GOBIERNO DE PUERTO RICO
COMISIÓN DE JUEGOS

ROUTE GAMING MACHINES TECHNICAL STANDARD

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DISCLAIMER: Any discrepancies or differences between this translation and the original Spanish version are for reference purposes only. The Spanish version shall govern and be binding for all purposes, and the English translation shall not be used for enforcement or legal purposes.

ABOUT THIS STANDARD

This technical standard has been produced for the purpose of providing independent certifications under this Standard that comply with the requirements established in this document for gaming devices installed in the Route Gaming machines which control the operation of the same.

A manufacturer shall submit gaming devices installed in Route Gaming machines with a request to be certified in accordance with this technical standard. Upon completion of testing, an independent laboratory shall provide a certificate evidencing certification to this Standard for such gaming device. Additional components that are not certified by the independent laboratory that are part of this requirement shall be installed and operated as defined in the standard.

Purposes of this Technical Standard

The purpose of this standard is indicated below:

a) Eliminate subjective criteria in the analysis and certification of the operation of the gaming device.

b) Test only those criteria that affect the credibility and integrity of the gaming device from the revenue collection and player perspective.

c) Create a standard that ensures that gaming devices are fair, secure, and capable of being audited and operated correctly.

d) Distinguish between public policies of the Government of Puerto Rico and the criteria of the Independent Testing Laboratory.

e) Recognize that non-gaming tests (such as electrical testing) should not be incorporated into this standard but left to appropriate testing laboratories that specialize in such testing. Except as specifically identified in this standard, these tests are not intended to address health or safety issues. These issues are the responsibility of the manufacturer, purchaser, and operator of the equipment.

f) Build a standard that is easy to revise to allow for new technology.

g) Construct a standard that does not specify any particular design, method, or algorithm. The intent is to allow a wide range of methods to be used to meet the standard while at the same time encouraging the development of new methods.

No Limitation of Technology. It should be noted that this document should not be read in a way that limits the use of future technology. This document should not be interpreted in such a way that, if technology is not mentioned, then it is not allowed. On the contrary, as new technology is developed, the Puerto Rico Government Gaming Commission will review this regulation and make changes to include minimum standards for any new and related technology.

Definition of a Gaming Device

General Statement. At a minimum, a gaming device uses an element of chance in the determination of prizes, contains some form of activation to initiate the wagering process, and makes use of a suitable methodology for the delivery of determined outcomes. The functions of a gaming device may be logically separated into multiple parts or distributed across multiple physical and/or server components. The terms "gaming device" and "machine" are used interchangeably throughout this document. A "gaming device," for purposes of this standard, does not include electronic equipment used in the conduct of table games.

REQUIREMENTS FOR A GAMING DEVICE / MACHINE

Introduction. This chapter establishes the technical requirements for the key attributes of a gaming device or machine.

Physical and Environmental Hazards and Electrical Safety Testing. The design principles and the electrical and mechanical parts of the gaming device shall not expose the player to any physical hazards. The independent testing laboratory does not perform any testing with respect to electromagnetic compatibility (EMC) or radio frequency interference (RFI), as this is the responsibility of the manufacturer of the device, or those purchasing the device. EMC and RFI testing may be required under a separate statute, regulation, law or act and therefore must be evaluated by the parties manufacturing or purchasing such a device.

Gaming Device Integrity. The independent testing laboratory will perform certain tests to determine if an electrostatic discharge (ESD) affects the integrity of a gaming device. ESD testing is intended to simulate techniques observed in the field that may be used in an attempt to alter the integrity of electronic gaming devices.

ESD effects. A gaming device must meet the following requirements related to ESD testing:

a) The Random Number Generator (RNG) and random selection process will be immune to the influences of ESD; and
b) Static discharge protection requires that the conductive enclosures of the electronic gaming device be grounded in such a manner that static discharge energy will not permanently damage or inhibit the normal operation of the electronic components or other components located within the machine. Gaming machines may exhibit temporary outages when subjected to a significant external electrostatic discharge with a severity level of 27kV air discharge. The gaming device must have the ability to recover and complete any interrupted play without loss or corruption of any control data or critical information following any temporary interruption.

2.4 Machine Identification

2.4.1 Identification Badge. A gaming device 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) Full name of the manufacturer or some type of abbreviation appropriate for the manufacturer;
b) A unique serial number;
c) The model number of the gaming device; and
d) The date of manufacture

2.5 Basic Machine Hardware Requirements

2.5.1 Gaming Device Control. A gaming device shall be controlled by one (1) or more microprocessors or their equivalent in such a manner that the gaming software is controlled entirely by the microprocessor(s). This does not prevent the outcome of a game from being derived from a mechanical device, as outlined in the "Random Number Generator (RNG) Requirements" section of this standard.

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

a) Each PCB must be clearly identifiable by an alphanumeric ID and, where applicable, a revision number. It is recommended that this identification be easily visible without removing the board from the gaming device; and
b) If track cuts, patch wires, or other circuit alterations are introduced to the board, then a new revision number will be assigned.

2.5.3 Switches and Bridges. If the gaming device contains switches and/or jumpers, they must comply with the following provisions:

a) All switches and jumpers must be fully documented for evaluation in the Independent Test Laboratory; and
b) Hardware switches and/or jumpers that may alter jurisdiction-specific configurable settings, paytables, game denominations, or payout percentages shall comply with the applicable sections of this document and shall be housed within the logical compartment of the gaming device. This includes changes to payouts (with or without progressives), selectable settings, or any other options that could affect the payout percentage.

2.5.4 Machine Wiring. The gaming device shall be designed in such a way that data and power cables entering and exiting the gaming device can be diverted so that they are not accessible to the general public. Safety cables and wires that are diverted to the logic area should be secured so that they are securely fastened inside the device using the appropriate mechanical fasteners, plugs, sockets, connectors, etc.

Note: The Laboratory will not make any determination regarding the gaming device that is in compliance with local electrical codes, or any other electrical testing standards and practices.

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

a) Have appropriate fuses and/or be electrically protected; and
b) Not affect the integrity, proper operation, or outcome of the gaming device.

2.5.6 Screens and Monitors. If a device is equipped with a monitor/display, the following rules apply:

a) The monitor shall fit properly into the device and surround the device in such a way as to eliminate gaps or voids, resist the entry of objects; and that does not conceal or physically cover any game information that is required to be displayed;
b) The configured display/monitor resolution shall be compatible with one or more of the resolutions supported by the gaming device software in a manner that ensures the proposed function of the deployment; and
c) The configured screen/monitor resolution must not be cut off or fail to display any critical game information.

Note: Please refer to the section titled "Touch Screen" for requirements applicable to devices that enable touch screen functionality.

2.5.7 Wired Communication Ports. Wired communication ports must be clearly labeled and securely housed within the gaming device to prevent unauthorized access to the ports or their associated cable connectors.

2.6 Electrical Supply of the Machine

2.6.1 Current Overloads. The gaming device will not be adversely affected except for a re-initialization due to current fluctuations at a level of ± 20% of the voltage supply. It is acceptable for the gaming device to be restarted under the condition that it does not cause any damage to the computer or experience data loss or corruption. After restarting, the game should return to its previous state. It is acceptable for the game to return to a finished game state as long as the history and all credits and meters reflect a finished game.

2.6.2 Protection of Circuits. The current source used in a gaming device must have the appropriate fuses or be protected by circuit breakers. The amperage of the fuses and circuit breakers shall be clearly indicated on or near the fuse or circuit breaker.

2.6.3 Power on/off switch. An on/off switch that controls the electrical current must be located in an easily accessible area inside the gaming device. Switch on/off positions must be labeled appropriately.

2.7 Machine Doors

2.7.1 Physical Security. A gaming device shall be robust enough to resist forced entry into any secured door, area, or compartment. In the event that extreme force is applied to the enclosure materials causing a potential machine safety violation, evidence of tampering must be visible. "Secure Areas" or "secure compartments" shall include logic areas, external doors such as the front door or belly door, cash compartment doors such as a drop box door, access areas for peripherals or other access areas of the gaming device that may potentially affect the integrity of the game such as top boxes, drivers, etc.

2.7.2 External Doors. The following requirements apply to the external doors of the gaming device (e.g. main, belly, upper boxes, etc.):

a) External doors shall be made of materials which are suitable to permit only legitimate access to the interior of the gaming cabinet. Locks, doors and their associated hinges must be able to withstand unauthorised and determined efforts to gain access to the interior of the gaming device and must leave clear evidence of tampering if such an attempt is made;

b) The seal between the gaming device cabinet and the door of a locked area shall be designed to resist the entry of objects. It must not be possible to insert an object into the gaming device that disables the open door sensor when the door of the gaming device is properly closed, leaving no clear evidence of tampering; and
c) All exterior doors must be secure and withstand the installation of padlocks.

2.7.3 Door Monitoring. All doors that provide access to secure areas of the gaming device must be monitored by a door access detection system. The detection system must register a door as open when the door is moved from its full closing point as long as power is provided to the gaming device. The door access detection system should monitor access to the following areas:

a) All external doors of the device that allow access to a secure area of the gaming device;
b) Logic door(s);
c) Cashbox door or dropbox;
d) Stacker door;
e) Any other type of coin storage that has a door; and
f) Peripheral device access areas.

Note: The Laboratory will not make any determination regarding the gaming device that is in compliance with this requirement.

2.7.4 Open/Closed Door Interruptions. When any of the doors mentioned above are opened, the gaming device must stop the game, enter an error condition, display an appropriate error message, disable credit acceptance, and trigger an alarm sound or illuminate the tower light. This error condition must be communicated to the online system when a compatible system and protocol are connected. When all monitored doors are closed, the game device should return to its original state and display an appropriate closed door event message, until the next game has started.

2.8 Machine Logic Area

2.8.1 General Declaration. The logic area should be a separate, locked area of the enclosure where electronic components that have the potential to affect the outcome and integrity of the gaming device will be housed. There may be more than one (1) such logical area on a gaming device

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

a) Central Processing Unit (CPU) or machine microprocessor chips;
b) Any program storage device (PSD) containing the software that may affect game integrity, including, but not limited to, game accounting, system communication, game execution, game screen, game outcome determination, security, etc.;
c) Any electronics associated with logic control for door monitoring and/or access detection;
d) Any of the components that handle the digital signature calculation or verification of the critical control program;
e) Any of the components that manage the encryption and decryption of critical data;
f) Communications controller of electronics and components that house the storage devices of communications programs; and
g) The non-volatile critical memory backup device.

Note: All exceptions to the requirements of the logic area and components will be evaluated on a case-by-case basis and the Commission will issue a decision on the same in accordance with the provisions of the applicable Laws and Regulations.

2.8.3 Access to the Logic Area. Logic areas shall contain an access detection mechanism to detect the condition of the open logic door, as defined in this standard in the sections titled "Door Monitoring" and "Open/Closed Door Interruptions".

2.9 Machine Program Storage Devices

2.9.1 General Declaration. The term Program Storage Device (PSD) is defined as the physical medium or electronic device that contains critical control programs or software that affects the integrity of the gaming device. Device types include, but are not limited to, EPROMs, Compact Cards and CFast cards, optical discs, hard drives, SSD (Solid State Drive) devices, and USB devices. For the purpose of this technical standard, logical partitions defined on a disk drive should be considered as a separate PSD. This partial list of PSD types may vary depending on the evolution of storage technology.

2.9.2 PSD Identification. A PSD shall be clearly labeled with sufficient information to identify the level of software and review of the information stored on the device. It is acceptable for the gaming device to alternatively display this information via the operator's menu. In any case, each DSP will be identified only with the following information:

a) Manufacturer identification, as applicable;
b) Program ID Number;
c) Version number, if applicable; and
d) Location of the installation on the gaming device, if there are multiple possible locations and as applicable.

