Random Number Generator Evaluation Report
for
Lucky Skill Ltd

23 January 2009

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iTech Labs is an ISO/IEC 17025 NATA accredited testing laboratory

1. Operator

Lucky Skill Ltd.	URL: www.luckyskill.com

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

Lucky Skill Ltd.	URL: www.luckyskill.com
Address: Atho 3 B-C Agioi Omologites P.C. 1087 Nicosia, Cyprus	

4. System/Module tested

System: N/A	URL: N/A
Module: Random Number Generator (RNG) using Mersenne Twister algorithm.	
Date Completed: 23 January 2009	

5. Previous history of items under test

None.

6. Evaluation performed

iTech Labs has conducted evaluation for the RNG implementation using Mersenne Twister algorithm as below:

This RNG consisted of implementation of Mersenne Twister algorithm. Our evaluation of the RNG consisted of source code evaluation, Diehard tests on the raw numbers generated by the algorithm and Chi-square tests on the shuffled decks for card games and dice numbers for the dice games.

1. Source code examination

   The following source code evaluation was conducted:

   a) Identification of RNG algorithm;
   b) Security of internal state, seeding and re-seeding, thread safety;
   c) Shuffling of cards;
   d) Scaling for the ranges required for the non-card games

2. Tests conducted

   a) Marsaglia's "Diehard" tests were applied to 80 million bits of raw 32 bit random

numbers generated by the Mersenne Twister 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 SQEEZE test
xiv) OVERLAPPING SUMS TEST
xv) RUNS TEST
xvi) CRAPS TEST

b) The following Chi-squared tests were conducted:

i) Shuffling tests for 8 decks of cards. These tests were conducted using samples ranging from 1,000 to 100,000 deals for a total of over 2.5 million deals

ii) Scaling tests for the Dice games.

The RNG tests were conducted for compliance to relevant Alderney Gambling Control Commission (AGCC), UK Gambling Commission, Isle of Man and Malta standards.

7. Evaluation results:

1. Source code examination
   Lucky Skill Ltd. RNG implements Mersenne Twister (MT) algorithm.
   We identified a small number of issues including some regarding scaling and shuffle. All these issues ware resolved in the updated code provided by Lucky Skill Ltd.
2. Tests conducted
   a) Marsaglia's "Diehard" tests
   The results were satisfactory.
   b) Chi-squared tests
   i) Shuffling tests
   The results were satisfactory.
   ii) Scaling tests for the specified ranges
   The results were satisfactory.

8. Observations

1. Thread safety: If multiple threads access a single instance, access should be synchronized externally. Or alternately, different threads must use different instances of the RNG.

9. Certification

Date of Certification: 23 January 2009

Software provider: Lucky Skill Ltd Operator: Lucky Skill Ltd Total number of pages: 5
iTech Labs certifies that the RNG (listed in Appendix-A) comply with Alderney Gambling Control Commission (AGCC), UK Gambling Commission, Isle of Man and Malta standards subject to the conditions in *section 10 Conditions.*

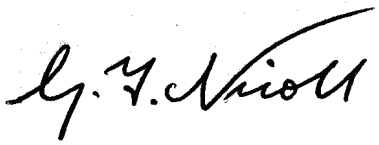
10. Conditions of Certification

1. The source code provided to iTech Labs (as per Appendix-A) must be used for compilation of the RNG module.
2. While using the RNG, the issue identified in *section 8 Observations* should be satisfied.
3. Any change to the RNG source files listed in Appendix-A must be verified by iTech Labs.

11. Conclusion

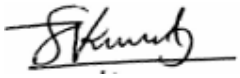
While it is not possible to test all possible scenarios in a laboratory environment, iTech Labs has conducted a level of testing appropriate for a submission of this type.

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



Geoff Nicoll
Principal Consultant
iTech Labs Australia

23 January 2009



Kiren Sreekumar
Principal Consultant
iTech Labs Australia

23 January 2009

Appendix – A

1. Md5sum* of RNG source files

File Name	Size (bytes)	Md5sum
Random.cpp	4,256 bytes	98ABE30C4B51098A53633BB2E63D8F7A
Random.h	4,096 bytes	4E58969FE2999FC24CA678E3B79E4CBE

* Md5sum is calculated using the Linux program md5sum.