eGAMING COMPLIANCE SERVICES LIMITED

RANDOM NUMBER GENERATOR EVALUATION REPORT

FOR

SUMMUS TECH N.V.

REPORT REFERENCE NUMBER: 21833STGGB001

REPORT ISSUE DATE: 18 JANUARY 2021

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TABLE OF CONTENTS

SECTION 1. GENERAL INFORMATION

CLIENT NAME:	Summus Tech N.V.
CLIENT ADDRESS:	Landhuis Groot Kwartier , Groot Kwartierweg 12, Curacao
PRODUCT NAME:	Quantis USB 4M
SUPPLIER:	ID Quantique SA
PRODUCT DESCRIPTION:	Quantis is an easily configurable physical random number generator USB device that is compatible with most operating systems, where its operation is continually monitored to detect any failure.
PRODUCT VERSION:	1.0
RNG TYPE:	Hardware
JURISDICTION:	Great Britain
SCOPE OF TESTING:	Remote Gambling and Software Technical Standards ("RTS") – June 2017, Level 1 testing against RTS 7A and 7B
TESTING LABORATORY:	eGaming Compliance Services Limited, trading as 'eCOGRA' 2/F Berkeley Square House, Berkeley Square, London, W1J 6 BD, United Kingdom
TESTING LABORATORY ACCREDITATION:	A UKAS accredited testing laboratory No. 4656 ISO/IEC 17025:2017, issued by the United Kingdom Accreditation Service (Issue No: 017, Issue Date: 05 June 2020).
TEST ENGINEERS:	Tyrone Rajah, Sphamandla Langa, Sikhumbuso Mzobe, Janine Odayan, Dario Pillay, Pooveshan Gounden
TEST SUPERVISOR:	Gary Lupton-Smith
TESTING PERIOD:	15 April 2020 – 18 December 2020
CERTIFICATE DATE:	18 January 2021
CERTIFICATE NUMBER:	21833STGGB001
RESULT OF TESTING:	Compliant (Refer to Test Results under Schedule 1)

I hereby certify that the abovementioned RNG complies with the requirements of RTS 7A and RTS 7B of the UKGC's Remote Gambling and Software Technical Standards – June 2017, as described in Section 4 of this report.

Gary Lupton-Smith

Technical Services Manager, eCOGRA

Section 2. Introduction

eCOGRA has been appointed by Summus Tech N.V. to evaluate and certify the Random Number Generator product against compliance with the relevant Remote gambling and software technical standards – June 2017, and to highlight any exceptions identified during testing.

➢ Quantis USB 4M version 1.0

This certification report highlights our key findings as a result of the evaluation conducted during the period 15 April 2020 to 18 December 2020.

SECTION 3. HARDWARE DETAILS

The scope of the RNG evaluation and certification applies solely to the RNG devices provided in the table below:

Random Number Generator

RNG File Name	Description	Serial Number
Quantis USB 4M	1.0	111545A410

Section 4. Review Findings

The key findings of our evaluation of the RNG for compliance with the relevant sections of the Remote Gambling and Software Technical Standards – June 2017, are as follows:

RTS Requirement	RTS Implementation Guidance	Testing Applied	Assessment	Comments
RTS 7 – Generation of random outcomes				
(Aim: To ensure that games and other virtual events operate fairly)				
RTS requirement 7A Random number generation and game results must be 'acceptably random'. Acceptably random here means that it is possible to demonstrate to a high degree of confidence that the output of the RNG, game, lottery and virtual event outcomes are random, through, for example, statistical analysis using generally accepted tests and	**RTS implementation guidance 7A** a. RNG's should be capable of demonstrating the following qualities: i. the output from the RNG is uniformly distributed over the entire output range and game, lottery, or virtual event outcomes are distributed in accordance with the expected/theoretical probabilities ii. the output of the RNG, game, lottery, and virtual event outcomes should be unpredictable, for example, for a software RNG it should be computationally infeasible to predict what the next number will be	Refer to "1. Tests Performed" under "Schedule 1 – RNG Testing" below.	Compliant	

