CYPRUS GAMING + CASINO SUPERVISION COMMISSION
ΑΡΧΗ ΠΑΙΓΝΙΩΝ + ΕΠΟΠΤΕΙΑΣ ΚΑΖΙΝΟΥ ΚΥΠΡΟΥ

Κυπριακή Δημοκρατία
Republic of Cyprus

Gaming Equipment Technical Standards

Cyprus Gaming and Casino Supervision Commission

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Background

Regulation 26 (3) of the Republic of Cyprus Casino Operations and Control (General) Regulations of 2016 (Regulations) states that the Cyprus Gaming Commission (Commission) shall set out the required technical standards for gaming equipment or class of gaming equipment that are used in the casino (Technical Standards). Gaming equipment must comply with such Technical Standards, which at a minimum shall provide:

(a) mechanical and electrical reliability;

(b) security against tampering;

(c) ease of understanding use by casino customers;

(d) acceptable noise and light levels; and

(e) such standards as necessary to protect casino customers from fraud or deception and the integrity of the gaming and shall be similar to technical standards and types of gaming machines permitted in jurisdictions hosting world class resorts/ casinos.

Purpose of Technical Standards:

The Technical Standards have been developed to help ensure that the Commission's licensing objectives are met. These objectives are to:

- Prevent gambling from being a source of crime or disorder, being associated with crime or disorder or being used to support crime;
- Ensure that gambling is conducted in a fair and open way; and
- Protect against problem and underage gambling.

Disclaimer

Operators or end users should not rely upon these Technical Standards as a measure of reliability, quality or minimal security requirements.

The Cyprus Gaming Commission accepts no responsibility whatever for errors or omissions within these Technical Standards. In particular, it accepts no responsibility for actual or consequential loss which may be claimed by any person to be attributable to compliance with the Technical Standards, whether or not such loss is due to negligence on its part. Gaming Equipment Manufacturers and approved testing laboratories may seek clarification of any matter contained within the Technical Standards, but any such clarification shall be proved by the Commission in writing, and shall be subject to the same limitation of liability.

These Gaming Equipment Technical Standards are subject to change from time to time to adapt to the continual development and evolution of the gaming industry in the Republic of Cyprus. The Commission reserves the right to change its policies and to amend, modify or supplement any information in this document through standards notices, orders or operating instructions.

These Gaming Equipment Technical Standards do not in any way bind the Commission to grant any approval or exemption from any matter for which approval is required under any written law in the Republic of Cyprus.

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PART 1 GAMING MACHINES

CHAPTER 1 INTRODUCTION TO GAMING MACHINES

1.1 Introduction

1.1.1 **Definition of a gaming machine.** A gaming machine is defined under the Republic of Cyprus Casino and Control Law of 2015 as any device or object, whether wholly or partly mechanically operated and which (a) that is designed so that it may be used for the purpose of playing a game of chance or a game of mixed chance and skill (b) that is designed so that as a result of making a wage on the device, winnings may be payable, and (c) has been approved by the Commission as a gaming machine.

1.1.2 **Function of gaming machine.** A gaming machine utilizes an element of chance and/or skill in the determination of prizes, contains some form of activation to initiate the wagering process, and makes use of a suitable methodology for delivery of the determined outcome. The functions of a gaming machine may be logically separated into multiple parts or distributed among several physical and/or server components. A "gaming machine" does NOT include, for purposes of this standard, electronic equipment used in the conduct of electronic table games.

1.2 Definitions

In these technical standards for Gaming Machines, the following definitions apply:

Advertised Award – A term describing a prize that can be awarded by a gaming machine and which is explicitly advertised to the casino customer in the game artwork.

Alarm – An audible alert provided by a gaming machine that can be heard in a typical operating environment and which is intended to notify responsible personnel to various error conditions that may exist for the device.

Alterable Media – Physical storage media for control programs that can be altered or modified when installed and operating in-circuit within the gaming machine. From a practical standpoint, media that is rendered read-only or unalterable by a hardware or software means when installed and operating is not considered alterable media.

Alternative Game Mode – Any mode of a gaming machine other than the normal mode of game play. This includes modes such as attract, test/diagnostic, autoplay, idle, and free play.

Artwork – The graphics, thematic art, helpscreens, and other textual information that is shown to a casino customer by way of a game's payglass and/or video display(s).

Attendant Paid Cancelled Credits - Credit value paid by an attendant resulting from a casino customer-initiated cash-out that exceeds the physical or configured capability of the device.

Attendant Paid Jackpot - Credit value paid by an attendant resulting from a single game cycle, the amount of which is not capable of being paid automatically by the gaming machine itself.

Attract Mode - Visual and/or audible options intended to attract casino customers when the machine is in the idle mode (i.e., no active credits or gameplay).

Autoplay Mode – A casino customer-selectable mode of a gaming machine that allows a casino customer to place wagers automatically without any manual interaction, once a denomination, wager, and other play attributes have been selected for game play.

Background Cycling (for RNG) – A process whereby an RNG continues to generate random numbers at a programmed rate during periods where its output is not actively being used to produce game outcomes.

Barcode – An optical machine-readable representation of data. Barcodes may be used on printed vouchers.

Barcode Reader – A device that is capable of reading or interpreting a barcode. This may extend to some smartphones or other electronic devices that can execute an application to read a barcode.

Bill In - The total value of all currency accepted by a gaming machine bill validator.

Bill Validator – A peripheral component used on a gaming machine that is capable of accepting paper currency, tickets, and other approved notes in exchange for credits on the credit meter.

Bluetooth - A low power, short-range wireless communications protocol utilised for the interconnection of cellular phones, computers, and other electronic devices, including gaming machines. Bluetooth connections typically operate over distances of 10 meters or less and rely upon short-wavelength radio waves to transmit data over the air.

Card Reader –A gaming machine peripheral that reads data embedded on a magnetic strip, or stored in an integrated circuit chip, for the purpose of casino customer identification.

Cashable Electronic Promotion - Cashable credits electronically transferred to/from a gaming machine from/to a promotional account.

Cashable Promotional Credit Wagered - The total value of promotional cashable credits which are wagered.

Cashless Account Transfer In/Out - Cashable credits electronically transferred to/from the gaming machine from a wagering account by means of an external connection between the device and a cashless wagering system.

Casino customer Credentials – Sensitive information regarding a casino customer and which may include items such as full name, date of birth, place of birth, social security number, address, phone number, medical or employment history, or other personal information as defined by the regulatory body.

Casino customer Interaction Device – An internal or external device that connects to a machine and that registers various types of casino customer inputs allowing the casino customer to interact with the machine. Several examples include touch screens, button panels, joysticks, handheld controllers, camera systems, etc. The casino customer interaction device may be hard-wired or wireless. A “smart” casino customer interaction device supports two-way communications with the gaming machine. For the purpose of this technical standard, a traditional electromechanical button panel is excluded from this definition unless it is used to affect the outcome for a game.

CF Card, *Compact Flash* - A small removable mass storage device that relies on flash memory technology. A CF card is a storage technology that does not require a battery to retain data indefinitely.

CFast, *CompactFast* - A variant of a Compact Flash based on a serial ATA interface rather than the parallel ATA used by CF Cards.

Coin Acceptor – A gaming machine peripheral that accepts coins or tokens in exchange for credits. The coin-in assembly receives, verifies, counts and appropriately routes coins deposited into the machine.

Coin Drop - Total coins or tokens diverted to the drop box.

Collect Meter - A meter which shows the number of credits or cash collected by a casino customer upon cashout.

Community Bonus – A type of bonus play where a bank of machines is connected to a controller that allows casino customers to collaborate and/or compete for a shared prize.

Coupon – A printed or virtual wagering instrument that is used primarily for promotional purposes and which can be redeemed for restricted or unrestricted credits.

CPU, *Central Processing Unit* – An electronic component of a gaming machine, more commonly called the processor, which consists of a control unit and arithmetic logic unit and which is located on a circuit board housed within the secure logic area of the gaming machine. The CPU performs arithmetic and logic functions and decodes and executes game program instructions.

CRC, *Cyclic Redundancy Check* – A software algorithm used to verify the accuracy of data during its transmission, storage, or retrieval. The algorithm is used to validate or check the data for possible corruption or unauthorised changes.

Credit Meter - A meter which maintains the credits or cash available to the casino customer for the commitment of a wager.

Critical Control Program – A software program that controls gaming machine behaviours relative to any applicable technical standard and/or regulatory requirement.

Critical Non-Volatile (NV) Memory – Memory used to store all data that is considered vital to the continued operation of the gaming machine including, but not limited to, data elements such as electronic accounting and metering, current credits, configuration data, game recall, significant events, last normal game and machine state, paytable information, etc.

Cryptographic RNG - An RNG which is resistant to attack or compromise by an intelligent attacker with modern computational resources, and who has knowledge of the source code of the RNG and/or its algorithm. Cryptographic RNGs cannot be feasibly 'broken' to predict future values.

Direct Cryptanalytic Attack - An RNG attack whereby the attacker, given a sequence of past values produced by an RNG, is able to predict or estimate future RNG values.

Direction Detector - A device which can determine the direction and speed of coin/token travel in a coin acceptor.

Diverter - The portion of the coin-in assembly that channels coins to either the hopper or the drop box.

Double-Up (aka "Gamble") – An extended game play feature available to a casino customer to double or risk current winnings.

Drop Box – A secure container housed within a gaming machine cabinet that collects coins when the hopper is full or when the diverter directs coins to it.

EFT, *Electronic Funds Transfer; ECT, Electronic Credits Transfer* - EFT (or ECT) is a system by which currency can be electronically transferred to or from a gaming machine in the form of credits. EFT requires some form of communication between the gaming machine and a host system.

Electronic Accounting Meter (aka "Software Meter" / "Soft Meter") – An accounting meter that is implemented in the main program software of a gaming machine.

EMC, *Electromagnetic Compatibility* - The principal in which any electronic or electrical appliance should be able to operate without causing, or being affected by, electromagnetic interference.

EMI, *Electromagnetic Interference* - Any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics and electrical equipment.

EPROM, *Erasable Programmable Read-Only Memory* - *A* memory chip that holds its content without power and can be erased using ultraviolet light, or reprogrammed external to the gaming machine using a special tool.

ESD, *Electro-Static Discharge* - The release of static electricity when two objects come into contact. It is the sudden flow of electricity between two electrically charged objects caused by contact, an electrical short, or a dielectric breakdown.

Firewall – A component of a computer system or network that is designed to block unauthorised access or traffic while still permitting outward communication.

Firmware - Programs stored permanently in read-only memory (ROM).

Flight Recorder – A term used to describe game recall functionality that records various casino customer physical actions and correlates them in time to other game inputs such as touch screen activations, button presses, etc. in order to more fully reconstruct the outcome of game play. When used in conjunction with a game containing a physical skill element, such functionality may be especially useful for recording/documenting aspects of game history specific to a casino customer's physicality, dexterity, motions, or gestures.

Free Play Mode – A gaming machine mode that allows a casino customer to participate in a game without placing any wager, principally for the purpose of learning or understanding game play mechanics.

Gamble Feature - see "Double-Up".

Game Cycle - A game cycle is defined as "wager to wager". The cycle is the period from an initial wager to the point of the final transfer to the casino customer's credit meter, or when all credits wagered are lost.

Game with Skill - A wagered game in which the skill of the casino customer, rather than pure chance, is a factor in affecting the outcome of the game as determined over a period of continuous play. A game with skill contains one or more elements of skill in its design which can be leveraged by a casino customer to impact the return percentage.

Gaming machine – See section 1.1.1 of this Part 1.

Gaming Session – The period of time commencing when a casino customer initiates a game or series of games on a gaming machine by committing a wager and ending at the time of a final game outcome for that game or series of games and coincident with the opportunity for the casino customer to retrieve their credit balance.

Hardware-Based RNG – An RNG that derives its randomness from small-scale physical events such as electric circuit feedback, thermal noise, radioactive decay, photon spin, etc.

Hash Algorithm - A function that converts a data string into a numeric string output of fixed length.

Hopper - An electromechanical assembly inside the machine that receives, holds and dispenses coins. When the hopper is full, coins are diverted to the drop box.

Identifier - Any specific and verifiable fact concerning a casino customer or group of casino customers which is based upon objective criteria relating to the casino customer or group of casino customers and which may be utilised to affect some prescribed change to a game or gaming machine configuration.

Idle Mode – A gaming machine mode that exists when the machine is not being played and no credits exist on the credit meter.

In-Play Wager – A wager that is placed while a virtual event is in-progress or actually taking place.

Integrated Casino customer Identification Component – An integrated casino customer identification component is an electronic device controlled by a gaming machine's critical control program which provides a means for casino customers to enter their secure identification information. Examples include a card reader, a barcode reader, or a biometric scanner.

Jumper – A removable connector (plug, wire, etc.) that electrically joins together or short-circuits two separate physical connections.

Known Input Attack - An RNG attack whereby the attacker is able to compromise an RNG by determining or estimating the state of the RNG after initial seeding.

Logic Area / Logic Box - A separately locked area of a gaming machine which houses electronic components that have the potential to influence the outcome or integrity of the device. This area contains the main processor board and other critical components. It is a sealed, secured box or enclosure within the machine that houses the critical control program(s) for the device.

Mapping - The process by which a value is associated to a symbol or object that is usable and applicable to the current game (e.g. the value 51 might be mapped to an ace of spades).

Mechanical RNG (aka "Physical Randomness Device") – An RNG that generates outcomes mechanically, employing the laws of physics. Gaming machine implementations include, but are not limited to, mechanical wheels, tumblers, blowers, shufflers, etc.

MI, *Magnetic Interference* - Any magnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics and electrical equipment.

Microprocessor - A component that incorporates the functions of a computer's central processing unit (CPU) on a single integrated circuit (IC), or at most a few integrated circuits.

Multi-Game - A game which can simultaneously be configured for use with multiple themes and/or multiple paytables.

Multi-Wager Game – A game where multiple, independent wagers can simultaneously be applied towards advertised awards.

Mystery Award - A prize paid by a gaming machine that is not associated with a specific paytable combination.

Near Miss - Showing a top award-winning combination above or below an active payline.

NFC, *Near Field Communication* - A short-range wireless connectivity standard that uses magnetic field induction to enable communication between devices when they are touched together, or brought within a few centimetres of each other.

Non-Cashable Electronic Promotion In - Non-cashable credits electronically transferred to the gaming machine from a promotional account.

Non-EPROM – Any Program Storage Device which is not a physical EPROM.

Non-Wager Purchase – A purchase made by the casino customer that debits the credit meter and which is used for entertainment purposes only. A non-wager purchase does not influence the outcome of the game. An example might be the purchase of an artistic attribute of a game.

Parlay Bet – A single bet that links together two or more individual wagers and which is dependent on all of those wagers winning together.

Paytable (aka, "variation") - A term used to describe the mathematical behaviour of a game based upon the data from the manufacturer's PAR sheet, inclusive of the return percentage, and reflective of all possible payouts/awards.

PCB, *Printed Circuit Board* - A hardware component of a computer or other electronic device, consisting of a flat piece of a non-conductive, rigid material to which Integrated Circuits (ICs) and other electronic components such as capacitors, resistors, etc. are mounted. Electrical connections are made between the ICs and components using a copper sheet that is laminated into the overall board assembly.

Perfecta – aka Exacta – A bet in which the bettor picks the first and second place finishers in a race in the correct order.

Peripheral – An internal or external device connected to a machine that supports credit acceptance, credit issuance, casino customer interaction, or other specialized function(s).

Persistence Game - A game that is associated with a unique attribute (e.g., casino customer ID, game or device ID, etc.) and incorporates a feature that enables progress towards the award of game play enhancements and/or bonuses through the achievement of some designated game outcome.

Physical Coin In / Out- The total value of coins or tokens inserted into or paid out by the gaming machine.

Physics Engine - Specialized software that approximates the laws of physics, including behaviours such as motion, gravity, speed, acceleration, mass, etc. for a game's elements or objects. The physics engine is utilised to place game elements/objects into the context of the physical world when rendering computer graphics or video simulations.

PIN, *Personal Identification Number* - A numerical code associated with an individual and which allows secure access to a domain, account, network, system, etc.

Play from Save - A feature utilised in some persistence game designs where complexity increases, or additional elements are added to the game, as play continues. A casino customer is able to save their progress and resume from the saved point of game play.

Printer – A gaming machine peripheral that prints tickets, coupons, vouchers, or receipts.

Program Storage Device *(PSD)* - The physical storage media or electronic device that contains critical control programs or executable software that operates the gaming machine. Types of PSDs include, but are not limited to, EPROMs, Compact Flash and CFast cards, optical disks, hard drives, solid state drives, and USB drives.

Progressive System- A system that takes contributions from one or more gaming machines and applies it to an incrementing award. When the proper condition or trigger occurs, the award is paid to a casino customer.

Protocol - A set of rules and conventions that specifies information exchange between devices, through a network or other media.

Quinella – A bet in which the first two places in a race must be predicted, but not necessarily in the finishing order.

Residual Credit Removal - A residual credit removal feature is a casino customer-selectable option that allows for the removal of credits left on the machine when there is a credit balance less than that which can be cashed out by the casino customer using an available, configured payment device. For a gaming machine with a hopper, a residual credit equates to a value less than the dispensed coin or token.

RFI, *Radio Frequency Interference* - Electromagnetic radiation which is emitted by electrical circuits carrying rapidly changing signals, as a by-product of their normal operation, and which causes unwanted signals (interference or noise) to be induced in other circuits.

RNG State - The RNG state is defined by one or more variables in computer memory and represents a specific point within the cycle of the RNG. RNG state may be modified by

replacing one or more of these variables with new values, or otherwise mixing the values with new data.

RNG, *Random Number Generator* - A computational or physical device, algorithm, or system designed to produce numbers in a manner indistinguishable from random selection.

ROM, *Read Only Memory* – The electronic component used for storage of non-volatile information in a gaming machine. The term includes Programmable ROM (PROM) and Erasable Programmable ROM (EPROM).

RTP, *Return to Casino customer* - A ratio of the 'total amount won' to the 'total amount wagered' by a casino customer. Such a return may be "theoretical" (based on mathematical calculations or simulations) or "actual" (based on the metering supported by a fielded gaming machine).

Scaling Algorithm - An algorithm or method by which the numbers selected by an RNG are scaled or mapped from a greater range to a lesser range for use in the game.

Scaling Bias - A scaling algorithm is said to have bias if each value in the target range is not selected with equal frequency when mapping all possible values in the original range.

Secure Areas or Secure Compartments – Sensitive areas of a gaming machine such as the logic area, external doors such as the main door or belly door, cash compartments such as a drop box, peripheral device access areas, and other areas for devices that can potentially impact game integrity such as top boxes, controllers, etc.

Seeding / Seed - Seeding is the initialization of the state variables of an RNG. The source value or values used for initialization is the seed.

Sensitive Information – Includes information such as validation numbers, PINs, casino customer credentials, passwords, secure seeds and keys, and other data that must be handled in a secure manner.

Significant Events - Conditions such as power resets, hand pays, door openings/closings, coin/token errors, bill validator errors, card reader errors, hopper errors, critical program or memory error, mechanical device errors, and any of the "error conditions" documented within this standard.

SMIB (aka Slot Machine Interface Board) – A circuit board that interfaces the gaming machine with an external system, supporting protocol conversion between the machine and the system.

Software RNG – An RNG that derives its randomness from a computer-based or software-driven algorithm.

Source Code – A text listing of commands to be compiled or assembled into an executable computer program.

Stacker – An electromechanical bill validator component that loads bill, notes, coupons, or tickets into a locked container for secure storage within the gaming machine.

State Compromise Extension Attack - A category of attacks in which an attacker compromises a single state of the RNG and penetrates past or future outputs of the RNG using this

information. Usually this attack is executed using the seed state or a vulnerable state in which insufficient entropy is available.

Surrender – An option available in some card games where the casino customer can forfeit half of their wager rather than play out their active hand of cards. There are two types of surrender: early and late. These terms refer to whether or not a dealer checks to see if she/he has a blackjack (when an Ace or 10 is showing) before the casino customer makes the surrender decision.

Test/Diagnostic Mode (aka "Audit" or "Demo" mode) – A secure mode of a gaming machine that allows an attendant or operator to view game play mechanics, perform paytable tests, or execute other auditing and/or diagnostic functions supported by the machine, or that permits secure access to various audit menus that display information related to configuration settings, performance, recall, logs, or accounting and metering information.

Ticket and/or Voucher In/Out - The total value of all gaming machine vouchers accepted or paid out by the device.

Tilt – An error in gaming machine operation that halts or suspends play and/or that generates some intelligent fault message.

Tokenisation - When the unit of wager is equal to the denomination of the game, then the tokenization ratio is 1:1. With tokenization, a game with a denomination of one U.S. quarter and a tokenization ratio of 1:5 would provide a casino customer with five credits per quarter.

Touch Screen – A video display device that also acts as a casino customer input device by using electrical touch point locations on the display screen.

Tournament - A tournament is an organized, measured event that permits a casino customer to engage in competitive play against other casino customers. An out-of-revenue tournament involves only non-wagered play using tournament credits or points that have no cash value. In contrast, an in-revenue tournament allows for wagered play in conjunction with the operation of the tournament.

Tower Light – A light located on the top of a gaming machine that illuminates automatically in response to various machine error conditions, or which may be illuminated by a casino customer for summoning an attendant or other service personnel.

Trifecta – A racing bet in which a bettor wins by selecting the first three finishers of a race in the correct order of finish.

USB, ***Universal Serial Bus*** - An industry standard interface that defines the cables, connectors and communications protocols used for connection, communication, and power supply between computers and electronic devices. Often used to reference the type of port or a flash type storage device using this interface technology.

Virtual Event Wagering – A form of betting that allows for the placement of wagers on sports, contests, and matches whose results are determined solely by an approved Random Number Generator (RNG).

Virtual Opponent – Term used to describe a computer-based casino customer that participates in a game with skill and effectively mimics the actions of a live casino customer.

Virtual Participant – The athlete or other entity that competes in a virtual event.

Voucher - A printed or virtual ticket issued by a gaming machine which can be redeemed for cash or used to subsequently establish credits on a device. A virtual voucher is an electronic token exchanged between a casino customer's mobile device and the gaming machine which is used for credit insertion and redemption.

Wager - Any commitment of credits or money by the casino customer which has an impact on game outcome.

Wager Category – A term used to describe different bet options/levels available to the casino customer in regards to the commitment of credits or money which could have an impact on game outcome.

WAT, *Wagering Account Transfer* - See Cashless Account Transfer In/Out.

Wi-Fi - The standard wireless local area network (WLAN) technology for connecting computers and electronic devices to each other and/or to the internet.

CHAPTER 2 GAMING MACHINES REQUIREMENTS

2.1 Introduction to Gaming Machine Requirements

2.1.1 **Introduction.** This chapter sets forth the technical requirements for the key attributes of a gaming machine.

2.2 Machine and Casino Customer Safety

2.2.1 **Physical Hazards and Environmental and Electrical Safety Testing.** Electrical and mechanical parts and design principals of the gaming machine shall not subject a casino customer to any physical hazards.

2.3 Environmental Effects on Gaming Machine Integrity

2.3.1 Gaming machine Integrity.

a) Gaming machines must not divert from normal application by the application of electromagnetic interference from an outside source.

b) Gaming machines must exhibit total immunity to human body electrostatic discharges on all areas exposed to casino customer contact.

c) Gaming machines should exhibit temporary disruption when subjected to a significant electrostatic discharge greater than body discharge, but they must exhibit a capacity to recover and complete any interrupted play without loss or corruption of any control or data information associated with the gaming machine.

d) Gaming machines must not divert from normal operation by the application of radio frequency interference (e.g. radio frequency generated by Wi-Fi, Bluetooth, etc.)

e) Liquid spills applied to the outside of a gaming machine must not affect the normal operation of the gaming machine or the integrity of the material or information stored inside the cabinet.

2.3.2 **ESD, EMC and RFI Effects.** A gaming machine shall comply with the following requirements related to ESD testing:

a) The Random Number Generator (RNG) and random selection process shall be impervious to influences from ESD, Electromagentic compatibility (EMC) and Radio Frequency Interference.

b) Protection against ESD requires that the gaming machine's conductive cabinet be earthed in such a way that static discharge energy shall not permanently damage or permanently impact the normal operation of the electronics or other components within the gaming machine. Gaming machines may exhibit temporary disruption when subjected to a significant external ESD with a severity level of 27kV air discharge. The gaming machine shall exhibit a capacity to recover and complete any interrupted play without loss or corruption of any control information or critical data following any temporary disruption.

2.4 Machine Identification

2.4.1 **Identification Badge.** A gaming machine shall have an identification badge affixed to the exterior of the device by the manufacturer. The identification badge shall not be removable without leaving evidence of tampering. This badge shall include the following minimum information:

a) The complete name of the manufacturer or some appropriate abbreviation for same;

b) A unique serial number;

c) The gaming machine model number;

d) The date of manufacture; and

e) CE marking.

2.5 Basic Gaming Machine Hardware Requirements

2.5.1 **Gaming Machine Control.** A gaming machine shall be controlled by one (1) or more microprocessors or the equivalent in such a manner that the game program is completely controlled by the microprocessor(s). This does not preclude a game outcome from being derived from a mechanical device as described under the "Random Number Generator (RNG) Requirements" chapter of this Part 1.

2.5.2 **Printed Circuit Board (PCB) Identification Requirements.** Identification for any PCB that impacts the integrity of the gaming machine shall include the following:

a) Each PCB shall be clearly identifiable by an alphanumeric identification and, when applicable, a revision number. It is recommended that this identification be readily viewable without removal of the PCB from the gaming machine; and

b) If track cuts, patch wires, or other circuit alterations are introduced to the PCB, then a new revision number shall be assigned.

2.5.3 **Switches and Jumpers.** If the gaming machine contains switches and/or jumpers, the following rules shall be met:

a) All hardware switches or jumpers shall be fully documented for evaluation by the independent test laboratory; and

b) Hardware switches and/or jumpers which may alter the jurisdiction-specific configuration settings, paytables, game denomination, or payout percentages shall meet the applicable sections of this document and must be housed within the logic compartment of the ganing machine. This includes award changes (with or without progressives), selectable settings, or any other option that would affect the payout percentage.

2.5.4 **Machine Wiring.** The gaming machine shall be designed so that power and data cables into and out of the device can be routed so that they are not accessible to the general public. Wires and cables that are routed into a logic area shall be securely fastened within the interior of the device using appropriate mechanical fasteners, plugs, sockets, connectors, etc. The gaming machine installation must conform to local electrical codes, or to any other electrical testing standards and practices.

2.5.5 **Charging Mechanisms.** A gaming machine may support the use of an externally accessible charging mechanism, such as a Universal Serial Bus (USB) charging port, or some other analogous technology (e.g., cables, inductive chargers, etc.). The mechanism may be used to provide external power or charging access for an electronic device such as a smartphone, tablet, etc. If so equipped, the charging mechanism shall:

a) be appropriately fused and/or electrically-protected; and

b) not impact the integrity, proper operation, or outcome of the gaming machine.

2.5.6 **Displays and Monitors.** If a gaming machine is equipped with a display/monitor, the following rules apply:

a) The display/monitor shall fit properly into the gaming machine and the surrounding bezel in a manner that eliminates gaps or voids, resists the entry of objects, and which does not physically obscure or cover any required game display information;

b) The resolution of the configured display/monitor shall be compatible with one or more of the resolutions supported by the gaming machine software in a manner that ensures the intended function of the display; and

c) The resolution of the configured display/monitor shall not clip or fail to display any information critical to game play.

2.5.7 **Wired Communication Ports.** Wired communication ports shall be clearly labelled and must be securely housed within the gaming machine to prevent unauthorised access to the ports or their associated cable connectors.

2.6 Machine Electrical Power

2.6.1 **Power Surges.** The gaming machine shall not be adversely affected, other than resets, by surges or dips of ± 20% of the supply voltage. It is acceptable for the gaming machine to reset provided no damage to the equipment or loss or corruption of data is experienced. Upon reset, the game must return to its previous state. It is acceptable for the game to return to a game completion state provided the game history and all credit and accounting meters reflect a completed game.

2.6.2 **Circuit Protection.** The power supply used in a gaming machine must be appropriately fused or protected by circuit breakers. The amperage rating of all fuses and circuit breakers must be clearly stated on or near the fuse or the breaker.

2.6.3 **On/Off Switch.** An on/off switch that controls the electrical current supplied to the machine shall be located in a place which is readily accessible within the interior of the gaming machine. The on/off positions of the switch shall be clearly labelled.

