undertaken Vulnerability Assessment by having external auditors identify problems and weaknesses of BAHTNET along with performing External Penetration Testing on a yearly basis.
Key consideration 2	**An FMI should have documented governance arrangements that provide clear and direct lines of responsibility and accountability. These arrangements should be disclosed to owners, relevant authorities, participants, and, at a more general level, the public.**

Description	*Governance arrangements* Oversight and operational functions related to BAHTNET are under separated line of command in order to achieve balance of power as well as to ensure a clear and transparent responsibilities and accountability. At present, there are three departments under separate groups in the Bank of Thailand having responsibilities related to payment systems as follows:  **Banknote and Payment Management Department (BPD)** The primary BAHTNET-related responsibilities include monitoring day-to-day operations, managing operational risks, and implementing internal policies and procedures to ensure all activities align with the established goals and objectives of the BAHTNET system. BPD is under the Payment Infrastructure and Services Group (PIG) which reports to Assistant Governor for PIG Group and Deputy Governor Corporate Development, respectively. **Payment Infrastructure and Services Strategy and Development Department (PID)** PID is responsible for enhancing the systems and infrastructure to serve changing business needs and establishing a risk management process in accordance with the Risk Management Framework approved by the PSC. PID is also under the Payment Infrastructure and Services Group (PIG) which reports to Assistant Governor for PIG Group and Deputy Governor Corporate Development. In addition, for policy issues related to risk management, efficiency, and safety of BAHTNET, PID must seek approval from the PSC.

	Payment Systems and Financial Technology Policy Department (PSD) Its main responsibilities are formulating the payment system policies and regulations for key infrastructures and services in the payment systems as well as overseeing BAHTNET which is a systemically important payment system and other payment systems. PSD is under Payment Systems Policy and Financial Consumer Protection Group which reports to Assistant Governor for Payment Systems Policy and Financial Consumer Protection Group and Deputy Governor for Financial Institutions Stability, respectively. The payment systems oversight policies including risk management framework formulated by PSD have to seek approval from the PSC which acts as the Oversight board. In addition, the payment systems stability report is presented to the PSC on a semi-annual basis. The governance arrangements are documented and composition of the committees and organization structures are disclosed publicly on the BOT's website. BAHTNET provides accountability to owners, participants and relevant stakeholders through the Determination of its rights and duties which is clearly articulated in title 3 of BAHTNET regulation. The information is publicly available on the BOT's website. The PSC, which is the FMI's board, is empowered by the BOT Act to formulate policies concerning the payment systems that are under the BOT supervision and the clearing systems between financial institutions, and to monitor the BOT's operations according to Section 28/12. Moreover, the BOT is responsible to ensure system availability, allow fair and open access as well as take into consideration the needs of participants and the market. Therefore, in order to engage with the industry, the BOT has established BAHTNET Advisory Group (AG) comprising representatives from Thai Bankers' Association, the Association of International Banks, Specialized Financial Institutions (SFI), and the Thailand Securities Depository Co., Ltd. (TSD). The BOT arranges meetings with AG at least twice a year and conducts surveys to seek comments from all participants regarding changes in the system. The PSC governance arrangement is disclosed to the public on the BOT's website (www.bot.or.th) under About Us → Committee → Payment Systems Committee (PSC) Boards' arrangement and objectives are stated in the BOT Act which is published on the BOT's website.

Key consideration 3	**The roles and responsibilities of an FMI's board of directors *(or equivalent)* should be clearly specified, and there should be documented procedures for its functioning, including procedures to identify, address, and manage member conflicts of interest. The board should review both its overall performance and the performance of its individual board members regularly.**
Description	*Roles and responsibilities of the board* The PSC, which is the FMI's board, is responsible for formulating policies concerning the payment systems that are under the BOT supervision and the clearing system between financial institutions to ensure security and effectiveness according to Section 28/12 of the BOT Act. Furthermore, the PSC is responsible for monitoring the BOT's operations under Section 8(6) which are to establish or support establishment of a payment system. The PSC also needs to act upon the PSC Governance Framework, which was approved by the PSC in the PSC meeting no. 2/2560, to promote good governance. The Framework specifies the PSC responsibilities in 3 parts as follows: 1) Formulation of strategic development plan for payment systems landscape 2) Oversight of payment systems stability 3) Oversight of payment systems and services In sum, the PSC is responsible for overseeing payment systems under BOT supervision as well as stipulating a clear and understandable oversight policy for payment systems. As the FMI's board, the PSC is responsible for overseeing BAHTNET and ensuring BAHTNET's compliance with the PFMI. The procedures for the PSC's function as the FMI's board to oversee payment systems under the BOT supervision are clearly documented in the PSC Governance Framework as follows: • Stipulate and set a clear and understandable oversight policies for the payment systems • Monitor oversight of the payment systems regulated by the BOT The PSC or FMI's board has to act upon the regulations as stipulated in the Responsibilities and Governance Framework to address and manage member conflicts of interest as follows:

	• The BOT's Rule with regard to Code of Ethics for Payment Systems Committee in Performing Duties in accordance with Laws B.E. 2553 (2010)
	  ○ 4.4 Members ought to segregate personal matters from duties, and set public conscience as priority and over personal interest.
	
	• The BOT's Rule with regard to Preventing Interest for Payment System Committee in Performing Duties in accordance with Laws B.E. 2553 (2010)
	  ○ 4.4.2.1 Members shall avoid having an interest arisen from performing duties, both directly and indirectly.
	  ○ 4.4.25During performing duties, if any members find that they themselves may have an interest or a conflict of interest, they must disclose an interest or a conflict of interest to the committee.
	
	The Responsibilities and Governance Framework are disclosed to all of PSC members as well as relevant parties such as PSD. The Framework will be reviewed upon a significant change.
	
	Presently, there is a secretary team to facilitate functioning of the PSC. The secretary team provides important information to support the PSC tasks such as proposing key issues regarding the new payment roadmap or new policies on payment systems for consideration.
	Moreover, there are 2 more committees that support the PSC's task to oversee BAHTNET as follows:
	
	• The Risk Oversight Committee (ROC) which is responsible for reviewing BAHTNET's Control Self-Assessment (CSA) with respect to the Enterprise Risk Management Framework established by Enterprise Risk Management Department (ERD).
	• The Bank of Thailand Audit Committee (BOTAC) which is responsible for reviewing the internal audit assessment of BAHTNET.
	
	The PSC's performance is reported to the Bank of Thailand Board (BOTB) on a quarterly basis according to Section 28/12 of the BOT Act.
	Although there is no performance review on each individual member of the PSC, in practice, the non-executive committee members, who are experts in the area of payment systems or related areas, have actively provided important information and made comments on various subjects in each meeting.

Key consideration 4	**The board should contain suitable members with the appropriate skills and incentives to fulfill its multiple roles. This typically requires the inclusion of non-executive board member(s)**
Description	To ensure that the PSC has appropriate skills to fulfil its multiple roles, members of the PSC consist of the BOT high-level executives and representatives from the banking industry, business and government sector. The BOT Governor serves as the PSC Chairman, while Deputy Governor for Financial Institutions Stability, who has responsibility to oversee payment systems including BAHTNET, is assigned by the Governor to act as a Deputy-Chairman. Other committee members include Deputy Governor for Corporate Development, President of the Thai Bankers' Association, independent experts appointed by the BOT Board from business and government sector. There is three-year tenure for each member of the PSC, with an opportunity for only one time re-appointment. Current independent experts are 1) Associate Professor in Banking and Finance from high-ranking academic institute in Thailand. 2) Former Country Manager of a well-known card clearing company 3) Executive Director and Chief Corporate Strategy and Investment Advisor of a big fast-moving consumer goods (FMCG) company in Thailand, and Country Managing Partner, global consulting firm. On incentives, Section 23 of the BOT Act stipulates that Chairman and the committee members shall receive meeting allowance or other remuneration as specified by the Minister. The meeting allowance and remuneration shall be deemed to be expenses of the BOT's operations. As mentioned before, the PSC, which is responsible for overseeing the payment systems and services under the BOT supervision, acts as the FMI's Board. The PSC receives monthly allowance as well as meeting allowance for each meeting, which is held every other month. Some independent committees, such as President of the Thai Bankers' Association (TBA), implicitly gain side benefits that the banking industry has safe and sound BAHTNET operations in place to serve for funds transfer transactions. The independent committee members also have an opportunity to induce change to serve needs of the industry they represent.

	Another non-executive committee member, appointed by their position as the PSC permanent committee member according to the BOT Act, is President of the Thai Bankers' Association. According to Section 28/11 of the BOT Act, members of the Payment Systems Board shall comprise the BOT Governor, as Chairman, 2 Deputy Governors determined by the Governor; one of which shall be assigned by the Governor to be a Deputy-Chairman and 4 outside independent committee members, including President of the Thai Bankers' Association and 3 experts selected by the BOT Board. The reason for including these independent committee members in the PSC is for the benefit of driving development and implementing strategy for Thailand's payment industry. The appointment criteria for independent board members are specified in the BOT's Rule with regard to Nomination, Consideration, and Selection of Experts to be Members of Payment Systems Committee B.E. 2552 (2009), given that the candidates are Thai citizen, having adequate expertise, knowledge and experience in the field related to payment systems. In addition, they must not have prohibited characteristics such as: • being or having been a political official unless vacating from the office for not less than 1 year; • being a director or having a position in a financial institution or any juristic person established by any specific law, except for a position specified by law; • being a director or an executive or a person with power of management or having significant interest in the juristic person having interest over the BOT's business. The list of both executive and independent board member is publicly disclosed on the BOT website (www.bot.or.th) under the Committee section.
Key consideration 5	**The roles and responsibilities of management should be clearly specified. An FMI's management should have the appropriate experience, a mix of skills, and the integrity necessary to discharge their responsibilities for the operation and risk management of the FMI.**
Description	*Roles and responsibilities of management* Roles and responsibilities of management are clearly stipulated in Section 28/13 of the BOT Act: the Governor shall be responsible for the management and administration of the BOT's operations to attain the objectives prescribed under Section 7, including payment system stability.

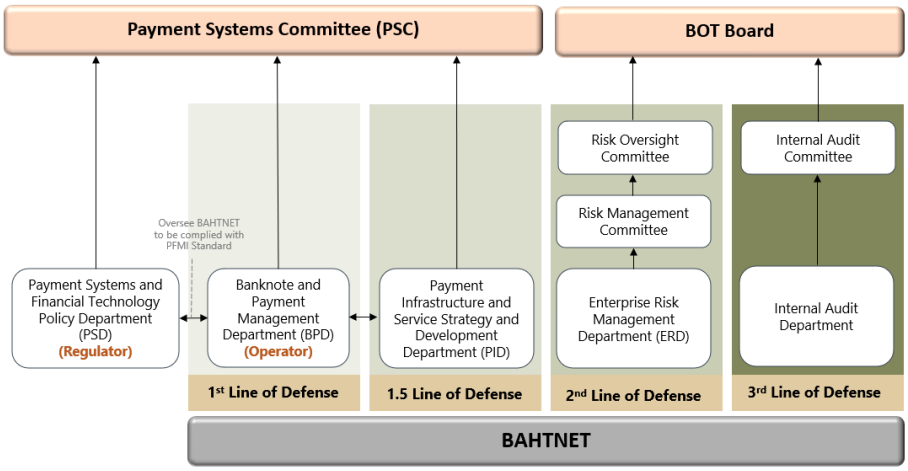
	Moreover, Section 8 empowers the BOT to transact businesses to attain the objectives to maintain payment system stability by establishment or supporting establishment of a payment system such as BAHTNET. Day-to-day operations and BAHTNET risk management are under responsibility of BPD, for which specific matters concerning BAHTNET such as functionality change and incidents are reported to Assistant Governor for Payment Infrastructure and Services Group, Deputy Governor for Corporate Development and, if necessary, escalated to the Governor. Roles and objectives of management are clearly set in the BOT Act. Furthermore, the BOT Board has established the Governor's Performance Evaluation Committee comprising 3 external experts who are members of the BOT Board to assess the Governor's performance in accordance with Bank of Thailand Board Order No. Tor. 8/2560. Assessment of individual management and staffs are conducted against KPIs which are set twice a year. Roles and responsibilities of the Governor are stipulated in Section 28/13 of the BOT Act. The Governor shall be appointed by His Majesty the King upon the recommendation of the Cabinet and must have knowledge and professional skill in the field of economics or banking and finance as stipulated in Section 28/15. According to the BOT's Rule on Organization Structure B.E. 2561, the Governor has delegated the operation function to BPD under Payment Infrastructure and Services Group. Senior director as the BPD head is appointed among executives with ample experience and knowledge concerning payments, finance and IT. BPD head is responsible for managing day-to-day operations of BAHTNET including risk management. BPD staffs are required to possess appropriate knowledge, expertise or experience related to payment system, money market and financial system to operate BAHTNET smoothly and to ensure high availability, safe and resilience operations of the system. Also, the PID Senior Director, who leads efforts to enhance the efficiency and resilience of the BAHTNET system, must possess the analytical skills to assess the system's needs, the strategic vision to create a roadmap for its future development, and the project management expertise to execute that vision. The management will be removed according to the criteria below:

	Governor Under Section 28/19 of the BOT Act, in addition to the retirement from office on the expiration of the term prescribed under Section 28/18, the Governor shall vacate upon: • Death; • Resignation; • Possessing qualifications or restrictions contravening the provisions of Section 28/17 such as being more than 60 years of age, having been adjudged as an incompetent person, being declared bankrupt or being a director in a financial institution; • Being removed by the Cabinet upon the recommendation of the Minister due to wrongful misconduct or dishonest performance of duties; • Being removed by the Cabinet upon the recommendation of the Minister or by the proposal of the Minister upon the recommendation of the BOTB due to gross incompetence in the performance of duties or incapability, provided that explicit reason shall be specified in the order. **BAHTNET Management** According to Section 6 of the BOT Order on Human Resource Management (HRM), the HRM Committee chaired by the Governor has the authority to make decision on suspension or dismissal of an employee who breaks the discipline or is disqualified as a BOT employee such as lack of capability to perform such role.
Key consideration 6	**The board should establish a clear, documented risk-management framework) that includes the FMI's risk-tolerance policy, assigns responsibilities and accountability for risk decisions, and addresses decision making in crises and emergencies. Governance arrangements should ensure that the risk-management and internal control functions have sufficient authority, independence, resources, and access to the board.**
Description	*Risk management framework* PID has developed the comprehensive BAHTNET Risk Management Framework in accordance with the Risk Management Framework for Payment Systems based on international standards e.g., ISO 30001 for risk management process and COSO Enterprise Risk Management (COSO ERM) for risk response and control. The Framework is also aligned with the BOT's bank-wide Risk Management Framework. Approved by the PSC in 2018, the Framework provides clarity and details on the BAHTNET risk policy, risk governance, risk management

	as well as risk appetites and is subject to an annual review or when there are significant changes. The Framework was updated and approved by the PSC in 2024, the key point is to further identify important risk events and prepare an emergency plan to support business continuity (BCP). The Framework address the tolerance policy by identifying the tolerance level for each type of risk. BPD has the authority to make a decision during crises and emergencies, where the person responsible to make a decision varies upon the impact level. For example, extension of cut-off time due to liquidity problem of a participant can be authorized by BPD director, while, liquidity problem that may affect the public can be authorized by the senior director and escalated to the higher executive. *Authority and independence of risk management and audit functions* The BAHTNET Risk Management Framework is reviewed by PID and approved by the PSC on an annual basis. There are 4 BOT internal departments that involve in risk management of BAHTNET as follows: 1) Payment Systems and Financial Technology Policy Department (PSD) as a regulator of BAHTNET 2) The Payment Infrastructure and Services Strategy and Development Department (PID) functions as an operational risk control, bridging the gap between the first and second lines of defense, often referred to as the 1.5 line of defense 3) Enterprise Risk Management Department (ERD) as a second line of defense 4) Internal Audit Department (IAD) as an auditor of the BOT and a third line of defense. Generally, BPD as a first line and PID as a 1.5 line of defense continuously monitor, manage, and control risks in the system and, if necessary, report to the PSC according to the line of command. BPD also reports critical incidents affecting availability of BAHTNET to the PSC. As a regulator of BAHTNET, PSD closely monitors risk management of BAHTNET by setting bilateral agreement with BPD order to obtain information related to risk management such as incident report, KRI or information on liquidity problem. Additionally, PSD requires PID to conduct self-assessment[3] against the PFMI standard every 2 years.

[3] BAHTNET Self-assessment against the PFMI standard is published on BOT website (www.bot.or.th) under topic - Our Roles→Payment Systems→BAHTNET→BAHTNET Self-assessment

As a second line of defense, ERD has the responsibilities to monitor risks of all departments in the BOT including BAHTNET system as well as establish the Enterprise Risk Management Framework as a guideline to manage all risks. BPD is required to conduct Control Self-Assessments (CSA) by adopting the ERM framework established by ERD on annual basis and submit to ERD. The CSA result will be respectively escalated to the Enterprise Risk Management Committee (ERMC), chaired by the Governor, and the Risk Oversight Committee (ROC), chaired by outside expert, if the result concerns the stability of BAHTNET.



IAD performs the third line of defense by providing assurance, based on the highest level of independence, on effectiveness of risk management and internal controls. The audit program and scope will either target the high risk area identified from the CSA (Risk matrix/ risk mapping) or will look upon legal compliance. IAD will conduct on-site examination according to the 3-year audit plan approved by the BOT Audit Committee (BOTAC). In this regard, PSD may coordinate a joint examination with IAD, where the audit result will be reported to the BOTAC accordingly.

BOT utilizes the internationally recognized Three Lines of Defense Model for risk management. In this model, Banknote and Payment Management Department (BPD) as the BAHTNET operator, constitutes the first line of defense. The Payment Infrastructure and Services Strategy and Development Department (PID) strengthens risk controls and ensures compliance, acting as the 1.5 line of defense. The Enterprise Risk Management Department (ERD) provides oversight through various risk control and compliance functions, serving as the second line. Finally, the Internal Audit Department (IAD) offers independent assurance as the third line. Each line plays a distinct role within the BOT's governance framework.

Key consideration 7	**The board should ensure that the FMI's design, rules, overall strategy, and major decisions reflect appropriately the legitimate interests of its direct and indirect participants and other relevant stakeholders. Major decisions should be clearly disclosed to relevant stakeholders and, where there is a broad market impact, the public.**
Description	*Identification and consideration of stakeholder interests* In order to identify and take into account interests of participants, the important mechanism is to set up consultation forum with the industry. The BOT has established the BAHTNET Advisory Group (AG) comprising representatives from the Thai Bankers' Association, Association of International Banks, Specialized Financial Institutions (SFI), and Thailand Securities Depository Co., Ltd. (TSD). The BOT and BAHTNET AG use this forum to exchange views on: • business and technology • major decisions on design and overall strategy • new initiatives on system development • rules and regulations / practical guidelines • new policies or measures Any development of new features or functions will be discussed with the AG to ensure that the new initiatives meet the needs of participants and the market and are in line with the international standards. The AG consultative meeting is held at least annually or occasionally as it deems necessary. In addition, the BOT conducts a survey to assess impact of proposed changes and gather views of participants before finalizing its decision. The views of direct and indirect participants as well as other relevant stakeholders are collected through consultative meetings with the AG. When there are major changes in BAHTNET policies, the BOT will notify participants in advance to gather their opinions before finalizing its decision. In an event of a dispute between participants and BOT as operator of BAHTNET, the matter will be identified and submitted to the arbitrators. Resolution of the dispute will proceed according to the law on arbitration. Each party will appoint one arbitrator, and the two arbitrators will together appoint an independent outsider as a neutral arbitrator.

	The BOT will notify stakeholders when there are significant issues or major decision regarding payment systems policies via e-mail, meeting with stakeholders as well as publish such information on the BOT website. In the past, during implementation of the 3rd payment systems roadmap, a payment systems seminar was held to disclose major policies to relevant stakeholders as well.
Key conclusions	Governance arrangements of BAHTNET are clear and transparent, thereby promoting safety and efficiency of BAHTNET as stipulated in Section 7 of the BOT Act, and support stability of the overall financial system, other relevant public interest considerations, and relevant stakeholders. BAHTNET has been established, owned, operated and overseen solely by the BOT. The oversight and operation function related to BAHTNET are under separate line of command to ensure clear and transparent responsibilities and accountability. Two departments having direct responsibilities related to BAHTNET include (1) BPD which is responsible for operation function and (2) PSD which is responsible for oversight function. In addition, committees for operational management and oversight comprise skilled and experienced executive/non-executive members and clearly segregated. The BOT has adopted the Three Lines of Defense Model which is the internationally accepted model for risk management. In the Three Lines of Defense Model, BPD as BAHTNET operator is the first line of defense in risk management, PID functions as an operational risk control referred to as the 1.5 line of defense, the various risk control and compliance over-sight functions or tasks conducted by ERD are the second line, and IAD provides independent assurance as the third line.
Assessment of Principle 2	**Observed**
Recommendations and comments	
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.	
Key consideration 1	**An FMI should have risk-management policies, procedures, and systems that enable it to identify, measure, monitor, and manage the range of risks that arise in or are borne by the FMI. Risk-management frameworks should be subject to periodic review.**

Description	*Risks that arise in or are borne by the FMI* Primary risks arise in RTGS service are as follows: **1. Operational risk** arises from operational defect, corruption, mistake, inadequate or inappropriate operational procedures, staffs, IT systems or external factor including accident, natural disaster, human threats as well as cyber threats that affect efficiency of BAHTNET and stability of the payment systems. **2. Liquidity risk** arises when participants cannot meet fund transfer obligations temporarily since they cannot liquidate their assets on time or cannot find sufficient source of fund. **3. Credit risk** arises when a counterparty cannot meet its full fund transfer or settlement obligation either when due or anytime in the future or when the BOT provides intraday credit to participants against collateral**.** **4. Legal and compliance risk** arises when BOT operations are not supported by any legal framework or operations do not comply with the legal framework, regulations or contracts, resulting in severe impact. This includes the case where participants do not understand or do not comply with relevant regulations and laws, thereby affecting BAHTNET operations. **5. Reputational risk** occurs when the public have negative attitude toward the BOT, leading to loss of the BOT's credibility. **6. General business risk** arises from inappropriate revenue and cost management as well as inappropriate pricing policies. **7. Systemic risk** arises when an individual or multiple participants cannot fulfill their settlement obligations, creating a chain impact to other participants, thereby adversely affecting the payment systems and financial system as a whole. In addition, there are other risks such as **Custody risk** (occurs when the custodian cannot efficiently manage the deposit assets which may cause damage to such assets) and **Investment risk** (occurs when unexpected loss arising from using collateralized securities for further investment). However, these risks are not relevant or have low impacts to central bank that is an FMI operator. Payment Systems and Financial Technology Policy Department (PSD) has initiated the Risk Management Framework for Payment Systems based mainly on the international standards such as PFMI, ISO 30001 and COSO Enterprise Risk Management (COSO ERM). The Framework approved by the PSC is used as a guideline for the payment systems to effectively manage risks arising from the operations. The main part of the Framework elaborates risk management process which includes steps and tools to effectively identify, assess, monitor, and manage risks arising in the payment systems. Any other risks that may

	arise from operating a payment system such as reputation risk are also covered under the Framework. These risks are only suggested as a minimum, the operators may consider to include additional risks in their risk management policies to encompass risks as deemed appropriate or may exclude those which are not relevant. Infrastructure and Services Strategy and Development Department (PID) has adopted the Risk Management Framework for the payment systems and the BOT Enterprise Risk Management Framework in order to establish the BAHTNET Risk Management Framework. The BAHTNET Risk Management Framework clearly specifies comprehensive risk management policy, risk governance, risks identified in BAHTNET, risk appetite, risk management process including identification, assessment, response and control, monitoring and reporting. Approved by the PSC, the BAHTNET Risk Management Framework has identified risk management policy as "*BAHTNET shall provide services which are continuous, efficient, stable, secure and in line with the international standards*". The risk management process starts from identification and assessment of risks arising from both external factors and within the organization. The identified risks will then be assessed using risk matrix methodology by considering their likelihood and impact. After the assessment, the high rating risks will be prioritized and mitigation measures will be established and applied to such risks. Accordingly, several controls are applied to residual risks in order to contain them at acceptable level. BAHTNET operators utilize several tools for risk monitoring such as Early Warning Indicator, Key Risk Indicator, Control Self-Assessment, internal and external auditor. Reporting lines are also accurately described in the BAHTNET Risk Management Framework. BAHTNET Risk Management Framework is subject to annual review by PID and the result will be reported to the PSC. BAHTNET operation team is responsible for monitoring day-to-day operations through a monitoring screen which shows essential real time information for risk monitoring such as transaction queue (insufficient fund), current account balance and intraday liquidity usage/remaining. BAHTNET operators can monitor detailed information of each participant in real time basis.

