APPENDIX A

DEPARTMENT OF PUBLIC SAFETY
GAMBLING CONTROL UNIT
STATE OF MAINE
BEANO/BINGO OR ASSOCIATED EQUIPMENT TECHNICAL STANDARDS

INTRODUCTION

1. The Gambling Control Unit has adopted as its Beano/Bingo and associated technical requirements the specifications contained in the following standards developed and published by the Gaming Laboratories International, Inc.:

    A. GLI-15, Electronic Bingo and Keno Systems, version 1.3

    B. GLI-11, Gaming Devices in Casinos, version 3.0

    C. GLI-13, On-Line Monitoring and Control Systems (MCS) and Validation Systems in Casinos, version 2.1

2. All Beano/Bingo devices and associated equipment designated by a Beano/Bingo Distributor for delivery to Maine will comply with the standards referenced in 1A-C.

3. The standards are contained in the remainder of this Appendix.

STANDARD SERIES

GLI-15:

Electronic Bingo and Keno Systems

Version: 1.3

Release Date: September 6, 2011

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ABOUT THIS STANDARD

This Standard has been produced by Gaming Laboratories International, LLC for the purpose of providing independent certifications to suppliers under this Standard and complies with the requirements set forth herein.

A supplier should submit equipment with a request that it be certified in accordance with this Standard. Upon certification, Gaming Laboratories International, LLC will provide a certificate of compliance along with an appropriate *Gaming Labs Certified*® mark evidencing the certification to this Standard.

Nothing in this standard shall be construed to offer an opinion as to the classification of Bingo and Keno Systems under the Indian Gaming Regulatory Act (IGRA).

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CHAPTER 1

1.0 OVERVIEW - STANDARDS FOR ELECTRONIC BINGO AND KENO SYSTEMS

1.1 Introduction

1.1.1 ***Electronic Bingo and Keno Systems Defined***. An Electronic Bingo and Keno System is a game management system that is primarily tasked to provide logging, searching, and reporting of gaming significant events, collection of financial data, and display and verification of winning cards. These Standards are intended to provide guidance toward the certification of the following types of electronic Bingo and Keno systems:

a)   Manual Draw games using paper Cards;

b)   Electronic Draw games using paper cards;

c)   Manual Draw games using electronic card marking devices;

d)   Electronic Draw games using electronic card marking devices;

e)   Manual Draw games using a combination of paper and electronic card marking devices;

f)   Electronic Draw games using a combination of paper and electronic card marking devices; and

g)   Electronic Draw game using player terminals.

1.1.2 ***Phases of Certification***.   The approval of an Electronic Bingo or Keno System may be certified in up to two phases:

a)   Initial laboratory testing, where the laboratory will test the integrity of the system in the laboratory setting with the equipment assembled; and

b)   On-site certification where the system and configuration set up are tested on the gaming floor prior to implementation.

1.2   Acknowledgment of Other Standards Reviewed

1.2.1 General Statement. These Standards have been developed by reviewing and using portions of the documents from the organizations listed below. We acknowledge the regulators who have assembled these documents and thank them:

a)   The State of Kentucky, Dept. of Charitable Games;

b)   Alberta Canada, Liquor and Gaming Authority;

c)   The Texas Lottery;

d)   The State of Louisiana Charitable Gaming Division;

e)   The State of Nevada;

f)   The State of New York, Charitable Games;

g)   The State of Washington;

h)   The Washington Charity Satellite Bingo Regulations;

i)   The Province of British Columbia, Charitable Games;

j)   The State of Illinois;

k)   The State of Mississippi;

l)   The State of Missouri;

m)   The State of Nebraska;

n)   The State of New Hampshire;

o)   The Province of Nova Scotia, Canada;

p)   The State of Virginia; and

q)   The National Indian Gaming Commission.

1.3   Purpose of Standard

13.1   General Statement. The purpose of this technical standard is as follows:

a)   To eliminate subjective criteria in analyzing and certifying Electronic Bingo and Keno Systems.

b) To only test those criteria which impact the credibility and integrity of gaming from both the Revenue Collection and game play point of view.

c) To create a standard that will insure that Electronic Bingo and Keno systems are fair, secure, and able to be audited and operated correctly.

d) To distinguish between local public policy and laboratory criteria. At GLI, we believe that it is up to each local jurisdiction to set their public policy with respect to gaming.

e) To recognize that non-gaming testing (such as Electrical Testing) should not be incorporated into this standard but left to appropriate test laboratories that specialize in that type of testing. Except where specifically identified in the standard, testing is not directed at health or safety matters. These matters are the responsibility of the manufacturer, purchaser, and operator of the equipment.

f) To construct a standard that can be easily changed or modified to allow for new technology.

g) To construct a standard that does not specify any particular technology, method or algorithm. The intent is to allow a wide range of methods to be used to conform to the standards, while at the same time, to encourage new methods to be developed.

1.3.2 ___No Limitation of Technology___. One should be cautioned that this document should not be read in such a way that limits the use of future technology. The document should not be interpreted that if the technology is not mentioned, then it is not allowed. Quite to the contrary, as new technology is developed, we will review this standard, make changes and incorporate new minimum standards for the new technology.

1.3.3 ___Scope of Standard___. This standard will only govern Electronic Bingo and Keno System requirements necessary to achieve certification for the purpose of properly displaying selected balls or numbers, properly verifying and awarding player winnings, and properly accounting for and reporting all financial and game history data as needed to properly audit the system.

1.4   Other Documents That May Apply

1.4.1 <u>***General Statement***</u>.   This standard covers the minimal requirements of electronic   Bingo and Keno Systems and all associated components. The following other standards may apply:

a)   GLI-11 Gaming Devices in Casinos;

b)   GLI-12 Progressive Systems in Casinos; and

c)   Individual Gaming Board Minimum Internal Control Procedures.

CHAPTER 2

2.0 BINGO SYSTEM REQUIREMENTS

2.1 Bingo System Definitions

2.1.1 ***General Statement***. The following are commonly used terms in describing the game of Bingo and the play of the game that are used throughout this chapter.

a) "Deal" means each separate package or series of packages consisting of one game of instant bingo, pull-tab raffle or seal cards with the same serial number.

b) "Designator" means an object used in the number selection process, such as a ping pong ball, upon which bingo letters and numbers are imprinted.

c) "Disposable paper card" means a non-reusable, paper bingo card manufactured with pre-printed numbers.

d) "Electronic Bingo Card Monitoring Device" (referred to as "EBM" throughout this chapter) means an electronic device that is used by a bingo player to monitor bingo cards purchased at the time and place of a licensed organization's bingo occasion. An EBM provides a means for bingo players to input numbers announced by a bingo caller; and compares the numbers entered by the player to the numbers contained on cards previously stored in the electronic memory of the device. An EBM also identifies the winning pattern; and signals only the bingo player when a winning bingo pattern is achieved. Automatically marking numbers on the EBM is only permissible when allowed by local ordinance. An EBM shall not mean or include any device into which coin, currency, or tokens are inserted to activate play.

e) "Electronic verification" means the verification of bingo by entering the free space number of the winning bingo card into computer equipment which contains pre- programmed software for this purpose.

f) "Equipment and video systems" includes equipment that facilitates the conduct of Bingo such as ball blowers, flash-boards, TV monitors, cameras, electronic verifiers and replacement parts for such equipment.

g) "Fixed Base Station" has the same meaning as Player Terminal.

h) "Free space number", "center number", "card" or "face number" means the number that is generally displayed in the center space of a bingo card that identifies the unique pattern of numbers displayed on that card.

i) "Manufacturer" means a person who modifies, converts, adds to or removes parts from a completed piece of bingo or other gaming equipment.

j) "Packet" means sets of bingo cards assembled in the order of games to be played. This may or may not include specials, winner-take-alls and jackpots.

k) "Perm Number" means a group of predefined bingo cards, each of which has a card number.

l) "Player Terminal" means a device or player station that are connected to a central system and allow the player to play the game of electronic bingo.

m) "Random selection" or "randomly selected" means a process of selecting number designators to produce random numbers during a bingo game in which each designator or number in the remaining population has an equal chance or probability of being selected.

n) "Serial number" means a unique number displayed or printed by the manufacturer on each set of bingo cards or each instant bingo or pull-tab card in a deal.

o) "Session" means a period of time during which one or more bingo games are conducted that begins with the selection of the first ball for the first game and ends after someone wins the last game.

2.2   General Operating Procedures

2.2.1 *RESERVED*.

2.2.2 *Game Display*. All systems shall utilize a lighted game board or other means to display to the public the drawn balls and the winning pattern of play for the game.

2.2.3 ***Ball Drawing***. The balls shall be drawn one at a time from a machine that mixes the balls or via an approved electronic random number generator certified for use in the game of Bingo. The operator shall have no discretion over which ball is drawn.

2.2.4 ***Packet Sales***. There shall be an easy means to determine the number of packs sold.

2.3   Point of Sale or Cashier Station Requirements

2.3.1 ***General Statement***. Each bingo system must have a device or facility that provides for the sale of bingo cards and the collection and accounting tools needed to determine all sales initiated through the bingo system.

2.3.2 ***Accounting Requirements***. The system must have the capability of recording and printing reports detailing sales and accounting information. This information can include, but is not limited to, price of card faces or packages, number of faces or packages sold, total sales for both paper and electronic faces, total paid.

2.3.3 ***Backup Requirements***. The system must have a backup and archive utility to allow the operator to save critical data should a system failure occur. This backup can be automatically run after the end of each session or may be a manual process to be run at the operator's desire.

2.3.4 ***Sales and Accounting Report Requirements***. The system shall contain sales and accounting reports detailing all financial transactions on the system. In addition, a log of significant events relating to accounting and sales must be maintained on the system and the operator shall be given the option of printing this log on demand.

2.3.5 ***Configuration Access Requirements***. The interface element setup/configuration menu(s) must not be available unless using an authorized access method.

2.3.6 ***Sales Adjustments and Corrections***. The system shall allow for meter adjustments and sales data corrections, if applicable, through a password controlled audit menu. A log of all accounting changes including the employee name/ID, authorized to make the changes, the date of the change, the time of the change and the detailed items adjusted must be kept on the system. A printout of this audit log must also be available upon demand.

2.3.7 ***Remote or Portable Sales Stations***. The system may have the capability of supporting remote sales units provided that each unit communicate all sales to the main sales station either via radio communications or via direct wiring to the stations. Remote sales terminals may have all of the operational capabilities of the main sales station except that audit functions may only be done at the main station.

2.4   Callers Desk Requirements

2.4.1 ***General Statement***. A Bingo system may possess a 'Callers Desk' or other means in which the selected balls or numbers get entered into the system for validation purposes. The Callers Desk shall not have the ability to sell or modify sales information.

2.4.2 ***Ball Draw Information***. The Callers desk shall have either a manual ball blower system or an approved Electronic Random Number Generator, see also Section 2.7, 'Electronic Random Number Generator Requirements,' to determine the order of drawn balls. Each drawn ball shall be announced prior to marking the light board. If the system used EBM devices the ball draw information must be entered into the system at the same time as the number is announced. The Callers Desk should have some means of correcting any input errors regarding drawn balls up to the time the game is closed.

2.4.3 ***Winning Bingo Card Verification***. The system shall contain a means in which all card perm numbers or electronic serial numbers are contained within a database for winning card verification. The winning card number or numbers, if more than one card has simultaneous Bingo, shall be entered into the system and the system shall verify that the claim is valid. A

printed record of all drawn balls, and each card face that won for each game, as required by local ordinance.

2.5   Server and Database Requirements

2.5.1   _General Statement_. An Electronic Bingo System will possess a database of all cards in the perm. Modification or changes to card faces shall not be permitted. Access to the database shall be controlled by password authorization or another secure method.

2.5.2   _System Clock_. A Bingo System must maintain an internal clock that reflects the current time (24hr format - which is understood by the local date/time format) and date that shall be used to provide for the following:

a)   Time stamping of significant events;

b)   Reference clock for reporting; and

c)   Time stamping of all sales and draw events.

2.5.3   _Synchronization Feature_.   If multiple clocks are supported the system shall have a facility whereby it is able to update all clocks in components.

2.5.4   _System Accounting Reporting Requirements_. The system or other equipment, shall be capable of producing general accounting reports to include the following information:

a)   The name of the organization;

b)   The game date and total number of cards and packets sold;

c)   The sales for regular and packet games;

d)   All information for special games that would be required to validate a bingo. (i.e., Color, special patterns, special cards, free strips, odd/even numbers, etc.)

e)   The winner-take-all and bonus computations;

f)   Cash due and cash received reconciliation;

g)   All other monies received from bingo game;

h)   Cash and check expenses;

i)   The total tax, cash, expenses and deposits;

j)   The signature and date of the person preparing the report; and

k)   Other reports as required by the specific local ordinance

2.5.5   _Game Schedule Reports_. A report detailing the game schedule and the type of games being played in the session shall be available to be printed from the system. Changes to the game parameters shall not be allowed once the game has begun.

2.6   Electronic Bingo Card Marking Device (EBM) Requirements

2.6.1   _General Statement_. EBM shall not mean or include any device into which coin, currency, or tokens are inserted to activate play.

2.6.2   _Bingo Card Limitation_.   The EBM shall have the ability to limit the number of bingo cards per game, if required by local ordinances.

2.6.3   _RESERVED_

2.6.4   _Clearing of EBM_. Each EBM shall be programmed to automatically erase all electronic bingo cards and/or bingo card face numbers stored in device:

a)   upon turning off the device after the last bingo game of the occasion has been played; or

b)   by some secondary timing or clearing method.

2.6.5   _Card Selection_. No EBM may be designed to allow bingo players the ability to design their own bingo cards by choosing, rearranging, or placing numbers on a card, unless permissible by the local ordinance.

2.6.6 ___EBM Without a Site System___. If the EBM is not used in conjunction with a site system but rather requires an organization to enter bingo card face numbers from disposable paper bingo cards, there must be a method to limit the number of cards loaded into the device. The limit will be established by local ordinance. Additionally, the system shall have a means of configuring the limitation, if required by local ordinance. A site system shall not be able to engage in any type of sale, void, or reload transaction unless the EBM is connected to and communicating with the site system.

2.6.7 ___Printing of Bingo Cards___. A receipting function for electronic bingo cards must be self contained within the site system and must record and print out on a copy which is given to the player, the device identification number, the date, number of electronic bingo cards purchased or loaded and the total amount charged for the electronic bingo cards.

2.6.8 ___Printing of Bingo Game Information___. A site system shall be able to provide the winning numbers and game patterns required for the entire bingo occasion on a hard copy printout. The printout must be available upon demand at the bingo occasion.