2.9.3 PSD program verification. The gaming device shall perform an integrity check to verify all critical control programs contained in the PSD before it is available for any game and after any processor restart. In addition, the following requirements will apply to this verification mechanism:

a) Gaming devices that have control programs that reside in one or more EPROMs must employ a control program and data verification mechanism. The mechanism must use, at a minimum, a checksum; either way, it is recommended to use a cyclic redundancy check (CRC) of at least 16-bit.
b) For PSDs that are not EPROM, the gaming device must provide a mechanism for detecting unauthorized software or corrupted elements from any access and must prevent the execution or use of those elements on the gaming device. The mechanism must employ a hashing algorithm that results in a message digest of at least 128 bits.
c) Alterable media must meet the following requirements in addition to the requirements listed in point (b) immediately above:

    i. Employ a mechanism that checks accessible areas of alterable media to detect unwanted programs or data and verify the integrity of the media structure. The mechanism must prevent plays on the gaming device if unexpected data or structural inconsistency is found.
    ii. Employ a mechanism to keep a record of each time a program control component is added, removed, or altered in any alterable media. The record must contain at least the last ten (10) modifications to the medium. Each record must contain the date and time of the action, identification of the affected component, reason for the modification, and any relevant validation information, such as the corresponding digital signature of the changed components.

d) For all types of storage media, in the event of a failed authentication (i.e., the program matches or authentication fails), the gaming device must immediately enter an error condition, cease operation, display an appropriate error message, disable credit acceptance, and trigger an alarm sound and/or illuminate the tower light. This error condition must be communicated to the online system when a compatible system and protocol are connected. In addition, this error condition will require operator intervention to erase it and should not be erased until the data is successfully authenticated, following operator intervention, or the media is replaced or repaired. Any critical PSD control program that fails authentication should not be uploaded to the gaming device's NV memory.

Note: The verification mechanisms of the Control Program will be evaluated on a case-by-case basis and approved by the regulatory body and independent testing laboratory based on industry standard safety practices.

2.9.4 Independent verification of the PSD. The gaming device will have the ability to allow an independent integrity check of the device's PSD, from an external source. This verification is required for all PSDs that contain critical control programs that affect the integrity or outcome of the game. This verification shall be achieved by being authenticated with a third-party application, which may be contained within the game software, or by having an interface port for third-party devices to authenticate the storage media, or by allowing the removal of the storage media to be externally verified. This integrity check should provide a means of verifying the software in the field. The independent testing laboratory, before approving the device, must evaluate the method of integrity verification.

2.9.5 Implementation of Gaming Authentication Terminal (GAT). Gaming devices submitted for approval on or after January 1, 2026 will be required to employ a GAT verification mechanism that allows for remote validation of all PSDs.

a) The verification mechanism shall be easily accessible via a communication port and protocol approved by the Commission. The port must be a free port not used for communications to a system or other components. If an existing gaming device does not have a free port, the manufacturer can request an exemption from the Commission.

b) The communication port shall be located within the locked logic area and allow connectivity without requiring access to the locked logic compartment. If the port is located in the back plane of the inside of the enclosure, an extension cord shall be permanently mounted to allow the connection of the required cable to the inside of the gaming device enclosure.

c) Gaming devices must provide authentication at the request of each PSD. This feature will not require the gaming device to be turned off, and the runtime will not exceed twenty (20) minutes.

d) Gaming devices must generate a unique signature for each component of the PSD using Secure Hash Algorithm 1 (SHA-1) with the hash-based message authentication code (HMAC), as defined by the National Institute of Standards and Technology (NIST). The commission will continuously reevaluate hashing methodologies to ensure that industry best security practices are maintained.

e) Gaming devices must allow the saving and retrieval of the results of the verification. The results of the verification shall be retained and retrieved pending a request for further verification or a loss of power. The game must allow authentication to be sent to the game and, after a disconnection of communications, subsequently retrieved. During the disconnection of communications it is recommended that the game can be put back into a playable state. If this is not possible, the game must at least be able to be put into an out-of-service state.

NOTE: All gaming devices submitted for approval prior to January 1, 2026, that possess a communication port, notwithstanding paragraph (b), shall comply with this standard by January 1, 2026, by updating the PSD to satisfy compliance, unless otherwise approved in writing by the Commission.

NOTE: Older gaming devices that do not offer a communication port are excluded from this requirement.

2.10 Device Critical NV Memory

2.10.1 Content of the Critical NV Memory. Critical Non-Volatile (NV) Memory should be used to store all data elements that are considered vital for the continuity of the gaming device's operation. Data elements include, but are not limited to:

a) All electronic meters required in the "Accounting and Accountant Requirements" section of this standard.
b) Current credits;
c) Device configuration data (e.g. button panel, top box, communications, progressives, etc.);
d) Game configuration data (e.g. paytable, denomination, etc.);

e) Game History;
f) Device status (e.g., machine error conditions, etc.);
g) Game status (e.g., current game status, progress, etc.); and
h) All gaming device records as defined within this technical standard and as applicable based on the vendor's implementation (includes "Bill Validator Memory", "Ticket Out", "Identifier", "Machine Non-Bet Purchases", and "Machine Significant Events" records).

2.10.2 Recording of Significant Machine Events. The last 100 significant events for gaming devices must be stored with an appropriate time stamp in one or more secure device records that are not accessible to the player and that include at least the following events, as the case may be:

a) PSD verification errors or critical NV memory errors, if technically possible to record these events based on the nature and/or severity of the error;
b) Changes made to game settings that could be used to make the paytables or retention percentages;
c) Power Supply Reset;
d) Manual Payment Terms;
e) Door Open Errors and Door Closed Events;
f) Logical Area Access Events;
g) Coin, Token, and Hopper Errors;
h) Bill validation errors;
i) Hardware errors for integrated player identification component;
j) NV Low Battery Errors;
k) Reel spinning errors, mechanical device or errors in player interaction devices, if any of these errors directly impact the outcome of the game; and
l) Printer errors.

2.10.3 Critical NV memory requirements. The following are the NV memory requirements for gaming devices:

a) The gaming device shall have the ability to retain data from all critical memory as defined herein and shall be capable of accurately maintaining all required information for thirty (30) days after the electrical current is discontinued from the machine;

b) For rechargeable battery types only, if the backup battery is used as an off-chip battery source, it will recharge to its full potential within twenty-four (24) hours. Its useful life must be at least five (5) years;
c) Non-volatile memory that uses an off-chip backup power supply to retain its contents when the main power source is turned off shall have a detection system that provides a method for the software to interpret and act under a low battery condition before the battery reaches a level where it is no longer able to maintain the memory in question. If a low battery condition is identified, the gaming device should display an appropriate error message and trigger an alarm and/or illuminate the tower light. This error condition will be communicated to the online system, when a compatible system and protocol is connected; and
d) The deletion of NV memory can only be performed by accessing the locked logic area or another secure method as long as the method has been accepted or can be controlled by the regulatory body.

2.10.4 NV Memory Restore Function. After the initiation of a non-volatile memory restoration procedure using a certified non-volatile memory erase method, the critical game program must run a routine that initializes the non-volatile memory to its default state. All memory addresses that indicate the non-volatile memory erase process must be fully restarted in all cases.

2.10.5 Configuration Settings. It will not be possible to change a configuration that causes any obstruction or alteration of the electronic meters without having to perform a non-volatile memory erasure. Any changes to the available denomination or paytable settings must be made by a secure means, including access to the locked logical area or other secure method inaccessible to a player.

2.11 Critical NV (Non-Volatile) Memory Monitoring

2.11.1 Critical NV Memory Errors. The storage of the Critical NV Memory must be maintained using a methodology that allows the identification of errors. This methodology may include digital signatures, checksum, redundant copies, error checking database, and/or other regulator-approved method(s).

2.11.2 Critical NV Memory Checks. Comprehensive checks of the Critical NV Memory should be carried out after the initiation of the game, but before displaying the game result to the player. NV memory that is not critical to the integrity of the gaming device does not need to be validated.

2.11.3 Unrecoverable Corruption of Critical NV Memory. An unrecoverable corruption of Critical NV Memory shall result in an error and the gaming device shall immediately cease play and pause, display an appropriate error message, disable credit acceptance, and trigger the sound of an alarm and/or illuminate the tower light. The memory error should not be automatically cleared. Also, the Critical NV Memory error should interrupt any external communication to the gaming device. An unrecoverable Critical NV memory error will require a complete NV memory erase performed by an authorized person.

Note: This section is not intended to prevent the use of alternative storage media types, such as hard drives, for critical data retention. Such alternative storage medium shall maintain the integrity of critical data in a manner consistent with the requirements of this section, as appropriate to the specific storage technology implemented.

2.12 Player Interaction Devices

2.12.1 Touch screen. All touchscreen video monitors will comply with the following regulations:

a) Touch screens must be accurate and if required by their design compatible with a calibration method to maintain that accuracy, alternatively the deployment hardware may have self-automatic calibration; and
b) If applied to the design, a touchscreen can be manually recalibrated without access to the gaming device other than opening the front door.

2.12.2 Wireless Player Interaction Devices. Communication between a gaming device and any wireless player interaction device, which is carried out using transmission technologies such as Near Field Communications (NFC), Bluetooth (BT), Wi-Fi, optical, etc., must be:

a) Use secure communication methods to prevent unauthorized access to sensitive data by unwanted persons;
b) They employ a method to detect corruption in the data, upon detection of the corruption, either correcting the error or terminating the communication while providing an appropriate error message;
c) They employ a method to prevent the unauthorized modification of sensitive data that affects the outcome of the game or that represents the secure information of the players; and
d) It will only be possible with approved wireless player interaction devices.

2.13 Bill Validators and Stackers

2.13.1 General Declaration. For gaming devices that support bill validators, the requirements defined within this section apply.

2.13.2 Bill Validators. The bill validator must be constructed in a way that ensures proper handling of the bills and protects against vandalism, abuse or fraudulent activity. In addition, bill validators must comply with the following provisions:

a) A bill validator shall be electronically based and configured to ensure that it detects the entry of valid bills, coupons, vouchers or other approved notes as applicable and provides a method that allows the gaming device software to interpret and act appropriately following a valid or invalid entry;
b) Invalid bills, coupons, vouchers or other **unapproved** notes must be rejected and returned to the player.
c) Each valid and approved bill, coupon, ticket/voucher or other monetary note shall record the actual monetary value or number of credits received appropriate to the denomination being used. If you have directly registered the credits, the conversion rate must be clearly stated, or easily deductible on the gaming device;
d) Credits will only be recorded when:

    i. Approved bills, coupons, tickets/vouchers, or other bank notes have passed the point where they are accepted and stacked; and
    ii. The bill validator has sent the message "irrevocably stacked" to the gaming device.

e) Each bill validator should be designed to prevent the use of fraudulent methods such as threading and pulling bills, inserting foreign objects and any other manipulation that could be considered a cheating technique. An error condition with the proper correlation should be generated and the validator should be disabled;
f) A method for detecting counterfeit banknotes should be implemented. Counterfeit banknotes must be rejected with a high degree of accuracy.
g) Acceptance of bills, tickets/vouchers, coupons or other notes approved for credit to the credit meter will only be possible when the gaming device is enabled to play. Other statuses, such as error conditions, including open doors, should cause the bill validator system to be disabled;

h) Each gaming machine and/or bill validator shall have the ability to detect and display the error conditions below. The bill validator disables itself and will provide an appropriate error message that will be communicated to the online system, when the system and the protocol are connected. Errors must be eliminated by an assistant, or with the initiation of a new game sequence when the error is nullified.

   i. Full stacker; It is not recommended that an explicit "stacker full" error message be used as this may promote a security issue; rather, a message such as "Bill Validator Malfunction" or similar is suggested; It is acceptable to turn on the lights of the bill validators intermittently;
   ii. Stuck bill; It is acceptable to turn on bill validator lights intermittently;
   iii. Communication failure to the bill validator; It is acceptable to turn on the lights of the bill validators intermittently;
   iv. Stacker door open; The stacker door is the door immediately prior to entering the cash box/stacker assembly, the gaming device must be suspended and sound an alarm and/or illuminate the tower light as long as the gaming device is being supplied with power; and
   v. Stacker removed; The game must be suspended and sound an alarm or illuminate the tower light or both as long as the game device is being supplied with power.