	There is also a dedicated liquidity monitoring screen which shows total liquidity exposures of all participants, allowing BAHTNET operators to detect liquidity problem in real time so that they can immediately coordinate with relevant participants to solve the problem in time. In addition, BAHTNET has a suspicious transaction detection function that allows the system to suspend suspicious transaction and notify relevant parties. Furthermore, PID has developed Early Warning Indicator system (EWI) as a system to automatically monitor liquidity problem of BAHTNET participants. The EWI system comprises indicators which are designed to identify liquidity problem in accordance with BAHTNET activities such as participants' failing to buyback ILF securities by the end of day or causing a delay in cheque MFT settlement. Liquidity problem indicated by the EWI will be treated differently depending on the type of problem and its severity. For the highest severity case, the problem will be reported to BPD director and escalated to higher executive according to line of command for further resolution . Moreover, BAHTNET provides continuous real time information to participants in order to help them manage their risk exposures in the system. In particular, participants are able to monitor their transactions' status, queuing facility and the balance or movement of their deposit and settlement accounts on a real time basis. The systems provide comprehensive information and measurement tools in aggregating exposures in the BAHTNET system, especially the liquidity monitoring system which helps BAHTNET operators to detect aggregated risk on a real time basis. **Risk management policies** According to the Framework, payment systems under the BOT's oversight shall establish a payment system risk governance board to be responsible for risk policy approval, reviewing, management and monitoring. The BPD's Control Self-Assessment (CSA) working group, chaired by senior director of BPD, is responsible for reviewing and monitoring risks arising from operations within the department including BAHTNET.

	Risk management systems To serve both internal and external requirement, BAHTNET will develop new functions for risk management system from time to time. In practice, BPD and PID will arrange the BAHTNET Advisory Group meeting at least twice a year in order to take into account new requirements from BAHTNET participants, change in market practices or foreseen risks arising from BAHTNET operations. In addition, the BOT holds an annual meeting with all participants to communicate important matters on rules and regulations, development plan and any changes related to BAHTNET. Furthermore, the BOT keeps updated on global trends and new policies regarding payment systems, technologies as well as security standard in order to improve the Risk Management Framework. For example, the BOT conducted a study and discussed with participants on the benefits of applying ISO 27001 to ensure the system safety. In 2017, the BOT officially required all participants' workstation to be certified with ISO 27001 by 2018. In line with the Risk Management Framework approved by the PSC, PID has developed the BAHTNET Risk Management Framework and BPD has conducted Control Self-Assessment, a method used to help identify residual risks and new risks (if any). The risk mapping/risk matrix is applied to measure variations of risk level comparing to the previous year. Effectiveness of the risk management policy, procedures and systems is achieved when the level of risk is at low/medium level or lower than the risk level in the previous year. The result will be reported and reviewed by Enterprise Risk Management Department. In addition, the PSC has specified three indicators for measuring effectiveness of BAHTNET, comprising System Availability, Recovery Time Objective (RTO) and Recovery Point Objective (RPO). Effectiveness of the risk management policies would induce smooth operation of BAHTNET, thus achieving the aforementioned performance indicators. Moreover, to ensure the effectiveness, PID is required to conduct BAHTNET self-assessment against PFMI every two years, and the result is reviewed by PSD. The risk management policy, procedures and systems are subject to annual review or when there are significant changes in the system.

<table>
<tr><td>Key consideration 2</td><td>An FMI should provide incentives to participants and, where relevant, their customers to manage and contain the risks they pose to the FMI.</td></tr>
<tr><td>Description</td><td>
The BAHTNET system provides participants an access to real-time information for monitoring their performance as well as assessing risks through the BAHTNET Web Portal.

This tool allows participants to manage the risks by monitoring incoming and outgoing transactions status, queued transactions, current/settlement account balance, intraday liquidity balance and securities holding to be used as collaterals.

Participants can also request for cancellation if their transactions are pending in the queue because of insufficient funds in the accounts. Pending transactions in queue can also be reprioritized for settlement. In addition, participants are able to set rule to temporarily block suspicious outgoing or incoming transactions and will receive a warning when the system detects those suspicious ones.

The risk management policies and procedures of BAHTNET are provided to all participants in the form of regulation and users' manual in written documents and are published on the BOT's website. The regulation lays out provisions on the type of risk exposures and risk management procedures with the objective to enable participants to have a clear understanding of the system's impact on each risk that may incur through participation in the system. Therefore, participants can strengthen their internal arrangement to manage and mitigate the risks identified in the users' manual with respect to BAHTNET operations.

The BOT provides the Through-put guideline and time-zone fee incentive to participants so as to encourage them to submit their transactions as early as possible, especially before noon, to avoid critical congestion during the closing hours which may cause operational and liquidity risk. Details of the fee scheme are as follows:

<table>
<tr><th rowspan="2">Times</th><th colspan="2">Fee</th></tr>
<tr><th>SWIFT</th><th>Web Portal</th></tr>
<tr><td>8:30 – 12:00</td><td>5 THB</td><td>8 THB</td></tr>
<tr><td>12:00 – 16:00</td><td>10 THB</td><td>16 THB</td></tr>
<tr><td>16:00 – 17:30</td><td>200 THB</td><td>200 THB</td></tr>
</table>
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	In response to the Through-put guideline, participants typically settle 30% of their funds transfer value, a large portion of their transactions, by 12.00 pm. and settle the other 70% of their funds transfer value by 3.00 pm. Moreover, if Settlement Agent submits Multilateral Funds Transfer (MFT) [1] instructions after the designated submit time, the BOT will charge the Settlement Agent 1,000 Baht per minute beginning from the first minute after the designated "Submit Time" until the submission finishes according to BOT Notification No. Sor.Ror.Khor 5/2550. This is to avoid liquidity risk that may arise due to many MFT instructions postponed and effected settlements at the same time later in the day. According to BAHTNET Regulation, participants are required to establish their own risk management policy to manage and contain the risks that may impose to BAHTNET. Furthermore, the BOT provides tools for participants and annually conducts a training session for participants regarding usage of BAHTNET web portal screens and functions to ensure that they have comprehensive understanding of the real-time information that they can access for managing and containing the risks. In addition, the BOT usually consults participants prior to development of any new functions including risk management function.
Key consideration 3	**An FMI should regularly review the material risks it bears from and poses to other entities *(*such as other FMIs, settlement banks, liquidity providers, and service providers*)* as a result of interdependencies and develop appropriate risk-management tools to address these risks.**
Description	*Material risks* The Risk Management Framework, approved by the PSC, has identified all potential material risks including risks that BAHTNET bears from and poses to other entities as a result of interdependencies. PID reviews the Framework on annual basis to ensure possible material risks are identified. The material risk that BAHTNET bears from and poses to other entities as a result of interdependencies is mainly operational risk which may arise from the linkage between BAHTNET and other entities as follows: 1) BAHTNET linkage with Thailand Securities Depository Company Limited (TSD) for Delivery Versus Payment against securities/equity

	2) BAHTNET linkage with Thailand Clearing House Co. Ltd. (TCH) facilitates multilateral funds transfer settlement as the central counterparty for equity settlement 3) BAHTNET linkage with Hong Kong Monetary Authority (HKMA) for Payment Versus Payment between THB and USD Operational disruptions of the linkage could lead to liquidity shortage and settlement failure, which could result in a loss to participants and the payment system as a whole. However, for day-to-day operation, these risks are monitored by BAHTNET Operator through real-time monitoring tools. As THB legs of inter-connected DvP and PvP transactions are settled through BAHTNET, the relevant risks such as credit risk, liquidity risk are monitored and measured by the same risk management policies and systems similar to other transactions in BAHTNET. To mitigate risks arising from interdependencies among FMIs, BOT and its partners, TSD and TCH, are developing enhanced contingency procedures. In 2024, we are collaborating to identify and address risks associated with simultaneous disruptions across multiple FMIs. Specifically, BOT and TCH have developed and tested internal offline systems and processes to ensure service continuity in the event of a dual disruption scenario. During a joint test in Q3 2024, TCH successfully transitioned to its CCP Offline (CCPO) system, while BAHTNET operated via BAHTNET Offline (BNO), demonstrating their ability to maintain critical services despite a simulated simultaneous failure. Furthermore, BOT has identified a significant risk to the BAHTNET system due to increasing global political instability. This risk stems from BAHTNET's reliance on international network providers (SWIFT). If BAHTNET experience disruptions from international network providers, it could severely impact the ability of participants to use the automated Straight-Through Processing (STP) feature. Recognizing this vulnerability, the BOT is actively assessing the degree of dependency on these international networks and developing strategies to mitigate potential disruptions, ensuring the continued stability of BAHTNET In addition to risk management tools which are used in BAHTNET daily operations, the best practices of settlement models are adopted to mitigate risks arising from the linkages as explained below

	Principal risk For settlement of government securities transactions through the linkage with TSD, the principal risk is eliminated by adopting DvP model 1 arrangement, for which both securities and cash legs are simultaneously settled on a gross basis. On the other hands, settlement of equity transaction is adopted by DvP model 3 arrangement, for which both securities and funds are simultaneously settled on a net basis. For THB/USD FX transaction, the PvP mechanism is applied to eliminate principal and settlement risk, given that THB is debited in a sending bank's account and credited to a receiving bank's account in BAHTNET, whereas USD is debited from the sending bank's account and credited to the receiving bank's account in USD CHATS simultaneously. **Operational risk** To maintain operational reliability of the linkage, the BOT has established the operational procedures with the linked FMIs to ensure that the communication and relevant system are secured. Moreover, the operational procedures clearly define responsible persons and actions to be taken in case of disruption, and the testing with TSD and Hong Kong Interbank Clearing Limited (HKICL) are conducted on a yearly basis. In addition, since the BOT has an MOU with Securities Exchange Commission which oversees TSD as well as an MOU with HKMA which oversees USD-CHATS, the oversight information can be exchanged to address the risks that may arise from interdependencies. As inter-connected transactions are processed through BAHTNET, risks are monitored and measured by the same risk management policies and systems similar to other transactions in BAHTNET. In other words, the assessment and review process are in line with the normal process. Geopolitical issues can also lead to operational risk. To enhance BAHTNET system stability and reduce reliance on international network providers, BOT is developing an API-based domestic network for RTGS services through the BAHTNET NextGen project. This initiative aims to bolster risk management capabilities and drive system innovation, aligning with global technological advancements. The project is structured in three phases:

	• **Track I: Resiliency and Innovation (2024 – 2027)**: Focuses on developing an API-based domestic network for BAHTNET service to mitigate international network dependencies and leverage API technology for enhanced use cases. • **Track II: Infrastructure Stability (2025)**: Concentrates on strengthening infrastructure components to ensure readiness for future operational demands. • **Track III: BAHTNET Modernization (2026 – 2029)**: Seeks to expand BAHTNET's functionalities, capacity, and availability, ensuring long-term system stability."
Key consideration 4	**An FMI should identify scenarios that may potentially prevent it from being able to provide its critical operations and services as a going concern and assess the effectiveness of a full range of options for recovery or orderly wind-down. An FMI should prepare appropriate plans for its recovery or orderly wind-down based on the results of that assessment. Where applicable, an FMI should also provide relevant authorities with the information needed for purposes of resolution planning.**
Description	*Scenarios that may prevent an FMI from providing critical operations and services* According to the policy on Business Contingency Plan (BCP), the BOT identifies scenarios that may potentially prevent BAHTNET from providing critical operations and services as follows: 1) Disaster (fire, flood, earthquake), 2) Political Unrest (coup d'etat, protest, terrorism), 3) Epidemic (flu, bird flu) 4) Disruption of interconnected FMIs (TSD/TCH) 5) Disruption of critical 3rd party IT service provider 6) Participant default In case that there is disruption to BAHTNET, the system operations will be transferred to secondary site which has synchronous data copy scheme with the primary site. The BOT safeguards business continuity against geopolitical hazards by operating a geographically dispersed backup site (tertiary site), located more than 400 km from its primary facility. This site provides an data, software, and hardware environment to operate BAHTNET. While system reconfiguration is necessary for connection, the tertiary site is activated solely in the event of a total failure affecting both the primary and secondary infrastructure.

	Beyond above mentioned backup sites, BOT has implemented a comprehensive Business Continuity Plan (BCP) for a total failure scenario. This plan centers on the BAHTNET Offline (BNO) Project, which features BAHTNET Lite, an operational tool designed for emergency use when all three backup sites are compromised. After tested with all BAHTNET members, BAHTNET Lite is now ready for operation. To ensure consistent implementation, in 2023, the BOT issued "Guideline for Operation in Case of Total Failure of BAHTNET System (BAHTNET Offline: BNO) using BAHTNET Lite system." This guideline provides BAHTNET members with standardized procedures for activation, operation, and recovery during and after a BNO event. These scenarios mainly focus on operational risk which may cease the BAHTNET service. Other related risks such as credit or liquidity risk are already addressed by the mechanism and measures implemented in the system. At present, there are 2 BCPs for disaster/political unrest and the BCP for epidemic. Both BCPs covers details as follows: • Responsible persons • Work location • Use of resource and tool • Migration plan • Communication procedure The recovery plan of BAHTNET is designed to enable critical system to resume operations within 2 hours after disruptive events are acknowledged. This plan enables BAHTNET to facilitate or complete settlement by the end of day even in extreme circumstances that may impact system's operational reliability. On key recovery, BAHTNET is designed to enable critical operations and services to resume operations within 2 hours. Besides, the BOT has the backup sites located 35 and 400 kilometers away from the primary site. The secondary site has identical hardware, software and network as the primary site. It is a hot backup, which means all transactions in the production environment are mirrored to the backup site in real time and loss of transaction data cannot occur. In this regard, the backup site has the ability to continue operations for a long period of time until the primary site is recovered. Apart from that, there are communication lines, which are serviced by different providers. BAHTNET's recovery plan is subject to an annual review. The update will be done upon major changes in BAHTNET's functionalities or IT.

Key conclusions	The BOT has initiated the Risk Management Framework for all payment systems under the BOT's supervision. With regard to the Risk Management Framework, BAHTNET has developed the robust risk management policies, procedures and system that enable BAHTNET to manage the risks associated with its operations effectively. BAHTNET's participants have real-time access to information that enable them to manage the risks they may face in as well as the risks they may pose to BAHTNET. Rules and procedures are effectively enforced to ensure ongoing compliance by participants. BAHTNET continuously analyzes the risks arising from interdependencies with other FMIs. In the case of the link with Hong Kong USD CHATS for FX settlement, TSD for DvP settlement, and TCH as central counterparty connected to BAHTNET, BAHTNET has a robust framework for management of operational risk, including comprehensive business continuity arrangements.
Assessment of Principle 3	**Observed**
Recommendations and comments	

Principle 4. Credit risk **An FMI should effectively measure, monitor, and manage its credit exposure 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 largest participants and their affiliates that would potentially cause the largest aggregate credit exposures to the CCP in extreme but plausible market conditions. All other CCPs should maintain, at a minimum, total financial resources sufficient to cover the default of the one participant and its affiliates that would potentially cause the largest aggregate credit exposures to the CCP in extreme but plausible market conditions.**	
Key consideration 1	**An FMI should establish a robust framework to manage its credit exposures to its participants and the credit risks arising from its payment, clearing, and settlement processes. Credit exposure may arise from current exposures, potential future exposures, or both.**
Description	**Credit Risk** Due to the RTGS characteristics, BAHTNET is designed to eliminate credit risk posed by participants upon the system or operators. Funds transfer transactions will be completed only if the sender's account has sufficient funds to cover transaction amount. For securities settlement, the securities leg and cash leg will be simultaneously settled in DVP model 1. So, the system does not pose credit risk to participants. Even though the BOT does not face credit risk from settlement process in BAHTNET, the BOT may face credit risk arising from lending interest-free intraday liquidity through Intraday Liquidity Facilities (ILF) to participants or activating Securities Requirement for Settlement (SRS) measure in case that participants fail to buy back their collateralized securities by the end of day. Thus, the BOT may face both current and potential future credit exposure as described below. **Credit exposures** Current exposures occur when the BOT extends liquidity facilities to participants which are obliged to buy back their collateralized securities either from using ILF or activating SRS by the end of day in order to avoid carrying over current exposures to the next day. In the event that participants are unable to partially or fully buy back their collateralized securities at the end of day, those securities will become overnight loan. Participants are still allowed to repurchase those securities until noon of the next day at the same price plus penalty rate.

	Potential future exposures occur when participants fail to buy back their overnight loans and the BOT permanently seize their collaterals in order to liquidate to cover its loss. Residual exposures can occur due to fluctuations in the securities market values. In this regard, the BOT has put in place measures to mitigate such potential future exposure. Apart from these measures, the securities selection mechanism for partial buy back in the system also helps reduce potential future exposures as securities which are less liquid will be repurchased first, for example, collateralized securities with large amount of unit and small par value. BOT Framework to Manage Credit Risk The BOT has established BAHTNET's credit risk framework, focusing on collateralize scheme, mark-to-market and prudent haircut policy in order to minimize credit risk as follows: 1) Intraday Liquidity Facilities (ILF) The BOT provides interest-free intraday liquidity to participants against eligible collaterals. Participants are required to reserve securities that meet the requirements to make a repurchase transaction with the BOT in order to obtain intraday liquidity. Haircut rates are applied to the accepted securities that will be used as collaterals, depending on type and maturity of the securities as determined in the *BOT Notification No.* Sor Ror Khor. 2/2563 *for the BOT's Purchase Prices of Debt Instruments in Connection to the Provision of Intraday Liquidity Facilities for Financial Institutions*. At the end of day, participants have to buy back the full amount. If participants fail to buy back full amount of their securities, the remaining amount will be converted to overnight loan and will be charged with penalty. The participants are required to buy back the remaining securities before noon of the next working day. If the participants still fail to do so, the BOT will permanently seize the collaterals, for which fee and penalty will also be applied. These securities will be liquidated in the market to cover the loss. Note that ILF is available for commercial banks and specialized financial institutions only. Banks with daily average value of funds transfer above 500 million THB and above are required to maintain securities for ILF equivalent to or not less than 10 percent of the average value of their funds transfers in BAHTNET during the same fortnight of the previous month.

	2) Securities Requirement for Settlement (SRS) The BOT provides Securities Requirement for Settlement (SRS) facility to mitigate settlement risk of MFT[4] in case that participants have insufficient funds to complete the settlement. Under SRS, participants are required to pledge collateral against the exposures from net settlements from retail payment such as cheque clearing and interbank retail funds transfer. Securities pledged shall not be less than the Potential Debit Position (PDP) value as calculated by the BOT on monthly basis.) (**Source**: Sor Ror Khor 5/2561) If participants have insufficient account balance for a settlement within a specified time, it is considered that such participants agree to sell those debt securities to the BOT with repurchase agreement as specified in the BOT Regulation Notification.No. Sor Ror Khor 7/2557. The process for buy back and the measure on remaining overnight collaterals are similar to that of ILF. (**Source**: Sor Ror Khor 7/2557) The type of securities that can be used as collateral as well as haircut policy for BAHTNET are derived from the BOT's standing facilities policy originally set by Enterprise Risk Management Department and Financial Markets Department. The policy is subject to an annual review. Haircuts are determined by calculating value at risk (VaR) at 95% level of confidence. The data cover a long historical time span which includes several stressed periods. Volatilities of collateral values are inputs of the haircut calculations, based on the number of days required for liquidating the collaterals. The haircut policy is reviewed on a yearly basis. The BOT continuously reviews volatilities of the collaterals' values and adjust the haircuts to reflect any new stressed period. Haircut sufficiency is incorporated into the haircut derivation process by using the data from historical peak periods. The BOT reviews the volatility data annually to validate whether a new historical peak occurs. While Financial Risk Management Department determines the haircut methodology and procedure, the Enterprise Risk Management Department reviews and tests such procedures at least annually. Thus, the credit risk

4 The MFT refers to instructions that the settlement agent submits through the Central Settlement System for settlement of different types of payment transactions between the funds transferring/funds receiving institutions in BAHTNET system, which shall result in the instructions to simultaneously debit funds from and to credit funds to deposit accounts according to net balances of the funds transferring/funds receiving institutions, according to the rules set by the BOT. (Source: Sor Ror Khor 7/2551)

	management framework of BAHTNET including accepted type of securities and haircut policy are reviewed on a yearly basis. Type of accepted securities is elaborated in the Sor Ror Khor 1/2558 The Haircut policy is stated in the BOT Notification No. Sor Ror Khor 2/2563.
Key consideration 2	**An FMI should identify sources of credit risk, routinely measure and monitor credit exposures, and use appropriate risk-management tools to control these risks.**
Description	There is no credit risk in the system as a result of the settlement process. However, the BOT faces current credit exposures from providing ILF and SRS to participants. Potential future exposures also occur when participants fail to buy back their collateralized securities and the BOT has to liquidate those securities to cover its loss. The BOT daily measures and monitors credit risk via BAHTNET by comparing the price that participants sell to the BOT with participants' funds remaining in their accounts, using real-time calculation. The real-time information whether participants have sufficient funds to repay their securities posed as collaterals in the morning or any time during the day will be on a display. Furthermore, BAHTNET operators can access and monitor cash and securities account information of all participants in the system on a real-time basis. BAHTNET will mitigate residual exposures that might occur due to extreme price volatility by applying robust haircuts which are subject to an annual review. Note that SRS mechanism has never been triggered since its launch in 2014 as participants always have sufficient funds for MFTs. **Tools to control sources of credit risk** As an RTGS facilitates DvP and PvP mechanism including intraday liquidity facilities, BAHTNET does not pose credit risk to its participants. BAHTNET's credit risk comes from participants' failure to buy back their collateralized securities by the end of day. Stipulation on type of accepted securities and haircut policy are the tools that the BOT uses to mitigate credit risk.