2.6.9 ___EBM or Site System Malfunction___. If any malfunction or problem with a EBM or site system that could affect the security or integrity of the bingo game, the bingo card monitoring devices, or the site system, is discovered, the system must log and immediately notify operations staff of the malfunction, as soon as possible.

2.6.10 ___RESERVED___

2.6.11 ___RESERVED___

2.6.12 ___RESERVED___

2.6.13 ___EBM Back-up___. It is recommended that regardless of the number of EBMs made available for play, at least one (1) device shall be reserved by the licensed organization as a back- up device, in the event a device in play malfunctions.

2.6.14 *RESERVED*

2.6.15 *RESERVED*

2.6.16 *Bingo Card Verification*. Numbers appearing on a bingo card identified by an EBM to be a winning bingo card, must be verified in the presence of the majority of the players or entry into an electronic card verifier.

2.7   Electronic Random Number Generator Requirements

2.7.1   *Random Number Generator Requirements*.   The use of an RNG results in the selection of game symbols or production of game outcomes. The selection shall:

a)   Be statistically independent;
b)   Conform to the desired random distribution;
c)   Pass various recognized statistical tests; and
d)   Be unpredictable.

2.7.2   *Applied Tests*. The test laboratory may employ the use of various recognized tests to determine whether or not the random values produced by the random number generator pass the desired confidence level of 99%. These tests may include, but are not limited to:

a)   Chi-square test;
b)   Equi-distribution (frequency) test;
c)   Gap test;
d)   Overlaps test;
e)   Coupon collector's test;
f)   Permutation test;
g)   Kolmogorov-Smirnov test;

h)   Adjacency criterion tests;

i)   Order statistic test;

j)   Runs tests (patterns of occurrences should not be recurrent);

k)   Interplay correlation test;

l)   Serial correlation test potency and degree of serial correlation (outcomes should be independent of the previous game); and

m)   Tests on subsequences.

2.7.3   *Background RNG Activity Requirement*. The RNG shall be cycled continuously in the background between games and during game play at a speed that cannot be timed by the player. The test laboratory recognizes that some time during the game, the RNG may not be cycled when interrupts may be suspended. The test laboratory recognizes this but shall find that this exception shall be kept to a minimum.

2.7.4   *RNG Seeding*. The first seed shall be randomly determined by an uncontrolled event. After every ball draw, there shall be a random change in the RNG process (new seed, random timer, delay, etc.). This will verify the RNG doesn't start at the same value, every time. It is permissible not to use a random seed; however, the manufacturer must ensure that games will not synchronize.

2.7.5   *RESERVED*

2.7.6   *Ball Drawing Games*. The consequences for games depicting balls being drawn from a barrel are as follows:

a)   At the start of each game, only balls applicable to the game are to be depicted. For games with bonus features and additional balls that are selected, they should be chosen from the original selection without duplicating an already chosen ball;

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

c)   As balls are drawn from the barrel, they shall be immediately used as directed by the Rules of the Game (i.e., the balls are not to be discarded due to adaptive behavior by the gaming device).

2.7.7   *Scaling Algorithms*.

a) If a random number with a range shorter than that provided by the RNG is required for some purpose within the gaming device, the method of re-scaling, (i.e., converting the number to the lower range), is to be designed in such a way that all numbers within the lower range are equally probable.

b) If a particular random number selected is outside the range of equal distribution of re-scaling values, it is permissible to discard that random number and select the next in sequence for the purpose of re-scaling.

2.8   Mechanical Random Number Generator Requirements

2.8.1   *Mechanical Based RNG Games*. Mechanical based RNG games are games that use the laws of physics to generate the outcome of the game. All mechanical based RNG games must meet the requirements of this document with the exception of the requirements for electronic random number generators. In addition, mechanical based RNG games must meet the following rules:

a)   The test laboratory will test via PC communications multiple iterations to gather enough data to verify the randomness. In addition, the manufacturer may supply live data to assist in this evaluation;

b)   The mechanical pieces must be constructed of materials to prevent decomposition of any component over time (e.g., a ball shall not disintegrate);

c)   The properties of physical items used to choose the selection shall not be altered; and

d)   The player shall not have the ability to physically interact or come into physical contact or manipulate the machine physically with the mechanical portion of the game.

NOTE: The laboratory reserves the right to require replacement parts after a pre-determined amount of time. In addition, the device(s) may require periodic inspections to ensure the integrity of the device. Each mechanical based RNG game shall be reviewed on a case-by-case basis.

2.8.2 *__Mechanical Ball Mixing Method__*. A mechanical device that uses air flow for mixing and randomly withdrawing balls to determine the letters and numbers or symbols to be called must be utilized in locations that do not use Electronic RNG's to draw the winning balls. This device shall be constructed in the following manner:

a)   It will allow participants full view of the mixing action of the balls; and

b)   The operation cannot be interrupted to change the random placement of the balls at the exit receptacle of the device, except when the device is shut off.

2.8.3 *__Bingo Balls__*. A set of balls, each bearing a unique number, and the letters B, I, N, G, or O provided, that the letters B, I, N, G, O need not appear if the balls are used for speed or hidden face bingo games. The following additional requirements regarding bingo balls must be met:

a) The entire set of balls shall be available for inspection by the players before a bingo session begins to determine that all are present and in operating condition;

b) Each numbered ball shall be the same weight as each of the other balls and free from any defects; and

c) Each set of balls in play must be distinguishable from all other sets of balls in play.

2.8.4 *__RNG Outcome__*. There shall be a method to display the RNG Outcome for the numbers called at all bingo games. The display must be visible to all players and clearly indicate all numbers that have been called.

CHAPTER 3
3.0 ELECTRONIC KENO SYSTEM REQUIREMENTS

3.1   Keno System Definitions

3.1.1 General Statement.   The following are commonly used terms in describing the game   of Keno and the play of the game.

a)   "EPROM" means Erasable Programmable ROM.

b)   "Exception log" means a record documenting a prize payout that has not been authorized by the computer.

c)   "Inside ticket" means a blank Keno ticket:

    i.   Constructed with eighty (80) blocks numbered one (1) through eighty (80); and

    ii.   Containing a bet block.

d)   "Keno" means a numbers game in which:

    i.   A participant chooses from one (1) to ten (10) numbers from a pool of eighty (80) numbers; and

    ii.   The winner and his prize is determined by correctly matching his numbers to the twenty (20) numbers generated in the game.

e)   "Keno equipment" means:

    i.   Electronic selection device;

    ii.   Random number generator;

    iii.   Computerized Keno system; or

    iv.   Integrated system of computer hardware and software that:

        A.   Generates a player ticket;

        B.   Records a game outcome;

        C.   Verifies a winning ticket;

        D.   Produces a management report; or

        E.   Performs other internal audit controls of a Keno operation.

f)   "Keno manager" means the person in charge of the operation of the Keno game.

g)   "Outside ticket" means a computer generated ticket given to the player which reflects certain game and wagering information.

h)   "PROM" means programmable ROM.

i)   "Quick pick" means a number selection made for the player by a computer.

j)   "Random number generator" means a device:

   i.   For generating number values that exhibit characteristics of randomness; and

   ii.   Composed of:

      A.   Computer hardware;

      B.   Computer software; or

      C.   A combination of computer hardware and software.

k)   "ROM" or "read only memory" means:

   i.   The electronic component used for storage of nonvolatile information in Keno equipment that provides instructions needed by the computer to begin its operations each time it is turned on;

   ii.   "PROM"; and

   iii.   "EPROM".

l)   "Selection device" means a device that:

   i.   May be operated:

      A.   Manually; or

      B.   Automatically; and

   ii.   Is used to randomly select numbers.

m)   "Transaction log" means a record of the same information printed on each outside ticket that is:

   i.   Retained in the computer's memory; or

   ii.   Printed out by the computer.

3.2 General Operating Procedures

3.2.1 **_General Statement_**.   The rules within this section are general rules that govern the conduct of Keno.

3.2.2 **_Operation of Keno Equipment_**. No player shall have access to, or be allowed to activate the Keno equipment. Each number selected by the player, along with the amount wagered and the total numbers played shall be entered into the computer by the operations staff, and an outside ticket shall be presented to the player. The inside ticket shall be retained until at least three games after the game in which the ticket was purchased for.

3.2.3 **_Ticket Marking_**. Players shall mark the inside ticket with their number selections or selection by quick pick is permissible.

3.2.4 **_Outside Ticket_**. Concurrently with the generation of the outside ticket, the information on the outside ticket shall be recorded on the transaction log.

3.2.5   **_Information on the Outside Ticket_**. The outside ticket that is given to the player shall contain the following information:

a)   Date of the game;
b)   Numbers chosen by the player;
c)   Ticket sequence number;
d)   Conditioning of the ticket;
e)   Station number where the ticket was generated;
f)   Game number; and
g)   The name of the organization.

3.2.6 **_Voiding a Ticket_**.   If a ticket is voided, the void information shall be input in the computer, and the computer shall document the appropriate information pertaining to the voided

wager. A void slip shall then be issued, which shall be retained with the outside tickets to serve as documentation of the transaction.

3.2.7 _**Malfunction During Number Selection**_. If the Keno equipment breaks down or malfunctions during the selection of the winning numbers and the problem is not promptly corrected, players shall be refunded the amount wagered upon presenting their outside ticket.

3.2.8 _**Start of the Game**_. Once the Keno manager is satisfied that all tickets for a game have been issued, the game shall be closed and all players shall be so notified. No tickets may be written or voided after a game has been closed and the number selection process has begun. Controls shall exist to prevent the writing and voiding of tickets after a game has been closed and after the number selection process has begun.

3.2.9 _**Display of Winnings**_. The potential payout or prize for each different type of wager shall be made known to the players prior to their selecting numbers. This may be done through posting the potential payouts in a manner clearly visible to the players or through a printed schedule that is available at each location where Keno is played.

3.2.10 _**Display of Time Restrictions**_. A statement indicating any time restrictions for redeeming a winning ticket shall be visibly posted at each location where Keno is played or printed on the outside ticket or the schedule of prize payouts.

3.2.11 _**Draw Ticket Generation**_. A draw ticket shall be prepared by the computer.

3.2.12 _**Collection of Winnings**_. A player shall wait until the last game wagered on has been called in order to collect any winnings. A player may be allowed to play fewer consecutive games than originally indicated, if approval has been obtained from the Keno manager and the voided wagers are properly documented in the transaction log.

3.2.13 _**Winner Verification**_. Winning tickets shall be verified prior to payout and paid in the following manner:

a)   Procedures shall be established to preclude payment of a ticket previously presented for payment, unclaimed winning tickets after a specified period of time, voided tickets, and tickets which have not been issued.

b)   The sequence number of a ticket presented for payment shall be input into the computer, and the payment amount shall be generated by the computer and shall be given to the player.

c)   No payouts shall be made unless a winning outside ticket has been presented. If the payout amount is not indicated on the outside ticket, a payout slip shall be issued.

d)   The exception log shall be produced and maintained documenting any payments made on tickets that have not been authorized by the computer.

3.2.14 *Simultaneous Winners*. If two (2) or more tickets fulfill the requirements for winning the largest prize on the same game, the full prize shall be divided equally among the winning tickets subject to any prize payout limit per game. Applicable prize payout limits shall be legibly posted at each location where Keno is played and printed on the schedule of prize payouts.

3.3   Hardware Requirements

3.3.1 *General Statement*.   All hardware associated with a Keno System must meet the following Hardware Requirements:

a)   All electrical and mechanical parts and design principles shall follow acceptable industrial codes in standards in both design and manufacture;

b)   Logic boards and software EPROM's shall be in a locked or sealed area within the machine or in a separate machine. No access to this area is allowed by persons other than the manufacturer's or distributor's authorized service personnel;

c)   A surge protector that feeds all power to the equipment shall be installed;

d)   The operation of the Keno equipment shall be impervious to influences from the outside of the device, including electro-magnetic interference, electro-static interference, and radio frequency interference;

e)   All computer functions and programs shall be secured in a secured and protective housing; and

f)   The design of the Keno equipment shall ensure that there are no readily accessible game function related points which would allow any input and that there is no access to input or output circuits unless it is necessary for the proper operation of the equipment. No switches or other controlling devices may be added to the machine that would cause the machine to operate in a manner other than in which it was designed to play.

3.4   Software Requirements

3.4.1   ***General Statement***. This section refers to all the associated software in a Keno System.

3.4.2   ***Storage of Software***. All programs residing in the equipment shall be contained in a storage media which is not alterable through any use of the circuitry or programming of the machine itself.

3.4.3   ***Detection of Corruption.*** Machine programs shall be capable of detecting corruption and shall provide an error message due to failure of the program storage media and cause the machine to cease play until corrected.

3.4.4   ***Random Number Generator***. A random number generator shall reside on a PROM or EPROM secured in the logic board of the computer. The numbers selected by the random number generator for each game shall be stored in the computer's memory and be capable of being output to produce a draw ticket with no manual input of the numbers required. Each possible combination of numbers which produce winning or losing game outcomes shall be available for random selection at the initiation of each game. The random selection process shall not produce any patterns of game outcomes, or be dependent upon any previous number selections or game outcomes, the amount wagered, or upon the style or method of play. The

logic of the hardware or software may not interfere with the random number generator software, see also Section 3.7 'Electronic Random Number Generator Requirements' and Section 3.8 'Mechanical Random Number Generator Requirements.

3.4.5 _**Retention of Game Data**_. The following rules apply to the game data within the Keno System:

a)   No Keno equipment shall have a mechanism whereby an error will cause the game data to automatically clear. Game data shall be maintained at all times regardless of whether the machine is being supplied with power.

b)   Game data shall be stored in such a way as to prevent loss of the data when replacing parts or modules during normal maintenance.

3.4.6 _**Printer**_. The following rules apply to the printers associated with the Keno System:

a)   The numbers that the player selects shall be printed on the outside ticket;

b)   The printer mechanism shall have a paper-sensing device that upon sensing a "paper low" condition will allow the machine to finish printing the ticket and then prevent further ticket writing;

c)   Each machine shall recognize a printer power loss occurrence and cease play until power has been restored to the printer and the machine is capable of producing a valid ticket;

d)   The printer shall have the capability of producing, at a minimum, the following accounting reports: The records shall include:

i.   The information contained in the transaction log;

ii.   Payout information for each game played;

iii.   The number draw and time of the draw for each game played;

iv.   RESERVED;

v.   System exception information including voids and late pays for each game played; and

vi.   The exception log.