2.7 Machine Doors

2.7.1 **Physical Security.** A gaming machine shall be robust enough to resist forced entry into any secured doors, areas, or compartments. In the event that extreme force is applied to the cabinet materials causing a potential breach in machine security, evidence of tampering must be conspicuous. "Secured areas" or "secured compartments" shall include the logic area(s), external doors such as the main door or belly door, cash compartment doors such as a drop box door, peripheral device access area(s), and/or other sensitive access areas of the gaming machine that can potentially impact game integrity such as top boxes, controllers, etc.

2.7.2 **External Doors.** The following requirements apply to the gaming machine's external doors (e.g., main, belly, top box, etc.):

a) External doors shall be manufactured of materials that are suitable for allowing only legitimate access to the inside of the gaming machine cabinet. Doors and their associated hinges shall be capable of withstanding determined and unauthorised efforts to gain access to the interior of the gaming machine and shall leave conspicuous evidence of tampering if such an attempt is made;

b) The seal between the gaming machine cabinet and the door of a locked area shall be designed to resist the entry of objects. It shall not be possible to insert an object into the gaming machine that disables a door open sensor when the gaming machine's door is fully closed, without leaving conspicuous evidence of tampering; and

c) All external doors shall be secure and support the installation of locks.

2.7.3 **Door Monitoring.** All doors that provide access to secure areas of the gaming machine shall be monitored by a door access detection system. The detection system shall register a door as being open when the door is moved from its fully closed and locked position, provided power is supplied to the gaming machine. The door access detection system shall monitor access to the following areas:

a) All machine external doors that provide access to a secure area of the gaming machine;

b) Logic door(s);

c) Drop box door;

d) Stacker door;

e) Any other currency storage areas that have a door; and

f) Peripheral device access areas.

2.7.4 **Door Open/Close Interruptions.** When any one of the above-listed doors are opened, the gaming machine shall cease play, enter an error condition, display an appropriate error message, disable credit acceptance, and sound an alarm and/or illuminate the tower light. This error condition shall be communicated to the on-line system when such a compatible system and protocol is supported. When all of the monitored doors are closed, the gaming machine shall return to its original state and display an appropriate door close event message, until the next game has started.

2.8 Machine Logic Area

2.8.1 **General Statement**. The logic area is a separately locked area of the gaming machine which houses electronic components that have the potential to influence the outcome or integrity of the device. There may be more than one (1) such logic area in a gaming machine.

2.8.2 **Electronic Components**. Electronic components that are required to be housed in one (1) or more logic areas shall include:

a) A Central Processing Unit (CPU) or machine microprocessor(s);

b) Any Program Storage Device (PSD) that contains software that may affect the integrity of gaming, including, but not limited to, game accounting, systems communication, execution of game play, game display, game result determination, security, etc.;

c) Any electronics associated with the control logic for door monitoring and/or access detection;

d) Any components that handle critical control program signature computation or verification;

e) Any components that manage encryption/decryption of critical data;

f) Any communication controller electronics, and/or components housing the PSD responsible for communications; and

g) Machine critical NV memory backup devices.

2.8.3 **Logic Area Access.** Logic area(s) shall contain an access detection mechanism to detect a logic door open condition, as defined elsewhere in this standard under the sections entitled "Door Monitoring" and "Door Open/Close Interruptions".

2.9 Gaming Machine Program Storage Devices

2.9.1 **General Statement**. The term Program Storage Device (PSD) is defined to be the physical storage media or electronic device that contains a critical control program or software that affects the integrity of the gaming machine. Types of PSDs include, but are not limited to, EPROMs, Compact Flash and CFast cards, optical disks, hard drives, solid state drives, and USB drives. For the purpose of this technical standard, logical partitions defined on a disk drive shall be viewed as separate PSDs. This partial list of PSD types may change as storage technology evolves.

2.9.2 **PSD Identification**. A PSD shall be clearly labelled with sufficient information to identify the software and revision level of the information stored on the device. It is acceptable for the gaming machine to alternatively display this information via an attendant menu. In either case, each PSD shall be uniquely identified by the following information:

a) Manufacturer identification, as appropriate;

b) Program ID number;

c) Version number, if applicable; and

d) Location of installation in the gaming machine, if there are multiple locations possible and as applicable.

2.9.3 **PSD Program Verification**. The gaming machine shall perform an integrity check to verify all designated critical control programs contained on the PSD(s) prior to being available for any game play and upon any processor reset. In addition, the following requirements shall apply to this verification mechanism:

a) Gaming machines which have critical control programs residing in one or more EPROMs shall employ a mechanism to verify critical control programs and data. The mechanism shall use, at a minimum, a checksum; however, it is recommended that a Cyclic Redundancy Check (CRC) be used that is at least 16-bit.

b) For non-EPROM PSDs, the gaming machine shall provide a mechanism for the detection of unauthorised or corrupt software elements upon any access, and shall prevent the execution or usage of those elements by the gaming machine. The mechanism shall employ a hashing algorithm which produces a message digest output of at least 128 bits.

c) Alterable media shall meet the following rules, (i) and (ii), in addition to the requirements stated in item (b) immediately above:

i. Employ a mechanism which tests accessible areas of the alterable media for unintended programs or data and tests the structure of the media for integrity. The mechanism shall prevent further play of the gaming machine if unexpected data or structural inconsistencies are found.

ii. Employ a mechanism for keeping a record any time a critical control program component is added, removed, or altered on any alterable media. The record shall contain a minimum of the last ten (10) modifications to the media. Each record shall contain the date and time of the action, identification of the component affected, the reason for the modification, and any pertinent validation information such as the corresponding signatures of the changed components.

d) For all media types, in the event of a failed authentication (i.e., program mismatch or authentication failure), the gaming machine shall immediately enter an error/tilt condition, cease operation, display an appropriate error message, disable credit acceptance, and sound an alarm and/or illuminate the tower light. This error condition shall be communicated to the on-line system when such a compatible system and protocol is supported. Additionally, the error condition shall require operator intervention to clear, and shall not clear until the program data authenticates properly following the operator intervention, or the media is replaced or repaired. Any PSD critical control program that fails authentication shall not be loaded into gaming machine NV memory.

2.9.4 **Independent PSD Verification**. The gaming machine shall have the ability to allow for an independent integrity check of the device's PSD from an outside source. This verification is required for all PSDs containing critical control programs that affect the integrity or outcome of the game. The verification shall be accomplished by being authenticated by a third-party application which may be embedded within the game software, by having an interface port for a third-party device to authenticate the media, or by allowing for removal of the media such that it can be verified external to the gaming machine. The integrity check must support a means for field verification of the software.

2.10 Machine Critical NV Memory

2.10.1 **Contents of Critical NV Memory.** Critical Non-Volatile (NV) memory shall be used to store all data elements that are considered vital to the continued operation of the gaming machine. These data elements include, but are not limited to:

a) All electronic meters defined in the "Accounting and Metering Requirements" chapter of this standard;

b) Current credits;

c) Machine configuration data (e.g., button panel, top box, communications, progressives, etc.);

d) Game configuration data (e.g., paytable, denomination, etc.);

e) Game history/recall data;

f) Machine state (e.g., machine error conditions, etc.);

g) Game state (e.g., current game play status, progress, etc.); and

h) All machine logs as defined within this technical standard and as applicable based upon supplier implementation (includes "Bill Validator Recall", "Voucher Out", "Identifier", "Machine Non-Wager Purchase", and "Machine Significant Event" logs).

2.10.2 **Machine Significant Event Log.** The last 100 significant events for gaming machines shall be stored with an appropriate timestamp in one or more secure machine logs that are not accessible to the casino customer and which minimally include the following events, as applicable:

a) PSD verification errors or critical NV memory errors, if technically possible to log these events based on the nature and/or severity of the error;

b) Changes made to game configuration which may alter paytables or hold percentages;

c) Power resets;

d) Hand pay conditions;

e) Door open errors and door close events;

f) Logic area access events;

g) Coin, token, and hopper errors;

h) Bill validator errors;

i) Hardware errors for integrated casino customer identification components;

j) Low NV battery errors;

k) Reel spin, mechanical device, or smart casino customer interaction

device errors, if any of these errors directly impact game outcome; and

l) Printer errors.

2.10.3 **Machine Non-Wager Purchase Log.** The last 10 non-wager purchases for gaming machines shall be stored in a secure machine log that is not accessible to the casino customer and which minimally includes the following information:

a) Unique transaction identification number;

b) Date and time of the non-wager purchase;

c) Value of the non-wager purchase in credits and/or local currency; and

d) Type of non-wager purchase.

2.10.4 **Identifier Log.** If an identifier triggers an action that alters the gaming machine configuration or the outcome of a game, then it shall be recorded in a log file containing the last 10 identifier-based transactions which shall be maintained by the gaming machine or an external system, as applicable. The log file shall contain the following information:

a) A unique transaction identification number;

b) An identification number unique to the casino customer, if known;

c) The date and time of the transaction;

d) The criteria for the use of the identifier (skill level of casino customer, subscriptions, account memberships, casino customer tracking information, skill requirements of the game, etc.); and

e) The type of action taken or alteration made to the game (e.g., game rule change, paytable change, or other configuration change related to game outcome).

2.10.5 **Critical NV Memory Requirements**. The following are the critical NV memory requirements for gaming machines:

a) The gaming machine shall have the ability to retain data for all critical NV memory as defined herein and shall be capable of maintaining the accuracy of all information required for thirty (30) days after power is disconnected from the gaming machine;

b) For rechargeable battery types only, if the battery back-up is used as an 'off chip' battery source, it shall re-charge itself within twenty-four (24) hours. The shelf life shall be at least five (5) years;

c) NV memory that uses an off-chip back-up power source to retain its contents when the main power is switched off shall have a detection system which provides a method for software to interpret and act upon a low battery condition before the battery reaches a level where it is no longer capable of maintaining the memory in question. If a low battery condition is identified, the gaming machine shall display an appropriate

error message and sound an alarm and/or illuminate the tower light. This error condition shall be communicated to the on-line system, when such a compatible system and protocol is supported; and

d) Clearing NV memory shall require access to the locked logic area or other secure method, provided that the method has been accepted by, or can be controlled by, the regulatory body.

2.10.6 **Function of Critical NV Memory Reset**. Following the initiation of a critical NV memory reset procedure utilizing a certified NV memory clear method, the critical control program shall execute a routine which initializes critical NV memory to the default state. All memory locations as per the NV memory clear process shall be fully reset in all cases.

2.10.7 **Configuration Settings**. It shall not be possible to change a configuration setting that causes any obstruction or alteration to the electronic accounting meters without performing an NV memory clear. Any change to the available denominations or paytable configurations shall be performed by a secure means which includes access to the locked logic area, or other secure method inaccessible to a casino customer.

2.11 Monitoring of Critical NV Memory

2.11.1 **Critical NV Memory Errors**. Critical NV memory storage shall be maintained by a methodology that enables errors to be identified. This methodology may involve signatures, checksums, redundant copies, database error checks, and/or other method(s) approved by the Commission.

2.11.2 **Critical NV Memory Checks**. Comprehensive checks of critical NV memory data elements shall be made following game initiation, but prior to display of game outcome to the casino customer. NV memory that is not critical to gaming machine integrity is not required to be checked.

2.11.3 **Unrecoverable Corruption of Critical NV Memory.** An unrecoverable corruption of critical NV memory shall result in an error and the gaming machine shall immediately cease play and tilt, display an appropriate error message, disable credit acceptance, and sound an alarm and/or illuminate the tower light. The memory error shall not be cleared automatically. Additionally, the critical NV memory error shall cause any communication external to the gaming machine to cease. An unrecoverable critical NV memory error shall require a full NV memory clear performed by an authorised person.

2.12 Casino customer Interaction Devices

2.12.1 **Touch Screen Displays**. All touch screen displays shall meet the following rules:

a) Touch screen displays shall be accurate, and if required by their design, shall support a calibration method to maintain that accuracy; alternatively, the display hardware may support automatic self-calibration; and

b) If applicable to design, a touch screen display shall be capable of being manually re-calibrated without access to the gaming machine cabinet other than opening the main door.

2.12.2 **Maintenance of Casino customer Interaction Devices.** A gaming machine that incorporates one or more casino customer interaction devices that impact game outcome shall:

a) Monitor any smart casino customer interaction device that supports two-way communications with the gaming machine to determine if it is offline or not communicating. Upon detection of an offline condition, the gaming machine must tilt unless an alternative interface mechanism is available to the casino customer; and

b) Support a manual test mode accessible to the operator that checks the electrical continuity of the casino customer interaction device and which allows the operator to assess the functional health of the device, as per its intended design.

2.12.3 **Wireless Casino customer Interaction Devices.** Communication between a gaming machine and any wireless casino customer interaction device, conducted using transmission technologies such as Near Field Communications (NFC), Bluetooth (BT), Wi-Fi, optical, etc., shall:

a) Utilize secure communication methods to prevent unauthorised access to sensitive data by unintended recipients;

b) Employ a method to detect data corruption; upon detection of corruption, either correct the error, or terminate the communication while providing a suitable error message;

c) Employ a method to prevent unauthorised modification of sensitive data that impacts game outcome or that represents secure casino customer information; and

d) Only be possible with authorised wireless casino customer interaction devices.

2.13 Bill Validators and Stackers

2.13.1 **General Statement.** For gaming machines that support a bill validator, the requirements defined within this section apply.

2.13.2 **Bill Validators**. Bill validators shall be constructed in a manner that ensures proper handling of inputs and that protects against vandalism, abuse, or fraudulent activity. In addition, bill validators shall meet the following rules:

a) A bill validator shall be electronically-based and be configured to ensure that it detects the entry of valid bills, coupons, vouchers, or other approved notes as applicable, and provides a method to enable the gaming machine software to interpret and act appropriately upon a valid or invalid input;

b) Invalid bills, coupons, vouchers or other approved notes must be rejected and shall be returned to the casino customer;

c) Each valid bill, coupon, voucher or other approved note shall register on the credit meter the actual monetary value in local currency, or the appropriate number of credits received for the denomination being used. If registered directly as credits, the conversion rate shall be clearly stated, or be easily ascertainable from the gaming machine;

d) Credits shall only be registered when:

   i. The bill, coupon, voucher or other approved note has passed the point where it is accepted and stacked; and

   ii. The bill validator has sent the "irrevocably stacked" message to the gaming machine.

e) Each bill validator shall be designed to prevent the use of cheating methods such as stringing, the insertion of foreign objects, and any other manipulation that may be deemed a cheating technique. Appropriate correlating error conditions shall be generated and the bill validator shall be disabled;

f) A method for detection of counterfeit bills must be implemented. Counterfeit bills shall be rejected with a high degree of accuracy;

g) Acceptance of any bills, vouchers, coupons or other approved notes for crediting to the credit meter shall only be possible when the gaming machine is enabled for play. Other states, such as error conditions including door opens, shall cause the disabling of the bill validator system; and

h) Each gaming machine and/or bill validator shall have the capability of detecting and displaying the error conditions listed below. The bill validator shall disable itself and provide a suitable error message which shall be communicated to the on-line system, when such a compatible system and protocol is supported. The error(s) shall be cleared by an attendant, or upon initiation of a new play sequence subsequent to the error being cleared.

   i. Stacker full; it is recommended that an explicit “stacker full” error message not be utilised since this may promote a security issue; rather, a message such as “Bill Validator Malfunction” or similar is suggested; it is acceptable to flash lights with respect to the bill validator itself;

   ii. Bill jams; it is acceptable to flash lights with respect to the bill validator itself;

   iii. Bill validator communication failure; it is acceptable to flash lights with respect to the bill validator itself;

iv. Stacker door open; the stacker door is the door immediately prior to accessing the cashbox/stacker assembly; the gaming machine shall cease play and sound an alarm and/or illuminate the tower light, provided power is supplied to the device; and

v. Stacker removed; the gaming machine shall cease play and sound an alarm and/or illuminate the tower light, provided power is supplied to the device.

2.13.3 **Bill Validator Self-Test.** The bill validator shall perform a self-test during each power up. In the event of a self-test failure, the bill validator shall automatically disable itself until the error state has been cleared.

2.13.4 **Bill Validator Communications**. All bill validators shall communicate to the gaming machine using a bi-directional protocol.

2.13.5 **Bill Validator Settings**. It shall only be possible to conduct preventive maintenance, or perform the following changes or adjustments to bill validators in the field:

a) The selection of desired acceptance for bills, coupons, vouchers, or other approved notes and their limits;

b) Changing of certified critical control program media or downloading of certified software;

c) Adjustment of the bill validator for the tolerance level for accepting bills or notes of varying quality shall not be allowed external to the gaming machine. Adjustments of the tolerance level must only be allowed with adequate levels of security in place. This can be accomplished through lock and key, physical switch settings, or other accepted methods approved on a case-by-case basis;

d) Maintenance, adjustment, and repair per approved factory procedures; and

e) Options that set the direction or orientation of acceptance.

2.13.6 **Bill Validator Location**. If a gaming machine is equipped with a bill validator, it shall be located in a secure area of the device but not within the logic area. Only the bill or voucher insertion area shall be accessible to the casino customer.

2.13.7 **Power Failures During Bill Validator Acceptance.** If a power failure occurs during acceptance of a bill/voucher, the bill validator shall give proper credits or return the bill/voucher. There may be a small window of time where power may fail and credit may not be given due to the timing of validating the bill/voucher. However, in this case, the timing window shall be less than one (1) second.

2.13.8 **Bill Validator Recall**. A gaming machine that uses a bill validator shall retain in its memory and display the denomination/value for each of the last five (5) items accepted by the bill validator. The bill validator recall log may be combined or maintained separately by item type and shall include a timestamp for each item. If combined, the type of item accepted shall be recorded along with its respective timestamp.

2.13.9 **Bill Validator Stacker.** Each bill validator shall have a secure stacker and all accepted items shall be deposited into the secure stacker receptacle. The secure stacker and its receptacle must be attached to the gaming machine in such a manner so that they cannot be easily removed by physical force and shall meet the following rules:

a) The bill validator device shall have the ability to detect a stacker full condition; and

b) There shall be a separate keyed lock to access the stacker area. This keyed lock shall be separate from the main door. In addition, a separate keyed lock shall be required to remove the bills from the stacker.

2.14 Coin Acceptors, Diverters, and Drop Boxes

2.14.1 **Coin Acceptors**. Coin acceptors shall be able to detect the entry of valid coins/tokens and provide a method to enable the gaming machine software to interpret and act appropriately upon a valid or invalid input. The coin acceptor shall accept or reject the coin/token on the basis of metal composition, mass, composite makeup, or an equivalent method to securely identify a valid coin/token. Coin acceptors shall be constructed in a manner that ensures proper handling of inputs and that protects against vandalism, abuse, or fraudulent activity. In addition, a coin acceptor shall meet the following rules:

a) Each valid coin/token inserted shall register on the credit meter the actual monetary value, or the appropriate number of credits received for the denomination being used. If registered directly as credits, the conversion rate shall be clearly stated, or be easily ascertainable from the gaming machine;

b) The coin acceptor shall be designed to prevent the use of cheating methods including, but not limited to, slugging (counterfeit coins), stringing (coin pullback), the insertion of foreign objects, and any other manipulation that may be deemed a cheating technique. Appropriate, correlating error conditions shall be generated and the coin acceptor shall be disabled;

c) Acceptance of any coins or tokens for crediting to the credit meter shall only be possible when the gaming machine is enabled for play. Other states, such as error conditions including door opens, shall cause the disabling of the coin acceptor system;

d) The gaming machine shall be capable of handling rapidly-fed coins/tokens or piggy-backed coins/tokens such that occurrences of cheating are eliminated. Coins/tokens traveling too fast that do not register on the casino customer's credit meter shall be returned to the casino customer;

e) The gaming machine shall have suitable detectors for determining the direction and the speed of coin/token travel in the acceptor. If a coin/token traveling at too slow of a speed, or improper direction, is

detected, the gaming machine shall display a suitable error condition for at least thirty (30) seconds or be cleared by an attendant;

f) Coins/tokens deemed invalid by the acceptor shall be rejected to the coin tray and shall not be counted as credits; and

g) If a coin acceptor error condition as listed below is identified, the gaming machine shall display an appropriate error message, disable the coin acceptor, and sound an alarm and/or illuminate the tower light. This error condition shall be communicated to the on-line system, when such a compatible system and protocol is supported.

i. Coin/token-in jam;

ii. Coin/token return jam;

iii. Reverse coin-in or token-in (coin or token traveling wrong direction through acceptor); and

iv. Coin or token too slow/ too fast.

2.14.2 **Diverter**. For gaming machines that accept coins or tokens, the software shall ensure that the diverter directs coins to the hopper, or to the drop box when the hopper is full. The hopper full detector shall be monitored to determine whether a change in diverter status is required. If the state of the detector changes, the diverter shall operate within ten (10) games, after the state change, without causing a disruption of coin flow, or creating a coin jam. Hopper-less gaming machines shall always divert coins to the drop box.

2.14.3 **Drop Box**. If the gaming machine is equipped to accept coins or tokens, then the following rules shall be met with respect to the drop box:

a) Each gaming machine shall contain a separate box to collect and retain all such coins or tokens that are diverted into the drop box;

b) A drop box shall be housed in a locked compartment, separate from any other compartment of the gaming machine; and

c) There must be a method to monitor the drop box door to detect access, as defined elsewhere in this standard under the sections entitled “Door Monitoring” and “Door Open/Close Interruptions”.

2.15 Integrated Casino customer Identification Components

2.15.1 **General Statement.** An integrated casino customer identification component is an electronic device controlled by a machine’s critical control program and which supports a means for casino customers to provide identification information. Examples of these integrated components include a card reader, a barcode reader, or a biometric scanner. Note that an integrated casino customer identification component as defined in this section does not include any SMIB-based or non-integrated form of these devices that operate outside the control of the gaming machine.

2.15.2 **Integrated Card Readers.** Integrated card readers shall be able to detect the use of a valid casino customer card, as applicable, and provide a method to enable the software to interpret and act appropriately upon a valid or invalid input. The card reader shall be electronically-based and be configured to ensure that it only reads valid cards.

2.15.3 **Integrated Barcode Readers.** Integrated barcode readers shall be able to associate the barcode visible on a card, coupon, voucher, or an allowed electronic device such as a smartphone, as applicable, with data stored in an external database as a means to identify an account association, or for the purpose of redemption. A barcode reader shall provide a method to enable the software to interpret and act appropriately upon a valid or invalid input.

2.15.4 **Integrated Biometric Scanners.** Integrated biometric scanners shall be able to associate a person's physical characteristics with those recorded within an external database as means to authenticate the identity of a casino customer and for the purpose of account association. A biometric scanner shall provide a method to enable the software to interpret and act appropriately upon a valid or invalid input.

2.15.5 **Integrated Casino Customer Identification Component Requirements.** Integrated casino customer identification components shall meet the following rules:

a) The integrated casino customer identification component hardware shall be secured in a locked enclosure or sealed casing, or located within a locked area of the gaming machine outside of the logic area (i.e., an area that requires opening of the main door for access). Only the areas of the component that require physical interaction shall be accessible to the casino customer;

b) Each integrated casino customer identification component shall be designed to prevent manipulation that may impact game integrity. A method for detection of counterfeiting shall be implemented; and

c) Each gaming machine shall have the capability of detecting and displaying an error condition related to a malfunction of any integrated casino customer identification component. If a malfunction is identified, the gaming machine shall display an appropriate error message, disable the integrated casino customer identification component, and sound an alarm and/or illuminate the tower light. For integrated casino customer identification components, it is acceptable to flash lights with respect to the component itself. This error condition shall be communicated to the on-line system, when such a compatible system and protocol is supported.

2.16 Machine Tower Light

2.16.1 **Tower Light**. The gaming machine shall have a light located prominently on its top that automatically illuminates when a casino customer has won an amount or is collecting credits that the device cannot automatically pay, an error condition has occurred, or a 'Call Attendant' request has been initiated by the casino customer. For bar-top style

devices, it is permissible for the tower light to be shared among a group of gaming machines, or to be substituted by an audible alarm.

2.17 Machine Payment and Payment Devices

2.17.1 **Payments by the Gaming machine**. Available credits may be collected from the gaming machine by the casino customer pressing a collect or cash out button at any time other than during:

a) A game being played (subject to the applicable rules of the game);

b) Any door open condition;

c) Test/diagnostic mode;

d) A credit meter or win meter increment, unless the entire amount is placed on the meters when the collect button is pressed; or

e) An error condition, provided the error condition prevents a valid cashout which is not supported through some other means.

2.17.2 **Cashout Limit Exceeded**. If credits are collected, and the total credit value is greater than or equal to a specific limit, the gaming machine shall lock up until the credits have been paid, and the handpay or attendant-paid cancelled credit condition is cleared by the attendant or via a system-based command.

2.17.3 **Coin Hoppers.** If coin hoppers are used, they are to be monitored for proper operation by the gaming machine critical control program, as per requirements defined under "Hopper Error Conditions". In addition, coin hoppers shall prohibit manipulation by the insertion of a light source or any foreign object, and there shall not be an abnormal payout when exposed to higher levels of Electro-Static Discharge (ESD), or if power is lost at any time during a payout.

2.17.4 **Hopper Location**. If a gaming machine is equipped with a hopper, it shall be located in a secure area of the gaming machine, but not within the logic area or the drop box.

2.17.5 **Hopper Error Conditions**. A gaming machine that is equipped with a hopper shall have mechanisms to allow critical control program software to interpret and act upon the conditions listed immediately below. If a hopper error condition as listed below is identified, the gaming machine shall display an appropriate error message, disable the hopper, and sound an alarm and/or illuminate the tower light. This error condition shall be communicated to the on-line system, when such a compatible system and protocol is supported.

a) Hopper empty or timed out;

b) Hopper jam; and

c) Hopper runaway or extra coin paid out.

2.17.6 **Printer Location**. If a gaming machine is equipped with a printer, it shall be located within a secure area of the gaming machine, but not be housed within the logic area or the drop box.

2.17.7 **Printer Error Conditions**. A gaming machine that is equipped with a printer shall have mechanisms to allow critical control program software to interpret and act upon the conditions listed below. If a printer error condition is identified, the gaming machine shall display an appropriate error message and sound an alarm and/or illuminate the tower light. The error condition shall be communicated to the on-line system, when such a compatible system and protocol is supported. Additionally, for the conditions stated immediately below in (b), the printer shall be disabled. Printer error conditions shall include:

a) Out of paper/paper low; it is permissible for the gaming machine to not lock up for these conditions, however, there shall be a means for the attendant to be alerted;

b) Printer jam/failure;

c) Printer disconnected; it is permissible for the gaming machine to detect this error condition when the game tries to print; and

d) Once a printer error condition has been cleared, any unprinted voucher shall be generated or a suitable handpay shall be processed.

2.18 Machine Vouchers

2.18.1 **Payment by Voucher**. Payment by voucher as a method of credit redemption is only permissible when:

a) The gaming machine is linked to a computerized validation system which allows for the validation of the voucher. Provisions must be made if communication is lost and validation information cannot be sent to the validation system, thereby requiring the manufacturer to support some alternate method of payment; or

b) Utilizing an approved alternative method that includes the ability to identify duplicate vouchers to prevent fraud through the redemption of a voucher that was previously issued by the gaming machine.

2.18.2 **Voucher Information.** A voucher shall contain the following information at a minimum:

a) Casino name / site identification (for a printed paper voucher, it is permissible for this information to be contained on the ticket stock itself);

b) Machine identification number;

c) Date and time;

d) Alpha value of the voucher in local monetary units;

e) Numeric value of the voucher in local monetary units;

f) Voucher sequence number;

g) Validation number (and which for a printed paper voucher, must appear on the leading edge of the ticket);

h) Bar code or any machine readable code representing the validation number;

i) Indication if the voucher is a "duplicate", assuming duplicate vouchers may be printed by the gaming machine;

j) Type of transaction or other method of differentiating voucher types (assuming multiple voucher types are available). Additionally, it is strongly recommended that whenever the voucher type is itself a non-cashable item and/or just a receipt, that the voucher explicitly states that it has "no cash value" or other equivalent wording; and

k) Indication of an expiration period from date of issue, or date the voucher will expire (for a printed paper voucher, it is permissible for this information to be contained on the ticket stock itself).

2.18.3 **Voucher-Out Log.** The gaming machine shall have the ability to retain information on the last twenty-five (25) issued vouchers in a voucher-out log. The voucher-out log shall contain the following information for each recorded voucher:

a) Value of credits in local monetary units in numerical form;

b) Time of day the voucher was issued, in twenty-four (24) hour format showing hours and minutes;

c) Date, in any recognized format, indicating the day, month, and year; and

d) Validation number. The gaming machine shall mask all but the last 4 digits of the validation number as displayed in the twenty-five (25) voucher-out log.