	1) Type of accepted securities BAHTNET does not set a limit for intraday credit provision since only high quality and liquid securities are accepted as eligible collaterals and the collaterals are subject to prudential haircuts. Examples of high qualities securities are stated in Article 7 of the *BOT Regulation No.Sor Ror Khor 1/2558 regarding collateral for settlement* as follows: • Treasury bills, Debt Restructuring bills, government bonds • Bonds or debt securities issued by state enterprises or banks established under special laws as specified by the BOT for which the Ministry of Finance provides a guarantee for principal and interests • BOT bonds or BOT saving bonds 2) Haircut policy The BOT buys participants' collaterals by applying the marked-to-market price with haircuts so as to absorb potential credit risk. The haircut policy for BAHTNET is derived from the BOT's standing facilities policy which is originally issued by Enterprise Risk Management Department and Financial Markets Department. Haircuts are determined by calculating value at risk (VaR) at 95% level of confidence. The data cover a long historical time span that includes several stressed periods. Volatilities of collateral values and the number of days required for liquidating collaterals are inputs of haircut determination. **Measurement for effectiveness of these tools** Enterprise Risk Management Department and Financial Markets Department continuously review volatilities of collateral values and adjust the haircuts to reflect any new stressed period. Sufficiency of haircuts is incorporated in the haircut derivation process by using the data from historical peak periods. The BOT reviews the volatility data annually to validate if a new historical peak occurs. While Financial Risk Management Department determines the haircut methodology and procedure, the Enterprise Risk Management Department reviews and tests such procedures at least annually. Heretofore, the haircut policy helps absorb the impact from price fluctuations. Furthermore, to ensure the effectiveness of this tool, haircuts are reviewed annually as required in the haircut policy. (**Source:** Sor Ror Khor 1/2557)

Key consideration 3	**A payment system or SSS should cover its current and, where they exist, potential future exposures to each participant fully with a high degree of confidence using collateral and other equivalent financial resources (see Principle 5 on collateral). In the case of a DNS payment system or DNS SSS in which there is no settlement guarantee but where its participants face credit exposures arising from its payment, clearing, and settlement processes, such an FMI should maintain, at a minimum, sufficient resources to cover the exposures of the two participants and their affiliates that would create the largest aggregate credit exposure in the system.**
Description	*Coverage of exposures to each participant* Although the BOT does not maintain financial resources to cover credit exposures in BAHTNET, BAHTNET requires its participants to pledge their securities as financial resources to cover BAHTNET's exposure from providing ILF and SRS. The requirement of financial resources for ILF and SRS are derived from historical transfer value of gross-settlement and net settlement, respectively. **Extent of Coverage** The current and potential future exposures are fully covered with a high degree of confidence as the BOT only accept the highest-quality collaterals such as government bonds, BOT bonds, and SOEs bonds and prudent haircuts are applied depending on the type and maturity of securities. These policies aim to maintain the BOT's ability to liquidate and reduce the need for procyclical adjustments, thus, ensuring high degree of confidence. **Frequency of Evaluation** Sufficiency of financial resources depend on the policies on type of accepted securities and strictness of haircut policy. Evaluation of both policies are on annual basis. **Credit Exposure** BAHTNET is a real-time gross settlement system for which transactions are processed and settled continuously upon availability of funds in participants' accounts. BAHTNET also facilitates settlement of net position from clearing houses which calculate net debit and net credit position of relevant parties. In this regard, BAHTNET participants may face credit exposures arising from the Multilateral Funds Transfer (MFT) transactions if participants with net debit position have insufficient funds in their accounts, which results in failure of MFT settlement and may also cause systemic risk in the system. BAHTNET provides the

	mitigation measure, specifically, the SRS, as well as monitoring system to its participants. Credit exposure will be measured when participants are required to adopt the SRS. BAHTNET also provides operators with monitoring screen which displays participants' net debit positions and account positions on a real-time basis. **Credit Exposure Calculation** Credit exposures arising from MFT can be mitigated as follows: 1) SRS is the measure that the BOT provides for participants to manage exposures from multilateral net settlement through BAHTNET. This measure requires participants to maintain eligible securities at the BOT as collaterals for settlement. The required amount of eligible securities must be in line with each participant's Potential Debit position (PDP) calculated from historical MFT data. This measure aims at reducing settlement risk and ensuring that, at least, the net settlement through BAHTNET is conducted within a specified time, even though one particular member with the highest debit position cannot carry out its settlement. 2) Potential Debit position (PDP) means the highest potential debit position on the settlement of each transferring/receiving institution, calculated by the method specified by the BOT. The PDP formula are described in the BOT Notification No. Sor Ror Khor 7/2557 – Article 1 as shown below. **Highest potential debit position = $\mu - 2.6 \times \sigma$** According to the formula: • The highest potential debit position of each transferring or receiving institution, with 99.9% confidence interval, is equal to an average deducted by the product of 2.6 and standard deviation. • Mean (μ) means the average daily settlement positions for the previous 12-month period, one month before the starting day of the maintenance period. • Standard deviation means the standard deviation of daily settlement positions for the previous 12-month period, one month before the starting day for the maintenance period. • In case where the highest deficit position calculated under the first paragraph is greater than the highest deficit position, on a daily basis, during the 12-month period for such calculation, the BOT shall use such deficit position as the highest potential debit position of

	the transferring or receiving institution in place of the calculated value. (**Source**: Sor Ror Khor 1/2557) (**Source**: Sor Ror Khor 7/2551) (**Source**: Sor Ror Khor 7/2557) *For DNS payment systems and DNS SSSs in which there is no settlement guarantee* Not applicable since BAHTNET is an RTGS which does not maintain financial resources to guarantee settlement among participants.
Key consideration 4	**A CCP should cover its current and potential future exposures to each participant fully with a high degree of confidence using margin and other prefunded financial resources *(*see Principle 5 on collateral and Principle 6 on margin*)*. 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 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 for 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 for the CCP in extreme but plausible market conditions. In all cases, a CCP should document its supporting rationale for, and should have appropriate governance arrangements relating to, the amount of total financial resources it maintains.**
Description	*Coverage of current and potential future exposures to each participant* Not applicable *Risk profile and systemic importance in multiple jurisdictions* Not applicable *Additional financial resources* Not applicable

	Supporting rationale and governance arrangements Not applicable
Key consideration 5	**A CCP should determine the amount and regularly test the sufficiency of its total financial resources available in the event of a default or multiple defaults in extreme but plausible market conditions through rigorous stress testing. A CCP should have clear procedures to report the results of its stress tests to appropriate decision makers at the CCP and to use these results to evaluate the adequacy of and adjust its total financial resources. Stress tests should be performed daily using standard and predetermined parameters and assumptions. On at least a monthly basis, a CCP should perform a comprehensive and thorough analysis of stress testing scenarios, models, and underlying parameters and assumptions used to ensure they are appropriate for determining the CCP's required level of default protection in light of current and evolving market conditions. A CCP should perform this analysis of stress testing more frequently when the products cleared or markets served display high volatility, become less liquid, or when the size or concentration of positions held by a CCP's participants increases significantly. A full validation of a CCP's risk-management model should be performed at least annually.**
Description	*Stress testing* Not applicable *Review and validation* Not applicable
Key consideration 6	**In conducting stress testing, a CCP should consider the effect of a wide range of relevant stress scenarios in terms of both defaulters' positions and possible price changes in liquidation periods. Scenarios should include relevant peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions.**
Description	Not applicable

Key consideration 7	**An FMI should establish explicit rules and procedures that address fully any credit losses it may face as a result of any individual or combined default among its participants with respect to any of their obligations to the FMI. These rules and procedures should address how potentially uncovered credit losses would be allocated, including the repayment of any funds an FMI may borrow from liquidity providers. These rules and procedures should also indicate the FMI's process to replenish any financial resources that the FMI may employ during a stress event, so that the FMI can continue to operate in a safe and sound manner.**
Description	*Allocation of credit losses* According to the BOT Regulation No. Sor Ror Khor 2/2552, if participants are unable to buy back their collaterals by 12.00 pm. on the next business day, credit loss is explicitly addressed by the regulation in that participants have no rights to buy their collaterals back. BPD will dispose these collaterals to FOG at the market price on the selling date, charging or paying the marginal difference to cover price fluctuation effect. After that, FOG can liquidate this collateral in the market. Thus, collaterals that participants are required to deposit at the BOT as ILF collaterals can cover credit loss that the BOT may face without replenishing other's financial resource or borrowing from liquidity providers. (**Source:** Sor Ror Khor 2/2552)
Key conclusions	BAHTNET is designed to provide Real Time Gross Settlement (RTGS) mechanism in order to mitigate credit risk between participants. Fund transfer via the BAHTNET system is accomplished only if participants have adequate funds in their deposit accounts at the BOT. The BOT, as provider of Intraday Liquidity Facilities, may expose to credit risk arising from failure of participant to repay their ILF at the end of day. For MFT settlement, the BOT also provides the Securities Requirement for Settlement (SRS) facility to mitigate credit risk which may incur among participants. In this regard, credit risk is addressed by the collateralized scheme, marked-to-market and prudential haircut policy.
Assessment of Principle 4	**Observed**
Recommendations and comments	

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.	
Key consideration 1	**An FMI should generally limit the assets it (routinely) accepts as collateral to those with low credit, liquidity, and market risks.**
Description	The BOT's policy is to accept only the highest quality collaterals for intraday liquidity facilities (ILF) provision in BAHTNET as well as applies prudential haircuts to these collaterals. In addition, the BOT requires only repurchase agreements (repos) as a mechanism to provide intraday liquidity for BAHTNET participants. Debt instruments that are accepted as collateral include BOT bonds, government bonds, State-owned Enterprises (SOEs) bonds, and debt instruments as prescribed in the **BOT Regulation for Intraday Liquidity Facilities (ILF) (Second Amendment) (**Sor Ror Khor. 1/2558**)** which are the subset of eligible debt instruments stated in the *BOT Regulation for Borrowing from the BOT via Repurchase Agreement (FMOG 1/2561)*. The rationale behind this approach is that when participants are unable to buy back the collaterals by noon of the next day, BPD can sell those collaterals to FOG to cover loss from lending ILF. Furthermore, on an exceptional basis, the BOT can issue a notification to broaden the type of accepted eligible bonds which is not in the FOG's eligible debt instruments list. (**Source**: Sor Ror Khor. 1/2558) BAHTNET monitors posted collaterals to ensure that they meet the acceptance criteria. When participants transfer their securities to the BOT for use of liquidity facilities of BAHTNET, these collaterals will be verified against the eligible collateral list as specified by the BAHTNET regulation for ILF. Eligibility of posted securities will be rechecked again every time before conducting a repo transaction and granting ILF to participants. The BOT's collateral acceptance criteria focus on the issuers of debt instruments; at present only the highest quality collaterals issued by the BOT, Ministry of Finance and SOEs are accepted while own issuer or guarantor of debt instruments are not accepted. In addition, the BOT regularly reviews the list of eligible issuers and collaterals. The BOT shall purchase debt instruments from financial institutions with repurchase contract in accordance with the conditions as follows:

	1) The BOT shall purchase debt instruments at the price stipulated by the BOT. 2) The BOT shall charge compensation for purchase of debt instruments at the rate stipulated by the BOT. 3) The BOT shall purchase only debt instruments which can be marked to market. 4) Each lot of debt instruments purchased by the BOT shall be the instruments that meet the conditions and have face value not less than the level stipulated by the BOT. 5) For debt instruments pledged as securities for cheque-clearing credit balance in accordance with the *BOT Regulation on Cheque Clearing System*, the BOT shall purchase such debt instruments upon completion of returned cheque-clearing round, or purchase those debt instruments for settlement of returned cheque-clearing round only. Financial institutions shall maintain sufficient number or ratio of debt instruments for intraday liquidity facilities as stipulated in the BOT Regulation for BAHTNET services B.E.2549 (2006). Financial institutions that have daily average value of funds transfer over 500 million Baht are required to maintain an ILF capacity in the amount not less than 10 percent of the average value of their funds transfer in BAHTNET over the same fortnight of the previous month. Please see the BOT Regulation for Intraday Liquidity Facilities (ILF) (Sor Ror Khor. 2/2552) and the BOT Regulation for Fees and Charges on BAHTNET Services (Sor Ror Khor. 10/2565) for more information. (**Source:** BAHTNET Regulation) The BOT mitigates possible specific wrong-way-risk by limiting acceptable collaterals to be mainly government bonds, BOT bonds, and SOEs bonds. These bonds' values do not have explicit correlation with financial institutions' credit quality, thus, default of a financial institution should not affect the value of these collaterals. Additionally, BOT announces through *BOT Notification No.* Sor Ror Khor. 8/2562 *on Additional Criteria on Purchase of Debt Instruments Issued by State-Owned Enterprises or Financial Institutions Established under a Specific Law and the Use of Debt Instruments for which the BOT is Not a Registrar as Collateral* that BAHTNET participants shall not pledge their own debt instruments as collateral at BOT for the use of liquidity facilities of BAHTNET. In other words, there is no likelihood of wrong-way risk.

<table>
<tr><td>Key consideration 2</td><td>An FMI should establish prudent valuation practices and develop haircuts that are regularly tested and take into account stressed market conditions.</td></tr>
<tr><td>Description</td><td>

Valuation practices

Collaterals are valued on a daily marked-to-market basis, with haircuts. The BOT does not exercise discretion in valuing assets as the BOT accepts only collaterals which can be marked to market based on the market prices published by the Thai Bond Market Association (ThaiBMA).

Haircutting practices

Haircuts are determined by calculating value at risk (VaR) at 95% confidence level. The data cover a long historical time span that includes several stressed periods. Volatilities of collateral values are calculated as inputs of the haircuts, based on the number of days required for liquidating the collaterals. The BOT continuously reviews volatilities of collaterals' values and adjust the haircuts to reflect any new stressed period.

Haircut rates vary depending on securities types and maturities as specified in the *BOT Notification No.* Sor Ror Khor. 2/2563 *for the Bank of Thailand's Purchase Prices of Debt Instruments in Connection to the Provision of Intraday Liquidity Facilities for Financial Institutions. The haircut rates in 2024 that are used for intra-day lending are* as shown below.

Haircut Rates

Debt instrument type	**Haircut (percent) according to remaining time to maturity**			
	0 – 5 years	**>5 – 10 years**	**> 10 – 20 years**	**> 20 years**
Treasury bill, Debt Restructuring Government Bond (R-bill), government bond[1], BOT bond[1]	0.50	1.00	1.50	2.00
Bond or debentures issued by a government institution or state-owned enterprises or financial institutions established under a specific law, as the BOT deems appropriate	0.50	1.00	1.50	2.50

[1] For floating rate government bonds and floating rate BOT bonds with variable interest rates, the haircuts in the 0-5 year remaining time to maturity shall be applied.

Sufficiency of haircuts is incorporated in the haircut derivation process by using the data from historical peak periods. Furthermore, the BOT reviews volatility data on a yearly basis to validate whether a new historical peak

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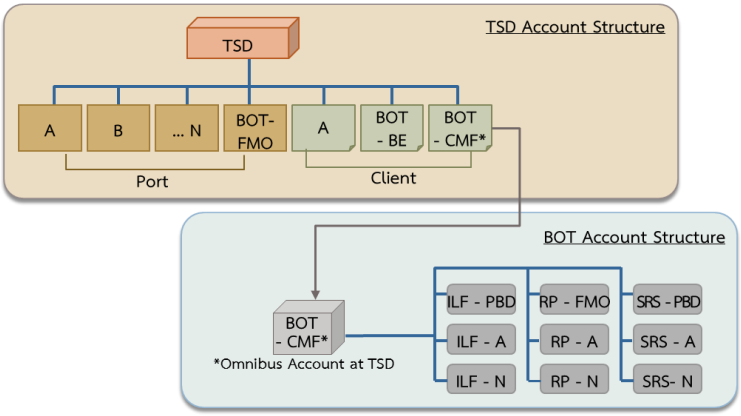
	occurs. While Financial Risk Management Department determines the haircut methodology and procedure, the Enterprise Risk Management Department reviews and tests such procedures at least annually.
Key consideration 3	**In order to reduce the need for pro-cyclical adjustments, an FMI should establish stable and conservative haircuts that are calibrated to include periods of stressed market conditions, to the extent practicable and prudent.**
Description	The BOT designs the haircut procedures with an aim to reduce procyclical adjustments. Therefore, the highest historical volatility occurred during the period of market stress will be used to ensure that the haircuts are generally steady through changing market conditions.
Key consideration 4	**An FMI should avoid concentrated holdings of certain assets where this would significantly impair the ability to liquidate such assets quickly without significant adverse price effects.**
Description	BOT announces through the *BOT Notification No.* Sor Ror Khor. 8/2562 *on Additional Criteria on Purchase of Debt Instruments Issued by State-Owned Enterprises or Financial Institutions Established under a Specific Law and the Use of Debt Instruments for which the BOT is Not a Registrar as Collateral* to limit concentrated holdings of debt instruments, which principal and interest are not guaranteed by the Ministry of Finance in Intraday Liquidity Facilities (ILF) and securities requirements for settlement (SRS) sub-account as following : - **For ILF sub-account,** the holding is capped at 10 percent of Criteria on Intraday Liquidity Facilities. - **For SRS sub-account,** the holdings is capped at 10 percent of its' Potential Debit Position (PDP) value. To ensure that holdings of debt instrument not guaranteed by the Ministry of Finance not exceed the acceptance criteria, financial institutions shall routinely monitor and manage debt instruments in ILF and SRS sub-account via BOT-EFS External. In case of breaching the criteria, BOT has the authority to remove the exceeded amount of such debt instruments and related fee will be applied.
Key consideration 5	**An FMI that accepts cross-border collateral should mitigate the risks associated with its use and ensure that the collateral can be used in a timely manner.**
Description	Not applicable
Key consideration 6	**An FMI should use a collateral management system that is well-designed and operationally flexible.**

Description	*Collateral management system design* In 2016, the BOT and Thailand Securities Depository Co., Ltd. (TSD) jointly enhanced the RTGS-DVP Linkage (RDL) in order to upgrade the infrastructure to the latest technology as well as improve the information sharing and collateral management system. Financial Institutions have to maintain securities accounts at TSD to transfer, deposit and withdraw securities via Post Trade Integration (PTI) system. The BOT also maintains BOT-CMF account (Securities account of the BOT for managing collateral) at TSD. In order to transfer securities to conduct transactions with the BOT, financial Institutions can transfer their securities from their accounts at TSD to BOT-CMF account by indicating the type of 'Sub-account of debt instruments as collateral for settlement [2] in the BOT's subsystem. After securities transfer at TSD is complete, the sub-account of debt instruments as collaterals for settlement will be simultaneously updated and participants can use the securities in their sub-accounts to conduct the transactions with the BOT. At present, there are 3 transaction types which are intraday liquidity facilities (ILF), repurchase (RP) and securities requirements for settlement (SRS).  **Securities account Structure** - **Securities account of the BOT for managing collateral** is a securities account of the BOT opened at the TSD in order to hold debt instruments on behalf of BAHTNET participants to facilitate the usage of collateral in the system or and undertaking of transactions with the BOT.

	- **Sub-account of debt instruments as collateral for settlement** is a sub-account of debt instruments of each BAHTENT participant which the collaterals maintained under this sub-account will be used for ILF and SRS or used for undertaking End-of-day Repurchase transaction (RP) with the BOT. The BOT shall manage and monitor collaterals via BOT-EFS Internal. At the end of day, collaterals' outstanding in BOT-CMF will be reconciled before the BAHTNET system closes. Financial Institutions that maintain securities accounts at TSD can manage and monitor their own collateral via Post Trade Integration) PTI) system at TSD and via BOT-EFS External at the BOT, for example, they can transfer debt instruments from their securities accounts at TSD to their sub-account of debt instruments as collateral for settlement. *Operational flexibility* The collateral management system was well-designed and operationally flexible to ensure smooth operations during any of stressed conditions. The BOT and TSD have established the operational procedures for the system. Moreover, the BCP is established and tested annually.
Key conclusions	The BOT only accepts limited types of bond which have low credit risk and high liquidity such as BOT bonds, government bonds and SOEs bonds. In addition, the BOT may broaden the range of eligible collateral when financial institutions face temporary shortage. BAHTNET accepts as collateral bonds or debt securities issued by SOEs and SFIs. However, participants shall not pledge their own debt instruments as collateral at BOT for the use of liquidity facilities of BAHTNET. In other words, there is no likelihood of wrong-way risk. Collateral value is marked-to-market on a daily basis with prudential haircut applied, depending on type and maturity of the securities. Haircuts are determined by calculating VAR at 95% confidence level to mitigate the need for procyclical adjustment by considering historical statistics that include several stressed periods. The BOT reviews volatility data on a yearly basis to ensure that haircuts are still appropriate. BAHTNET also implemented concentration limit of holdings debt instruments, which are <u>not guaranteed</u> by the Ministry of Finance. The BOT and TSD have established the operational procedures and BCP to ensure that the collateral management system has smooth operations during stressed conditions, with an annual BCP test.

Assessment of Principle 5	**Observed**
Recommendations and comments	
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.	
Key consideration 1	**A CCP should have a margin system that establishes margin levels commensurate with the risks and particular attributes of each product, portfolio, and market it serves.**
Description	*Description of margin methodology* *Credit exposures* *Operational components*
Key consideration 2	**A CCP should have a reliable source of timely price data for its margin system. A CCP should also have procedures and sound valuation models for addressing circumstances in which pricing data are not readily available or reliable.**
Description	*Sources of price data* *Estimation of prices*
Key consideration 3	**A CCP should adopt initial margin models and parameters that are risk-based and generate margin requirements sufficient to cover its potential future exposure to participants in the interval between the last margin collection and the close out of positions following a participant default. Initial margin should meet an established single-tailed confidence level of at least 99 percent with respect to the estimated distribution of future exposure. For a CCP that calculates margin at the portfolio level, this requirement applies to each portfolio's distribution of future exposure. For a CCP that calculates margin at more-granular levels, such as at the sub-portfolio level or by product, the requirement must be met for the corresponding distributions of future exposure. The model should (a) use a conservative estimate of the time horizons for the effective hedging or close out of the particular types of products cleared by the CCP (including in stressed market conditions), (b) have an appropriate method for measuring credit exposure that accounts for relevant product risk factors and portfolio effects across products, and (c) to the extent practicable and prudent, limit the need for destabilising, procyclical changes.**

Description	*Initial margin model* *Closeout and sample periods* *Procyclicality and specific wrong-way risk*
Key consideration 4	**A CCP should mark participant positions to market and collect variation margin at least daily to limit the build-up of current exposures. A CCP should have the authority and operational capacity to make intraday margin calls and payments, both scheduled and unscheduled, to participants.**
Description	
Key consideration 5	**In calculating margin requirements, a CCP may allow offsets or reductions in required margin across products that it clears or between products that it and another CCP clear, if the risk of one product is significantly and reliably correlated with the risk of the other product. Where two or more CCPs are authorised to offer cross-margining, they must have appropriate safeguards and harmonised overall risk-management systems.**
Description	*Portfolio margining* *Cross-margining* *Robustness of methodologies*
Key consideration 6	**A CCP should analyse and monitor its model performance and overall margin coverage by conducting rigorous daily backtesting – and at least monthly, and more-frequent where appropriate, sensitivity analysis. A CCP should regularly conduct an assessment of the theoretical and empirical properties of its margin model for all products it clears. In conducting sensitivity analysis of the model's coverage, a CCP should take into account a wide range of parameters and assumptions that reflect possible market conditions, including the most-volatile periods that have been experienced by the markets it serves and extreme changes in the correlations between prices.**
Description	*Backtesting and sensitivity analysis* *Margin model performance*
Key consideration 7	**A CCP should regularly review and validate its margin system.**
Description	
Key conclusions	
Assessment of Principle 6	**Not applicable**
Recommendations and comments	

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**.**	
Key consideration 1	**An FMI should have a robust framework to manage its liquidity risks from its participants, settlement banks, nostro agents, custodian banks, liquidity providers, and other entities.**
Description	By the design of BAHTNET which is Real Time Gross Settlement (RTGS) System, funds transfer transactions will be settled one by one only if there is sufficient balance in participants' accounts. Therefore, there is no liquidity risk exposed from its operation. Unsettled transactions in queue will be cancelled by the system at the end of day. Liquidity risk in BAHTNET arises from failed obligations between participants due to insufficient balances to complete the instructions when due. Initial sources of liquidity in BAHTNET come from participants' opening balances in Deposit/Settlement Account and the maturity of money market placements with the BOT. Besides, the BOT provides variety of tools and mechanisms to manage liquidity risk and ensure sufficient liquidity in the system as follows: 1. **Queuing Mechanism** to facilitate transactions with insufficient liquidity to be queued in the system and immediately proceed when there is sufficient fund in sending banks' accounts. The queuing mechanism design allows sending institutions to assign priority within their own queues of transactions through their workstation. Unsettled payment instructions that are still in queue at the end-of-day will be flushed from the system, and must be re-entered by sending participants the next day. In practice, such situation rarely occurs since there are other liquidity provision mechanisms to BAHTNET participants, especially for commercial banks, so that there is sufficient liquidity for settling the transactions. Furthermore, BAHTNET specifies cut-off time prior to the end of day to allow participants to manage their liquidity effectively and maintain desired overnight balances in their accounts before closing. 2. **Gridlock Resolution** to reduce liquidity needs for settling transactions. This mechanism aims at solving a situation when several

	transfer instructions among several participants cannot be executed due to insufficient funds in one or more accounts. When instructions from various institutions stand in their queues and form a loop of funds transfers, the system will search for the group of instructions that, if executed, will result in a positive net position for each of the transferors. When these instructions are found, the system will off-set all related transactions and post them to each account simultaneously. This helps reduce liquidity needs in the system. 3. **Intraday Liquidity Facilities (ILF)** to provide liquidity against eligible collaterals. The BOT provides fully collateralized intraday facilities. Both direct and associate participants who are financial institutions under the BOT's supervision are allowed to use the facility to support their liquidity management. This facility is, however, not available to participants who are nonfinancial institutions such as securities companies and government agencies. During the day, ILF is provided free of interest. The outstanding amount at the end of day is treated as an overnight loan and will be charged a penalty rate, which is policy rate (one-day repurchase rate) plus 0.5 percent per year. Financial institutions that have daily average value of funds transfer greater than 500 million Baht are required to maintain an ILF capacity not less than 10 percent of the average value of the funds transfers in BAHTNET during the same fortnight of the previous month. Collaterals used for intraday liquidity include government bonds and securities guaranteed by the government denominated in THB. These collaterals are marked-to-market daily and are subject to prudential haircuts, depending on maturity of each class of bonds.) 4. **Securities Requirements for Settlement (SRS)** to provide liquidity to mitigate settlement risk of MFT transactions. In addition to ILF, the BOT requires participants involved in Multilateral Funds Transfer (MFT) to reserve collaterals against the exposure from net clearing positions from retail payments that are settled through BAHTNET such as cheque clearing and interbank retail funds transfer. To ensure that participants have sufficient liquidity to settle their net debit positions, they are required to reserve collaterals not less than their highest Potential Debit Positions (PDP), calculated based on historical net debit position of their net settlement. These collaterals include government bonds and securities guaranteed by the government denominated in THB. Collaterals are marked-to-market

	daily and are subject to prudential haircuts, depending on maturity of each class of bonds. 5. **Pricing incentive** to encourage early submission of participants' funds transfer orders into the system during operation hours by charging fee based on time-zone difference. BAHTNET fee is determined by the transaction settlement time during the day. This pricing incentive aims to encourage participants to submit funds transfer instructions early in the day in order to facilitate transactions settlement more efficiently. There are three time zones with ascending fee rates; 8:30–12:00 with the lowest charge; 12:00–16:00, and 16:00–17:30 with the highest charge. 6. **Throughput guideline** to encourage early submission of participants' funds transfer orders into the system during operation hours. The BOT requires participants that transact greater than 500 million Baht per day to submit at least 30 percent of the expected total value of transactions that day or the average value during the same fortnight of the previous month by noon, and at least 70 percent by 15:00. This requirement aims to facilitate smooth operations of the settlement process and avoid heavy congestion of instructions and liquidity management problems, particularly in the afternoon. Even though BAHTNET itself does not require liquidity to complete its operation, the BOT requires participants with have daily average value of funds transfer greater than 500 million Baht to maintain Intraday Liquidity Facilities (ILF) at least 10% of their daily funds transfer value in BAHTNET or 10% of the average value of their funds transfers in BAHTNET during the same fortnight of the previous month. In sum, ILF facilitates continuously and smoothly funds transfer orders' settlement throughout operation hours. In this regard, the BOT has stipulated participants to maintain debt instruments according to the Bank of Thailand Regulation on Purchase of Debt Instruments under Repurchase Contract for Intraday Liquidity Facilities (ILF) and Securities Requirements for Settlement (SRS). ILF and SRS are provided in THB against high quality collaterals pledged at the BOT by participants. So, the size of liquidity needed in the system is represented by the value of those collaterals, net of prudential haircut. Since BAHTNET is owned and operated by the BOT which is the issuer of THB currency, there is no liquidity risks derived from other relevant currencies.