RTS Requirement	RTS Implementation Guidance	Testing Applied	Assessment	Comments
methods of analysis. Adaptive behaviour (i.e. a compensated game) is not permitted. Where lotteries use the outcome of other events external to the lottery, to determine the result of the lottery (for example, using numbers from the National Lottery) the outcome must be unpredictable and externally verifiable.	without complete knowledge of the algorithm and seed value iii. random number generation does not reproduce the same output stream (cycle), and that two instances of a RNG do not produce the same stream as each other (synchronise) iv. any forms of seeding and re-seeding used do not introduce predictability v. any scaling applied to the output of the random number generator maintains the qualities above. c. For games or virtual events that use the laws of physics to generate the outcome of the game (mechanical RNGs), the mechanical RNG used should be capable of meeting the requirements in a. where applicable and in addition: i. the mechanical pieces should be constructed of materials to prevent decomposition of any component over time (e.g. a ball shall not disintegrate)			

RTS Requirement	RTS Implementation Guidance	Testing Applied	Assessment	Comments
	ii. the properties of physical items used to choose the selection should not be altered iii. players should not have the ability to interact with, come into physical contact with, or manipulate the mechanics of the game. d. Restricting adaptive behaviour prohibits automatic or manual interventions that change the probabilities of game outcomes occurring during play. Restricting adaptive behaviour is not intended to prevent games from offering bonus or special features that implement a different set of rules, if they are based on the occurrence of random events.			
RTS requirement 7B As far as is reasonably possible, games and events must be implemented fairly and in accordance with the rules and prevailing payouts, where	**RTS implementation guidance 7B** a. Games should implement the rules as described in the rules available to the customer before play commenced. b. The mapping of the random inputs to game outcomes should be in accordance	Refer to individual game certification.	Compliant (as stipulated in individual game certifications)	

RTS Requirement	RTS Implementation Guidance	Testing Applied	Assessment	Comments
applicable, as they are described to the customer.	with prevailing probabilities, pay tables, etc. c. When random numbers, scaled or otherwise, are received, e.g. following a game requesting a sequence of random numbers, they are to be used in the order in which they are received. For example, they may not be discarded due to adaptive behaviour. d. Numbers or sequences of numbers are not to be discarded, unless they fall outside the expected range of numbers required by the virtual event – such an occurrence should result in an error being logged and investigated.			

Schedule 1. RNG Testing

1. Tests Performed

The scope of the evaluation consisted of an assessment of the following components:
- Documentation;
- Statistical and mathematical analysis;
- Seeding/re-seeding;
- RNG range; and
- RNG scaling.

The RNG evaluation was performed to ensure the following requirements were met:
- The data must be randomly generated;
- The data must be unpredictable; and
- The series cannot be reproduced.

The test suite used to perform the evaluation consisted of the following:
- Chi-Squared Tests;
- Wald-Wolfowitz (or Runs) Tests;
- Correlation Tests; and
- Diehard Test Suite.

All testing of shuffled decks has specifically been excluded from the scope of testing of the RNG, as per the client's request. As such, the RNG is not currently certified to be used in any card games, without further RNG testing being conducted.

2. Test Results

Numerous recognised statistical and mathematical tests were performed to certify the RNG operated in compliance with RTS 7A and RTS 7B of the Remote Gambling and Software Technical Standards – June 2017, including tests for probability (to ensure the expected occurrences), randomness (so that one cannot predict the following occurrence with any degree of certainty) and uniformity (to determine that each possible outcome is equally likely over the long-term). The acceptance criteria for the statistical tests should pass the tests at a 95% confidence level.

1. **OUTPUT BASED TESTING ON SCALED RANGES: 0-33, 0-36, 0-51, 0-66, 0-99, 0-500, 0-999**
    a. **OUTPUT BASED TESTING ON SCALED RANGES RESULTS**

OUTPUT BASED TESTING				CLIENT GENERATED DATA			eCOGRA GENERATED DATA		
				Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
Test Number	Sample size	Test Range	DoF	P-value	P-value	P-value	P-value	P-value	P-value
1	3 000 000	0-33	33	0.1560	0.0634	0.2834	0.8267	0.3552	0.8865
2	3 000 000	0-36	36	0.6627	0.7815	0.4660	0.1772	0.6238	0.1581
3	3 000 000	0-51	51	0.8561	0.4266	0.5577	0.0420	0.9732	0.5853
4	3 000 000	0-66	66	0.7977	0.8691	0.9206	0.0566	0.0602	0.3914
5	3 000 000	0-99	99	0.8520	0.6003	0.3625	0.8727	0.6572	0.2749
6	3 000 000	0-500	500	0.0148	0.1163	0.4044	0.4518	0.7509	0.2422
7	3 000 000	0-999	999	0.6201	0.7746	0.0147	0.4603	0.3094	0.2717