2.18.4 **Online Voucher Issuance**. The gaming machine may pay the casino customer by issuing a printed or virtual voucher that contains the information as indicated in the section entitled "Voucher Information" above. Additionally, the gaming machine shall support the transmission of the following information to the ticketing system regarding each voucher issued, as required by the communications protocol supported:

a) Value of credits in local monetary units in numerical form;

b) Time of day the voucher was printed in twenty-four (24) hour format showing hours and minutes;

c) Date, in any recognized format, indicating the day, month, and year;

d) Gaming machine asset number; and

e) Validation number.

2.18.5 **Offline Voucher Issuance**. The gaming machine shall meet the following minimum set of requirements to support the issuance of offline vouchers after a loss of communication with the validation system has been identified:

a) The gaming machine shall not issue more offline vouchers than it has the ability to retain and display in the voucher out log;

b) The gaming machine shall not request validation numbers, or values for seeds, keys, etc. used in the issuance of vouchers, until all outstanding offline voucher information has been fully communicated to the voucher validation system;

c) The gaming machine shall request a new set of validation numbers, seeds, keys, etc. if the current list has the possibility of being compromised;

d) The values for the seeds, keys, etc. shall never be viewable through any display supported by the gaming machine; and

e) An "offline authentication identifier" shall be included on the voucher. For printed paper vouchers, this identifier must appear on the next line immediately following the leading edge validation number that in no way overwrites, or otherwise compromises, the printing of the validation number on the voucher (not required for vouchers that are non-redeemable at a gaming machine). The offline authentication identifier must be derived by a hash, or other secure encryption method of at least 128 bits, that will uniquely identify the voucher, verify that the redeeming system was also the issuing system, and validate the amount of the voucher. For cases where a suitable authentication identifier is not included on the voucher, the gaming machine must issue at most one voucher after the communications between the gaming machine and the system have been lost.

2.18.6 **Online Voucher Redemption**. Vouchers may be accepted by a gaming machine connected to a ticket validation system provided that no credits are issued to the gaming machine prior to confirmation of voucher validity.

2.19 Gaming Machine Communication Protocol

2.19.1 **Integrity of Protocol Communications**. For gaming machines that are designed to support communications with an on-line system, the gaming machine shall accurately function as indicated by the communications protocol that is implemented, and as required by the regulatory body, including, but not limited to, protocol-based metering and remote verification of the critical control program, where supported. In addition, the following rules shall be met:

a) With the exception of 'disable' commands, communications shall not negatively impact casino customer interaction on the gaming machine, including a casino customer's access to all screen displays; and

b) After a program interruption, any communications to an external device shall not begin until the program resumption routine, including any self-test, is completed successfully.

2.19.2 **Protection of Sensitive Information**. The gaming machine shall not allow any information contained in communication to or from the online monitoring system that is intended by the communication protocol to be protected, or which is of a sensitive

nature, to be viewable through any display mechanism supported by the device. This includes, but is not limited to, validation numbers, secure PINs, casino customer credentials, or secure seeds and keys.

2.19.3 **Gaming machine Communication**. Any gaming machine which is capable of bidirectional communication with internal or external associated equipment, or other equipment, shall utilize a robust communication protocol which ensures that erroneous data or signals do not adversely affect the integrity or operation of the device.

2.20 Gaming Machine Connections to the Internet

2.20.1 **General Statement.** Gaming machines may be designed to connect to, or otherwise communicate over, servers or networks via the internet.

2.20.2 **Internet Connections.** The following requirements shall apply to gaming machines supporting an internet connection or access to a public network:

a) The gaming machine shall not be directly connected to the internet/ public network; a gaming machine shall only be connected to the internet/ public network when utilizing a method that securely isolates the gaming device from that external network, for example, through an approved firewall mechanism; and

b) The gaming machine shall support adequate network security measures to ensure all data transmitted between the gaming network and the internet/ public network is encrypted and utilizes Virtual Private Network (VPN), Secure Socket Layer (SSL), Internet Protocol Security (IPS), or some other accepted methodology approved by the regulatory body for securing data transmissions.

2.21 Multi-Casino Customer Gaming Machines

2.21.1 **General Statement**. A multi-casino customer gaming machine is a gaming machine consisting of multiple casino customer interfaces linked to a shared master console.

2.21.2 **Master Console.** The master console shall coordinate game play in a manner that is consistent across all casino customer interfaces. The master console shall coordinate game display consistently among the casino customer interfaces and must meet any applicable gaming machine and game requirements contained within this document.

2.21.3 **Casino customer Interfaces.** The casino customer interfaces support casino customer interaction devices as well as devices for credit acceptance and issuance. The following rules shall apply to each casino customer interface comprising a multi-casino customer gaming machine:

a) Each individual casino customer interface shall be capable of being independently monitored by an online system, when such a compatible system or protocol is supported;

b) Each casino customer interface shall meet the applicable standards outlined throughout this document, including gaming machine identification and metering;

c) Each casino customer interface shall be designed such that the actions of, or results obtained by any one casino customer, do not affect the outcome(s) of any other casino customer, unless otherwise denoted by the game rules;

d) In the event of a malfunction of any casino customer interface, which could include, but is not limited to, a loss of communication with the master console, each malfunctioning or non-communicating casino customer interface shall immediately enter into an unplayable mode and must display a suitable tilt message;

e) In the event of a master console malfunction, all casino customer interfaces shall enter into an unplayable mode and must display a suitable tilt message;

f) There shall be a method provided by a multi-casino customer gaming machine for each casino customer to know when the next game will begin; and

g) All casino customer interfaces shall utilise a compatible version of software and must employ consistent configurations of that software.

2.22 Mechanical Devices Used for Display of Game Outcomes in Machines

2.22.1 **Mechanical Display Devices**. If the gaming machine has mechanical (or electro-mechanical) devices which are used for displaying game outcomes, the following rules shall be observed:

a) Mechanical devices (e.g. reels or wheels) shall have a sufficiently closed loop of control so as to enable the software to detect malfunctions such as a reel/wheel which is jammed, not spinning freely, or manipulated from its final resting position. This requirement is designed to ensure that if a reel or wheel is not in the position it is supposed to be in, an error condition will be generated. This shall be detected under the following conditions:

i. A mis-index condition for rotating reels/wheels, that affects the outcome of the game;

ii. In the final positioning of the reel/wheel, if the position error exceeds one-half of the width of the smallest symbol excluding blanks on the reel/wheel artwork;

b) If the gaming machine detects a malfunction related to the operation of any related mechanical display device, it shall tilt and cease game play, provide an appropriate error message (including the specific reel number when applicable), disable credit acceptance, and sound an alarm and/or

illuminate the tower light. This error condition shall be communicated to the on-line system, when such a compatible system and protocol is supported, and shall not be cleared automatically;

c) Microprocessor-controlled mechanical reels or wheels shall have a mechanism that ensures the correct mounting of the assembly's artwork, if applicable;

d) Displays shall be constructed in such a way that winning symbol combinations align properly with paylines or other applicable pay indicators;

e) A display assembly for a mechanical device shall be designed such that it is not obstructed by any other components; and

f) Microprocessor-controlled reels or wheels shall re-spin automatically to the last valid reel/wheel position when game play mode is re-entered, and the reel/wheel positions have been altered (e.g. after the main door is closed, power is restored, test/diagnostic mode is exited, or an error condition is cleared).

CHAPTER 3 RANDOM NUMBER GENERATOR (RNG) REQUIREMENTS

3.1 Introduction to RNG Requirements

3.1.1 **Introduction**. This chapter sets forth the technical requirements for a Random Number Generator (RNG). See also related requirements found in "Game Outcome Using a Random Number Generator" section as contained in the "Game Requirements" chapter of this Part 1.

3.2 General RNG Requirements

3.2.1 **Distribution.** Each possible RNG selection shall be equally likely to be chosen. Where the game design specifies a non-uniform distribution, the final outcome shall conform to the intended distribution.

a) All scaling, mapping, and shuffling algorithms used shall be entirely free of bias, as verified by source code review. The discard of RNG values is permissible in this context and may be necessary to eliminate bias; and

b) The final outcome output shall be tested against intended distribution using appropriate statistical tests.

3.2.2 **Independence.** Knowledge of the numbers chosen in one draw shall not provide information on the numbers that may be chosen in a future draw. If the RNG selects multiple values within the context of a single draw, knowing one or more values shall not provide information on the other values within the draw, unless provided for by the game design.

a) As verified by source code review, the RNG shall not discard or modify selections based on previous selections, except where intended by game design (e.g., without-replacement functionality); and

b) The final outcome output shall be tested for independence by an independent testing house between draws and, as applicable, independence within a draw, using appropriate statistical tests (e.g., Serial or Interplay Correlation tests, and Runs test).

3.2.3 **Available Outcomes.** As verified by source code review, the set of possible outcomes produced by the RNG solution (i.e., the RNG period), taken as a whole, shall be sufficiently large to ensure that all outcomes shall be available on every draw with the appropriate likelihood, independent of previously produced outcomes, except where specified by the game design.

3.2.4 **Unpredictability.** The state of the RNG must be modified between every game unless a "cryptographic RNG" is implemented, as defined elsewhere within this chapter. If necessary, to ensure unpredictability, such modification may be additionally required within a game. Note that hardware devices are considered to modify their state continuously. Possible modifications of RNG state that may satisfy this requirement include, but are not limited to:

a) The discard of an unpredictable number of RNG values (i.e., background cycling). If the number of discarded values is determined by an RNG, it may not be determined by the primary RNG itself, but must instead be determined by a secondary RNG, independent and asynchronous to the primary RNG; and

b) The overwriting (re-seeding) or mixing (entropy injection) of all or a portion of the RNG state by an external event or entropy source. The re-seeding or mixing shall be done in such a way that does not compromise the intended distribution, independence, or availability of prizes. The external event or entropy source shall not be able to be predicted or estimated by a casino customer.

3.3 Software-Based RNG

3.3.1 **General Statement.** Software-based RNGs do not use hardware devices and derive their randomness principally and primarily from a computer-based or software-driven algorithm. They do not incorporate hardware randomness in a significant way. The following requirements apply to software-based RNGs.

3.3.2 **Seeding.** The initial state, or seed, of a software-based RNG shall be randomly determined by an uncontrolled and unpredictable event. The manufacturer must ensure that games will not synchronize, even when powered-on or booted simultaneously. The set of available seeds shall be sufficiently large to ensure independence of outcomes.

3.4 Hardware-Based RNG

3.4.1 **General Statement.** Hardware-based RNGs derive their randomness from small-scale physical events such as electric circuit feedback, thermal noise, radioactive decay, photon spin, etc. The following requirements apply to hardware-based RNGs.

3.4.2 **Dynamic Output Monitoring.** Due to their physical nature, the performance of hardware-based RNGs may deteriorate over time or otherwise malfunction, independent of the gaming machine. The failure of a hardware-based RNG could have serious consequences for the intended usage of the RNG. For this reason, if a hardware-based RNG is used, there shall be dynamic monitoring of the output by statistical testing. This monitoring process shall disable game play when malfunction or degradation is detected.

3.5 Mechanical RNG (Physical Randomness Device)

3.5.1 **General Statement.** Mechanical RNGs or "physical randomness devices" generate game outcomes mechanically, employing the laws of physics (e.g., wheels, tumblers, blowers, shufflers). The requirements defined within this section apply to mechanical RNGs / physical randomness devices.

3.5.2 **Data Collection Procedures.** The data collection shall be accomplished in a fashion reasonably similar to the intended use of the device in the field. In particular, the recommended setup and calibration shall be executed initially, and the device and components (cards, balls, etc.) shall be replaced or serviced during the collection period as recommended by the manufacturer.

3.5.3 **Durability.** All mechanical pieces shall be constructed of materials to prevent degradation of any component over its intended lifespan.

3.5.4 **Tampering.** The casino customer / game operator shall not have the ability to manipulate or influence the mechanical RNG in a physical manner with respect to the production of game outcomes, except as intended by game design.

3.6 Cryptographic RNG

3.6.1 **General Statement.** A cryptographic RNG is one that cannot be feasibly compromised by a skilled attacker with knowledge of the source code. "Cryptographically strong" means that the RNG is resistant to attack or compromise by an intelligent attacker with modern computational resources, and who may have knowledge of the source code of the RNG.

3.6.2 **RNG Attacks.** At a minimum, cryptographic RNGs shall be resistant to the following types of attack, all of which serve to replace the general RNG requirements for 'unpredictability':

a) Direct Cryptanalytic Attack: Given a sequence of past values produced by the RNG, it shall be computationally infeasible to predict or estimate future RNG values. This must be ensured through the appropriate use of a recognized cryptographic algorithm (RNG algorithm, hash, cipher, etc.);

b) Known Input Attack: It shall be infeasible to computationally determine or reasonably estimate the state of the RNG after initial seeding. In particular, the RNG must not be seeded from a time value alone. The manufacturer must ensure that games will not have the same initial seed, even when powered-on or booted simultaneously. Seeding methods shall not compromise the cryptographic strength of the RNG; and

c) State Compromise Extension Attack: The RNG shall periodically modify its state, through the use of external entropy, limiting the effective duration of any potential exploit by a successful attacker.

CHAPTER 4 GAME REQUIREMENTS

4.1 Introduction to Game Requirements

4.1.1 **Introduction**. This chapter sets forth technical requirements for the casino customer interface, rules of play, game fairness, game selection, game outcome, related casino customer displays and artwork, bonus games, game history recall, game modes, common features, games with skill, tournaments, and other game requirements.

4.2 Casino customer Interface

4.2.1 **General Statement.** The casino customer interface is defined as the interface in which the casino customer interacts with the game, including the touch screen(s), button panel(s), or other forms of casino customer interaction devices.

4.2.2 **Casino customer Interface Rules.** The casino customer interface shall meet the following requirements:

a) Any resizing or overlay of the casino customer interface screen shall be mapped accurately to reflect the revised display and touch points;

b) All casino customer-selectable touch points or buttons represented on the casino customer interface that impact game play and/or the integrity or outcome of the game shall be clearly labelled according to their function and shall operate in accordance with applicable game rules; and

c) There shall be no hidden or undocumented touch points or buttons anywhere on the casino customer interface that affect game play and/or that impact the integrity or outcome of the game, except as provided for by the game rules.

4.2.3 **Simultaneous Inputs**. Simultaneous or sequential activation of various casino customer interaction devices comprising a casino customer interface shall not cause gaming machine malfunctions, and must not lead to results that are contrary to a game's design intent.

4.3 General Game Requirements

4.3.1 **General Statement.** A traditional game cycle consists of all casino customer actions and game activity that occur from wager to wager. Where multiple games are accessible simultaneously, casino customers may play more than one game cycle at a time in separate instances of the gaming window.

4.3.2 **Game Cycle.** The following requirements apply to a traditional game cycle:

a) Game cycle initiation shall be defined to be:

i. After the casino customer places a wager or commits a bet; and/or

ii. After the casino customer presses a "play" button or performs a similar action to initiate a game in accordance with the game rules.

b) The following game elements shall be considered to be part of a single game cycle:

i. Games that trigger a free game feature and any subsequent free games;

ii. “Second screen” bonus feature(s);

iii. Games with casino customer choice (e.g., draw poker or blackjack);

iv. Games where the rules permit wagering of additional credits (e.g., blackjack insurance, or the second part of a two-part keno game); and

v. Secondary game features (e.g., double-up/gamble).

c) A game cycle shall be considered complete when the final transfer to the casino customer’s credit meter takes place or when all credits wagered are lost.

4.3.3 **Information to be Displayed**. A casino customer interface shall display the following information whenever credits are available for play, with the exception of when the casino customer is viewing an informational screen such as a menu or help screen:

a) Current credit balance;

b) Denomination being played;

c) Current bet amount and placement of all active wagers, or sufficient display information to otherwise derive these parameters;

d) Any casino customer wager options that occur prior to game initiation, or during the course of game play;

e) Accurate representation of the last completed game outcome until the next game starts, wager options are modified, or the casino customer cashes out;

f) Amount won for the last completed game until the next game starts, wager options are modified, or the casino customer cashes out; and

g) Any casino customer wager options in effect at the completion of a game until the next game starts, wager options are modified, or the casino customer cashes out.

4.3.4 **Display for Multi-Wager Games.** The following requirements shall apply to games where multiple independent wagers can simultaneously be applied toward advertised rewards:

(a) Each individual wager placed shall be clearly indicated so that the player is in no doubt as to which wagers have been made and the credits bet per wager;

(b) The winning amount for each separate wager, and the total winning amount, shall be displayed on the game screen; and

(c) Each winning prize obtained shall be displayed to the player in a way that clearly associates the prize to the appropriate wager. Where there are wins associated with multiple wagers, each winning wager may be indicated in turn. In cases where there is a multitude of wager information to convey, a summary screen may suffice. Any exceptions will be reviewed by the independent test laboratory on a case-by case basis.

4.3.5 **Display for Line Games**. The following requirements shall apply to display for line games:

a) For multi-line games, the game shall provide a summary display of the paylines that are available to form winning combinations;

b) Each individual line to be played shall be clearly indicated by the game so that the casino customer is in no doubt as to which lines are being wagered upon. Displaying the number of wagered lines shall be sufficient to meet this requirement;

c) The bet multiplier shall be shown. It is acceptable if this may be easily derived from other displayed information;

d) Winning paylines shall be clearly discernible to the casino customer; and

e) Where there are wins on multiple lines, each winning payline shall be indicated in turn. This requirement would not apply to electro-mechanical reel games unless technology is used which implements the display of winning paylines in a manner similar to those found on video reel games. Additionally, this requirement shall not preclude other intuitive methods of displaying line wins such as the grouping of common win types, nor shall it prohibit a casino customer option to bypass a detailed outcome display of line wins, where supported.

4.4 Game Information and Rules of Play

4.4.1 **Game Information and Rules of Play.** The following requirements apply to the game information, artwork, paytables, and help screens including any written, graphical, and auditory information provided to the casino customer by the gaming machine:

a) Casino customer interface and casino customer interaction device usage instructions, paytable information, and rules of play shall be complete and unambiguous and shall not be misleading or unfair to the casino customer.

b) If there are multiple casino customer interaction devices able to affect the same casino customer action, then all such options shall be clearly explained to the casino customer.

c) Help screen information shall be accessible by a casino customer without the need for credits on the game or commitment of a wager. This information shall include descriptions of unique game features, extended play, free spins, double-up, autoplay, countdown timers, symbol transformations, community style bonus awards, etc.

d) Minimum, maximum, and other available wagers shall be stated within, or be able to be deduced from, the artwork, with adequate instruction for any available wager option.

e) Paytable information shall include all possible winning outcomes and combinations, along with their corresponding payouts, for any available modifiers and/or wager options.

f) The artwork shall clearly indicate whether awards are designated in credits, currency, or some other unit.

g) For artwork that contains game instructions explicitly advertising a credit award or merchandise prize, it shall be possible to win the advertised award/prize from a single game, or series of games enabled by an initiating game, when including features, bonuses, or other game options, or the artwork must clearly specify the criteria necessary to win the advertised award/prize.

h) The game shall reflect any change in award value, which may occur during the course of play. This may be accomplished with a digital display in a conspicuous location of the casino customer interface. The game shall clearly state the criteria for which any prize value is modified. This requirement shall not apply to incrementing progressive prize displays.

i) Game instructions that are presented aurally shall also be presented in written form within the artwork.

j) Game instructions shall be rendered in a color that contrasts with the background color to ensure that all instructions are clearly visible/readable.

k) The artwork shall clearly state the rules for payments of prizes. If a specific winning combination is paid where multiple wins are possible, then the payment method shall be described.

    i. The artwork shall clearly communicate the treatment of coinciding

game outcomes. For example, whether or not a straight flush is construed as both a flush and a straight, or if 3/4/5 of a kind can be construed as paying all of kind or just the highest. Where a payline may be interpreted to have more than one such winning combination, there must be a statement if only the highest winning combination is paid per line;

ii. Where the game supports scatters, the artwork shall display a message indicating that scattered wins are added to payline wins, or equivalent, if this is the rule of the game; and

iii. The artwork shall clearly communicate the treatment of coinciding scattered wins with respect to other possible scattered wins. For example, the artwork must state whether combinations of scattered symbols pay all possible prizes or only the highest prize.

l) Where multiplier instructions are displayed in artwork, it shall be clear what the multiplier does and does not apply to.

m) All game symbols/objects shall be clearly displayed to the casino customer and must not be misleading.

i. Game instructions that specifically correspond to one or more symbols/prizes, shall be clearly associated with those symbols/prizes. For example, this may be achieved with appropriate framing or boxing. Additional wording such as “these symbols” may also be used.

ii. If game instructions refer to a particular symbol, and the written name for the symbol may be mistaken for another symbol, or may imply other characteristics, then the visual display of the instructions shall clearly indicate to which symbol the instruction refers.

iii. Game symbols and objects shall retain their shape throughout all artwork, except while animation is in progress. Any symbol that changes shape or color during an animation process shall not appear in a way that can be misinterpreted to be some other symbol defined in the paytable.

iv. If the function of a symbol changes (e.g., a non-substitute symbol becomes a substitute symbol during a feature), or the symbol’s appearance changes, the artwork shall clearly indicate this change of function or appearance and any special conditions that apply to it.

v. If limitations exist with respect to the location and/or appearance of any symbol, the limitation shall be disclosed in the artwork. For example, if a symbol is only available in a bonus game, or on a specific reel strip, then the artwork must disclose this.

n) The artwork shall clearly state which symbols/objects may act as a substitute or wild, and in which winning combinations the substitute or wild may be applied; this description must address any/all phases of game play where a wild or substitute symbol operates.

o) The artwork shall clearly state which symbols/objects may act as a scatter and in which winning combinations the scatter may be applied.

p) The artwork shall contain textual and/or graphical information to clearly explain the order in which symbols are to appear, in order for a prize to be awarded or a feature to be triggered, including numbers to indicate how many correct symbols/objects each pattern corresponds to.

q) The artwork shall indicate any rules and/or limitations which pertain to how pays are evaluated, including an indication of:

   i. How line wins are evaluated (i.e., left to right, right to left, or both ways);

   ii. How individual symbols are evaluated (i.e., whether pays are awarded on adjacent reels only, or as scatter pays);

r) For games that permit multiple credits to be wagered on selected lines, the artwork shall:

   i. For linear pays, clearly state that the win(s) for each selected line will be multiplied by the bet multiplier, or

   ii. For non-linear pays, convey all possible wagers and their awards;

s) The game shall not advertise 'upcoming wins', for example, "three (3) times pay coming soon", unless the advertisement is accurate and mathematically demonstrable, or unless the casino customer has a direct advertisement of the current progress to that win (e.g. they have 2 of 4 tokens collected that are required to win a prize).

t) The game artwork shall clearly explain to the casino customer any non-wager purchase option and its value in credits or local currency.

u) The artwork shall disclose any restrictive features of game play, such as any play duration limits, maximum win values, etc. which are implemented as an element of game design.

v) A disclaimer stating "Malfunction Voids all Pays" or some equivalent verbiage be clearly displayed on the gaming machine.

4.5 Game Fairness

4.5.1 **Game Fairness.** The following requirements shall apply to the fairness of the game:

a) Games that are designed to give a casino customer the perception that they have control over the outcome of the game due to skill or dexterity, when they actually do not (i.e., the game outcome is random and the

illusion of skill is for entertainment value only), shall fully disclose this fact within the game help screens;

b) Games shall not include any hidden source code that can be leveraged by a casino customer to circumvent the rules of play and/or the intended behaviours of game design; this requirement shall not preclude reasonably identifiable "discovery features" offered by a game which are intentional from a design perspective, but which may be undocumented or unknown to the casino customer; and

c) The final outcome of each game shall be displayed for a sufficient length of time that permits a casino customer a reasonable opportunity to verify the outcome of the game; this requirement shall not preclude an option for the casino customer to bypass the outcome display.

4.5.2 **Simulation of Physical Objects.** Where a game incorporates a graphical representation or simulation of a physical object that is used to determine game outcome, the behaviours portrayed by the simulation must be consistent with the real-world object, unless otherwise denoted by the game rules. This requirement shall not apply to graphical representations or simulations that are utilised for entertainment purposes only. The following shall apply to the simulation:

a) The probability of any event occurring in the simulation that affects the outcome of the game shall be analogous to the properties of the physical object;

b) Where the game simulates multiple physical objects that would normally be expected to be independent of one another based on the rules of the game, each simulation must be independent of any other simulations; and

c) Where the game simulates physical objects that have no memory of previous events, the behaviour of the simulated objects must be independent of their previous behaviour, so as to be non-adaptive and non-predictable, unless otherwise disclosed to the casino customer.

4.5.3 **Physics Engine.** Games may utilise a "physics engine" which is specialized software that approximates or simulates a physical environment, including behaviours such as motion, gravity, speed, acceleration, inertia, trajectory, etc. A physics engine shall be designed to maintain consistent play behaviours and game play environment, unless an indication is otherwise provided to the casino customer by the game artwork. A physics engine may utilize the random properties of an RNG to impact game outcome, in which case, the requirements found in the "Random Number Generator (RNG) Requirements" chapter shall apply.

4.5.4 **Live Game Correlation**. Unless otherwise denoted in the game artwork, where the gaming machine offers a game that is recognisable as a simulation of a live casino game such as poker, blackjack, roulette, etc., the same probabilities associated with the live game shall be evident in the simulated game. For example, the odds of getting any

particular number in roulette where there is a single zero (0) and a double zero (00) on the wheel, shall be 1 in 38; the odds of drawing a specific card or cards in poker shall be the same as in the live game.

4.5.5 **Random Event Probability**. For games that incorporate a random event or an element of chance that affects the outcome, the mathematical probability of any chance event occurring for a paid game shall be constant, unless otherwise denoted by the game artwork.

4.6 Game Types

4.6.1 **General Statement**. The Commission must approve all casino games and game modifications. This section is intended to define a baseline set of requirements for certain traditional types of games.

4.6.2 **Card Game Requirements**. The requirements for casino games depicting cards being drawn from one or more decks are the following:

a) At the start of each game and/or hand, the cards shall be drawn from a randomly-shuffled deck(s). It is acceptable to draw random numbers for replacement cards at the time of the first hand's random number draw, provided that the replacement cards are sequentially used as needed, and so long as any stored RNG values are encrypted using a means approved by the regulatory body;

b) Cards once removed from the deck(s) shall not be returned to the deck(s) except as provided by the rules of the game;

c) The deck(s) shall not be reshuffled except as provided by the rules of the game;

d) The game shall alert the casino customer as to the number of cards in a deck and the number of decks in play;

e) Card faces shall clearly display the card value and the suit; and

f) Jokers and wild cards shall be distinguishable from all other cards.

4.6.3 **Poker Game Requirements.** The following requirements apply only to simulations of poker games:

a) The artwork shall provide clear indication of what variant of poker is being played and the rules that apply;

b) Wild card rules shall be clearly explained in the help screens; and

c) Held and non-held cards, including recommended holds where allowed, shall be clearly marked on the screen. The method for changing a selected card state shall be clearly displayed to the casino customer.

4.6.4 **Blackjack Game Requirements.** The following requirements apply only to simulations of blackjack games:

a) Insurance rules shall be clearly explained, if insurance is available;

b) Pair split rules shall be explained to include:

i. Split aces have only one card dealt to each ace, if this is the game rule;

ii. Further splits, if available;

iii. Double-down after splits, if available;

c) Double-down rules shall be clearly explained, including limitations of which totals may allow a double-down to be selected;

d) Any limits on the number of cards that may be drawn by casino customer and/or dealer shall be explained, including winners declared (if any) when the limit is reached (e.g., five under wins);

e) Surrender rules, if any, shall be explained;

f) If pair splits have occurred, the results for each hand shall be shown (e.g., total points, resultant win or loss category, amount won, amount wagered);

g) Special rules, if any, shall be clearly explained; and

h) All casino customer options that are available at any point in time shall be shown in the artwork.

4.6.5 **Ball Drawing Games**. The requirements for games depicting balls being drawn from a pool are as follows:

a) Simulated balls shall be drawn from a randomly mixed pool consisting of the full set of balls applicable to the game rules;

b) At the start of each game, only the balls applicable to the game are to be depicted. For games with bonus features and additional balls that are selected, they shall be chosen from the original selection unless otherwise allowed for by the game rules;

c) The pool shall not be re-mixed except as provided by the rules of the game depicted; and

d) All balls drawn shall be clearly displayed to the casino customer.