	In 2024, the BOT provided ILF approximately 700 billion Baht per day . In case of stress scenarios, the BOT can consider providing liquidity as follows: 1. In case that the BOT deems necessary to provide liquidity in BAHTNET as stated in Section 45 of the BOT Act, the loan granting process must be in accordance with rules, procedures and conditions prescribed by the PSC. On granting loan for intra-day liquidity, the BOT may consider charging interest or remuneration or calling for collateral. 2. In addition, under Section 42 of the BOT Act, the BOT may consider providing financial assistance to financial institutions that have liquidity problem, provided that the problem is deemed to endanger the stability of economic and monetary system as a whole. In this regard, the BOT can use these financial institutions' shares or properties as collaterals for granted loans, in accordance with rules, procedures and conditions prescribed by the Financial Institutions Policy Committee. Potential aggregate liquidity risk that the BOT takes into account comprises the value of ILF provided and the value of participants' debit position in Multilateral Funds Transfer (MFT) transactions as follows: • Intraday Liquidity Facilities (ILF) BAHTNET monitors collaterals that are posted in the system to ensure they meet the acceptance criteria. Eligibility of posted securities will be rechecked every time before conducting a repo transaction and before granting ILF to participants. The BOT's collateral acceptance criteria focus on the debt instrument issuers; at present only the **highest quality collaterals** issued by the BOT, Ministry of Finance and State-Owned-Enterprises are accepted. The BOT regularly reviews the list of eligible issuers and collaterals as well. ILF is fully collateralized, where collaterals are marked-to-market and are subject to prudential haircut policy which is originally set by Financial Risk Management Department and verified by Enterprise Risk Management Department. In this regard, financial institutions that have daily average value of funds transfer greater than 500 million Baht are required to maintain an ILF capacity not less than 10 percent of their daily funds transfer value or 10% of the average value of the funds transfers in BAHTNET during the same fortnight of the previous month. Total amount of ILF provided to participants can be considered as part of potential aggregate liquidity risk that may incur in the system.

	Please see the BOT Regulation for Intraday Liquidity Facilities (ILF) (Sor Ror Khor. 2/2552) for more information. **Securities Requirements for Settlement (SRS)** As participants' net positions from MFT transactions are considered as part of potential aggregate liquidity risk that may incur in the system, SRS measure is put in place to ensure that participants have sufficient liquidity to settle their net debit positions. In response to 2018 FSAP recommendations, the BOT initiated a conceptual study for an automated collateral management system. This study examines a design that would potentially minimize participant opportunity costs through automated collateral management of the Liquidity Saving Mechanism. To enhance this function, the BOT is actively studying various models, including automated partial selling of intraday liquidity facilities (ILF) and collateral pooling. The BOT is currently analyzing and summarizing these concepts in collaboration with BAHTNET participants, with the intention of integrating these innovations into the BAHTNET Modernization project, scheduled for implementation in 2029.
Key consideration 2	**An FMI should have effective operational and analytical tools to identify, measure, and monitor its settlement and funding flows on an ongoing and timely basis, including its use of intraday liquidity.**
Description	**Operational Tools** BAHTNET provides real-time operational monitoring tools to identify, measure, and monitor settlement and funding flows as follows: • BAHTNET provides real-time monitoring tools for BAHTNET's operators to monitor the funds flow via account balances and account movements of all participants including their queued transactions submitted to the system. Moreover, the recent liquidity dashboard summarizing necessary liquidity information enhances better liquidity monitoring, management and provide a warning feature. • BAHTNET provides real-time monitoring tools for participants to actively monitor their funds flow, liquidity balances and transaction information in real-time via BAHTNET web station. For transactions in queue, participants can change the priority of their transfer orders as well as set the urgency for a particular transfer order to be executed before any other transfer orders in the queue. They can also cancel transfer orders upon consent of their counterparties.

Key consideration 3	**A payment system or SSS, including one employing a DNS mechanism, should maintain sufficient liquid resources in all relevant currencies to effect same-day settlement, and where appropriate intraday or 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 payment obligation in extreme but plausible market conditions.**
Description	Not applicable • BAHTNET is an RTGS and settled in THB only. It does not need to determine the amount of liquid resources in all relevant currencies to effect the same day settlement or multiple of payment obligations. Instead, the amount of liquidity requirement of participants is a major concern. A reverse stress test is conducted in order to determine a participant's daily maximum requirement for intraday liquidity. The potential largest stress scenario is when a participant needs to cover all of its obligation using its own source of funds, which are funds in account balance and ILF, without any incoming funds from others.
Key consideration 4	**A CCP should maintain sufficient liquid resources in all relevant currencies to settle securities-related payments, make required variation margin payments, and meet other payment obligations on time 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 payment obligation to the CCP in extreme but plausible market conditions. In addition, a CCP that is involved in activities with a more-complex risk profile or that is systemically important in multiple jurisdictions should consider maintaining additional liquidity resources sufficient to cover a wider range of potential stress scenarios that should include, but not be limited to, the default of the two participants and their affiliates that would generate the largest aggregate payment obligation to the CCP in extreme but plausible market conditions.**
Description	Not applicable

Key consideration 5	**For the purpose of meeting its minimum liquid resource requirement, an FMI's qualifying liquid resources in each currency include cash at the central bank of issue and at creditworthy commercial banks, committed lines of credit, committed foreign exchange swaps, and committed repos, as well as highly marketable collateral held in custody and investments that are readily available and convertible into cash with prearranged and highly reliable funding arrangements, even in extreme but plausible market conditions. If an FMI has access to routine credit at the central bank of issue, the FMI may count such access as part of the minimum requirement to the extent it has collateral that is eligible for pledging to (or for conducting other appropriate forms of transactions with) the relevant central bank. All such resources should be available when needed.**
Description	Not applicable
Key consideration 6	**An FMI may supplement its qualifying liquid resources with other forms of liquid resources. If the FMI does so, then these liquid resources should be in the form of assets that are likely to be saleable or acceptable as collateral for lines of credit, swaps, or repos on an ad hoc basis following a default, even if this cannot be reliably prearranged or guaranteed in extreme market conditions. Even if an FMI does not have access to routine central bank credit, it should still take account of what collateral is typically accepted by the relevant central bank, as such assets may be more likely to be liquid in stressed circumstances. An FMI should not assume the availability of emergency central bank credit as a part of its liquidity plan.**
Description	*Size and composition of supplemental liquid resources* Not applicable *Availability of supplemental liquid resources*
Key consideration 7	**An FMI should obtain a high degree of confidence, through rigorous due diligence, that each provider of its minimum required qualifying liquid resources, whether a participant of the FMI or an external party, has sufficient information to understand and to manage its associated liquidity risks, and that it has the capacity to perform as required under its commitment. Where relevant to assessing a liquidity provider's performance reliability with respect to a particular currency, a liquidity provider's potential access to credit from the central bank of issue may be taken into account. An FMI should regularly test its procedures for accessing its liquid resources at a liquidity provider.**
Description	*Use of liquidity providers*

	Not applicable *Reliability of liquidity providers*
Key consideration 8	**An FMI with access to central bank accounts, payment services, or securities services should use these services, where practical, to enhance its management of liquidity risk.**
Description	Not applicable since BAHTNET operates on central bank money. Please see principle 9.
Key consideration 9	**An FMI should determine the amount and regularly test the sufficiency of its liquid resources through rigorous stress testing. An FMI should have clear procedures to report the results of its stress tests to appropriate decision makers at the FMI and to use these results to evaluate the adequacy of and adjust its liquidity risk-management framework. In conducting stress testing, an FMI should consider a wide range of relevant scenarios. Scenarios should include relevant peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions. Scenarios should also take into account the design and operation of the FMI, include all entities that might pose material liquidity risks to the FMI (such as settlement banks, nostro agents, custodian banks, liquidity providers, and linked FMIs), and where appropriate, cover a multiday period. In all cases, an FMI should document its supporting rationale for, and should have appropriate governance arrangements relating to, the amount and form of total liquid resources it maintains.**
Description	*Stress test programme* Not applicable since BAHTNET is an RTGS which does not require liquidity resource to operate. Instead, simulations and studies are conducted to determine sufficiency of participants' sources of liquidity. *Stress test scenarios* *Review and validation*
Key consideration 10	**An FMI should establish explicit rules and procedures that enable the FMI to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations on time following any individual or combined default among its participants. These rules and procedures should address unforeseen and potentially uncovered liquidity shortfalls and should aim to avoid unwinding, revoking, or delaying the same-day settlement of payment obligations. These**

	rules and procedures should also indicate the FMI's process to replenish any liquidity resources it may employ during a stress event, so that it can continue to operate in a safe and sound manner.
Description	*Same day settlement* Not applicable since BAHTNET is an RTGS which is not responsible for liquidity shortfalls of defaulting participants. *Replenishment of liquidity resources*
Key Conclusions	BAHTNET is Real Time Gross Settlement (RTGS) System which settles funds transfer transactions one by one only if there is sufficient balance in the participants' accounts, therefore there is no liquidity risk exposed from its operation. Moreover, BAHTNET is an RTGS owned and operated by the BOT which is in a position to meet THB liquidity requirements of all participants in the system at all points for settling their transactions. Liquidity of the BAHTNET system is provided by many tools and mechanism including Intraday Liquidity Facilities (ILF), Securities Requirements for Settlement (SRS), Queuing Mechanism, Gridlock Resolution, Pricing incentive and Throughput guideline. In addition, information for liquidity management and transaction details are available for BAHTNET participants on a real-time basis. The analysis is also conducted to identify liquidity need of participants.
Assessment of Principle 7	**Observed**
Recommendations and comments	

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**.**	
Key consideration 1	**An FMI's rules and procedures should clearly define the point at which settlement is final.**
Description	*Point of settlement finality* Each funds transfer transaction will be completed and considered final and irrevocable at the point which will be described as follows: **BAHTNET:** According to Article 40 and 41 of BAHTNET Regulation, the transaction is deemed final and irrevocable when funds is debited from sending institution's account and credited to receiving institution's account

	as specified in the transfer order. After the settlement is completed, the sending institution cannot revoke the transaction. **RDL (RTGS-DvP Linkage):** According to the *BOT Notification for Linkage service for securities settlement between BOT and TSD, Article 4.3*, the transaction is deemed final and irrevocable when funds is debited from sending institution's account and credited to receiving institution's account as specified in the sending institution's request for funds settlement and BOT has already accordingly notified the TSD. **CSS (Central Settlement System)**: According to the *BOT Notification No.* Sor Ror Khor. 7/2551, *Article 13 for Multilateral Fund Transfer*, the transaction is considered final and irrevocable when the funds is completely transferred from the net-debit sending institution's account to the net-credit receiving institution's account as specified in the MFT instruction. After the settlement is completed, the institution cannot revoke the transaction. (**Source:** Sor Ror Khor. 7/2551) Note: CSS is a system served for net settlement of retail payment transactions among BAHTNET participants undertaken through Multilateral Fund Transfer (MFT) function by debiting a number of net-debit sending institutions' accounts and simultaneously crediting a number of net-credit receiving institutions' accounts such as settlement of inter-bank cheque clearing. Moreover, all of the sending institutions need to have sufficient funds at the designated time in order for the settlement to take place. In case one of the participants faces the liquidity shortage resulting in failing to settle MFT, the BOT will utilize the collaterals held for Securities Requirement for Settlement (SRS) to mitigate settlement risk. **PvP**: According to the Notification for Linkage between BAHTNET and USD CHATS for FX settlement No. Sor Ror Khor. 4/2557 Article 5.2.4, the PvP transaction is deemed final and irrevocable when the funds in Thai Baht leg is debited from sending institution's account and credited to receiving institution's account in BAHTNET and the funds in US dollar leg is debited from sending institution's account and credited to receiving institution's account in USD CHATS simultaneously. Once the PvP processes mentioned are completed, the transfer for Thai Baht leg is deemed to be final and irrevocable. The sending institution cannot revoke the transaction. (**Source:** Sor Ror Khor 4/2557)

	The relevant regulations as specified above are disclosed to all of BAHTNET's participants and public through BOT website. Currently, the Payment Systems Act has been enacted which laid out the oversight and supervision framework for payment systems and services, and especially address the essence of payment finality. Moreover, Section 9 of the Payment System Act states that in the case where the court has issued the order accepting the petition for business reorganization or the order for receivership of a member, the transactions that were completed through the country's major clearing and settlement system before the court's decision shall be final and irrevocable. This is to ensure the high degree of legal certainty that finality will be achieved. During the process of enacting the Payment Systems Act, BOT has obtained a well-reasoned legal opinion from the Office of the Council of State, the Legal Department and the National Legislative Assembly in order to ensure high degree of legal certainty in all Thai relevant jurisdictions. *Finality in the case of links* **a) Finality in the case of SSS** There are two types of Exchange-of-Value settlement in BAHTNET. The first linkage is the DvP linkage between the BOT and the TSD for government securities and equity settlement. The second one is the PvP linkage between BAHTNET and the HKMA's USD CHATS for foreign exchange settlement. For securities transactions, the principal risk can be eliminated by applying a DvP model 1 arrangement which securities and funds are settled on a gross basis. For equity transactions traded via exchange, a DvP model 3 arrangement which securities and funds are settled on net basis will be applied. For FX transaction between THB/USD, the PvP mechanism is applied to eliminate principal and settlement risk. To ensure that the final settlement of one obligation occurs if and only if the final settlement of the linked obligation also occurs, the BOT has implemented relevant rules and regulations as follows: **(1) DvP Linkage between the BOT and the TSD** **1.1 RTGS-DvP linkage for securities settlement** The TSD initiates the securities settlement transaction from their side by earmarking the securities in seller's account and sending a request for cash settlement to the BAHTNET. As stipulated in *Article 4.3 of*

	the BOT Notification for Linkage service for securities settlement between the BOT and the TSD, the cash leg transaction is deemed final and irrevocable when funds transfer order is debited from sending institution's account and credited to receiving institution's account as specified in the transfer order on settlement date. As soon as the funds transfer is completed, the BOT will notify the TSD and TSD will complete settlement of securities leg accordingly (DvP model 1- Gross-Gross). **1.2 DvP Arrangement for equity settlement** For equity settlement, the BOT adopt DvP model 3 (Net-Net) which TCH will submit the MFT transactions to BAHTNET system to effect cash leg of equity settlement. Once the MFT is settled, the funds transfer is considered final and irrevocable as stipulated in the BOT Notification No. Sor Ror Khor. 7/2551, Article 13. The BOT will notify the TCH when the funds transfer is completed. (**Source:** Sor Ror Khor. 7/2551) In the case of securities/equity transfer between participants, the TSD will transfer the ownership of securities/equity after receiving confirmation from the TCH that the funds has been completely transferred. Once the TSD transferred the ownership of securities/equity, that transfer transaction is considered final and irrevocable as stipulated in Notification No. Tor. Tor. 32/2559 Regulation and procedure for the TCH and the TSD, Article 57, Paragraph 2. Furthermore, the TSD also states in the rule book that the TSD will transfer ownership of securities/equity after receiving settlement confirmation from the TCH and the transaction will be deemed final and irrevocable as stipulated in regulation Chapter 400: Securities Accounts, Deposit, Withdrawal, Transfer and Cancellation of a Deposit of Securities, Article 405.2: Validity of a Transfer of Securities. **(2) PvP Linkage between BAHTNET and USD CHATS for FX settlement** The PvP transaction is deemed final and irrevocable when the funds in Thai Baht leg is debited from sending bank's account and credited to receiving's account in BAHTNET and the funds in US dollar leg is debited from sending bank's account and credited to receiving's account in USD CHATS simultaneously, as stipulated in the *BOT Notification No.* Sor Ror Khor. 4/2557 - *Article 5.2.4 for Linkage service for FX settlement between BAHTNET and USD CHATS*.

	For US Dollar leg, the PvP transaction is deemed final and irrevocable as stipulated in Payment Systems and Stored Value Facilities Ordinance : PSSVFO (Chapter 584 of the Laws of Hong Kong) In addition, BAHTNET is operated and overseen by the BOT whereas securities settlement system is operated by the TSD and overseen by the SEC. In this regards, the BOT and the SEC have shared oversight information for both regular and irregular events according to the MOU on cooperative oversight for DvP linkage. For cross-border linkage, USD CHATS is operated by HKICL and overseen by the HKMA. Both central banks have also shared oversight information on its RTGS according to the MOU on cooperative oversight for PvP linkage. **b) For CCP -** Not applicable
Key consideration 2	**An FMI should complete final settlement no later than the end of the value date, and preferably intraday or in real time, to reduce settlement risk. An LVPS or SSS should consider adopting RTGS or multiple-batch processing during the settlement day.**
Description	*Final settlement on the value date* Final settlement in BAHTNET is completed individually on a real time transaction-by-transaction basis on the value date only. In case that there is insufficient funds in sending institution's account, the transfer order will be placed in queue until the sending institution has adequate funds in its account, according to Article 44 of BAHTNET regulation. However, if the sending institution still does not have sufficient amount of funds at the end of the value date resulting in failure to execute its transfer order at the closing time, the sending institution will receive a rejection message from the system. *Intraday or real-time final settlement* BAHTNET has never postponed the settlement to the next working day as the system is designed to operate and settle within the settlement date. Moreover, BAHTNET has never operated in a way that was not contemplated by its rules, procedures or contracts. However, in case of emergency such as unexpected special holidays occurred from major disasters or political unrests, the forward value date transactions will be invalid, participants have to resend the transactions to the system on the first business date after the special holiday, likewise the DVP transaction. Practically, BAHTNET will be operated on the first day of unexpected holiday to ensure that participants could manage their transactions promptly.

	In addition, in order to ensure the smooth settlement of PVP transaction through PVP linkage, BOT and HKICL has a communication BCP arrangement for unpredictable ad hoc holidays that may occur from major disasters, political unrests and epidemics. Both operators will send broadcast messages to inform all participants in their RTGS in order to prepare transactions for the next business date. Moreover, both central banks have assigned the contact persons to handle the incident when it occurs. BAHTNET provides the real-time final settlement as stated in BAHTNET Regulation as follows: According to Article 2 of BAHTNET regulation, BAHTNET, as a financial infrastructure serving for Real-Time Gross Settlement (RTGS) of large value funds transfer between financial institutions or other organizations maintaining deposit accounts at the BOT, was designed to mitigate settlement risk amongst financial institutions as well as to facilitate efficient, fast and secure transfers for third-parties. Additionally, all of the funds transfer transactions that are completed in BAHTNET are considered final and irrevocable. Moreover, BAHTNET participants are allowed to monitor or print the status of their transfer order on a real-time basis in respect of Article 37 of BAHTNET regulation. BAHTNET provides Multilateral Funds Transfer (MFT) settlement on designated time which is bilaterally agreed with Clearing Houses. This function allows a number of simultaneous debit/credit funds transfers for daily settlements. These settlements are net positions of retail transactions sent by settlement agents i.e. NITMX, TCH, and BOT. Once the MFT is completely settled, all of the transactions involved are consider final and irrevocable, according to the *BOT Notification on Multilateral Fund Transfer (Sor Ror Khor. 7/2551), Article 2 and 13*. BOT reserves the right as deem appropriate to change the submit time and settlement time for MFT to prevent any disruptions that may occurred. For settlement of MFT transaction, participants can use liquidity from their accounts or ILF to complete settlement similar to a gross transaction. In case one of the participants faces the liquidity shortage resulting in failing to settle MFT, the transfer order will be placed in queue.

	Moreover, SRS[5] measure may be activated to ensure that the net settlement through BAHTNET will be completed within the specified timeframe even if the participants with the highest debit amount do not have sufficient funds to settle the MFT.
Key consideration 3	**An FMI should clearly define the point after which unsettled payments, transfer instructions, or other obligations may not be revoked by a participant.**
Description	For BAHTNET, if a transaction is considered final, it is irrevocable. However, if the participant knows that the funds was sent to the wrong receiving institution, such participant needs to send message requesting the receiving institution to transfer back those funds. Moreover, BAHTNET defines the point at which participants can cancel (not revoke) their unsettled payments, transfer instructions or other obligations as follows: Cancellation of the incomplete transfer order (Article 39 of BAHTNET regulation) • When the sending institution sends the transfer order to the BOT, the transfer order could be cancelled upon a request to BAHTNET operator under 2 conditions (1) a consent from the receiving institution and (2) BOT has not yet executed that transfer order by crediting funds into the receiving institution's account. The cancellation process is subject to relevant rules and regulations specified by BOT. In addition, BAHTNET prohibits the unilateral revocation of accepted and unsettled payment since it needs consent from both sending institution and receiving institution for the cancellation. There are two cases where unsettled transactions can be cancelled as follows: • Cancellation for the transfer orders that are in queue (Article 63 and 68 of BAHTNET regulation) • Once the transfer order submitted to BAHTNET but the sending's institution does not have adequate funds in its account, these transfer orders will be put in queue waiting for sufficient funds for further settlement.

[5] Securities Requirement for Settlement (SRS) refers to the facility for settlement risk mitigation in case that a member has insufficient funds to complete settlement of Multilateral Funds Transfer (MFT) transaction. By this measure, members are required to pledge collateral against the exposure arising from net settlement from retail payment such as cheque clearing and interbank retail funds transfer. Securities pledged shall not be less than the maximum possible negative balance.

	• BAHTNET participants could notify the BOT to suspend or cancel transfer order that is waiting in queue, according to relevant rules and regulations as specified by BOT. Moreover, an instruction or transfer order accepted and placed in the queue by the system will be cancelled if there is a court order for bankruptcy or winding up of that particular default participant. Cancellation of forward date value transfer orders submitted in advance (Article 69 of BAHTNET regulation) Participants are allowed to submit the transfer orders in advance within the period of time specified by BOT. They are allowed to cancel the transfer order submitted to the queue in advance in accordance with the rule and regulation as prescribed by BOT. The BOT will strictly maintain the normal operating hours of BAHTNET system. The BOT may decide to extend operating hours upon the request from participants in accordance with the criteria as specified in Article 31 and 32 of BAHTNET regulation. BOT reserves the right to disapprove the request to avoid impacts on the rest of service users. The consideration result will be notified to all involved parties. The BOT will consider extending the normal operating hours, upon acknowledging of some justifiable reasons and necessities, i.e., (1) Any participants lack sufficient liquidity, or wait for funds transfer from other participants, or (2) Disruption in any participants, resulting in some unprocessed transactions, or (3) Participants must submit funds transfer order on a particular day in order to avoid impacts on the funds receiving institution. All of the regulations and notification are disclosed to the participants as well as public on the BOT's website (www.bot.or.th) under Payment Systems Notification & Circulars for BAHTNET system section.
Key conclusions	Settlement of funds transfers in the BAHTNET is achieved in real-time and considered final and irrevocable. The transaction settled in the BAHTNET is protected under Section 9 of the Payment Systems Act and could not be cancelled or revoked. Moreover, final settlement through BAHTNET is completed only within the value date. For DvP, the transaction is deemed final and irrevocable when funds transfer order is transferred from sending institution's account to receiving institution's account and accordingly notified the TSD.

	For PvP, once both currencies, Thai Baht and US Dollar, are transferred from the sending institution's account to the receiving institution's account, the transfer in Thai Baht is deemed to be final and irrevocable. In this regard, the formal MOU with the HKMA was established to address all of the concern issues especially the point of finality for both sides. The participants can suspend or cancel a transfer order which is placed in the queue in respect of the rules and regulations as specified by the BOT. Revocation and cancellation can only be done with the consent of the receiving's institution.
Assessment of Principle 8	**Observed**
Recommendations and comments	
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 risk arising from the use of commercial bank money**.**	
Key consideration 1	**An FMI should conduct its money settlements in central bank money, where practical and available, to avoid credit and liquidity risks.**
Description	BAHTNET conducts money settlements through central bank money by requiring participants to maintain current or settlement accounts with the BOT as prescribed in Article 3 of BAHTNET regulation. At present, BAHTNET conducts settlement denominated in Thai Baht only according to Article 1 of BAHTNET regulation.
Key consideration 2	**If central bank money is not used, an FMI should conduct its money settlements using a settlement asset with little or no credit or liquidity risk.**
Description	BAHTNET uses central bank money for settlement except in the case of PvP transaction which US Dollar leg will use commercial bank money for settlement via the linkage with USD CHATS (USD Clearing House Automated Transfer System). Money settlements via USD CHATS are effected through accounts on the books of HSBC, which is appointed by the HKMA to perform the USD settlement institution function in Hong Kong. HSBC is under the prudential supervision of the HKMA which taking risk-based approach. This is to ensure that risks arising from the commercial bank settlement has been closely identified, monitored and managed. Moreover, the HKMA is responsible to oversee USD CHATS in order to ensure the credit and liquidity exposures in the system are properly addressed.