2.13.3 Self-test of the Bill Validator. The bill validator will need to perform an automatic self-test each time it is initialized. In case this test fails, the bill validator must be automatically disabled until the error has been aborted.

2.13.4 Communications from the Bill Validator. All bill validators will need to communicate with the gaming device using a two-way protocol.

2.13.5 Configuring the Bill Validator. It will only be possible to carry out preventive maintenance, or make the following changes or adjustments to the bill validators in the:

a) The selection of desired acceptances for approved bills, coupons, tickets/vouchers or other bank notes and their limits;
b) Changes to the storage media of critical certified programs of the bill validator or downloads of the certified programs;
c) Bill validator settings for the tolerance level on accepting bills or notes of varying quality should not be allowed externally from the gaming device. Adjustments to the tolerance level will only be allowed with adequate levels of safety. This can be achieved through keyed locks, adjustments to physical switches, or other acceptable methods approved on a case-by-case basis;

d) Maintenance, adjustments, and repair according to approved factory procedures; and
e) The options that set the direction or orientation of acceptance.

2.13.6 Location of the Bill Validator. If the gaming device is equipped with a bill validator, it must be located in a secure area of the machine, but not in the logical area. Only the area for entering bill/vouchers must be accessible to the player.

2.13.7 Electrical Failures During Acceptance of Bills in the Validator. If a power failure occurs during the acceptance of a bill/voucher, the bill validator will credit the player correctly or return the bill /voucher. There may be a small window of time where the power may fail and the player is not credited as it is at the exact moment of the bill /voucher validation. However, in this case, the sync window should be less than 1 second.

2.13.8 Historical Retention of the Bill Validator. A gaming device using a bill validator shall retain in its memory and display the information of the last five (5) items accepted by the bill validator. The historical retention record can be combined or maintained separately by item type and must include a time stamp for each item. If combined, the accepted item type will be recorded along with its respective timestamp.

2.13.9 Bill Validator stacker. Each bill validator will have a secure stacker and all accepted bill will be deposited inside the secure stacker container. The secure stacker and its container must be mounted on the play device in such a way that they cannot be easily removed by physical force and must comply with the following rules:

a) The bill validator device must have the ability to detect a full stacker condition; and
b) You will have a separate keyed lock to access the stacker area. This key lock will be separated from the front door. In addition, a separate lockable lock will be required to remove the bills from the stacker.

2.14 Coin Acceptors, Diverters & Drop Box

2.14.1 Coin Acceptors. Coin acceptors must be able to detect the entry of valid coins/chips and provide a method that allows the gaming device software to interpret and act appropriately after a valid or invalid input. The coin acceptor must accept or reject the coin/token based on its metallic composition, mass, compound mixture, or equivalent method to safely identify a valid coin/token. In addition, it must comply with the following requirements:

a) Each valid coin or token inserted will record in the credit meter the actual monetary value or the appropriate number of credits received with respect to the denomination being used. If you have directly registered the credits, the conversion rate must be clearly stated, or easily

deductible on the gaming device;

b) The coin acceptor shall be designed to prevent the use of fraudulent methods such as, but not limited to, counterfeit coins, coin returns, insertion of foreign objects, and any other type of manipulation deemed to be a technique for cheating. Respective error conditions must be generated appropriately and the currency acceptance system must be disabled;

c) Accepting any of the coins or chips to credit the credit meter will only be possible when the gaming device is enabled to play. Other statuses, such as error conditions including open doors, should cause the coin acceptor system to be disabled;

d) The gaming device must be able to handle quickly inserted coins/tokens or joined coins/tokens so that potential cheating is eliminated. Coins/chips traveling too fast that are not recorded in the credit meter must be returned to the player;

e) The gaming device must have suitable detectors to be able to determine the direction and speed of the coin/token traveling in the acceptor. If a coin or chip is traveling at too slow a speed, or the wrong direction is detected, the gaming device must display an appropriate error condition for at least thirty (30) seconds or when overridden by an attendant;

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

g) If a coin acceptor error condition such as those listed below is identified, the gaming device must display an appropriate error message, disable the coin acceptor, and sound an alarm and/or illuminate the tower light. This error condition must be communicated to the online system, when a compatible system and protocol are connected.

    i. Coin-in jam;
    ii. Coin return jam;
    iii. Reverse coin-in, Reverse token-in (coin/token traveling through the acceptor with an incorrect orientation); and
    iv. Coin or token too slow / too fast.

Note: It is acceptable to report stuck entered coin/token, entered currency or reversed entered token, and too slow/too fast coin/token as a generic coin/token input error.

2.14.2 Derailleur. For those machines that accept coins or tokens, the software must ensure that the diverter directs the coins to the hopper or drop box when the hopper is full. The hopper-full detector must be monitored in order to determine when a change in the diverter condition is required. When the status of the detector changes, the diverter must operate in the next ten (10) plays after the change in state, without causing interruptions in the flow of coins or causing coin jams. Gaming machines that do not have a hopper must always divert the inserted coins into the drop box.

2.14.3 Drop Box. If the gaming device is equipped to accept coins or tokens, then the following rules must be complied with regarding the drop box:

a) Each device in the game must contain a separate box to collect and hold all those coins or tokens that are diverted in the drop box;
b) The drop box must be housed in a locked compartment, separate from any other compartment of the gaming device; and
c) A method must be in place to control the drop box door for access, as defined elsewhere in this standard in the sections titled "Door Monitoring" and "Door Open/Closed Interruptions".

2.15 Reserved

2.16 Machine Top Light Indicator Light

2.16.1 Luz de la Torre. The gaming device must have a light visibly placed at the top that automatically illuminates when a player has won a prize or is redeeming credits that the machine cannot automatically pay, an error condition has occurred, or a 'Call Attendant' condition has been initiated by the player. In machines such as the 'Bar top' type it is allowed for the indicator light to be shared with other devices or replaced by an audible alarm.

Note: The independent test laboratory will not make any determination as to the color of the tower light or the sequence of the flashes. In addition, alternative means such as visible messages, audible tones, special animation effects, game-to-system communications, etc., that can be used to alert appropriate personnel will be considered on a case-by-case basis.

2.17 Machine Payments and Payment Devices

2.17.1 Payments from the Game Device. Available credits can be cashed out on the gaming device by the player by pressing the collect or cash out button at any time as long as it is not when:

a) A game is being played (subject to applicable game rules);
b) Any door is open;
c) Test/Diagnostic Mode;
d) An increase in the credit meter or profit meter, unless the full amount is recorded in the meters when the collect button is pressed; or
e) An error condition, provided that the error condition prevents valid charging that is not compatible with other means.

2.17.2 Excess in the Limit to be Charged. If credits are collected, and the total value of credits is

greater than or equal to a specific limit, the game device must be frozen until the credits have been paid and the manual payment condition or the condition of credits canceled by an assistant has been cleared by the wizard or via command from a system-based.

2.17.3 Coin Hoppers. If coin hoppers are used, they will have to be duly monitored by the gaming device's control program according to the requirements defined in the "Hopper Error Conditions" section. In addition, coin hoppers must prohibit tampering by inserting a light source or any other foreign object, and there must be no abnormal payouts when exposed to high levels of electrostatic discharge, or if power is lost at any time during a payout.

Note: Activities that result in the payment of an additional currency (e.g., hopper removal and reinsertion) are not considered an abnormal payment as long as they are accounted for as an additional currency paid.

2.17.4 Location of the Hopper. If a play device is equipped with a hopper, it must be located in a safe area of the machine, but not within the logic area or in the area of the drop box.

2.17.5 Hopper Error Conditions. A play device that is equipped with a hopper must have mechanisms to enable critical control program software to interpret and act on the conditions listed below. If a hopper error condition is identified from those listed below, the gaming device must display an appropriate error message, disable the hopper and sound an alarm and/or illuminate the tower light. This error condition will be communicated to the online system when a compatible system and protocol are connected.

a) Hopper empty or out of time;
b) Coins stuck in the hopper; and
c) Additional coin paid or Uncontrolled hopper.

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

2.17.7 Printer Error Conditions. A gaming device that is equipped with a printer must have mechanisms to enable critical control program software to interpret and act on the conditions listed below. If a printer error condition is identified from the following, the gaming device must display an appropriate error message, disable the hopper and sound an alarm and/or illuminate the tower light. This error condition will be communicated to the online system when a compatible system and protocol are connected. In addition, for the conditions listed in subparagraph (b), the printer must be disabled. Printer error conditions include:

a) Paperless/Paperless; It is permissible for the gaming device not to freeze under this condition, however, there must be methods to alert the attendant;
b) Printer Jam/Failure;
c) Printer disconnected; it is permissible for the gaming device to detect this error condition when the game attempts to print; and
d) Once a printer error condition has been cleared, any vouchers that have not been printed must be generated or an appropriate manual payment must be processed.

2.18 Machine Tickets/Vouchers

2.18.1 Payment for Tickets/Vouchers. Payment with paper tickets/vouchers used as a method of credit redemption is only allowed when:

a) The gaming device is linked to a computerized validation system, which allows the validation of the voucher. Provisions should be made in case communication is lost and validation information cannot be sent to the system, consequently requiring the manufacturer to have an alternative method of payment; or
b) By utilizing an approved alternative method that includes the ability to identify duplicate tickets/vouchers to prevent fraud by redeeming a ticket/voucher that has been previously issued by the gaming device.

2.18.2 Ticket/Voucher Information. A ticket/voucher must contain at least the following printed information:

a) Gaming Venue Name/Venue Identifier (it is permissible that this information is contained as pre-printed on the ticket itself);
b) Machine Identification Number;
c) Date and Time;
d) The amount of the ticket/voucher literally in local currency unit;
e) The amount of the ticket/voucher in numerical form in local currency unit;
f) The sequence number of the ticket/voucher;
g) The validation number (which, for a printed paper voucher, must appear on the edge of the ticket);
h) The barcode or any machine-readable code that represents the validation number;
i) Indication if the ticket/voucher is a "duplicate", assuming duplicate tickets/vouchers can be printed by the gaming device.
j) Transaction type or other method of distinguishing voucher types (assuming multiple voucher types exist). In addition, it is strongly recommended whenever the type of voucher contains a non-redeemable value or is only a receipt, that the ticket expressly indicates that it "has no

monetary value" or other equivalent text; and

k) The indication of an expiry period from the date of issue, or the date the ticket/voucher will expire (for a printed paper voucher, it is permissible for this information to be contained as pre-printed on the ticket itself. (e.g., "expires in one year").

Note: Some of the data mentioned above may also be part of the number or barcode validation. Multiple barcodes are allowed and can represent more than the validation number.

2.18.3 Payment of Tickets/Vouchers by Printer. The gaming device must have the ability to retain the information of the last twenty-five (25) printed tickets/vouchers in the ticket/voucher payment register. The paid ticket/voucher register must contain the following information for each ticket/voucher registered:

a) Value of credits in local currency units in numerical form;
b) The time of day the ticket/voucher was printed in twenty-four (24) hour format showing the hours and minutes;
c) Date, in any recognized format, indicating the day, month and year; and
d) Unique validation number. The gaming device must cover all but the last 4 digits of the validation number as shown in the twenty-five (25) ticket/voucher report.

