

Evaluation Report for: Pocket Games Software

Random Number Generator Slot Server RNG version 2.0.0

Manufacturer:	Pocket Games Software
RNG Name:	Slot Server RNG 2.0.0
ATF Report Number:	RNG.UK.POCKET.1007.01.01
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BMM Spain Testlabs s.l.u

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EVALUATION REPORT

Client name & Address:

Pocket Games Software
Fourth Floor, Suite 20, South Street
Valletta (Malta)

Client Reference Number:

Client Submission Letter Dated 30th January 2018

Testing dates:

Start date: 30th January 2018

End date: 5th February 2018

Slot Server RNG

2.0.0

Product / Game Description:

Soft Random

CHECKSUM: See paragraph 4.1

Test Category:

Random study

Jurisdictions Recommended:

UK

Technical Standard used for Evaluation:

UK. Remote Gambling and Software Technical Standards, June 2017

Location where test was performed:

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Parc Tecnològic del Vallés (C.E.N.T.)

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Location where report was issued:

Avda. Parc Tecnològic del Vallés, 3

08290 – Cerdanyola del Vallés

Barcelona – España

Conclusion:

Pass

BMM Reference Number:

POCKET.1007

Method/Procedures used:

EURAF-SPA-MO-41

Consultant(s):

Enric Ferrés

1. SCOPE

Pocket Games Software has requested BMM to perform an evaluation of the Slot Server RNG 2.0.0. The evaluation was conducted against the UK aforementioned industry recognized standards for Random Number Generator (RNG) testing.

This evaluation includes an assessment of the algorithm implemented within the RNG.

2. WORK DESCRIPTION

The evaluation of the Slot Server RNG 2.0.0 consisted of a source code review and empirical statistical tests.

The industry recognized standard for statistical testing includes, but is not limited to: Chi-squared, Simple Number Frequency, Correlation tests, Run, Gap, Birthday Spacing, Coupon Collector, and Die Hard suite of tests. BMM also tested samples for generation and use without replacement. These tests are intended to verify the statistical properties of the RNG output and demonstrated the correct use of the RNG.

3. EVALUATION CARRIED OUT BY BMM

The source code review of the RNG and empirical statistical RNG testing of the Slot Server RNG 2.0.0 confirms:

- The RNG makes use of the C# System.Security.Cryptography.RNGCryptoServiceProvider class. This class draws random bytes from the operating system's cryptographically secure RNG, which incorporates entropy collected from a number of hardware and software sources.
- The RNG requires no seeding, as it draws on the operating system's non-deterministic RNG. As entropy is constantly being collected and used to produce random bytes, there is also no chance of two instances of the RNG producing the same sequence of results, and the output is entirely unpredictable and cannot be feasibly calculated, even with full knowledge of the algorithms used and all previously generated numbers.
- The scaling algorithm provided can generate random 32-bit numbers in any range up to 2^{32} . No bias is introduced, and scaled numbers are uniformly distributed.
- The RNG itself is implemented into the system source code properly.
- The RNG program does not contain any malicious code that could significantly affect the outcome of the RNG.
- The overall results of the statistical tests are probabilities that are expected to be uniformly distributed between 0 and 1.

4. EVALUATION DETAILS

4.1. DETAILS OF THE SOFTWARE USED FOR THE TEST

The following table details the relevant information for the Slot Server RNG 2.0.0 that has been evaluated as compliant to UK RNG Technical Standards:

Reference		Functionality
CryptoRNG.cs		RNG
SHA1	7E9D47727D31C60FD8940619592C9256F62CB475	

4.2. STATISTICAL RESULTS

The RNG passed all tests within the expected 99% confidence range.

