

RANDOM NUMBER GENERATOR EVALUATION TESTING REPORT

RNG, Version: 0.5.0

Reference regulation: Maltese Remote Gaming Regulations 2004

(Legal Notice 176 of 2004 of the Lotteries and other Games Act - ACT XXIV OF 2001 and further amendments by Legal Notices 110 of 2006, 270 and 426 of 2007, and 90 of 2011 and 131 of 2016)

April 20, 2018



INTRODUCTION

The findings reported in this summary are the results of a broader set of documents and testing activities results archived in QUINEL Limited's facilities. It is intended that the requester declares that:

- Any Hardware provided or described for analysis and testing is configured identically to hardware in commercial use
- Game software/ function provided for the testing and code review is declared by the customer to have the same behaviour to the software/code in commercial use
- Functionality made by the software in automatic test mode has a realistic behaviour

and that

- all the files and modules,
- the database schemas and all the specific programming resources,
- all the parameters contained into any databases and/or configuration file

that have been subject to the audit process guarantee the same behaviour of what is going to be published/deployed according to this audit results.

The Recipient, by accepting and using this Report, declares to be aware and accept unconditionally all the terms and conditions set forth. If the Applicant and / or the Recipient does not agree on the terms and conditions set forth, QUINEL Limited reserves the right to cancel the certification provided with this Report, it follows therefore that the Recipient must immediately return all copies to QUINEL Limited of this Report and cannot use them nor refer to.

Any copy of this test reports and calibration certificates must also include the page number and total number of pages.

Copy of this test report must not be reproduced except in full, without written approval of the laboratory.

A) Audit ID

J18040359_R001_RNG_REV.1

B) Reference regulation

Maltese Remote Gaming Regulations 2004

(Legal Notice 176 of 2004 of the Lotteries and other Games Act - ACT XXIV OF 2001 and further amendments by Legal Notices 110 of 2006, 270 and 426 of 2007, and 90 of 2011 and 131 of 2016)

C) Test methods

QISI001– Software source code inspection
 QIRT000 – RNG qualitative analysis
 QIRT001 (UD01 / SI01 / RT01) - Uniform distribution, statistical independence, Runs tests
 ERT001 – DIEHARD battery of tests
 ERT002 – NIST (SP800-22rev1a) battery of tests
 QIRT002 (SS01) – Statistical analysis on scaled/mapped/shuffled numbers (Gap test, Serial test, etc)
 QIMT001 – Mathematical analysis

D) Auditor / Test lab (RGR Part VI, 26.b)

QUINEL Limited
 Marina Court, Flat 8, Triq Giuseppe Cali’,
 XBX 1421 Ta’ Xbiex – Malta
info@quinel.com.mt

E) Audit subject

Description: Compliance of the following test items (games):

<i>Test Item</i>	<i>Test Item Name</i>	<i>Version</i>	<i>Interface</i>
R001	RNG	0.5.0	N.A.

Receipt date:
 03/04/2018 – first submission for testing against Maltese regulation as per Section (B)

Inspection date:
 10/04/2018 - 20/04/2018

F) Requester (RGR Part VI, 26.a)

Booming Games Limited
 PO BOX 227, Clinch’s House, Lord Street
 Douglas, Isle of Man, IM99 1RZ

G) Owner of the system/software (RGR Part VI, 26.a)

Refer to section F)

H) Companies and organizations involved in the process (RGR Part VI, 26.c)

Producer(s): Ref. to Section G)

Requester: Ref. to Section F)

Licensee/Operator: N.A.

I) Individuals involved in the process (RGR Part VI, 26.d)

On the Requester side: Mr. Moritz Blume, Mr. Stefan Heim

On the Producer(s) / Integrator(s) side: same as for Requester;

On the Licensee/Operator side: N.A.

J) Processes, rules and parameters of the games (RGR Part VI, 26.e)

N.A.