3.4.7 <u>***Report Requirements***</u>. At the conclusion of each day generate a daily report.   The required reports are as follows:

a)   Records shall be maintained which include win and write by individual writer for each day;

b)   Records shall be maintained which include (for each licensed game) win, write, and win-to-write hold percentage for:

   i.   Each shift;

   ii.   Each day;

   iii.   Month-to-date; and

   iv.   Year-to-date or fiscal year-to-date as applicable.

c)   Payout information (date, time, ticket number, amount, etc.);

d)   Game information (number, ball draw, time, etc.);

e)   Daily recap information which includes:

   i.   Write;

   ii.   Payouts; and

   iii.   Gross revenue (win).

f)   System exception information, including:

   i.   Voids;

   ii.   Late pays; and

   iii.   Appropriate system parameter information (e.g., changes in paytables, ball draws, payouts over a predetermined amount, etc.)

CHAPTER 4

4.0 ELECTRONIC KENO AND BINGO GAMES USING PLAYER TERMINALS

4.1   Player Terminal Definitions

4.1.1 ***General Statement***. The following are commonly used terms in describing the games of Keno and Bingo and the play of the game that are used throughout this chapter.

a)   <u>"Cash-out ticket"</u> means an instrument of value generated by a gaming machine representing a monetary amount owed to a customer at a specific gaming machine. This investment may be wagered at other machines by depositing the cash-out ticket in the machine document acceptor.

b)   <u>"EPROM"</u> means erasable programmable read-only memory.

c)   <u>"Game server"</u> means an electronic selection device, utilizing a random number generator.

d)   <u>"Gaming machine"</u> means an electronic or electromechanical machine which contains a microprocessor with random number generator capability which allows a player to play games of chance, some of which may be affected by skill, which machine is activated by the insertion of a coin, token or currency, or by the use of a credit, and which awards game credits, cash, tokens, or replays, or a written statement of the player's accumulated credits, which written statements are redeemable for cash.

e)   <u>"Hold"</u> means the relationship of win to coin-in for gaming machines.

f)   <u>"Hold percentage"</u> means the percentage calculated by dividing the win by the drop or coin-in. Can be calculated for individual tables or slot machines, type of table games or slot machines on a per day or cumulative basis.

g)   <u>"Jackpot payout"</u> means the portion of a jackpot paid by gaming machine personnel. The amount is usually determined as the difference between the total posted jackpot amount and the coins paid out by the machine. May also be the total amount of the jackpot.

h)   "PIN" means personal identification number selected by player and used to access player's account.

i)   "Player tracking system" means a system typically used in gaming machine departments that can record the gaming machine play of individual patrons.

j)   "Random number generator" means a device that generates numbers in the absence of a pattern. May be used to determine numbers selected in various games such as keno and bingo. Also commonly used in gaming machines to generate game outcome.

k)   "Theoretical hold" means the intended hold percentage or win of an individual coin-operated gaming machine as computed by reference to its payout schedule and reel strip settings or EPROM.

l)   "Theoretical hold worksheet" means a worksheet provided by the manufacturer for all gaming machines which indicate the theoretical percentages that the gaming machine should hold based on adequate levels of coin-in. The worksheet also indicates the reel strip settings, number of coins that may be played, the payout schedule, the number of reels and other information descriptive of the particular type of gaming machine.

m)   "Tokens" means a coin like money substitute, in various denominations, used for gambling transactions.

4.2   General Operating Procedures

4.2.1   *General Statement*. The following are general rules that govern the conduct of Keno or Bingo games using player terminals.

a)   Electronic player terminals must be designed to comply with the standards defined in GLI-11 and GLI-12, with the exception of the Random Number Generator requirements, provided that the Bingo or Keno system contains an approved RNG, and the cash handling equipment requirements, provided that the Bingo or Keno system supports cashier transactions; and

b)   If the electronic equipment uses a bar code or microchip reader, the reader shall be tested periodically, by an entity independent of Bingo personnel, to determine that it is correctly reading the bar code or the microchip.

4.2.2   _Live Game Correlation_. Unless otherwise denoted on the payglass, where the gaming device plays a game that is recognizable such as Poker, Blackjack, Roulette, etc., the same probabilities associated with the live game shall be evident in the simulated game.

4.3   Payment by Voucher or Payment Slip

4.3.1 _General Statement_. If the electronic equipment returns a voucher or a payment slip to the player, the following shall apply:

a)   The customer may request a cash-out ticket from the gaming machine which reflects all remaining credits. The cash-out ticket shall be printed at the gaming machine by an internal document printer;

b)   The customer shall redeem the cash-out ticket at a change booth or cashiers' cage. Once presented for redemption, the cashier shall:

    i.   Scan the bar code via an optical reader or its equivalent; or

    ii.   Input the cash-out ticket validation number into the computer.

c)   The information contained on the cash out ticket shall be transmitted to the host computer. The host computer shall verify the authenticity of the cash-out ticket and communicate directly to the change booth or cashier cage terminal;

d)   If valid, the cashier pays the customer the appropriate amount and the cash-out ticket is electronically noted "paid" in the system;

e)   If invalid, the host computer shall notify the cashier that one of the following conditions exists:

    i.   Serial number cannot be found on file (stale date, forgery, etc.);

    ii.   Cash-out ticket has already been paid; or

    iii.   Amount of cash-out ticket differs from amount on file. The cashier shall refuse payment to the customer and notify a supervisor of the invalid condition.

f)   If the coinless/cashless gaming machine system temporarily goes down, cashiers may redeem cash-out tickets after recording the following:

    i.   Serial number of the cash-out ticket;

    ii.   Date;

    iii.   Dollar amount; and

    iv.   Issuing gaming machine number.

g)   Cash-out tickets shall be validated as expeditiously as possible when the coinless/cashless gaming machine system is restored.

4.4   Cashless Player Terminals

4.4.1   *General Statement*. If the gaming machine does not accept currency or coin and does not return currency or coin, the following standards shall apply:

a)   The device must be connected to a central computer, with supporting hardware and software, to coordinate network activities, provide system interface, and store and manage a player/account database; or

b)   A network of contiguous player terminals with touch-screen or button-controlled video monitors connected to an electronic selection device and the central computer via a communications network; or

c)   One or more electronic selection devices, utilizing random number generators, each of which selects any combination or combinations of numbers, colors and/or symbols for a network of player terminals.

4.5   Game Server Requirements

4.5.1   *General Statement*.   If the player terminals are connected to a game server, the following standards shall apply:

a)   The game server shall generate and transmit to the bank of player terminals a set of random numbers, colors and/or symbols at regular intervals. The subsequent game results are determined at the player terminal and the resulting information is transmitted to the account server;

b)   The game servers shall be housed in a game server room or secure locked cabinet outside of the player terminal.

4.6   Account Server Requirements

4.6.1   *General Statement*. A central computer acting as an account server shall provide customer account maintenance and the deposit/withdrawal function of those account balances. If the player terminals are connected to an account server, the following standards shall apply:

a)   Patrons may access their accounts on the computer system by means of a Player Identification Number or other secure method, at the player terminal. Each player terminal may be equipped with a card reader and PIN (personal identification number) pad or touch screen array for this purpose;

b)   All communications between remote peripheral devices and the system shall be encrypted for security reasons;

c)   A computer file for each patron shall be prepared by a clerk prior to the patron being issued a PIN card to be utilized for machine play. The patron shall select his/her four digit PIN, known only to the patron, to be used in conjunction with the PIN Card;

d)   The clerk shall sign-on with a unique password to a terminal equipped with peripherals required to input data from the Patron Registration form. Passwords are issued and can only be changed by MIS personnel at the discretion of the department director; and

e)   After entering a specified number of incorrect PIN entries at the cage or player terminal, the patron shall be directed to proceed to the Gaming Machine Information Center to obtain a new PIN. If a patron forgets, misplaces or requests a change to their four digit PIN, the patron shall proceed to the Gaming Machine Information Center.

4.6.2 **_Account Deposits_**. When a patron is depositing credits into an existing account the following standards shall apply:

a)   The cashier shall sign-on with a unique password to a cashier terminal equipped with peripherals required to complete the credit transactions. Passwords are issued and can only be changed by MIS personnel at the discretion of the department director;

b)   The patron shall present cash, chips, coin or coupons along with their PIN Card to a cashier to deposit credits;

c)   The cashier shall complete the transaction by utilizing a card scanner which the cashier shall slide the patron's PIN card through; and

d)   The cashier shall accept the funds from the patron and enter the appropriate amount on the cashier terminal.

4.7   Required Reports

4.7.1 **_General Statement_**. The accounting, game servers and player tracking systems shall contain the following accounting data and must be capable of producing accounting reports on demand of this data:

a)   Data required to be maintained for each game played includes:
    i.   Date and time game start and game end.
    ii.   Sales information by location.
    iii.   Money distribution by location.
    iv.   Refund totals by location.
    v.   Cards-in-play count by location.
    vi.   Identification number of winning card(s).
    vii.   Ordered list of balls or numbers drawn.
    viii.   Prize amounts at start and end of game.

b)   Sales information required shall include:

    i.   Daily sales totals by location.

    ii.   Commissions distribution summary by location.

    iii.   Game-by-game sales, prizes, refunds, by location.

    iv.   Daily network summary, by game by location.

c)   Player account information shall include:

    i.   Printed receipts issued with any player account shall include a time/date stamp.

    ii.   All player transactions shall be maintained, chronologically by account number.

    iii.   the ability to, upon request, produce a printed account history, including all transactions, and a printed game summary (total purchases, deposits, wins, debits, for any account that has been active in the game during the preceding 24 hours).

    iv.   The software shall provide a "player account summary" at the end of every game. This summary shall list all accounts for which there were any transactions during that game day and include total purchases, total deposits, total credits (wins), total debits (cash-outs) and an ending balance.

STANDARD SERIES

GLI-11:

Gaming Devices

Version: 3.0

Release Date: September 21, 2016

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ABOUT THIS STANDARD

This technical standard has been produced by **Gaming Laboratories International, LLC (GLI)** for the purpose of providing independent certifications under this standard and which comply with the requirements set forth herein.

A supplier is expected to submit equipment with a request that it be certified in accordance with this technical standard. Upon completion of testing, GLI provides a certificate of compliance evidencing the certification of the gaming device to this standard.

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Table of Contents

CHAPTER 1: INTRODUCTION TO GAMING DEVICES

1.1 Introduction

1.1.1 <u>*General Statement*</u>. **Gaming Laboratories International, LLC (GLI)** has been testing gaming devices since 1989. Over the years, GLI has developed numerous technical standards utilized by jurisdictions all over the world. This document, GLI-11, sets forth the technical standards for gaming devices.

1.1.2 <u>*Document History*</u>. This document is a compilation based upon many standards documents from around the world. Some GLI has written; some were written by industry regulators with input from independent test laboratories and gaming device manufacturers. GLI has taken each of the standards documents, merged the unique rules together, eliminated some rules and updated others, in order to reflect both the change in technology and the purpose of maintaining an objective, factual standard. GLI lists below, and gives credit to, agencies whose documents were reviewed prior to writing this standard. It is the policy of GLI to update this document as often as possible to reflect changes in technology and/or testing methods. This document will be distributed without charge and may be obtained by downloading it from the GLI website at www.gaminglabs.com or by contacting GLI at:

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1.2   Acknowledgment of Other Standards Reviewed

*1.2.1 **General Statement***. This technical standard has been developed by reviewing and using portions of the documents from the organizations listed below. GLI acknowledges the regulators and other industry participants who have assembled these documents and thank them:

a)   The Australian Capital Territory Gambling and Racing Commission;

b)   The New South Wales Independent Liquor and Gaming Authority;

c)   The New Zealand Department of Internal Affairs;

d)   The Northern Territory Department of Business;

e)   The Queensland Office of Liquor and Gambling Regulation;

f)   The South Australian Consumer and Business Services (CBS);

g)   The Tasmanian Liquor and Gaming Commission;

h)   The Victorian Commission for Gambling and Liquor Regulation;

i)   The Western Australian Department of Racing Gaming and Liquor;

j)   US Tribal Compacts from Tribal Governments and State Governments including:

    i.   Arizona;

    ii.   Connecticut;

    iii.   Iowa;

    iv.   Kansas;

    v.   Louisiana;

    vi.   Michigan;

    vii.   Minnesota;

    viii.   Mississippi;

    ix.   North Carolina;

    x.   North Dakota;

    xi.   Oregon; and

    xii.   Wisconsin.

k)   Colorado Division on Gaming – Limited Gaming Regulations;

l)   Illinois Gaming Board – Adopted Rules;

m)   Indiana Gaming Commission;

n)   Iowa Racing and Gaming Commission;

o)   Louisiana State Police – Riverboat Gaming Division – Gaming Device;

p)   Missouri Gaming Commission – Department of Public Safety;

q)   Nevada Gaming Commission and Gaming Control Board and Nevada Regulations and Technical Standards Related to Gaming Devices;

r)   New Jersey – Regulations on Accounting and Internal Controls;

s)   South Dakota Commission on Gaming – Rules and Regulations for Limited Gaming;

t)   Various protocol standards from the Gaming Standards Association (GSA); and

u)   The "International Technical Standards for EGM" from the International Association of Gaming Regulators (IAGR).

1.3   Purpose of Technical Standard

1.3.1   *Purpose*. The purpose of this technical standard is as follows:

a)   To eliminate subjective criteria in analyzing and certifying gaming device operation.

b)   To only test those criteria that impact the credibility and integrity of a gaming device from both the revenue collection and player's perspective.

c)   To create a standard that will ensure that gaming devices are fair, secure, and able to be audited and operated correctly.

d)   To distinguish between local public policy and independent test laboratory criteria. It is up to each local jurisdiction to set public policy with respect to gaming.

e)   To recognize that non-gaming testing (such as electrical testing) should not be incorporated into this standard, but left to appropriate test laboratories that specialize in that type of testing. Except where specifically identified in this standard, testing is not directed at health or safety matters. These matters are the responsibility of the manufacturer, purchaser, and operator of the gaming device.

f)   To construct a standard that can be easily revised to allow for new technology.

g)   To 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 conform to the standard, while at the same time, to encourage new methods to be developed.

1.3.2 ***No Limitation of Technology***. One should be cautioned that this document must not be read in such a way that limits the use of future technology. This document should not be interpreted that if the technology is not mentioned, then it is not allowed. To the contrary, GLI will review this standard and make changes to incorporate minimum standards for any new and related technology.

1.3.3 ***Adoption and Observance.*** This GLI technical standard can be adopted in whole or in part by any regulatory body that wishes to implement a comprehensive set of requirements for gaming devices.