Number of tests: 3900

Low Outliers at 99%

Observed	Expected	Prob	Result
21	19,5	0,3965	PASS

High Outliers at 99%

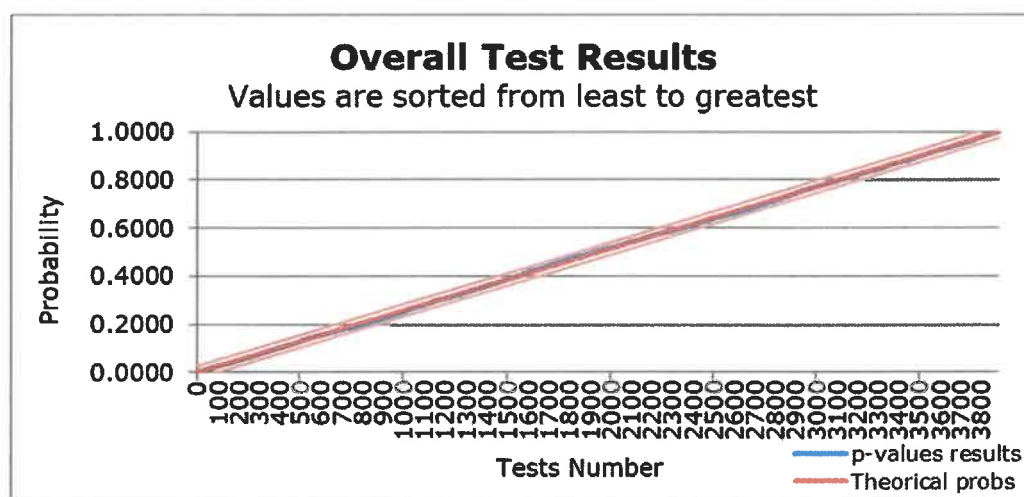
Observed	Expected	Prob	Result
18	19,5	0,4243	PASS

Overall KS Test	0,0759	PASS
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Diehard test	PASS
NIST	PASS

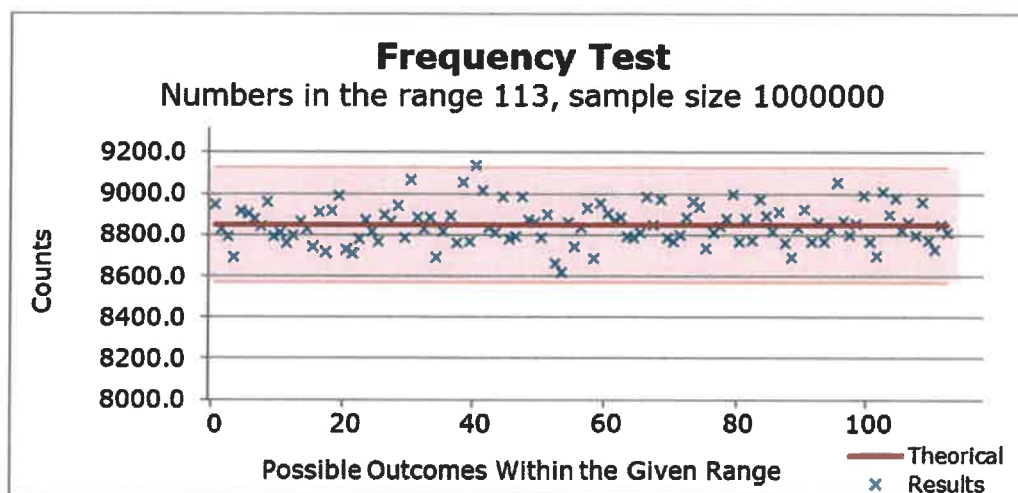
Overall RNG Statistical Tests, Frequency, GAP, Coupon Test Results

The results of the Statistical tests are probabilities that are expected to be uniformly distributed between 0 and 1. This chart shows those test results plotted against an expected result indicator of perfect distribution from 0 to along the lines of confidence interval 0.05 shown. This shows that the RNG stays within the expected outcome and produces statistically strong random numbers.