2.18.4 Online Ticket/Voucher issuance. The gaming device may be paid by the player by issuing a printed or virtual ticket/voucher containing the information as indicated in the section entitled "Ticket/Voucher Information" above. In addition, the gaming device shall transmit the following information to the ticket/voucher validation system with respect to each ticket/voucher issued, as required by the supported communications protocol:

a) Value of credits in local currency units in numerical form;
b) The time of day the ticket/voucher was printed in twenty-four (24) hour format showing the hours and minutes;
c) Date, in any recognized format, indicating the day, month and year; and
d) Gaming device number; and
e) Validation number.

2.18.5 Offline Ticket/Voucher issuance. The gaming device shall meet the following minimum set of requirements for the issuance of offline tickets/vouchers after a loss of communication with the validation system has been identified:

a) When the gaming device is offline, it will not issue more than the tickets/vouchers that it can keep and display in the ticket/voucher register;

b) The gaming device shall not request validation numbers, seed values, keys, etc. used in ticketing/vouchers until all outstanding ticket/voucher information when offline is fully transmitted to the validation system;
c) The gaming device will need to request a new set of validation numbers, seed, key, etc. if the current list has a chance of being compromised.
d) The values of the seed, key, etc. will never be visible through any screen compatible with the gaming device; and
e) An offline authentication ID must be included in the ticket/ticket. For vouchers printed on paper, this identifier must appear on the line immediately following the validation number and must in no way overwrite or compromise the printing of the validation number on the ticket/voucher (not required for vouchers that are not cashable on a gaming device). The offline authentication ID must be derived using a hash, or other secure encryption methods of at least 128 bits, which only identify the ticket/voucher, verify that the redemption system is the same issuing system, and validate the amount on the ticket/voucher. For cases where a proper authentication identifier is not included in the ticket/voucher, the gaming device shall issue no more than one betting instrument after communications between the system and the gaming device have been lost.

2.18.6 Online Ticket/Voucher Redemption. Tickets/Vouchers may be accepted by a gaming device connected to a ticket validation system on the condition that no credit is issued to the gaming machine prior to confirming the validity of the ticket/voucher.

2.19 Machine Communication Protocol

2.19.1 Integrity of the Communications Protocol. Gaming devices designed for communications with an online system shall function exactly as indicated by the communications protocol being implemented and as required by the regulator. In addition, the following rules must be complied with:

a) With the exception of "disable" commands, communications shall not adversely impact player interaction on the gaming device, including player access to all screens; and
b) After a program interruption, any communication to an external device will not begin until the program resume routine, including any automatic testing, has been successfully completed.

2.19.2 Protection of Sensitive Information. The gaming device must not allow any information contained in communication to or from the online monitoring system that should be protected by the SAS 6.0 communication protocol, or that is of a sensitive nature, to be visible through any screen mechanism compatible with the device. This includes, but is not limited to, validation numbers, security pins, player credentials, or secure seeds and keys.

2.19.3 Communication on the Gaming Device. Each gaming device shall be capable of communicating bi-directionally with internally or externally associated devices or any other type of equipment, shall use a robust communication protocol that ensures that erroneous data or signals do not adversely affect the integrity or operation of the device.

2.20 Machine Connections to the Internet

2.20.1 General Declaration. Gaming devices may be designed to connect to, or otherwise communicate with, servers or networks over the internet.

2.20.2 Internet connections. The following requirements will apply to gaming devices with an internet connection or access to a public network:

a) The gaming device must not connect directly to the internet/public network; A gaming device should only connect to the Internet/public network when it uses a method that securely isolates the gaming device from the network, for example, using an approved firewall mechanism; and
b) The gaming device must support adequate security measures that ensure all data transmitted between the gaming device's network and the internet/public network is encrypted and uses Virtual Private Network (VPN), Secure Socket Layer (SSL), Internet Security Protocol (IPS), or some other accepted method approved by the regulatory body to secure data transmission.

It is recommended that routine field audits be conducted to ensure that network configurations meet these requirements.

2.21 Reserved

2.22 Mechanical Devices Used to Display Game Results on Machines

2.22.1 Mechanical Devices. If the machine has mechanical or electromechanical devices that are used to display the results of the game, the following rules must be observed:

a) Mechanical devices (e.g., rollers or wheels) shall have a sufficiently closed control circle in order to enable software to detect malfunctions, such as when the roller/wheel is stuck, does not rotate freely, or is manipulated from its end position. This requirement is designed to ensure that if a roller or wheel is not in the position it is supposed to be, an error condition will be generated. This must be detected under the following conditions:

    i. A position error condition on the reels or wheels, which affects the outcome of the game;
    ii. In the final positioning of the reel/wheel, if the position error is more than half

the width of the smallest symbol without including blank spaces in the illustrations of the reels or wheels;

b) If the gaming device detects a malfunction related to the operation of any mechanical display device, it shall immediately enter an error mode that does not allow play, it shall display an appropriate error message (including the specific reel number where applicable), disable credit acceptance, and sound an alarm and/or illuminate the tower light. This error condition will be communicated to the online system, when such system and the compatible protocol are connected and will not be automatically deleted;
c) Microprocessor-controlled mechanical rollers or wheels must have a mechanism that ensures the correct assembly of the gear in the assembly, if applicable;
d) Displays must be constructed so that winning symbol combinations match paylines or other applicable payout indicators;
e) A deployment assembly for a mechanical device shall be designed so that it is not obstructed by any other component; and
f) Microprocessor-controlled rollers or wheels must automatically rotate to return to the last valid position when the game mode is reactivated, and the positions of the rollers/wheels have been altered (e.g., after closing the front door, power is restored, the test and diagnostic mode is exited, or an error condition is deleted).

CHAPTER 3: RANDOM NUMBER GENERATOR (RNG) REQUIREMENTS

3.1 Introduction to RNG Requirements

3.1.1 Introduction. This chapter sets out the technical requirements for a Random Number Generator (RNG). See also the related requirements in the "Game Results Using a Random Number Generator" section found in the "Game Requirements" chapter of this standard.

3.2 General RNG Requirements

3.2.1 Source Code Review. The independent testing lab will review the source code related to any and all algorithms, randomness cores, scaling algorithms, shuffling algorithms, and other algorithms or functions that play a critical role in the final random result selected for a game's use. This review should include comparisons with published references, where appropriate, and in an examination for sources of bias, implementation errors, malicious code, code with the potential for corrupt behavior, or switches or parameters that have the potential to influence randomness and fair play.

3.2.2 Statistical Analysis. The independent testing laboratory shall employ statistical tests to evaluate the results produced by the RNG, after scaling, shuffling, or other mapping (hereinafter referred to as the "final result*")*). The independent testing laboratory should choose appropriate tests on a case-by-case basis, depending on the RNG being evaluated and its use in the game. Tests will be selected to ensure conformity with the intended distribution of values, statistical independence between draws, and, where applicable, statistical independence between multiple values within a single draw. The tests applied will be evaluated, as a whole, at a confidence level of 99%. The amount of data tested shall be such that significant deviations from applicable RNG testing criteria can be detected with high frequency. In the case of a variable-use RNG, it is the responsibility of the independent testing laboratory to select and test a representative set of uses as test cases. Statistical tests may include one or more of the following:

a) Total Distribution or Chi-Square Test;
b) Superposition Testing;
c) Voucher collector test
d) Run Test;
e) Interaction correlation test;
f) Serial correlation test; and
g) Duplicate Testing;

3.2.3 Distribution. Every possible selection of the RNG will be equally likely to be chosen. Where the game design specifies a non-uniform distribution, the final result will conform to the intended distribution.

a) All scaling, mapping, and shuffling algorithms used will be completely free of bias, as verified by source code review. Discarding RNG values is permitted in this context and may be necessary to eliminate bias; and
b) The final result will be tested against the target distribution using appropriate statistical tests (e.g., Total Distribution Test).

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

a) As proven by the source code review, the RNG will not discard or modify selections based on previous selections, except if intentional by game design. (e.g., functionality without replacement); and
b) The final result will be tested for independence between draws and, as applicable, independence within a draw, using appropriate statistical tests (e.g., Serial Correlation Test or Interaction Correlation Test and Run Test).

3.2.5 Results available. As verified by the source code review, the set of possible outcomes produced by the RNG solution (e.g., RNG period), taken as a whole, shall be large enough to ensure that all results will be available in each draw with the appropriate probability, independent of the results previously produced, except, when specified by the game design.

3.2.6 Unpredictability. The **RNG state should be changed between games unless** a "cryptographic RNG" is implemented, as defined elsewhere in this chapter. If necessary to ensure unpredictability, such modification may also be additionally required within a game. Possible RNG status modifications that may meet this requirement include, but are not limited to:

a) The discarding of an unpredictable number of RNG values (e.g., bottom cycling). If the number of discarded values is determined by an RNG, it cannot be determined by the main RNG itself, it must instead be determined by a secondary RNG, independent and asynchronous to the main RNG; and
b) Overwriting (reusing the seed) or mixing (injection of entropy) of all or part of the RNG state by an external event or an entropy source. When re-seeding or remixing, it shall be done in such a way as not to compromise intended distribution, independence, or availability of prizes. The external event or source of entropy may not be predicted or estimated by a player.

3.3 Software-based RNGs

3.3.1 General Declaration. Software-based RNG does not use hardware devices and derives its randomness primarily and primarily from a computer-based or software-based algorithm. These do not incorporate hardware randomness in any meaningful way. The following requirements apply to software-based RNGs.

3.3.2 Seed initiation. The initial state, or seed, of the software-based RNG will be determined at random by an uncontrolled and unpredictable event. The manufacturer must ensure that games are not synced, even when a power up or boot occurs simultaneously. The pool of available seeds must be large enough to ensure the independence of the results.

3.4 Hardware-based RNGs

3.4.1 General Declaration. Hardware-based random number generators derive their randomness from physical events on small scales such as electrical circuit results, thermal noise, radioactive decay, particle spinning, 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 random number generators may deteriorate over time or they may malfunction, regardless

of the gaming device. The failure of a hardware-based RNG could have serious consequences for the intended use of the RNG. For this reason, if a hardware-based RNG is used, there must be dynamic monitoring of the result by statistical tests. This monitoring process should disable the game when a malfunction or degradation is detected.

3.5 RNG Mecánico (Dispositivo de Aleatoriedad Física)

3.5.1 General Declaration. Mechanical random number generators or "physical randomness devices" generate game results mechanically, employing the laws of physics (e.g., wheels, tumblers, blowers, shufflers). The requirements defined in this section apply to mechanical random number generators/physical randomization devices.

Note: Devices that faithfully and mechanically create or display the outcome of a game selected by a computer RNG are not considered physical randomness devices and will be tested as random number generators, once the faithful reproduction of the selected RNG result has been ensured. Physical randomness devices may incorporate random number generators in secondary roles (e.g., rotation speed). Such secondary random number generators do not need to be evaluated against the RNG requirements contained herein because they do not select the outcome of the game directly. Rather, the physical system will be tested as a whole as described in this section.

Note: Approved components of a mechanical RNG may not be exchanged or replaced with unapproved components, as they are integral to the behavior and performance of the mechanical RNG. "Approved Components" in this context include the physical products that produce random behavior – e.g., balls in a mixer, cards in a shuffler, etc. As an example, shuffler certified by the independent testing laboratory to use plastic playing cards cannot be considered as an approved equivalent for the same mechanical shuffler using paper playing cards

3.5.2 Amount of Data Collection. To provide the best assurance of random behavior, the independent testing lab will collect game result data at a minimum, 10,000 game results.