	For cross-border linkage, the sharing of oversight information between the BOT and the HKMA both regular and irregular events is undertaken according to the MOU on cooperative oversight arrangement to ensure the compliance of the system as well as the operations and stability of the settlement bank.
Key consideration 3	**If an FMI settles in commercial bank money, it should monitor, manage, and limit its credit and liquidity risks arising from the commercial settlement banks. In particular, an FMI should establish and monitor adherence to strict criteria for its settlement banks that take account of, among other things, their regulation and supervision, creditworthiness, capitalisation, access to liquidity, and operational reliability. An FMI should also monitor and manage the concentration of credit and liquidity exposures to its commercial settlement banks.**
Description	BAHTNET uses central bank money for settlement.
Key consideration 4	**If an FMI conducts money settlements on its own books, it should minimize and strictly control its credit and liquidity risks.**
Description	Not applicable
Key consideration 5	**An FMI's legal agreements with any settlement banks should state clearly when transfers on the books of individual settlement banks are expected to occur, that transfers are to be final when effected, and that funds received should be transferable as soon as possible, at a minimum by the end of the day and ideally intraday, in order to enable the FMI and its participants to manage credit and liquidity risks.**
Description	Not applicable
Key conclusions	Money settlement in BAHTNET is conducted in Thai Baht via central bank money in order to mitigate credit and liquidity risk. In the case of PVP transaction, the US Dollar leg will use commercial bank money for settlement in USD CHATS. The HKMA is responsible to oversee USD CHATS system to ensure the compliance of the system as well as the operations and stability of the settlement bank.
Assessment of Principle 9	**Observed**
Recommendations and comments	
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.	
Key consideration 1	**An FMI's rules should clearly state its obligations with respect to the delivery of physical instruments or commodities.**
Description	

Key consideration 2	**An FMI should identify, monitor, and manage the risks and costs associated with the storage and delivery of physical instruments or commodities.**
Description	
Key conclusions	
Assessment of Principle 10	**Not applicable**
Recommendations and comments	
Principle 11: Central Securities Depositories A CSD should have appropriate rules and procedures to help ensure the integrity of securities issues and minimise and manage the risks associated with the safekeeping and transfer of securities. A CSD should maintain securities in an immobilised or dematerialised form for their transfer by book entry.	
Key consideration 1	**A CSD should have appropriate rules, procedures, and controls, including robust accounting practices, to safeguard the rights of securities issuers and holders, prevent the unauthorised creation or deletion of securities, and conduct periodic and at least daily reconciliation of securities issues it maintains.**
Description	*Safeguarding the rights of securities issuers and holders* *Prevention of the unauthorised creation or deletion of securities* *Periodic reconciliation of securities issues*
Key consideration 2	**A CSD should prohibit overdrafts and debit balances in securities accounts.**
Description	
Key consideration 3	**A CSD should maintain securities in an immobilised or dematerialised form for their transfer by book entry. Where appropriate, a CSD should provide incentives to immobilise or dematerialise securities.**
Description	
Key consideration 4	**A CSD should protect assets against custody risk through appropriate rules and procedures consistent with its legal framework.**
Description	
Key consideration 5	**A CSD should employ a robust system that ensures segregation between the CSD's own assets and the securities of its participants and segregation among the securities of participants. Where supported by the legal framework, the CSD should also support operationally the segregation of securities belonging to a participant's customers on the participant's books and facilitate the transfer of customer holdings.**
Description	

Key consideration 6	**A CSD should identify, measure, monitor, and manage its risks from other activities that it may perform; additional tools may be necessary in order to address these risks.**
Description	
Key conclusions	
Assessment of Principle 11	**Not applicable**
Recommendations and comments	

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.

Key consideration 1	**An FMI that is an exchange-of-value settlement system should eliminate principal risk by ensuring that the final settlement of one obligation occurs if and only if the final settlement of the linked obligation also occurs, regardless of whether the FMI settles on a gross or net basis and when finality occurs.**
Description	BAHTNET and the linked FMIs adopt the best practice for exchange-of-value settlement which is DvP (model 1 and 3) for securities settlement and PvP for THB-USD Fx settlement to eliminate principal risk. The length of time between blocking and final settlement of the linked obligations differs across settlement models. Details are as follows: • Delivery versus Payment (DvP) linkage for securities settlement For OTC securities settlement which adopts DvP model 1, finality of the linked obligations is nearly simultaneous. TSD initiates a DvP transaction by earmarking securities in the seller's account and send funds transfer order to BAHTNET accordingly. As soon as the funds transfer instruction is complete in BAHTNET, the BOT will confirm TSD through the linked system, and TSD will transfer securities from the seller account to the buyer account simultaneously. Finality occurs when funds are transferred into the seller account, while securities are transferred to the buyer's securities account completely. Under the TSD's and BAHTNET's rules, such settlement transaction becomes valid, and may not be revoked. As TSD will block the securities in the seller account, the seller asset is protected from a claim by other parties. If the payment cannot be complete within the day, TSD will release the securities blocking at the end of day. The blocked assets during the settlement process of DvP model 1 are safeguarded from a third party claim in accordance with Section 402.02 of the Regulation of TSD (Chapter 400).

	For securities traded through the exchange, DvP settlement model 3 has been adopted to eliminate principal risk, for which TCH acts as CCP and SSS for securities. Settlement finality for obligations on securities and cash legs are described as followed: • Selling members Selling members must maintain securities in the settlement account by 1:30 p.m. TCH shall request TSD to transfer those securities to TCH settlement account, which will be blocked until delivery time. Once the delivered securities are transferred to TCH account, the delivery of securities of the selling member shall be deemed final. After that, TCH will submit an MFT transaction to BAHTNET and wait for cash settlement. Cash obligation for the selling member will be final when the payment is made from TCH account to the selling member account by 2.05 pm. Therefore, for the seller, the length of time between blocking of securities and cash receipt is about 35 minutes. • Buying members Buying members will make a payment to TCH by 2.00 pm and cash obligation of the buying members shall be deemed final at this point. Securities will be delivered to the buying members after acknowledgement of cash transfer in BAHTNET which will be no later than 2.15 pm. Therefore, for the buyer, the length of time between delivery of cash to TCH and receipt of securities is 15 minutes. The length of time that securities are hold in TCH account until transferring of such securities into the buyer account is about 45 minutes. For equities settlement which adopts DVP model 3, assets are safeguarded from a third party claim during the settlement process by the legal basis for segregation and application of the customer's assets pursuant to Section 223/3, Section 224 of Securities and Exchange Act B.E. 2535 (SEA), whereas enforceability of the final settlement shall be irrevocable following Section 510.02 (for payment) and Section 511 (for securities delivery) of the Regulation of TCH (Chapter 500). Besides, Section 111/1 of the SEA states that when a securities business operator becomes a debtor by judgment or a debtor under receivership, the customer asset shall not be regarded as asset subject to seizure or attachment in the civil case and shall not be regarded as bankruptcy asset

	which may be distributed among creditors of a securities business operator in bankruptcy. This provision also applies to the case of clearinghouse insolvency as prescribed in Section 223/5 of the SEA. (Source: Securities and Exchange Act B.E.2535, Regulation of TSD Chapter 400 Regulation of TCH Chapter 500) Payment versus Payment (PvP) linkage for FX settlement Likewise, when Thai Baht and US Dollar funds transfer orders are matched, BAHTNET and USD CHATS will respectively hold Thai Baht and US Dollar in the sending banks' accounts. After that, each RTGS will check funds availability and effect the funds transfers simultaneously as soon as sufficient funds has been confirmed from both sides. Finality of the linked obligations is achieved simultaneously upon completion of settlement in BAHTNET and USD CHATS.
Key conclusions	DvP model 1 and 3 are applied for the settlement of securities and equity, respectively, in central bank money, whereas PvP settlement mechanism is applied for foreign exchange settlement. Adoption of these forms of settlement has led to elimination of principal risk. For DvP model 1, finality of fund and securities occurs almost simultaneously. For DvP model 3, finality occurs upon completion of securities transfer and cash settlement. The length of time between blocking securities and final fund transfer to the seller account is about 35 minutes. On the other hands, it takes about 15 minutes to deliver securities to the buyer account after TCH receives funds transfer from the buyer.
Assessment of Principle 12	**Observed**
Recommendations and comments	
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.	
Key consideration 1	**An FMI should have default rules and procedures that enable the FMI to continue to meet its obligations in the event of a participant**

	default and that address the replenishment of resources following a default.
Description	*Participant default rules and procedures* The BOT has rules and procedures that clearly define an event of default for both financial and operational default. These rules and procedures contain actions that needed to be taken by the BOT to minimize further impact to non-defaulting participants as well as management of defaulting participants. Details are as follows; Financial default BAHTNET is an RTGS system which settles in central bank money; funds transfer is settled by funds held in participants' settlement or current account at the BOT with immediate finality. Therefore, participants are normally able to meet their financial obligations if funds are available in their accounts. However, there may be cases where participants face liquidity shortage due to insufficient funds in their accounts. These will not be considered as an event of default because participants can still meet their final obligations by using liquidity risk management tools and mechanisms provided by the BAHTNET system such as ILF, queuing and gridlock mechanism. According to Article 8 of the Payment System Act, B.E. 2560 (2017), the *BOT Regulation for Highly Important Payment System's Participant Default Rules and Procedure*, and the *BOT Notification for BAHTNET's Participant Default Rules and Procedures***, participants default related to financial problem** is defined as any participant who files a petition or has filed a petition for business reorganization and the court has issued the order accepting the petition, or who has been filed for bankruptcy or has been under a receivership order by the court under the Bankruptcy Act, B.E.2483 (1940). (From this point onward, all these participants subjected to aforementioned context shall be denoted as *defaulting participant*.) In quarter 2 of every year, BOT and BAHTNET participants conducted a test on participant default scenarios as required by the BOT Regulation No.SorRorKhor. 1/2561 on Highly Important Payment System's Participant Default Rules and Procedures. These tests employ a rotating methodology: surveys, table-top exercises, and full-scale exercises on Industry Wide Test (IWT) environments.

	In 2023, a full-scale (L-size) IWT exercise was conducted with participant involvement. Conversely, 2024 featured an internal BOT table-top exercise, supplemented by participant surveys, to assess process knowledge and understanding. Results from both years confirmed that all BAHTNET participants possess adequate procedures for handling default scenarios **Operational default** For operational default, the events of default may occur as a result of operational disruptions, for example telecommunication problems, electrical power failures and cyber-attacks, thereby preventing participants from communicating with BAHTNET. Participants default rules and procedures regarding operational problems are stated in Title 10 of Emergency management of the BOT Regulation for BAHTNET services B.E.2549 (2006) and Principle 17: Operational Risk. a) the actions that the FMI can take when a default is declared **Financial default** In order to prevent an impact to non-defaulting participants, once a participant knows the hearing date for its bankruptcy lawsuit, the *BOT Regulation on Highly Important Payment System's Participant Default Rules and Procedures* requires that such participant shall immediately notify the date and time of hearing to the BOT in order that, on the hearing date, the BOT shall temporarily suspend service to such participant as well as cancel all pending transactions from the designated time to the time of adjudication. According to Article 8 of the Payment System Act, B.E. 2560 (2017) and the *BOT Regulation on Highly Important Payment System's Participant Default Rules and Procedures*, any *defaulting participant* shall notify Banknote and Payment Management Department (BPD) after an acknowledgement of the Court's bankruptcy order. BAHTNET Operation Team will permanently revoke BAHTNET service to that participant. In addition, all relevant parties will be informed by BAHTNET Operation Team regarding the *participant* upon acknowledgement of the hearing date and Court's bankruptcy order. **Operational default** According to the BAHTNET Regulation, *defaulting participant* is required to notify BAHTNET Operation Team upon disruption as soon as possible (Article 75). BAHTNET Operation Team may suggest the *defaulting*

	participant to trigger its contingency plan (Article 74) in order to use other arrangements to transfer funds such as backup channel (Article 76) or funds transfer order's letter (Article 77). In addition, BAHTNET Operation Team reserves the right to consider minimizing impacts and risks to the system such as changing service hours, instructing the opening/closing of the system or temporarily terminate BAHTNET services for such participant. b) the extent to which the actions are automatic or discretionary **Financial & Operational default** The actions are discretionary. BAHTNET Operation Team will take actions after getting notification from *defaulting participant* as stated in a). c) changes to normal settlement practices There are no changes to normal settlement practices for financial and operational default. d) the management of transactions at different stages of processing **Financial default** After acknowledgement of *defaulting participant*, the BOT will temporarily suspend all of its incoming and outgoing transactions. All settled transactions are final and irrevocable. Awaiting-transactions are managed differently as follows: **Gross-basis transaction (Including cash leg for DvP and PvP):** • BAHTNET Operation Team will cancel awaiting transactions, including forward-date transactions, in-queue transactions or transactions related to BATHNET's participant who is adjudged bankrupt at the time of Court's order, in accordance with the *BOT Notification for BAHTNET's Participant Default Rules and Procedures*. **Multilateral Funds Transfer transaction (MFT):** • The BAHTNET Operation Team will cancel awaiting MFT transaction and request the settlement agents to resubmit new MFT transaction to exclude the *defaulting participant* in

accordance with the *BOT Notification for BAHTNET's Participant Default Rules and Procedures*.

Operational default

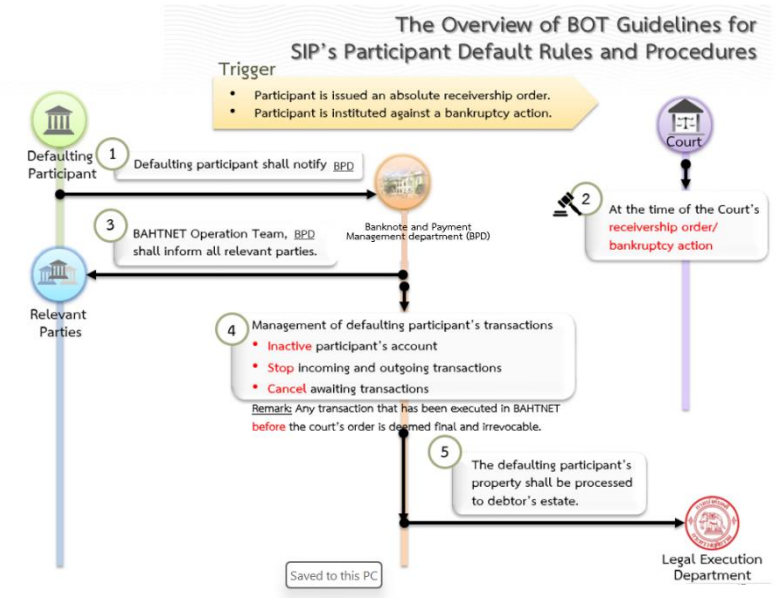
BAHTNET will prevent the *defaulting participant* from using BAHTNET services as described in a), thus no new transaction will be submitted to the BAHTNET system.

e) the expected treatment of proprietary and customer transactions and accounts

The BAHTNET system does not have direct relationship with its participants' customers, thus the treatment for proprietary and customer transactions and accounts of the defaulting participant is not covered in the *BOT Regulation and the Notification for BAHTNET's Participant default rules and procedures*.

f) the probable sequencing of actions

Financial default



BAHTNET Operation Team will take the following actions upon acknowledgement of participant who is subject to bankruptcy lawsuit.

1) Notify all relevant parties including BOT's internal departments, external parties and BAHTNET's participants.
2) Temporarily revoke BAHTNET service, inactive *defaulting participant*'s account including cancel awaiting transactions related to that participant.
3) Permanently revoke BAHTNET service in case of participant is ruled as bankrupt under the court's order.

The defaulting participant's property shall be processed to debtor's estate according to the steps of bankruptcy execution as stated by the BOT Notification for BAHTNET's Participant Default Rules and Procedures.

Operational default

BAHTNET Operation Team may suggest defaulting participant to take action to mitigate impact as described in a). If BAHTNET Operation Team observes that a participant frequently faces operational default and may create systemic risk to the system, the sequence of actions are as follows:

1) BAHTNET Operation Team will inform all relevant parties and temporarily terminate BAHTNET service to such participant.
2) The participant is required to submit rectification plan within 1 month after its service user is revoked.
3) In case of permanent revocation, the participant must follow the instructions as stipulated in the Article 89 of BAHTNET regulation including returning the BOT's application (if any) and manual, eliminating the BOT's application from its workstation.

g) the roles, obligations and responsibilities of various parties, including non-defaulting participants

BAHTNET Operation Team	**Defaulting Participant**	**Non-defaulting participants**
▪ Notify all non-defaulting participants including relevant authorities ▪ Temporarily revoke BAHTNET service for the defaulting participant ▪ Inactivate the defaulting participant's account ▪ Cancel awaiting and forward-date transactions related to the defaulting participant	Notify BAHTNET Operation Team immediately upon acknowledge-ment of the hearing date	Stop sending new transactions with and receiving transactions from the defaulting participant

	h) the existence of other mechanisms that may be activated to contain the impact of a default? Besides the aforementioned procedures, there are no others mechanisms to be activated to mitigate impact to non-defaulting participants. Not applicable. The BOT does not maintain any financial resources to cover losses from the defaulting participant. *Use of financial resources*
Key consideration 2	**An FMI should be well prepared to implement its default rules and procedures, including any appropriate discretionary procedures provided for in its rules.**
Description	Yes, the BOT has internal plans in place for the event of default. The BOT has defined roles, responsibilities and procedures of participants and relevant parties in the Notification and Guidelines for BAHTNET's Participant Default Rules and Procedures Furthermore, the BOT's internal procedures are also defined in the BAHTNET Operational Guidelines, covering such issues as - Handling the defaulting participant's transactions and asset - Communication between the BOT and relevant parties - Sequencing of actions for BAHTNET Operation Team For BAHTNET's participants and relevant stakeholders, BAHTNET Operation Team shall notify them through broadcast message in the BAHTNET system and others communication channels as specified in the *BOT Regulation on Highly Important Payment System's Participant Default Rules and Procedures*. BPD, the BAHTNET operator, will inform Payment Systems and Financial Technology Policy Department (PSD), BAHTNET Regulator, regarding default of participant. Accordingly, PSD will inform other regulators of the linked FMIs who has entered into the Memorandum of Understanding (MOU) with the BOT for cooperative oversight. The Notification in the event of any *defaulting participant* is subject to an annual review by all relevant parties including BOT's internal departments, external parties and BAHTNET's participants. The plans are approved by Senior Director of BPD.
Key consideration 3	**An FMI should publicly disclose key aspects of its default rules and procedures.**

Description	The BOT discloses key aspects of default rules, which include a) to d), in the *BOT Regulation and Notification for BAHTNET's Participant Default Rules and Procedures* on the BOT website and sends the circular letter to all relevant parties. For e), the BAHTNET system does not have direct relationship with its participants' customers, thus the mechanisms for addressing the defaulting participant's obligations are not covered in the *BOT Regulation and Notification for BAHTNET's Participant default rules and procedures.*
Key consideration 4	**An FMI should involve its participants and other stakeholders in the testing and review of the FMI's default procedures, including any close-out procedures. Such testing and review should be conducted at least annually or following material changes to the rules and procedures to ensure that they are practical and effective.**
Description	Financial default The *BOT Regulation on Highly Important Payment System's Participant Default Rules and Procedures* is subject to an annual testing, for which participants and connected FMIs are also required to participate by following the details specified in test plan document. The BOT will conduct the testing with all relevant parties and follow up the test result, whereas revision and adjustment of procedure is executed accordingly. The test results are reported to Senior Director of BPDand all relevant parties. Operational default According to Article 74 of the BOT Regulation for BAHTNET services B.E.2549 (2006), BAHTNET participants are responsible for their BCP testing and are required to report their test results to the BOT at least annually. In addition, the BOT conducts its BCP testing with all relevant parties on a yearly basis. The test results are reported to Assistant Governor and all relevant parties. Potential participant default scenarios and procedures covered by the tests are categorized into financial default and operation default. Financial default Since the *BOT Notification for BAHTNET's Participant Default Rules and Procedures* has been published in 2018, the annual testing covers all scenarios as stipulated in the procedure including all transaction types and involve all relevant parties. The BOT will review and evaluate the test

	result with all relevant parties and will adjust the procedure to be more practical accordingly. Operational default According to Article 74 of the BOT Regulation for BAHTNET services B.E.2549 (2006), the BOT will conduct annual BCP drill with participants. The details of BCP testing are described in Principle 17: Operational Risk.
Key conclusions	According to the *BOT Regulation and Notifications for BAHTNET's Participant Default Rules and Procedures* by virtue of the Payment Systems Act, B.E. 2560 (2017), the BOT shall cancel awaiting transactions including forward-date transactions, in-queue transactions or transactions related to *defaulting participant* and shall notify to all relevant parties. Such *defaulting participant* shall not participate in any transaction with the BOT nor with other relevant parties. The *BOT Notifications for BAHTNET's Participant Default Rules and Procedures* has been annually discussed, reviewed, tested and notified to all relevant parties before being published on the BOT website.
Assessment of Principle 13	**Observed**
Recommendations and comments	
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.	
Key consideration 1	**A CCP should, at a minimum, have segregation and portability arrangements that effectively protect a participant's customers' positions and related collateral from the default or insolvency of that participant. If the CCP additionally offers protection of such customer positions and collateral against the concurrent default of the participant and a fellow customer, the CCP should take steps to ensure that such protection is effective.**
Description	*Customer protection from participant default* *Customer protection from participant and fellow customer default* *Legal basis*
Key consideration 2	**A CCP should employ an account structure that enables it readily to identify positions of a participant's customers and to segregate related collateral. A CCP should maintain customer positions and**

	collateral in individual customer accounts or in omnibus customer accounts.
Description	
Key consideration 3	**A CCP should structure its portability arrangements in a way that makes it highly likely that the positions and collateral of a defaulting participant's customers will be transferred to one or more other participants.**
Description	
Key consideration 4	**A CCP should disclose its rules, policies, and procedures relating to the segregation and portability of a participant's customers' positions and related collateral. In particular, the CCP should disclose whether customer collateral is protected on an individual or omnibus basis. In addition, a CCP should disclose any constraints, such as legal or operational constraints, that may impair its ability to segregate or port a participant's customers' positions and related collateral.**
Description	
Key conclusions	
Assessment of Principle 14	**Not applicable**
Recommendations and comments	
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 materialize. Further, liquid net assets should at all times be sufficient to ensure a recovery or orderly wind-down of critical operations and services.	
Key consideration 1	**An FMI should have robust management and control systems to identify, monitor, and manage general business risks, including losses from poor execution of business strategy, negative cash flows, or unexpected and excessively large operating expenses.**
Description	Generally, a central bank has no business risk. Therefore, key considerations under this principle do not apply with FMIs that are owned and operated by central bank according to CPMI-IOSCO's publication on Application of the "Principles for Financial Market Infrastructures" to central bank FMIs. BAHTNET system is developed and operated by the BOT to be the financial infrastructure of the country with the purposes of enhancing the efficiency as well as mitigating settlement risks of financial institutions and preventing systemic risk to the financial system according to Section 44 of the Bank of Thailand Act.

	However, the BOT has adopted cost-recovery policy for BAHTNET fee structure. In this regard, the BOT may still expose to general business risk arising from inappropriate revenue and cost management. This concern has been included in the BAHTNET Risk management framework. The pricing policy is approved by the Payment Systems Committee (PSC) underlining that revenue has to cover operating cost. The pricing policy will be reviewed every 2 years or following significant changes. Regarding ongoing monitoring, the BOT analyses BAHTNET's general business risk by considering increasing and decreasing trends of the transactions together with the present fee scheme every 6 months.
Key consideration 2	**An FMI should hold liquid net assets funded by equity (such as common stock, disclosed reserves, or other retained earnings) so that it can continue operations and services as a going concern if it incurs general business losses. The amount of liquid net assets funded by equity an FMI should hold should be determined by its general business risk profile and the length of time required to achieve a recovery or orderly wind-down, as appropriate, of its critical operations and services if such action is taken.**
Description	Not applicable
Key consideration 3	**An FMI should maintain a viable recovery or orderly wind-down plan and should hold sufficient liquid net assets funded by equity to implement this plan. At a minimum, an FMI should hold liquid net assets funded by equity equal to at least six months of current operating expenses. These assets are in addition to resources held to cover participant defaults or other risks covered under the financial resources principles. However, equity held under international risk-based capital standards can be included where relevant and appropriate to avoid duplicate capital requirements.**
Description	*Recovery or orderly wind-down plan* Not applicable *Resources*
Key consideration 4	**Assets held to cover general business risk should be of high quality and sufficiently liquid in order to allow the FMI to meet its current and projected operating expenses under a range of scenarios, including in adverse market conditions.**
Description	Not applicable

Key consideration 5	**An FMI should maintain a viable plan for raising additional equity should its equity fall close to or below the amount needed. This plan should be approved by the board of directors and updated regularly.**
Description	Not applicable
Key conclusions	The BAHTNET system was developed to be the fundamental financial infrastructure for enhancing performance and mitigating risks and cost of funds transfer for financial institutions. Since the BOT owns and operates the BAHTNET system, there is no business risk. However, since the BOT has adopted cost-recovery policy for BAHTNET fee structure, general business risk may arise from inappropriate revenue and cost management. This concern has been included in the BAHTNET Risk management framework.
Assessment of Principle 15	**Observed**
Recommendations and comments	
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.	
Key consideration 1	**An FMI should hold its own and its participants' assets at supervised and regulated entities that have robust accounting practices, safekeeping procedures, and internal controls that fully protect these assets.**
Description	BAHTNET does not use custodians. There are 2 type of assets used to transact in BAHTNET, cash and securities. Both assets are used for operational purpose in the BAHTNET system only. Cash accounts are safeguarded by the BOT as participants are required to open current/settlement accounts at the BOT for transferring and receiving funds in BAHTNET as well as to obtain intraday liquidity facilities against collaterals. For securities to be used as collaterals in BAHTNET, the BOT opens and holds securities accounts (BOT Collateral Management Facilities: BOT-CMF) on behalf of participants at TSD which is the central securities depository in Thailand. TSD is regulated by the SEC to ensure the robust accounting practices and procedures complied with international standards. In addition, the BOT has a securities sub-account system which is directly linked with the BOT-CMF to facilitate participants' management of collaterals.