K) Protocols and specifications of the gaming system (RGR Part VI, 26.f)

RNG is written in Ruby (2.5.0) programming language using the interface SecureRandom. This interface implements a cryptographically secure pseudorandom number generator as reported in the documentation available on

<http://ruby-doc.org/stdlib-2.5.0/libdoc/securerandom/rdoc/SecureRandom.html>

The specific solutions, developed to provide random services to the games, implements a generic “int64” extractor and uses the number extracted to provide random results for all the other functions used by the games, therefore all those functions are based on this “SecureRandom” interface.

All statistical tests have been performed by collecting sequences of scaled and “raw” random numbers using a script on the Requester’s staging server during a live session with the Requester,

Scaled integer within specific ranges used within the test items:

[0,1]

[0,36]

[0,37]

[0,51]

[0,99]

[0,149]

[0,199]

Refer to the Annex report for the full list of requirements satisfied.

L) Security of the system (RGR Part VI, 26.g)

N.A.

M) Critical modules (RGR Part VI, 26.h)

The tests were performed on the files listed below:

<i>SHA1</i>	<i>Critical</i>	<i>Test Item</i>	<i>File</i>
67f190d6d205b0524046f01b5805d60704e69b1b	Yes	R001	prng.rb
2e16ed239531b92ee293cf838416ea8cba3259c9	Yes	R001	prng_provider.rb

N) Evaluation performed

The test evaluation, required by Requester (Ref. to Section F) was completed against the following requirements:

- Part VI, 25, 26
- Third Schedule (Regulation 25)

O) Testing activities applied

Internal procedure followed:
Rif. "IOP 02-02 TEST METHODS"

P) Additional information (RGR Part VI, 26.i)

None

Q) Setup and application/system architecture (RGR Part VI, 26.j)

Refer to Section K)

R) Product Tested

Refer to Section M)

S) CERTIFICATION

Date: April 20, 2018
Requester: Booming Games Limited
PO BOX 227, Clinch's House, Lord Street
Douglas, Isle of Man, IM99 1RZ

Total Number of Pages: 16

QUINEL Limited certifies that the games / test items identified at section E) subject to testing and here briefly listed:

R001: **RNG** version 0.5.0

comply with the with the Remote Gaming Regulation of Malta (Legal Notice 176 of 2004 of the Lotteries and other Games Act - ACT XXIV OF 2001 and further amendments by Legal Notices 110 of 2006, 270 and 426 of 2007, and 90 of 2011 and 131 of 2016).

Refer to the Annex reports for the full list of requirements satisfied.

T) CONDITIONS

N.A.

U) CONCLUSIONS

QUINEL Limited certifies that the RGS tested complies with the Technical Standards requested

Date: April 20, 2018

Signed:



Davide De Nobile – Laboratory Technical Director
(QUINEL Limited)