Note: Due to feasibility concerns associated with reasonable collection on some devices, the regulatory body may choose to accept test results, on a case-by-case basis, from a smaller amount of the collection.

Equally possible, a larger example of data collection may be necessary. However, the independent testing laboratory will clearly indicate in the applicable certification the amount of data that was used for the tests. When using games with fewer than 10,000 results, a statement about the statistical limitations of reduced testing will be clearly denoted in the certification report.

3.5.3 Data Collection Procedures. Data collection will be done in a reasonable manner, similar to the intended use of the device in the field. In particular, the recommended configuration and calibration should be executed initially, and the device and components should be replaced or maintained during the collection period as recommended by the manufacturer.

3.5.4 Durability. All mechanical parts shall be constructed of materials to prevent degradation of any component during its intended service life.

Note: The independent testing laboratory may recommend a more stringent replacement schedule than suggested by the device manufacturer to meet the 'Durability' requirement above. In addition, the independent testing laboratory may recommend a periodic inspection of the device to ensure its integrity.

3.5.5 Manipulation. The player/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 results, except as specified by the game design.

3.6 Cryptographic RNG

3.6.1 General Declaration. A cryptographic RNG is one that cannot be feasibly compromised by the skill of an attacker with knowledge of the source code. "Cryptographically strong" means that the RNG is resistant to attack or compromise by a smart attacker with modern computational resources, and who may have knowledge of the source code. The following RNG requirements apply to a cryptographic RNG and are introduced into this technical standard as optional requirements, available for adoption or

deployment. At its discretion, the regulatory body can choose whether to require random number generators used in determining game outcomes to be cryptographically strong.

3.6.2 RNG attacks. At a minimum, cryptographic random number generators must be resilient to the following types of attack, all of which serve to replace the general RNG requirements for "unpredictability":

a) Direct Cryptoanalytic Attack: Given a sequence of past values produced by the RNG, it will not be computationally feasible to predict or estimate future values of the RNG. This must be ensured by the proper use of a recognized cryptographic algorithm (RNG algorithm, hashing, encryption, etc.);

Note: Due to continuous computational improvements and advances in cryptographic research, compliance with this criterion will be re-evaluated as required by the regulatory body.

b) Known Entry Attack: It will not be computationally feasible to determine or reasonably estimate the state of the RNG after initial seed. In particular, the RNG should not be initialized with a seed from a specific time value. The manufacturer must ensure that the games will not have the same initial seed, even when it is turned on or booted simultaneously. Seeding methods must not compromise the cryptographic strength of the RNG; and

c) Compromised State Attack Extension: The RNG must periodically modify its state, through the use of external entropy, limiting the effective duration of any potential attack exploited by an attacker.

CHAPTER 4: GAME REQUIREMENTS

4.1 Introduction to Game Requirements

4.1.1 Introduction. This chapter sets out the technical requirements of the player interface, game rules, fair play, game selection, game outcome, player-related displays and artwork, payout percentages and odds, bonus games, game history, game modes, common bonuses, tournaments and other game requirements.

4.2 Player Interface

4.2.1 General Declaration. The player interface is defined as the interface on which the player interacts with the game, including the touch screen(s), button panel(s), or other forms of player interaction devices.

4.2.2 Player Interface Rules. The player interface must meet the following requirements:

a) Any changes to the size or overlay of the player interface screen will need to be accurately mapped to reflect the deployment review and touchpoints;
b) All player-selectable touchpoints or buttons depicted in the player interface that impact the development of the game and/or the integrity or outcome of the game shall be clearly labeled according to their function and shall operate in accordance with the applicable rules of the game; and
c) There will be no hidden or undocumented touchpoints or buttons anywhere in the player interface that affect the game and/or impact the integrity or outcome of the game, except as indicated by the game rules;

4.2.3 Simultaneous Inputs. The simultaneous or sequential activation of multiple player interaction devices comprising a player interface must not cause the gaming device to malfunction, and must not lead to results that contradict the intended design of the game.

4.3 General Game Requirements

4.3.1 General Declaration. A traditional game cycle consists of all player actions and game activity occurring from bet to bet. Where multiple games are accessible simultaneously, players can play more than one game loop at a time from separate instances in the game window.

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

a) The initiation of a game cycle is defined to be:
   i) After the player places a bet or commits to a bet; and/or
   ii) After the player presses a "Play" button or performs a similar action to start a game according to the game's rules.
b) The following game items will be considered to be part of a single game cycle:
   i) Games that initiate a free play bonus and any subsequent free play;
   ii) "Second Screen" Bonus(es);
   iii) Games with player choices (e.g. draw poker or blackjack);
   iv) Games where the rules allow additional credit bets (e.g., blackjack insurance, or the second part of a two-part Keno game); and
   v) Secondary Play Bonuses
c) A game cycle will be considered completed when the final transfer to the player's credit meter takes place or when all bets are lost.

4.3.3 Information to be Displayed. The player interface must display the following information whenever there are credits available to play, with the exception of when a player is looking at an informational screen such as a menu or help screen.

a) Current credit balance;
b) Denomination being played;
c) The amount of the current bet and the placement of all active bets, or show enough information to otherwise derive these parameters;
d) Any option of the player's bet that occurred prior to the initiation of the game or during the course of the game
e) An accurate representation of the last completed game result until the next game starts, changed betting options, or the player cashes out their credits;

f) The amount won in the last completed game, until the next game begins, if the betting options are changed, or if the player initiates a cashout; and
g) Any betting options in effect, at the end of a game until the next game begins, if the betting options are modified, or if the player initiates a cash out

4.3.4 Deployment for Multiple Stakes Games. The following requirements will apply to games where multiple, independent bets can be applied simultaneously towards the advertised prizes:

a) Each individual bet placed must be clearly indicated so that the player is in doubt about the bets he has placed and the credits wagered per bet.
b) The win amount for each separate bet and the total win amount should be displayed on the game screen; and
c) Each winning prize must be clearly displayed to the player the prizes associated with the appropriate bet. Where there are winnings associated with multiple bets, each winning bet can be indicated in turn. In cases where there are multitudes of betting information to communicate, an on-screen summary is sufficient. Any exceptions will be reviewed by the independent testing laboratory on a case-by-case basis.

4.4 Game Information and Playing Rules

4.4.1 Game Information and Rules of Play. The following requirements apply to game information, art artwork, paytables, and help screens including any written, graphic, and audio information provided to the player by the game device:

a) Player interface and instructions for the use of the interaction device, paytable information and game rules shall be complete and unambiguous and shall not be misleading or unfair to the player. If there are multiple player interaction devices capable of performing the same player action, then all of these options should be clearly explained to the player.
b) If there are multiple player interaction devices available to cause the same player action, then those options should be clearly explained to the player.

c) The information on the help screens will be accessible by the player without the need for credits to exist in the game or for a bet to be committed. This information shall include descriptions of unique game bonuses, extended games, free spins, double or nothing, autoplays, timekeepers, symbol transformations, community-type prize bonuses, etc.
d) Minimum, maximum and other available bets will be indicated, or can be deducted in the artwork, with the appropriate instruction for any available bets.
e) Paytable information that must include all possible winning outcomes and combinations along with their corresponding payouts for any available betting options.
f) Art artwork must clearly indicate whether prizes are designated in credits, cash, or some other unit.
g) Artwork that contains in-game instructions explicitly announcing a credit prize or merchandise prize, must be eligible to win the advertised prize from a single game or series of games enabled by the initial game, when bonuses or other game options are included or artwork must clearly specify the criteria necessary to win the prize.
h) The game will reflect any changes in the value of the prize, which may occur during the course of the game. This can be achieved with a digital display in a visible place in the player interface. The game will clearly indicate the criteria for any prize value to be modified. This requirement should not apply to the incremental deployment of a progressive prize.
i) Game instructions that are presented audibly will also be presented in written form within the art artwork.
j) The game instructions will be rendered in a color that contrasts with the background color to ensure that all instructions are clearly visible/readable.
k) The art artwork will clearly indicate the rules for prize payouts. If a specific winning combination is paid where multiple wins are possible, then the payment method must be described.

    i) The art illustrations must clearly indicate the treatment of the results coinciding with the game. For example, if a straight flush is interpreted as a straight flush and a straight flush, or if 3/4/5 decks of the same kind can be interpreted as paying all of the same kind or only the highest. When a payline can be interpreted to have more than one winning combination, there must be an indication of whether only the highest winning combination per line will be paid;

ii) Where the game has scatter symbols, the artwork must display a message indicating that the scatter wins are added to the payline wins, or its equivalent, if this is the rule of the game; and

iii) The art artwork must clearly indicate the treatment of the matching winning scatters with respect to other possible scatter wins. For example, the art illustration should indicate whether combinations of scattered symbols pay all possible prizes or only the highest prize.

l) When multiplier instructions are shown in the art artwork, it should be clear what the multiplier does and does not apply to.

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

i) Game instructions that specifically correspond to one or more symbols/prizes, must be clearly associated with those symbols/prizes. For example, this can be accomplished with an appropriate frame or frame. Additional text such as "these symbols" may also be used.

ii) If the game instructions refer to a particular symbol and the name of the written symbol can be confused with another symbol, or may imply other characteristics, then the visual presentation of the instructions should clearly indicate which symbol is referred to in the game instruction.

iii) In-game symbols and objects will retain their shape throughout all art artwork, except while an animation is in progress. Any symbol that changes its shape or color during an animation process may not appear in a way that could be misinterpreted as some other symbol defined on the paytable.

iv) If the function of a symbol changes (for example, a non-substitute symbol becomes a substitute symbol during a bonus), or the appearance of the symbol changes, the art artwork must clearly describe this change in function or appearance and any special conditions that apply to it.

v) If there are limitations regarding the placement and/or appearance of any symbol, the limitation must be stated on the art artwork. For example, if a symbol is only available in a bonus game, or on a specific reel ribbon, then the art artwork should indicate this.

n) The art artwork will clearly indicate which symbols/objects can act as a substitute or wild symbol and in which winning combinations the substitute or wild symbol can be applied; this description should clarify any/all phases of the game where a wild or substitute symbol operates.

o) The art artwork will clearly indicate which symbols/objects can act as a scatter symbol and in which winning combinations the scatter can be applied.

p) The art illustration must contain textual and/or graphic information explaining the order in which symbols appear for a prize to be awarded or for when a bonus will start, including

numbers to indicate how many correct symbols/objects correspond to each pattern.

q) The art artwork will indicate any rules and/or limitations related to how payments are assessed, including an indication of:

   i) How line wins are evaluated (i.e., left-to-right, right-to-left, or both sides);
   ii) How individual symbols are evaluated (i.e. whether payouts are only awarded on adjacent reels or as scatter payouts).

r) For games that allow multiple credits to be wagered on selected lines, the art illustration must:

   i) For linear payouts, it must be clearly stated that the win or wins for each selected line will be multiplied by the bet multiplier.
   ii) For non-linear payouts, indicate all possible bets and their prizes;

s) The game must not advertise "Upcoming Wins" e.g., "Triple Payout Coming Soon" unless the announcement is accurate and can be proven mathematically or unless the player has a direct announcement of the current process of that win. (For example, they have 2 out of 4 tokens collected that are required to win a prize.)
t) The art artwork should clearly explain to the player any no-bet purchase options and their costs in credits or local monetary value.
u) The art illustration should explain any form of game restriction, such as any game duration limits, maximum win values, etc., that are implemented as a game design element.
v) It is recommended that the indication "Malfunction voids all payments" or some equivalent text be clearly displayed on the gaming device.