	At the end of day, to ensure the integrity of accounting and safekeeping procedures, the BOT and TSD will reconcile securities account after closing the systems. Should there be some errors, the BOT and TSD will coordinate to investigate and rectify accordingly. TSD has recently amended the Securities Act, focusing on Sections 223/5 and 225, to enhance asset protection for participants and investors. These amendments clarify ownership rights and provide safeguards for securities balances held at TSD in case of its bankruptcy.
Key consideration 2	**An FMI should have prompt access to its assets and the assets provided by participants, when required.**
Description	The BOT opens BOT-CMF accounts on behalf of BAHTNET participants at TSD, securities under BOT-CMF are safeguarded by the Securities and Exchange Act. (Section 225) and the Regulation of TSD (Chapter 400) For securities in sub-accounts of BAHTNET participants, they are safeguarded by the BOT Regulations depending on the type of sub-account as described in Principle 5. BAHTNET participants are required to deposit securities in BAHTNET for Intraday Liquidity Facilities (ILF) and Security Requirement for Net Settlement (SRS). The BOT will buy these securities in repurchase transaction, where ownership of those securities will be transferred to the BOT. At the end of day, participants are supposed to buy back their securities and the ownership will be transferred back to the participants. In case participants fail to buy back their securities at the end of day until 12.00 p.m. on the next business day, participants' right to buy back securities will end as prescribed in Sor Ror Khor 2/2552- Article 20 while the ownership is still with the BOT. For securities used as Security Requirement for Net Settlement (SRS), Sor Ror Khor 1/2557 – Title 5, Article 17 stipulates that if participants' deposits are deficient to settle their transactions within the specified time, the participants have given consent to sell their securities to the BOT in repurchase transaction for settling their obligations under the buy-back agreement. Similar to ILF, If participants fail to buy back their securities by 12.00 p.m. on the next business day, participants' right to buy back securities will end as prescribed in Sor Ror Khor 1/2557-Title 5, Article 20 while the ownership is still with the BOT.

	At present, the above regulations help to ensure the BOT's prompt access to the assets, including securities in the event of participant default. Furthermore, the Payment Systems Act enhance the BOT's prompt access to participants' assets and separation of assets and liabilities. Section 10 of the Payment System Act states that, in the event of participant default, any funds or securities which participants have deposited at the BOT as collaterals in BAHTNET for ILF or SRS will be protected from allocating to other creditors of participants as stipulated in the Bankruptcy Laws. The BOT will be empowered to seize those collaterals for settlement. The residual collaterals, if any, will be transferred to debtors' property of estate. Note that there is no asset held with a custodian in another time zone or legal jurisdiction.
Key consideration 3	**An FMI should evaluate and understand its exposures to its custodian banks, taking into account the full scope of its relationships with each.**
Description	Not applicable
Key consideration 4	**An FMI's investment strategy should be consistent with its overall risk-management strategy and fully disclosed to its participants, and investments should be secured by, or be claims on, high-quality obligors. These investments should allow for quick liquidation with little, if any, adverse price effect.**
Description	*Investment strategy* According to Application of the Principles for Financial Market Infrastructures to central bank FMIs, PFMI is not intended to constrain central bank policies on the investment strategy or disclosure of that strategy. Therefore, this key consideration is not applicable since BAHTNET does not implement investment strategy on any participants' assets. BOT investment strategy is consistent with reserve management policy. *Risk characteristics of investments*
Key conclusions	BAHTNET does not keep assets with a custodian bank except TSD which is an FMI regulated by the SEC. TSD provides a system for the BOT to have prompt access to assets kept at TSD. Cash and securities assets used in BAHTNET are for operational purpose in the system only. In the event of participant default, Article 10 of the Payment System Act has a provision to empower the BOT to have prompt access to those assets and protect them from allocating to other creditors of the defaulting participant.

	In addition, there is no investment policy implemented for those assets.
Assessment of Principle 16	**Observed**
Recommendations and comments	
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 fulfillment of the FMI's obligations, including in the event of a wide-scale or major disruption.	
Key consideration 1	**An FMI should establish a robust operational risk-management framework with appropriate systems, policies, procedures, and controls to identify, monitor, and manage operational risks.**
Description	*Identification of operational risk* Presently, policies and processes for identifying, monitoring and managing risks arising from BAHTNET operation are identified in the BAHTNET Risk Management Framework. In the early stage, BAHTNET adopted the BOT Risk Management Framework which was originally designed to provide guidelines for risk management to all departments and functions in the BOT including BAHTNET. As BAHTNET operator, BPDis responsible for establishing Control Self-Assessment (CSA) focusing on operational risk and reporting to Enterprise Risk Management Department (ERD) every year. Therefore, BAHTNET operational risk is identified by conducting CSA. Plausible sources of operational risk had been identified in accordance with BOT Regulation No. Tor. 39/2558 – the Measures of Operational Risk Incident - Section 3 Appendix A, which describes plausible sources of operation risk as follows; - Process: Operational risk is identified as lack of or error of the internal process. - People: Operational risk is identified as insufficient or human error related areas as well as operation by people that leads to harm. - System: Operational risk is identified as insufficient or error of the system.

	- External Event: Operational risk is identified as change in external circumstance including social, politics and environment that leads to harm. The risk appetite statement is set out for stating tolerance level of each identified risk. After the introduction of PFMI, BAHTNET self-assessment against PFMI was conducted and the assessment result suggested that risk management framework should be formulated to be in line with the standard. Accordingly, BAHTNET Risk Management Framework has been established and approved by the Payment Systems Committee (PSC) in April 2018. The Framework encompasses all aspects of risk related to BAHTNET system, including operational risk. In this regard, operational risk management practices in the Framework are similar to those conducted in the past. The PSC has approved BAHTNET Risk Management Policy which states that "BAHTNET shall provide services which are continuous, efficient, stable, secure and in line with international standards". Risk identification must be conducted every year due to changes of several factors such as new technology, introduction of new business function or cyber threat. Therefore, operational risks vary over the years, depending on the situation at that time. Normally, sources of operational risk which were identified can be categorized into 3 groups comprising 1) Operational related risk - such as inadequate monitoring system or process 2) Personnel related risk – such as inadequate training for staff or control of fraud 3) Technical related risk – such as hardware or software failure, network or utilities interruption Risks related to these 3 groups can incur from both internal, i.e. BAHTNET operator and BOT IT staff, and external parties, which are utility service providers or participants. On single points of failure, BAHTNET system was designed to have high availability and equipped with state-of-art technologies to avoid having single points of failure and to ensure high degree of operational reliability. All BAHTNET hardware and related network components are

	redundant and data are replicated to the backup site in real-time manner. KRIs are used to monitor identified operational risk with high risk rating (with exceptionally high likelihood or impact). Furthermore, BAHTNET operation team is responsible for monitoring day-to-day operation through BAHTNET monitoring screens which show essential information related to operational risk in a real-time basis. Relevant monitoring screens for operational risk management comprise 1) System Monitoring Dashboard – a dashboard for monitoring overall status of system components 2) Queue Monitor – for monitoring throughput of BAHTNET transaction 3) Web connection – for monitoring connection between BAHTNET system and participants' workstations 4) Non-acknowledge message – for monitoring SWIFT confirmation messages that do not receive acknowledgement from SWIFT network 5) Suspicious Transaction -a tool for detecting and handling unusual or suspicious transactions. Incidents that occur in BAHTNET will be recorded and analysed for further prevention and resolution in BOT-Risk Management System (BOT-RMS). Moreover, BAHTNET is audited by both internal and external auditors on an annual basis. The BOT's IT department is responsible for preventive monitoring of IT infrastructure and resource usage of hardware and applications, with real-time notification. BAHTNET operation team and IT infrastructure team have established a number of working procedures including checklist for normal daily operation as well as emergency situation. These systems, policies and procedures are well documented in both soft file and hard copy both at the main and secondary site. Operation status of BAHTNET is reported to executives every day. *Management of operational risk* Operational risk is identified and assessed by conducting CSA. High-level risks will be closely monitored and reported to relevant parties to ensure that operational procedures are implemented appropriately. In this regard, measures will be developed to maintain risk at an acceptable

	level. These steps are summarized and included in the BAHTNET Risk Management Framework as follows: 1) Risk identification and risk assessment 2) Risk response and control 3) Risk monitoring 4) Risk Reporting The BOT employs the risk management process and control in accordance with the international framework such as Lines of Defense. Process and control are audited by external auditors from time to time such as PWC in 2007,2010 and Deloitte in 2016. Furthermore, BAHTNET system was certified by the ISO/IEC 27001: 2013 in ISMS in 2015 where the surveillance audit is required on an annual basis. Moreover, re-certification audit is also required for certificate renewal every three years. In 2019, all participants' workstations have been certified with ISO 27001. This helps ensure that policies, process and controls are designed and implemented appropriately and in line with accepted international standards. *Policies, processes and controls* The BOT employs the BOT Rule on Human Resource Management B.E. 2556 as its human resources policies in order to hire, train and retain qualified personnel. The BOT Rule on Human Resource Management B.E. 2556 is set by the BOT Committee to ensure working stability for employees and to establish the employment framework between the BOT and employees such as recruitment, appointment, promotion, training, scholarships, punishment, welfare, etc. BAHTNET team has implemented several HR policies in order to prevent and mitigate operational risk arising from personnel. The qualification for hiring BAHTNET operators is mutually agreed by BPD and HR department; a newcomer has to follow a job training process for one month so that he or she has inclusive understanding for all tasks of BAHTNET team. Newcomer will be assigned to work as a buddy with an experienced operator to ensure that operations are done correctly and accurately. Consequently, all BAHTNET procedures can be performed by any operator. Currently, BAHTNET operation team does not face high turnover rate. According to the BOT's HR policies, all employees are subjected to give a

	one-month notice before resignation, where the BOT reserves the right to retain the leaving employee up to 3 months from the informed date in case that the resignation will affect the BOT operation. Furthermore, BOT Regulation No. Tor. 39/2558 – the measures of Operational Risk Incident is applied to mitigate personnel risk as follows. BOT Regulation No. Tor. 39/2558 – the measures of Operational Risk Incident: operational risk relating to personnel is mentioned in this regulation. For example, insufficient human resource, human error, etc. To prevent fraud, each BAHTNET operator is given only authorization at the minimum level to perform the assigned tasks. In addition, "dual control" approach is adopted, for which any task has to be completed by two persons. Operators are allowed to rotate themselves to related department in order to enhance their knowledge, which will positively affect operational efficiency. Note that the system always record usage history and logs of each operator. Risks arising from implementing new functions or changes may vary from misunderstanding or miscommunication of the requirements between relevant stakeholders during the development process, lack of understanding or training for using new functions or interruption caused by implementation of new functions, all of which adversely affect smooth functioning of BAHTNET. Every change has to be recorded in the change management system by BPD which is approved by BPD and ITD management. BPD and ITD will report ongoing project status to the Payment System Sub Committee on a quarterly basis. In order to mitigate risks arising from changes and major projects, the BOT places a high priority on the project and change management process, comprising planning, development and testing phases as follows: Planning Project's detail, impact and activities are analysed as well as coordinated with related parties. Project activities are planned thoroughly before obtaining an approval from the Payment System Sub Committee. Accordingly, working teams are set up to be responsible for the project development, consisting of representatives from BPD and ITD. Developing The development process is mainly responsible by ITD with several ongoing discussions with the BPD and PID to ensure that functions are developed in accordance with the business requirements.

	Testing This can be divided into 4 phases which are 1) System Integration Test (SIT): conducted by ITD to ensure that the new function works individually and is compatible with existing functions 2) User Acceptance Test (UAT): conducted by BPD or PID to verify correctness of the new function compared to business requirements 3) Industry Wide Test (IWT): conducted by BPD and BAHTNET participants in order to get used to the new function and test with real business cases. Training is also provided to participants during this phase to create good understanding of the new function. In addition, Performance and Disaster Recovery Test are conducted together by IT BPD and PID to ensure that the new function can be operated on both the primary and secondary site, ensuring high degree of reliability and availability. 4) Project value realization: After 6 months of change and project implementation, project value realization is conducted to evaluate user satisfaction, system efficiency and related statistics by means of a survey with participants. The result will be reported to the Payment System Sub Committee for project closure approval accordingly.
Key consideration 2	**An FMI's board of directors should clearly define the roles and responsibilities for addressing operational risk and should endorse the FMI's operational risk-management framework. Systems, operational policies, procedures, and controls should be reviewed, audited, and tested periodically and after significant changes.**
Description	*Roles, responsibilities and framework* Roles and responsibilities for BAHTNET operational risk management are defined according to BPD line of management. The PSC, which acts as an FMI board, is responsible for annually reviewing and endorsing the Payment System Risk Management Framework and BAHTNET Risk Management Framework, which contains risk reporting practices, to achieve clear responsibilities and accountabilities. *Review, audit and testing* Operational policies and procedures will be reviewed and tested following all significant changes in the system such as introducing a new function. The BOT will arrange the Industry Wide Test (IWT) with participants before implementation.

	Operational procedures and controls will be annually audited by Internal Audit Department. In addition, the BOT conducts an annual drill on BCP with participants, normally during the last quarter of each year. Participants are also required to conduct internal test of their BCP at least once a year as prescribed in BAHTNET Regulation, the result must be submitted to the BOT. Process and control are audited by external auditors from time to time. The recent external audit on BAHTNET was conducted in 2016, for which the audit scope comprised the following 1) IT Governance 2) Business Continuity Management 3) Network and Server Management 4) Software Quality Assurance Furthermore, BAHTNET system was certified by the ISO/IEC 27001: 2013 in ISMS in 2015 where a surveillance audit is required on an annual basis. The scope includes 1) Daily operation of BAHTNET team 2) Physical security 3) Incident 4) Rights 5) Management of classified information 6) Understanding on policy and security objective 7) Compliance on related regulation Moreover, re-certification audit is required for certificate renewal every three years.
Key consideration 3	**An FMI should have clearly defined operational reliability objectives and should have policies in place that are designed to achieve those objectives.**
Description	BAHTNET's operational objective is annually defined by the PSC. Currently, the objective is the target availability, for which the Recovery Time Objective is set at 2 hours without any information loss (Recovery Point Objective = 0), and the target system availability was set at 99.90 percent for 2024. Apart from being reviewed by and reported to the PSC, BAHTNET availability target is published in the annual Payment System Report.

	Note that BPD and ITD have signed the BAHTNET Service Level Agreement (BAHTNET SLA), which is in accordance with the target availability approved by the PSC. In term of operational reliability objectivesHigh degree of operational reliability can be achieved by: • Recovery Time Objective: The 2 hours recovery time is the viable objective for resuming operation by activating the backup site in an extreme circumstance which are tested annually. • Recovery Point Objective: The systems are designed with a real-time data redundancy with RPO set to 0 to ensure that all transactions can be resumed seamlessly after the recovery. • System Availability: Critical business functions are identified and prioritized in BAHTNET SLA, which will be used to calculate the system downtime. The policies to achieve BAHTNET operational reliability objectives are designed as follows: Daily operation checklist and BCP are established to specify actions, communication, procedures and responsibilities to be taken in case of contingency. Additionally, the BOT has set up the secondary site 35 kilometers away from the main site, with similar hardware, software and real-time data replication to ensure continuous operation in case of natural disaster or system failure. This will enable, in the case that operation cannot be resumed at the primary site, the system to resume its operation within 2 hours by migrating BAHTNET system to operate on the secondary site. In this regard, the Service Level Agreement (SLA) has been established between BPD and ITD for providing recovery service to BAHTNET system within 2 hours. In addition, an annual disaster recovery drill is conducted every year to ensure that the operational reliability objectives can be achieved.
Key consideration 4	**An FMI should ensure that it has scalable capacity adequate to handle increasing stress volumes and to achieve its service-level objectives.**
Description	According to the current design of BAHTNET, the transaction capacity is set to 25,000 transactions per hour, whereas the actual number of transactions processed through BAHTNET was approximately 23,000 transactions per day in 2024. BAHTNET operation team is responsible for tracking the number of processed transactions in order to generate the statistic report for capacity improvement planning.

	Normally, the volume stress test is conducted on the testing environment every time there is a change or new function implemented in the system. ITD will adjust programs or system configurations to meet the agreed transaction capacity accordingly .So far, the result shows that the system can still handle peak time capacity with excess capacity available. The capacity planning is done every year. BPD and ITD are both responsible for monitoring the system capacity in a different perspective. BPD has a real-time monitoring tool to keep track of the number of transactions against the maximum capacity. ITD will monitor BAHTNET capacity through a resource utilization monitoring tool. In case that the capacity is near its maximum capacity (or above the agreed threshold), there will be an alert notification to relevant persons to monitor closely. BPD will try to figure out the situation whether it can be addressed by using business solution. If a business solution is not viable, BPD and ITD will cooperatively explore the solution to be in line with current business needs.
Key consideration 5	**An FMI should have comprehensive physical and information security policies that address all potential vulnerabilities and threats**.
Description	*Physical security* Restricted area access According to Section 3 of BOT Notification No. 56/2560 of Security Department, BPD and ITD are required to identify the restricted areas in cooperation with Security Department. Accordingly, the management of both departments have the obligation to define and manage the access rights of their responsible restricted areas. Data center Criteria for establishing data centers are specified internally by ITD including the location, structure and zoning, access control, environmental control, working procedures, emergencies handling, monitoring and data tape elimination. Furthermore, the data centers are required to follow Notification of ITD No. Tor. 3/2560 regarding IT security measures as follows: - Section 7: Topic 1 - Requirements for the maintenance of physical security for the data center and computers; To ensure that physical access to data center and equipment inside is

	protected from unauthorized access which may result in a breach of information of IT system security. For example, the location of data center shall not be easily known and should be difficult to access by a third party. - Section 7: Topic 2 – Requirement for the maintenance of security for computers; to ensure that there are damage protection measures for the BOT's computers, along with measures to prevent stored information from unauthorized access. For example, the Data Center Team shall ensure that there is a fire control system which operates automatically when there is a fire without causing harm to equipment and staff. ITD is responsible for project or change management that are related to BAHTNET physical security such as data centers. Sources of physical vulnerabilities are identified following the recommendation of leading international technology consultants before implementing the project or change to ensure that plausible source of physical vulnerabilities and threats are handled properly. In 2018, the BOT implemented 2-factor authentication by using Biometrics technology in every data center. *Information security* Plausible sources of information security vulnerabilities and threats are addressed in the BOT policies and process on an ongoing basis as explained below. Referred to BOT Notification ITD No. Tor. 3/2560, which is in line with related external and internal laws and regulations such as Computer-Related Crime Act, Electronic Transactions Act and BOT Regulation on Security Policy, IT security measures are stated as follows: - Section 5: Topic 1 – Setting the policy on information access control; To ensure that there is a guideline on the control and restriction of access to information at all levels, for example, management and Product Managers have the duties and responsibilities to ensure that there is appropriate segregation of duties amongst staffs to prevent any one staff from gaining absolute right such that damage is incurred to the BOT.. - Section 5: Topic 2 –Managing access by users; To ensure that there is management and restriction of access to information at all levels. The management and Product Managers have the duties and responsibilities to oversee the request for usage, modification and revocation of user accounts.

	- Section 5: Topic 3 – Responsibilities in password protection; BOT staffs are responsible for protecting and keeping their own password confidential. By design, the password must be updated regularly. - Section 5: Topic 4 – Managing application access; The system must be protected from unauthorized access by setting the methods for accessing IT systems and the procedures for user authentication so that access to IT systems is secure and suitable. Process for addressing the plausible sources of information security vulnerabilities and threats: • BPD and ITD are responsible for project or change management that are related to BAHTNET information security such as implementing new applications or features. Sources of information vulnerabilities are identified in the planning process before implementing the project or change to ensure confidentiality, integrity and availability of data. The BOT strictly follows IT security measures to ensure safety of Information technology usage, covering the following areas: 1) General usage of information technology 2) Usage of computer and computer peripheral 3) Usage of computer network and computer system 4) Usage of computer software 5) Usage of fundamental IT system 6) Usage and disclosure of information *7)* Usage of personal owned device with the BOT's system (BYOD@BOT) Information security policies, processes, controls and testing are appropriately complied with related external and internal laws and regulation.
Key consideration 6	**An FMI should have a business continuity plan that addresses events posing a significant risk of disrupting operations, including events that could cause a wide-scale or major disruption. The plan should incorporate the use of a secondary site and should be designed to ensure that critical information technology (IT) systems can resume operations within two hours following disruptive events. The plan should be designed to enable the FMI to complete settlement by the end of the day of the disruption, even in case of extreme circumstances. The FMI should regularly test these arrangements.**
Description	*Objectives of business continuity plan*

	BAHTNET's business continuity plan (BCP) reflects the objectives, policies and procedures which allow for rapid recovery and timely resumption of critical operations following a wide-scale or major disruption as shown below. BAHTNET BCP is a framework to mitigate/limit potential damage from emerging events. Scenarios are defined and evaluated following different disruptive events such as disaster, unrest and epidemic. Operation checklists in case of emergencies are also prepared to ensure a rapid recovery within the 2-hour timeframe, so that the BOT can resume daily operation with the least relevant effect. Objectives of the BCP are summarized as follows: - Define solutions and framework to handle the consequences. - Specify responsibilities of the BOT and participants clearly and implement when an incident occurs. - Collaborate smoothly between participants and relevant BOT departments. - Readiness preparation such as human resource, back-up applications ERD will conduct an annual enterprise disaster recovery drill and BPD will conduct an annual disaster recovery drill with the participants and connected FMIs including TSD and HKMA. In addition, disaster recovery test is conducted every time there is a change or new function implemented in the system. *Design of business continuity plan* The BOT has developed a contingency plan to cope with a wide range of incidents and failures. The plan deals with different levels of software and hardware defects and disruptions in various communication networks. Various scenarios and staff roles are analysed, including disruptions in telecommunication and electrical power, and disruptions in contact with important external parties. Moreover, rules and procedures for decision-making processes are worked out under the plan, and there is a clear division of staff responsibility in various emergency situations and follow-up responsibilities. The BCP of BAHTNET system was designed in accordance with the 2-hour recovery objective which includes IT and Business activities. The decision to activate the BCP was designed in accordance with the recovery capability of IT system which was tested annually. So far,

	the test result showed that the IT system migration can be recovered approximately within 1.30 hours, thus leaving room for BAHTNET operators to verify functionality of the recovered system. The maximum processing capacity of BAHTNET is 25,000 transactions per hour, while the transaction processed through was approximately 23,000 transactions per day in 2024. Therefore, BAHTNET is capable of handling average number of daily transactions within around 1 hour. BCP documents are in place for every role of staff such as IT system administrators, IT application administrators, IT operators, IT strategy team, business users and the management. The documents are required to be up-to-date at all times. BCP execution is conducted regularly to ensure that every party can effectively follow the procedures and is ready when the disaster happens, as well as to ensure that the backup system runs smoothly. Following this, participants are required to join the test which includes back-up site testing for all members. This is to ensure that the two-hour recovery time can be achieved. In case of crisis, the call tree will be activated. BAHTNET System was designed by having redundant hardware and network components both at the main and secondary site, while data are also replicated to the secondary site in a real-time manner, thus the Recovery Point Objective is 0. Data verification is conducted after the recovery to identify status of the latest transaction of each participant. However, in case there is a missing transaction during disruption, participants and the BOT will cooperatively figure out to ensure that all transactions are identified and smoothly resume their operation Crisis Management Procedures of the BOT address the need for effective communication both internally and externally with key stakeholders and the authorities as follows: - BOT Regulation No. Tor. 15/2551 – The Measures of Business Continuity Plan of the BOT indicates the responsibilities of BOT executives for command and responsibilities of relevant departments for operation. The procedures and processes for handling the incidents that affect BOT performance are also included. BAHTNET BCP, both business part and IT part - Emergency contacts (Call Tree) and communication procedures of relevant parties are clearly identified in BAHTNET BCP. Lines of authority for decision making are also stated and specified for each scenario.