1.4   Other Documents That May Apply

1.4.1 ***Other Standards***.   This standard covers the requirements for gaming devices.   The following other GLI technical standards may also apply:

a)   GLI-12 Progressive Gaming Devices in Casinos;

b)   GLI-13 On-Line Monitoring and Control Systems (MCS) and Validation Systems in Casinos;

c)   GLI-16 Cashless Systems in Casinos;

d)   GLI-17 Bonusing Systems in Casinos;

e)   GLI-18 Promotional Systems in Casinos;

f)   GLI-20 Redemption Kiosks;

g)   GLI-21 Client-Server Systems;

h)   GLI-26 Wireless System Standard;

i)   GLI-28 Player User Interface Systems; and

j)   GLI-29 Card Shufflers and Dealer Shoes.

NOTE: The entire family of GLI Standards is available free of charge at www.gaminglabs.com*.*

1.5   Definition of a Gaming Device

1.5.1 __General Statement__. At a minimum, a gaming device utilizes an element of chance and/or skill in the determination of prizes, contains some form of activation to initiate the wagering process, and makes use of a suitable methodology for delivery of the determined outcome. The functions of a gaming device may be logically separated into multiple parts or distributed among several physical and/or server components. The terms "gaming device" and "machine" are used interchangeably throughout this document. A "gaming device" does NOT include, for purposes of this standard, electronic equipment used in the conduct of table games. For detailed standards applicable to electronic table games, please reference GLI-24 (Electronic Table Game Systems) and GLI-25 (Dealer Controlled Electronic Table Games).

CHAPTER 2: GAMING DEVICE / MACHINE REQUIREMENTS

2.1   Introduction to Gaming Device / Machine Requirements

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

2.2   Machine and Player Safety

2.2.1 *__Physical Hazards and Environmental and Electrical Safety Testing__*. Electrical and mechanical parts and design principals of the gaming device shall not subject a player to any physical hazards. The independent test laboratory does not make any findings with regard to Electro-Magnetic Compatibility (EMC) or Radio Frequency Interference (RFI), as that is the responsibility of the manufacturer of the device, or those that purchase the device. Such EMC and RFI testing may be required under separate statute, regulation, law, or act and should be researched accordingly by those parties who manufacture or purchase said device. The independent test laboratory does not test for, is not liable for, nor makes any findings related to these matters. However, during the course of testing, the independent test laboratory may inspect for marks or symbols indicating that a gaming device has undergone product safety or other compliance testing by some other party but that is outside the scope of the requirements defined by this technical standard.

2.3   Environmental Effects on Machine and Gaming Device Integrity

2.3.1 *__Gaming Device Integrity__*. The independent test laboratory shall perform certain tests to determine whether or not an Electro-Static Discharge (ESD) impacts 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 disrupt the integrity of electronic gaming devices.

2.3.2 **_ESD Effects_**. A gaming device shall comply with the following requirements related to ESD testing:

a) The Random Number Generator (RNG) and random selection process shall be impervious to influences from ESD; and

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

2.4   Machine Identification

2.4.1 _Identification Badge_. A gaming 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) The complete name of the manufacturer or some appropriate abbreviation for same;

b) A unique serial number;

c) The gaming device model number; 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 the equivalent in such a manner that the game program is completely

controlled by the microprocessor(s). This does not preclude a game outcome from being derived from a mechanical device as described under the "Random Number Generator (RNG) Requirements" chapter of this standard.

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

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

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

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

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

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

2.5.4 *Machine Wiring.* The gaming device shall be designed so that power and data cables into and out of the device can be routed so that they are not accessible to the general public. Wires and cables that are routed into a logic area shall be securely fastened within the interior of the device using appropriate mechanical fasteners, plugs, sockets, connectors, etc.

NOTE: The independent test laboratory will make no determination as to whether the gaming device installation conforms to local electrical codes, or to any other electrical testing standards, and practices.

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

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

b)   Not impact the integrity, proper operation, or outcome of the gaming device.

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

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

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

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

NOTE: Please reference section entitled "Touch Screen Displays" for requirements applicable to display devices that support touch screen functionality.

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

2.6   Machine Electrical Power

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

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

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

2.7   Machine Doors

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

2.7.2   _External Doors_. The following requirements apply to the gaming device's external doors (e.g., main, belly, top box, etc.):

a)   External doors shall be manufactured of materials that are suitable for allowing only legitimate access to the inside of the gaming device cabinet. Doors and their associated hinges shall be capable of withstanding determined and unauthorized efforts to gain access to the interior of the gaming device and shall leave conspicuous 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 shall not be possible to insert an object into the gaming device that disables a door open sensor when the gaming device's door is fully closed, without leaving conspicuous evidence of tampering; and

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

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

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

b)   Logic door(s);

c)   Drop box door;

d)   Stacker door;

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

f)   Peripheral device access areas.

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

2.8   Machine Logic Area

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

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

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

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

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

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

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

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

g)   Machine critical NV memory backup devices.

NOTE: Any exceptions to the above logic area requirements and components will be evaluated on a case-by-case basis.

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

2.9 Machine Program Storage Devices

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

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

a)   Manufacturer identification, as appropriate;

b)   Program ID number;

c)   Version number, if applicable; and

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

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

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

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

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

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

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

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

NOTE: Critical control program verification mechanisms will be evaluated on a case-by-case basis and approved by the regulatory body and the independent test laboratory based on industry-standard security practices.

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

2.10 Machine Critical NV Memory

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

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

b)   Current credits;

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

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

e)   Game history/recall data;

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

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

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

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

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

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

c)   Power resets;

d)   Handpay conditions;

e)   Door open errors and door close events;

f)   Logic area access events;

g)   Coin, token, and hopper errors;

h)   Bill validator errors;

i)   Hardware errors for integrated player identification components;

j)   Low NV battery errors;

k)   Reel spin, mechanical device, or smart player interaction device errors, if any of these errors directly impact game outcome; and

l)   Printer errors.

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

a)   Unique transaction identification number;

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

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

d)   Type of non-wager purchase.

2.10.4 ***Identifier Log.***   If an identifier triggers an action that alters the gaming device configuration or the outcome of a game, then it shall be recorded in a log file containing the last

10 identifier-based transactions which shall be maintained by the gaming device or an external system, as applicable. The log file shall contain the following information:

a) A unique transaction identification number;

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

c) The date and time of the transaction;

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

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

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

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

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

c) NV memory that uses an off-chip back-up power source to retain its contents when the main power is switched off shall have a detection system which provides a method for software to interpret and act upon a low battery condition before the battery reaches a level where it is no longer capable of maintaining the memory in question. If a low battery condition is identified, the gaming device shall display an appropriate error message and sound an alarm and/or illuminate the tower light. This error condition shall be communicated to the on-line system, when such a compatible system and protocol is supported; and

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

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

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

2.11 Monitoring of Critical NV Memory

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

2.11.2 <u>*Critical NV Memory Checks*</u>. Comprehensive checks of critical NV memory data elements shall be made following game initiation, but prior to display of game outcome to the player. NV memory that is not critical to gaming device integrity is not required to be checked.

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

NOTE: This section is not intended to preclude the use of alternate storage media types, such as hard disk drives, for the retention of critical data. Such alternate storage media is still expected to maintain critical data integrity in a manner consistent with the requirements in this section, as applicable to the specific storage technology implemented.

2.12   Player Interaction Devices

2.12.1 <u>Touch Screen Displays</u>. All touch screen displays shall meet the following rules:

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

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

2.12.2 <u>Maintenance of Player Interaction Devices</u>. A gaming device that incorporates one or more player interaction devices that impact game outcome shall:

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

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

2.12.3 <u>Wireless Player Interaction Devices</u>. Communication between a gaming device and any wireless player interaction device, conducted using transmission technologies such as Near Field Communications (NFC), Bluetooth (BT), Wi-Fi, optical, etc., shall:

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

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

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

d)   Only be possible with authorized wireless player interaction devices.

2.13   Bill Validators and Stackers

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

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

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

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

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

d)   Credits shall only be registered when:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2.14   Coin Acceptors, Diverters, and Drop Boxes

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

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

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

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

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

e)   The gaming device shall have suitable detectors for determining the direction and the speed of coin/token travel in the acceptor. If a coin/token traveling at too slow of a speed, or improper direction, is detected, the gaming device shall display a suitable error condition for at least thirty (30) seconds or be cleared by an attendant;

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

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

i.   Coin/token-in jam;

ii.   Coin/token return jam;

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

iv.   Coin or token too slow / too fast.

NOTE: It is acceptable to report coin/token-in jam, reverse coin-in or token-in, and coin or token too slow / too fast error as a generic coin/token-in error.

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

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

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

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

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

2.15   Integrated Player Identification Components

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

NOTE: Wireless devices that are employed for player identification purposes are expected to also meet the requirements defined in the section entitled "Wireless Player Interaction Devices".

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

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

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

2.15.5 **_Integrated Player Identification Component Requirements._** Integrated player identification components shall meet the following rules:

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

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

c) Each gaming device shall have the capability of detecting and displaying an error condition related to a malfunction of any integrated player identification component. If a malfunction is identified, the gaming device shall display an appropriate error message, disable the integrated player identification component, and sound an alarm and/or

illuminate the tower light. For integrated player identification components, it is acceptable to flash lights with respect to the component itself. This error condition shall be communicated to the on-line system, when such a compatible system and protocol is supported.

2.16   Machine Tower Light

2.16.1 *Tower Light*. The gaming device shall have a light located prominently on its top that automatically illuminates when a player has won an amount or is collecting credits that the device cannot automatically pay, an error condition has occurred , or a 'Call Attendant' request has been initiated by the player. For bar-top style devices, it is permissible for the tower light to be shared among a group of gaming devices, or to be substituted by an audible alarm.

NOTE: The independent test laboratory will make no determination as to tower light color or flash sequence. Furthermore, alternative means such as displayed messages, audible tones, special animation effects, game-to-system communications etc., that may be used to alert appropriate personnel will be considered on a case-by-case basis.

2.17   Machine Payment and Payment Devices

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

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

b)   Any door open condition;

c)   Test/diagnostic mode;

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

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

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

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

NOTE: Activities that result in the payout of a single extra coin (e.g., the removal and re-insertion of the hopper) are not considered an abnormal payout as long as it is accounted for as an extra coin paid.

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

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

a)   Hopper empty or timed out;

b)   Hopper jam; and

c)   Hopper runaway or extra coin paid out.

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

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

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

b)   Printer jam/failure;

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

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

2.18   Machine Vouchers

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

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

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

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

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

b)   Machine identification number;

c)   Date and time;

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

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

f)   Voucher sequence number;

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

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

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

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

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

NOTE: Some of the above-listed information may also be part of the validation number or barcode. Multiple barcodes are allowed and may represent more than just the validation number.

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

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

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

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

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

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

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

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

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

d) Gaming device asset number; and

e) Validation number.

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

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

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

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

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

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

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

2.19   Machine Communication Protocol

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

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

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

2.19.2 *__Protection of Sensitive Information__*. The gaming device shall not allow any information contained in communication to or from the online monitoring system that is intended by the communication protocol to be protected, or which is of a sensitive nature, to be viewable through any display mechanism supported by the device. This includes, but is not limited to, validation numbers, secure PINs, player credentials, or secure seeds and keys.

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

2.20   Machine Connections to the Internet

2.20.1 *__General Statement__*.   Gaming devices may be designed to connect to, or otherwise communicate over, servers or networks via the internet.

2.20.2 *__Internet Connections__*.   The following requirements shall apply to gaming devices supporting an internet connection or access to a public network:

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

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

NOTE: It is recommended that routine field audits be conducted to ensure that production network configurations satisfy these requirements.

2.21   Multi-Player Machine

2.21.1 <u>*General Statement*</u>. A multi-player machine is a gaming device consisting of multiple player interfaces linked to a shared master console.

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

2.21.3 <u>*Player Interfaces*</u>. The player interfaces support player interaction devices as well as devices for credit acceptance and issuance. The following rules shall apply to each player interface comprising a multi-player machine:

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

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

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

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

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

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

g)   All player interfaces shall utilize a compatible version of software and must employ consistent configurations of that software.

2.22 Mechanical Devices Used for Display of Game Outcomes   in Machines

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

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

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

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

b)   If the gaming device detects a malfunction related to the operation of any related mechanical display device, it shall tilt and cease game play, provide an appropriate error message (including the specific reel number when applicable), disable credit acceptance, and sound an alarm and/or illuminate the tower light. This error condition shall be communicated to the on-line system, when such a compatible system and protocol is supported, and shall not be cleared automatically;

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

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

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

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

CHAPTER 3: RANDOM NUMBER GENERATOR (RNG) REQUIREMENTS

3.1   Introduction to RNG Requirements

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

3.2   General RNG Requirements

3.2.1 <u>Source Code Review</u>. The independent test laboratory shall review the source code pertaining to any and all core randomness algorithms, scaling algorithms, shuffling algorithms, and other algorithms or functions that play a critical role in the final random outcome selected for use by a game. This review shall include comparison to published references, where applicable, and an examination for sources of bias, errors in implementation, malicious code, code with the potential to corrupt behavior, or undisclosed switches or parameters having a possible influence on randomness and fair play.

3.2.2 <u>Statistical Analysis</u>. The independent test laboratory shall employ statistical tests to assess the outcomes produced by the RNG, after scaling, shuffling, or other mapping (hereafter referred to as "final outcome output"). The independent test laboratory shall choose appropriate tests on a case-by-case basis, depending on the RNG under review and its usage within the game. The tests shall be selected to assure conformance to intended distribution of values, statistical independence between draws, and, if applicable, statistical independence between multiple values within a single draw. The applied tests shall be evaluated, collectively, at a 99% confidence level. 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 an RNG intended for variable usage, it is the responsibility of the independent test laboratory to select and

test a representative set of usages as test cases. Statistical tests may include any one or more of the following:

a)   Total Distribution or Chi-square test;

b)   Overlaps test;

c)   Coupon Collector's test;

d)   Runs test;

e)   Interplay Correlation test;

f)   Serial Correlation test; and

g)   Duplicates test.

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

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

b)   The final outcome output shall be tested against intended distribution using appropriate statistical tests (e.g., Total Distribution test).

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

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

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

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

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

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

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

3.3 Software-Based RNG

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

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

3.4   Hardware-Based RNG

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

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

3.5   Mechanical RNG (Physical Randomness Device)

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

NOTE: Devices which faithfully and mechanically create or display a game outcome selected by a computer RNG are not considered physical randomness devices and shall be tested as RNGs, once the faithful reproduction of RNG selected outcome has been assured. Physical randomness devices may incorporate RNGs in secondary roles (e.g., rotation speed). Such secondary   RNGs

need not be evaluated against the RNG requirements contained herein, as they do not directly select the game outcome. Rather, the physical system shall be tested as a whole as described in this section.

NOTE: The approved components of a mechanical RNG cannot be swapped out or replaced with unapproved components, as they are integral to the behavior and performance of the mechanical RNG. The "approved components" in this context include those physical items that produce the random behavior – e.g., balls in a mixer, cards in a shuffler, etc. As one example, a shuffler certified by the independent test laboratory to utilize plastic cards cannot be viewed as an approved equivalent to the same mechanical shuffler using paper cards.