    b. **SCALED DATA RANDOMNESS TEST SUCCESS (✔) OR FAILURE (×) SUMMARY**

OUTPUT BASED TESTING				CLIENT GENERATED DATA			eCOGRA GENERATED DATA		
				Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
Test Number	Sample size	Test Range	DoF	P-value	P-value	P-value	P-value	P-value	P-value
1	3 000 000	0-33	33	✔	✔	✔	✔	✔	✔
2	3 000 000	0-36	36	✔	✔	✔	✔	✔	✔
3	3 000 000	0-51	51	✔	✔	✔	✔	✔	✔
4	3 000 000	0-66	66	✔	✔	✔	✔	✔	✔
5	3 000 000	0-99	99	✔	✔	✔	✔	✔	✔
6	3 000 000	0-500	500	✔	✔	✔	✔	✔	✔
7	3 000 000	0-999	999	✔	✔	✔	✔	✔	✔

2. DIEHARD TESTS

a. DIEHARD TEST RESULTS

DIEHARD TEST		CLIENT GENERATED DATA			eCOGRA GENERATED DATA		
Test Name	Sample Size	Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
BIRTHDAY SPACINGS TEST	48 000 000	0.0590	0.0148	0.0719	0.0793	0.0743	0.0163
OVERLAPPING 5-PERMUTATION TEST	48 000 000	0.0521	0.8437	0.0331	0.2522	0.1083	0.4005
THE BITSTREAM TEST	48 000 000	0.0766	0.0726	0.1416	0.0469	0.0917	0.0231
COUNT-THE-1's TEST bytes	48 000 000	0.0140	0.0289	0.0969	0.0013	0.0518	0.0891
MINIMUM DISTANCE TEST	48 000 000	0.8133	0.6698	0.6657	0.9660	0.2176	0.3927
SQEEZE TEST	48 000 000	0.6912	0.8397	0.4145	0.9685	0.0394	0.6507
RUNS TEST	48 000 000	0.0996	0.5563	0.1824	0.0613	0.0241	0.0943
CRAPS TEST	48 000 000	0.1030	0.1991	0.1377	0.1845	0.1885	0.1857

b. DIEHARD TESTS SUCCESS (✓) OR FAILURE (×) SUMMARY

DIEHARD TEST		CLIENT GENERATED DATA			eCOGRA GENERATED DATA		
Test Name	Sample Size	Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
BIRTHDAY SPACINGS TEST	48 000 000	✓	✓	✓	✓	✓	✓
OVERLAPPING 5-PERMUTATION TEST	48 000 000	✓	✓	✓	✓	✓	✓
THE BITSTREAM TEST	48 000 000	✓	✓	✓	✓	✓	✓
COUNT-THE-1's TEST bytes	48 000 000	✓	✓	✓	✓	✓	✓
MINIMUM DISTANCE TEST	48 000 000	✓	✓	✓	✓	✓	✓
SQEEZE TEST	48 000 000	✓	✓	✓	✓	✓	✓
RUNS TEST	48 000 000	✓	✓	✓	✓	✓	✓
CRAPS TEST	48 000 000	✓	✓	✓	✓	✓	✓