4.6.6 **Keno / Bingo / Lottery Game Requirements.** The following requirements apply, as relevant to the specific game design, for simulations of keno, bingo, or lottery games, where balls are drawn and a casino customer tries to pick in advance which of the balls will be selected:

a) All of the casino customer's selections shall be clearly identified directly on the game screen. Where the game uses multiple casino customer cards, it is acceptable for the casino customer's selections to be accessible by flipping or switching through the cards;

b) The drawn numbers shall be clearly identified on the screen;

c) The game shall highlight numbers drawn which match the casino customer's selections;

d) Special hits, if any, shall be clearly identified;

e) The screen must provide clear indication of how many spots were selected and how many hits were achieved; and

f) Rules for purchase of additional features of the game, if any, must be explained.

4.6.7 **Roulette Game Requirements.** The following requirements apply only to simulations of roulette games:

a) The method of selecting individual wagers shall be explained by the game rules;

b) The wager(s) already selected by the casino customer shall be displayed on the screen; and

c) The result of each spin of the roulette wheel shall be clearly shown to the casino customer.

4.6.8 **Dice Game Requirements.** The following requirements apply only to simulations of dice games:

a) Each die face shall clearly show the number of spots or other indication of the face value;

b) It must be obvious which is the up face on each die, after the dice are thrown; and

c) The result of each die shall be clearly visible or displayed.

4.6.9 **Racing Game Requirements.** The following requirements apply to simulations of racing games:

a) Each participant in a race shall be unique in appearance;

b) The result of a race shall be clear and not open to misinterpretation by the casino customer;

c) If prizes are to be paid for combinations involving participants other than solely the first place finisher, the order of the participants that can be involved with these prizes shall be clearly shown on the screen (e.g., result 8-4-7); and

d) The rules for any exotic wagering options (e.g. perfecta, trifecta, quinella, etc.) and the expected payouts, shall be clearly explained in the artwork.

4.7 Game Outcome Using a Random Number Generator (RNG)

4.7.1 **RNG and Evaluation of Game Outcome.** The evaluation of game outcome using an RNG shall comply with the following rules:

a) Where more than one RNG is used to determine different game outcomes, each RNG shall be separately evaluated; and

b) Where each instance of an RNG is identical, but involves a different implementation within the game, each implementation shall be separately evaluated.

4.7.2 **Game Selection Process.** Determination of events of chance that result in a monetary award shall not be influenced, affected, or controlled by anything other than the values selected by an approved RNG, in accordance with the following requirements:

a) When making calls to the RNG, the game shall not limit the outcomes available for selection, except as provided for by game design;

b) The game shall not modify or discard outcomes selected by the RNG due to adaptive behaviour. Additionally, outcomes shall be used as directed by the rules of the game;

c) After selection of the game outcome, the game shall not display a "near miss" where it makes a variable secondary decision which affects the result shown to the casino customer. For example, if the RNG chooses a losing outcome, the game shall not substitute a different losing outcome to show to the casino customer than that originally selected.

d) Except as provided for by the rules of the game, events of chance shall be independent and shall not correlate with any other events within the same game, or events within previous games:

i. a game shall not adjust the likelihood of a bonus occurring, based on the history of prizes obtained in previous games;

ii. a game shall not adapt its theoretical return to the casino customer based on past payouts; and

e) Any associated equipment used in conjunction with a gaming machine shall not influence or modify the behaviours of the game's RNG and/or random selection process, except as authorised, or intended by design.

4.8 Game Payout Percentages, Odds, and Non-Cash Awards

4.8.1 **Software Requirements for Percentage Payout**. Each game shall theoretically payout a minimum of eighty-five percent (85%). Progressives, bonus systems, merchandise, etc. shall not be included in the percentage payout if they are external to the game, unless required for operation.

a) Gaming machines that may be affected by casino customer skill shall meet the requirements of this section when using an optimal method of play that provides the greatest return to the casino customer over a period of continuous play.

b) The minimum percentage requirement of 85% shall be met for all wagering configurations. If a game is continuously played at any single

bet level, line configuration, etc. for the life of the game, the 85% requirement must be satisfied.

4.8.2 **Odds**. The odds of achieving any explicitly advertised award that is based solely upon chance shall occur at least once in every 100 million games. However, an allowance shall be made for any advertised award that exceeds this odds requirement, provided that the game artwork prominently displays the actual odds of that award to the casino customer. This rule shall apply to all wager categories that can win the advertised award. In the context of odds, an award shall be defined to be a credit prize, a multiplier, entry into a bonus game or feature, etc.

4.8.3 **Limitations on Awards.** Limitations on the prize amounts in lieu of merchandise, annuities, or payment plans shall be clearly explained to the casino customer on the game that is offering such a prize.

4.9 Bonus/Feature Games

4.9.1 **Bonus/Feature Game Requirements**. Bonus/feature games shall meet the following requirements:

a) A game which offers a bonus/feature game, other than those that occur randomly, shall display to the casino customer sufficient information to indicate the current status towards the triggering of the next bonus/feature game;

b) If a bonus/feature game requires obtaining several achievements towards the activation of a feature, or the awarding of a bonus prize, the number of achievements needed to trigger the feature, or win the bonus prize, shall be indicated, along with the number collected at any point;

c) If a bonus/feature game allows the casino customer to hold one or more reels/cards/symbols for the purpose of a re-spin or draw, then the held reels/cards/symbols must be clearly indicated and the method for changing holds shall be clearly explained to the casino customer;

d) If a bonus/feature game is triggered after accruing a certain number of events/symbols or combination of events/symbols of a different kind over multiple games, the probability of obtaining like events/symbols shall not deteriorate as the bonus/feature game progresses, unless otherwise disclosed to the casino customer;

e) The bonus/feature game shall make it clear to the casino customer that they are in a bonus or feature mode; and

f) If a bonus/feature game consists of multiple events or spins, then a counter shall be maintained and displayed to the casino customer to indicate the number of spins initially awarded and the number of spins remaining during bonus play, or alternatively, the number of spins that have been played.

4.9.2 **Casino customer Selection or Interaction in Bonus/Feature Games**. All gaming machines which offer a bonus/feature game which requires casino customer selection or interaction are prohibited from automatically making selections or initiating games or features, unless the gaming machine meets one of the requirements listed below and explains the mechanism for automatic initiation or selection in the artwork:

a) The casino customer is presented with a choice and specifically acknowledges their intent to have the gaming machine auto-initiate the bonus/feature game by means of a button press or other casino customer interaction;

b) The bonus/feature game provides only one choice to the casino customer, i.e., press button to spin wheel. In this case, the device may auto-initiate the bonus/feature game after a time out period of at least two (2) minutes; or

c) The bonus/feature game is offered as part of community play that involves two or more casino customers and where the delay of an offered selection or game initiation will directly impact the ability for other casino customers to continue their bonus or extended feature. Prior to automatically making selections or initiating a community bonus or feature the casino customer must be made aware of the time remaining in which they must make their selection or initiate play.

4.9.3 **Extra Credits Wagered During a Bonus/Feature Game**. If a bonus or feature game requires extra credits to be wagered, and all winnings are accumulated from the base game and the bonus or feature game to a temporary "win" meter, rather than directly to the credit meter, the game shall:

a) Provide a means where winnings on the temporary meter can be wagered (i.e., add credits to the credit meter) to allow for instances where the casino customer has an insufficient credit meter balance to complete the bonus/feature, or allow the casino customer to add money to the credit meter;

b) Transfer all credits on the temporary win meter to the credit meter upon completion of the bonus or feature game; and

c) Provide the casino customer an opportunity not to participate.

4.10 External Device Bonus Games

4.10.1 **External Device Bonus Game Requirements.** Gaming machine software that is supported by an external bonus device utilizing an independent RNG shall meet the following rules:

a) If the external device is used to display a bonus feature to the casino customer, then the game or device shall display all relevant details of the bonus game including, when applicable, individual line wins, remaining

free spins, multiplier values, bonus eligibility, bonus rules, bonus meters, and any other bonus detail not listed;

b) Changes to any configuration settings for the external bonus device shall be performed only by a secure means that is inaccessible to the casino customer;

c) In the case that a bonus feature is offered with a timed eligibility period, changes to configuration settings shall not be allowed while there is time remaining for bonus eligibility, or while a gaming machine is within a bonus feature;

d) If communications are lost between the gaming machine and the external bonus device, or if the external device malfunctions, the game shall tilt, enter an unplayable state and display a suitable error condition which shall require operator intervention to clear;

e) If an eligible gaming machine goes into an unplayable state once a bonus feature has been triggered, the casino customer shall be given an opportunity to complete the bonus feature once the game returns to a playable state, or be awarded a calculated prize equivalent to their participation in the bonus, provided such an equivalent prize calculation is clearly disclosed to the casino customer. Any tilt related to this error condition shall be cleared automatically or by an attendant, as appropriate; and

f) The entire bonus game sequence including all bonus feature information shall be recallable in history and/or available through a maintained log for at least the last ten (10) bonus games. The necessary recall information shall be stored in the external bonus device and/or gaming machine such that all information needed to completely and accurately reconstruct bonus game play is available. See also related requirements under “Game History Recall” section within this technical standard.

4.11 Double-Up / Gamble Features

4.11.1 **Double-Up / Gamble Requirements.** The following requirements apply to games which offer some form of a double-up or gamble feature. Such games may use alternative terminology such as “Triple-Up” or “Take-or-Risk” to describe a double-up or gamble feature.

a) All double-up / gamble feature instructions shall be fully disclosed in the game's artwork and must be accessible without committing to the feature;

b) Entry to a double-up / gamble feature shall only occur upon completion of a winning base game;

c) The casino customer shall have a choice as to whether or not they want to participate in the double-up / gamble feature;

d) The double-up or gamble features shall have a theoretical return to the casino customer of one hundred percent (100%);

e) The maximum number of double-ups / gambles available shall be clearly stated, or as a suitable alternative, the prize limit for double-up / gamble shall be disclosed to the casino customer;

f) Only credits won on the primary game shall be available for wagering on a double-up / gamble feature, (i.e., it is not possible to wager any credits from the credit meter on double-up / gamble);

g) When the double-up / gamble feature is discontinued automatically before reaching the maximum number of double-ups / gambles available, the reason shall be clearly stated;

h) Any game conditions during which the double-up / gamble feature is not available shall be specified;

i) If a double-up / gamble feature offers a choice of multipliers, it must be clear to the casino customer what the range of choices and payouts are; and

j) If the casino customer selects a multiplier for double-up / gamble, it must be clearly stated on the screen which multiplier has been selected.

4.12 Mystery Awards

4.12.1 **General Statement**. A mystery award is a prize paid by a gaming machine that is not associated with a specific paytable combination.

4.12.2 **Requirements for Mystery Awards.** It is acceptable for games to offer a mystery award, however, the game artwork must indicate the minimum and maximum amounts that the casino customer could potentially win. If the minimum amount that could potentially be awarded is zero, then it is not required to be explicitly displayed. If the value of the mystery prize depends on credits wagered, or any other factors, the conditions shall be clearly stated.

4.13 Multiple Games on the Gaming machine

4.13.1 **General Statement.** A multi-game is defined as a game which can simultaneously be configured for use with multiple themes and/or multiple paytables.

4.13.2 **Selection of Game for Display**. The following rules apply to the selection of a specific game within a multi-game:

a) The methodology employed by a casino customer to select a particular game for play on a multi-game gaming machine shall be clearly explained to the casino customer on the device;

b) The gaming machine shall clearly inform the casino customer of all games available for play;

c) The casino customer shall at all times be made aware of which game has been selected for play and is being played;

d) When multiple games are offered for play, the casino customer shall not be forced to play a game just by selecting a game title, unless the game screen clearly indicates the game selection is unchangeable. If not disclosed, the casino customer shall be able to return to the main menu or game chooser screen prior to committing a wager;

e) It shall not be possible to select or start a new game before the current game cycle is completed and all relevant meters and game history have been updated, including features, double-up / gamble, and other options of the game, unless the action to start a new game terminates the current play in an orderly manner. The simultaneous play of multiple games on a single gaming machine is not permitted. Metering and applicable limits and lockups shall be enforced against each available game, as it is played, and all other requirements within this chapter shall continue to apply to these multiple game-in-play designs;

f) The set of games or the paytable(s) offered to the casino customer for selection can be changed only by a secure, certified method. This requirement shall not preclude the use of an identifier to alter a game or paytable. The rules outlined in "Configuration Settings" section of this document shall govern the NV memory clear requirements related to these types of changes. However, for games that keep the previous paytable's data in memory, an NV memory clear is not required; and

g) No changes to the set of games, or to the paytable(s) offered to the casino customer for selection, are permitted while there are credits on the casino customer's credit meter, or while a game is in progress. However, specific protocol features are permitted which allow such changes to be made in a controlled fashion, as defined by the protocol. Similarly, identifiers may be used to make such changes, subject to applicable logging and casino customer disclosure requirements defined elsewhere in this standard.

4.14 Game Tokenization and Residual Credits

4.14.1 **Tokenisation**. For gaming machines that support tokenisation, the device shall receive monetary value from the credit acceptance device and post to the credit meter the entire amount inserted, and shall display any fractional credits, when applicable. However, it is alternately permissible for the gaming machine to automatically issue a voucher that reflects any partial credits, rather than posting them to the credit meter. It is acceptable for the device to store the fractional credits if one of the following conditions is met:

a) The gaming machine displays the current credit meter in Euros; or

b) The gaming machine informs the casino customer that there are fractional credits stored on the device at an opportune time to avoid the possibility of the casino customer walking away from the gaming machine without such knowledge.

4.14.2 **Credit Meter Display of Residual Credits**. If the current Euro amount is not an even multiple of the denomination for a game, or the credit amount has a fractional value, the credits displayed for that game may be displayed and played as a truncated amount, (i.e., fractional part removed). However, the fractional credit amount shall be made available to the casino customer when the truncated credit balance is zero. The fractional amount is also known as 'residual credit'.

4.14.3 **Residual Credit Removal.** A residual credit removal feature is a casino customer-selectable option that allows for the removal of credits left on the machine when there is a credit balance less than that which can be cashed out by the casino customer using an available, configured payment device. If residual credits exist, the manufacturer may provide a residual credit removal feature, or return the gaming machine to normal game play (i.e., leave the residual credits on the casino customer's credit meter). The following rules shall apply to a residual credit removal feature when implemented:

a) Residual credits wagered by the residual credit removal play shall be added to the Coin-In meter;

b) If the residual credit removal play is won, the value of the win shall either:

i. Increment the casino customer's credit meter; or

ii. Be automatically dispensed, and the value of the credits added to the Coin-Out meter;

c) If the residual credit removal play is lost, all residual credits are to be removed from the credit meter;

d) If the residual credits are cashed out rather than wagered, the gaming machine shall update the relevant meters;

e) The residual credit removal play feature shall return at least seventy five percent (75%) to the casino customer over the life of the game;

f) The casino customer's current options and/or choices for residual credit removal shall be clearly displayed;

g) If the residual credit removal play offers the casino customer a choice to complete the game, the casino customer shall also be given the option of exiting the residual credit removal feature and returning to the previous game mode; and

h) The last game recall shall either display the residual credit removal play result or contain sufficient information, including metering, to derive the result.

4.15 Game Program Interruption and Resumption

4.15.1 **Requirements for Game Interruption and Resumption**. After a program interruption, the game software shall recover to the state it was in immediately prior to the interruption occurring. Where no casino customer input is required to complete the game, it is acceptable for the game to return to a game completion state, provided the game history and all credit and accounting meters reflect a completed game.

4.15.2 **Default Game Display.** The default game display immediately following an NV memory reset shall not correspond to the highest advertised award. The default game display upon entering game play mode from a main menu or game chooser screen, shall not correspond to the highest advertised award. This applies to the base game only and not to any secondary bonus features.

4.16 Taxation Reporting Limits for Games

4.16.1 Game Taxation Lockup Requirements. Intentionally left blank.

4.17 Alternative Game Modes

4.17.1 **Test/Diagnostic Mode**. Test/diagnostic mode (sometimes called demonstration or audit mode) allows an attendant to view game play mechanics, perform paytable tests, or execute other auditing and/or diagnostic functions supported by the machine. If test/diagnostic mode is supported, the following rules shall apply:

a) Entry to test/diagnostic mode shall only be possible using a secure means that is not accessible to the casino customer.

b) If the gaming machine is in a test/diagnostic mode, any test or diagnostic that incorporates credits entering or leaving the gaming machine shall be completed prior to the resumption of normal game play operation.

c) If the device is in a test/diagnostic mode, the gaming machine shall clearly indicate that it is in this mode, not normal game play.

d) When exiting from test/diagnostic mode, the game shall return to the original state it was in when the test/diagnostic mode was entered.

e) Any credits on the gaming machine that were accrued during the test/diagnostic mode shall be automatically cleared when the mode is exited.

4.17.2 **Attract Mode.** This mode enables the gaming machine to advertise game play to a potential casino customer. If the gaming machine supports an attract mode, the following rules apply:

a) A gaming machine shall only enter attract mode when in an idle state and with no credits on the device;

b) Attract mode shall accurately reflect an available configuration for the game; and

c) Attract mode shall terminate automatically when any door is opened, or when any casino customer input or credit acceptance device is activated.

4.17.3 **Free Play Mode.** Free play mode allows a casino customer to participate in a game without placing a wager. If the gaming machine supports a free play mode of operation, the following requirements apply:

a) Free play games shall accurately represent the normal operation of a paid game. Games played in free play mode shall not mislead the casino customer about the likelihood of winning any prizes available in the wagered version of the game;

b) Free play shall not be available for casino customer selection when there are credits on the gaming machine;

c) Free play mode shall be prominently displayed as such on the gaming machine, so a casino customer knows at all times if/when this mode is active;

d) Free play mode shall not increment the credit meter;

e) Free play mode shall not increment any accounting meters. Specific meters are permissible for this mode provided the meters clearly indicate as such;

f) Free play mode shall exit automatically when credits are added to the gaming machine, or shall be terminated whenever the casino customer opts to exit this mode, or when the free play game(s) are concluded; and

g) When free play mode is exited, the game shall return to its previous state.

4.17.4 **Autoplay Mode.** Autoplay mode allows a gaming machine to place wagers automatically without casino customer interaction, once a denomination, wager, and other play attributes have been selected by the casino customer. If the gaming machine supports an autoplay mode, the following rules apply:

a) Autoplay shall be securely controlled using a Commission approved program that either allows or disallows the feature, reflective of the Commission's then current policy;

b) Autoplay mode may allow the casino customer to choose the individual game wager, the number of autoplays, and/or the total amount to be wagered;

i. All casino customer-defined thresholds shall remain in effect for the duration of autoplay;

ii. The gaming machine shall display the number of autoplays remaining or the number used, reflective of a casino customer-defined threshold;

iii. Autoplay mode must end automatically and return to manual game play when casino customer-defined thresholds are reached;

c) Autoplay mode must offer the casino customer an option to terminate the mode at the completion of a current game cycle, regardless of how many autoplay wagers they initially chose or how many remain; and

d) If casino customer options are supported for autoplay mode, these options must default to the manual mode of game play.

4.18 Game History Recall

4.18.1 **Number of Last Games Required**. Information on at least the last ten (10) games played on the gaming machine shall be retrievable using an external key-switch or other secure method that is not available to the casino customer.

4.18.2 **Last Play Information Required**. Game recall shall consist of graphical, textual, or video content, or some combination of these options, so long as the full and accurate reconstruction of game outcome is possible. Game recall shall display the following information:

a) Date and time stamp;

b) The denomination played for the game, if a multi-denomination game type;

c) The display associated with the final outcome of the game, either graphically or via a clear text description;

d) The credit meter value at the start of play and/or at the end of play;

e) Any non-wager purchase that occurs during the recorded game;

f) Paytable identification, unless discernible from other screens or attendant menus;

g) Total amount wagered;

h) Total amount won;

i) Total amount collected after the end of a game, unless discernible from other screens or attendant menus;

j) The results of any casino customer choices involved in the game outcome;

k) The results of any intermediate game phases, such as double up / gamble, residual credit removal, or bonus games; and

l) If a progressive prize was won, an indication that the progressive was awarded.

4.18.3 **Bonus Game Recall**. The ten (10) game recall shall reflect at least the last 50 events of completed bonus games. If a bonus game consists of 'x number of events,' each with separate outcomes, each of the 'x events', up to 50, shall be displayed with its corresponding outcome, regardless of whether the result was a win or loss.

4.19 Tournament Games

4.19.1 **General Statement**. A tournament is an organized, measured event that permits a casino customer to engage in competitive play against other casino customers. Tournament play may be in-revenue or out-of-revenue.

4.19.2 **Gaming machine Hardware for Tournaments.** Gaming machine hardware supporting tournament play shall comply with the "Machine Requirements" as set forth in this technical standard. All gaming machines used in a single tournament shall utilize similar hardware and electronics to ensure each casino customer has the same chance of winning, unless otherwise disclosed.

4.19.3 **Gaming machine Software for Tournaments**. Each gaming machine may be equipped with a certified program, which allows for tournament mode play. All gaming machines used in a single tournament shall utilize similar software and game configuration settings to ensure each casino customer has the same chance of winning, unless otherwise disclosed. If tournament is a configurable option for the gaming machine, it shall be enabled by a regulator-approved and controlled method requiring operator intervention. The tournament option shall default to disabled.

4.19.4 **Gaming machine Displays for Tournaments.** The following requirements apply to information displays for a gaming machine that supports tournament play, and/or information regarding a tournament that is otherwise provided to casino customers via external signage, forms, or brochures available at the gaming venue:

a) All conditions casino customers must meet to qualify for entry into the tournament, and advancement through it, shall be disclosed;

b) A message shall be prominently displayed on the gaming machine informing the casino customer that it is operating in a tournament mode;

c) For time-based tournaments, a timer shall be displayed to casino customers to indicate the remaining period of play. If a tournament is based on some extended duration of play, or is initiated or concluded based upon the occurrence of a specific event, then this information shall be disclosed to the casino customers;

d) Specific information pertaining to any single tournament shall be displayed to the casino customers, including the available prizes or awards;

e) For tournaments with multiple awards, the distribution of funds based on specific outcomes shall be disclosed; and

f) At the conclusion of the tournament, the casino customer rankings shall be displayed and the winner(s) notified.

4.19.5 **Out-of-Revenue Tournaments.** The following requirements apply to a gaming machine offering out-of-revenue tournament game play:

a) While enabled for out-of-revenue tournament play, the gaming machine shall not accept cash or currency from any source, nor shall the device

issue payment; all credit acceptance devices shall be disabled. The gaming machine shall utilize tournament-specific credits, points, or chips which shall have no cash value.

NOTE: Vouchers may be generated by the device while in the out-of-revenue tournament mode to serve as evidence of a casino customer's achieved score or rank.

b) A gaming machine shall not increment any accounting meters unless they are meters designed exclusively for use with tournament software. Additionally, the gaming machine shall not communicate any tournament-related accounting information to the on-line system, if applicable, unless the tournament data is stored in separate records in the system.

c) If game history recall is utilised to record the outcome of tournament game play, this shall be clearly indicated within recall and any tournament recall data shall not overwrite any non-tournament game play recorded in game history.

d) The gaming machine shall not impact the return percentage for the game, as the "Game Payout Percentages" requirements of this standard are waived for out-of-revenue tournament games.

4.19.6 **In-Revenue Tournaments.** The following requirements apply gaming machines supporting in-revenue tournament game play:

a) While enabled for in-revenue tournament play, the gaming machine shall allow for cash or currency from any source to be present on the gaming machine, subject to the rules and related internal controls for conducting the tournament.

b) In-revenue tournament games shall increment the appropriate gaming machine electronic meters during play. Additionally, the gaming machine shall communicate this accounting information to the on-line system, when such a compatible system and protocol is supported.

c) Game history recall shall be utilised to record the outcome of in-revenue tournament game play, and this shall be clearly indicated within recall. Any tournament recall data shall not overwrite any non-tournament game play recorded in game history.

4.19.7 **Remotely-Initiated Tournaments.** The following requirements apply to gaming machines which support tournament play that is controlled remotely. For the avoidance of doubt, all play by casino customers of remotely initiated tournaments shall take place within the casino.

a) The casino customer shall be provided with an option on whether or not to participate. If/when opting in, the casino customer must be able to complete their non-tournament game prior to entering the tournament

mode of play, unless the gaming machine supports simultaneous tournament and non-tournament modes of play.

b) If the gaming machine is in an error condition or handpay condition, that condition must be cleared prior to entering tournament mode.

c) When exiting tournament mode, the gaming machine shall return to the original state it was in prior to entering the tournament mode.

d) Any tournament-specific game meters displayed to the casino customer by the gaming machine shall be automatically cleared when the tournament mode is exited.

4.20 Games with Skill

4.20.1 **General Statement.** A game with skill contains one or more elements in its design which can be leveraged by a casino customer to impact the return percentage. Skill means the human attributes of a casino customer such as knowledge, dexterity, visual recognition, logic, memory, reaction, strength, agility, athleticism, hand-to-eye coordination, numerical and/or lexical ability, or any other ability or expertise relevant to game play.

4.20.2 **Display for Games with Skill.** A game with skill shall conform to applicable display requirements found in related sections of this standard for "Game Information and Rules of Play", "Information to be Displayed", and "Game Fairness". In addition, the supplemental requirements defined within this section shall apply to games with skill to ensure casino customer fairness and clarity with respect to casino customer notification.

4.20.3 **Disclosure for Games with Skill.** Any game with skill where there is a potential for the style or method of play to result in the game falling below the minimum theoretical return of eighty-five percent (85%), shall prominently disclose that the outcome is affected by casino customer skill. This disclosure must be prominently displayed on the gaming machine prior to committing a wager. This requirement shall not apply to traditional casino games (e.g. poker, blackjack, etc.).

4.20.4 **Casino customer Versus Casino customer (PVP) Advantage Feature.** A game with skill may contain a feature that allows a casino customer or casino customers to gain an advantage over other casino customers, provided that the gaming machine:

a) Clearly describes to all casino customers that the feature is available and the advantage it offers;

b) Discloses the method for obtaining the feature, including any required wager; and

c) Provides casino customers with sufficient information to make an informed decision, prior to game play, as to whether or not to compete against another casino customer(s) who may possess such a feature.

4.20.5 **Virtual Opponent.** Games with skill may offer a casino customer the opportunity to compete against a virtual opponent provided that the gaming machine:

a) Clearly and prominently discloses when a virtual opponent is participating; and

b) Prevents the virtual opponent from utilizing privileged information of the live casino customer upon which a decision is made, unless otherwise disclosed to the casino customer.

4.20.6 **Outcome for Games with Skill.** Except as otherwise disclosed to the casino customer, once a game with skill is initiated, no function of the gaming machine related to game outcome shall be altered during play. Additionally, in the event that available paytables or rules of play change between games, notice of the change shall be prominently displayed to the casino customer through the game artwork. An example of the latter case might be the use of an identifier to change the paytables available to the casino customer during the course of play.

4.20.7 **Actual Return Percentage for Games with Skill.** A game with skill shall support the ability for the Commission to securely examine the actual return percentage on-demand, via a direct interface with the metering/accounting of the gaming machine, and/or via secure communications with an external system.

4.20.8 **Odds for Skill-Based Awards.** Each advertised skill-based award shall be available to be achieved by a casino customer. For skill-based awards that incorporate an element of chance, the opportunity to achieve the advertised award shall occur at least once in every 100 million games. However, an allowance shall be made for any such advertised award that exceeds this odds requirement, provided that the game artwork prominently displays the actual odds of that award to the casino customer.

4.20.9 **Casino customer Advice Features.** A game containing a skill element may support a feature that offers advice, hints, or suggestions to a casino customer. An illustrative example might be a trivia game that provides hints, clues, or other casino customer assistance in making a selection. A game with skill may support casino customer advice features provided that it conforms to the following requirements:

a) The casino customer advice feature shall clearly describe to the casino customer that it is available and what options exist for selection;

b) Any casino customer advice that is offered to the casino customer for purchase shall clearly disclose the cost and benefit;

c) The casino customer advice shall not be misleading or inaccurate, and must reflect the rules of play for the game, while noting that the game rules may change as a function of the advice offered, provided any such changes are disclosed to the casino customer prior to acceptance of the advice;

d) The game design shall prevent access to any “information store” such that data related to the skill element is not readily available through software tampering (for example, a trivia game shall prevent access to an answers database);

e) The casino customer advice feature shall allow the casino customer the option of accepting the advice, and must not force the casino customer to accept the assistance unless it reflects the only possible option for the casino customer to pursue at the time; and

f) The availability and content of casino customer advice shall remain consistent unless otherwise disclosed and must not adapt in a way that disadvantages the casino customer based upon prior game play or game events.