	Secondary site BAHTNET BCP incorporates use of the secondary site to ensure that the secondary site has sufficient resources, capabilities, functionalities and appropriate staffing arrangements as well as locates in a sufficient geographic distance from the primary site as described below. BAHTNET System is designed to have its hardware and database at the primary data center (DC1) and the secondary data center (DC2) with identical capacity, replaceable and redundancy. Consequently, BCP was designed by categorizing disruptive events for switching operation from the primary site (DC1) to the secondary site (DC2), such as absolute disruption of the BAHTNET system, occurrence of an emergency incident or a disaster's damaging primary data center. Generally, IT staffs remotely monitor the secondary site and are assigned to station at the secondary site once a week. The secondary site is geographically diverse as it is located in a different province which is 35 Kilometres away from the main site. In this regard, BAHTNET operation team are not required to routinely station at the secondary site as it takes only 1 hour to travel. In addition, the BOT has established another data center (DC3) in 2018 which is located in the North eastern region of Thailand in order to obtain higher resilience. *Review and testing* The BOT conducts cooperative testing with BAHTNET participants and other FMIs in case of disaster, unrest and epidemic every year. The scenarios are set differently each year to test the process and the recovery timeframe back to normal. Off-site work is also tested in case of Mobile Office to support the operation in emergency incidents to become more flexible. BAHTNET participants, including TSD, are required to involve in BAHTNET's annual BCP drill and contingency arrangements. In 2023 and 2024, the tests simulated scenarios of ransomware attacks and bomb threats, which could severely impact critical level 1 operations and necessitate a site switch. Participants are able to provide feedback and suggestion regarding the tested BCP drill as well as review and test their own BCPs according to the description below.

	BAHTNET participants have to arrange internal BCP test at least once a year and report the result to the BOT (According to BOT Regulation BN – Article 74). Internal BCP test should apply one of these following incidents; - Case 1 : Migrate to DR site - Case 2 : Discontinuity of the system - Case 3 : Network error - Case 4 : Staff replacement - Case 5 : SWIFT Network error (for SWIFT members) The BOT arranges a cooperative testing every year on Annual Clearing Contingency Drill with HKMA, the USD CHATS service provider. BOT, TSD, and TCH have completed internal BCP testing on offline scenario in 2022. Following that, BOT and TCH further developed and tested internal offline systems and processes to ensure service continuity during dual disruption events. In a joint test conducted in the third quarter of 2024, TCH successfully transitioned to its CCP Offline (CCPO) system, while BAHTNET operated via BAHTNET Offline (BNO), validating their capacity to maintain critical services in a simulated simultaneous failure scenario.
Key consideration 7	**An FMI should identify, monitor, and manage the risks that key participants, other FMIs, and service and utility providers might pose to its operations. In addition, an FMI should identify, monitor, and manage the risks its operations might pose to other FMIs.**
Description	*Risks to the FMI's own operations* Risks related to BAHTNET operation are identified comprehensively in the BAHTNET Risk Management Framework including risks arising from participants, the linked FMIs and utility providers as follows: • Risk arising from key participants: BAHTNET has identified the top sending banks in BAHTNET system via liquidity monitoring as key participants of BAHTNET since these parties may create a widespread impact to other participants, if disrupted, and may cause operation delay or cut-off time extension. Accordingly, the BOT has prepared a contingency plan for these key participants. Key participants may be identified by the numbers of customers that rely on a particular direct participant for processing 3rd party funds transfer transaction in BAHTNET which may create dependency on liquidity and operation. BPD has from time to time, conducted analysis on this arrangement and closely monitored participants who have high dependency.

	• Risk arising from other FMIs: Disruption of linkage with other FMIs such as CSD Link with TSD may interrupt all transactions related to securities settlement and prevent day-end reconciliation process. In this case, the BOT and TSD will follow the contingency procedures in order to analyze the cause and promptly notify the other party via telephone and email, apply for service time extension and resolve the difficulty; other parties' coordinator shall be promptly notified via telephone and email.Risk arising from utilities and network service such as disconnection of network or power outage. The BOT has implemented several measures to prevent risk arising from disruption of utilities such as redundancy of networks or power sources (there are 2 network equipment and 2 sources of power supply per site, with over 4 network providers). In addition, penalty is set out in a contract between the BOT and network providers in case the service is unavailable for a certain period. Not applicable since BAHTNET does not outsource any of its service. *Risks posed to other FMIs* The BOT regularly monitors linkages with other FMIs in order to timely respond to operational risk arising from disruption of BAHTNET which may pose to other FMIs, including linkage with TSD and HKMA. In addition, the BOT requires connected FMIs to have their BCPs arranged and conducted an annual drill with the BOT to ensure timely recovery from their backup site in case of disruption The BOT has designed a framework for communication and cooperative problem solving with TSD and HKMA. 1. **Measures between the BOT and TSD** (Section 5.10 Measures for disruption between the BOT and TSD linkage system) - When an incident occurs, inform the cause and solving timeframe to the other FMI immediately via phone or e-mail respectively. - If the problem cannot be solved within the operating hours and there are still pending transactions in the system, the BOT and TSD will mutually consider to extend the operating hours and inform related parties accordingly. - If the problems are solved, the BOT or TSD will immediately inform the other FMI via phone. 2. Communication BCP USD-THB PvP Link - Part 1: Extend the Cut-off Time of USD-THB PvP Link

	- Part 2: Disconnect the USD-THB PvP Link between THB CCPMP and Gateway during the Announced PvP Service Suspension Period and back to former channel. - Part 3: Ad Hoc Holidays in Thailand
Key conclusions	The BOT provides comprehensive policies, procedures, and controls for BAHTNET system in order to monitor and mitigate operational risk. These policies, procedures, and controls are well documented and tested regularly. BAHTNET risk management policy and processes are specified in the BAHTNET Risk Management Framework. Identified plausible sources of operational risk include those arisen internally and externally as well as risks that bear from and pose to participants and other FMIs. BAHTNET operational reliability objective is defined and approved by the PSC, for which the system can be recovered within 2 hours following the disruption without data loss (RPO = 0). The target availability of BAHTNET is reviewed annually and set to 99.90% for year 2024. Business Continuity Plans are comprehensive, taking into account all related aspects (including business and IT perspective) and are tested regularly including the BOT internal test, BAHTNET participants' test, TSD test and cooperative test between the BOT, TSD and participants. The DR sites and all back-up procedures are available to support immediately in case of emergency incidents.
Assessment of Principle 17	**Observed**
Recommendations and comments	

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**.**

Key consideration 1	**An FMI should allow for fair and open access to its services, including by direct and, where relevant, indirect participants and other FMIs, based on reasonable risk-related participation requirements.**

Description	*Participation criteria and requirements* Criteria and requirements for BAHTNET participants are elaborated in BAHTNET Regulations and BOT Notifications which includes financial, operational and legal requirements.

	Legal and Financial requirements The Regulations and Notifications specifies type of institutions that are allowed to become BAHTNET participants. These intuitions have to comply with the regulations, legal and financial requirements specified by relevant authorities and the BOT will not impose additional legal or financial requirements. BAHTNET participation criteria are as follows: 1. Being financial institutions in accordance with the Financial Institutions Business Law. 2. Being state-owned Specialized Financial Institutions established under specific laws. 3. Being government agencies, internal departments of the BOT or other juristic persons established under specific laws which transfer or receive high-value of funds transfer. 4. Being securities companies, clearing houses or securities depositories in accordance with the Securities and Exchange Law. 5. Being payment system business providers under supervision which provide retail funds transfer systems for systems users or card network systems in accordance with the Payment Systems Law. 6. Being payment service business providers under supervision in accordance with the Payment Systems Law which transfer or receive high-value of funds transfer. All entities must have prior approval by the BOT to open current or settlement accounts for funds transfer via BAHTNET. Moreover, entities under item 1 – 6 are subject to the BOT consideration whether they are sound for the payment systems as a whole both in terms of efficiency and stability. (**Source:** Guidelines for opening an account at the BOT) *Operational requirements* the operational requirements for participants are specified as follows: 1. The juristic persons that wish to request authorization from the BOT to use BAHTNET services shall have computer systems and Business Continuity Plan (BCP) that meet the generally accepted standards in case there is an event which prohibits normal operations of BAHTNET. 2. The juristic persons are required to maintain the availability of personnel to operate BAHTNET or experts in relevant fields who are ready to attend user training and testing as required by the BOT prior to commencing BAHTNET services. (Source: Access Criteria for Juristic Person to Participate as BAHTNET Service User – ถฝ. 4/2561)

	Related legal frameworks: BAHTNET participants which are financial institutions under Financial Institutions Businesses Act B.E. 2551 (2008) or Specialized Financial Institutions (SFIs) will be regulated by the BOT. BAHTNET participants which are payment system business providers or payment service business providers under Payment Systems Act B.E. 2560 (2017) will be regulated by the BOT. - BAHTNET participants which are securities companies, clearing house or securities depository under Securities and Exchange Act B.E.2535 will be regulated by the SEC. The criteria and requirements for participating in BAHTNET allow for fair and open access. The BOT allows not only financial institutions but also other types of entities as prescribed in the Notification to become BAHTNET participants with an aim to promote effectiveness and stability of the overall payment systems. These entities must have prior approval by the BOT to open settlement accounts for funds transfer via BAHTNET system. (**Source:** Guidelines for opening an account at the BOT) There are 2 types of participants, namely, direct participants and associate participants. Direct participants are able to send and receive funds transfer, and perform other functions using their own workstation subsystem, which is directly connected to BAHTNET. Associate participants have an account at the BOT, but do not have their own workstation subsystem. They will rely on direct participants to perform funds transfer and other functions on behalf of them. Normally, associate participants are institutions which have small transfer volume/value in BAHTNET, thus they do not want to have high investment cost from becoming direct participants. Note that both direct and associate participants are subject to the same access criteria when applying to participate in the system. *Access to trade repositories* Not applicable since BAHTNET is considered as Systemically Important Payment Systems (SIPS) not Trade Repositories (TR).
Key consideration 2	**An FMI's participation requirements should be justified in terms of the safety and efficiency of the FMI and the markets it serves, be tailored to and commensurate with the FMI's specific risks, and be publicly disclosed. Subject to maintaining acceptable risk control standards, an FMI should endeavour to set requirements that have the least-restrictive impact on access that circumstances permit.**
Description	*Justification and rationale of participation criteria*

	BAHTNET participation requirements aim at enhancing safety and efficiency of the BAHTNET system as well as stability of the payment systems as a whole. Therefore, the BOT allows financial institutions and specialized financial institutions which are supervised by the BOT, government agencies as well as legal entities under supervision of relevant authorities that the BOT deems appropriate to have access to BAHTNET services. In addition, there are operational requirements to ensure safety and efficiency of BAHTNET. There are no non-risk based requirements. Participant requirements for BAHTNET are risk based as described in the access criteria *Least restrictive access* Both direct and associate participants are subject to the same access criteria as prescribed in BAHTNET Regulations (Title 2 - BAHTNET Access Criteria) and *BOT Notification No.* Sor Ror Khor. 4/2561 *Access Criteria for Juristic Person to Participate as BAHTNET Service User*. They must obtain approval from the BOT to become BAHTNET participants. The PSC has stipulated that the access requirements should be reviewed when there is a policy change, where the updated access criteria are subject to the PSC approval. Furthermore, to ensure that the access criteria do not place too much restrictive requirements, the BOT conducted a study on other central banks' access criteria as well as discussed with relevant stakeholders such as BAHTNET AG, new potential players which the BOT deems appropriate to have access to BAHTNET services. After the study, the BOT revised the access criteria accordingly. *Disclosure of criteria* All of the regulations and notifications related to criteria and requirements for participation including Guidelines for Opening an Account at the BOT are publicly disclosed on the BOT website under the Payment Systems Notification & Circulars for BAHTNET system section. Hard-copy documents are circulated to all BAHTNET participants.
Key consideration 3	**An FMI should monitor compliance with its participation requirements on an ongoing basis and have clearly defined and publicly disclosed procedures for facilitating the suspension and**

	orderly exit of a participant that breaches, or no longer meets, the participation requirements.
Description	*Monitoring compliance* BAHTNET Operation Team manages the access criteria and requirements and detailed information of participants. The team is also responsible for examining and monitoring BAHTNET participants' ongoing compliance by performing an annual review on access criteria and requirements of all participants. Besides, BAHTNET participants will be requested to submit their BCPs and organize a drill of the contingency plan annually in order to ensure participants' compliance with operational requirements. BAHTNET participants are subject to on-site and off-site examination for their legal and financial requirements by the BOT supervisors in accordance with the following regulations: - BAHTNET participants which are financial institutions under Financial Institutions Businesses Act B.E. 2551 (2008) and Specialized Financial Institutions (SFIs) will be monitored by the BOT Supervision Group. BAHTNET participants which are payment system business providers or payment service business providers under the Payment Systems Act B.E. 2560 (2017) will be monitored by Payment Systems and Financial Technology Policy Department. BAHTNET participants which are securities companies, clearing house or securities depository under the Securities and Exchange Act B.E.2535 will be monitored by the SEC. BAHTNET Operation Team will receive information regarding risk profile of participants from relevant supervisors. The procedure was established internally with the Supervision Group to ensure that the supervisors will notify BAHTNET Operation Team to conduct enhanced surveillance when participant's risk profile is deteriorated. For example, BAHTNET Operation Team will closely monitor liquidity sufficiency as well as EWI indicators. Generally, Supervision Group will monitor participants which are financial institutions under 3 aspects 1) financial condition and performance, 2) risk management and 3) information technology management and operation. For other legal entities such as securities company or licensed electronic payment business providers, BAHTNET Operation Team will closely monitor those whose risk profile deteriorates and coordinate with the SEC

	or the examiners under Payment Systems Policy Department respectively to take necessary actions according to related laws and regulations. *Suspension and orderly exit* The BOT will monitor participants' compliance with BAHTNET's participation requirements and will instruct temporary termination of services under the following cases: - Inability to comply with the BOT regulations - Frequent disruptions in BAHTNET Workstation or equipment that links to the BAHTNET system - Inappropriate security system in BAHTNET Workstation - Being under complete custodianship as ruled by Thai or foreign court - In a default situation as stipulated in the *BOT Regulation for Highly Important Payment System's Participant Default Rules and Procedure* The procedures for managing suspension and orderly exit of a participant that breaches, or no longer meets the participation requirements are stated in Article 83 – 88 (Title 12 – Termination of Services) of BAHTNET Regulation. In addition, participant who wants to terminate BAHTNET services, either temporarily or permanently must notify the BOT at least 30 days in advance, for which the BOT may consider to terminate its services to a participant who does not observe its regulations or poses risks to the system. Lastly, the procedures for suspension or orderly exit which the BAHTNET participant needs to act upon, according to Article 89 – 90 of the BAHTNET Regulation, are for example: - Eliminate the BOT's application programs in the participant's Workstation Subsystem - Maintain confidentiality pertaining to use of BAHTNET despite the service termination - For a participant which is a SWIFT member, whenever there is a termination of all services of BAHTNET, that participant's membership of the CUG will also be terminated.

	Besides, BAHTNET itself also has the mechanism to prevent participants from accessing BAHTNET service after termination by blocking all access channels that the participants could enter into the system. (**Source:** BAHTNET Regulation) In an event of default, the BOT will manage the suspension and orderly exit of the participant as described in Principle 13. BAHTNET Regulation Title 12 – Termination of Services related to the procedures for managing suspension and orderly exit of participant is disclosed to the public on the BOT Website (www.bot.or.th) under Payment Systems Notification & Circulars for BAHTNET system section**.** (**Source:** BAHTNET Regulation)
Key Conclusions	BAHTNET has fair and open access criteria with an aim to promote risk management capability, system stability and efficiency as well as financial stability. The BOT examines and monitors BAHTNET participants' ongoing compliance by performing an annual review on access criteria and requirements of all permitted participants. The access criteria, requirements and procedures for facilitating suspension and orderly exit of a participant are clearly defined and are available to the general public on the BOT website
Assessment of principle 18	**Observed**
Recommendations and comments	

Principle 19. Tiered Participation Arrangements An FMI should identify, monitor, and manage the material risks to the FMI arising from tiered participation arrangements.	
Key consideration 1	An FMI should ensure that its rules, procedures, and agreements allow it to gather basic information about indirect participation in order to identify, monitor, and manage any material risks to the FMI arising from such tiered participation arrangements.
Description	*Tiered participation arrangements* Currently, all BAHTNET participants are bound by BAHTNET rules and regulations to open and hold the current account or settlement account. Thus, tiered participation arrangements does not exist in BAHTNET as all participants are recognized as direct participant.

	BAHTNET participants are categorized into Direct and Associate, as follows: 1. Direct participant is a member who received the BOT's permission to use BAHTNET services. 2. Associate participant is a member who received the BOT's permission to use BAHTNET services' via other direct participant's BAHTNET Workstation Subsystem. The transactions will be sent and received by an affiliated direct participant on its behalf [6]. This could be classified into 2 categories as follows: - *Associate participant with the BOT* which are BOT's internal departments such as Finance & Accounting Department. - *Associate participant with parent institution* which is a securities company that uses its parent bank's workstation for BAHTNET usage. In this case there is only one participant namely Tisco Securities Company Limited who uses Tisco Bank Public Company Limited's workstation for BAHTNET usage. As mentioned above, there is no tiered participation arrangements in the system. Both direct and associate participants are required to open their own current or settlement accounts in BAHTNET according to the Guidelines for Opening an Account at the BOT. They also have to comply with the BOT Regulations related to BAHTNET in order to identify, monitor, and manage any material risks. As of September 2024, there were 59 BAHTNET participants comprised of 55 direct participants and 4 associate participants. Although BAHTNET does not have indirect participant, BAHTNET provides 3rd party funds transfer service for individual customers, corporates or other financial institutions whose payment transactions are processed through direct participants. The majority of 3rd party transactions are from subsidiaries of direct participants. These arrangement may create dependency on liquidity of direct participant. BAHTNET operation team conducts analysis on risk arising from 3rd party funds transfer service every 6 months by gathering basic information regarding traffic on BAHTNET. Both direct and associate participants are monitored and regulated under BAHTNET regulations, thereby having equal binding under the Rights and Obligations of the BAHTNET participants.

[6] This is due to the fact that the associate participants usually have only a few transactions such as less than 10 transactions per month. Therefore, the BOT allows them to rely on direct participant's workstation to avoid investment cost on their own BAHTNET workstation.

	The BOT closely monitors associate participants via either their current or settlement accounts held at the BOT to ensure no material risks can arise from such arrangements. *Risks to the FMI* Not applicable since BAHTNET does not have tiered participation arrangements.
Key consideration 2	**An FMI should identify material dependencies between direct and indirect participants that might affect the FMI.**
Description	Not applicable since BAHTNET does not have indirect participants.
Key consideration 3	**An FMI should identify indirect participants responsible for a significant proportion of transactions processed by the FMI and indirect participants whose transaction volumes or values are large relative to the capacity of the direct participants through which they access the FMI in order to manage the risks arising from these transactions.**
Description	Not applicable
Key consideration 4	**An FMI should regularly review risks arising from tiered participation arrangements and should take mitigating action when appropriate.**
Description	Not applicable
Key conclusions	All BAHTNET participants are bound by BAHTNET rules and regulations to maintain or open account with the system. There is no tiered participation arrangement in BAHTNET as all participants are recognized as direct participants.
Assessment of Principle 19	**Not applicable**
Recommendations and comments	

<table>
<tr><td colspan="2">Principle 20. FMI Links

An FMI that establishes a link with one or more FMIs should identify, monitor, and manage link-related risks.</td></tr>
<tr><td>Key consideration 1</td><td>Before entering into a link arrangement and on an ongoing basis once the link is established, an FMI should identify, monitor, and manage all potential sources of risk arising from the link arrangement. Link arrangements should be designed such that each FMI is able to observe the other principles in this report.</td></tr>
<tr><td>Description</td><td></td></tr>
<tr><td>Key consideration 2</td><td>A link should have a well-founded legal basis, in all relevant jurisdictions, that supports its design and provides adequate protection to the FMIs involved in the link.</td></tr>
<tr><td>Description</td><td></td></tr>
<tr><td>Key consideration 3</td><td>Linked CSDs should measure, monitor, and manage the credit and liquidity risks arising from each other. Any credit extensions between CSDs should be covered fully with high quality collateral and be subject to limits.</td></tr>
<tr><td>Description</td><td></td></tr>
<tr><td>Key consideration 4</td><td>Provisional transfers of securities between linked CSDs should be prohibited or, at a minimum, the retransfer of provisionally transferred securities should be prohibited prior to the transfer becoming final.</td></tr>
<tr><td>Description</td><td></td></tr>
<tr><td>Key consideration 5</td><td>An investor CSD should only establish a link with an issuer CSD if the arrangement provides a high level of protection for the rights of the investor CSD’s participants.</td></tr>
<tr><td>Description</td><td></td></tr>
<tr><td>Key consideration 6</td><td>An investor CSD that uses an intermediary to operate a link with an issuer CSD should measure, monitor, and manage the additional risks (including custody, credit, legal, and operational risks) arising from the use of the intermediary.</td></tr>
<tr><td>Description</td><td></td></tr>
<tr><td>Key consideration 7</td><td>Before entering into a link with another CCP, a CCP should identify and manage the potential spill-over effects from the default of the linked CCP. If a link has three or more CCPs, each CCP should identify, assess, and manage the risks of the collective link arrangement.</td></tr>
<tr><td>Description</td><td>Linked CCP default
Collective link arrangements (three or more CCPs)</td></tr>
<tr><td>Key consideration 8</td><td><table><tr><td>PS</td><td>CSD</td><td>SSS</td><td>CCP</td><td>TR</td></tr><tr><td></td><td></td><td></td><td>●</td><td></td></tr></table></td></tr>
</table>

	Each CCP in a CCP link arrangement should be able to cover, at least on a daily basis, its current and potential future exposures to the linked CCP and its participants, if any, fully with a high degree of confidence without reducing the CCP's ability to fulfil its obligations to its own participants at any time.
Description	*Exposures and coverage of exposures* *Management of risks* *Information provided to participants*
Key consideration 9	**A TR should carefully assess the additional operational risks related to its links to ensure the scalability and reliability of IT and related resources.**
Description	
Key conclusions	
Assessment of Principle 20	**Not Applicable**
Recommendations and comments	
Principle 21: Efficiency and effectiveness An FMI should be efficient and effective in meeting the requirements of its participants and the markets it serves.	
Key consideration 1	**An FMI should be designed to meet the needs of its participants and the markets it serves, in particular, with regard to choice of a clearing and settlement arrangement; operating structure; scope of products cleared, settled, or recorded; and use of technology and procedures.**
Description	As one of the key financial infrastructures for Thailand, BAHTNET was designed to provide interbank funds transfer services and smooth settlement supporting financial and capital markets' transactions to serve the participants' needs as well as to maintain financial stability. Besides interbank funds transfer services, BAHTNET provides third party funds transfer, capital market settlement and retail payment settlement, as well as PvP settlement between THB and USD as a choice for participants to mitigate FX settlement risk. To ensure that BAHTNET services take into account the needs of participants and the market, the BOT has established a consultation forum with the industry, specifically, the BAHTNET Advisory Group (AG). BAHTNET AG comprises representatives from Thai Bankers' Association, the Association of International Banks, Specialized Financial Institutions

	(SFIs), and Thailand Securities Depository Co., Ltd. (TSD). All meeting minutes are circulated to all BAHTNET participants after each meeting. The BOT and BAHTNET AG use this forum to exchange views on the feasibilities of: - Adoption of new business and technology - New initiatives on system development - Rules and regulations / practical guidelines - New policies or measures Any development of new features or functions will be discussed with the AG to ensure that the new initiatives meet the needs of participants and the market and are in line with the international standards. AG consultative meeting is held occasionally as deemed necessary or at least annually. Specific working groups under the AG may be set up to tackle particular topics as necessary. An additional mechanism to collect participants' requirements is an industry survey and hearing sessions to get views and feedbacks from all participants. When there is a new initiative or system development due to change in payment environment or new edge of technology, the BOT will discuss with relevant stakeholders including the AG as well as other central banks to exchange views and insights. Moreover, the BOT will host hearing sessions to discuss and inform participants of the implementation plan and timeline, facilitate training and industry wide testing, and collect feedback to ensure the system development will be in line with the participants' needs. Apart from BAHTNET participants, the needs of other stakeholders are taken into account such as requirements from the linked systems or government agencies. Executive meetings between the BOT and TSD are held annually in order to discuss development plans, cooperation and impact to the other system. The BOT also meets with the government agencies (i.e. the Comptroller's General Department) in order to take into account development requirements from the government policies. The BOT also provides an annual service satisfaction survey to all participants to evaluate not only the quality and stability of the system but also the service of BAHTNET in order to collect requirements and

	improve the service to meet the needs of participants and the market in the future.
Key consideration 2	**An FMI should have clearly defined goals and objectives that are measurable and achievable, such as in the areas of minimum service levels, risk-management expectations, and business priorities.**
Description	By virtue of Section 7 of the Bank of Thailand Act, the BOT is responsible for maintaining monetary stability, financial institutions system stability, and payment systems stability. Moreover, by virtue of Section 44, the BOT shall establish or support the establishment of payment systems including clearing system between institutions and management of such system for an efficient, safe and sound payment systems. Therefore, BAHTNET is established as a financial infrastructure to serve Real-Time Gross Settlement (RTGS) of large value funds transfer between financial institutions or other organizations. BAHTNET was designed to mitigate settlement risk among financial institutions that maintain deposit accounts at the BOT as well as to facilitate efficient, fast and secure transfers for third-parties. BAHTNET was designed to operate with high level of availability, targeting at 99.90% where the system availability performance is reported to the PSC regularly. The target recovery time is approximately 2 hours (Recovery Time Objective -RTO) without any information loss (Recovery Point Objective = 0). To ensure that the goals and objectives are achievable, the BAHTNET system was designed to have high availability and equipped with state-of-the art technologies to avoid having single point of failure and ensure high degree of operational reliability. All BAHTNET hardware and related network components are redundant and data is replicated to the backup site in real-time manner. BAHTNET has informed its participants of the measurable and quantifiable efficiency in terms of time to process transactions or time to recover the system in a service downtime. BAHTNET and its participants regularly participate in BCM/BCP testing for various scenarios such as major disasters, political unrests, or epidemics in order to be well-prepared and achieve recovery time in an emergency event. For safety and soundness, BAHTNET has implemented multiple policies to ensure that the system meets security standard as follows: 1) Comply with IT & Cyber framework including practices and guidelines in line with related domestic laws and international

	standards such as ISO27001, SWIFT CSP and Internal security guidelines. 2) Undertaken Vulnerability Assessment by having external auditor to identify problems and weaknesses of BAHTNET along with performing the External Penetration Testing on a yearly basis. Since the latest infrastructure upgrade of BAHTNET, the annual system availability target is always achieved and higher than 99.90%..
Key consideration 3	**An FMI should have established mechanisms for the regular review of its efficiency and effectiveness**.
Description	BAHTNET is reviewed regularly on an annual basis for its safety and efficiency. The system's activities and payment process are monitored throughout the day, using variety of automated tools, graphs and manual checks. For safety standard, BAHTNET has received ISO/IEC 27001:2013 certificate for Information Security Management System (ISMS) where an annual surveillance audit is required. Moreover, re-certification audit is required for certificate renewal every three years. BAHTNET also receives external audit on Information System covering IT governance, business continuity management, network and server management and software quality assurance. Moreover, all transactions in BAHTNET can be tracked back from receivers to senders (end-to-end). BAHTNET keeps logs on the status of transactions at each stage in the transaction life cycle. Each transaction has a unique transaction ID number which provides an audit trail for future enquiry. Incidents and disruptions are adequately logged and rules are in place for operational follow-ups in accordance with the Computer - Related Crime Act. Computer-Related Crime Act B.E.2550 → Computer-Related Crime Act B.E.2560 (unofficial) For efficiency, there is a tool to keep continuous record of resource utilization for both hardware and software. If the utilization's threshold is reached, there will be a real-time message to alert relevant staffs to take action accordingly. Besides, BAHTNET will generate an incident report of resource utilization which will be used for performance and capacity assessment on a yearly basis.