3. CORRELATION TESTS

    a. CORRELATION TEST RESULTS: Sample 1

Range	CLIENT GENERATED DATA							eCOGRA GENERATED DATA						
	0-33	0-36	0-51	0-66	0-99	0-500	0-999	0-33	0-36	0-51	0-66	0-99	0-500	0-999
LAG 1	0.0629	0.6492	0.1199	0.4117	0.5748	0.5463	0.6378	0.2609	0.3881	0.2593	0.4108	0.4084	0.7633	0.6037
LAG 2	0.1710	0.8769	0.2527	0.7018	0.7174	0.6534	0.7703	0.0112	0.4945	0.5273	0.3460	0.3721	0.9082	0.7849
LAG 3	0.0807	0.9605	0.4312	0.8253	0.4009	0.7865	0.9069	0.0280	0.6906	0.6857	0.3629	0.5571	0.8037	0.8181
LAG 4	0.0723	0.9468	0.4184	0.7000	0.5226	0.7516	0.8885	0.0539	0.4948	0.7409	0.3037	0.1808	0.5061	0.5863
LAG 5	0.1164	0.9809	0.5615	0.7038	0.5913	0.6851	0.6292	0.0292	0.4699	0.7794	0.4307	0.2480	0.1838	0.6256
LAG 6	0.0462	0.9830	0.6327	0.7054	0.7063	0.1966	0.4805	0.0479	0.5232	0.6804	0.5521	0.2031	0.2611	0.7424
LAG 7	0.0440	0.9933	0.7407	0.7714	0.7724	0.2556	0.3456	0.0789	0.6385	0.7656	0.6498	0.2829	0.3584	0.2816
LAG 8	0.0711	0.9880	0.7512	0.8063	0.8511	0.2941	0.3784	0.1081	0.7368	0.7563	0.6357	0.2542	0.1492	0.2650
LAG 9	0.0993	0.9921	0.7882	0.6634	0.8739	0.3451	0.3841	0.1416	0.4670	0.8324	0.7292	0.2659	0.2019	0.3217
LAG 10	0.1356	0.9885	0.6282	0.5601	0.9171	0.1883	0.4387	0.1770	0.4900	0.7073	0.7567	0.2666	0.1390	0.4034

    b. CORRELATION TEST SUCCESS (✓) OR FAILURE (×) SUMMARY

Range	CLIENT GENERATED DATA							eCOGRA GENERATED DATA						
	0-33	0-36	0-51	0-66	0-99	0-500	0-999	0-33	0-36	0-51	0-66	0-99	0-500	0-999
LAG 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

3. Conclusion

Our test results together with the individual Level 3 game testing certifications produced statistically acceptable outcomes that were free of any significant statistical bias or predictability. Based on the testing conducted, the RNG is compliant with the requirements of RTS 7A and RTS 7B of the UKGC's Remote gambling and software technical standards – June 2017.

eGAMING COMPLIANCE SERVICES LIMITED

RANDOM NUMBER GENERATOR EVALUATION REPORT

FOR

SUMMUS TECH N.V.

REPORT REFERENCE NUMBER: 21834STGMJ001

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TABLE OF CONTENTS

1. INTRODUCTION

Summus Tech N.V. requested eCOGRA to evaluate the randomness of their Random Number Generator product for an online gambling license application for products deployed in licensed jurisdiction. The Random Number Generator used for the gambling applications is hardware based.

2. COMPONENTS INSPECTED

CLIENT NAME:	Summus Tech N.V
CLIENT ADDRESS:	Landhuis Groot Kwartier , Groot Kwartierweg 12, Curacao
PRODUCT NAME:	Quantis USB 4M
SUPPLIER:	ID Quantique SA
PRODUCT DESCRIPTION:	Quantis is an easily configurable physical random number generator USB device that is compatible with most operating systems, where its operation is continually monitored to detect any failure.
PRODUCT VERSION:	1.0
RNG TYPE:	Hardware
JURISDICTION:	Alderney, Gibraltar, Isle of Man, Estonia, Latvia, Malta
TEST ENTITY FULL NAME:	eGaming Compliance Services Limited t/a eCOGRA
TEST ENTITY ADDRESS:	2nd Floor Berkeley Square House, Berkeley Square, London, W1J 6BD, United Kingdom
TEST ENTITY ACCREDITATIONS HELD:	An Accredited Testing Laboratory No. 4656. ISO/IEC 17025:2017 (Great Britain, Denmark, Sweden and Switzerland), Issued by The United Kingdom Accreditation Service (Issue No: 017, Issue Date: 05 June 2020).
TESTING PERIOD	15 April 2020 – 18 December 2020
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REPORT ISSUE DATE:	18 January 2021
TEST ENGINEERS:	Tyrone Rajah, Sphamandla Langa, Sikhumbuso Mzobe, Janine Odayan, Dario Pillay, Pooveshan Gounden
SUPERVISION AND APPROVAL:	Gary Lupton-Smith
ASSESSMENT RESULT:	Compliant

3. Hardware Details

The scope of the RNG evaluation and certification applies solely to the RNG devices provided in the table below:

Random Number Generator

RNG File Name	Description	Serial Number
Quantis USB 4M	1.0	111545A410

Schedule 1. RNG Testing

1. Tests Performed

The scope of the evaluation consisted of an assessment of the following components:
- Documentation review;
- Statistical and mathematical analysis;
- Seeding/re-seeding;
- RNG range; and
- RNG scaling.