4.20.10 **Peripheral Devices Used with Games Containing Skill.** If unique peripherals (e.g., joysticks, game controllers, camera systems, sound systems, motion sensors, image sensors, accelerometers, etc.) are employed by the gaming machine to support skill, then the game must provide adequate and clear instruction on their purpose, usage, and effect.

4.20.11 **Game Recall for Games with Skill.** Games with skill shall maintain all information necessary to adequately reconstruct the last ten (10) gaming sessions, consistent with recall requirements stated within the section entitled "Last Play Information Required". A "gaming session" is defined as the period of time commencing when a casino customer initiates a game or series of games on a gaming machine by committing a wager, and ending at the time of a final game outcome for that game or series of games and coincident with the opportunity for the casino customer to retrieve their credit balance. Some combination of text, logs, video, graphics, screen captures, or other means (e.g. "flight recorder" mechanism) shall be used to reconstruct the game outcome and/or casino customer actions, provided that game history recall is sufficient to reconstruct game play. Additionally, for any game with skill that offers casino customer advice, game recall shall reflect that information.

4.20.12 **Interruption and Resumption for Games with Skill**. After a program interruption, a game with skill shall recover to the state it was in before the interruption, unless the game artwork clearly discloses any superseding terms and conditions for game recovery. This disclosure must be available to the casino customer prior to play of the game.

4.21 Persistence Games

4.21.1 **General Statement.** A persistence game is associated with a unique attribute (e.g., casino customer ID, game or device ID, etc.) and incorporates a feature that enables progress towards the award of game play enhancements and/or bonuses through the achievement of some designated game outcome. These additional offerings become available when the casino customer has achieved specific thresholds defined for game play. Each designated outcome advances the state of the persistence game. Multiple plays of a game are usually necessary to trigger the persistence award. The persistence feature is typically provided through a persistence game controller associated with a single gaming machine, bank of devices, or linked system.

4.21.2 **Persistence Game Thresholds.** A persistence game shall recognize a particular attribute for the purpose of restoring previously-earned thresholds during each subsequent visit to a gaming machine. A gaming machine participating in a persistence game shall contain in its help screens, a clear description of each persistence game-related feature and/or function, and the requirements for achieving persistence game thresholds, as well as information regarding how the casino customer restores previously-earned thresholds (using a login/password, ticket, etc.). Additionally, casino customers shall be notified each time a persistence game threshold has been achieved.

4.21.3 **Play from Save.** Play from save is a feature utilised in some persistence game designs where complexity increases, or additional elements are added to the game, as play continues. Additionally, play from save allows the casino customer to save a persistence game at critical points (i.e., save points), typically after some accomplishment or goal has been achieved. The casino customer can resume game play from that point at a later date, and continue on to the next goal. The following requirements apply to play from save:

a) Prizes awarded or made available for reaching a save point shall be clearly defined and displayed to the casino customer prior to placing any wager. If a random type award may be won, the details and all possible payouts shall be displayed to the casino customer;

b) The game shall provide a suitable notification to the casino customer whenever a designated save point is reached during play;

c) If game rules or awards change as different levels are reached during play from save activity, these changes must be clearly displayed to the casino customer; and

d) If the play from save state is not indefinitely maintained, then the game shall provide an indication to the casino customer of any limitation and/or expiration of saved data that is stored for use in supporting game play at a later period in time.

4.21.4 **Loss of Communications or Malfunction.** The gaming machine shall adhere to the following requirements for a loss of communication or critical controller malfunction during persistence game play:

a) For cases where the persistence game controller stores critical data, a gaming machine shall tilt and become unplayable when there is a loss of communication with the persistence game controller, or if there is a critical controller malfunction. The gaming machine must inform the casino customer if persistence game play is disabled. For cases where the persistence game controller does not store any critical data and there is a loss of communication or controller malfunction, the gaming machine shall continue operation but must still inform the casino customer if persistence game play has been disabled; and

b) A gaming machine shall resume the persistence game play from the point of interruption when the communication is restored, or the controller malfunction is cleared; or

c) A gaming machine shall allow persistence game play to continue if the controller communicates the award thresholds to the device prior to the communication loss or controller malfunction; the gaming machine may continue operating if it is capable of determining the trigger for the persistence award while operating independently. The gaming machine shall clearly notify the casino customer when it is operating independently.

4.22 Community Bonus Games

4.22.1 **General Statement.** Gaming machines may support community bonus games where a bank of machines is connected to a controller that allows casino customers to collaborate and/or compete for a shared prize.

4.22.2 **Community Bonus Game Controller Error.** When an error occurs that impacts the integrity of play on the community bonus game controller, all participating gaming machines shall be disabled, or alternatively, the gaming machine shall provide the casino customers the option of waiting for the error to be cleared, or to forego the community bonus by providing another non-community bonus game for play that affords a comparable return percentage. A clear and unambiguous error or tilt message that explains the stoppage of game play and error handling shall be displayed on each of the interconnected gaming machines and/or any overhead or shared display, as applicable to the implementation.

4.22.3 **Loss of Communications.** The gaming machine shall adhere to the following requirements for a loss of communications during community bonus game play:

a) A gaming machine connected to a community bonus game controller shall tilt and become unplayable when there is a loss of communication between the gaming machine and the controller. The gaming machine must inform the casino customer if community bonus game play is disabled; and

b) A gaming machine shall resume the community bonus game play from the point of interruption when the communications have been restored; or

c) A gaming machine shall allow community bonus game play to continue if the controller communicates the award to the gaming machine prior to the communication loss. The gaming machine may continue operating if it is capable of functioning independently. The gaming machine shall clearly notify the casino customer when it is operating independently.

4.22.4 **Community Bonus Event Recall.** Outcomes for at least the last ten (10) community bonus events shall be recallable in game history and/or available through a maintained recall log. The necessary recall information shall be stored in the gaming machine

and/or in the community bonus controller. See also related requirements found under the "Game History Recall" section within this technical standard.

4.23 Virtual Event Wagering

4.23.1 **General Statement**. Virtual event wagering allows for the placement of wagers on simulations of sporting events, contests, and races whose results are based solely on the output of an approved Random Number Generator (RNG). Nothing in this section should be interpreted as being applicable to live event wagering.

4.23.2 **Randomization and Virtual Events.** The RNG utilised in virtual event wagering shall comply with applicable requirements as found within the "Random Number Generator (RNG) Requirements" chapter and "Game Outcome Using a Random Number Generator" section of this technical standard. Additionally, the following rules apply specific to virtual event wagering:

a) It shall not be possible to ascertain the outcome of the virtual event prior to its commencement; and

b) Subsequent to the commencement of a virtual event, no subsequent actions or decisions shall be made that change the behaviour of any of the elements of chance within the virtual event, other than casino customer decisions.

4.23.3 **Virtual Event Display.** A virtual event game shall conform to applicable display requirements of this standard as found in the sections entitled "Game Information and Rules of Play", "Information to be Displayed", and "Game Fairness". In addition, the following display requirements apply:

a) The casino customer shall be able to view information on all available events and wager types prior to placing a wager. Wagering types may include parlay bets. The description of each wager type shall include all available betting options for that wager type.

b) Statistical data that is made available to the casino customer pertaining to the virtual event shall not misrepresent the capabilities of any virtual participant. This does not prevent the use of an element of chance or randomness from impacting performance of the virtual participant during the virtual event game.

c) For scheduled virtual events, a countdown of the time remaining to place a wager in that event shall be displayed to the casino customer. It shall not be possible to place wagers on the event once this time has passed, however, this requirement does not prohibit the implementation of in-play wagers.

d) If a wager involves combining events (i.e., parlay bets), such combinations shall be clearly explained to the casino customer.

e) There shall be a clear indication provided to the casino customer that a wager has been accepted by the gaming machine.

f) A confirmation containing details of the actual wager accepted shall be provided to the casino customer.

g) The artwork shall clearly explain whether the odds/payouts are locked-in at the time of the wager, or if the odds/payouts may change dynamically prior to the commencement of the virtual event.

h) The rules available to the casino customer must clearly state the means by which a winning wager is determined and shall clearly state the handling of an award in any case where a tie is possible.

CHAPTER 5 ACCOUNTING AND METERING REQUIREMENTS

5.1 Accounting and Metering

5.1.1 **Introduction.** This chapter sets forth the various metering and accounting requirements for gaming machines.

5.2 Credit Meter

5.2.1 **Credit Meter Units and Display**. At a minimum, a credit meter shall be visible to the casino customer at any time a wager may be placed, at any time a cashout is allowed, or at any time the meter is actively being incremented or decremented. Additionally, the credit meter shall conform to the following requirements:

a) The credit meter shall be displayed in credits or Euro format, and shall at all times it is shown, indicate all credits or Euro value available for the casino customer to wager or cashout, with the exception of when the casino customer is viewing an informational screen such as a menu or help screen item;

b) If the game's credit meter allows for toggling between credits and Euros, this functionality shall be easily understood by the casino customer; the credit meter shall clearly indicate whether credits or Euros are being displayed;

c) The credit meter shall be displayed to the casino customer unless a tilt condition or malfunction exists that impacts its proper display; and

d) Any casino customer-selectable option to hide the display of the credit meter must be securely configurable on the gaming machine and default to disabled.

5.2.2 **Credit Meter Incrementation**. The value of every prize at the end of a game shall be added to the casino customer's credit meter, except for handpays or merchandise.

5.2.3 **Credit Meter Decrementation**. Credits wagered or committed at any point at the start of, or within the course of, play shall be immediately subtracted from the casino customer's credit meter.

5.2.4 **Credit Meter for Progressives.** Progressive awards may be added to the credit meter if either:

a) The credit meter is maintained in the Euro amount format;

b) The progressive meter is incremented in whole credit amounts; or

c) The progressive prize in Euros format is converted properly to credits upon transfer to the casino customer's credit meter in a manner that does not mislead the casino customer.

5.3 Collect Meter

5.3.1 **Collect Meter**. There shall be a collect meter which will show the number of credits or cash collected by the casino customer upon a cashout**.** This meter may include handpays. The collect meter must adhere to the following requirements:

a) The collect meter shall be displayed to the casino customer upon a cashout event unless a tilt condition or malfunction exists, or unless the casino customer opts to view an informational screen such as a menu or help screen item; and

b) The number of credits or cash collected shall be subtracted from the casino customer's credit meter and added to the collect meter.

5.4 Electronic Accounting and Occurrence Meters

5.4.1 **Electronic Accounting Meters**. Electronic accounting meters shall be at least ten (10) digits in length. These meters shall be maintained in credit units equal to the denomination, or in local currency. If the meter is being used in dollars and cents format, eight (8) digits must be used for the dollar amount and two (2) digits used for the cents amount. Devices configured for multi-denomination play shall display the units in local currency. The meter must automatically roll over to zero once its maximum logical value has been reached. Meters shall be labeled so they can be clearly understood in accordance with their function. The required electronic accounting meters are as follows:

a) Credits Bet (Coin In). The gaming machine must have a meter that accumulates the total value of all wagers, whether the wagered amount results from the insertion of coins, tokens, currency, deduction from a credit meter or any other means. This meter shall:

i. Not include subsequent wagers of intermediate winnings accumulated during game play such as those acquired from "double up" games; and

ii. For chance-based slot machine paytables with a difference in theoretical payback percentage which exceeds 4 percent between wager categories, the gaming machine shall maintain and display coin in meters and the associated theoretical payback percentage, for each wager category with a different theoretical payback

percentage, and calculate and display a weighted average theoretical payback percentage for that paytable.

b) Credits Won (Coin Out). The gaming machine must have a meter that accumulates the total value of all credits directly paid by the gaming machine as a result of winning wagers, whether the payout is made from the hopper, to a credit meter or by any other means. This meter will not record credits awarded as the result of an external bonusing system or a progressive payout;

c) Coin Drop. The gaming machine must have a meter that accumulates the total value of coins or tokens diverted to the drop box;

d) Attendant Paid Jackpots. The gaming machine must have a meter that accumulates the total value of credits paid by an attendant resulting from a single game cycle, the amount of which is not capable of being paid by the gaming machine itself. This meter will not record credits awarded as the result of an external bonusing system or a progressive payout. This meter is only to include awards resulting from specifically identified amounts listed in the manufacturer's par sheet. Awards which are keyed to the credit meter shall not increment this meter, but shall instead increment the Coin Out or Credits Won meter;

e) Attendant Paid Cancelled Credits. The gaming machine must have a meter that accumulates the total value paid by an attendant or by system-based command and which results from a casino customer-initiated cash-out that exceeds the physical or configured capability of the device to make the proper payout amount;

f) Physical Coin In. The gaming machine must have a meter that accumulates the total value of coins or tokens inserted into the device;

g) Physical Coin Out. The gaming machine must have a meter that accumulates the value of all coins or tokens physically paid by the device;

h) Bill In. The gaming machine must have a meter that accumulates the total value of currency accepted;

i) Ticket-In or Voucher In. The gaming machine must have a meter that accumulates the total value of all wagering vouchers accepted by the device;

j) Ticket-Out or Voucher Out. The gaming machine must have a meter that accumulates the total value of all wagering vouchers issued by the device;

k) Electronic Funds Transfer In (EFT In). The gaming machine must have a meter that accumulates the total value of cashable credits electronically transferred from a financial institution to the gaming machine through a cashless wagering system;

l) Cashless Account Transfer In (Wagering Account Transfer In or WAT In). The gaming machine must have a meter that accumulates the total value of cashable credits electronically transferred to the gaming machine from a wagering account by means of an external connection between the device and a cashless wagering system;

m) Cashless Account Transfer Out (Wagering Account Transfer Out or WAT Out). The gaming machine must have a meter that accumulates the total value of cashable credits electronically transferred from the gaming machine to a wagering account by means of an external connection between the device and a cashless wagering system;

n) Non-Cashable Electronic Promotion In (NCEP In). The gaming machine must have a meter that accumulates the total value of non-cashable credits electronically transferred to the gaming machine from a promotional account by means of an external connection between the device and a cashless wagering system;

o) Cashable Electronic Promotion In (CEP In). The gaming machine must have a meter that accumulates the total value of cashable credits electronically transferred to the gaming machine from a promotional account by means of an external connection between the device and a cashless wagering system;

p) Non-Cashable Electronic Promotion Out (NCEP Out). The gaming machine must have a meter that accumulates the total value of non-cashable credits electronically transferred from the gaming machine to a promotional account by means of an external connection between the device and a cashless wagering system;

q) Cashable Electronic Promotion Out (CEP Out). The gaming machine must have a meter that accumulates the total value of cashable credits electronically transferred from the gaming machine to a promotional account by means of an external connection between the device and a cashless wagering system;

r) Cashable Promotional Credit Wagered. If supported by function, the gaming machine must have a meter that accumulates the total value of promotional cashable credits which are wagered. This includes credits that are transferred to the machine electronically or through the acceptance of coupon or voucher;

s) Coupon Promotion In. The gaming machine must have a meter that accumulates the total value of all gaming machine promotional coupons accepted by the device;

t) Coupon Promotion Out. The gaming machine must have a meter that accumulates the total value of all gaming machine promotional coupons issued by the device;

u) Machine Paid External Bonus Payout. The gaming machine must have a meter that accumulates the total value of additional amounts awarded as a result of an external bonusing system and paid by the device;

v) Attendant Paid External Bonus Payout. The gaming machine must have a meter that accumulates the total value of amounts awarded as a result of an external bonusing system paid by an attendant. Bonus payouts which are keyed to the credit meter, shall not increment this meter, but instead shall be metered to Machine Paid External Bonus Payout;

w) Machine Paid Progressive Payout. The gaming machine must have a meter that accumulates the total value of credits paid as a result of progressive awards paid directly by the device. This meter does not include awards paid as a result of an external bonusing system;

x) Attendant Paid Progressive Payout. The gaming machine must have a meter that accumulates the total value of credits paid by an attendant as a result of progressive awards that are not capable of being paid by the device itself. Progressive payouts which are keyed to the credit meter shall not increment this meter, but shall instead be metered to Machine Paid Progressive Payout. This meter shall not include awards paid as a result of an external bonusing system;

y) Non-Wager Purchase. The gaming machine that makes use of a non-wager purchase must have a meter that accumulates all credits deducted from the credit meter paid for such purchase. A non-wager purchase is a purchase made by the casino customer that debits the credit meter and which is used for entertainment purposes only and does not influence the outcome of the game; and

z) Other Meters. A gaming machine that allows for additions to, or deductions from, the credit meter, that would not otherwise be metered under any of the above electronic accounting meters, must maintain sufficient meters to properly reconcile all such transactions.

5.4.2 **Electronic Occurrence Meters**. Occurrence meters shall be at least eight (8) digits in length, however, are not required to automatically roll over. Meters shall be labelled so they can be clearly understood in accordance with their function. The required electronic occurrence meters are as follows:

a) Games Played. The gaming machine must have meters that accumulates the number of games played:

   i. Since power reset;

   ii. Since external door close; and

   iii. Since game initialization (NV memory clear);

b) External Doors. The machine must have meters that accumulate the number of times any external door that allows access to the locked logic

area or currency compartment (e.g., main or belly door, drop box door, currency area with an external door, etc.) was opened since the last NV memory clear, provided power is supplied to the device.

c) Stacker Door. The gaming machine must have a meter that accumulates the number of times the stacker door has been opened since the last NV memory clear provided power is supplied to the device;

d) Progressive Occurrence. There must be a meter that accumulates the number of times each progressive is awarded. This rule requires that the controller, whether internal to the gaming machine itself, or external, shall support this occurrence meter for each progressive level offered;

e) Bill Denomination. The gaming machine must have a specific occurrence meter for each denomination of currency accepted by the bill validator; and

f) Vouchers/Coupons Accepted. The gaming machine must have a specific occurrence meter that records the number of all other notes not including bills, such as wagering vouchers and coupons, accepted by the bill validator.

5.5 Paytable-Specific Meters

5.5.1 **Paytable-Specific Meters.** In addition to the electronic accounting meters required above, each individual game available for play shall have the paytable-specific meters 'Credits Bet' and 'Credits Won' in either credits or local currency. Even if a double-up or gamble game is lost, the win amount and the credits bet amount for the primary game shall be recorded in the paytable-specific meters. Additionally, it is recommended that the game support paytable-specific meters for "Number of Games Played". Primary game shall mean the base game and includes amounts won from free spins and bonus game before the double up game or gamble game is casino customer.

5.6 Double Up or Gamble Meters

5.6.1 **Double-Up / Gamble Meters.** For each type of double-up or gamble feature offered, there shall be sufficient meters to determine the feature's actual return percentage, which shall increment accurately every time a double-up or gamble play concludes, including:

a) Double-up / gamble amount wagered;

b) Double-up / gamble amount won;

c) Double-up / gamble games played; and

d) Double-up / gamble games won.

PART 2 ELECTRONIC TABLE GAMES SYSTEMS

CHAPTER 1 INTRODUCTION

1.1 Definitions

1.1.1 **Definition of Electronic Table Game.** An electronic table game is defined under the Republic of Cyprus Casino and Control Law 2015 as a casino game, which is traditionally played at a table and includes an electronic device through which wagers may be placed on a game played at a table and has been approved as such by the Commission.

1.1.2 **Electronic Table Game Systems.** An Electronic Table Game System (ETGS) is the combination of a Central Server, Casino customer Interface and all Interface Elements that function collectively for the purpose of electronically simulating table game operations. This technical standard is to be used when there is no live dealer and the game plays without significant human interaction including the initiation of game play, responsible for all monetary transactions including credit acceptance, collecting wagers, distributing winnings, and ensuring all wagers are registered properly.

CHAPTER 2 ELECTRONIC TABLE GAME SYSTEM REQUIREMENTS

2.1 Introduction

2.1.1 **General Statement**. This chapter applies to the overall system operations to ensure the security, accountability and integrity of the equipment.

2.2 Table Game System Requirements

2.2.1 **System Clock**. The system must maintain an internal clock that reflects the current time (24hr format - which is understood by the local date/time format) and date that shall be used to provide for the following:

a) Time stamping of significant events;

b) Reference clock for reporting; and

c) Time stamping of configuration changes.

2.2.2 **Synchronisation Feature**. If multiple clocks are supported, the system shall have a facility whereby it is able to synchronise those clocks in each system component, whereby conflicting information could not occur.

2.3 System Security

2.3.1 **General Statement**. All communications, including Remote Access, must pass through at least one approved application-level firewall and must not have a facility that allows for an alternate network path.

2.3.2 **Firewall Audit Logs**. The firewall application must maintain an audit log of the following information and must disable all communications and generate an error event if the audit log becomes full:

a) All changes to configuration of the firewall;

b) All successful and unsuccessful connection attempts through the firewall; and

c) The source and destination IP Addresses, Port Numbers and MAC Addresses.

2.3.3 **Surveillance/Security Functionality**. The system shall provide for interrogation that enables on-line comprehensive searching of the significant event log.

2.3.4 **Access Control**. The system must support either a hierarchical role structure whereby user name and password define program access or individual menu item access or logon program /device security based strictly on user name and password or PIN. The system shall not permit the alteration of any significant log information without supervised access control. There shall be a provision for system administrator notification and user lockout or audit trail entry after a set number of unsuccessful login attempts. The system shall record: date and time of the login attempt, username supplied, and success or failure. The use of generic user accounts on servers is not permitted.

2.3.5 **Data Alteration**. The system shall not permit the alteration of any accounting or significant event log information without supervised access controls. In the event financial data is changed, an audit log must be capable of being produced to document:

a) Data element altered;

b) Data element value prior to alteration;

c) Data element value after alteration;

d) Time and Date of alteration; and

e) Personnel that performed alteration (user login).

2.4 Remote Access

2.4.1 **Remote Access defined**. Remote Access defines any access made by a component outside the 'trusted' network.

2.4.2 **General Statement**. Remote access where permitted, shall authenticate all computer systems based on the authorised settings of the electronic table game and firewall application that establishes a connection with the electronic table game as long as the following requirements are met:

a) Remote Access User Activity log is maintained by both the property and the manufacturer, depicting: authorised by, purpose, logon name, time/date, duration, and activity while logged in;

b) No unauthorised remote user administration functionality (adding users, changing permissions, etc.);

c) No unauthorised access to database;

d) No unauthorised access to operating system; and

e) If remote access is to be on a continuous basis then a network filter (firewall) must be installed to protect access (Dependent upon

jurisdictional approval).

2.4.3 **Self Monitoring**. The system must implement self monitoring of all critical Interface Elements (e.g. Central hosts, network devices, firewalls, links to third parties, etc.) and shall have the ability to effectively notify the system administrator of any error condition, provided the condition is not catastrophic. The system shall be able to perform this operation with a frequency of at least once in every 24-hour period and during each power-up and power reset.

2.5 Backups and Recovery

2.5.1 **System Redundancy, Backup & Recovery**. The system shall have sufficient redundancy and modularity so that if any single component or part of a component fails, gaming can continue. There shall be redundant copies of each log file or system database or both on the system with open support for backups and restoration.

2.5.2 **Backup & Recovery**. In the event of a catastrophic failure when the system cannot be restarted in any other way, it shall be possible to reload the system from the last viable backup point and fully recover the contents of that backup, recommended to consist of at least the following information:

a) Significant events;

b) Accounting information;

c) Auditing information; and

d) Specific site information such as Device file, employee file, game profiles, etc.

2.6 Communication Protocol

2.6.1 **General Statement**. Each component of an electronic table game system must function as indicated by the communication protocol implemented. All protocols must use communication techniques that have proper error detection and/or recovery mechanisms which are designed to prevent unauthorised access or tampering, employing Data Encryption Standards (DES) or equivalent encryption with secure seeds or algorithms. Any alternative measures will be reviewed on a case-by-case basis, with Commission approval.

2.7 System Integrity

2.7.1 **General Statement**. An independent testing laboratory licensed by the Commission will perform certain tests to determine whether or not outside influences affect game fairness to the casino customer or create cheating opportunities. During the course of testing, the independent testing laboratory shall also inspect for marks or symbols indicating that a device has undergone product safety compliance testing. The independent testing laboratory shall review submissions and information contained therein related to Electromagnetic Interference (EMI), Radio Frequency Interference (RFI), Magnetic Interference, Liquid Spills, Power Fluctuations and Environmental conditions and Electrostatic Discharge. An electronic table game system shall be able to withstand the following tests, resuming game play without operator intervention:

a) Random Number Generator. If implemented, the random number generator and random selection process shall be impervious to influences from outside the device, including, but not limited to, electro-magnetic interference, electro-static interference, and radio frequency interference;

b) Electro-Static Interference. Protection against static discharges requires that the table game's conductive cabinets be earthed in such a way that static discharge energy shall not permanently damage or permanently inhibit the normal operation of the electronics or other components within the electronic table game. The electronic table game may exhibit temporary disruption when subjected to a significant electro-static discharge greater than human body discharge, but they shall exhibit a capacity to recover and complete any interrupted play without loss or corruption of any control or critical data information associated with the electronic table game. The tests will be conducted with a severity level of a maximum of 27KV air discharge;

2.7.2 **Physical Security**. The server or system component(s) must reside in a secure area where access is limited to authorised personnel. Logical access to the game shall be logged on the system or on a computer or other logging device that resides outside the secure area and is not accessible to the individual(s) accessing the secure area. The logged data should include the time, date, and the identity of the individual accessing the secure area. The resulting logs should be kept for a minimum of 90 days.

2.8 Random Number Generator

2.8.1 **General Statement**. The Random Number Generator (RNG) is the selection of game symbols or production of game outcomes. The regulations within this section are only applicable to electronic table games that utilize an RNG, which shall:

a) Be statistically independent;

b) Conform to the desired random distribution;

c) Pass various recognized statistical tests; and

d) Be unpredictable.

2.8.2 Game Selection Process.

a) All Combinations and Outcomes Shall Be Available. Each possible permutation or combination of game elements that produces winning or losing game outcomes shall be available for random selection at the initiation of each play, unless otherwise denoted by the game.

b) No Near Miss. After selection of the game outcome, the electronic table game shall not make a variable secondary decision, which affects the result shown to the casino customer. For instance, the random number generator chooses an outcome that the game will be a loser.

c) No Corruption from Associated Equipment. An electronic table game shall use appropriate protocols that effectively protect the random number generator and random selection process from influence by associated equipment, which may be communicating with the electronic table game.

2.8.3 **Background RNG Activity**. The RNG shall be cycled continuously in the background between games and during game play at a speed that cannot be timed by the casino customer.

2.8.4 **RNG Seeding**. The first seed shall be randomly determined by an uncontrolled event. After every game, there shall be a random change in the RNG process (new seed, random timer, delay, etc.). This will verify the RNG doesn't start at the same value every time. It is permissible not to use a random seed; however, the manufacturer must ensure that games will not synchronize.

2.8.5 **Live Game Correlation**. Unless otherwise denoted on the pay glass/display, where the electronic table game plays a game that is recognizable such as Poker, Blackjack, Roulette, etc., the same probabilities associated with the live game shall be evident in the simulated game. For example, the odds of getting any particular number in Roulette where there is a single zero (0) and a double zero (00) on the wheel, shall be 1 in 38; the odds of drawing a specific card or cards in Poker shall be the same as in the live game.

2.8.6 **Card Games**. The requirements for games depicting cards being drawn from a deck are the following:

a) At the start of each game/hand, the cards shall be drawn fairly from a randomly-shuffled deck; the replacement cards shall not be drawn until needed, and in accordance with game rules, to allow for multi-deck and depleting decks;

b) Cards once removed from the deck shall not be returned to the deck except as provided by the rules of the game depicted;

c) As cards are removed from the deck they shall be immediately used as directed by the Rules of the Game (i.e., the cards are not to be discarded due to adaptive behaviour by the electronic table game system).

2.9 Maintenance of Critical Memory

2.9.1 **General Statement**. Critical memory storage may be maintained by the casino customer terminal or the system, where applicable. Critical memory shall be maintained by a methodology that enables errors to be identified. This methodology may involve signatures, checksums, partial checksums, multiple copies, timestamps and/or effective use of validity codes.

2.9.2 **Comprehensive Checks**. Comprehensive checks of critical memory shall be made following game initiation but prior to display of game outcome to the casino customer. It is recommended that critical memory is continuously monitored for corruption. Test methodology shall detect failures with an extremely high level of accuracy.

2.9.3 **Unrecoverable Critical Memory**. An unrecoverable corruption of critical memory shall result in an error. The memory error shall not be cleared automatically and shall result in a tilt condition, which facilitates the identification of the error and causes the electronic table game to cease further function. The critical memory error shall also cause any communication external to the electronic table game to immediately cease. An unrecoverable critical memory error shall require a full non-volatile memory clear performed by an authorised person.

