



Random Number Generator Evaluation Report

for

**Vegas License International LLC
a C-Byte Company, Inc.**

10 May 2012



1. Operator

Vegas License International LLC a C-Byte Company Inc.	URL: www.c-byte.us.com
3565 Las Vegas Blvd S 148 Las Vegas, Nevada 89109 U.S.A.	
To: Trevor Biscope	e-mail: trevor@vegas.management

2. Test house

iTech Labs Australia	URL: http://www.itechlabs.com.au
Suite 24, 40 Montclair Ave Glen Waverley VIC 3150, Australia	
e-mail: (info@itechlabs.com.au)	

3. Software Provider

C-Byte Company, Inc.	URL: www.c-byte.us.com
3565 Las Vegas Blvd S 148 Las Vegas, Nevada 89109 U.S.A.	
To: Trevor Biscope	e-mail: trevor@vegas.management

4. System/Module tested

System: N/A	URL: N/A
Module: Hardware Random Number Generator (HRNG) using Quantis (PCI-1 , PCI-4)	
Date Completed: 10 May 2012	

5. Previous history of items under test

None.

6. Evaluation performed

iTech Labs has conducted evaluation for the Hardware Random Number Generator as below:

<p>Our evaluation of the HRNG (using Quantis PCI-1, PCI-4 consisted of source code evaluation, Diehard tests on the raw numbers generated by the hardware device and Chi-square tests on the scaled numbers.</p> <ol style="list-style-type: none">1. Source code examination The following source code evaluation was conducted:<ol style="list-style-type: none">a) Scaling of the raw numbers generated by the hardware device

2. Tests conducted

- a) Marsaglia's "Diehard" tests were applied to 80 million bits of raw 32 bit random numbers generated by the algorithm. The following diehard tests were conducted on 2 sets of 80 million bits;
 - i) BIRTHDAY SPACINGS
 - ii) OVERLAPPING 5-PERMUTATIONS
 - iii) BINARY RANK TEST for 31x31 matrices
 - iv) BINARY RANK TEST for 32x32 matrices
 - v) BINARY RANK TEST for 6x8 matrices
 - vi) BITSTREAM TESTS ON 20-BIT Words
 - vii) BITSTREAM TESTS OPSO, OQSO, DNA
 - viii) COUNT-THE-1's IN A STREAM OF BYTES
 - ix) COUNT-THE-1's IN SPECIFIC BYTES
 - x) PARKING LOT TEST
 - xi) MINIMUM DISTANCE TEST
 - xii) THE 3DSPHERES TEST
 - xiii) THE SQUEEZE test
 - xiv) OVERLAPPING SUMS TEST
 - xv) RUNS TEST
 - xvi) CRAPS TEST
- b) Scaling tests (Chi-squared tests) were conducted for slot games.

The scaling tests were conducted for over 1 million numbers for sets ranging from 5,000 to 100,000 numbers.

DOF: 63

The HRNG tests were conducted for compliance to relevant UK Gambling Commission, Isle of Man Gambling Supervision Commission and Malta standards.

7. Evaluation results

1. Source code examination
 - RNG hardware device:** Quantis PCI-1, PCI-4
 - Security of internal state:** N/A
 - Seeding:** N/A
 - Reseeding:** N/A
 - Thread safety:** N/A
 - Scaling:** OK
2. Tests conducted
 - a) Marsaglia's "Diehard" tests
 - The results were satisfactory.
 - b) Chi-squared tests
 - i) Scaling for Slot games
 - DOF: 63
 - The results were satisfactory.



8. Observations

1. Source code evaluation was required for only the scaling code.
2. The failover mechanism uses DRBD (distributed replicated block device) to keep the db in lock-step across two machines. When the heartbeat on one machine stops, the other one starts up. So if one machine dies the RNG card in the other machine takes over. There is no "code" for this. So no code evaluation was necessary for the failover mechanism.

9. Certification

Date of Certification: 10 May 2012

Software provider: C-Byte Company, Inc.

Operator: Vegas License International LLC

URL: www.c-byte.us.com

Total number of pages: 6

iTech Labs certifies that the RNG (listed in Appendix-A) comply with UK Gambling Commission, Isle of Man Gambling Supervision Commission and Malta standards subject to the conditions in *section 10 Conditions*.

10. Conditions of Certification

None

11. Conclusion

While it is not possible to test all possible scenarios in a laboratory environment, iTech Labs has conducted a level of testing appropriate for a submission of this type.

Accordingly, subject to the above comment, iTech Labs certifies that the items under test comply with the relevant Technical Standards, unless otherwise stated.

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iTech Labs Australia

10 May 2012

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iTech Labs Australia

10 May 2012



Appendix – A

1. Hardware device details

Quantis PCI-1, PCI-4

2. Certified files

iTech Labs has reviewed only the code used for scaling the raw numbers generated by the hardware device into numbers used by Slot games.

The failover mechanism uses DRBD (distributed replicated block device) to keep the db in lock-step across two machines, hence there is no code.

There are no certified files for this RNG.