The RNG evaluation was performed to ensure the following requirements were met:
- The data must be randomly generated;
- The data must be unpredictable; and
- The series cannot be reproduced.

The test suite used to perform the evaluation consisted of the following:
- Chi-Squared Tests;
- Wald-Wolfowitz (or Runs) Tests;
- Correlation Test; and
- Diehard Test Suite.

All testing of shuffled decks has specifically been excluded from the scope of testing of the RNG, as per the client's request. As such, the RNG is not currently certified to be used in any card games, without further RNG testing being conducted.

2. Test Results

Recognised statistical and mathematical tests were performed to certify the RNG operated in compliance with the requirements stipulated in the regulations of highly regulated online gambling jurisdictions. This included tests for probability (to ensure the expected number of occurrences), randomness (so that one cannot predict the following occurrence with any degree of certainty) and uniformity (to determine that each possible outcome is equally likely over the long-term). The acceptance criteria for the statistical tests is a pass at a 95% confidence level.

1. **OUTPUT BASED TESTING ON SCALED RANGES: 0-33, 0-36, 0-51, 0-66, 0-99, 0-500, 0-999**
   a. **OUTPUT BASED TESTING ON SCALED RANGES RESULTS**

OUTPUT BASED TESTING				CLIENT GENERATED DATA			eCOGRA GENERATED DATA		
				Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
Test Number	Sample size	Test Range	DoF	P-value	P-value	P-value	P-value	P-value	P-value
1	3 000 000	0-33	33	0.1560	0.0634	0.2834	0.8267	0.3552	0.8865
2	3 000 000	0-36	36	0.6627	0.7815	0.4660	0.1772	0.6238	0.1581
3	3 000 000	0-51	51	0.8561	0.4266	0.5577	0.0420	0.9732	0.5853
4	3 000 000	0-66	66	0.7977	0.8691	0.9206	0.0566	0.0602	0.3914
5	3 000 000	0-99	99	0.8520	0.6003	0.3625	0.8727	0.6572	0.2749
6	3 000 000	0-500	500	0.0148	0.1163	0.4044	0.4518	0.7509	0.2422
7	3 000 000	0-999	999	0.6201	0.7746	0.0147	0.4603	0.3094	0.2717

   b. **SCALED DATA RANDOMNESS TEST SUCCESS (✓) OR FAILURE (×) SUMMARY**

OUTPUT BASED TESTING				CLIENT GENERATED DATA			eCOGRA GENERATED DATA		
				Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
Test Number	Sample size	Test Range	DoF	P-value	P-value	P-value	P-value	P-value	P-value
1	3 000 000	0-33	33	✓	✓	✓	✓	✓	✓
2	3 000 000	0-36	36	✓	✓	✓	✓	✓	✓
3	3 000 000	0-51	51	✓	✓	✓	✓	✓	✓
4	3 000 000	0-66	66	✓	✓	✓	✓	✓	✓
5	3 000 000	0-99	99	✓	✓	✓	✓	✓	✓
6	3 000 000	0-500	500	✓	✓	✓	✓	✓	✓
7	3 000 000	0-999	999	✓	✓	✓	✓	✓	✓

2. **DIEHARD TESTS**

a. **DIEHARD TEST RESULTS**

DIEHARD TEST		CLIENT GENERATED DATA			eCOGRA GENERATED DATA		
Test Name	Sample Size	Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
BIRTHDAY SPACINGS TEST	48 000 000	0.0590	0.0148	0.0719	0.0793	0.0743	0.0163
OVERLAPPING 5-PERMUTATION TEST	48 000 000	0.0521	0.8437	0.0331	0.2522	0.1083	0.4005
THE BITSTREAM TEST	48 000 000	0.0766	0.0726	0.1416	0.0469	0.0917	0.0231
COUNT-THE-1's TEST bytes	48 000 000	0.0140	0.0289	0.0969	0.0013	0.0518	0.0891
MINIMUM DISTANCE TEST	48 000 000	0.8133	0.6698	0.6657	0.9660	0.2176	0.3927
SQEEZE TEST	48 000 000	0.6912	0.8397	0.4145	0.9685	0.0394	0.6507
RUNS TEST	48 000 000	0.0996	0.5563	0.1824	0.0613	0.0241	0.0943
CRAPS TEST	48 000 000	0.1030	0.1991	0.1377	0.1845	0.1885	0.1857