2.9.4 **Non-volatile Memory and Program Storage Device Space**. Non-volatile memory space that is not critical to the electronic table game operations are not required to be validated.

2.10 Program Storage Device Requirements

2.10.1 **General Statement**. The term *Program Storage Device* is defined to be the media or an electronic device that contains the critical control program components. Device types include but are not limited to EPROMs, compact flash cards, optical disks, hard drives, solid state drives, USB drives, etc. This partial list may change as storage technology evolves. All program storage devices shall:

a) Be housed within a fully enclosed and locked logic compartment;

b) Be clearly marked with sufficient information to identify the software and revision level of the information stored in the device. In the case of media types on which multiple programs may reside it is acceptable to display this information via the attendant menu.

c) Validate themselves during each processor reset; and

d) Validate themselves the first time they are used; and

e) CD-ROM, DVD, and other optical disk-based Program Storage shall:

i. Not be a re-writeable disk; and

ii. The “Session” shall be closed to prevent any further writing.

2.11 Control Program Requirements

2.11.1 Control Program Verification.

a) EPROM-based Program Storage:

i. Electronic table games which have control programs residing in one or more EPROMs must employ a mechanism to verify control programs and data. The mechanism must use at a minimum a checksum; however, it is recommended that a Cyclic Redundancy Check (CRC) be used (at least 16-bit).

b) Non-EPROM Program Storage shall meet the following rules:

i. The software shall provide a mechanism for the detection of unauthorised and corrupt software elements, upon any access, and subsequently prevent the execution or usage of those

elements by the electronic table game. The mechanism must employ a hashing algorithm which produces a message digest output of at least 128 bits.

ii. In the event of a failed authentication, after the game has been powered up, the electronic table game should immediately enter an error condition and display an appropriate error. This error shall require operator intervention to clear and shall not clear until; the data authenticates properly, following the operator intervention, or the media is replaced or corrected, and the electronic table game's memory is cleared.

c) Alterable Media shall meet the following rules in addition to the requirements outlined in 2.11.1(b):

i. Employ a mechanism which tests unused or unallocated areas of the alterable media for unintended programs or data and tests the structure of the media for integrity. The mechanism must prevent further play of the electronic table game if unexpected data or structural inconsistencies are found.

ii. Employ a mechanism for keeping a record anytime a control program component is added, removed, or altered on any alterable media. The record shall contain a minimum of the last ten (10) modifications to the media and each record must contain that date and time of the action, identification of the component affected, the reason for the modification and any pertinent validation information.

2.11.2 **Program Identification**. Program storage devices, which do not have the ability to be modified while installed in the electronic table game during normal operation, shall be clearly marked with sufficient information to identify the software and revision level of the information stored in the devices.

2.11.3 **Independent Control Program Verification**. The system server(s) and each component of the electronic table game that would have an effect on the integrity of the electronic table game shall have the ability to allow for an independent integrity check of the device's software from an outside source and is required for all control programs that may affect the integrity of the game. This must be accomplished by being authenticated by a third-party device, which may be embedded within the game software, by having an interface port for a third-party device to authenticate the media, or by allowing for removal of the media such that it can be verified externally. This integrity check will provide a means for field verification of the software to identify and validate the program. The independent test laboratory, prior to device approval, shall evaluate the integrity check method.

2.12 Casino customer Interface Terminal Requirements

2.12.1 **General Statement**. Casino customer interface terminals may either be a display mechanism where the system performs all operations of the game (Thin Client), or

contain its own logic function in conjunction with the electronic table game system (Thick Client). In either case, the casino customer interface terminal(s) must meet the hardware and software requirements outlined within the Gaming Machines technical standards in Part 1.

2.13 Rules of Play

2.13.1Display.

a) A placard or video display used to convey game play information shall be clearly identified and shall accurately state the house rules of the game, game profile and rake (collection) schedule, and the award that will be paid to the casino customer when the casino customer obtains a specific win.

b) The placard or video display shall clearly indicate whether awards are designated in denominational units, currency, or some other unit.

c) The table game shall reflect any change in award value, which may occur in the course of play. This may be accomplished with a digital display in a conspicuous location to the table game, and the table game must clearly indicate such.

d) All paytable information should be available to the casino customer, prior to them committing to a bet. This includes unique game features, extended play, free spins, double-up, take-a-risk, auto play, countdown timers, symbol transformations, and community style bonus awards.

e) Placard or video displays shall not be certified if the information is inaccurate.

f) Any table game which utilises multiple decks of cards should alert the casino customer to the number of card decks in play.

2.13.2Multi-Wager Games.

a) Each individual wager to be played shall be clearly indicated on the casino customer interface so that the casino customer is in no doubt as to which wagers have been made; and

b) The winning outcome(s) shall be clearly discernible to the casino customer. (e.g. on an Electronic terminal it may be accomplished by highlighting the symbol(s) or wagers and/or the flashing of winning symbol(s) or wagers. Where there are wins on multiple wagers, each winning wager may be indicated in turn.)

2.14 Software Requirements for Percentage Payout

2.14.1**General Statement**. Each Electronic Table Game System shall theoretically payout a minimum of eighty-five percent (85%) during the expected lifetime of the game (i.e. progressives, bonus systems, merchandise, etc. shall not be included in the percentage payout if they are external to the game).

a) Optimum Play Used for Skill Games. Electronic Table Game Systems that may be affected by casino customer skill shall be calculated using a method of play that will provide the greatest return to the casino customer over a period of continuous play.

b) Minimum Percentage Requirement Met at All Times. The minimum percentage requirement shall be met at all times. The minimum percentage requirement shall be met when playing at the lowest end of a non-linear paytable (i.e., if a game is continuously played at a minimum bet level for its total game cycle and the theoretical RTP is lower than the minimum percentage, then the game is unacceptable). This example also extends to games such as Keno, whereby the continuous playing of any spot combination results in a theoretical return to casino customer lower than the minimum percentage.

c) Double-up or Gamble. The Double-up or Gamble options shall have a theoretical return to the casino customer of one hundred percent (100%).

d) Additional or Optional Wagers. If these wagers can only be made by participating in the base game, the minimum and maximum payback percentage will be included with calculations of the base game.

2.15 Casino customer Interface Error Conditions

2.15.1 **General Statement**. The Casino customer Interface, where applicable, shall be capable of detecting and displaying the following error conditions and illuminating a light system for each, or sound an audible alarm. Error conditions should cause the electronic table game to lock up and require attendant intervention except as noted within this section. Error conditions shall be cleared either by an attendant or upon initiation of a new play sequence after the error has cleared except for those denoted by an "*" which will require further evaluation since deemed as a critical error. Error conditions shall be communicated to an on-line monitoring and control system, where applicable:

2.15.2 Door Open Error Conditions.

a) All external doors on the electronic table game;

b) Drop box door;

c) Stacker door; and

d) Any other currency storage areas that have a door.

2.15.3 Other Error Conditions.

a) NV memory error (for any critical memory)*;

b) Low NV memory battery for batteries external to the NV memory itself or low power source;

c) Program error or authentication mismatch*;

2.15.4 **Error Codes**. For games that use error codes, a description of electronic table game error codes and their meanings shall be affixed inside the device. This does not apply to video-based games; however, video based games shall display meaningful text as to the error conditions.

2.16 Door Open/Close

2.16.1 **Required Door Metering**. The system or components of the system shall be able to detect and meter access to the following secure areas provided power is supplied to the device:

a) All external doors on the electronic table game;

b) Drop box door;

c) Stacker door; and

d) Any other currency storage areas that have a door.

2.17 Taxation Reporting Limits **Intentionally left blank.**

2.18 Play History

2.18.1 **Number of Last Games Required**. For the purpose of settling disputes between casino customers or casino customers versus the house, the electronic table game system shall maintain the historical data for the play history. Information on at least the last ten (10) games/hands played is to be always retrievable on the operation of a suitable external key-switch, or another secure method that is not available to the casino customer.

2.18.2 **Last Play Information Required**. Last play information shall provide all information required to fully reconstruct the last ten (10) games/hands played. All values shall be displayed, including the initial credits or ending credits, credits bet, credits won, and credits paid whether the outcome resulted in a win or loss. This information can be represented in graphical or text format. If a progressive was awarded, it is sufficient to indicate the progressive was awarded and not display the value. This information should include the final game outcome, including all casino customer choices and bonus features. In addition, include the results of double-up or gamble (if applicable). For games that do not re-shuffle the cards at the beginning of each game, there must be secure procedures to permit a forced 're-shuffle' following access to the play history. These procedures are to be included in the system submission to the Test Laboratory.

2.18.3 **Bonus Rounds**. The last play information shall reflect bonus rounds in their entirety. If a bonus round lasts 'x number of events,' each with separate outcomes, each of the 'x events' shall be displayed with its corresponding outcome, regardless if the result is a win or loss. Electronic table games offering games with a variable number of free games, per base game, may satisfy this requirement by providing the capability to display the last 50 free games in addition to each base game.

2.19 Significant Logs and Events

2.19.1 **General Statement**. Significant events are generated at the electronic table game and sent directly to the backend utilizing an approved Communication Protocol, as

described in the earlier part of this document. All Significant Events that take place at each table will be monitored and recorded in an Event History. The Event History may be divided into sections (e.g. accounting, security, finance, errors, etc.); these events will be logged by date, time and event, and should be filterable. Each event must be stored in a database(s) which includes the following:

a) Date and time which the event occurred;

b) Identity of the electronic table game system component that generated the event;

c) A unique number/code that defines the event; or

d) A brief text that describes the event in the local language.

2.19.2 **Significant Events Defined**. The following events must be conveyed to the backend where a mechanism must exist for timely notification:

a) Power resets of any device;

b) Loss of communication with any device;

c) Error Conditions on any critical interface element;

d) Critical memory/control program corruption of any critical component.

e) Cashless account transactions,

f) Jackpots (Large Win Events)

g) Game start

h) Game stop

i) Software signature check and result (if supported)

j) Connection by authorised devices

k) Attempted connection by unauthorised devices

2.20 Accounting Information

2.20.1 **General Statement**. There shall be a method to accurately maintain the accounting information that is needed for proper revenue reporting and auditing. For electronic table game systems that do not maintain this information electronically, operational procedures are to be included with the system submission. Electronic table game systems that do maintain electronic accounting information shall effectively collect and store the information in a secure manner.

2.20.2 **Clearing Meters**. The clearing of stored Accounting Information may only be performed by authorised personnel via secure system controls or approved internal controls.

2.20.3 **Backup Requirements**. Data recorded by electronic meters shall be preserved after a power loss to an interface component and shall be maintained for a period of at least thirty (30) days.

2.21 Reports

2.21.1 **General Statement**. For electronic table game systems that maintain Significant Event and Accounting Information reports shall subsequently be available on demand. The reports must be generated accurately and provide effective information for the purpose of security and accounting auditing. For electronic table game systems that have the ability to communicate the Significant Event and Accounting Information to a separate Monitoring Control System it must be via a secure communication protocol.

2.21.2 **Cashless Transactions**. The following reports are required for electronic table game systems that provide for cashless transactions unless properly communicated to a separate Monitoring Control System:

a) Casino customer Account Summary and Detail Reports. These reports shall include beginning and ending account balance, transaction information depicting machine number, amount, date/time and are to be immediately available to a casino customer upon request.

b) Liability Report. This report is to include previous day's starting value of outstanding Cashless Liability, aggregate Cashless-In and out totals (Including rake, jackpot and amount in play), and ending Cashless liability, if applicable.

c) Cashless Meter Reconciliation Summary and Detail Reports. These reports will reconcile each participating device's cashless Meter(s) against the Electronic Table Game System's cashless activity. (including Cashless in and Cashless out)

d) Cashier Summary and Detail Reports. To include casino customer account, Deposits and cash-out, amount of transaction, date and time of transaction, and cashier starting and ending balances, session start and end date/time (etc.) by cashier.

e) Device Transaction Summary and Detail Reports. Wagering, issuance, voids by device, date/time, account number, and transaction number.

f) Cashless Wagering System Activity Report. Deposits, transfers to and from electronic table game system, withdrawals, adjustments and balances, by wagering account.

g) Electronic Table Game System Performance Report. Hands per hour, total hands played, number of hours of operation, dollars played, dollars contributed and average number of casino customers.

h) Cashless Wagering Account Adjustment Report. For each individual adjustment made to a cashless wagering account or a promotional account, a summary of the adjustment to include:

i. Casino customer name and account number, or specific promotion, as applicable;

ii. Amount of, and explanation for, the adjustment; and

iii. Identification of the user completing and/or authorising the adjustment.

2.22 Electronic Table Game Identification

2.22.1 **General Statement**. An electronic table game shall have an identification badge affixed to the exterior of the table by the manufacturer, that is not removable without leaving evidence of tampering and this badge shall include the following information:

a) The manufacturer;

b) A unique serial number;

c) The electronic table game model number; and

d) The date of manufacture.

2.22.2 **CE label** The manufacturer shall affix a CE marking certifying compliance with CE standards somewhere on each electronic gaming table or its packaging.

PART 3 PROGRESSIVE GAMING MACHINES IN CASINOS

CHAPTER 1 PROGRESSIVES DEFINITION

1.1 Progressives Defined

1.1.1 **General Statement**. A Progressive Gaming machine means a gaming machine that has an increasing jackpot, based on a function of credits that are bet. This includes games that award progressive jackpots or a 'pool' based on criteria other than obtaining winning symbols on the machine, such as 'Mystery Jackpot.' However, this does not include games that incorporate a bonus feature as part of the game theme, which offers awards that increase as the game is played and, as well, is not configurable.

Chapters 1, and 2 of this Part 3 shall set forth the technical standards requirements for the following types of progressives. Chapter 3 only applies to multi-site progressive games:

a) Stand-Alone Progressive Gaming machines. A stand-alone progressive gaming machine is a single progressive game that is not a part of a link; and

b) Multiple Gaming machine (Linked) Progressives. A 'linked progressive' is one (1) or more gaming machine(s) that offer common progressive jackpot(s) which are linked to a progressive controller within a single casino location.

CHAPTER 2 PROGRESSIVE COMPONENT REQUIREMENTS

2.1 Introduction

2.1.1 **General Statement**. This chapter shall govern the requirements for all progressive components submitted for review.

2.2 Hardware and Casino customer Safety

2.2.1 **General Statement**. Electrical and mechanical parts and design principals of the electronic associated progressive hardware must not subject a casino customer to any physical hazards.

2.3 Environmental Effects on Progressive Integrity

2.3.1 Progressive Integrity Environmental Standards.

a) Progressives must not divert from normal application by the application of electromagnetic interference from an outside source.

b) Progressives must exhibit total immunity to human body electrostatic discharges on all areas exposed to casino customer contact.

c) Protection against static discharges requires that the progressive components be earthed in such a way that static discharge energy shall not permanently damage, or permanently inhibit the normal operation of the electronics or other components within the progressive system.

d) Progressives should exhibit temporary disruption when subjected to a significant electrostatic discharge greater than body discharge, but they must exhibit a capacity to recover and complete any interrupted play without loss or corruption of any control or data information associated with the progressive.

e) Progressives must not divert from normal operation by the application of radio frequency interference (e.g. radio frequency generated by Wi-Fi, Bluetooth, etc.)

f) Liquid spills applied to the outside of a gaming machine must not affect the normal operation of the gaming machine or the integrity of the material or information stored inside the cabinet.

2.4 Progressive Meter/Display Requirements

2.4.1 **General Statement**. One or more progressive gaming machine(s) shall be linked, directly or indirectly, to a mechanical, electrical, or electronic device, including the video display, if applicable, that shows the payoff which increments at a set rate of progression as credits are wagered. This device is the Progressive Meter. For games that contain a progressive feature such as 'Mystery Jackpot', the payoff does not have to be displayed to the casino customer however, information must be available to the casino customer describing the feature.

2.4.2 **Progressive Displays**. A Progressive Meter shall be visible to all casino customers who are playing a device, which may potentially win the progressive amount if the progressive jackpot combination appears, except for 'mystery jackpots.' A casino customer shall know that he is playing a progressive game and not have to play the max bet amount to find out. The above are parameters that are verified on-site prior to implementation. The following rules apply to all Progressive Meter displays:

a) The progressive meter shall display the current total of the progressive jackpot in the monetary value or credits (the monetary value may vary for Multi-Site Progressive Displays.) Because the polling cycle does cause a delay, the jackpot meter need not precisely show the actual monies in the progressive pool at each instance. This rule does not apply to 'Mystery Jackpots.'

2.4.3 **Types of Updating Displays**. The use of odometer and other "paced" updating displays shall be permitted. The progressive meter shall display the winning value within 30 seconds of the jackpot being recognised by the central system. In the case of the use of paced updating displays, the system jackpot meter shall display the winning value after the jackpot broadcast is received from the central system.

2.4.4 **Progressive Display Digital Limitations**. If the progressive meter(s) progresses to its maximum display amount, the meter shall freeze and remain at the maximum value until awarded to a casino customer. This can be avoided by setting the jackpot limit in accordance with the digital limitations of the sign.

2.4.5 **Alternating Displays**. If this rule prescribes multiple items of information to be displayed on a gaming machine or progressive meter, it is sufficient to have the information displayed in an alternating fashion.

2.5 Progressive Controller Requirements

2.5.1 **General Statement.** Any progressive system shall meet the game standards set forth in this Part 3 and the Part 1 technical standards for gaming machines. The requirements of this Section are intended to apply equally to one progressive gaming machine linked to a progressive controller or is internally controlled, as well as several progressive gaming machines linked to one progressive controller within one casino or multiple casinos.

2.5.2 **Progressive Controller Description.** Progressive controller means hardware and software that controls communications among the devices that calculate the values of the progressive jackpots and displays the information within a progressive gaming machine link and on the associated progressive meter. The controller shall calculate the values of the progressives and display the information within a progressive gaming machine link and the associated progressive meter (if applicable, progressive controllers may be internally controlled by the game's control program). A progressive controller may consist of more than one discrete component and includes but is not limited to PC-based computers, wiring, interface boards and collection nodes, etc.

2.5.3 **Setting the Jackpot Amounts.** The method by which system jackpot parameter values are modified or entered is to be secure. All progressive gaming machines or any approved progressive system component shall display, upon request, the following information for each progressive prize offered (if applicable):

a) CURRENT VALUE: current prize amount;

b) OVERFLOW: amount exceeding limit;

c) HITS: number of times this progressive was won;

d) WINS: total value of wins for this progressive or a history of the last 25 progressive hits;

e) BASE: starting value;

f) LIMIT: jackpot limit value;

g) INCREMENT: percentage increment rate;

h) SECONDARY INCREMENT: percentage increment rate after limit is reached;

i) HIDDEN INCREMENT: percentage increment rate for the reserve pool;

j) RESET VALUE: the amount the progressive resets to after the progressive is won; and

k) The participating gaming machines.

2.5.4 **Progressive Controller Program Interruption.** After a program interruption (e.g. power down), the software shall be able to recover to the state it was in immediately prior to the interruption occurring.

2.5.5 **Internal Link Progressive Controller.** For link progressives where the progressive controller is part of the game software (internal link), all games on the link shall conform to the following criteria:

a) Require a secure method for configuring each game on the link.

b) Changes to progressive settings may not be made, unless it involves a secure method.

c) Each game on the link shall be uniquely identified.

d) Only one (1) game on the link shall function as the master progressive controller.

e) If the game configured as the master controller becomes inoperative, all games on the link must tilt.

f) If any game on the link loses communication with the master controller, that game must tilt.

g) The progressive link shall be capable of displaying all progressive parameters (i.e. contribution, reset amount, levels, etc.).

2.5.6 **Progressive Resumption.** On program resumption, the following procedures shall be performed as a minimum requirement:

a) Any communications to an external device shall not begin until the program resumption routine, including self-tests, is completed successfully;

b) Progressive System control programs shall test themselves for possible corruption due to failure of the program storage media. The authentication may use the checksum; however, it is preferred that the Cyclic Redundancy Check (CRC) calculations are used as a minimum (at least 16 bit). Other test methodologies shall be acceptable if at a comparable level of integrity; and

c) The integrity of all critical memory shall be checked.

2.5.7 **Communications for Signaling of a Jackpot.** There shall be a secure, two-way communication protocol between the main game processor board and progressive. In addition, the progressive system shall be able to:

a) Send to the electronic gaming machine the amount that was won for metering purposes; and

b) Constantly update the progressive display as play on the link is continued.

2.5.8 **Monitoring of Credits Bet.** During the 'Normal Mode' of progressive gaming machines, the progressive controller shall continuously monitor each device on the link for credits bet and shall multiply the same by the rate of progression and denomination in order

to determine the correct amounts to apply to the progressive jackpot. This shall be 99.99% accurate.

2.5.9 **Access to the Progressive Controller.** Each progressive controller used with a gaming machine shall be housed in a secure environment allowing only authorised accessibility. Access to the controller must conform to the local Internal Control procedures.

2.5.10 **Progressive Controller Required Meters.** The progressive controller or other approved progressive system component shall keep the following information in non-volatile memory, which shall be displayed on demand. Additionally, meters shall be 99.99% accurate:

a) The number of progressive jackpots won on each progressive level if the progressive display has more than one (1) winning amount;

b) The cumulative amounts paid on each progressive level if the progressive display has more than one (1) winning amount;

c) The maximum amount of the progressive payout for each level displayed;

d) The minimum amount of the progressive payout for each level displayed; and

e) The rate of progression for each level displayed.

2.5.11 **Controller and Display Functions During Progressive Jackpot Win.** When a progressive jackpot is recorded on an electronic gaming machine, which is attached to the progressive controller, the progressive controller shall allow for the following to occur on the device and/or progressive display:

a) Display of the winning amount;

b) Display of the electronic gaming machine identification that caused the progressive meter to activate if more than one (1) electronic gaming machine is attached to the controller;

c) The progressive controller shall automatically reset to the reset amount and continue normal play; and

d) The new progressive values that are current on the link.

2.5.12 **Base Progressive Jackpot Amount.** The initial amount of a progressive jackpot shall begin at or above an award for that particular gaming machine that makes the entire meter payout greater than the minimum percentage requirement.

2.5.13 **Progressive Controller Error Conditions.** When a controller error occurs, it shall alternate the displays, or equivalent, between the current amount and an appropriate error message that is visible to all casino customers, or can alert the casino to the error condition. If the following events occur, the progressive controller must convey the appropriate signal to disable the games using the progressive, and an error shall be displayed on the progressive meter, other approved progressive system component or gaming machine:

a) During a 'communication failure' between the game and the controller or anywhere within the progressive controller system;

b) When there have been multiple communication errors;

c) When a controller checksum or signature has failure;

d) When a controller's RAM or PSD (program storage device) mismatch or failure occurs;

e) When the jackpot configuration is lost or is not set;

f) If there has been an unreasonable amount of credits bet (an unreasonable amount of credits bet is defined by the progressive set up which is based on the number of bets and number of machine(s)); or

g) If the game meters are validated against the controller's meters (via communications between the game board and controller) and they do not reconcile.

2.5.14 **Transferring of Progressive Jackpot.** The progressive controller shall have a secure means of transferring a progressive jackpot and/or prizes to another progressive controller or other approved progressive system component. Transferring of progressive jackpots must meet the Internal Control procedures approved by the Commission.

2.5.15 **Jackpot Limits.** The controller may be configured with a limit on the jackpot of a progressive gaming machine, if the limit imposed is greater than the jackpot payout on the gaming machine at the time the limit is imposed. This limit shall be posted on or near the device or devices to which the limit applies.

2.5.16 **Time Limits.** The Progressive controller should have the ability to set time limits that limit the time the progressive is available.

2.6 Progressive Jackpots

2.6.1 **General Statement.** A Progressive Jackpot is an award for a winning or non-winning (e.g. mystery jackpot) play of the game. A bonus game where certain circumstances are required to be satisfied, prior to awarding a fixed bonus prize, is not a progressive gaming machine and is not subject to these procedures.

2.6.2 **Swapping Progressive Levels.** For progressives offering multiple levels of awards, the casino customer must always be paid the higher progressive amount, if a particular combination is won that should trigger the higher paying award. This may occur when a winning combination may be evaluated as more than one of the available paytable combinations (i.e., a Flush is a form of a Straight Flush and a Straight Flush is a form of a Royal Flush). Therefore, there may be situations where the progressive levels shall be swapped to ensure the casino customer is being awarded the highest possible progressive value based on all combinations the outcome may be defined as.

2.6.3 **Gaming machine Requirements when any Progressive prize is awarded.** When a progressive prize has been awarded, the gaming machine or other approved progressive component shall perform the following:

a) An appropriate message shall be displayed;

b) Unless the prize is transferred to the casino customer's credit meter the software and game shall lock-up until the award has been paid by the attendant; and

c) All progressive related meters must be updated.

2.6.4 **Progressive Gaming machine Metering Requirements.** The electronic gaming machine is required to update its electronic meters to reflect the winning progressive jackpot amount consistent with these procedures and the electronic accounting meter requirements in Part 1 for gaming machines. Progressive wins may be added to the credit meter if either:

a) The credit meter is maintained in monetary value or credits;

b) The progressive meter is incremented to whole credit amounts; or

c) The prize, in monetary value, is converted to credits on transfer to the casino customer's credit meter in a manner that does not mislead the casino customer. The conversion from monetary value to credits must always round up.

2.7 Progressive Awards Paid by Over Time

2.7.1 **Notice of Payment Over Time.** Where an award is paid over time, the progressive gaming machine shall comply with the display and sign requirements or internal control requirements, except that the display or sign need not include the cash equivalent value. In addition, clear and conspicuous notice of the following shall be provided to all casino customers:

a) That the displayed jackpot will be paid over time and not in one lump sum; and

b) The period of time covering the payments.

2.8 Progressive Percentage Requirements and Odds

2.8.1 **General Statement.** The rules within this section shall not supersede the Percentage and Odds rules outlined in Part 1.

2.8.2 **Linked Gaming machine Odds.** Each device on the link shall have the same probability of winning the progressive, adjusted for the denomination played. For instance, the probability shall remain the same for multiple denomination games based, on the monetary value of the wager (e.g.1. a two (2) coin €1 game has the probability of one (1) in 10,000 and a two (2) coin, €2 game on the same link has the probability one (1) in 5,000.)

2.9 Independent Control Program Verification

2.9.1 The controller software and any associated critical software used within the progressive system shall have the ability to allow for an independent integrity check of the device's software from an outside source and is required for all control programs that may affect the integrity of the game. This must be accomplished by being authenticated by a third-

party device, which may be embedded within the game software, by having an interface port for a third-party device to authenticate the media, or by allowing for removal of the media such that it can be verified externally. This integrity check will provide a means for field verification of the software to identify and validate the program.

CHAPTER 3 MULTIPLE SITE PROGRESSIVE REQUIREMENTS

3.1 Introduction

3.1.1 **General Statement**. In addition to Chapters 1, and 2 of this document, this Section shall set forth the technical requirements of "Multi-Site Progressive Gaming Devices." Multi-site progressive gaming devices are interconnected in more than one licensed casino within the Republic of Cyprus. The purpose of a Multi-site progressive system is to offer a common progressive jackpot (system jackpot) at all participating locations.

3.1.2 **Phases of Approval.** The approval of a "multi-Site" system shall be certified in two phases:

(a) Initial laboratory testing, where the laboratory will test the integrity of the gaming device(s) in conjunction with a progressive system in the laboratory setting with the equipment assembled; and

(b) On-site certification where the progressive communications and set up are tested on the casino floor prior to implementation.

3.2 Multi-Site Central Computer Requirements

3.2.1 **General Statement**. The operator shall be prepared to participate and submit a Multi-site progressive slot system for approval of a system of accounting and internal controls to the regulator, specifying the manner in which participating casino licensees will satisfy the requirements of Part 1, gaming machines concerning the operation of gaming machines.

3.2.2 **Location of Central Monitoring System**. The office containing the central computer shall be equipped with a surveillance system that must meet the Internal Control procedures.

3.2.3 **Method of Communication for Multi-Site Gaming Devices**. It is recommended that the method of communication be a non-shared, dedicated line or equivalent. Dial-tone systems may used as long as devices at the local site would not be able to be disabled from another outside line or manipulated by any other means. When the method of communication is a shared line, appropriate encryption and security must be in place to avoid corruption or compromise of data.

3.2.4 **Data Collection Requirement**. Multi-site systems shall ensure that security information and the amounts wagered information is communicated, at least once every 60 seconds for terrestrial lines (dedicated phone lines), and a reasonable amount of time for Radio Frequency, from each participating device to the central computer system.

3.2.5 **Multi-Site Encryption Method**. All Multi-Site property systems shall utilize an encryption method that has been approved by the independent testing laboratory. Such encryption method shall include the use of different encryption "keys" or "seeds" so that encryption can be changed in a real-time fashion.