	In term of pricing, currently, the BOT implements a cost recovery pricing policy, which means that the fees charged to participants must cover the cost for BAHTNET's operations and maintenances. These costs are derived from operating and overhead expenses associated with BAHTNET. Additionally, BAHTNET provides intangible values to the overall economy, serving as the backbone financial market infrastructure for interbank settlement. Therefore, both tangible and intangible values are taken into consideration in monitoring BAHTNET's cost and pricing structure. In order to ensure financial efficiency, the BOT conducts a review of cost and pricing structure every two years or upon changes that have an impact on BAHTNET. The latest review was conducted in 2024. Other efficiency metrics : BAHTNET is the RTGS system which the credit risk is eliminated and the settlement occurs in the central bank money. The system also facilitates settlement of other major retail payments. In addition, robust communication procedures with all relevant parties have been established to ensure smooth communication during normal and crisis situation.
Key conclusions	BAHTNET has an arrangement in place to consult with participants on a regular basis in order to address their needs in the view of design and development of its operations and services. In addition, BAHTNET has established mechanisms for regular review of its safety and efficiency such as participants' feedback, KPI scoring for measuring effectiveness and ensure system availability as targeted. The annual system availability target has been achieved and higher than 99.90%. Moreover, BAHTNET adopts cost recovery pricing policy which is reviewed every two years or when there are changes that may impact BAHTNET.
Assessment of Principle 21	**Observed**
Recommendations and comments	

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.	
Key consideration 1	**An FMI should use, or at a minimum accommodate, internationally accepted communication procedures and standards.**
Description	*Communication procedures* To achieve efficient payment and settlement system, BAHTNET has adopted an internationally accepted communication standards in order to ensure BAHTNET participants' abilities to communicate in a timely, reliable, and accurate manner. Communications procedures BAHTNET relies on 2 types of networks to communicate with participants: SWIFT Network (SWIFTNet) and BOTNET/X**.** (1) SWIFT Network (SWIFTNet) Participants which are SWIFT members communicate with the BAHTNET System in SWIFT format. In this regard, participants can develop their Straight Through Processing (STP) in-house systems to directly link with the BOT. (2) BOTNET/X It is the Virtual Private Network (VPN) that the BOT uses for communicating in the BAHTNET System. The message used to communicate via BOTNET/X is in the BAHTNET XML Format developed by the BOT in accordance with SWIFT format for non-SWIFT member participants. In addition, this is a backup channel for SWIFT member participants in the event that SWIFT is unavailable. There are 2 communication channels for participants to connect with BOTNET/X as follows: • **BAHTNET Web Service Channel**: All BAHTNET participants are required to use this channel to inquire information such as transaction's status, account movement, reports etc. • **Host-to-Host Channel**: the BOT uses this channel to link with TSD to facilitate securities settlement as well as funds

	transfer transactions between government agencies and the Comptroller General's Department. Communication Procedures for Cross-border BAHTNET has established linkage with USD CHATS of Hong Kong Monetary Authority (HKMA) for Payment versus Payment (PvP) foreign exchange settlement in order to mitigate FX settlement risk for USD/THB transactions. The communication goes through Internet Protocol – Virtual Private Network (IP – VPN) of the international service provider. Transactions in BAHTNET and USD CHATS are matched through the Cross Currency Payment Matching Processor (CCPMP), using proprietary standard developed and owned by HKMA. Communication Standards The BOT has adopted the ISO 20022 standards for the BAHTNET services since 2022 which has resulted in changes in the format of messages (from SWIFT FIN- MT to SWIFT InterAct) transmitted through the BAHTNET system. Therefore, the BOT announces the BOT Notification No. Sor Ror Khor. 8/2565 Payment Message for High-value Transactions via BAHTNET in Accordance with The ISO 20022 Standards to promote a correct understanding of the changes among BAHTNET service users and to provide accurate references for operations and developments of service systems according to the ISO 20022 standards. Both SWIFT and non-SWIFT member participants are using the same ISO20022 standard which can be processed in the system immediately. In addition, SWIFT Bank Identifier Code (SWIFT BIC) is used for identifying participants in the system for both message standard. The BOT has already adopted international standards as described above.
Key conclusions	The BOT has already adopted international standards for both communication procedures, SWIFT Network (SWIFTNet) and BOTNET/X, for the SWIFT-member and non-SWIFT member participants, respectively. For cross-border linkage, the proprietary message standard and procedure are adopted.
Assessment of Principle 22	**Observed**
Recommendations and comments	

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, fees, and other material costs they incur by participating in the FMI. All relevant rules and key procedures should be publicly disclosed.	
Key consideration 1	**An FMI should adopt clear and comprehensive rules and procedures that are fully disclosed to participants. Relevant rules and key procedures should also be publicly disclosed.**
Description	*Rules and procedures* Rule and procedures related to BAHTNET system are described in various forms of legal framework including the Payment Systems Act (PSA), several BOT Regulations as well as guidelines, rules and procedures on key areas, whereas Notifications under relevant Regulations provide further information or discipline for participants to comply with. Key areas of BAHTNET system are as follows: BAHTNET Service *BOT Regulation on BAHTNET Service* specifies rules and rights of BAHTNET participants, including the system's feature, access and exit criteria, rights and obligation of the BOT and participants, system rules, fees and risk management. In addition to *BOT Regulation on BAHTNET Service*, related notifications are issued under this regulation to provide more details for each particular area. For example, *BOT Notification No.* Sor Ror Khor. 4/2561 *Re: Access Criteria for Juristic Person to Participate as BAHTNET Service User* provides more detail about access requirement. BOT Notifications issued under the *BOT Regulation on BAHTNET Service* are listed below: (1) Fees and Charges on BAHTNET Services (2) Practical Procedure During the Transition Period of the BAHTNET System (3) Code of Conduct in case of SWIFT Network Failure, Cancellation of Funds Transfer and SWIFT Bilateral Key Exchange (4) BAHTNET's Operation hours and Confirmation of Funds Transfer (5) Access Criteria for BAHTNET Service User (6) Criteria on Intraday Liquidity Facilities and Proportion of funds transfer via BAHTNET

	(7) Multilateral Funds Transfer Service (8) Code of Conduct Multilateral Funds Transfer Instruction of Processing by the BOT in an Event of Difficulty (9) Linkage on Securities Payment Settlement (10) Find on BAHTNET service for Multilateral Funds Transfer (11) Linkage between the BAHTNET and USD CHATS for foreign exchange settlements (12) Requirements on Information Security Management System for BAHTNET Client Computers (13) Access Criteria for Juristic Person to Participate as BAHTNET Service User In addition to the above Regulation and Notifications, BAHTNET participants are required to comply with the *BOT Regulation and Notification on Electronic Financial Services*, which set out requirements for participants who connect with the system provided by the BOT. Intraday Liquidity Facilities *BOT Regulation on Purchase of Debt Instrument with Repurchase Agreement to Provide Intraday Liquidity Facilities* stipulates rules for purchase of debt instruments for the purpose of intraday liquidity management. The regulation provides details on, for instance, eligible participants for using ILF, type of accepted securities, obligation of participants and the BOT regarding provision of ILF. BOT Notifications issued under this regulation are as follows: (1) Designating other institutions as Financial Institutions under the *BOT Regulation on Purchase of Debt Instruments under Repurchase Contract for Intraday Liquidity Facilities* (2) Regulations on Purchase of Debt Securities for Being Used as Intraday Liquidity Facilities (3) Fees and Charges Associated with Usage of Intraday Liquidity Facilities (4) Requirement on Intraday Liquidity Facilities and Proportion of Funds Transfer via BAHTNET (5) Purchase of Debt Instrument with Repurchase Agreement to Provide Intraday Liquidity Facilities on a Special Financial Institution Holiday (Case of Emergency) Securities Requirements for Settlement *BOT Regulation on Measures for Managing Risks from Multilateral Net Settlement through BAHTNET (Securities Requirements for Settlement)*

	stipulates measures for managing risks arising from Multilateral Funds Transfer including relevant parties, calculation of requirement, type of accepted securities, obligation of participants and the BOT. Notifications issued under this regulation are as follows: • Maintenance of Debt Securities According to the Measures for Managing Risks from Multilateral Net Settlement through the BAHTNET • Default management *BOT Regulation on Procedures for Members of Highly Important Payment Systems to Enter Business Rehabilitation or Bankruptcy Proceedings* stipulates actions to be taken by the BOT, defaulting participant, non-defaulting participants when a participant in Highly Important Payment Systems enters into bankruptcy lawsuit. Notifications issued under this regulation are BOT Notification Re: Procedures for BAHTNET Service Users to Enter into Bankruptcy Proceedings Apart from regulations and notifications, other documents in the form of user manuals, training material or meeting document also contain specific details regarding system design and operation. Most of the above information are disclosed to the public, while some documents such as BAHTNET user manual, meeting documents and questionnaires are restricted to members only. Currently, there are two channels for information disclosure as follows: 1. Rules, regulations and guidelines in general are publicly disclosed on the BOT Website (www.bot.or.th) under the topic - Our Roles → Payment Systems → BAHTNET → BAHTNET related services. 2. BAHTNET user's manual, meeting documents and attachments, training documents and annual BCP documents are disclosed only to BAHTNET participants on the BOT Website (www.bot.or.th) under the topic - Our Services →Member's Corner→Payment System Member's Corner (available in Thai with access rights only) Recognizing the importance of participants' engagement at all levels in the issuance of rules and regulations so as to ensure practical procedures and comprehensive regulations for the participants, the BOT regularly communicates with BAHTNET participants. Specifically, the BOT has established BAHTNET Advisory Group (AG) comprising

	representatives from Thai Bankers' Association, the Association of International Banks, Specialized Financial Institutions (SFIs), and Thailand Securities Depository Co., Ltd. (TSD). The BOT and BAHTNET AG use this forum to exchange views on several topics including practicability of the rules and regulation which were issued or are being drafted. Additional mechanisms are meetings with all participants, focused groups, industry surveys and hearing sessions. The following BAHTNET related rules and regulations contain roles, responsibilities and procedures for the BOT and BAHTNET participants to follow during non-routine events, such as communication procedure, immediate actionable guideline or contact point, in order to ensure a smooth coordination and capabilities to tackle possible disruption. At present, non-routine events and relevant rules or procedures are as follows: (1) Code of Conduct on BAHTNET Services in an Event of Emergency (2) Code of Conduct in case of SWIFT Network Failure, Cancellation of Funds Transfer and SWIFT Bilateral Key Exchange (Sor Ror Khor. 9/2565) (3) Code of Conduct Multilateral Funds Transfer Instruction for Processing by BOT in an Event of Difficulty (4) Purchase of Debt Instrument with Repurchase Agreement to Provide Intraday Liquidity Facilities on a Special Financial Institution Holiday (Case of Emergency) BOT Regulation Re: Procedures for Members of Highly Important Payment Systems to Enter Business Rehabilitation or Bankruptcy Proceedings (SorRorKhor. 1/2561) *Disclosure* Normally, when there are changes in operating procedures or other issues which affect the regulations, notifications and guidelines, the BOT will follow the process. The process is disclosed to all BAHTNET participants in accordance with Article 94 of BAHTNET Regulation.

	The BOT discloses BAHTNET relevant rules, regulations, notifications, guidelines and key procedures on the BOT Website (www.bot.or.th) under the topic - Our Roles → Payment Systems→ BAHTNET→ BAHTNET related services. The information is categorize by service: Electronic Funds Transfer Service (EFS), Intraday liquidity Facilities (ILF), Securities Requirement for Settlement(SRS) etc. This information is disclosed to the general public.,
Key consideration 2	**An FMI should disclose clear descriptions of the system's design and operations, as well as the FMI's and participants' rights and obligations, so that participants can assess the risks they would incur by participating in the FMI.**
Description	General information of BAHTNET operations are disclosed *in BOT Regulation on BAHTNET Service* and other BOT Notifications which are publicly disclosed on the BOT website. In addition, the detailed and confidential information regarding BAHTNET system's design and operations are documented in the BAHTNET user's manual and the attachments which are available to participants only. In this regard, BAHTNET participants can download from the BOT Website (www.bot.or.th) under topic - Our Services→Member's Corner→Payment System Member's Corner (available in Thai with access rights only). The documents comprise, for example, BAHTNET message specification, user manual, configuration, rights assignment and training documents. Degree of the BOT's discretion which can exercise over key decisions is publicly disclosed in BAHTNET Regulation, Title 3 - Rights and Duties of the BOT -- which explains about the BOT's execution in case of necessary events as per the following Articles. **Article 10**: In any necessary event, the BOT will be able to take the following actions: (1) Cancel funds transfer order of participants (2) Suspend funds transfer order of participants (3) Suspend debiting of funds from participant's account (4) Freeze account movement of participants **Article 11**: The BOT will take responsibility of any damages arisen from normal operations of the BOT, except any of the following events, singly or severally, i.e.,

	(1) Damages from special events, or (2) Damages from any technical disruption in BAHTNET Host Computer, or (3) Damages from anything or system out of BOT's control, or (4) Force Majeure Besides BAHTNET Regulation, the BOT also exercises discretion on BOT Regulation for non-routine events and operation manual of BPD for routine events. In case of a non-routine event which disrupts operation, the level of consideration is at the management level with cooperation between BPD and ITD. The two departments will figure out the solution and escalate to higher management for decision-making and execution. Rights, obligations and risks incurred through participation in BAHTNET are stated in BAHTNET Regulation, Title 4: Rights and obligations of BAHTNET users, Article 12-28. The essence is as follows: 1. Responsibilities and obligations of potential BAHTNET users before using the service. For example, understanding the BAHTNET Service using Agreement, participating in the training and testing the system, etc. 2. Compliance to BOT regulations and guidelines, including supporting the BOT officers in auditing related system, security measure, internal control, related documents and others as required by the BOT. Details can be summarized as follows: Rights and obligations of BAHTNET participants as stated in Article 12 – 19: Before using BAHTNET services, participants have to provide the documents as required by BAHTNET regulation, including preparing their systems, programs and BAHTNET Workstation Subsystem for BAHTNET usage as well. Furthermore, participants have to be trained and are responsible for testing their system as well as understand the user's manual and other operating guidelines. - Risks incurred through participation in BAHTNET as stated in Article 20 – 28:

	Participants are required to provide measures for security and internal controls as well as prepare evidence and support BOT representatives in auditing related system, security measure, internal control, related documents and others as required by the BOT. (**Source:** BAHTNET Regulation)
Key consideration 3	**An FMI should provide all necessary and appropriate documentation and training to facilitate participants' understanding of the FMI's rules and procedures and the risks they face from participating in the FMI.**
Description	The BOT facilitates its participants' understanding of the rules, procedures and risks associated with participating in BAHTNET as follows: • According to **BAHTNET Regulation (Article 16),** BAHTNET users have to participate in training courses which will provide them with knowledge and understanding about BAHTNET functionality and services as well as rules, procedures and risks associated with participating in the system as provided by the BOT. • According to **BAHTNET Regulation (Article 17),** BAHTNET users are responsible for system testing in the following cases: - When becoming a new member; - When BAHTNET users improve their internal system related to BAHTNET. - When the BOT launches new functionality and services or improve BAHTNET related system. In this case, the BOT will arrange a meeting to inform BAHTNET participants of the progress, provide a training course and conduct testing with the participants. Moreover, participants can download **BAHTNET user's manual and other document** from the BOT Website (www.bot.or.th) under topic -Our Services→Member's Corner→Payment System Member's Corner. In addition, participants can also download detailed information about the system such as message specification and validation rules from the BOT-EFS Web Portal, which is a landing page before entering into BAHTNET system. The Letter of Agreement for BAHTNET Service Usage signed by participants aims to ensure that participants understand and are legally bound by BAHTNET rules, regulations and operating procedures as specified by the BOT. Moreover, participants will

	receive training and testing from BOT operation team before starting to use BAHTNET system. BAHTNET Operation Team will also provide clarification to any enquiries from BAHTNET participants during operating hours. In addition, trainings can be arranged upon participants' request or when there is a new participant joining the system as well as when new features are implemented. In practice, when participants' behavior demonstrates a lack of understanding of BAHTNET rules, procedures and risks of participation, BPD will take remedial actions as follows: • Firstly, BAHTNET Operation Team will provide consultation to BAHTNET participant during operating hours. And if the BOT finds that the participant does not comply with the rules as set out in the regulations or notifications, relevant penalty will be applied to such participant such as fines collection. • If there is possibility of risk, the BOT will further communicate with that participant. If the BOT views that such participant will pose risk to the system, the BOT will give a preliminary warning to that participant. If that participant is still unable to comply with the regulations, the BOT will instruct temporary termination of services and that participant is required to propose a clear rectification plan within one month. (**Source:** BAHTNET Regulation)
Key consideration 4	**An FMI should publicly disclose its fees at the level of individual services it offers as well as its policies on any available discounts. The FMI should provide clear descriptions of priced services for comparability purposes.**
Description	Fees of BAHTNET services and discount policies are publicly disclosed in BAHTNET Regulation and on the BOT Website as follows: As per BAHTNET Regulation (Article 7), the BOT will charge fees or fines to BAHTNET users according to the BOT Notifications and designed rates, which are: - BOT Notification No. Sor Ror Khor. 5/2550 – BAHTNET Fine in Case of Multilateral Fund Transfer (MFT) - BOT Notification No. Sor Ror Khor. 4/2551 – BAHTNET Fine in Case of Multilateral Fund Transfer (MFT), First Amendment - BOT Notification No. Sor Ror Khor 3/2556 – Fee and Fine of BAHTNET

	- BOT Notification No. Sor Ror Khor. 6/2559 – Fee and Fine related to Intraday Liquidity Facilities (ILF) (**Source:** BAHTNET Regulation) If there are any changes in services and fees, the BOT will circulate a notification and circular letter to all BAHTNET participants to inform details of the changes including the effective date .The notification and circular letter will also be published on the BOT Website. The BOT provides description of priced service as described in BOT Notification No. Sor Ror Khor 3/2556 - Fee and Fine of BAHTNET (1st Amendment: BOT Notification No.Sor Ror Khor 10/2565) which is adequate for comparing with other similar FMIs. According to *BOT Notification No. Sor Ror Khor 3/2556 - Fee and Fine of BAHTNET*, there are two types of fees that BAHTNET users are charged by the BOT: **Monthly Fee** is a monthly service charge which are: • 3,500 Baht for each direct member that has client computer • 500 Baht for each associate member For use of BAHTNET services in fraction of a month, the BOT will charge the fee in full month. **Transaction Fee** is the service charge per one transaction for each type of services which vary across message channels and categories, as well as the settlement time which is classified into 3 time zones. Necessary information on technology, communication procedures and any other factors that affect costs of operating BAHTNET are disclosed to all participants. As the BOT developed BAHTNET to be Thailand's **financial infrastructure,** the BOT implements a cost recovery pricing policy, which means that the fees charged to participants must cover the cost for BAHTNET's operations and maintenances. These costs are derived from operating and overhead expenses associated with BAHTNET.

Key consideration 5	**An FMI should complete regularly and disclose publicly responses to the CPSS-IOSCO disclosure framework for financial market infrastructures. An FMI also should, at a minimum, disclose basic data on transaction volumes and values.**

Description	The BOT has published BAHTNET Self-assessment Disclosure Report according to CPSS-IOSCO Disclosure framework for financial market infrastructures since 2018.
	Payment Infrastructure and Services Strategy and Development Department (PID) will conduct a review on the self-assessment report every two years and publish accordingly.
	
	Quantitative information published by the BOT includes the volumes and values of funds transfer in BAHTNET system on the BOT website as follows:
	
	Funds transfer via BAHTNET system Report (Monthly/Quarter/Annual) classified by:
	• Transaction Type
	• Sending Institution
	• Business Type
	• Settled Time
	• Amount Range
	
	Payment Systems Annual Report : For Example;
	• Volumes and values of funds transfer through BAHTNET
	• Proportion of funds transfer through BAHTNET categorized by transaction types
	• Daily average of BAHTNET intraday liquidity
	• BAHTNET's system availability
	
	(Source: BAHTNET Funds Transfer Statistics, Payment Systems Annual Report 2016)
	
	Apart from quantitative information above, the BOT also publishes other information related to BAHTNET which are:
	• List of BAHTNET members
	• Payment System Annual Report
	  ○ Payment Systems Oversight
	  ○ Payment Systems Stability Report
	• Management of key risks in BAHTNET
	  ○ Liquidity risk and settlement risk
	  ○ Operational risk
	• Oversight activities

	(Source: Payment Systems Annual Report 2016) BAHTNET discloses this information to the public both in Thai and English on the BOT Website (www.bot.or.th) under the topic – Our roles→ Payment System.
Key conclusions	BAHTNET rules, regulations and guidelines regarding system, operations, fees and fines, obligations as well as quantitative information are publicly disclosed on the BOT Website. Some detailed information such as system design or message specification are provided to BAHTNET participants only. The Bank of Thailand (BOT) has published its BAHTNET Self-Assessment Disclosure Report, adhering to the CPSS-IOSCO Principles for Financial Market Infrastructures (PFMI) disclosure framework, since 2018. This report is reviewed and updated every 2 years.
Assessment of Principle 23	**Observed**
Recommendations and comments	
Principle 24: Disclosure of Market Data by Trade Repositories A TR should provide timely and accurate data to relevant authorities and the public in line with their respective needs.	
Key consideration 1	**A TR should provide data in line with regulatory and industry expectations to relevant authorities and the public, respectively, that is comprehensive and at a level of detail sufficient to enhance market transparency and support other public policy objectives.**
Description	
Key consideration 2	**A TR should have effective processes and procedures to provide data to relevant authorities in a timely and appropriate manner to enable them to meet their respective regulatory mandates and legal responsibilities.**
Description	
Key consideration 3	**A TR should have robust information systems that provide accurate current and historical data. Data should be provided in a timely manner and in a format that permits it to be easily analyzed.**
Description	
Key conclusions	
Assessment of Principle 24	**Not Applicable**

Recommendations and comments	