3.5.2 <u>**Data Collection Amount.**</u> To provide best assurance of random behavior, the independent test laboratory shall collect game outcome data for at least 10,000 game outcomes.

NOTE: Due to feasibility concerns associated with reasonable data collection on some devices, the regulatory body may elect to accept testing results from a smaller collection amount on a case-by-case basis. Equally possible, a larger data collection sample may be required. Regardless, the independent test laboratory will clearly state in the applicable certification, the amount of data used for testing. When less than 10,000 games are used, a statement on the statistical limitations of reduced testing will be clearly denoted within the certification report.

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

3.5.4 <u>**Durability.**</u> All mechanical pieces shall be constructed of materials to prevent degradation of any component over its intended lifespan.

NOTE: The independent test laboratory may recommend a stricter replacement schedule than that suggested by the manufacturer of the device to comply with the 'Durability' requirement stated above. In addition, the independent test laboratory may recommend periodic inspection of the device to ensure and maintain its integrity.

3.5.5 <u>***Tampering.***</u> 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 outcomes, except as intended by game design.

3.6   Cryptographic RNG

3.6.1 <u>***General Statement.***</u> A cryptographic RNG is one that cannot be feasibly compromised by a skilled attacker with knowledge of the source code. "Cryptographically strong" means that the RNG is resistant to attack or compromise by an intelligent attacker with modern computational resources, and who may have knowledge of the source code of the RNG. The following RNG requirements apply to a cryptographic RNG and are being introduced to this technical standard as optional requirements. At its discretion, a regulatory body may elect to require that RNGs used in the determination of game outcomes be cryptographically strong.

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

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

NOTE: Because of continuous computational improvements and advances in cryptographic research, compliance to this criterion shall be re-evaluated as required by the regulatory body.

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

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

CHAPTER 4: GAME REQUIREMENTS

4.1   Introduction to Game Requirements

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

NOTE: Please reference the "Games with Skill" section of this technical standard for specific and supplemental requirements for games containing one or more skill elements.

4.2   Player Interface

4.2.1   General Statement. The player interface is defined as the interface in 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 shall meet the following requirements:

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

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

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

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

4.3   General Game Requirements

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

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

a)   Game cycle initiation shall be defined to be:
  i.   After the player places a wager or commits a bet; and/or
  ii.   After the player presses a "play" button or performs a similar action to initiate a game in accordance with the game rules.

b)   The following game elements shall be considered to be part of a single game cycle:
  i.   Games that trigger a free game feature and any subsequent free games;
  ii.   "Second screen" bonus feature(s);
  iii.   Games with player choice (e.g., draw poker or blackjack);
  iv.   Games where the rules permit wagering of additional credits (e.g., blackjack insurance, or the second part of a two-part keno game); and
  v.   Secondary game features (e.g., double-up/gamble).

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

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

a) Current credit balance;

b) Denomination being played;

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

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

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

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

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

4.3.4 **_Display for Multi-Wager Games_.** The following requirements shall apply to games where multiple, independent wagers can simultaneously be applied towards advertised awards:

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

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

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

4.3.5 **_Display for Line Games_.** The following requirements shall apply to display for line games:

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

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

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

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

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

4.4   Game Information and Rules of Play

4.4.1 __Game Information and Rules of Play__. The following requirements apply to the game information, artwork, paytables, and help screens including any written, graphical, and auditory information provided to the player by the gaming device:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

v) It is recommended that a disclaimer stating "Malfunction Voids all Pays" or some equivalent verbiage be clearly displayed on the gaming device.

4.5   Game Fairness

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

a) Games that are designed to give a 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 game outcome is random and the illusion of skill is for entertainment value only), shall fully disclose this fact within the game help screens;

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

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

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

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

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

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

4.5.3 *__Physics Engine.__* Games may utilize a "physics engine" which is specialized software that approximates or simulates a physical environment, including behaviors such as motion,

gravity, speed, acceleration, inertia, trajectory, etc. A physics engine shall be designed to maintain consistent play behaviors and game play environment, unless an indication is otherwise provided to the player by the game artwork. A physics engine may utilize the random properties of an RNG to impact game outcome, in which case, the requirements found elsewhere in this standard under "Random Number Generator (RNG) Requirements" chapter shall apply.

NOTE: Implementations of a physics engine in a gaming device will be evaluated on a case-by-case basis by the independent test laboratory.

4.5.4   **_Live Game Correlation_**. Unless otherwise denoted in the game artwork, where the gaming device offers a game that is recognizable as a simulation of a live casino game such as poker, blackjack, roulette, etc., the same probabilities associated with the live game shall be evident in the simulated game. For example, the odds of getting any particular number in roulette where there is a single zero (0) and a double zero (00) on the wheel, shall be 1 in 38; the odds of drawing a specific card or cards in poker shall be the same as in the live game.

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

4.6   Game Types

4.6.1   *General Statement*. This section is intended to define a baseline set of requirements for traditional types of games while recognizing that many variants of these same games are still permissible.

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

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

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

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

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

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

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

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

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

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

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

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

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

b)   Pair split rules shall be explained to include:

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

   ii.   Further splits, if available;

   iii.   Double-down after splits, if available;

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

4.7   Game Outcome Using a Random Number Generator (RNG)

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

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

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

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

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

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

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

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

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

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

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

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

4.8.1 *Software Requirements for Percentage Payout*. Each game shall theoretically payout a minimum of seventy-five percent (75%) during the expected lifetime of the game. Progressives, bonus systems, merchandise, etc. shall not be included in the percentage payout if they are external to the game, unless required for operation.

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

  NOTE: At the discretion of the regulatory agency, the independent test laboratory can apply an alternative approach to return percentage calculations.

b) The minimum percentage requirement of 75% shall be met for all wagering configurations. If a game is continuously played at any single bet level, line configuration, etc. for the life of the game, the 75% requirement must be satisfied.

4.8.2 *Odds*. The odds of achieving any explicitly advertised award that is based solely upon chance shall occur at least once in every 100 million games. However an allowance shall be made for any advertised award that exceeds this odds requirement, provided that the game artwork prominently displays the actual odds of that award to the player. This rule shall apply to

all wager categories that can win the advertised award. In the context of odds, an award shall be defined to be a credit prize, a multiplier, entry into a bonus game or feature, etc.

NOTE: Example - given an advertisement for a 100X multiplier, the evaluation shall assess the probability for a player to achieve the 100X multiplier and not an independent review identifying each of the potential values derived by combining the multiplier with every specifically advertised value with which it can multiply.

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

4.9   Bonus/Feature Games

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

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

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

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

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

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

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

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

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

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

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

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

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

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

c) Provide the player an opportunity not to participate.

4.10   External Device Bonus Games

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

a) If the external device is used to display a bonus feature to the player, then the game or device shall display all relevant details of the bonus game including, when applicable, individual line wins, remaining free spins, multiplier values, bonus eligibility, bonus rules, bonus meters, and any other bonus detail not listed;

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

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

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

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

reviewed by the independent test laboratory to determine whether or not current technology is able to accommodate this requirement; and

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

4.11 Double-Up / Gamble Features

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

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

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

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

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

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

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

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

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

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

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

4.12   Mystery Awards

4.12.1 <u>General Statement</u>. A mystery award is a prize paid by a gaming device that is not associated with a specific paytable combination.

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

4.13   Multiple Games on the Gaming Device

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

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

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

b)   The gaming device shall clearly inform the player of all games available for play;

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

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

e)   It shall not be possible to select or start a new game before the current game cycle is completed and all relevant meters and game history have been updated, including

features, double-up / gamble, and other options of the game, unless the action to start a new game terminates the current play in an orderly manner. This requirement is not intended to preclude or prohibit game designs that involve the simultaneous play of multiple games on a single gaming device. However, in such a case, metering and applicable limits and lockups shall be enforced against each available game, as it is played, and all other requirements within this chapter shall continue to apply to these multiple game-in-play designs;

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

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

4.14   Game Tokenization and Residual Credits

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

a)   The machine displays the current credit meter in local currency; 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 walking away from the gaming device without such knowledge.

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

4.14.3 **_Residual Credit Removal_**. A residual credit removal feature is a 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 by the residual credit removal play shall be added to the Coin-In meter;

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

     i.   Increment the player's credit meter; or

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

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

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

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

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

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

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

4.15   Game Program Interruption and Resumption

4.15.1 _Requirements for Game Interruption and Resumption_. After a program interruption, the game software shall recover to the state it was in immediately prior to the interruption occurring. Where no 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 immediately following an NV memory reset shall not correspond to the highest advertised award. The default game display upon entering game play mode from a main menu or game chooser screen, shall not correspond to the highest advertised award. This applies to the base game only and not to any secondary bonus features.

4.16   Taxation Reporting Limits for Games

4.16.1 _Game Taxation Lockup Requirements_. If the award(s) from a single game cycle is in excess of any jurisdictional limit, including a taxation limit, that is defined/configured on the gaming device, the device shall cease play, display an appropriate message, and require attendant intervention to resolve player payment. It is permissible to provide a mechanism to accrue taxable winnings to a separate meter, however, this meter must not support any direct wagers.

When the amount on the meter is collected by the player, the gaming device must still lock up as per the defined/configured limit required by the jurisdiction.

4.17   Alternative Game Modes

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

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

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

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

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

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

4.17.2 _Attract Mode_. This mode enables the gaming 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 shall only enter attract mode when in an idle state and with no credits on the device;

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

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

4.17.3 _Free Play Mode_. Free play mode allows a player to participate in a game without placing a wager. If the gaming device supports a free play mode of operation, the following requirements apply:

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

b)   Free play shall not be available for player selection when there are credits on the gaming device;

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

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

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

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

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

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

a)   Autoplay shall be securely controlled using a jurisdictional program that either allows or disallows the feature, reflective of jurisdictional preference;

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

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

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

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

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

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

4.18   Game History Recall

4.18.1 Number of Last Games Required. Information on at least the last ten (10) games played on the gaming 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 stamp;

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

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

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

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

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

g)   Total amount wagered;

h)   Total amount won;

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

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

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

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

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.

4.19   Tournament Games

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

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

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

4.19.4 *Gaming Device Displays for Tournaments*. The following requirements apply to information displays for a gaming device that supports tournament play, and/or information

regarding a tournament that is otherwise provided to players via external signage, forms, or brochures available at the gaming venue:

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

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

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

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

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

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

4.19.5 _Out-of-Revenue Tournaments_. The following requirements apply to a gaming device offering out-of-revenue tournament game play:

a) While enabled for out-of-revenue tournament play, the gaming device shall not accept cash or currency from any source, nor shall the device issue payment; all credit acceptance devices shall be disabled. The gaming device shall utilize tournament-specific credits, points, or chips which shall have no cash value.

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

b) A gaming device shall not increment any accounting meters unless they are meters designed exclusively for use with tournament software. Additionally, the gaming device shall not communicate any tournament-related accounting information to the on-line

system, if applicable, unless the tournament data is stored in separate records in the system.

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

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

4.19.6 _In-Revenue   Tournaments_.   The following requirements apply gaming devices supporting in-revenue tournament game play:

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

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

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

4.19.7 _Remotely-Initiated Tournaments_. The following requirements apply to gaming devices which support tournament play that is controlled remotely:

a)   The player shall be provided with an option on whether or not to participate. If/when opting in, the player must be able to complete their non-tournament game prior to entering the tournament mode of play, unless the gaming device supports simultaneous tournament and non-tournament modes of play.

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

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

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

4.20   Games with Skill

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

NOTE: This technical standard is not intended to classify a game as a "skill game" or to serve as a legal basis for game classification within the context of skill. Such classifications will be subject to interpretation by the regulatory body.

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

4.20.3 *Disclosure for Games with Skill.* Any game with skill where there is a potential for the style or method of play to result in the game falling below the minimum theoretical return of 75%, shall prominently disclose that the outcome is affected by player skill. This disclosure must be prominently displayed on the gaming device prior to committing a wager. This requirement shall not apply to traditional casino games (e.g., poker, blackjack, etc.).

4.20.4 ***Player Versus Player (PVP) Advantage Feature.*** A game with skill may contain a feature that allows a player or players to gain an advantage over other players, provided that the gaming device:

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

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

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

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

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

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

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

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

4.20.8 ***Odds for Skill-Based Awards.*** Each advertised skill-based award shall be available to

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

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

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

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

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

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

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

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

NOTE: It is recommended that the gaming device support a secure option to enable or disable player advice to accommodate regulatory bodies that may either allow or prohibit this type of feature.

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

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

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

4.21 Persistence Games

4.21.1 ***General Statement.*** A persistence game is associated with a unique attribute (e.g., player ID, game or device ID, etc.) and incorporates a feature that enables progress towards the award

of game play enhancements and/or bonuses through the achievement of some designated game outcome. These additional offerings become available when the player has achieved specific thresholds defined for game play. Each designated outcome advances the state of the persistence game. Multiple plays of a game are usually necessary to trigger the persistence award. The persistence feature is typically provided through a persistence game controller associated with a single gaming device, bank of devices, or linked system.

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

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

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

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

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

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

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

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

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

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

4.22   Community Bonus Games

4.22.1 __General Statement.__ Gaming devices may support 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 shall adhere to the following requirements for a loss of communications during community bonus game play:

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

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

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

4.23   Virtual Event Wagering

4.23.1 _**General Statement**_. Virtual event wagering allows for the placement of wagers on simulations of sporting events, contests, and races whose results are based solely on the output of

an approved Random Number Generator (RNG). Nothing in this section should be interpreted as being applicable to live event wagering.

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

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

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

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

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

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

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

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

e)   There shall be a clear indication provided to the player that a wager has been accepted by the gaming device.

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

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

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

CHAPTER 5: ACCOUNTING AND METERING REQUIREMENTS

5.1   Accounting and Metering

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

5.2   Credit Meter

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

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

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

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

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

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

5.2.3 **_Credit Meter Decrementation_**. Credits wagered or committed at any point at the start of, or within the course of, play shall be immediately subtracted from the player's credit meter.

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

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

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

c)   The progressive prize in local currency amount format is converted properly to credits upon transfer to the player's credit meter in a manner that does not mislead the player.