4.3.5 <u>Display for Line Games</u>. The following requirements will apply to line game deployments:

a) For multi-line games, the game will provide a summary of the display of paylines that are available to form winning combinations;
b) Each individual line to be played must be clearly indicated by the game so that the player has no doubt as to which lines are being wagered. Showing the number of lines bet will be enough to meet this requirement.
c) Bet multipliers per line should be displayed. It is acceptable if the bet can be easily derived from other information displayed.
d) Winning paylines must be clearly understood by the player; and
e) When there are wins on multiple lines, each winning payline will be indicated in turn. This requirement will not apply to electromechanical reel games unless the technology used implements the display of payline wins in a manner similar to those found in video reel games.

In addition, this requirement should not prevent other intuitive methods of displaying line wins such as grouping common win types, nor should it prohibit a player from going beyond the detailed display of line win results, where supported.

4.5 Fair Play

4.5.1 Fair game. The following requirements apply to fair play:

a) Games that are designed to give a player 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 outcome of the game is random and the illusion of skill is for entertainment only), shall fully state this fact within the game's help screens
b) The games shall not include any hidden source code that could be advantageous to a player to circumvent the rules of the game and/or intentional game design behavior; this requirement shall not prevent reasonably identifiable "discovery features" offered by a game that are intentional from a design perspective, but which may not be documented or unknown to the player; and
c) The final result of each game will be displayed for a sufficient period of time to allow a player a reasonable opportunity to verify the outcome of the game; This requirement will not prevent an option for the player to exceed the detailed display of the game results.

4.5.2 Simulation of Physical Objects. When a game incorporates a graphical representation or simulation of a physical object that is used to determine the outcome of the game, the behavior represented by the simulation must be consistent with the real-world object, unless otherwise stated in the game rules. This requirement should not apply to graphic representations that are used solely for entertainment purposes. The following applies to simulation:

a) The probability of any event that occurs in the simulation that affects the outcome of the game will 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 each other based on the rules of the game, each simulation must be independent of other simulations; and
c) Where the game simulates physical objects without having recollection of previous events, the behavior of the simulated objects should be independent of their previous behavior, so as not to be adaptive and not predictable, unless otherwise instructed to the player.

4.6 Types of Games

4.6.1 General statement. This section aims to define a baseline of a set of requirements for traditional game types while recognizing that many variants of these same games are still permissible:

4.6.2 Requirements for Card Games. The requirements for games representing decks being drawn from one or more cards/decks are as follows:

a) At the start of each game and/or hand, cards must be drawn from one or more randomly shuffled decks; it is acceptable to draw random numbers for replacement cards at the time the random number is drawn for the first hand on the condition that replacement cards are used sequentially when needed and provided that the stored RNG values are encrypted using means approved by the regulator:
b) Once cards have been drawn from the deck or decks they will not be returned to the deck or decks except as provided in the rules of the game;
c) The deck or decks may not be reshuffled, except as provided in the game rules;
d) The game should alert the player to the number of cards in a deck and the number of decks being played;
e) The face of the cards should clearly show the value of the card and its set; and
f) Joker cards and jokers must be distinguishable from the other cards.

4.6.3 Requirements for Poker Games. The following requirements apply only to poker game simulations:

a) The art illustration will provide a clear indication of which poker variant will be played and the rules that apply;
b) Joker card rules should be clearly explained on the help screens; and
c) Retained and non-retained cards, including recommended cards to be retained, shall be clearly indicated on the screen, and the method of changing the status of a selected card shall be clearly displayed to the player.

4.7 Game Result Using a Random Number Generator (RNG)

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

a) Where more than one RNG is used to determine different game outcomes, each RNG will be evaluated separately; and
b) Where each instance of an RNG is identical, but includes a different implementation in the game, each implementation will be evaluated separately.

4.7.2 Game Selection Process. The determination of opportunity events that result in a monetary prize will 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 will not limit the results available for selection, except as intended in the game design;
b) The game will not modify or discard the results selected by the RNG due to adaptive behavior, the results will be used as directed by the rules of the game;
c) After the selection of the game outcome, the game shall not display a "near miss" where it makes a variable secondary decision that affects the outcome shown to the player. For example, if the RNG chooses a losing outcome, the game will not be able to substitute a different losing outcome to show the player that they were originally selected.

d) Except as provided by the game rules, opportunity events will be independent of and do not correlate with any other events within the same game, or events within the previous games;

   i) A game should not adjust the probability of a bonus occurring, based on the history of prizes obtained in previous games; and
   ii) A game shall not adapt its theoretical return to player based on previous payouts;

e) Any associated equipment used in conjunction with a gaming device must not influence or modify the game's RNG behaviors and random selection process, except as authorized or intended by design.

4.8 Payout Percentages, Odds & Prizes

4.8.1 Payout Percentage Software Requirements. Each game will theoretically pay a minimum of eighty-three percent (83%) over the expected lifespan of the game. Progressives, Bonus Systems, merchandise, etc. will not be included in the payout percentage if they are external to the game, unless required for the operation.

a) Gaming devices that may be affected by the player's skill must comply with the requirements of this section when using an optimal method of play that will provide the greatest return to the player over a period of continuous play.
b) The minimum return percentage requirement of 83% must be met for all bet configurations. If a game is played continuously at any singular bet level, line configuration, etc. for the life of the game, the 83% requirement must be met.
c) Any game where a paytable below 83% that can be set up cannot be approved for Puerto Rico.

4.8.2 Odds. The odds of landing an explicitly advertised prize that is based solely on chance must occur at least once in every 100 million games. However, an award will be made for any advertised prize that exceeds this odds requirement, provided that the game art prominently displays to the player the actual odds for such prize. This rule will apply to all categories of bets that can win the advertised prize. In the context of odds, a prize is defined as a credit prize, a multiplier, entry to a bonus game, etc.

Note: An example given is an advertisement for a multiplier of 100 times, the evaluation should assess the probability of a player achieving the multiplier of 100 and not an independent review identifying each of the potential values derived by combining the multiplier with each specifically advertised value with which it could be multiplied.

4.8.3 Limitation of Prizes.

The limits required by the jurisdiction for the maximum prize amount won per play will be $5,000 per play.

a) Prizes will not exceed $5,000 on a single game item based on the jurisdictional requirement (e.g., if a play consists of a base game item and five (5) bonus game items, up to $5,000 can be won on each and every game item – 6 total).

b) The win awarded on any individual game item or sequence of game items must not be truncated, unless handling of the truncated amount is awarded to the player on a future item as part of the game.

c) Any game where a paytable that offers a win in excess of $5,000 and can be set up cannot be approved for Puerto Rico.

4.9 Bonus Games

4.9.1 Bonus Games Requirements. Game bonuses must meet the following requirements:

a) A game that offers a bonus/bonus game, other than those that occur randomly, must display sufficient information to the player to indicate the current status towards the activation of the next bonus game;

b) If a bonus/bonus game requires multiple achievements towards the activation of a bonus, or the awarding of a prize, the number of achievements required to activate the bonus, or win the prize, must be indicated, along with the number collected at any point;

c) If a bonus/bonus game allows the player to hold one or more reels/cards/symbols for the purpose of an additional spin or draw, then the reels/cards/symbols held must be clearly indicated and the method of changing the held must be clearly explained to the player;

d) If a bonus/bonus game is triggered after the accumulation of a certain number of events/symbols or combination of events/symbols of a different type in multiple games, the

probability of obtaining matching symbols/events must not deteriorate as the game progresses, unless otherwise disclosed to the player;

e) The bonus/bonus game must make it clear to the player when they are in a bonus/bonus mode; and

f) If a bonus/bonus game consists of multiple events or spins, then a meter will be kept and displayed to the player to indicate the number of spins initially awarded and the number of spins remaining during the bonus game or alternatively, the number of spins that have been played.

4.9.2 Player Selection or Interaction in a Bonus/Bonus Game All gaming devices that offer a bonus/bonus game that requires selection or interaction by the player are prohibited from automatically making selections or initiating games or bonuses, unless the gaming device meets one of the requirements listed below that explains the automatic initiation or selection mechanism in the art illustration:

a) The player is presented with a choice and expressly acknowledges his intention that the gaming device will automatically initiate a bonus/bonus game by means of a button press or other interaction by the player;

b) The extended bonus provides only one option for the player, i.e., pressing a button to spin the wheel. In this case, the device can automatically initiate the extended bonus after a period of time of at least (2) two minutes; or

c) The extended bonus is offered as part of a community game involving two or more players and where the delay of an offered selection or the initiation of the game will directly impact the ability for other players to follow their extended bonus. Before making selections or initiating a community or bonus automatically, the player must be instructed to be aware of the remaining time in which to make their selection or start the game.

4.9.3 Extra Credit Wagering During a Bonus/Bonus Game. If a game bonus requires additional credits to be wagered and all winnings are accumulated from the base game and the bonus to a temporary "win" meter, rather than directly to the credit meter, the game must:

a) Provide a means where winnings on the temporary meter can be wagered (i.e. add credits to the credit meter) to allow instances where the player does not have enough credits on the meter balance to complete the bonus, or allow the player to add money to the credit meter;

b) Transfer all credits in the temporary win meter to the credit meter when the play bonus has been completed, and
c) Provide the player with the opportunity to opt out.

4.13 Multiple Games on the Gaming Device

4.13.1 General Declaration. A multiple game is defined as a game that can at the same time be configured for use with multiple game themes or multiple paytables.

4.13.2 Selecting the Game for Viewing The following rules apply to the selection of a specific game within a multiple game:

a) The methodology employed by a player to select a particular game to play on a multi-game device shall be clearly explained to the player on the device;
b) The gaming device will clearly inform the player of all the games available to play;
c) The player must be informed at all times of which game theme has been selected to play and which one is being played;
d) When multiple game themes are offered to play, the player will not be required to play a game simply by selecting a game title, unless the game screen clearly indicates that a game's selection cannot be changed. If not indicated, the player may return to the main menu or game selection screen before placing a bet;
e) It will not be possible to select or start a new game before the current game cycle is completed and all related meters and game history have been updated, including bonuses and other game options, unless the action to start a new game ends the current game in an orderly manner. This requirement is not intended to prevent or prohibit game designs that involve simultaneously playing multiple games on a single gaming device. However, in this case, the applicable meters and limits and stoppages will be applied to each available game as played, and all other requirements of this chapter will continue to apply to these multiple game designs being played.
f) The set of games or paytables offered to the player for selection can be changed only by a certified secure method. This requirement should not limit the use of an identifier to alter a game or paytable. The rules described in the "Settings" section of this document govern the requirements for deleting non-volatile (NV) memory related to these types of changes. However, games that keep data from previous paytables in memory, a non-volatile memory wipe is not necessary; and

g) No changes to the set of games, or to the paytables offered to the player for selection, will be allowed while there are credits in the player's credit meter, or while a game is in progress. However, specific protocol features are allowed that allow for such changes in a controlled manner as defined by the protocol. Similarly, identifiers may be used to make such changes subject to the applicable reporting and player reporting requirements defined elsewhere in this standard.

4.14 Tokenization and Residual Credits

4.14.1 Tokenization. For gaming devices that have tokenization, the device will receive the monetary value from the credit acceptance device and record the total amount entered into the credit meter, and will need to display any fractional credits, where applicable. Alternatively, however, the gaming device is allowed to automatically issue a voucher reflecting any partial credits, rather than recording it on the credit meter. It is acceptable for the device to store fractional credits if one of the following conditions is met:

a) The machine displays the credit meter in local cash; or
b) The machine informs the player that there are fractional credits stored on the device at an opportune time to avoid the possibility of the player withdrawing from the gaming device without having such knowledge.