ANNEX I – REQUIREMENTS SATISFIED

DEFINITIONS
“ the Act ” means the Lotteries and Other Games Act, 2001
“ appropriate resources ” means financial resources which are, in the Authority’s sole discretion, adequate to ensure the financial viability of operations of a remote gaming office, and which are available from a source that is not tainted with illegality
“ appropriate services ” means the services of persons who have appropriate experience to ensure the proper and successful conduct of a remote gaming operation and, or a remote betting office
“ approved control system ” means a control system approved by the Authority, and shall include an approved control system changed or modified with the approval of the Authority
“ authorised game ” means remote gaming that a licensee is permitted to conduct under these regulation
“ the Authority ” means the Lotteries and Gaming Authority
“ betting market ” means a betting event with a well-defined termination point and decidable outcome
“ control system ” means a system of internal controls, and administrative and accounting procedures for the conduct of a remote gaming office which is set up and maintained in Malta
“ electronic means ” means all electronic data transfer, whether by telephone, facsimile, computer or any other means of distance communications as approved by the Authority
“ game ” has the same meaning assigned to it by the Act
“ gaming ” means an agreement, scheme, or arrangement between two or more parties to play together at a game of chance in which a prize or reward consisting of money or some other item of value, worth, advantage, or opportunity is offered or can be won and become the property of the winner under defined conditions established for the purpose of the game
“ gaming records ” means all records directly or indirectly related to remote gaming and to bets provided by a licensee and to player account information, wagers placed and to the outcomes of games played
“ gaming system ” means a computer system or systems of computers by means of which remote gaming is conducted, and shall include all its associated components, its operating systems and applications software
“ inspector ” has the same meaning assigned to it by article 17 of the Act
“ key official ” means a person nominated by the licensee who is a director of the licensee and resident in Malta
“ licensee ” means a person to whom the Authority has issued a remote gaming licence
“ means of distance communications ” has the same meaning assigned to it by the Act but shall not include press advertising with an order form or catalogue and phone-ins during radio and television programmes
“ the Minister ” means the Minister responsible for finance
“ player ” means any person who is over 18 years of age and who takes part in remote gaming
“ player’s account ” means a record kept by the licence holder, which record shall at all times be accessible to the player, which shows the player’s credit against such licence holder, taking into account all wagers placed and all prizes won by such player and any other debits or credits as may be permitted by these regulations or approved by the Authority
“ pool betting ” means betting made on terms where all or part of the winnings shall be determined by reference to the aggregate of stakes paid or agreed to be paid by the person betting, and which shall be divided among the winners
“ remote betting ” means the negotiation or receiving of any bet by a means of distance communications
“ remote gaming ” means any form of gaming by means of distance communications
“ remote gaming equipment ” means a machine or other device whether electronic, electrical or mechanical, computer software, or any other mechanism, device or item, used or suitable for use, in the operation of an authorised game and which is situated in Malta
“ remote gaming licence ” means the licence granted to a licensee by the Authority to conduct remote gaming
“ remote gaming related activities ” means any activity or business that the Authority considers reasonably

related to the operation of remote gaming, or any business that offers goods or services to persons who participate in licensed remote gaming

“**qualifying shareholding**” has the same meaning assigned to it by the Act

“**stake**” has the same meaning assigned to it by the Act.

Unless differently specified, the results are related to all the test items.

Part VI Gaming System		
25.	<i>An applicant for a licence, or a licensee shall in respect of a new gaming system, and before any such system becomes operational, provide adequate certification that may be required by the Authority. Provided that the certification must show that gaming system has been found within the previous six months to comply with each and all the technical specifications laid down in the Third Schedule to these Regulations</i>	PASS
26.	The certification submitted to the Authority for approval must, where the system is based on computer software, include the following information	
(a)	the name of the owner of the software	PASS
(b)	the name of the organisation which did the testing required by the Authority	PASS
(c)	all companies and organisations involved in the process and their credentials	PASS
(d)	all individuals involved in the process and their professional credentials	PASS
(e)	the processes, rules and parameters of the games	PASS
(f)	the server protocols, communication protocols and other specifications which are part of the gaming system architecture	N.A.
(g)	information about the security of the system	N.A.
(h)	which modules affect processes, rules and parameters of the game if the source-code is changed	PASS
(i)	any other information that is of material importance to the specific software	PASS
(j)	a detailed description of the setup and functionality of the application architecture and system architecture	N.A.

Unless differently specified, the results are related to all the test items.