5.3   Collect Meter

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

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

b)   The number of credits or cash collected shall be subtracted from the 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 accumulates the total

value of all wagers, whether the wagered amount results from the insertion of coins, tokens, currency, deduction from a credit meter or any other means. This meter shall:

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

ii. For chance-based slot machine paytables with a difference in theoretical payback percentage which exceeds 4 percent between wager categories, the gaming 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) <u>Attendant Paid Cancelled Credits</u>. 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) <u>Physical Coin In</u>. The gaming device must have a meter that accumulates the total value of coins or tokens inserted into the device;

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

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

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

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

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

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

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

n) <u>Non-Cashable Electronic Promotion In (NCEP In)</u>. The gaming device must have a meter that accumulates the total value of non-cashable credits electronically transferred to the gaming device from a promotional account by means of an external connection between

the device and a cashless wagering system;

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

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

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

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

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

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

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

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

w) Machine Paid Progressive Payout. The gaming 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;

x) <u>Attendant Paid Progressive Payout</u>. 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;

y) <u>Non-Wager Purchase</u>. 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

z) <u>Other Meters.</u> 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) <u>Games Played</u>. 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) <u>External Doors</u>. 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) <u>Stacker Door</u>. 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) <u>Progressive Occurrence.</u> 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) <u>Bill Denomination.</u> The gaming device must have a specific occurrence meter for each denomination of currency accepted by the bill validator; and

f) <u>Vouchers/Coupons Accepted.</u> 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.

5.6   Double Up or Gamble Meters

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

a)   Double-up / gamble amount wagered;

b)   Double-up / gamble amount won;

c)   Double-up / gamble games played; and

d)   Double-up / gamble games won.

GLOSSARY OF KEY TERMS

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

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

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

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

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

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

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

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

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

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

Barcode – An optical machine-readable representation of data. A good example is a barcode found on printed vouchers.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Gamble Feature - see "Double-Up".

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

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

Gaming Device (aka, machine, terminal) – An electronic or electro-mechanical device that at a minimum will utilize an element of chance, skill, or strategy, or some combination of these elements in the determination of prizes, contain some form of activation to initiate the selection process, and makes use of a suitable methodology for delivery of the determined outcome.

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

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

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

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

Identifier - Any specific and verifiable fact concerning a player or group of players which is based upon objective criteria relating to the player or group of players and which may be utilized to affect some prescribed change to a game or gaming device configuration.

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

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

Integrated Player Identification Component – An integrated player identification component is an electronic device controlled by a machine's critical control program which 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, wire, etc.) that electrically joins together or short-circuits two separate physical connections.

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

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

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

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

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

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

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

Multi-Player Machine – A multi-player machine is a gaming device consisting of multiple player interfaces linked to a shared master console. The master console coordinates game play and supports a consistent game display among the player interfaces. The player interfaces contain player interaction devices and payment devices.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Residual Credit Removal - A residual credit removal feature is a 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. For a gaming device with a hopper, a residual credit equates to a value less than the dispensed coin or token.

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

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

RNG State - The RNG state is defined by one or more variables in computer memory and represents a specific point within the cycle of the RNG. RNG state may be modified by replacing one or more of these variables with new values, or otherwise mixing the values with new data.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

STANDARD SERIES

GLI-13:

On-Line Monitoring and Control Systems (MCS) and Validation Systems in Casinos

Version: 2.1

Release Date: September 06, 2011

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ABOUT THIS STANDARD

This Standard has been produced by **Gaming Laboratories International, LLC** for the purpose of providing independent certifications to suppliers under this Standard and complies with the requirements set forth herein.

A supplier should submit equipment with a request that it be certified in accordance with this Standard. Upon certification, Gaming Laboratories International, LLC will provide a certificate evidencing the certification to this Standard.

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CHAPTER 1

1.0 OVERVIEW - STANDARDS FOR MONITORING AND CONTROL SYSTEMS (MCS)

1.1   Introduction

1.1.1   On-line Monitoring and Controls System Defined. An On-line Monitoring and Control System (MCS) is a game management system that continuously monitors each Electronic Gaming Device via a defined communication protocol by either a dedicated line, dial-up system, or other secure transmission method. A MCS is primarily tasked to provide logging, searching, and reporting of gaming Significant Events, collection of individual device financial and meter data, reconciliation of meter data against hard and soft counts, and System Security outlined in section 4.0 of this document.

1.1.2   Phases of Certification.   The approval of an On-line Monitoring and Control System shall be certified in two phases:

a) Initial laboratory testing, where the laboratory will test the integrity of the system in conjunction with Gaming Devices, in the laboratory setting with the equipment assembled; and

b) On-site certification where the communications and set up are tested on the casino floor prior to implementation.

1.2   Graphical Overview

1.2.1   General Statement.   The purpose of this section is to lend a visual depiction of a generic On-line Monitoring and controls computer system and is not intended to mandate any particular component or system topology providing functionality is maintained. The terms used throughout this document will be represented in a block diagram format to clarify individual components.
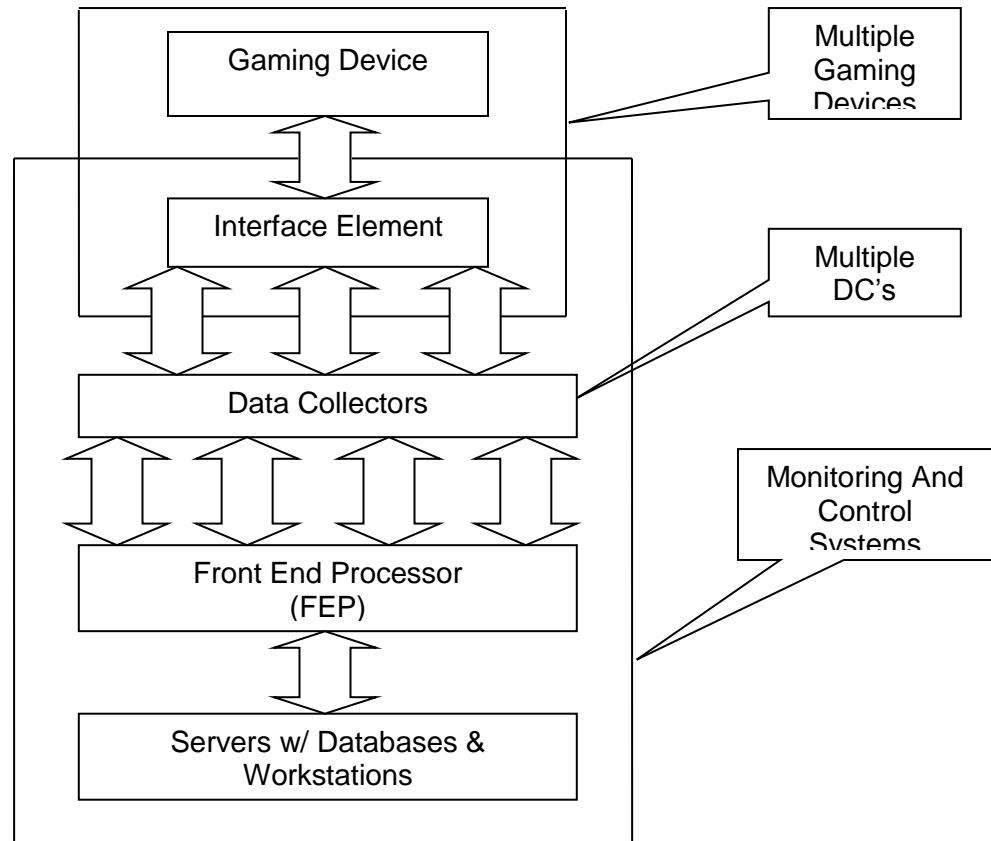
In the illustration above, this standard applies to all components referenced other than the Gaming Device. The requirements for the Gaming Device are defined in GLI-11. This document will only concern communications from the Gaming Device to the MCS, and not in the reverse order, with the exception of the Ticket/Voucher Validation System Requirements that are incorporated within Chapter 4.

1.3   Acknowledgment of Other Standards Reviewed

1.3.1 *General Statement*. These Standards have been developed by reviewing and using portions of the documents from the organizations listed below. We acknowledge the regulators who have assembled these documents and thank them:

a) The ACT Office of Financial Management;

b) The New South Wales Department of Gaming and Racing;

c) The New Zealand Casino Control Authority;

d) The New Zealand Department of Internal Affairs, Gaming Racing & Censorship Division;

e) The Northern Territory Racing and Gaming Authority;

f) The Queensland Office of Gaming Regulation;

g) The South Australian Office of the Liquor and Gaming Commissioner;

h) The Tasmanian Department of Treasury and Finance, Revenue and Gaming Division;

i) The Victorian Casino and Gaming Authority;

j) The Western Australian Office of Racing Gaming and Liquor;

k) The SABS 1718 part 3;

l) US Tribal Compacts from Tribal Governments and State Governments included:

    i.   Arizona

    ii. Connecticut

    iii. Iowa Indian

    iv. Kansas

    v.   Louisiana

    vi. Michigan

    vii. Minnesota

    viii.   Mississippi

    ix. North Carolina

    x.   North Dakota

    xi. Oregon

    xii. Wisconsin

m) Colorado Division on Gaming – Limited Gaming Regulations;

n) Illinois Gaming Board – Adopted Rules;

o) Indiana Gaming Commission;

p) Iowa Racing and Gaming Commission;

q) Louisiana State Police – Riverboat Gaming Division – Gaming Device;

r) Missouri Gaming Commission – Department of Public Safety;

s) Nevada Gaming Commission and State Gaming Control Board;

t) New Jersey – Regulations on Accounting and Internal Controls;

u) South Dakota Commission on Gaming – Rules and Regulations for Limited Gaming.

v) NIST Special Publication 800-57 *Recommendations for Key Management – Part 2: Best Practices for Key Management Organization;*

w) Nevada Regulatory 14 Technical Standards;

x) GSA G2S and S2S protocol standards; and

y) GLI-11, GLI-13, and GLI-20 Technical Standards.

1.4   Purpose of Standard

1.4.1   General Statement. The purpose of this technical standard is as follows:

a) To eliminate subjective criteria in analyzing and certifying gaming Monitoring and Control System operation.

b) To only test those criteria which impact the credibility and integrity of gaming from both the Revenue Collection and game play point of view.

c) To create a standard that will insure that On-Line Monitoring and Control Systems (MCS) And Validation Systems in Casinos are fair, secure, and able to be audited and operated correctly.

d) To distinguish between local public policy and laboratory criteria. At GLI, we believe that it is up to each local jurisdiction to set their public policy with respect to gaming.

e) To recognize that non-gaming testing (such as Electrical Testing) should not be incorporated into this standard but left to appropriate test laboratories that specialize in that type of testing. Except where specifically identified in the standard, testing is not directed

at health or safety matters. These matters are the responsibility of the manufacturer, purchaser, and operator of the equipment.

f) To construct a standard that can be easily changed or modified to allow for new technology.

g) To construct a standard that does not specify any particular technology, method, or algorithm. The intent is to allow a wide range of methods to be used to conform to the standards, while at the same time, to encourage new methods to be developed.

1.4.2 *No Limitation of Technology*. One should be cautioned that this document should not be read in such a way that limits the use of future technology. The document should not be interpreted that if the technology is not mentioned, then it is not allowed. Quite to the contrary, as new technology is developed, we will review this standard, make changes and incorporate new minimum standards for the new technology.

1.4.3 *Scope of Standard*. This standard will only govern On-Line Monitoring and Control Systems (MCS) and Validation System requirements necessary to achieve certification when interfaced to Gaming Devices, for the purpose of communicating mandatory security events and electronic meters. This infers that all relevant monetary transactions at the Gaming Device level are handled through:

a) Credit Issuance:
   i. Coins or tokens accepted via approved coin acceptors;
   ii. Currency notes (Bills) accepted via approved bill validators; and
   iii. Approved Ticket/Voucher (Items) accepted via approved Bill/ Ticket/Voucher validators; or
   iv. Player Account Cards (cashless)

b) Credit Redemption:
   i. Coins or tokens paid by approved hoppers;
   ii. Handpays;
   iii. Ticket/Voucher (Items) paid by approved ticket/voucher printers; or
   iv. Player Account Cards (cashless).

1.4.4 ***Exceptions to Standard***.   This standard does not govern MCS requirements for any other form of monetary transaction.   This standard also does not govern advanced bi-directional communication protocols (i.e. EFT, AFT, Bonusing, Promotional, System Based Progressives, features that utilize an RNG, etc.) that support credit transfer between Gaming Device and MCS. This standard only supports one-way communication of events originated at the Gaming Device level to the MCS with the exception of the Ticket/Voucher Validation System Requirements that are incorporated within Chapter 4.   This standard does not exclude Gaming Devices that operate with Player Account Cashless transactions for the purpose of communicating mandatory security events and electronic meters.   This infers that all relevant monetary transactions at the EGD level are handled via electronic transfer through a secure communication protocol.   These device types shall meet the applicable requirements set forth herein, specifically governing metering information and significant events in addition to other GLI standards that may apply.

1.5   Other Documents That May Apply

1.5.1 ***General Statement***.   This standard covers the minimal requirements of an MCS and all associated components. Please refer to the GLI website at www.gaminglabs.com for other GLI Standards. Below are a few that may apply:

  a) Gaming devices in Casinos (GLI-11);
  b) Progressive Gaming devices in Casinos (GLI-12);
  c) Cashless Systems in Casinos (GLI-16);
  d) Bonusing Systems in Casinos (GLI-17);
  e) Promotional Systems in Casinos (GLI-18);
  f) Individual Gaming Commission Minimum Internal Control Procedures;
  g) Redemption Terminals (GLI-20);
  h) Client-Server Systems (GLI-21); and
  i) Wireless Gaming Systems (GLI-26).

CHAPTER 2
2.0 SYSTEM COMPONENT REQUIREMENTS

2.1 Interface Element Requirements

2.1.1 General Statement. Each Gaming Device installed in the casino must have a device or facility (interface element) installed inside a secure area of the Gaming Device, that provides for communication between the Gaming Device and an external Data Collector.

2.1.2 Metering Requirements. If not directly communicating Gaming Device meters, the interface element must maintain separate electronic meters, of sufficient length, to preclude the loss of information from meter rollovers, or a means to identify multiple rollovers, as provided for in the connected Gaming Device. These electronic meters should be capable of being reviewed on demand, at the interface element level via an authorized access method, see also Section 3.3 'Meters.'

2.1.3 Battery Backup Requirements. The interface element must retain the required information after a power loss for a period determined by the regulatory agency. If this data is stored in volatile RAM, a battery backup must be installed within the interface element, see also Section 3.3 'Meters.'

2.1.4 Information Buffering. If unable to communicate the required information to the MCS, the interface element must provide a means to preserve all mandatory meter and significant event information until such time as it can be communicated to the MCS, see also Section 3.2, 'Significant Events' and Section 3.3 'Meters.' Gaming Device operation may continue until critical data will be overwritten and lost.