3.2.6 **Multi-Site Monitoring and Other On-Line System Requirements**. The on-line provision is to be able to monitor the meter readings and error events of each device regardless of any outside monitoring system. Therefore, the on-line security system requirement when gaming devices are in play is not altered in any way.

3.2.7 **Central Monitoring System Power Supply**. The central computer site shall be equipped with non-interruptible power supply that will allow the central computer to conduct an orderly shutdown if the power is lost. Should the system utilize hard disk peripherals, the central computer shall be capable of on-line data redundancy.

3.2.8 **Communication Failure**. A gaming device shall immediately disable itself and suspend play if communication is lost to the local collection unit hub. The gaming device may resume play only when communication to the local hub is restored. If the communication is lost between the local hub and the central computer, the gaming device may continue to play provided the progressive information from all games connected to the local hub is buffered. Once the local hub's buffer is full, the hub must disable games that are connected to it. Upon re-establishing communication with the central computer, the hub must accurately relay all buffered progressive information to the central system and the system wide totals are to be updated; not withstanding this rule if the communication is lost for more than 24 hours and the site must be shut down.

3.2.9 **Central Monitoring System Required Reports**. Any "Multi-Site" system shall supply, as requested, the following reports:

a) PROGRESSIVE SUMMARY: A report indicating the amount of, and basis for, the current jackpot amount (the amount currently in play);

b) AGGREGATE REPORT: A report indicating the balancing of the system with regard to system wide totals;

c) RESERVED; and

d) PAYOFF REPORT: A report that will clearly demonstrate the method of arriving at the payoff amount. This will include the credits contributed beginning at the polling cycle, immediately following the previous jackpot and will include all credits contributed up to and including the polling cycle which includes the jackpot signal.

3.2.10 Multi-Site System Meter Readings. All meter reading data shall be obtained in real time in an on-line, automated fashion. When requested to do so, the system shall return meter readings on all gaming devices attached to the system. The meter readings shall be identical to the meter information retained in the gaming device(s) accounting meters. Manual reading of

meter values may not be substituted for these requirements. The meter, in either credit or monetary value, required is as follows:

a) Credits Bet shall be defined as all amounts wagered.

3.2.11 Multi-Site System Door Monitoring. The Multi-Site Progressive system shall have the ability to monitor entry into the front door of the gaming device and report it to the central system immediately.

3.2.12 Jackpot Win During Poll Cycle. If a jackpot is recognized in the middle of a System-Wide Poll Cycle, the overhead display may contain a value less than the aggregated jackpot amount calculated by the central system. The credit values from the remaining portion of the poll cycle will be received by the central system but not the local site, in which case the jackpot amount paid will always be the higher of the two reporting amounts.

3.3 Multi-Site Progressive Procedures

3.3.1 General Statement. Procedures shall be developed, implemented and documented for the following. These reports shall adequately document the procedures, be generated and retained:

a) Reconciliation of meters and jackpot payouts;

b) Collection drop of gaming device funds;

c) Jackpot verification and payment procedures that include a Commission Agent be present for independent prize verification and payment.

d) System maintenance;

e) System accuracy;

f) System security;

g) System failures including:
   i. The local hub;
   ii. The central site;
   iii. Failures in communications; and
   iv. Backup and recovery.

3.4 Multi-Site Jackpots

3.4.1 Multiple Jackpots During the Same Polling Cycle. When multiple jackpots occur, where there is no definitive way of knowing which jackpot occurred first, they will be deemed to have occurred simultaneously; and therefore, the gaming regulator shall adopt procedures for payment of such jackpot occurrences. In addition, if there is a communication failure as described in Communication Failure, section 3.2.8, a winning player wagering at a non-updated site may also be eligible to a jackpot amount.

PART 4 CASHLESS SYSTEMS IN CASINOS

CHAPTER 1 OVERVIEW - STANDARDS FOR CASHLESS SYSTEMS IN CASINOS

1.1 Introduction

1.1.1 **Cashless Systems Defined**. Cashless systems allow casino customers to play gaming machines through the use of a magnetic strip casino customer card, which accesses a casino customer's account at the host system in the casino. Funds may be added to this casino customer's cashless account via a cashier station or any supporting gaming machine (through the insertion of coins, ticket/vouchers, bills, and coupons). 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. A Cashless system is characterised as a host system whereby a casino customer maintains an electronic account on the casino's host database. Usually a casino issues a casino customer a unique magnetic card and Personal Identification Number (PIN) in conjunction with a cashless account on the system's database, although any method of uniquely identifying casino customers could be implemented. All monetary transactions between a supporting gaming machine and the host must be secured either by card insertion into a magnetic card reader attached to the host and PIN entry or by other protected means. After the casino customer's identity is confirmed, the device may present transfer options to the casino customer on the LCD/VFD display of the card reader, which requires selection using a keypad/touchscreen before occurring. Such options would include how many credits they wish to "withdraw" and placed on the machine they are playing. Some systems may move either a predefined amount or the casino customer's entire balance to the machine for play. Once play is complete, the casino customer may have the option to move some of the credits back to the casino customer's account or cash out some credits. Other systems may require that the entire credit value be transferred back to the system.

CHAPTER 2 CASHLESS DEVICE AND SYSTEM REQUIREMENTS

2.1 Gaming machine/Card Reader Requirements

2.1.1 **General Statement**. The requirements throughout this section apply to gaming machines of the cashless environment. These requirements are in addition to the requirements set forth in Part 1 Gaming machines.

2.1.2 **Configuring Cashless Transactions on a Gaming machine**. Since a Cashless feature would impact the electronic accounting meters, any gaming machine that allows Cashless gaming as a selectable feature must conform to the 'Configuration Settings' requirements outlined within Part 1.

2.1.3 **Audit Trails for Cashless Transactions**. Cashless Gaming machines must have the ability to recall the last twenty-five (25) monetary transactions received from the host system and the last twenty-five (25) monetary transactions transmitted to the host system. However, if a gaming machine has promotional or host-bonusing features, or both,

enabled simultaneously with cashless features, a single 100-event log would suffice. The following information must be displayed:

a) The type of transaction (upload/download);

b) The transaction value;

c) The time and date; and

d) The casino customer's account number or a unique Transaction Number, either of which can be used to authenticate the source of the funds (i.e. source of where funds came from/went to).

2.1.4 **Meter Requirements for Cashless Gaming machines and Systems**. Cashless gaming machines and cashless host systems must incorporate electronic accounting meters that shall be at least ten (10) digits in length and conform to the following electronic metering requirements:

a) The operation of the mandatory electronic accounting meters, as mandated in Part 1, must not be impacted directly for Cashless type transactions;

b) Specific Cashless electronic accounting meters shall exist which increment to indicate:

i. electronic credits received from the central system-downloaded to gaming machine from host.

ii. electronic credits transmitted to the central system-uploaded from gaming machine to host.

c) Meters shall be labelled so they can be clearly understood in accordance with their function.

d) The following Cashless meter information shall be stored in units equal to the denomination of the device:

i. Electronic Funds Transfer In (EFT In). The gaming machine must have a meter "EFT In" that accumulates the total value of cashable credits electronically transferred from a financial institution to the gaming machine through a cashless wagering system.

ii. Cashless Account Transfer In (A.K.A. WAT In-Wagering Account Transfer In) The gaming machine must have a meter that accumulates the total value of cashable credits electronically transferred to the gaming machine from a wagering account by means of an external connection between the device and a cashless wagering system;

iii. Cashless Account Transfer Out (A.K.A. WAT Out-Wagering Account Transfer Out) The gaming machine must have a meter that accumulates the total value of cashable credits electronically transferred from the gaming machine to a wagering account by

means of an external connection between the device and a cashless wagering system;

2.1.5 **Transaction Confirmation**. The gaming machine or host card reader display must be capable of providing confirmation/denial of every cashless transaction initiated. This confirmation/denial must include:

a) The type of transaction (upload/download);

b) The transaction value;

c) The time and date (if printed confirmation);

d) The casino customer's account number or a unique Transaction Number, either of which can be used to authenticate the source of the funds (i.e. source of where funds came from/went to) [if printed confirmation]; and

e) A descriptive message as to why the transaction did not complete as initiated. This applies only to the denied transactions.

2.1.6 **Error Conditions**. The following sections outline the Error Conditions that apply to the:

a) Host System. The following conditions must be monitored, and a message must be displayed to the casino customer at the host card reader for the following:

i. invalid PIN or casino customer ID (can Prompt for Re-entry up to maximum allowed); and

ii. account unknown.

b) Gaming machine. Any credits on the gaming machine that are attempted to be transferred to the host system that result in a communication failure for which this is the only available payout medium (the casino customer cannot cashout via hopper or ticket/voucher printer), must result in a hand-pay lockup or tilt on the gaming machine.

2.1.7 **Transfer of Transactions**. If a casino customer 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 casino customer is clearly notified that he has received or deposited less than requested to avoid casino customer disputes.

2.1.8 **Identifying a Cashless Device**. A casino customer should be able to identify each Cashless compatible machine by a means left to the discretion of the Commission (e.g. remove display menu items that pertain to Cashless operation for gaming machines not participating; provide a host message indicating Cashless capability; or a specific sticker on gaming machines to indicate participation or non-participation).

2.2 Central System Security Requirements

2.2.1 **General Statement**. The rules within this section shall be implemented by the host system to allow for changing of any of the associated parameters or accessing any casino customer account. Additionally, the communication process used by the gaming

machine and the host system must be robust and stable enough to secure each cashless transaction such that failure event(s) can be identified and logged for subsequent audit and reconciliation.

2.2.2 **Modification of Casino customer Information**. An authorised, logged employee shall only change all casino customer information. Security of this information (including casino customer PIN codes or equivalent casino customer identification) must be guaranteed at all times.

2.2.3 **Balance Adjustments**. Any adjustment to an account balance outside of the normal methodology would require a supervisor's approval with all changes being logged and/or reported indicating who, what, when, and the item value before and after the change, with the reason.

2.2.4 **Security Levels**. The number of users that have the requisite permission levels/login to adjust critical parameters are limited.

2.2.5 **Prevention of Unauthorised Transactions**. The following minimal controls shall be implemented by the host system to ensure that games are prevented from responding to commands for crediting outside of properly authorised Cashless transactions (hacking):

a) The network hubs are secured (either in a locked/monitored room or area) and no access is allowed on any node without valid login and password;

b) The number of stations where critical Cashless applications or associated databases could be accessed is limited; and

c) Procedures shall be in place on the system to identify and flag suspect casino customer and employee accounts to prevent their unauthorised use to include:

i. having a maximum number of incorrect PIN entries before account lockout;

ii. flagging of "hot" accounts where cards have been stolen;

iii. invalidating accounts and transferring balances into a new account; and

iv. establishing limits for maximum Cashless activity in and out as a global or individual variable to preclude money laundering.

2.2.6 **Diagnostic Tests on a Cashless Gaming machine**. Controls must be in place for any diagnostic functionality available at the device such that all activity must be reported to the system that would reflect the specific account(s) and the individual(s) tasked to perform these diagnostics. This would allow all Cashless diagnostic activity that affects the gaming machine's associated electronic meters to be audited by the local regulatory group.

2.2.7 **Smart Card Technology**. It is permissible for systems to allow casino customers to access their accounts using "Smart Card" technology where the account information,

including the current balance, is maintained in the host system's database. Some "Smart Cards" have the ability to maintain a casino customer account balance. This method of technology is only permissible when host system validates that the amount on the card is in agreement with the amount stored within the system's database.

2.2.8 **Loss of Communication.** If communication between the Cashless accounting system and the gaming machine is lost, the game or interface element must display a message to the casino customer that cashless transfers cannot currently be processed.

2.2.9 **Encryption.** All data transmitted to and from the gaming machine must employ some form of encryption. This does not apply to communication between the gaming machine and the interface element.

2.3 Central System Audit Trails

2.3.1 **General Statement**. The central system shall have the ability to produce logs for all pending and completed Cashless transactions. These logs shall:

a) Be capable of being filtered by:

i. machine number

ii. casino customer account; and

iii. time/date.

2.4 Financial and Casino customer Reports

2.4.1 **General Statement**. The system shall have the ability to produce the following financial and casino customer reports:

a) Casino customer Account Summary and Detail Reports. These reports shall be immediately available to a casino customer upon request. These reports shall include beginning and ending account balance, transaction information depicting gaming machine number, amount, and date/time.

b) Liability Report. This report is to include previous days ending value (today's starting value) of outstanding Cashless liability, Total Cashless-in and Total Cashless out and the current day's ending Cashless liability.

c) Cashless Meter Reconciliation Summary and Detail Reports. These reports will reconcile each participating gaming machine's Cashless meter(s) against the host system's Cashless activity.

d) Cashier Summary and Detail Reports. To include casino customer account, buy-ins and cash-out, amount of transaction, date and time of transaction.

2.5 Casino customer Accounts

2.5.1 **General Statement**. All monetary transactions between a supporting gaming machine and the host must be secured either by card insertion into a magnetic card reader attached to the host and PIN entry or by other protected means (e.g. finger-print recognition). After the casino customer's identity is confirmed, the device may present

transfer options to the casino customer on the LCD/VFD display of the card reader, which requires selection using a keypad/touchscreen before occurring. Such options would include how many credits the casino customer wishes to "withdraw" and be placed on the machine. Some systems may move the entire casino customer's balance to the machine for play. Once play is complete the casino customer may have the option to move some of the credits back to the account or cash out. Other systems may require that the entire currency value of the credit balance be transferred back to the system.

2.5.2 **Adding Money to a Casino customers Account**. Money may be added to this account via a cashier station or any system-controlled kiosk, assuming that such kiosk has been approved by the Commission. Money may also be added by any supporting gaming machine (through credits won, the insertion of coins, ticket/vouchers, bills, coupons, etc.)

2.5.3 **Removing Money from a Casino customers Account**. Money may be removed from this account either through downloading of credits (currency based) to the gaming machine or by cashing out at a cashier's cage.

2.5.4 **Movement of Money**. Casino customers may also be afforded the option of moving some of their system credit to the gaming machine they are playing through "withdrawal" from the casino customer's account, which is maintained by the system. When they are finished playing, they can "deposit" their balance from the machine onto their casino customer account. Cashless gaming transactions are entirely electronic.

2.5.5 **Personal Identification Number**. Usually a casino issues a casino customer a unique magnetic card and personal identification number (PIN) in conjunction with an account on the system's database, although any method of uniquely identifying casino customers could be implemented.

2.5.6 **Account Balance**. Current account balance information should be available on demand from any participating gaming machine via the associated card reader (or equivalent) after confirmation of casino customer identity and be presented, in terms of currency, to the casino customer.

2.6 Software Verification

2.6.1 **General Statement**. Each component within the System, that would affect the integrity of the System, must have the ability to allow for an independent integrity check of the component's software that is critical to its operation, from an outside source. This must be accomplished by being authenticated by a third-party device, which may be embedded within the component's software or having an interface port for a third-party device to authenticate the media. This integrity check will provide a means for field testing the software to identify and validate the program.

PART 5 BONUSING SYSTEMS IN THE CASINO

CHAPTER 1 OVERVIEW - STANDARDS FOR BONUSING SYSTEMS IN THE CASINO

1.1 Introduction

1.1.1 **Bonusing Systems Defined**. Bonusing Systems are comprised of gaming machines that are configured to participate in electronically communicated bonus award payments from a host system, and the host system that controls the bonus award issuance parameters. The bonus host system provides designated gaming machines with additional features that entitle casino customers to special Bonus Awards based on events triggered by the gaming machine.

1.1.2 **Approval of Commission**. All bonuses shall require formal submission to and written approval from the Commission who may respond to unconditionally approve, require additional constraints be placed on the bonuses to resolve any issues, or disallow the bonus.

CHAPTER 2 BONUSING GAMING MACHINE AND SYSTEM REQUIREMENTS

2.1 Gaming machine(s) with a Bonusing Feature Requirements

2.1.1 **General Statement**. The requirements throughout this section apply to the bonus gaming machine. These requirements are in addition to the requirements set forth in Part 1, Gaming machines technical standards.

2.1.2 **Configuring Bonus Transactions on a Gaming machine**. Since a Bonusing feature would impact the electronic accounting meters, any Gaming machine that allows Bonusing gaming as a selectable feature must conform to the Configuration Setting requirements outlined within Part 1.

2.1.3 **Audit Trails for Bonusing Transactions**. Bonus gaming machines must have the ability to recall the last twenty-five (25) monetary transactions received from the host system. However, if a gaming machine has Cashless or host-Promotional features, or both, enabled simultaneously with bonus features, a single 100-event log would suffice. The following information must be displayed:

a) The transaction value; and

b) The time and date.

2.1.4 **Meter Requirements for Bonus Gaming machines**. Bonus gaming machines must incorporate electronic accounting meters that conform to the following electronic metering requirements:

a) The operation of the mandatory electronic accounting meter, "Coins-Out" as described in Part 1, shall not reflect Bonus wins, if the host pays those Bonus wins to the game (i.e. not handpaid);

b) The operation of the mandatory electronic accounting meter, “Machine Paid External Bonus Payout” as described in Part 1, shall reflect Bonus wins that are paid by the gaming machine; and

c) The operation of the mandatory electronic accounting meter, "Attendant Paid External Bonus Payout" as described in Part 1, shall reflect Bonus wins that are hand paid by the attendant; bonus payouts which are keyed to the credit meter shall not increment this meter.

2.1.5 **Identifying a Bonusing Device**. A casino customer should be able to identify each supporting machine at or near the gaming machine, by a means left to the discretion of the individual jurisdiction (e.g. provide a host message indicating bonusing capability or a specific sticker on gaming machines to indicate participation).

2.1.6 **Notification of a Bonus Award**. The method of bonus win notification, at or near the gaming machine, can include any combination of host messaging, sounds, or visual indicators as long as it approved by the Commission. Since bonuses are awarded directly to the gaming machine, the gaming machine itself shall reflect the amount of the bonus win. Additionally, electronic accounting meters, and logs must reflect all bonus transactions accordingly.

2.2 Central System Security Requirements

2.2.1 **General Statement**. The rules within this section shall be implemented by the host system to allow for securely changing of any of the associated parameters. Additionally, the communication process must be robust and stable enough to secure each bonus award transaction such that failure event(s) can be identified and logged for subsequent audit and reconciliation.

2.2.2 **Communication Failure**. Messages must be either displayed to the casino customer or be available under a diagnostic function, either at the game or system level, which would indicate the reason for any bonus transaction failure due to a Communication Failure. In this circumstance, the bonusing system must recognize failure of bonus win payment to be paid to the gaming machine, and notify appropriate casino employees so manual procedures can be implemented to ensure proper payment.

2.2.3 **Modification of Critical Parameters**. The Commission must approve all critical parameters and these may not be modified without Commission approval. All changes to factors that may impact bonus redemption frequency or amount must be logged indicating:

a) who made the change;

b) the altered parameter;

c) the time and date of change;

d) the parameter value before and after the change; and

e) the reason for the parameter adjustment.

2.2.4 **Prevention of Unauthorised Transactions**. The following minimal controls shall be implemented by the host system to ensure that games are prevented from responding to commands for crediting outside of properly authorised Bonus transactions (hacking):

a) The network hubs are secured (either in a locked/monitored room or area) and no access is allowed on any node without valid login and password;

b) The number of stations where critical Bonusing applications or associated databases could be accessed is limited; and

c) The users who have the requisite permission levels/login to adjust critical parameters are limited.

2.2.5 **Diagnostic Tests on a Bonusing Gaming machine**. Controls are placed on any diagnostic functionality available at the device/system such that all activity would reflect a specific individual(s) tasked to perform these diagnostics whereby all bonusing diagnostic activity that affect the gaming machine associated meters may be audited by the Commission.

2.3 Central System Audit Trails

2.3.1 **General Statement**. The central system shall have the ability to produce logs for all complete bonus transactions to include the same information required on gaming machine audit logs. In addition, these logs shall be capable of being filtered by:

a) Machine number;

b) Time/Date; and

c) Type.

2.4 Financial Reports

2.4.1 **General Statement**. The system shall have the ability to produce the following reports:

a) Bonus Summary and Detail Reports. These reports shall include transaction information indicating the gaming machine number, amount, date/time and type of bonus;

b) Bonus Meter Reconciliation Summary and Detail Reports. These reports shall provide reconciliation of each participating gaming machine bonus meter(s) against host system's bonus activity; and

c) Auditing Report. This report shall provide modification details whenever critical parameters are modified.

2.5 Central System Random Number Generator

2.5.1 **General Statement**. Bonus systems that utilize an electro-mechanical system based Random Number Generator (RNG) must comply with the requirements outlined within the "Mechanical Based RNG Games" requirements of Part 1.

PART 6 PROMOTIONAL SYSTEMS IN CASINOS

CHAPTER 1 OVERVIEW - STANDARDS FOR PROMOTIONAL SYSTEMS

1.1 Introduction

1.1.1 **Promotional Systems Defined**. A Promotional System is comprised of gaming machines that are configured to participate in electronically communicated promotional award payments from a host system, and the host system that controls the promotional award issuance parameters. Promotional awards are additional features that entitle casino customers to special promotional awards based on casino customers play activity. Promotional Awards are used by marketing departments and casino customer tracking/clubs rewarding casino customers with static enticement awards (such as coupons or cards that can be inserted into devices which entitle the casino customer to free credits) and awards based upon casino customer play. Facilities now exist to support these awards at a gaming machine utilising protocol commands for direct monetary transfers from the marketing department or slot club department directly via the casino customer's promotional account(s) accessible via a supporting device. The assumption of this Part 6 is that all promotional credits given to the casino customer in the above detailed manner have no impact on calculation of theoretical payback percentage for a gaming machine. Provisions must be made to ensure awards are metered uniquely by the gaming machine, so that they will not affect the hold percentage calculations.

1.1.2 **Approval of Commission.** All promotional systems shall require formal submission to and written approval from the Commission which may respond to unconditionally approve, require additional constraints be placed on the promotions to resolve any issues, or disallow the promotion.

CHAPTER 2 PROMOTIONAL DEVICE AND SYSTEM REQUIREMENTS

2.1 Gaming machine(s) with a Promotional Feature Requirements

2.1.1 **General Statement**. The requirements throughout this section apply to the promotional gaming machine. These requirements are in addition to the requirements set forth in Part 1.

2.1.2 **Configuring Promotion Transactions on a Gaming machine.** Since a Promotional feature would impact the electronic accounting meters, any Gaming machine that allows Promotional gaming as a selectable feature must conform to the Configuration Setting requirements outlined within Part 1.

2.1.3 **Audit Trails for Promotional Transactions.** Promotional Gaming machines must have the ability to recall the last twenty-five (25) promotional transactions received from the system and the last twenty-five (25) promotional transactions transmitted to the host system. However, if a gaming machine has Bonusing or host-Cashless features, or both, enabled simultaneously with promotional features, a single 100-event log will suffice. The following information must be displayed:

a) The type of transaction (upload/download) including restrictions (cashable or non-cashable, etc), if utilizing a single 100-event log;

b) The transaction value; and

c) The time and date.

2.1.4 **Meter Requirements for Promotional Gaming machines**. Promotional gaming machines must incorporate electronic accounting meters that conform to the following electronic metering requirements:

a) The operation of the mandatory electronic accounting meters, as mandated in Part 1, must not be impacted directly for Promotion transactions; and

b) The following specific Promotional meters will be added:

i. Total Promotional Awards In (received by game) meter, which includes: Total Non-Restricted (cashable), Promotional In if applicable; and Total Restricted (non-cashable), Promotional In if applicable.

ii. Total Promotional Awards Out (removed from game and transferred back to casino customer account) meter, if applicable, which includes: Total Non-Restricted (cashable) Promotional Out; and Total Restricted (non-cashable) Promotional Out.

2.1.5 **Error Conditions**. The following conditions must be monitored, and messages must be displayed to the casino customer, which would indicate the reason for any transaction failure to include the following:

a) Invalid PIN or Casino customer ID (Can Prompt for Re-entry up to maximum allowed); and

b) Account Unknown.

2.1.6 **Transfer of Transactions**. If a casino customer initiates a promotional 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 casino customer is clearly notified that they have received or deposited less than requested to avoid casino customer disputes.

2.1.7 **Identifying a Promotional Device**. A casino customer should be able to identify each machine that supports the promotion by a means approved by the the Commission (e.g. remove display menu items that pertain to promotional operation for gaming machines not participating; provide a host message indicating promotional capability; or a specific sticker on gaming machines to indicate participation).

2.1.8 **Notification of a Promotional Award**. The method of promotional award notification can include any combination of host messaging, sounds, or visual indicators as long as deemed acceptable to the individual jurisdiction. Since promotional awards are paid directly to the gaming machine (if applicable, after casino customer intervention), the gaming machine itself shall reflect the amount of promotional awards. Additionally, electronic accounting meters, and logs will reflect all promotional transactions accordingly (see 3.1.3 and 3.1.4 of this Part 6).

2.2 Central System Security Requirements

2.2.1 **General Statement**. The rules within this section shall be implemented by the host system to allow for securely changing of any of the associated parameters. Additionally, the communication process must be robust and stable enough to secure each promotional transaction such that failure event(s) can be identified and logged for subsequent audit and reconciliation.

2.2.2 **Modification of Critical Parameters**. All changes to parameters that may impact promotion redemption frequency or amount, must be logged indicating:

a) who made the change;

b) the altered parameter;

c) the time and date of change;

d) the parameter value before and after the change; and

e) the reason for the parameter adjustment.

2.2.3 **Prevention of Unauthorised Transactions**. The following minimal controls shall be implemented by the host system to ensure that games are prevented from responding to commands for crediting outside of properly authorised Promotional transactions (hacking):

a) The network hubs are secured (either in a locked/monitored room or area) and no access is allowed on any node without valid login and password;

b) The number of stations where critical promotional applications or associated databases could be accessed is limited;

c) The users who have the requisite permission levels/login to adjust critical parameters are limited; and

d) Procedures be in place on the system to identify and flag suspect casino customer and employee accounts to prevent their unauthorised use to include:

i. Flagging of “hot” accounts where cards (other instruments) have been stolen;

ii. Invalidating accounts and transferring all balances into a new account; and

iii. User roles or procedures are established in promotional parameter configuration applications, which enforce logical separation of controls to discourage obvious misbehaviour.

2.2.4 **Diagnostic Tests on a Promotional Gaming machine**. Controls are placed on any diagnostic functionality available at the device/system such that all activity would reflect a specific account(s) and the individual(s) tasked to perform these diagnostics whereby all promotional diagnostic activity that affect the gaming machine associated meters may be audited by the local regulatory group.

2.2.5 **Loss of Communication**. If communication between the promotional accounting system and the gaming machine is lost, promotional transfers shall not be processed until communications are re-established. It is recommended that the game or interface element provide a means for informing the casino customer that promotional transfers cannot currently be processed for any casino customer initiated transfers.

2.3 Central System Audit Trails

2.3.1 **General Statement**. The central system shall have the ability to produce logs for all complete promotional transactions to include the same information required on gaming machine audit logs and capable of being filtered by:

a) machine number;

b) casino customer account; or

c) promotional identification.

2.3.2 **Transaction Report**. The casino customer must be provided the ability to review a complete and comprehensive transaction report of all Promotional transactions concluded, indicating each separate transaction with amount.

2.4 Financial Reports

2.4.1 **General Statement**. The system shall have the ability to produce the following reports:

a) Casino customer Promotional Account Summary and Detail Reports. These reports shall include beginning and ending balance(s), transaction information including gaming machine number, amount, date/time and type (if multiple types are supported);

b) Liability Report. The Liability Report shall include the previous day's ending value (today's starting value) of outstanding promotional liability, Total promotional in and Total promotional out, expired promotional value, and the current day's ending promotional liability; and

c) Promotional Meter Reconciliation Summary and Detail Reports. These reports shall provide reconciliation of each participating gaming machine promotional meter(s) against the host system's promotional activity.

2.5 Casino customer Accounts

2.5.1 **General Statement**. For awards tied to a specific casino customer's account, a casino usually issues a casino customer a unique magnetic card and may require a personal identification number (PIN), in conjunction with an account on the host system's database, although any method of uniquely identifying casino customers could be implemented. All such transactions between a supporting gaming machine and the host system must be secured either by card insertion into a magnetic card reader attached to the host system or other protected means. The promotional options are presented to the casino customer on the LCD/VFD display of the card reader, which should require selection using a keypad/touchscreen before occurring.

2.5.2 **Removing Promotional Credits from a Casino customers Account**. Promotional credits may be removed from a casino customer's account either through:

a) downloading of the promotional credits to the gaming machine;

b) redeeming the promotional credits for merchandise/cash via a cashier; or

c) expiration of promotional credits.