Third Schedule		
Technical requirement for gaming system		
1.	The gaming system must-	
(a)	faithfully follow the game rules published by the operator and	<i>N.A.</i>
(b)	provide over time no more than the expected house advantage to the operator	<i>N.A.</i>
2.	Both the gaming and financial transactions must be congruent and secure.	<i>N.A.</i>
3.	The gaming system must satisfy the following criteria for randomness, following Schneier-	
	(a) the data must be randomly generated, passing appropriate statistical tests of randomness.	PASS
	(b) the data must be unpredictable, i.e. it must be computationally infeasible to predict what the next number will be, given complete knowledge of the algorithm or hardware generating the sequence, and all previously generated numbers.	PASS
	(c) the series cannot be reliably reproduced, i.e. if the sequence generator is activated again with the same input (as exactly as is reasonably possible) it will produce two completely unrelated random sequences.	PASS
4.	The outcome of any game event, and the return to the player, must be independent of the CPU, memory, disk or other components used in the playing device used by the player	<i>N.A.</i>
5.	The game or any game event outcome must not be affected by the effective bandwidth, link utilisation, bit error rate or other characteristic of the communication channel between the gaming system and the playing device used by the player.	<i>N.A.</i>
6.	The gaming system must be able to display for each game the following information on the current page or on a page directly accessible from the current page via a hyperlink-	
	(a) the name of the game	<i>N.A.</i>
	(b) restrictions on play	<i>N.A.</i>
	(c) instructions on how to play, including a pay-table for all prizes and special features	<i>N.A.</i>
	(d) the player's current account balance	<i>N.A.</i>
	(e) unit and total bets	<i>N.A.</i>
	(f) the rules of the game	<i>N.A.</i>
	(g) information relating to the average winnings paid out to players of the game over a period of time or a particular number of plays.	<i>N.A.</i>
7.	All financial reports produced by the gaming system must be congruent with gaming transaction reports and conversely	<i>N.A.</i>
	provided that all such reports shall be readily and freely available to the Authority	<i>N.A.</i>
8.	The gaming system must-	
	(a) be capable of producing monthly auditable and aggregate financial statements of gaming transactions, and	<i>N.A.</i>
	(b) calculate accurately all taxation and other monies due to the Authority	<i>N.A.</i>
9.	The gaming system must maintain information about all games played, including	
(a)	the identity of the player	<i>N.A.</i>
(b)	the time the game began as recorded on the games server	<i>N.A.</i>
(c)	the balance on the player's account at the start of the game	<i>N.A.</i>
(d)	the stakes placed in the game (time stamped by the games server)	<i>N.A.</i>
(e)	the game status (in progress, complete, etc)	<i>N.A.</i>

(f)	the result of the game (time stamped by the games server)	<i>N.A.</i>
(g)	the time the game ended as recorded by the games server	<i>N.A.</i>
(h)	the amount won or lost by the player and	<i>N.A.</i>
(i)	the balance on the player's account at the end of the game	<i>N.A.</i>
10.	The gaming system must maintain information about significant events as follows-	
	(a) large wins	<i>N.A.</i>
	(b) transfers of funds in excess of such amount as the Authority may from time to time direct by notice in writing to the operator	<i>N.A.</i>
	(c) changes made by the operator to game parameters	<i>N.A.</i>
<i>11. Any variations to any of the requirements specified in this Schedule shall be submitted to the Authority for its approval by notice in writing.</i>		

ANNEX II – RNG test details

A) Security

RNG output is used immediately and not stored in memory. Restarting of RNG is not performed programmatically and requires the entire platform to restart. Background cycling is in fact implemented sharing the RNG instance among all the games.

B) Testing results for raw output of RNG (section 3.6.1)

Data sets (3 million outcomes each, raw 32bit integers):
 fdac84a79a880cd6c0388011c06533938dd6cd0e *numbers_n_300000_upper_4294967295_pass_1
 d71a7ceff70a9aeca8ff7fd86839e9f8f53ae2e *numbers_n_300000_upper_4294967295_pass_2
 3e941180020ad70c70bc647a350a60716495be97 *numbers_n_300000_upper_4294967295_pass_3
 8b661f6fd288f3b89943ffa39bb36ba635e7c9bf *numbers_n_300000_upper_4294967295_pass_4
 231222b95cfb9d832ef4932571149a185847d2d0 *numbers_n_300000_upper_4294967295_pass_5
 322592119e64c9e620da7ae27d8dfbbcb1242e5b *numbers_n_300000_upper_4294967295_pass_6
 28a9f1108f7260cacc2819511a7aad3514a06b1 *numbers_n_300000_upper_4294967295_pass_7
 13278c396961ac98556cba70c635691d4475d83a *numbers_n_300000_upper_4294967295_pass_8
 1fbe5096f0138eaf21380abdad89c6259e11ceaa *numbers_n_300000_upper_4294967295_pass_9
 47aa73731b56fa52c68c5755f53ad6f05a99d116 *numbers_n_300000_upper_4294967295_pass_10
 9b02dc1b2b133a27533d1b257ab23c7f25b00d74 *raw_concatenato.txt

DIEHARD battery of tests

Overall results:

POSITIVE

Test results:

BIRTHDAY SPACINGS TEST:	PASS
OVERLAPPING 5-PERMUTATION TEST:	PASS
BINARY RANK TEST for 31x31M:	PASS
BINARY RANK TEST for 32x32M:	PASS
BINARY RANK TEST for 6x8M:	PASS
BITSTREAM TEST:	PASS
OPSO, OQSO and DNA TESTS:	PASS
COUNT-THE-1's TEST (stream) :	PASS
COUNT-THE-1's TEST (specific) :	PASS
PARKING LOT TEST:	PASS
MINIMUM DISTANCE TEST:	PASS
3DSPHERES TEST:	PASS
SQUEEZE TEST:	PASS
OVERLAPPING SUMS TEST:	PASS
RUNS TEST:	PASS
CRAPS TEST:	PASS

NIST battery of tests:

Overall results: POSITIVE

Test results:

Frequency:	PASS
BlockFrequency:	PASS
CumulativeSums:	PASS
Runs:	PASS
LongestRun:	PASS
Rank:	PASS
FFT:	PASS
NonOverlappingTemplate:	PASS
OverlappingTemplate:	PASS
Universal:	PASS
ApproximateEntropy:	PASS
RandomExcursions:	PASS
RandomExcursionsVariant:	PASS
Serial:	PASS
LinearComplexity:	PASS

C) Testing results for scaled data or shuffled decks data (section 3.6.2)

Confidence level: 95%

1) Data sets of 3 million outcomes each, random extraction DOF = 2, range=[0,1] (included):

58d280786e1ab1a38c5454de5143ec8a179cea28 *concatenato_0-1.txt
 43cfaf84caf0205dfcd38261bd0efb25be71684c *numbers_n_300000_upper_1_pass_1
 0557b064f60f5ccb8b00ef16a58fd25ba8d4b362 *numbers_n_300000_upper_1_pass_2
 caf96ebfb264f9c5799a20596caa9a610dcbe3ed *numbers_n_300000_upper_1_pass_3
 bb51bd012c6f857c76f2c0a26439fedbcb228b4d *numbers_n_300000_upper_1_pass_4
 45e02f5d731f65230e9725deee851e4f22a83192 *numbers_n_300000_upper_1_pass_5
 c551ff20510a938baead1f9bb69edab90d5aeac4 *numbers_n_300000_upper_1_pass_6
 320c5a746325153e1330da12971388103ba47891 *numbers_n_300000_upper_1_pass_7
 809667f999b77dd62b1085f3703c38cce6b674bc *numbers_n_300000_upper_1_pass_8
 8a567fd019fc22db14fcd2a5787cda0b0027c37b *numbers_n_300000_upper_1_pass_9
 78710d501a25efd2a3f2e65ff64fab464e55a073 *numbers_n_300000_upper_1_pass_10
 05c21dfb1ec34e169153c07fcf3b60a839e687d4 *numbers_n_3000000_upper_1_pass_1
 19afd05421937bfd76b3a265c56d6c67f329c1b4 *numbers_n_3000000_upper_1_pass_2
 6ac8c30b12fd874bebc4a0e2a212b9c76e2443f9 *numbers_n_3000000_upper_1_pass_3
 9e06f9ed5622ccf19fc6320f3e65b7a9f6662b12 *numbers_n_3000000_upper_1_pass_4

2) Data sets of 3 million outcomes each, random extraction DOF = 37, range=[0,36] (included):

1bc63529632c248b54ae016bee1a8c448a635e1e *concatenato_0-36.txt
 c50f62baa46cd85ad0a188291dac63136bd3a9fe *numbers_n_300000_upper_36_pass_1
 c1d8399e793c65aae6e841567f6ad16209b88b76 *numbers_n_300000_upper_36_pass_2
 d933adabe2939d9020e698fe657266c61c383732 *numbers_n_300000_upper_36_pass_3
 431d4b922aeff5f3eade7ca54408a28c978dafdd *numbers_n_300000_upper_36_pass_4