2.1.4.1 _Comprehensive Checks_ Comprehensive checks of interface element critical memory shall be made during each power resumption (this includes interface element restart).

a) Upon resumption, the integrity of all interface element critical memory shall be checked.

b) It is recommended that interface element critical memory is continuously monitored for corruption or with comprehensive checks occurring at the start of game play.

c) In addition, it is recommended that the control program (software that operates the interface element's functions) allow for the interface element to continually ensure the integrity of all control program components residing in non-volatile memory.

2.1.4.2 _Interface Element Requirements for Offline Ticketing Support_ It is recommended that the following set of minimum requirements should be met for an Interface Element to be capable of providing validation information to an EGD for the issuance of offline vouchers after a loss of communication to the Ticket/Voucher Validation System has been identified.

a) The Interface Element is recommended to be capable of communicating to the game that offline voucher issuance is supported and allow the game to negotiate non-support of this feature.

b) The Interface Element is recommended to meet the Manual Authentication ID requirements of Section 4.2.2.1.

c) The Interface Element is recommended to limit the number of provided validation numbers and seed, key, etc. values used for the issuance of offline vouchers to a max of 25 unused pairs.

   i. The Interface Element shall not provide to an EGD anymore than 25 validation numbers and seed, key, etc. values allowed for the issuance of offline vouchers until all outstanding offline voucher information has been fully communicated to the Ticket/Voucher Validation System.

d) The Interface Element is recommended to set a maximum expiration length of no more than 30 gaming days for all provided and still unused validation numbers and seed, key, etc. values.

     i.   Expired validation numbers and seed, key, etc. values must be discarded in a way that prevents the re-use of unique combinations of validation numbers and seed, key, etc. values for a sufficient period of time on the system.

2.1.5   ***Address Requirements***. The interface element must allow for the association of a unique identification number to be used in conjunction with a Gaming Device file on the MCS. This identification number will be used by the MCS to track all mandatory information of the associated Gaming Device. Additionally, the MCS should not allow for duplicate Gaming Device file entry of this identification number.

2.1.6   ***Configuration Access Requirements***. The interface element setup/configuration menu(s) must be not be available unless using an authorized access method.

2.2   Front End Controller and Data Collector Requirements

2.2.1   ***General Statement***. A MCS may possess a Front End Processor (FEP) that gathers and relays all data from the connected Data Collectors to the associated database(s). The Data Collectors, in turn, collect all data from connected Gaming Devices. Communication between components must be via an approved method and at a minimum conform to the Communication Protocol requirements stated in Section 3.1 of this document. If the FEP maintains buffered/logging information, then a means shall exist which prevents the loss of critical information contained herein.

2.3   Server and Database Requirements

2.3.1   ***General Statement***. A MCS will possess a Server(s), networked system or distributed systems that direct overall operation and an associated database(s) that stores all entered and collected system information.

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

a) Time stamping of Significant Events;
b) Reference clock for reporting; and
c) Time stamping of configuration changes.

2.3.3 ***Synchronization Feature***. If multiple clocks are supported the MCS shall have a facility whereby it is able to update those clocks in MCS components, whereby conflicting information could occur.

2.3.4 ***Database Access***. The MCS shall have no built-in facility whereby a casino user/operator can bypass system auditing to modify the database directly. Casino Operators will maintain secure access control.

2.4   Workstation Requirements

2.4.1 ***Jackpot/Fill Functionality***. A MCS System must have an application or facility that captures and processes every hand pay message from each Gaming Device. Hand pay messages must be created for single wins (jackpots), progressive jackpots and accumulated credit cash outs (canceled credits), which result in hand pays. A Fill (deposit of a pre-determined, or otherwise properly authorized, token amount in a Gaming Device's hopper) is normally initiated from a hopper empty message while a Credit (removal of excess tokens from a Gaming Device) is normally user initiated. An allowable exception to fill initiation would be where the system provides preventative or maintenance fill functionality, in which the transaction may be initiated by the system or an authorized user. Once captured, there must be adequate access controls to allow for authorization, alteration, or deletion of any of the values prior to payment or execution.

2.4.2   Tax Reporting Threshold. Every single win event hand pay message confirmed at this application by personnel of proper authorization, equal to or greater than the tax reporting threshold (established by the US Internal Revenue Service, currently $1,200), must advise the user of the need for a W2G (domestic players) or 10425 (foreign players) (required by the US Internal Revenue Service only) to be processed, either via the MCS or manually. This option must not be capable of being overridden. The keyed reset ability to return winnings from a taxable event to a Gaming Device should require user intervention to void the original jackpot slip that is generated.

NOTE: This is only applicable for U.S. jurisdictions that must comply with taxation requirements.

2.4.3   Jackpot/Fill Slip Information.   The following information is required for all slips generated with **some/all** fields to be completed by the MCS:

a) Type of slip;
    b) Numeric Slip identifier (which increments per event);
    c) Date and Time (Shift if required) ;
    d) Gaming Device number;
    e) Denomination;
    f) Amount of Fill;
    g) Amounts of Jackpot, Accumulated Credit, and Additional Pay;
    h) W2G indication, if applicable;
    i) Additional Payout, if applicable;
    j) Total before taxes and taxes withheld, if applicable;
    k) Amount to Patron;
    l) Total coins played and game outcome of award;
    m) Soft meter readings; and
    n) Relevant signatures as required by Gaming Board.

NOTE: Items 'b' through 'f,' 'm,' and 'n' apply to fill slips and items 'b' through 'e' and 'g' through 'n' apply to jackpot slips. The above information may vary dependent upon the jurisdictional Internal Controls and may or may not be required.

2.4.4 ***Surveillance/Security Functionality***. A MCS shall provide an interrogation program that enables on-line comprehensive searching of the significant event log for the present and for the previous 14 days through archived data or restoration from backup where maintaining such data on a live database is deemed inappropriate. The interrogation program shall have the ability to perform a search based at least on the following:

a) Date and Time range;

b) Unique interface element/Gaming Device identification number; and

c) Significant event number/identifier.

2.4.5 ***Gaming Device Management Functionality***. A MCS must have a master "Slot file" which is a database of every Gaming Device in operation, including at minimum the following information for each entry. If the MCS retrieves any of these parameters directly from the Gaming Device, sufficient controls must be in place to ensure accuracy of the information.

a) Unique interface element/location identification number;

b) Gaming Device identification number as assigned by the casino;

c) Denomination of the Gaming Device (please note that the denomination may reflect an alternative value, in the case of a multi-denomination game);

d) Theoretical hold of the Gaming Device; and

e) Control program(s) within Gaming Device.

2.4.6 ***Accounting Functionality***. A MCS must have an application or facility that allows controlled access to all accounting (financial) information and shall be able to create all mandatory reports in the 'Reporting Requirements,' Section 3.4, as well as all Internal Control required reports, if specified.

2.4.7   <u>*Exclusions*</u>. Generally, any system (component) not specified in this document that impacts revenue reporting must be submitted to the laboratory for test. For example,

Standalone Player Tracking Systems are not required for submission unless their function includes embedded feature(s) that affect revenue. (However, they may be tested for operation and version control if an integrated feature of a MCS submission.)

CHAPTER 3
3.0 SYSTEM REQUIREMENTS

3.1   Communication Protocol

3.1.1 General Statement. The system must support a defined communication protocol(s) and function as indicated by the communication protocol(s). A MCS must provide for the following:

a) All critical data communication shall be protocol based and/or incorporate an error detection and correction scheme to ensure an accuracy of ninety-nine percent (99%) or better of messages received;

b) All critical data communication that may affect revenue and is unsecured either in transmission or implementation shall employ encryption. The encryption algorithm shall employ variable keys, or similar methodology to preserve secure communication; and

c) All communication performed within the system, in it's entirety, must accurately function as indicated by the communication protocol that is implemented.

3.2   Significant Events

3.2.1 General Statement. Significant events are generated by a Gaming Device and sent via the interface element to the MCS utilizing an approved communication protocol. Each event must be stored in a database(s), which includes the following:

a) Date and time which the event occurred; and

b) Identity of the Gaming Device that generated the event; and

c) A unique number/code that defines the event; or

d) A brief text that describes the event in the local language.

3.2.2   *Significant Events*. The following significant events must be collected from the Gaming Device and transmitted to the system for storage:

a)   Power Resets or power failure;

b)   Hand pay Conditions (amount needs to be sent to the system):

 i.   Gaming Device Jackpot (An award in excess of the single win limit of the Gaming Device);

 ii.   Cancelled Credit Hand pay; and

 iii.   Progressive Jackpot (As per Jackpot above.)

c)   Door Openings (any door that accesses a critical area on the Gaming Device). Door switches (discrete inputs to the interface element) are acceptable if their operation does not result in redundant or confusing messaging.

d)   Coin or Token-In errors (It is acceptable to report Coin-In Jam, Reverse Coin-In and Coin Too Slow as a generic "Coin-In Error"):

e)   Bill (Item) Validator Errors ('i' and 'ii' should be sent as a unique message, if supported by the communication protocol):

 i.   Stacker Full (it is recommended that an explicit "stacker full" error message not be utilized since this may promote a security issue, rather "Bill Validator Malfunction" or equivalent); and

 ii.   Bill (Item) Jam.

f)   Gaming Device Low RAM Battery Error;

g)   Reel Spin Errors (if applicable with individual reel number identified);

h)   Coin or Token-Out Errors (should be sent as unique messages if supported in the protocol):

 i.   hopper jams;

 ii.   hopper runaways or extra coins paid out; and

 iii.   hopper empties.

i)   Printer Errors (if printer supported):

 i.   Printer Empty/Paper Low; and

 ii.   Printer Disconnect/Failure.

3.2.3   Priority Events. The following significant events must be conveyed to the MCS where a mechanism must exist for timely notification (it is permissible for the following significant events to be sent to the system as a generic error code) in cases where the game is unable to distinguish the specifics of the event:

a) Loss of Communication with Interface element;

b) Loss of Communication with Gaming Device;

c) Memory corruption of the Interface element, if storing critical information; and

d) RAM corruption of the Gaming Device.

3.3   Meters

3.3.1   General Statement. Metering information is generated on a Gaming Device and collected by the interface element and sent to the MCS via a communication protocol. This information may be either read directly from the Gaming Device or relayed using a delta function. Metering information on the MCS shall be labeled so they can be clearly understood in accordance to their function.

3.3.2   Required Meters. The following metering information must be communicated from the Gaming Device and stored on the system in units equal to the denomination of the gaming device or in dollars and cents:

a) Coin In;

    i. The System shall maintain Paytable Coin-In and theoretical payback percentage information provided by the gaming device for each multi-game or multi-denomination/multi-game.

    ii.   The System shall maintain Paytable Coin-In and weighted average theoretical payback percentage information provided by each gaming device which contain paytables with a difference in theoretical payback percentage which exceeds 4 percent between wager categories.

NOTE: This does not apply to Keno or Skill Games.

b) Coin Out:

c) Total Coin-Drop (coins-dropped or total value of all coins, bills and ticket/vouchers dropped);

d) Attendant Paid Jackpots (hand-pays);

e) Attendant Paid Cancelled Credits (if supported on Gaming Device);

f) Physical Coin In

g) Physical Coin Out

h) Bills In (total monetary value of all bills accepted);

i) Ticket/Vouchers Out

j) Machine Paid External Bonus Payout

k) Attendant Paid External Bonus Payout

l) Attendant Paid Progressive Payout

m) Machine Paid Progressive Payout

n) Ticket/Vouchers In (total monetary value of all ticket/vouchers accepted)

NOTE: Please refer to the GLI-11 standards for the electronic accounting meters that are to be maintained by the Gaming Device. While these electronic accounting meters should be communicated directly from the Gaming Device to the MCS, it is acceptable to use secondary MCS calculations where appropriate.

3.3.3 <u>**Clearing Meters**</u>. An interface element should not have a mechanism whereby an unauthorized user can cause the loss of stored accounting meter information, see also Section 3.1.4 '[Information Buffering](#).'

3.4   Reporting Requirements

3.4.1   *General Statement*. Significant event and metering information is stored on the MCS in a database and accounting reports are subsequently generated by querying the stored information.

3.4.2   *Required Reports*. Reports will be generated on a schedule determined by the Gaming Commission, which typically consists of daily, monthly, yearly period, and life to date reports generated from stored database information. These reports at minimum will consist of the following:

a) Net Win/Revenue Report for each Gaming Device;

b) Drop Comparison Reports for each medium dropped (examples = coins, bills) with dollar and percent variances for each medium and aggregate for each type;

c) Metered vs. Actual Jackpot comparison Report with the dollar and percent variances for each and aggregate;

d) Theoretical Hold vs. Actual Hold comparison with variances;

e) Significant Event Log for each Gaming Device; and

f) Other Reports, as required by individual jurisdictions.

NOTE: It is acceptable to combine reporting data where appropriate (e.g., revenue, theoretical/actual comparison)

NOTE: For additional revenue reporting requirements when ticket/voucher drop Gaming Devices are interfaced, please see 'Ticket/-Validation System Requirements,' section 4.0 of this document.

3.5   Security Requirements

3.5.1   Access Control. The MCS must support either a hierarchical role structure whereby user and password define program or individual menu item access or logon program/device security based strictly on user and password or PIN. In addition, the MCS shall not permit the alteration of any significant log information communicated from the Gaming Device. Additionally, there should be a provision for system administrator notification and user lockout or audit trail entry, after a set number of unsuccessful login attempts.

3.5.2   Data Alteration. The MCS shall not permit the alteration of any accounting or significant event log information that was properly communicated from the Gaming Device without supervised access controls. In the event financial data is changed, an automated audit log must be capable of being produced to document:

a) Data element altered;

b) Data element value prior to alteration;

c) Data element value after alteration;

d) Time and Date of alteration; and

e) Personnel that performed alteration (user login).

3.6   Additional System Features

3.6.1   Gaming Device Program Verification Requirements. If supported, a MCS may provide this redundant functionality to check Gaming Device game software. Although the overhead involved can potentially impede Gaming Device and MCS operation, the following information must be reviewed for validity prior to implementation:

a) Software signature algorithm(s); and

b) Data communications error check algorithm(s).

NOTE: The above standard is subject to review based on jurisdictional regulations and may or may not be required of the MCS.

3.6.2 ***Verification Algorithm Timing***. Verification may be user initiated or triggered by specific significant event(s) on the Gaming Device. To ensure complete coverage verification should be performed after each of the following events:

a) Gaming Device Power Up; and
b) New Gaming Device installed.

NOTE: The above standard is subject to review based on jurisdictional regulations and may or may not be required of the MCS.