4.14.2 Display of Residual Credits in the Credit Meter. If the current amount of local cash is not a denomination multiple for a game, or the amount of credits has a fractional value, the credits shown for that game may be displayed and played as a truncated amount, (i.e., remove the fractional share). However, the amount of fractional credits is also known as "Residual Credits"

4.14.3 Residual Credit Removal. A residual credit removal feature is a player-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 player using an available, configured payment device. If residual credits exist, the manufacturer may provide a residual credit removal feature, or return the gaming device to normal game play (i.e., leave the residual credits on the player's credit meter). The following rules shall apply to a residual credit removal feature when implemented:

a) Residual credits wagered in the residual credit removal game will be added to the Coin-in meter;

b) If the residual credit removal game is won, the value of the win will be either:

   i) Increasing the player's credit meter; or
   ii) Dispensed automatically and the value of the credits will be added to the Coin-Out meter;

c) If the residual credit removal set is lost, all residual credits will be removed from the credit meter.
d) If the residual credits are cashed out instead of wagered, the gaming device must update the corresponding meter;
e) The game bonus of residual credit removal must return at least eighty-three percent (83%) to the player over the life of the game;
f) Current options and/or player selections for the removal of residual credits will be clearly visible;
g) If the residual credit removal game offers the player an option to complete the game, the player will also be given the option to exit the residual credit removal bonus and return to the previous game mode; and
h) The game history must show the result of the game of removing residual credits or have sufficient information, including meters to be able to obtain 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 player 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 after a non-volatile memory (NV) reset will not be the advertised jackpot. The default game display when entering the play mode from the main menu or game choice will not correspond to the advertised jackpot. This only applies to the base game and not to any bonus of secondary bonuses.

4.16 Taxation Reporting Limits for Games

4.16.1 Game Taxation Lockup Requirements If the prize(s) of an individual game cycle is greater than five hundred dollars ($500), including a tax limit, which is defined/configured on the gaming device, the device will not allow play, display an appropriate message, and operator intervention will be required to resolve the player's payout. It is permissible to provide a mechanism for accumulating tax winnings on a separate meter, however, this meter must not accept any straight bets. When the amount on the meter is charged by the player, the gaming device must remain paralyzed according to the defined/configured limit required by the jurisdiction.

4.17 Alternate Game Modes

4.17.1 Test/Diagnostic Mode. Test/Diagnostic Mode (sometimes called Audit or Demo Mode) allows an operator to view game mechanics, perform paytable tests, or execute other auditing or diagnostic functions supported by the machine. If you have test/diagnostic mode, the following rules will apply:

a) Entry into test/diagnostic mode will only be possible by a secure means that is not accessible to the player.
b) If the gaming device is in test/diagnostic mode, any tests or diagnostics that incorporate credits entered or exited from the gaming device will be completed prior to the resumption of normal game operation.
c) If the device is in test/diagnostic mode, the gaming device will clearly indicate that it is in that mode, and not in normal gaming mode.
d) When exiting test/diagnostic mode, the game should return to the original state it was in when it entered test/diagnostic mode.
e) Any credits on the gaming device that were accumulated during the test/diagnostic mode will be automatically removed when you exit the mode.

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

a) A gaming device should only enter attraction mode when it is idle and without credits on the device;
b) The attraction mode must precisely reflect an available game configuration; and
c) The attraction mode will automatically end when a door is opened, or when any player enters or the credit acceptance device is activated.

4.18 Game History Memory

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

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;
b) The denomination played in the game, if it is a multiple denomination type game;
c) The screen associated with the final result of the game either graphically or through a clear textual description;
d) The value of the credit meter at the start of the game and/or at the end of the game;
e) Any non-bet buy-ins that occur during the recorded game.
f) Payment table identification, unless deductible from other wizard screens or menus;
g) Total Amount Wagered;
h) Total Amount Won;

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

j) The results of any player option involved in the outcome of the game;

k) The results of any intermediate game phase such as withdrawal of residual credits, or bonus games; and

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

NOTE: For "Last Play Information" stated above, it is allowable to display values in currency in place of credits.

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.

4.22 Community Bonus Games

4.22.1 General Declaration. Gaming devices may have community bonus games where a bank of machines is connected to a controller that allows players 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 devices shall be disabled, or alternatively, the gaming device shall provide the players 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 devices and/or any overhead or shared display, as applicable to the implementation.

4.22.3 Loss of Communications. The gaming device must adhere to the following requirements for a loss of communications during the game of a community bonus:

a) A gaming device connected to a community bonus game controller must generate an error and not allow the game when there is a loss of communication between the gaming device and the controller, the gaming device must inform the player if the community game bonus is disabled; and
b) A gaming device must resume community bonus play from the point of interruption when communications have been restored; or
c) A gaming device must allow community bonus play to continue if the controller communicates the prize to the gaming device before communication is lost; the gaming device can continue to function if it is capable of operating independently; The gaming device must clearly notify the player 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 device and/or in the community bonus controller. See also related requirements found under the "Game History Recall" section within this technical standard.

CHAPTER 5: ACCOUNTING AND METERING REQUIREMENTS

5.1 Accounting & Metering

5.1.1 Introduction. This chapter sets out accounting and metering requirements for gaming devices.

5.2 Credit Meter

5.2.1 ***Credit Meter Units and Display***. At a minimum, a credit meter must be visible to the player anytime a bet is placed, anytime a cash out is allowed, or any time the meter is being actively increased or deducted. In addition, the credit meter must meet the following requirements:

a) The credit meter must be displayed in credits or local currency format, and at all times it is displayed it must indicate all credits or local currency value available for the player to bet or make a withdrawal, with the exception of when the player is viewing an information screen such as a menu or help screen.

b) If the game's credit meter allows you to switch between credits and monetary value, this functionality must be clearly understood by the player; The credit meter should clearly indicate whether credits or monetary value are being displayed;

c) The credit meter must be displayed to the player unless there is an error or malfunction condition that affects its correct display; and

d) Any selectable player option to hide or show the credit meter must be securely set on the gaming device and make the default as disabled.

5.2.2 ***Credit Meter Incrementation***. The value of each prize at the end of a game must be added to the player's credit meter, except for manual or merchandise payments.

5.2.3 ***Credit Meter Decrementation***. Credits wagered or committed at any point at the start of the game, or within the course of the game, must be deducted immediately from the player's credit meter.

5.2.4 ***Credit Meter for Progressives.*** Progressive wins can be added to the credit meter if:

a) The credit meter is maintained in the format of the local currency amount; or

b) The progressive meter is incremented by full credit amounts; or

c) The progressive win in the format of the local currency amount is appropriately converted to credits after being transferred to the player's credit meter in a way that does not confuse the player.

5.3 Collect Meter

5.3.1 ***Collect Meter***. There should be a collect meter which shows the number of credits or cash cashed out by the player after a withdrawal. This meter may include manual payments. The collect meter must adhere to the following requirements:

a) The collect meter must be displayed to the player after a cashout event unless there is an error or malfunction condition, or unless the player chooses to view an informational screen such as a menu or help screen; and
b) The number of credits or cash collected must be subtracted from the player'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 device must have a meter that ates 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 device 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. (*NOTE: Wager categories, as used above, do not apply to keno games or games with skill*.)

b) Credits Won (Coin Out). The gaming device must have a meter that accumulates the total value of all credits directly paid by the device 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 device must have a meter that accumulates the total value of coins or tokens diverted to the drop box;

d) Attendant Paid Jackpots. The gaming device 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 device 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 device must have a meter that accumulates the total value paid by an attendant or by system-based command and which results from a player 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 device must have a meter that accumulates the total value of coins or tokens inserted into the device;

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

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

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

k) Attendant Paid Progressive Payout. The gaming device 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.

l) Machine Paid Progressive Payout. The gaming device 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; and

m) Non-Wager Purchase. The gaming device 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 player that debits the credit meter and which is used for entertainment purposes only and does not influence the outcome of the game; and

n) Other Meters. A gaming device 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.

NOTE: Any accounting meter that is not supported by the functionality of the gaming device, is not required to be implemented by the supplier.

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 labeled so they can be clearly understood in accordance with their function. The required electronic occurrence meters are as follows:

a) Games Played. The gaming device 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 device 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 device itself, or external, shall support this occurrence meter for each progressive level offered;
e) Bill Denomination. The gaming device must have a specific occurrence meter for each denomination of currency accepted by the bill validator; and
f) Vouchers/Coupons Accepted. The gaming device 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.

NOTE: Any occurrence meter that is not supported by the functionality of the gaming device, is not required to be implemented by the supplier.

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".

NOTE: Primary game is defined to be the base game and includes amounts won from free spins, bonus games, etc. before the double up game or gamble game is played.

GLOSSARY OF KEY TERMS

Advertised Award – A term that describes a prize that can be awarded by a gaming device and that is explicitly announced to the player in the game's artwork.

Alarm – An audible alert provided by the gaming device that can be heard in a typical operating environment and whose purpose is to notify the responsible personnel of various error conditions that may exist on the device.

Alterable Media – Physical storage medium for control programs that can be altered or modified when installed and operating in-circuit within the gaming device. From a practical point of view, when the media is made read-only or non-tamperable by means of hardware or software when installed and operating it is not considered an alterable medium.

Alternate Game Mode – A mode of a gaming device other than the normal game mode. This includes attraction modes, test and diagnosis, autoplays, idle, and free play.

Illustrations – The graphics, thematic art, help screens, and other textual information that is shown to a player through a game's help screens or videos.

Jackpot paid by an Attendee - Value in credits that is the result of a single game cycle that is paid by an attendee, as the amount cannot be paid automatically by the game device.

Cancelled Credits Paid by an Assistant – Value in credits that is the result of a player's collection action that is paid by an Assistant as it exceeds the capacity or physical configuration of the device.

Attraction Mode - Visual and/or audible options to engage players when the device is in idle mode (i.e. no active credits or plays).

Autoplay Mode – A player-selectable mode on a gaming device that allows a player to place bets automatically without any manual interaction, once the denomination, bet, and other attributes of the game have been selected for the plays.

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

Barcode – An optical representation of data that is readable by the device. A good example is a barcode on printed tickets/vouchers.

Barcode Reader – A device that is capable of reading or interpreting a barcode. This capability can be extended to some smartphones or other electronic devices that can run an app to read the barcode.

Bill In - The total value of all coins accepted by a gaming device.

Bill Validator – A peripheral component used in a gaming device that is capable of accepting paper money, tickets/vouchers, and other approved notes in exchange for credits on the credit counter.

Bluetooth - A low-power, short-range wireless communications protocol used for the interconnection of cell phones, computers, and other electronic devices including gaming devices. Bluetooth connections typically operate over distances of 10 meters or less and rely on shortwave radio waves to transmit data wirelessly.

Transfer to/from a Cashless Account - Cashable credits that are transferred electronically from the gaming device or from a betting account by means of an external connection between the device and a cashless betting system.

CFast, *CompactFast* - A variant of Compact Flash cards based on a serial ATA interface instead of the parallel ATA used in CF cards.

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

Coin Acceptors – A peripheral gaming device that accepts coins or tokens in exchange for credits. The assembly properly receives, verifies, counts and directs the coins deposited in the machine.

Dropped Coins – Total coins or tokens that were diverted to the drop box.

Collect Meter - A meter that shows the number of credits or cash collected by a player.

Community Bonuses – A type of bonus game where a group of machines is connected to a controller that allows players to collaborate and compete for a shared prize.

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

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

***Cyclic Redundancy Check (*CRC) -** A software algorithm used to verify the accuracy of data during transmission, storage, or retrieval. The algorithm is used to validate or verify data for possible corruption or unauthorized changes.

Credit Meter - A meter that keeps credits or cash available for the player to place a bet.

Critical Control Program – Any software program that controls the behaviors of the gaming device relative to any applicable technical standards and/or regulatory requirements.