85490fe8a2a3991678c487a30fb31741196a2e8b *numbers_n_300000_upper_36_pass_5
6e07b0eaab34172ea8bd82a91f6f115c50854228 *numbers_n_300000_upper_36_pass_6
4ca1d05876e5c888bd8279823b2685243f8463a1 *numbers_n_300000_upper_36_pass_7
7c497a6ceda596e25e0c396ba9d67ce65678e28a *numbers_n_300000_upper_36_pass_8
745ec7dd7f9d8ee720d885f3779c3e28a28ca9d8 *numbers_n_300000_upper_36_pass_9
fa18bbf86776a389ca846065ea750239e63343ec *numbers_n_300000_upper_36_pass_10
e036fa64b597c22f46d7e4b4cd859c65c17fb42 *numbers_n_300000_upper_36_pass_1
0949849da9e5af0c5f6057a49a8b181f226216f4 *numbers_n_300000_upper_36_pass_2
adc3e579b864a80f688d1c96c12fb1c0007c24d3 *numbers_n_300000_upper_36_pass_3
1769d08c2a409a0476b4436ebd7cf35a184c2ace *numbers_n_300000_upper_36_pass_4

3) Data sets of 3 million outcomes each, random extraction DOF = 38, range=[0,37] (included):

440fd9659cd6c8c948ad7239100e3be5e8a5dd26 *concatenato_0-37.txt
7eebb58f5f5cd1a56bc81b526594fcbec1cb82518 *numbers_n_300000_upper_37_pass_1
4764d152876418c199be565e82c5b8e0501786c3 *numbers_n_300000_upper_37_pass_2
217ab007e43feca0c452d6cd4fc2eccc16d3d *numbers_n_300000_upper_37_pass_3
7519a7a2e15ab579c6fdab52778aa87ba6262149 *numbers_n_300000_upper_37_pass_4
41ba8c43fbad4ef8507f276ca560902deb75bffd *numbers_n_300000_upper_37_pass_5
85730227979b61014eda6a64264d1e92f6c62d6f *numbers_n_300000_upper_37_pass_6
effe3e07cdfce786e78b49736a1956d803a4ccc1 *numbers_n_300000_upper_37_pass_7
133f395a2b6fb90109e62fedae8e582f53842158 *numbers_n_300000_upper_37_pass_8
c68c67b2f98f90dffe2e7819feb4e683e39ce5da *numbers_n_300000_upper_37_pass_9
d679c8c1f02119c14cf323808e1ce5cbcd7471d8 *numbers_n_300000_upper_37_pass_10
2ac350c0a0cca01af0373d5b908a5c69cd88e146 *numbers_n_300000_upper_37_pass_1
289b976b27ac49a77b7c73905ecf22180341ec08 *numbers_n_300000_upper_37_pass_2
e203b1f793388f25a46066fc8b04a84532dd23df *numbers_n_300000_upper_37_pass_3
610551cd9c64f657f217545b9872dc63991d231a *numbers_n_300000_upper_37_pass_4

4) Data sets of 3 million outcomes each, random extraction DOF = 52, range=[0,51] (included):

0aeae4f8d3f529a4afdea5fdfea7f3b49cf8a5c *concatena\output.txt
87c6a8d502051aae7cf760b4425c50ccaf9a38d8 *scaled_300000x[0-51]_83.txt
2bcbbcb12548d7c5a18420ebc60d597a7a256eb3c *scaled_300000x[0-51]_84.txt
bcbe0b4a30b57c6b1fda4cbb063bee1cd56386c *scaled_300000x[0-51]_85.txt
2d8cbfe8b43bef7df74b6226b3d98024eace133a *scaled_300000x[0-51]_20.txt
24f47a840f590a2226cf5da19366ed43c16ad8ef *scaled_300000x[0-51]_21.txt
4eb22fb7e4fa2295171b5ac2a8a2595ec0a92832 *scaled_300000x[0-51]_22.txt
61590e9a9914a071c4a1dfb9f58adf7629f72024 *scaled_300000x[0-51]_23.txt
18802277daefe9e28326569f8efcf36b2f494b7 *scaled_300000x[0-51]_24.txt
3c672c1013ec3b304caf50ecc164c2a4c4525fd6 *scaled_300000x[0-51]_25.txt
abc8afc47f4d20720e0be57c2d34d0932c232a9b *scaled_300000x[0-51]_26.txt
f341d8a0ea5484d1fe9c7db1203531792e9027e6 *scaled_300000x[0-51]_27.txt
7e6793611a40eda50d496b75e37d95a5f38038dd *scaled_300000x[0-51]_28.txt
f9da5478ca85beb8396be2532709a8445ba2633e *scaled_300000x[0-51]_29.txt

