



**TECHNICAL STANDARDS
FOR
CASHLESS WAGERING SYSTEM
(SINGAPORE)**

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Technical Standards for Cashless Wagering System (Singapore)

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TABLE OF CONTENTS

PREFACE.....	4
1. INTRODUCTION	6
1.1 Purpose.....	6
1.2 Scope.....	6
1.3 Terminology	7
1.4 Definition of Terms	8
1.5 Testing.....	9
1.6 Consistency of Interpretation	9
2. MONITORING REQUIREMENTS	10
2.1 Machine Identification	10
2.2 Metering	10
3. CWS SYSTEM REQUIREMENTS	11
3.1 System Integrity.....	11
3.2 Data Protection and Recovery	11
3.3 Physical Security	11
3.4 Events.....	12
3.5 Reporting Requirements.....	12
4. CWS SYSTEM COMPONENT REQUIREMENTS.....	13
4.1 Player Account	13
4.2 Interface Security.....	13
4.3 Data Integrity of Card	13
4.4 System Clock.....	14
5. DISPLAY AND COMMUNICATIONS REQUIREMENTS.....	15
5.1 Cashless Transaction Display Information	15
5.2 Communication	15

Preface

The purpose of this document is to establish the system requirements for the design and operation of a Cashless Wagering System (CWS) in the gaming industry in Singapore and to guide testing and certification bodies on the areas for technical compliance on the CWS.

A CWS is characterised as a host system whereby a player maintains an electronic wagering account on the CWS host database. A casino will provide the player a secure means of accessing the wagering account on the gaming machines. This is not limited to the issuing of a unique magnetic card and Personal Identification Number (PIN) in conjunction with the wagering account on the CWS database. Funds may be added to this player's wagering account via a cashier station or any supporting kiosk (through the insertion of coins and bills). The account value can be reduced either through debit transactions, in smaller amounts at a gaming machine or by cashing out at a cashier's cage. Once play is completed the player may have the option to move some of the credits back to the player's account or cash out some credits.

The intent of this document is to ensure the CWS operates in a manner that is:-

- a. Honest;
- b. Secure;
- c. Reliable; and
- d. Auditable.

It is not the intent of this document to:-

- a. Mandate a single solution or method to realise an objective;
- b. Limit technology application to gaming equipment;
- c. Limit creativity and variety of choice;
- d. Limit any supplier or manufacturer of equipment;
- e. Preclude research and development into new technologies equipment or innovative ideas.

As far as possible, this document specifies what the minimum technical requirements for CWS are instead of how the requirements should be met; nor try to mandate a particular solution or method as the means to realise the requirements.

Casino Regulatory Authority of Singapore (CRA) is the regulatory authority that supervises and regulates the activities of casinos in Singapore. Casino operators are required to be licensed by law and their CWS shall comply with the technical requirements stated in this document as part of their licensing requirements.

Where applicable, the provisions in the Casino Control Act (Cap. 33A) and its subsidiary legislations shall take precedence over the technical standards.

This document would be reviewed on an ongoing basis to take into account the evolution of systems security and development of other casino related technologies that may require technical regulation.

Technical Standards for Cashless Wagering System (Singapore)

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1. INTRODUCTION

1.1 Purpose

1.1.1 The purpose of this technical standard is to:-

- a. Create a standard that would ensure that the operation of the Cashless Wagering System (CWS) in Casinos under Singapore's jurisdiction is secure, reliable and auditable;
- b. Establish the minimum systems integrity standards for CWS;
- c. Eliminate subjective criteria in analysing and certifying CWS operation;
- d. Construct a standard that is technology neutral wherever feasible; and
- e. Construct a standard that does not specify or approve any particular method or algorithm. The intent being to allow a wide range of methods to be used to conform to the standards as long as the methods are secure, reliable and consistent with the technology best practices of the day.

1.2 Scope

1.2.1 The scope of this technical standard covers:-

- a. The minimum technical standards required in the operation of the Cashless Wagering System (CWS) so that security, reliability and integrity of the system are achieved; and
- b. The player interface modules to the electronic gaming machines for the purpose of facilitating cashless transactions.

1.2.2 The scope of this technical standard does not cover:-

- a. Bonus or Promotional system requirements;
- b. Electronic Funds Transfer, which refers to the electronic transfer of cashable credits from a financial institution to a game or gaming machine through the CWS; and
- c. Ticket In – Ticket Out (TITO) function as it shall be interpreted as a component of the Slot Management System.

1.3 Terminology

1.3.1 The following terminology used in this document is to be interpreted as follows:-

- a. Shall: The guideline defined is a mandatory requirement, and therefore must be complied with;
- b. Should: The guideline defined is a recommended requirement. Non-compliance shall be documented and approved by the management. Where appropriate, compensating controls shall be implemented; and
- c. May: The guideline defined is an optional requirement. The implementation of this guideline is determined by the operator's environmental requirements.