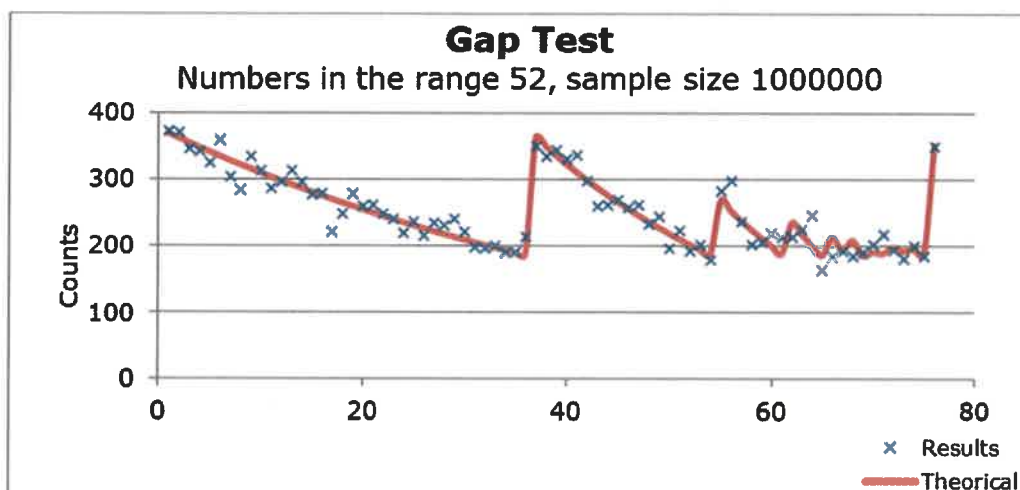
Frequency Test:

The Frequency test chart for the range of numbers from 0 to 112 with 1000000 samples displays the possible total count of each number and the actual total count of each number.



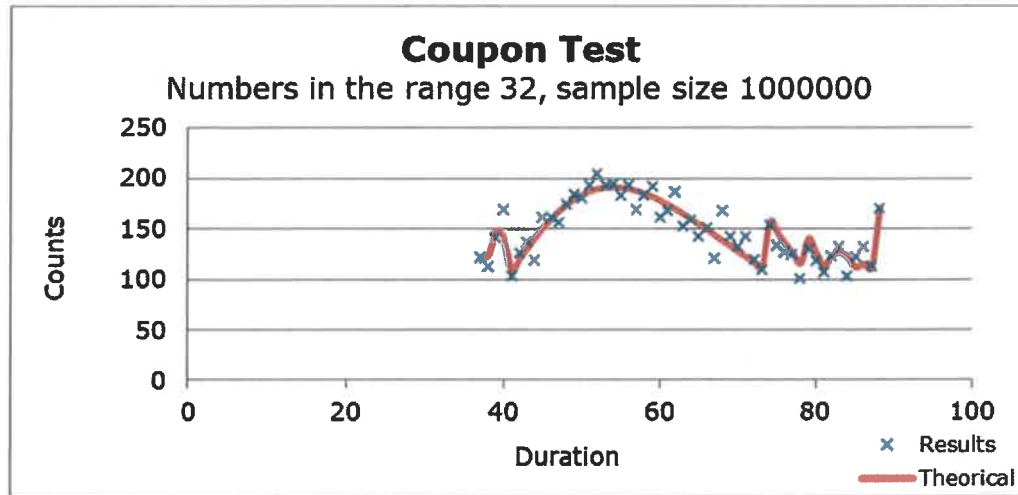
Gap Test:

The Gap test chart for the number 0 for 1000000 RNG samples generated with a range between zero (0) and 51. This test measures the expected distance between each occurrence of the number 0 and the actual distance between each occurrence over 1000000 RNG samples.



Coupon Test:

The Coupon test chart is for the range of numbers from 0 to 31 with 1000000 samples displays the possible number of selections required for a full set of numbers of 0 through 31.



5. ADDITIONAL INFORMATION/OBSERVATIONS

N/A

6. CONCLUSION

Accordingly, from the test results¹ obtained from the testing performed and results obtained, BMM Spain Testlabs s.l.u confirms that the item submitted under test conforms to all the relevant UK requirements described in the Scope section.

Yours faithfully,

BMM SPAIN TESTLABS S.L.U.

Director of Technical Services – Europe
Mario Zilevski

¹ The results included in this document are referred exclusively to the sampled tested, such as it is described in the corresponding section.