5) Data sets of 3 million outcomes each, random extraction DOF = 100, range=[0,99] (included):

5189515ce03745c04c4fce0a0ca18476bc2a9f61 *concatenato_0-51.txt
8777eab95cb6ed08cb6aa8ca4fdce89ef3c1783b *numbers_n_300000_upper_51_pass_1
15eaae92b79672aa888c7004e0658b8c7339729c *numbers_n_300000_upper_51_pass_2
d6b15b6b550b499defc4b682364b4e7909e2a0ba *numbers_n_300000_upper_51_pass_3
1f2f1336a2ca8810ae0ddf88d877483b44e74741 *numbers_n_300000_upper_51_pass_4
0f4a36644ef809b1ac2af3956977cee9bd33eee1 *numbers_n_300000_upper_51_pass_5
034cb0c1738d667ce21f5d6d6866a31ed3b474f5 *numbers_n_300000_upper_51_pass_6

2cb535b9fae2d7a8d3ae72694d000d587cd40a9c *numbers_n_300000_upper_51_pass_7
2ba0cddf2af9bab6f7c24c08ce8927d2144470e7 *numbers_n_300000_upper_51_pass_8
898adb2d0049de574b13e7c3834be43fa639ba3b *numbers_n_300000_upper_51_pass_9
980b8878897f56bd3427c4421aee3fd405ad529b *numbers_n_300000_upper_51_pass_10
63309b23b31e82d070c744de409fb59707a56a99 *numbers_n_3000000_upper_51_pass_1
fb6ad501bec2258af04b8c2037260e83bab69bf5 *numbers_n_3000000_upper_51_pass_2
21459dbfefbb6eb8f994a232ccbc75b0b5b06e22 *numbers_n_3000000_upper_51_pass_3
c3682cc56c25c2ad62f5a6f6e0f612f9d1299336 *numbers_n_3000000_upper_51_pass_4

6) Data sets of 3 million outcomes each, random extraction DOF = 100, range=[0,99] (included):

2077cfda566376ddd98abe9a2175bf3530bc887 *concatenato_0-99.txt
7ae52525b984edf65eea300955736b85541191c3 *numbers_n_300000_upper_99_pass_1
a2f4fb44c3ac39ba42c790de491f4df71de310a2 *numbers_n_300000_upper_99_pass_2
11ebabea094d1acf5bca1f48a442fe1ef567dbf0 *numbers_n_300000_upper_99_pass_3
29b08377d50bb73a0756768d867419798b4323a6 *numbers_n_300000_upper_99_pass_4
1a015e1739cd99d1fc277013ef9c7de0c01d9356 *numbers_n_300000_upper_99_pass_5
0407e405ff1b47c707e0f8a7b5df1de41069bf5a *numbers_n_300000_upper_99_pass_6
bab1865e9003e8892b81b9eb84ad8d005b8d9c3c *numbers_n_300000_upper_99_pass_7
7665ccbe1efe599ec8761be194564769575ba9b5 *numbers_n_300000_upper_99_pass_8
3b926495093d473f2728ab1862a09f42ebfc2f44 *numbers_n_300000_upper_99_pass_9
762a15589b1b4792943a77fc591531aed9c00633 *numbers_n_300000_upper_99_pass_10
d3559213d001a245380a3ea397da2f6ca8cb292f *numbers_n_3000000_upper_99_pass_1
9acb893c81c01f3e59cdac6ab72a9642ff7c5ec8 *numbers_n_3000000_upper_99_pass_2
620b9cdb6ba77809c92c98f510bec1e8a9f60000 *numbers_n_3000000_upper_99_pass_3
181c1eec12457cfa7177f90b09310d8cf936c88f *numbers_n_3000000_upper_99_pass_4