Technical Standards for Cashless Wagering System (Singapore)

1.4 Definition of Terms

Authority/ The CRA	The Casino Regulatory Authority of Singapore
Critical Data	Memory locations storing data at minimum relating to:- a. Account balances; b. Wagering account personal identification numbers (PIN); and c. Wagering transaction details.
Critical Memory	Memory locations storing information that is considered vital for the continued proper operation of the gaming machine.
Kiosk	A machine connected to the CWS. It is used for deposits/withdrawals of cash or cash equivalents to/from the player's account through the player's card with PIN entry or other secured means. It accepts coins and bills for the addition of funds to player's account.
Meter	A "meter" may be any of the following:- a. A hard meter. The meter can only be incremented. Meter incrementing can only be performed by the gaming equipment's computer. The meter is read by human inspection of the meter display; or b. A storage area within some form of computer memory (e.g. disk or RAM) into which the computer's software is programmed to store and update the current count of the metered quantity.
Player Interface Module	A unit in the gaming machine that may contain different types of peripheral devices such as card readers, key pads, displays and biometric input mechanisms, used for electronic wagering transactions with the CWS.
SMS	The Slot Management System in the casino operator's Gaming Network.
TITO	Ticket In – Ticket Out System which validates vouchers printed out by EGMs; the vouchers can either be redeemed for cash, or inserted for play into other EGMs that support this mechanism.
Wagering Account	An electronic ledger for a CWS patron deposit account wherein only the following types of transactions are recorded:- a. Deposits and withdrawals of cash or cash equivalents at a designated area of accountability; b. Wagering account transfers to and from gaming machines; and c. Wagering account adjustments.
Wagering Account	A transfer of funds between a CWS wagering account and a

Technical Standards for Cashless Wagering System (Singapore)

Transfer (WAT)	gaming machine.
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1.5 Testing

1.5.1 Testing of the CWS by recognised testing laboratories shall be aimed at determining compliance with the technical requirements provided in this document. Areas of non-compliance shall be reported in the test/certification report. Where, in the opinion of the testing/certification laboratory, the technical requirements spelt out in this document are insufficient, inappropriate or not pertinent to the design and operation of the CWS, the laboratory shall seek direction and further clarification from the Authority before proceeding to testing/certification.

1.6 Consistency of Interpretation

1.6.1 The Casino Regulatory Authority (CRA) of Singapore recognises that the technical standards may be subject to different interpretations by systems vendors, casino operators and testing/certification laboratories. As such, any feedback where different interpretations may be applied to the technical standards provided in this document should be directed to the CRA for clarification when it arises.

2. MONITORING REQUIREMENTS

2.1 Machine Identification

- 2.1.1 Each kiosk connected to a CWS shall be uniquely identified by the CWS. This includes kiosks that are connected to the CWS through a gateway or kiosk server.
- 2.1.2 The CWS shall also provide a function for uniquely identify a gaming machine with cashless capability.

2.2 Metering

- 2.2.1 All meters related to cashless transactions between the CWS and gaming machines shall be stored in the gaming machines' critical memory, in compliance with the clauses stipulated in the 'Technical Standards for Electronic Gaming Machines (Singapore) Section 3.2.3'.

3. CWS SYSTEM REQUIREMENTS

3.1 System Integrity

- 3.1.1 The operational and system control of the CWS shall be administered in accordance with the relevant Internal Control procedures.
- 3.1.2 All critical data communications associated with monetary player balances and affecting revenue shall be encrypted for secure communication purposes.
- 3.1.3 The encryption algorithm shall be demonstrably secured against cryptanalytic attacks.
- 3.1.4 The CWS shall be designed and developed to provide assurance of data accuracy and integrity. There shall be:-
 - a. Input data validation controls to ensure that input data is correct and appropriate;
 - b. Processing controls to detect errors in the completeness and accuracy of the processing and update of system; and
 - c. Output data controls to ensure the accuracy of information being output or reported.
- 3.1.5 The integrity of the CWS software shall be maintained during live use.
- 3.1.6 The CWS shall detect and prevent any alteration of any critical data stored, unless the change is made by an authorized, logged personnel, with all the changes and reasons recorded.
- 3.1.7 All PINs shall be encrypted in CWS host database.
- 3.1.8 Role Based Access Control which users are allowed access to only programs and menu items related to their job functions shall be supported.
- 3.1.9 All software for all the components of the CWS shall be maintained under an appropriate software version control system or mechanism.
- 3.1.10 All changes to the CWS software shall be authorised by CRA before they are implemented.

3.2 Data Protection and Recovery

- 3.2.1 The CWS database shall be stored on redundant media so that no single failure of any portion of the system would cause the loss or corruption of data.
- 3.2.2 In the event of a system failure, the database shall be reloaded from the last backup point and all data up to the minute of failure shall be fully recovered through roll forward of transaction logs.