2.5.3 **Movement of Promotional Credits.** Casino customers may have the option of moving some of their system promotional credit to the gaming machine, they are playing, through "withdrawal" from the casino customers account, maintained by the system. Then when they are finished playing, they may either "deposit" their balance from the machine onto their casino customer account or redeem them from the gaming machine via the available payout mechanism. Promotional gaming transactions are entirely electronic.

2.5.4 **Personal Identification Number.** Usually a casino issues a casino customer a unique magnetic card and personal identification number (PIN) in conjunction with an account on the system's database, although any method of uniquely identifying casino customers could be implemented. Security of this information must be guaranteed at all times.

2.5.5 **Account Balance.** Current balance information and promotional award transaction activities should be available on demand at any participating gaming machine or other system terminal after confirmation of casino customer identity. All discretionary account funds (i.e. those funds that have a possible expiration) must be maintained separately. Security of this information must be guaranteed at all times.

2.6 Software Verification

2.6.1 **General Statement**. Each component within the System, that would affect the integrity of the System, must have the ability to allow for an independent integrity check of the component's software that is critical to its operation, from an independent testing laboratory. This must be accomplished by being authenticated by a third-party device, which may be embedded within the components or having an interface port for a third-party device to authenticate the media. This integrity check will provide a means for field testing the software to identify and validate the program.

PART 7 CARD SHUFFLERS AND DEALER SHOES

CHAPTER 1 INTRODUCTION

1.1 Card Shuffler and Card Shoe Terminology – Definitions

1.1.1 Definitions.

a) Card Shuffler. A device that is designed, at a minimum, to have the capability to randomly rearrange a deck or decks of playing cards to eradicate any patterns introduced to the playing cards upon initial use or by prior game play.

b) Shuffle. A procedure used to randomize a deck of playing cards to provide an element of chance in card games.

c) Card Shoe or Dealer Shoe. A device used to hold playing cards for distribution by a dealer to each casino customer of a card game.

d) Program Storage Device. The media or an electronic device that contains the critical control program components.

e) Role Based Access Control. Software control which allows different levels of access depending on the person accessing the device. For example, a dealer may only be able to access game history where a pit boss may be able to also access the device's configuration menus.

CHAPTER 2 SOFTWARE REQUIREMENTS

2.1 Random Number Generator (RNG) Requirements

2.1.1 **Random Number Generator Requirements**. The RNG and the physical mechanics of the shuffling device will mutually result in the production of random card outcomes. The results of multiple random card outcomes will be evaluated. The outcome shall:

a) Be statistically independent;

b) Conform to the desired random distribution;

c) Pass various recognized statistical tests; and

d) Be unpredictable.

2.1.2 **Background RNG Activity Requirement.** The RNG shall be cycled continuously in the background between shuffles at a speed that cannot be timed by the casino customer.

2.1.3 **RNG Seeding.** The first seed shall be randomly determined by an uncontrolled event. After every game there shall be a random change in the RNG process (new seed, random timer, delay, etc.). This will verify the RNG doesn't start at the same value, every time. Alternatively, it is permissible not to use a random seed; however, the manufacturer must ensure that shuffles will not synchronize.

2.1.4 Scaling Algorithms.

a) If a random number with a range shorter than that provided by the RNG is required for some purpose within the device, the method of scaling, (i.e., converting the number to the lower range), is to be designed in such a way that all numbers within the lower range are equally probable.

b) If a particular random number selected is outside the range of equal distribution of scaling values, it is permissible to discard that random number and select the next in sequence for the purpose of scaling.

2.2 Non-Volatile (NV) Memory Requirements

2.2.1 **General Statement**. NV memory is used to store all data that is considered vital to the continued operation of the gaming device. The contents of NV memory may include, but is not limited to shuffling device configuration data (the number of decks being used, different shuffle methods, etc.) and game configuration data (the type of game being played and any variant of the game approved by the Commission.).

2.2.2 **Maintenance**. NV memory storage shall be maintained by a methodology that enables errors to be identified and corrected in most circumstances. This methodology may include, but is not limited to signatures, checksums, partial checksums, multiple copies, and effective use of validity codes.

2.2.3 **Comprehensive Checks**. Comprehensive checks of NV memory shall be made following the initiation of the shuffling process, but prior to the start of the shuffle and upon completion of the shuffle prior to the cards being used for game play. The methodology shall detect failures with an extremely high level of accuracy.

2.2.4 **Unrecoverable NV Memory**. An unrecoverable corruption of NV memory shall result in an NV memory error. Upon detection, the device shall meet the requirements as specified in section 2.7 Program Interruption & Resumption, of this Part 7.

2.2.5 **Non-Critical Memory Space.** NV memory space that is not critical to the gaming device's security is not required to be validated.

2.3 Program Storage Device (PSD) Requirements

2.3.1 **General Statement**. All program storage devices shall:

a) Be secured behind a fully closed door, panel, or compartment so that it is not openly accessible and shall meet the requirements as specified in section 2.8, Cover/Lid Open/Close, of this Part 7.

b) Contain sufficient information to identify the software and revision level of the information stored on the device, which may include but is not limited to physical labels or, if applicable, electronically stored and displayed via a display screen.

c) Contain information to allow the device to validate the contents of the program storage device upon (i) power up after initial installation; and (ii) processor reset.

2.3.2 **Non-Critical PSD Space**. PSD space that is not critical to the gaming device's security is not required to be validated.

2.4 Control Program Requirements

2.4.1 **General Statement**. Each device shall contain a proven and robust mechanism which has the capability to internally authenticate the program files prior to use or loading. The control program shall ensure the integrity of all controlled program components during execution of said components. Control programs shall test themselves for possible corruption due to failure of the program storage media.

2.4.2 **Authentication Mismatch.** If unexpected data or inconsistencies are found, the device shall meet the requirements as specified in section 2.6, Error Conditions, of this Part 7.

2.4.3 **Independent Control Program Verification.** The device shall have the ability to allow for an independent integrity check of the device's software from an independent testing laboratory and is required for all control programs that may affect the integrity of the device. This must be accomplished by being authenticated by a third-party device, which may be embedded within the shuffler software, by having an interface port for a third-party device to authenticate the media, or by allowing for removal of the media such that it can be verified externally. This integrity check will provide a means for field verification of the software to identify and validate the program. The independent test laboratory, prior to device approval, shall approve the integrity check method.

2.5 Communications Protocol

2.5.1 **General Statement**. For devices that are required to communicate with another system (e.g. prior game result display device, electronic card table, etc.), the device must accurately function as indicated by the communication protocol that is implemented.

2.5.2 **Display of Game Results**. For devices that have the capability to communicate results of the game with another device or system (e.g. prior game result display device, electronic card table, etc), it shall do so with a very high degree of accuracy.

2.5.3 **Protection of Sensitive Information**. The device must not allow any information contained in communication to or from another system that is intended by the communication protocol to be protected, or which is of a sensitive nature, to be viewable through any display mechanism supported by the device. This includes, but is not limited to validation information, secure PINs, credentials, or secure seeds and keys.

2.6 Error Conditions

2.6.1 **General Statement**. Shuffling devices shall be capable of detecting error conditions which shall cause the device to lock up and there shall be an appropriate indicator (e.g. audible alarm or light) to notify the operator. If a display screen is present, a message describing the type of error shall be displayed.

2.7 Program Interruption & Resumption

2.7.1 **Interruption.** After a program interruption (e.g., processor reset, or any error condition), the shuffling device shall enter a lock-up condition and the shuffle or deal shall be nullified. Upon detection, the device shall meet the requirements as specified in section 2.6, Error Conditions, of this Part 7.

2.7.2 **Restoring Power**. If the shuffling device is powered down while in an error condition, then upon restoring power, the specific error message shall still be displayed and the gaming device shall remain locked-up. This is unless power down is used as part of the error reset procedure, or if on power up or cover/lid closure, the gaming device checks for the error condition and detects that the error is no longer in existence.

2.7.3 **Simultaneous Inputs**. The program shall not be adversely affected by the simultaneous or sequential activation of the various inputs and outputs, which might, whether intentionally or not, cause malfunctions or invalid results.

2.7.4 **Resumption**. Upon program resumption, the device shall meet the requirements as specified in section 2.4, Control Program Requirements, of this Part 7.

2.8 Cover/Lid Open/Close

2.8.1 **Cover/Lid Open Procedures**. There shall be mechanisms in place to detect the opening of the cover, lid, or access to any other critical portion of the shuffling device which may affect the integrity and the security of the unit. Upon detection, the device shall meet the requirements as specified in section 2.6, Error Conditions, of this Part 7. Critical portions of the shuffling device include, but are not limited to, areas that contain:

a) The program storage media; and

b) The cards after the shuffling process has been initialised.

2.9 Levels of Certification

2.9.1 **General Statement.** All devices must pass the requirements set forth as specified in sections 2.1 through 2.8. In addition, each shuffling device must meet the requirements under, at least, one (1) of the sections as specified below. A shuffling device may qualify as being compliant with multiple levels of certification if it meets the requirements of more than one (1) of the sections as specified below.

2.9.2 **Type 3 Certification.** The shuffling device must pass Section 2.1.2, Applied Tests, where the statistical tests applied shall consider each card uniquely even though they may be considered indistinguishable to the casino customer (i.e. each card will be treated as a unique card).

2.9.3 **Type 2 Certification.** The shuffling device must pass Section 2.1.2, Applied Tests, where the statistical tests applied shall consider cards that are imperceptible to the casino customer as indistinguishable (i.e. each card does not need to be treated as a unique card). For example, when shuffling eight standard 52-card decks, the ace of spades from the first deck is indistinguishable from the ace of spades from any of the other seven decks.

CHAPTER 3 DEVICE REQUIREMENTS

3.1 Hardware Requirements

3.1.1 **Device Identification.** Each electronic shuffling device or card shoe shall bear, at minimum, the following information:

a) The name of manufacturer;

b) A unique serial number;

c) The model number;

d) The date of manufacture; and

e) CE Mark

3.1.2 Environmental interference.

a) Card shufflers and card shoe devices must not divert from normal application by the application of electromagnetic interference from an outside source.

b) Card shufflers and card shoe devices must exhibit total immunity to human body electrostatic discharges on all areas exposed to contact.

c) Protection against static discharges requires that the card shufflers and card shoe devices be earthed in such a way that static discharge energy shall not permanently damage, or permanently inhibit the normal operation of the electronics or other components within the progressive system.

d) Card shufflers and card shoe devices should exhibit temporary disruption when subjected to a significant electrostatic discharge greater than body discharge, but they must exhibit a capacity to recover and complete any interrupted play without loss or corruption of any control or data information associated with the card shufflers and card shoe devices.

e) Card shufflers and card shoe devices must not divert from normal operation by the application of radio frequency interference (e.g. radio frequency generated by Wi-Fi, Bluetooth, etc.)

f) Liquid spills applied to the outside of a card shuffler or card shoe device must not affect the normal operation of the card shuffler or card shoe device or the integrity of the material or information stored inside the cabinet.

3.1.3 **Machine Safety.** Electrical and mechanical parts and design principals of the device may not subject a person to any physical hazards.

3.2 Device Functionality

3.2.1 **Card Shuffler Functionality.** Card shufflers must be designed so that:

a) They can completely eradicate any pattern(s) introduced to the playing cards before being placed into the shuffler that would affect the outcome of the next game.

b) Their operation cannot be interfered with or interrupted, other than by turning off the power, without being detected.

c) During normal operation, the card shuffler must have the ability to dispense playing cards and not leave any marks, scuffs or abrasions, or cause any damage to the cards making any of the cards identifiable to the casino customer.

d) The card shuffler may not provide any real time information, for the current game being played, that can be used to aid in the:

i. Projection of the outcome of a game;

ii. Tracking of the cards played and cards remaining to be played;

iii. Analysing the probability of the occurrence of an event relating to a game; or

iv. Analysing the strategy for playing or betting to be used in a game.

e) The card shuffler may utilize ancillary devices to assist in meeting the requirements in section 3.2.1 of this Part 7. Ancillary devices shall have no effect on the outcome of the shuffle or on the outcome of the cards being dealt.

3.2.2 **Shoe Functionality.** The requirements set forth in this section pertain to the specific portion of the device which is used for collecting cards to be distributed by a dealer to the casino customers of the game. Shoes are devices that are designed and constructed to maintain the integrity of the game. There shall be mechanisms and controls in place to prevent the tampering of any card loaded into the card shoe. Card shoes, if supported, must be designed to:

a) Facilitate the dealing of cards without revealing their face value.

b) Have a cover that serves to obscure the back of the cards in the shoe.

c) Shall not leave any marking(s) on the cards that may assist, help or otherwise allow any person to predict or project the outcome of a game.

d) Shall not contain any hidden compartments.

3.2.3 **Card Recognition.** If card recognition software is used, it shall:

a) Ensure a very high degree of accuracy in identifying the value and suit of the card.

b) Not provide any information that may be used to compromise the cards contained in the current shuffle or dealing shoe.

c) Not interfere with or modify the device's behaviour beyond what functionality is associated with that software.

d) If supported, have Role Based Access Control to restrict access to the history of game(s) played.

3.2.4 **Card Count.** If card count technology is used, the card shuffler must provide an accurate count.

3.2.5 **Hand Formation.** If cards dealt technology is used, then the device shall:

a) Ensure all hands dealt meet section 2.1 Random Number Generator Requirements of this Part 7; and

b) Ensure the correct number of playing cards per hand with a very high degree of accuracy to ensure that extra cards are not dealt to casino customers.

3.2.6 **Game History.** If the device is capable of displaying the history of the game results, it shall do so with 100% accuracy.

3.2.7 **Multi-Game.** If the device is capable of shuffling or dealing more than one type of game, the device shall give an indication (i.e. if capable, display the game and variant on the display screen, sequence of lights, etc.) to the current game being shuffled or dealt.

PART 8 DEALER CONTROLLED ELECTRONIC TABLE GAMES

CHAPTER 1 OVERVIEW

1.1 General Statement

This standard covers the Technical Specifications of the operation of Dealer Controlled Electronic Table Games, as defined within section 1.2.1 below, where the table games are operated electronically, that require interaction from a live dealer. Please refer to Part 2 for Electronic Table Game Systems that do not utilise a live dealer.

1.2 Defining Dealer Controlled Electronic Table Games

1.2.1 **General Statement**. Dealer Controlled Electronic Table Games (ETG) is the operation of a table game(s) that require a live dealer that utilises electronics as part of the game's operation (i.e., game generation, electronically collecting, storing, communicating accounting and significant event data, etc.) This standard is only to be used when the electronic table game requires a live dealer.

1.3 Phases of Testing

1.3.1 **General Statement**. Electronic table game submissions to the independent test laboratory may be performed in two phases:

a) Within the laboratory setting; and

b) On-site following the initial install of the system to ensure proper configuration of the security applications.

CHAPTER 2 ELECTRONIC TABLE GAME SYSTEM REQUIREMENTS

2.1 Introduction

This chapter addresses electronic table games that may or may not function as a component within a table game system. The regulations of each subchapter only apply when the electronic table game(s) operate as part of a 'table game system' that is independent of any external gaming system. Electronic table game's that operate in conjunction with external systems shall meet the game level and communication requirements established within the appropriate Part of these Technical Standards.

2.2 Table Game System Requirements

2.2.1 **System Clock**. The system must maintain an internal clock that reflects the current time (24hr format - which is understood by the local date/time format) and date that shall be used to provide for the following:

a) Time stamping of significant events;

b) Reference clock for reporting; and

c) Time stamping of configuration changes.

2.2.2 **Synchronization Feature.** If multiple clocks are supported the system shall have a facility whereby it is able to synchronize those clocks in each system component, whereby conflicting information could not occur.

2.3 System Security

2.3.1 **General Statement.** All communications, including Remote Access, must pass through at least one approved application-level firewall and must not have a facility that allows for an alternate network path.

2.3.2 **Firewall Audit Logs.** The firewall application must maintain an audit log of the following information and must disable all communications and generate an error event if the audit log becomes full:

a) All changes to configuration of the firewall;

b) All successful and unsuccessful connection attempts through the firewall; and

c) The source and destination IP Addresses, Port Numbers and MAC Addresses.

2.3.3 **Surveillance/Security Functionality.** The system shall provide for interrogation that enables on-line comprehensive searching of the significant event log.

2.3.4 **Access Control.** The system must support either a hierarchical role structure whereby user name and password define program access or individual menu item access or logon program /device security based strictly on user name and password or PIN. The system shall not permit the alteration of any significant log information without supervised access control. There shall be a provision for system administrator notification and user lockout or audit trail entry, after a set number of unsuccessful login attempts. The system shall record: Date and Time of the Login attempt, username supplied, and success or failure. The use of generic user accounts on servers is not permitted.

2.3.5 **Data Alteration.** The system shall not permit the alteration of any accounting or significant event log information without supervised access controls. In the event financial data is changed, an audit log must be capable of being produced to document:

a) Data element altered;

b) Data element value prior to alteration;

c) Data element value after alteration;

d) Time and Date of alteration; and

e) Personnel that performed alteration (user login).

2.4 Remote Access

2.4.1 **Remote Access defined.** Remote access defines any access made by a component outside the 'trusted' network.

2.4.2 **General Statement.** Remote access where permitted, shall authenticate all computer systems based on the authorized settings of the electronic table game and firewall application that establishes a connection with the electronic table game as long as the following requirements are met:

a) Remote Access User Activity log is maintained by both the property and the manufacturer, depicting: authorized by, purpose, logon name, time/date, duration, and activity while logged in;

b) No unauthorized remote user administration functionality (adding users, changing permissions, etc.);

c) No unauthorized access to database;

d) No unauthorized access to operating system; and

e) If remote access is to be on a continuous basis then a network filter (firewall) must be installed to protect access (Dependent upon jurisdictional approval).

2.4.3 **Self Monitoring.** The system must implement self monitoring of all critical Interface Elements (e.g. central hosts, network devices, firewalls, links to third parties, etc.) and shall have the ability to effectively notify the system administrator of any error condition, provided the condition is not catastrophic. The system shall be able to perform this operation with a frequency of at least once in every 24-hour period and during each power-up and power reset.

2.5 Backups and Recovery

2.5.1 **System Redundancy, Backup & Recovery.** The system shall have sufficient redundancy and modularity so that if any single component or part of a component fails, gaming can continue. There shall be redundant copies of each log file or system database or both on the system with open support for backups and restoration.

2.5.2 **Backup & Recovery.** In the event of a catastrophic failure when the system cannot be restarted in any other way, it shall be possible to reload the system from the last viable backup point and fully recover the contents of that backup, recommended to consist of at least the following information:

a) Significant events;

b) Accounting information;

c) Auditing information; and

d) Specific site information such as Device file, Employee file, game profiles, etc.

2.6 Communication Protocol

2.6.1 **General Statement.** Each component of an electronic table game system must function as indicated by the communication protocol implemented. All protocols must use communication techniques that have proper error detection and/or recovery mechanisms which are designed to prevent unauthorized access or tampering, employing Data Encryption Standards (DES) or equivalent encryption with secure seeds or algorithms. Any alternative measures will be reviewed on a case-by-case basis, with Commission approval.

2.7 System Integrity

2.7.1 **General Statement**. The independent testing laboratory will perform certain tests to determine whether or not outside influences affect game fairness to the player or create cheating opportunities. During the course of testing, the independent testing laboratory shall inspect for marks or symbols indicating that a device has undergone product safety compliance testing. The independent testing laboratory shall also

perform, where possible, a cursory review of submissions and information contained therein related to Electromagnetic Interference (EMI), Radio Frequency Interference (RFI), Magnetic Interference, Liquid Spills, Power Fluctuations and Environmental conditions. Electrostatic Discharge Testing is intended only to simulate techniques observed in the field being used to attempt to disrupt the integrity of electronic table game systems. An electronic table game system shall be able to withstand the following tests, resuming game play without operator intervention:

a) **Random Number Generator.** If implemented, the random number generator and random selection process shall be impervious to influences from outside the device, including, but not limited to, electro-magnetic interference, electro-static interference, and radio frequency interference;

b) **Electro-Static Interference.** Protection against static discharges requires that the table game's conductive cabinets be earthed in such a way that static discharge energy shall not permanently damage, or permanently inhibit the normal operation of the electronics or other components within the electronic table game. The electronic table game may exhibit temporary disruption when subjected to a significant electro-static discharge greater than human body discharge, but they shall exhibit a capacity to recover and complete any interrupted play without loss or corruption of any control or critical data information associated with the electronic table game. The tests will be conducted with a severity level of a maximum of 27KV air discharge;

2.7.2 **Physical Security.** The server or system component(s) must reside in a secure area where access is limited to authorized personnel. It is recommended that logical access to the game be logged on the system or on a computer or other logging device that resides outside the secure area and is not accessible to the individual(s) accessing the secure area. The logged data should include the time, date, and the identity of the individual accessing the secure area. The resulting logs should be kept for a minimum of 90 days.

2.8 Random Number Generator

2.8.1 **General Statement.** The Random Number Generator (RNG) is the selection of game symbols or production of game outcomes. The regulations within this section are only applicable to electronic table games that utilize an RNG, which shall:

a) Be statistically independent;

b) Conform to the desired random distribution;

c) Pass various recognized statistical tests; and

d) Be unpredictable.

2.8.2 **Game Selection Process.**

a) All Combinations and Outcomes Shall Be Available. Each possible permutation or combination of game elements that produces winning or losing game

outcomes shall be available for random selection at the initiation of each play, unless otherwise denoted by the game.

b) No Near Miss. After selection of the game outcome, the electronic table game shall not make a variable secondary decision, which affects the result shown to the player. For instance, the random number generator chooses an outcome that the game will be a loser.

c) No Corruption from Associated Equipment. An electronic table game shall use appropriate protocols that effectively protect the random number generator and random selection process from influence by associated equipment, which may be communicating with the electronic table game.

2.8.3 **Applied Tests.** The independent test laboratory may employ the use of various recognized tests to determine whether or not the random values produced by the random number generator pass the desired confidence level of 99%. These tests may include, but are not limited to:

a) Chi-square test;

b) Equi-distribution (frequency) test;

c) Gap test;

d) Overlaps test;

e) Poker test;

f) Coupon collector's test;

g) Permutation test;

h) Kolmogorov-Smirnov test;

i) Adjacency criterion tests;

j) Order statistic test;

k) Runs tests (patterns of occurrences should not be recurrent);

l) Interplay correlation test;

m) Serial correlation test potency and degree of serial correlation (outcomes should be independent of the previous game);

n) Tests on subsequences; and

o) Poisson distribution.

2.8.4 **Background RNG Activity.** The RNG shall be cycled continuously in the background between games and during game play at a speed that cannot be timed by the player. The independent test laboratory recognizes that some time during the game, the RNG may not be cycled when interrupts may be suspended. The test laboratory recognizes this but shall find that this exception shall be kept to a minimum.

2.8.5 **RNG Seeding.** The first seed shall be randomly determined by an uncontrolled event. After every game there shall be a random change in the RNG process (new seed,

random timer, delay, etc.). This will verify the RNG doesn't start at the same value, every time. It is permissible not to use a random seed; however, the manufacturer must ensure that games will not synchronize.

2.8.6 **Live Game Correlation.** Unless otherwise denoted on the pay glass/display, where the electronic table game plays a game that is recognizable such as Poker, Blackjack, Roulette, etc., the same probabilities associated with the live game shall be evident in the simulated game. For example, the odds of getting any particular number in Roulette where there is a single zero (0) and a double zero (00) on the wheel, shall be 1 in 38; the odds of drawing a specific card or cards in Poker shall be the same as in the live game.

2.8.7 **Card Games**. The requirements for games depicting cards being drawn from a deck are the following:

a) At the start of each game/hand, the cards shall be drawn fairly from a randomly-shuffled deck; the replacement cards shall not be drawn until needed, and in accordance with game rules, to allow for multi-deck and depleting decks;

b) Cards once removed from the deck shall not be returned to the deck except as provided by the rules of the game depicted;

c) As cards are removed from the deck they shall be immediately used as directed by the rules of the game (i.e., the cards are not to be discarded due to adaptive behaviour by the electronic table game system)

2.9 Maintenance of Critical Memory

2.9.1 **General Statement.** Critical memory storage may be maintained by the player terminal or the system, where applicable. Critical memory shall be maintained by a methodology that enables errors to be identified. This methodology may involve signatures, checksums, partial checksums, multiple copies, timestamps and/or effective use of validity codes.

2.9.2 **Comprehensive Checks**. Comprehensive checks of critical memory shall be made following game initiation but prior to display of game outcome to the player. It is recommended that critical memory is continuously monitored for corruption. Test methodology shall detect failures with an extremely high level of accuracy.

2.9.3 **Unrecoverable Critical Memory.** An unrecoverable corruption of critical memory shall result in an error. The memory error shall not be cleared automatically and shall result in a tilt condition, which facilitates the identification of the error and causes the electronic table game to cease further function. The critical memory error shall also cause any communication external to the electronic table game to immediately cease. An unrecoverable critical memory error shall require a full non-volatile memory clear performed by an authorized person.

2.9.4 **Non-volatile Memory and Program Storage Device Space.** Non-volatile memory space that is not critical to the electronic table game operations are not required to be validated.

2.10 Program Storage Device Requirements

2.10.1 **General Statement.** The term Program Storage Device is defined to be the media or an electronic device that contains the critical control program components. Device types include but are not limited to EPROMs, compact flash cards, optical disks, hard drives, solid state drives, USB drives, etc. This partial list may change as storage technology evolves. All program storage devices shall:

a) Be housed within a fully enclosed and locked logic compartment;

b) Be clearly marked with sufficient information to identify the software and revision level of the information stored in the device. In the case of media types on which multiple programs may reside it is acceptable to display this information via the attendant menu.

c) Validate themselves during each processor reset;

d) Validate themselves the first time they are used; and

e) CD-ROM, DVD, and other optical disk-based Program Storage shall:

i. Not be a re-writeable disk; and

ii. The "Session" shall be closed to prevent any further writing.

2.11 Control Program Requirements

2.11.1 Control Program Verification.

a) EPROM-based Program Storage:

i. Electronic table games which have control programs residing in one or more EPROMs must employ a mechanism to verify control programs and data. The mechanism must use at a minimum a checksum; however, it is recommended that a Cyclic Redundancy Check (CRC) be used (at least 16-bit).

b) Non-EPROM Program Storage shall meet the following rules:

i. The software shall provide a mechanism for the detection of unauthorized and corrupt software elements, upon any access, and subsequently prevent the execution or usage of those elements by the electronic table game. The mechanism must employ a hashing algorithm which produces a message digest output of at least 128 bits.

ii. In the event of a failed authentication, after the game has been powered up, the electronic table game should immediately enter an error condition and display an appropriate error. This error shall require operator intervention to clear and shall not clear until; the data authenticates properly, following the operator intervention, or the media is replaced or corrected, and the electronic table game's memory is cleared.

c) Alterable Media shall meet the following rules in addition to the requirements outlined in 2.11.1(b):

i. Employ a mechanism which tests unused or unallocated areas of the alterable media for unintended programs or data and tests the structure of the media for integrity. The mechanism must prevent further play of the electronic table game if unexpected data or structural inconsistencies are found.

ii. Employ a mechanism for keeping a record anytime a control program component is added, removed, or altered on any alterable media. The record shall contain a minimum of the last ten (10) modifications to the media and each record must contain that date and time of the action., identification of the component affected, the reason for the modification and any pertinent validation information.

2.11.2 **Program Identification.** Program storage devices which do not have the ability to be modified while installed in the electronic table game during normal operation, shall be clearly marked with sufficient information to identify the software and revision level of the information stored in the devices.

2.11.3 **Independent Control Program Verification.** The system server(s) and each component of the electronic table game that would have an effect on the integrity of the electronic table game shall have the ability to allow for an independent integrity check of the device's software from an outside source and is required for all control programs that may affect the integrity of the game. This must be accomplished by being authenticated by a third-party device, which may be embedded within the game software (see NOTE below), by having an interface port for a third-party device to authenticate the media, or by allowing for removal of the media such that it can be verified externally. This integrity check will provide a means for field verification of the software to identify and validate the program. The test laboratory, prior to device approval, shall evaluate the integrity check method.

2.12 Player Interface Terminal Requirements

2.12.1 **General Statement.** Player interface terminals may either be a display mechanism where the system performs all operations of the game (Thin Client), or contain its own logic function in conjunction with the electronic table game system (Thick Client). In either case, the player interface terminal(s) must meet the hardware and software requirements outlined within Part 1 for gaming devices, to ensure security and player safety.