7) Data sets of 3 million outcomes each, random extraction DOF = 150, range=[0,149] (included):

8c00a370f526a241d50b2f122d91fb3b09ea764e *concatenato_0-149.txt
bc73faace2548d7fafa94be9ded3503d5211c55e *numbers_n_300000_upper_149_pass_1
0beb4539d94e3676f465574253114bf5bd44b692 *numbers_n_300000_upper_149_pass_2
4d6385faca77339682e2121879b792cd33ffe112 *numbers_n_300000_upper_149_pass_3
015d2ccac0f7e55ebd9fca06d86796142fddf673 *numbers_n_300000_upper_149_pass_4
146566f1af79a1808551f9550e51d79972e61f53 *numbers_n_300000_upper_149_pass_5
f707e63e330223c13f878462791c5560068ec794 *numbers_n_300000_upper_149_pass_6
e714ba48f0abef15096b63085ac940845961ce87 *numbers_n_300000_upper_149_pass_7
3476cac2224090e517ef48324a408b96bde0fe54 *numbers_n_300000_upper_149_pass_8
1a610efe343dd4612fd7a31830965d6346730460 *numbers_n_300000_upper_149_pass_9
de7b26f88b3a5d54c3e6b031bee13b9bd0ab580e *numbers_n_300000_upper_149_pass_10
58fcc9e7a5c8cdf65e600fb9813d26146ac82c8a *numbers_n_3000000_upper_149_pass_1
fe95811a6cd9dc6fc7b3c84dad882f872a635a6 *numbers_n_3000000_upper_149_pass_2
3d579150c1c998cb63143eb20b018bce4c0ed780 *numbers_n_3000000_upper_149_pass_3
0a000a5e0e62a7adb8780b4ae6ca624cc77c8856 *numbers_n_3000000_upper_149_pass_4

8) Data sets of 3 million outcomes each, random extraction DOF = 200, range=[0,199] (included):

b5f7bcf59ee33483255cc8399aebec0d9ca667cc *concatenato_0-199.txt
e5c2b36b8b51c9ff2fc73db3409f8519c26d0602 *numbers_n_300000_upper_199_pass_1
73d3cb8e3fbc35c510fb5bf680722668a25cb45c *numbers_n_300000_upper_199_pass_2
8051536f9fac1b28ab9124ccf0fdcd6b79868dde *numbers_n_300000_upper_199_pass_3
d459f1e78c71ee47bd7c3ce16c884756c5152b18 *numbers_n_300000_upper_199_pass_4
37c00f8bbb2e43453fc3c790b38b772bc9f4d129 *numbers_n_300000_upper_199_pass_5
3d63b083ffa8aaa9f3c30efcb48259de90a4d9e5 *numbers_n_300000_upper_199_pass_6
c4f5b4709f079b964c2615f1f20d30ce7e52721c *numbers_n_300000_upper_199_pass_7
e85504bf89eecd6dd6a67b19a69f3a54725eb38a *numbers_n_300000_upper_199_pass_8
244134fe55ac4ed29a398b91eb971b13b02429a2 *numbers_n_300000_upper_199_pass_9

0fa1c856baca8064bd644ed282109037c90ac42e *numbers_n_300000_upper_199_pass_10
3bb6b912059789d51727d70298a92803088daa6b *numbers_n_3000000_upper_199_pass_1
3794cdc119d6e723bfee5a51877aac4b5db77660 *numbers_n_3000000_upper_199_pass_2
13242490f592bc8ff6f2c55a526bd1b729650976 *numbers_n_3000000_upper_199_pass_3
b57163ebe9027dd96bae4950953fe0e0eb5d67c7 *numbers_n_3000000_upper_199_pass_4

Overall results:

POSITIVE

Test results:

UNIFORM DISTRIBUTION / FREQUENCY:	PASS
STATISTICAL INDEPENDENCE (Chi square):	PASS
RUNS TESTS:	PASS
SELF-CORRELATION:	PASS
CROSS-CORRELATION:	PASS

END
OF
COMPLIANCE
REPORT