3.3 Physical Security

- 3.3.1 The CWS programs and database shall be hosted in a secure area where only authorised personnel may enter.

Technical Standards for Cashless Wagering System (Singapore)

- 3.3.2 Physical access controls shall be in place to monitor the entry of personnel into the CWS hosting environment so as to prevent and detect unauthorised entry attempts.
- 3.3.3 Adequate environment controls shall be implemented to manage the risk against possible environmental exposure such as power failures, flooding and fires at the location where the CWS is hosted.

3.4 Events

Diagnostic Activity

- 3.4.1 For any CWS related diagnostic activity performed on gaming machines/kiosks, the specific account(s), the individual(s) and the diagnostic activities shall be logged.

Event Search

- 3.4.2 The CWS shall provide an online search facility that enables comprehensive searching of the event log for the pending and all completed cashless transactions for the previous thirty (30) days of data. The search facility shall have the ability to perform a search based at least on the following:-
 - a. Date and Time range;
 - b. Unique gaming machine/kiosk identification number; and
 - c. Patron's wagering account information.

3.5 Reporting Requirements

- 3.5.1 The CWS shall be able to create all the financial reconciliation and variance reports as well as all Internal Controls required reports as stipulated in CRA "Casino Reporting Requirements for Operators" document.

4. CWS SYSTEM COMPONENT REQUIREMENTS

4.1 Player Account

- 4.1.1 After the confirmation of player's identity through secured authentication means, the player interface module shall at minimum allow the transfer of a pre-configured amount from the player account to the gaming machine.
- 4.1.2 Cashless wagering transactions are entirely electronic. Players shall be able to:-
 - a. Remove funds from their wagering account through electronic credits transfer to the gaming machine they are playing; and
 - b. Add funds to their wagering account through electronic credits transfer from the gaming machine after the game is finished.
- 4.1.3 Current wagering account balance information should be available on demand from any participating gaming machine via the player interface module after confirmation of patron identity and be presented, in terms of Singapore currency, to the patron.

4.2 Interface Security

- 4.2.1 Each gaming machine interfaced with a CWS using a player interface module shall have the interface module installed inside a secure area of the gaming machine and shall employ a secure communication method between the interface module and the CWS.
- 4.2.2 All patrons' access to the wagering account shall be secured either by card insertion into a magnetic card reader attached to the gaming machine with PIN entry or by other protected means.
- 4.2.3 Any device in the player interface module that holds information, relating to events and cashless transactions in its memory shall not have means to compromise the information and shall not allow the removal of its information unless it has transferred that information to the CWS host.

4.3 Data Integrity of Card

- 4.3.1 It is permissible for the CWS to allow players to access their wagering accounts using "Smart Card" technology where the account information, including the current balance, is maintained in the CWS host database. Some "Smart Cards" have the ability to maintain a player account balance. This method of technology is only permissible when CWS host validates that the amount on the card is in agreement with the amount stored with the system's database.

Technical Standards for Cashless Wagering System (Singapore)

4.4 System Clock

- 4.4.1 The CWS shall synchronize its internal clock with the same time source as that of the SMS. The time source shall accurately reflect the current time (in hours, minutes and seconds) and date that shall be used to provide the following:-
- a. Time stamping of wagering account transactions; and
 - b. Time stamping of critical data alterations.

5. DISPLAY AND COMMUNICATIONS REQUIREMENTS

5.1 Cashless Transaction Display Information

- 5.1.1 The player interface module shall be capable of providing confirmation/denial of every cashless transaction initiated. This confirmation/denial shall include:-
- a. The type of transaction (WAT In/WAT Out);
 - b. The transaction value;
 - c. The time and date;
 - d. The player's account number or a unique Transaction Number; and
 - e. A descriptive message as to why the transaction did not complete as initiated.
- 5.1.2 A message describing the type of error shall be displayed to the patron at the player interface module in the event of the following error conditions:-
- a. Invalid PIN (Can prompt for re-entry up to maximum allowed); and
 - b. Unknown account.
- 5.1.3 If a player initiates a cashless transaction and that transaction would exceed game configured limits (i.e. the credit limit, etc) then this transaction may only be processed provided that the patron is clearly notified that he has received or deposited less than requested to avoid patron disputes.

5.2 Communication

- 5.2.1 If communication between the CWS and gaming machine/kiosk is lost, the game or interface module must display a message to the player that cashless transfers cannot currently be processed.
- 5.2.2 In the event of communication breakdown between the gaming machine/kiosk and CWS, the gaming machine/kiosk shall:-
- a. Not transfer any credits from the CWS host to the gaming machine; and
 - b. Not transfer any credits on the gaming machine to the CWS host. If this is the only available payout medium, it shall result in a hand-pay lockup or tilt on the gaming machine.
- 5.2.3 When a malfunction in the operation of the CWS occurs, an appropriate error message shall be made visible to the players at the player interface module of the affected gaming machines and shall alert the casino to the error condition.