3.6.3 ***FLASH Download Requirements***. If supported, a MCS may utilize FLASH technology to update interface element software if all of the following requirements are met:

a) FLASH Download functionality must be, at a minimum, password protected, and should be at a supervisor level. The MCS can continue to locate and verify versions currently running but it cannot load code that is not currently running on the system without user intervention;
b) An audit log must record the time/date of a FLASH download and some provision must be made to associate this log with, which version(s) of code was downloaded, and the user who initiated the download. A separate FLASH Audit Log Report would be ideal; and
c) All modifications to the download executable or flash file(s) must be submitted to GLI for approval. At this time, GLI will perform a FLASH download to the system existing at GLI and verify operation. GLI will then assign signatures to any relevant executable code and flash file(s) that can be verified by a regulator in the field. Additionally, all flash files must be available to a regulator to verify the signature.

NOTE: The above refers to loading of new system executable code only. Other program parameters may be updated as long as the process is securely controlled and subject to audit.

3.6.4   _Remote Access Requirements_. If supported, a MCS may utilize password controlled remote access to a MCS as long as the following requirements are met:

a) Remote Access User Activity log is maintained depicting logon name, time/date, duration, activity while logged in;

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

c) No unauthorized access to database other than information retrieval using existing functions;

d) No unauthorized access to operating system; and

e) If remote access is to be continuous basis then a network filter (firewall) should be installed to protect access.

NOTE: GLI acknowledges that the MCS manufacturer may, as needed, remotely access the MCS and its associated components for the purpose of product and user support. This feature however, must be optional, by a secure means, to accommodate those jurisdictions that do not permit remote access.

3.6.5   _Verification of System Software_.   System software components/modules shall be verifiable by a secure means (as defined in 3.5.1 Access Controls) at the system level denoting Program ID and Version. The system shall have the ability to allow for an independent integrity check of the components/modules from an outside source and is required for all control programs that may affect the integrity of the system. This must be accomplished by being authenticated by a third-party device, which may be embedded within the system software (see NOTE below) or having an interface port for a third-party device to authenticate the media. This integrity check will provide a means for field verification of the system components/modules to identify and validate the programs/files. The test laboratory, prior to system approval, shall approve the integrity check method.

NOTE: If the authentication program is contained within the system software, the manufacturer must receive written approval from the test laboratory prior to submission.

3.7   Backups and Recovery

3.7.1   General Statement.   The MCS shall have sufficient redundancy and modularity so that if any single component or part of a component fails, gaming can continue. There shall be redundant copies of each log file or system database or both on the MCS with open support for backups and restoration.

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

a) Significant Events;

b) Accounting information;

c) Auditing information;

d) Specific site information such as slot file, employee file, progressive set-up, etc; and

e) If voucher issuance is supported, all information utilized in the voucher redemption process including information specific to the redemption of offline vouchers if applicable.

CHAPTER 4

4.0 TICKET/VOUCHER VALIDATION SYSTEM REQUIREMENTS

4.1 Introduction

4.1.1 General Statement. A ticket/voucher validation system may be entirely integrated into a MCS or exist as an entirely separate entity. Ticket/Voucher validation systems are generally classified into two types: bi-directional ticket/voucher systems that allow Gaming Devices to print and redeem ticket/vouchers (TITO) and ticket/voucher out (TOO) only systems that allow Gaming Devices to print ticket/vouchers but do not allow ticket/voucher redemption. This chapter primarily addresses bi-directional ticket/voucher systems. Where ticket/voucher out only systems are utilized, some of the following may not apply.

4.1.2 Payment by Ticket/Voucher Printer. Payment by ticket/voucher printer as a method of credit redemption on a Gaming Device is only permissible when the Gaming Device is linked to an approved validation system or MCS that allows validation of the printed ticket/voucher. Validation information shall come from the validation system or MCS using a secure communication protocol.

NOTE: For support of offline voucher issuance, the Gaming Device must be linked to an approved validation system or MCS that allows validation of the printed ticket/voucher, but does not have to be in constant communication for the issuance of voucher to be permissible.

4.2 Ticket/Voucher Issuance

4.2.1   *Ticket/Voucher Information used by the Gaming Device while communicating to a validation system*.   The ticket/voucher validation system must be able to communicate the following ticket/voucher data to the Gaming Device to print on the ticket/voucher.

a) Casino Name/Site Identifier;

b) Indication of an expiration period from date of issuance, or date and time the ticket/voucher will expire (24 hr format which is understood by the local date/time format) if applicable;

c) System date and time (24 hr format which is understood by the local date/time format); and

d) Ticket/Voucher validation number for the Gaming Device to generate the validation number.

4.2.2   *Algorithm for generating ticket/voucher validation numbers or seeds*.

a) *System Validation* – the algorithm or method used by the validation system or MCS to generate the ticket/voucher validation number must guarantee an insignificant percentage of repetitive validation numbers.

b) *Gaming Device generated validation number (system seed)* **–** The validation system must send a unique seed to the Gaming Device upon enrolling the Gaming Device as ticket/voucher printing capable. The system may subsequently send a new seed to the Gaming Device after a ticket/voucher is printed. The algorithm or methods used to determine the seed must guarantee an insignificant percentage of repetitive validation numbers.

4.2.2.1 Algorithm for generating offline ticket/voucher authentication identifiers If support, the offline authentication identifier must be of a unique value that is derived by a HASH or other secure encryption method of at least 128 bits, that will: uniquely identify the wager instrument, verify that the redeeming system was also the issuing system, and validate the amount of the voucher. The following minimum set of inputs must be used to create the authentication identifier:

a) EGM identifier;

b) Validation number;

c) Voucher amount; and

d) Secure seed, key, etc. provided by the validation system or MCS to the Gaming Device;

    i. Secure seeds, keys, etc. as assigned must be sufficiently random. Measures to avoid predictability will be reviewed by the test laboratory on a case by case basis.

    ii. The minimum length for any secure seeds, keys, etc. employed by the validation system or MCS shall be chosen from a pool of the variable type specified by the communication protocol utilized. The pool must be comprised of at least 10 to the power of 14 randomly distributed values.

4.2.3   *System Ticket/Voucher Records*.

a) The validation system must retrieve the ticket/voucher information correctly based on the secure communication protocol implemented, and store the ticket/voucher information into a database.

b) The ticket/voucher record on the host system must contain at a minimum the following ticket/voucher information:

    i. Validation number;

    ii. Date and time the Gaming Device printed the ticket/voucher (24 hr format which is understood by the local date/time format);

    iii. Type of transaction or other method of differentiating ticket/voucher types (assuming multiple ticket/voucher types are available);

    iv. Numeric value of ticket/voucher in dollars and cents;

    v. Status of ticket/voucher (i.e. valid, unredeemed, pending, void, invalid, redemption in progress, redeemed, etc.);

    vi. Date and time the ticket/voucher will expire (24 hr format which is understood by the local date/time format or expiration period from date of issuance) if applicable;

vii.   Machine number (or Cashier/Change booth location number, if ticket/voucher creation outside the Gaming Device is supported) that identifies where the ticket/voucher was issued from.

4.2.4 __System Requirements for Offline Ticketing Support__. This section is recommended if an approved offline voucher routine is supported.

a) Support the identification and redemption of offline vouchers through a system provided application.

b) Log all access and operations of users of the aforementioned application for 14 days through archived data or restoration from backup where maintaining such data on a live database is deemed inappropriate.

c) The validation system or MCS must set a maximum expiration length of no more than 30 gaming days for all provided and still unused validation numbers and seed, key, etc. values.

d) Expired validation numbers and seed, key, etc. values must be discarded in a way that prevents the re-use of unique combinations of validation numbers and seed, key, etc. values for a sufficient period of time on the system.

4.2.5 *****Ticket/Voucher Printing during loss of communication with validation system***.
For validation systems that communicate to a Gaming Device through an Interface Board (also called SMIB, System Machine Interface Board), if any links between the Interface Board and the MCS database go down, the Interface Board must:

a) Not respond to the validation request from the Gaming Device and stop ticket/voucher printing, or

b) Prevent the Gaming Device from further ticket/voucher issuance, or

c) Not read or store any further ticket/voucher information generated by the Gaming Device.

NOTE: A maximum of 2 (two) ticket/vouchers directly after loss of communication is acceptable, in cases where the interface element has already been 'seeded' by the system, provided the ticket/voucher issuance information is sent immediately, when communication is reestablished.

**NOTE: This section does not apply to systems employing an approved offline voucher routine.

4.3   Ticket/Voucher Redemption

4.3.1   Online Ticket/Voucher Redemption.   Ticket/Vouchers can be redeemed at Gaming Device, Cashier/Change booths or other approved Validation Terminals (Kiosks) provided they are enrolled for ticket/voucher validation with a validation system. (See GLI-11 2.31 for Gaming Device ticket/voucher validation requirements).

a) The validation system must process ticket/voucher redemption correctly according to the secure communication protocol implemented;

b) The validation system must update the ticket/voucher status on the database during each phase of the redemption process accordingly. In other words, whenever the ticket/voucher status changes, the system must update the database; Upon each status change, the database must indicate the following information:

      i. Date and time of status change;

      ii.   Ticket/Voucher status;

      iii.   Ticket/Voucher value;

      iv.   Machine number or source identification from where the ticket/voucher information came from.

4.3.2   Offline Ticket/Voucher Redemption.   If supported, Offline Ticket/Vouchers can be redeemed at Cashier/Change booth provided they are enrolled for ticket/voucher validation with a validation system.

a) The validation system at a minimum must support the identification and redemption of offline vouchers through a system provided application;

b) The validation system must process offline ticket/voucher redemption correctly according to the secure communication protocol implemented;

c) The validation system must update the ticket/voucher status on the database during each phase of the redemption process accordingly. In other words, whenever the ticket/voucher status changes, the system must update the database. Upon each status change, the database must indicate the following information:

    i. Date and time of status change;

    ii. Ticket/Voucher status;

    iii. Ticket/Voucher value;

    iv. Machine number or source identification from where the ticket/voucher information came from.

4.3.3 **_Cashier/Change Booth Operation_**. All validation terminals shall be user and password controlled. Once presented for redemption, the cashier shall:

a) Scan the bar code via an optical reader or equivalent; or

b) Input the ticket/voucher validation number manually; and

c) May print a validation receipt, after the ticket/voucher is electronically validated, if applicable.

4.3.4 **_Validation Receipt Information_**. If applicable, the validation receipt, at a minimum, shall contain the following printed information:

a) Machine number;

b) Validation number;

c) Date and Time paid;

d) Amount; and

e) Cashier/Change Booth identifier.

4.3.5   _Invalid Ticket/Voucher Notification_.   The validation system or MCS must have the ability to identify these occurrences and notify the cashier that one of the following conditions exists:

a) Ticket/Voucher cannot be found on file (stale date, forgery, etc.);

b) Ticket/Voucher has already been paid; or

c) Amount of ticket/voucher differs from amount on file (requirement can be met by display of ticket/voucher amount for confirmation by cashier during the redemption process).

4.3.6   **_Ticket/Voucher Redemption During Communication Loss_. If the on-line data system temporarily goes down and validation information cannot be sent to the validation system or MCS, an alternate method of payment must be provided either by the validation system possessing unique features, (e.g., validity checking of ticket/voucher information in conjunction with a local database storage), to identify duplicate ticket/vouchers and prevent fraud by reprinting and redeeming a ticket/voucher that was previously issued by the Gaming Device; or use of an approved alternative method as designated by the regulatory jurisdiction that will accomplish the same.

NOTE: A maximum of 2 (two) ticket/vouchers directly after loss of communication is acceptable, in cases where the interface element has already been 'seeded' by the system, provided the ticket/voucher issuance information is sent immediately, when communication is reestablished.

**NOTE: This section does not apply to systems employing an approved offline voucher routine.

4.3.7   _Redemption Terminals (Kiosks)_. Refer to GLI-20 Redemption Terminals for technical standards for these devices.

4.4   Reports

4.4.1 **_Reporting Requirements_**.   The following reports shall be generated at a minimum and reconciled with all validated/redeemed ticket/vouchers:

    a) Ticket/Voucher Issuance Report;

    b) Ticket/Voucher Redemption Report;

    c) Ticket/Voucher Liability Report;

    d) Ticket/Voucher Drop Variance Report

    e) Transaction Detail Report must be available from the validation system that shows all ticket/vouchers generated by a Gaming Device and all ticket/vouchers redeemed by the validation terminal or other Gaming Device; and

    f) Cashier Report, which is to detail individual ticket/vouchers, the sum of the ticket/vouchers paid by Cashier/Change Booth or Redemption Terminal.

NOTE: The requirements for 'b' & 'd' are waived where two-part ticket/vouchers exist for the Gaming Device where the first part is dispensed as an original ticket/voucher to the patron and the second part remains attached to the printer mechanism as a copy (on a continuous roll) in the Gaming Device.

4.5   Security

4.5.1 **_Database and Validation Component Security_**. Once the validation information is stored in the database, the data may not be altered in any way. The validation system database must be encrypted or password-protected and should possess a non-alterable user audit trail to prevent unauthorized access. Further, the normal operation of any device that holds ticket/voucher information shall not have any options or method that may compromise ticket/voucher information. Any device that holds ticket/voucher information in its memory shall not allow removing of the information unless it has first transferred that information to the database or other secured component(s) of the validation system.

CHAPTER 5

5.0 SYSTEM ENVIRONMENTAL AND SAFETY REQUIREMENTS

5.1   Introduction

5.1.1   General Statement. This chapter shall govern the environmental and safety requirements for all system components submitted for review.

5.2   Hardware and Player Safety

5.2.1   General Statement. Electrical and mechanical parts and design principals of the electronic associated hardware may not subject a player to any physical hazards. The test laboratory shall NOT make any finding with regard to Safety and EMC testing as that is the responsibility of the manufacturer of the goods or those that purchase the goods. Such Safety and EMC testing may be required under separate statute, regulation, law or Act and should be researched, accordingly, by those parties who manufacture or purchase said hardware. The test laboratory shall not test for, be liable for, nor make a finding relating to these matters.

5.3   Environmental Effects on System Integrity

5.3.1   Integrity Standard. The Laboratory will perform certain tests to determine whether or not outside influences affect game fairness to the player or create cheating opportunities. An on-line system shall be able to withstand the following tests, resuming game play without operator intervention:

a) <u>Electro-magnetic Interference</u>. Systems shall not create electronic noise that affects the integrity or fairness of the neighboring associated equipment;

b) <u>Electro-static Interference</u>. Protection against static discharges requires that the system's hardware be earthed in such a way that static discharge energy shall not damage or inhibit the normal operation of the electronics or other components within the System. Systems may exhibit temporary disruption when subjected to a significant electro-static discharge greater than human body discharge, but they shall exhibit a capacity to recover and complete any interrupted function without loss or corruption of any control or data information associated with the System. The tests will be conducted with a severity level of up to 27KV air discharge.