b. **DIEHARD TESTS SUCCESS (✓) OR FAILURE (×) SUMMARY**

DIEHARD TEST		CLIENT GENERATED DATA			eCOGRA GENERATED DATA		
Test Name	Sample Size	Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
BIRTHDAY SPACINGS TEST	48 000 000	✓	✓	✓	✓	✓	✓
OVERLAPPING 5-PERMUTATION TEST	48 000 000	✓	✓	✓	✓	✓	✓
THE BITSTREAM TEST	48 000 000	✓	✓	✓	✓	✓	✓
COUNT-THE-1's TEST bytes	48 000 000	✓	✓	✓	✓	✓	✓
MINIMUM DISTANCE TEST	48 000 000	✓	✓	✓	✓	✓	✓
SQEEZE TEST	48 000 000	✓	✓	✓	✓	✓	✓
RUNS TEST	48 000 000	✓	✓	✓	✓	✓	✓
CRAPS TEST	48 000 000	✓	✓	✓	✓	✓	✓

3. CORRELATION TESTS

a. CORRELATION TEST RESULTS: Sample 1

Range	CLIENT GENERATED DATA							eCOGRA GENERATED DATA						
	0-33	0-36	0-51	0-66	0-99	0-500	0-999	0-33	0-36	0-51	0-66	0-99	0-500	0-999
LAG 1	0.0629	0.6492	0.1199	0.4117	0.5748	0.5463	0.6378	0.2609	0.3881	0.2593	0.4108	0.4084	0.7633	0.6037
LAG 2	0.1710	0.8769	0.2527	0.7018	0.7174	0.6534	0.7703	0.0112	0.4945	0.5273	0.3460	0.3721	0.9082	0.7849
LAG 3	0.0807	0.9605	0.4312	0.8253	0.4009	0.7865	0.9069	0.0280	0.6906	0.6857	0.3629	0.5571	0.8037	0.8181
LAG 4	0.0723	0.9468	0.4184	0.7000	0.5226	0.7516	0.8885	0.0539	0.4948	0.7409	0.3037	0.1808	0.5061	0.5863
LAG 5	0.1164	0.9809	0.5615	0.7038	0.5913	0.6851	0.6292	0.0292	0.4699	0.7794	0.4307	0.2480	0.1838	0.6256
LAG 6	0.0462	0.9830	0.6327	0.7054	0.7063	0.1966	0.4805	0.0479	0.5232	0.6804	0.5521	0.2031	0.2611	0.7424
LAG 7	0.0440	0.9933	0.7407	0.7714	0.7724	0.2556	0.3456	0.0789	0.6385	0.7656	0.6498	0.2829	0.3584	0.2816
LAG 8	0.0711	0.9880	0.7512	0.8063	0.8511	0.2941	0.3784	0.1081	0.7368	0.7563	0.6357	0.2542	0.1492	0.2650
LAG 9	0.0993	0.9921	0.7882	0.6634	0.8739	0.3451	0.3841	0.1416	0.4670	0.8324	0.7292	0.2659	0.2019	0.3217
LAG 10	0.1356	0.9885	0.6282	0.5601	0.9171	0.1883	0.4387	0.1770	0.4900	0.7073	0.7567	0.2666	0.1390	0.4034

b. CORRELATION TEST SUCCESS (✓) OR FAILURE (×) SUMMARY

Range	CLIENT GENERATED DATA							eCOGRA GENERATED DATA						
	0-33	0-36	0-51	0-66	0-99	0-500	0-999	0-33	0-36	0-51	0-66	0-99	0-500	0-999
LAG 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAG 10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

3. CONCLUSION

Our test results for the RNG produced statistically acceptable random numbers that were free of any significant statistical bias or predictability. The results obtained from eCOGRA's testing confirm the random number generator operates in compliance with the applicable requirements of the regulations of highly regulated online gambling jurisdictions.

Project Approval:

Gary Lupton-Smith,
Technical Services Manager