Non-volatile critical memory – The memory used to store all data that is considered vital for the continuity of the gaming device's operation including, but not limited to data elements such as electronic accounting and counters, current credits, configuration data, game history, significant events, last normal state of the game and the machine, paytable information, etc.

Cryptographic RNG – An RNG that is resistant to attack or compromised by a smart attacker with modern computational resources and who has knowledge of the RNG's source code and/or its algorithm. A cryptographic RNG cannot be easily "compromised" to predict future values.

Direct crypto-analytic attack – An attack on an RNG where the attacker, given a sequence of past values produced by an RNG is able to predict or estimate the future values of the RNG.

Direction Detector – A device that can determine the direction and speed of the coin or token travels on a coin acceptor.

Diverter - The part of the coin inlet assembly that directs the coins to the hopper or drop box.

Drop Box – A secure container located inside the gaming device cabinet that collects coins when the hopper is full or when the diverter directs the coins towards it.

Electronic Accounting Meters (also known as "Software Meters") – a meter that is implemented in the main program software of a gaming device.

EMC - The principle that any electronic or electrical appliance must be able to operate without causing or being affected by electromagnetic interference.

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

EPROM, ***Read-Only Erasable Programmable Memory*** - A block of memory that keeps its contents without a power source and can be erased using UV light or reprogrammed externally from the gaming device using a special tool.

ESD, ***Electrostatic 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, a short circuit or dielectric breakdown.

Firewall – A part of a computer or network system that is designed to block unauthorized access or traffic while also allowing communication to the outside.

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

Flight Recorder – A term used to describe game history functionality that records various physical actions of the player and relates them in time to other game inputs such as touchscreen activations, pressing a button, etc. to fully reconstruct the outcome of the game. When used in conjunction with a game that contains an element of physical ability, such functionality can be especially useful for recording/documenting aspects specifically related to a player's physique, dexterity, movements, or gestures in the game history.

Game Cycle - A game cycle is defined as "from one bet to the next bet". The cycle is the period from the initial bet to the point of the final transfer to the player's credit counter, or when all bets are forfeited.

Gaming device (also known as a machine, terminal) – An electronic or electromechanical device that will at least use an element of chance, skill, strategy, or some combination of these elements in determining prizes, contain some type of activation to initiate the selection process, and makes use of an appropriate methodology to display the determined results.

Game Session – The period of time that begins when a player starts a game or series of games on a gaming device by placing a bet and ends at the time that a final game result is awarded for that game or series of games and at the same time coincides with the opportunity for the player to recover their available credit.

Hardware-Based RNG – An RNG that derives its randomness from small-scale physical events such as the response of an electrical circuit, thermal noise, radioactive decay, particle spinning, etc.

Hashing algorithm- A function that converts a string of data into a fixed-length numerical string as a result.

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

Identifier – Any concrete, verifiable fact with respect to a player or group of players that is based on objective criteria relating to that player or group of players and that can be used to affect prescribed changes to the game or game device settings.

Idle Mode – A mode of the gaming device that exists when the device is not being used for gaming and there are no credits in the credit counter.

In-Game Bet – A bet that is placed while a virtual event is running or happening in reality.

Integrated Player Identification Component – An Integrated Player Identification Component is an electronic device controlled by the machine's control program that provides a means for players to enter their secure identification information. Examples include a card reader, a barcode reader, or a biometric scanner.

Jumper – A removable connector (plug, cable, etc.) that electrically joins or cuts the circuit of two independent physical connections.

Known Entry Attack - An RNG attack where 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 locked area separate from the gaming device that 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. This is a sealed, secure box or compartment inside the machine that houses the device's control program.

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

Mechanical RNG (also known as a "Physical Random Device") – An RNG that generates results mechanically using the laws of physics. Implementations of gaming devices include, but are not limited to mechanical wheels, tomboleras, blowers, mixers, etc..

Magnetic *Interference* - Any magnetic disturbance that disrupts, obstructs, degrades, or limits the effective performance of electronic and electrical equipment.

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

Multi-Games - A game that at the same time can be configured for use with multiple themes or multiple paytables.

Multiplayer Machine – A multiplayer device is a gaming device that consists of multiple player interfaces linked to a shared main console. The main console coordinates the game and provides consistent game deployment between the player interfaces. Player interfaces contain player interaction devices and payouts.

Multiple Bet Game – A game where multiple, independent bets can be applied simultaneously towards advertised prizes.

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

Non-Cashable Wagered Promotional Credits – Non-Cashable credits that are electronically transferred to the gaming device from a promotional account.

Near Miss - Displaying the combination of symbols of a jackpot 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 close together, or when they are within a few centimeters of each other.

Non-EPROM – Any program storage device that is not a physical EPROM.

Purchase without wagering – A purchase made by the player that is debited from the credit counter and used for entertainment purposes. A purchase without a bet has no influence on the outcome of the game. An example could be the purchase of an artistic attribute in a game.

Player Interaction Device – An internal or external device that connects to a machine and records various types of player inputs allowing the player to interact with the machine. Various examples include touchscreens, levers, hand controls, camera systems, etc. The player's interaction device can be wired or wireless. A "smart" gaming interaction device has two-way communication with the gaming device. For purposes of this technical standard, a traditional electromechanical button panel is excluded from this definition unless it is used to affect the outcome of the game.

Paytable (also known as "variation") – A term used to describe the mathematical behavior of a game based on the manufacturer's PAR sheets, including the percentage of return and reflection of

all possible payouts/prizes.

PCB - ***A*** hardware component of a computer or other electronic device consisting of a flat, rectangular piece of rigid material to which integrated circuits and other electronic components such as capacitors, resistors, etc., are mounted. Electrical connections are made between the integrated circuits and the components a copper foil that is laminated inside the complete board assembly.

Exacta – a bet in which the player selects first and second place in a race in the correct order.

Peripheral – An internal or external device connected to a machine that supports credit acceptance, credit issuance, player interaction, and other specialized functions.

Coins Entered/Physically Delivered - The total value of coins or tokens inserted or paid into the gaming device.

Physical Engine - Specialized software that approximates the laws of physics, including behaviors such as motion, gravity, velocity, acceleration, mass, etc. for the elements or objects in a game. The physical engine is used in place of game elements/objects within the context of the physical world during the rendering of computer graphics or video simulations.

PIN - A numerical code assigned to an individual to establish identity and used in many electronic transactions.

Player Credentials – Sensitive information relating to a player and which may include items such as full name, date of birth, place of birth, social security number, address, telephone number, medical or employment history, or other personal information as defined by the regulatory body.

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

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

Progressive Systems - A system that takes the contributions of one or more gaming devices and applies it to the prize increment. When the conditions for winning occur, the prize is paid to one player.

Protocol - A set of rules and conventions that specify the exchange of information between devices, over a network, or on other means of communication.

Quinella – A bet that you should predict the first two places in a race, but not necessarily in the order of arrival.

Residual Credit Removal - A game feature for residual credit removal is a player-selectable option that allows for the removal of credits remaining on the machine when there is a lower credit balance than can be collected by the player using an available device configured to make payments. For a gaming device with a hopper, a residual credit is equivalent to a value less than the coin or token that can be dispensed.

RFI, *Radio Frequency Interference* - Electromagnetic radiation signals that are emitted by rapidly changing electrical circuits, as a byproduct of their normal operation, and that cause unwanted signals (interference or noise) to be induced in other circuits.

RNG – *A* random number generator is a device, algorithm, or computational or physical system designed to generate numbers in a manner indistinguishable from random selection...

RNG Status - The state of the random number generator is defined by one or more variables in the computer's memory and represents a specific point within the random number generator cycle. The state of the random number generator can be modified by replacing one or more of these variables with new values, or by mixing the values with new data.

Read-Only Memory (ROM) - The electronic component used for storing non-volatile information in a gaming device. The term includes programmable ROM (PROM) and erasable programmable ROM (EPROM).

RTP, *Return to Player* - The quotient between the 'total amount won' and the 'total amount wagered' by a player. Such a return can be theoretical (based on mathematical calculations or simulations) or real (based on measurement using a gaming device being played).

SAS in English, Accounting System *for Game Machines* - Data collection and accounting package developed by IGT. Data about the device's activity is transmitted to a controller who, in turn, transmits the collected data to a computer.

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

Scaling with Partiality - The scaling algorithm is said to have bias if each value in the target range is not selected with the same frequency when all possible values are mapped in the original range.

Secure areas or secure compartments - Sensitive areas of a gaming device such as the logical area external doors, such as the front door or belly door, money compartments such as the drop box, access areas of peripheral devices, and other areas for devices that can potentially impact the integrity of the game such as overhead monitors, controllers, etc.

Seed – The seed is the initialization of the state variables of a random number generator. The source value(s) used for initialization is the seed.

Sensitive Information - Includes information such as validation numbers, PINs, player credentials, passwords, security seeds and keys, and other data that must be handled securely.

Significant Events – Conditions such as restart, manual payment, door openings/closings, currency or 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 (also known as Machine Interface Connection Board) - A circuit board that allows the gaming device to be interconnected with an external system, to facilitate the conversion of protocols between the machine and the system.

RNG Software – A random number generator that derives its randomness from a computer-based or software-based algorithm.

Source code – Text that lists the commands that must be compiled or assembled in an executable computer program.

Stacker – An electromechanical component of the banknote validator that stores the banknotes, tickets, coupons or vouchers in a closed container for secure storage within the gaming device.

Compromised State Extension Attack - A category of attacks in which an attacker compromises a single RNG State and penetrates past or future RNG results with this information. Usually this attack is executed using the seed state or a vulnerable state in which sufficient entropy is available.

Surrender – An option available in some card games where the player can lose half of their bet instead of playing their hand. There are two ways to give up: early and late. These terms refer to whether a dealer checks to see if they have a blackjack (when they are showing an ace or a 10) before the player makes the decision to surrender.

Test/Diagnostic Mode (also known as "Demo" or "Audit" mode) – A safe mode of a gaming device that allows an attendee or operator visibility of

game mechanics, perform paytable tests, or run other auditing and/or diagnostic functions supported by the machine, or allowing secure access to the various audit menus that display information related to configuration values, performance, memory, logs, or accounting and counter information.

Ticket or Voucher Entered/Delivered - The total value of all tickets/vouchers accepted or paid for by the gaming device.

Breakdown/freeze – An error in the operation of the gaming device that stops or suspends the game and generates an intelligent error message.

Tokenization – When the betting unit is equal to the denomination of the game, then the tokenization ratio is 1:1. With tokenization, a game with a denomination of 0.25 cents and a 1:5 ratio of tokenization would provide a player with five credits for each 0.25 cent coin.

Touchscreen – A video display device that also acts as a player input device using the location of the electrical touch point on the screen.

Tower Light – A light located on top of a gaming device that automatically illuminates in response to various machine error conditions, or that may be illuminated by a player to summon an assistant or other service personnel.

USB in English, ***Universal Serial Bus*** - an industry-standard interface that defines the cables, connectors and communications protocols used for connection, communication and power between computers and electronic devices. It is often used to refer to the type of port or the flash-type storage device that uses this interface technology.

Ticket/Voucher – A printed or virtual ticket issued by a gaming device that can be redeemed for cash or used to later add credits on a device. A virtual ticket is an electronic token exchanged between a player's mobile device and the gaming device that is used for the insertion and redemption of credits.

Bet – Any commitment in credits or money that the player acquires that has an impact on the outcome of the game.

Bet Category – A term used to describe different levels/betting options available to the player in regards to the commitment acquired in credits or money that could have an impact on the outcome of the game.

Wi-Fi – Standard local area network (WLAN) wireless technology to connect computers and electronic devices to each other and to the internet.

ANNEX A

Additional Machine Requirements

- The SAS 6.0 protocol will be used in the terminals and in the interconnection system.