



eGAMING COMPLIANCE SERVICES LIMITED

ISLE OF MAN GAMBLING SUPERVISION COMMISSION

**CONFORMITY ASSESSMENT REPORT
RANDOM NUMBER GENERATOR**

FOR

FUNKY GAMES LTD.

REPORT REFERENCE NUMBER: e213047TTSIMN

REPORT ISSUE DATE: 18 JUNE 2021

CONFIDENTIAL

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SECTION 1. INTRODUCTION

Funky Games Ltd. requested eCOGRA to evaluate the Random Number Generator (RNG) to be utilised for the offering of online gambling products against the relevant regulatory requirements for the jurisdiction as listed below. The Random Number Generator used for the gambling applications is Software based.

SECTION 2. GENERAL INFORMATION

CLIENT NAME:	Funky Games Ltd.
CLIENT ADDRESS:	8th Floor Techzone Building, 213 Sen Gil Puyat Ave., Makati City 1203 Philippines
CLIENT CONTACT PERSON:	Christine Chiang
CLIENT E-MAIL ADDRESS:	christine.chiang@funkygamesltd.com
CLIENT TELEPHONE NUMBER/SKYPE:	christine.chiang701
PRODUCT NAME:	Random Number Generator (RNG)
SUPPLIER:	Celton Systems Limited
PRODUCT DESCRIPTION:	The Random Number Generator is developed using the Mersenne Twister algorithm, which is a widely used and general purpose software RNG. The seeds value is a function of the current timestamp and re-seeding occurs after a random time each day.
PRODUCT VERSION:	MT19937
RNG TYPE:	Software
JURISDICTION:	Isle of Man
ASSESSMENT STANDARDS AND CRITERIA:	Online Gambling (Systems Verification) (No.2) Regulations 2007 – Schedule 1.
ACCREDITED BODY FULL NAME:	eGaming Compliance Services Limited t/a eCOGRA
ACCREDITED BODY LEGAL FORM:	Private Company
ACCREDITED BODY MANAGING ADDRESS:	2 nd Floor Berkeley Square House, Berkeley Square, London, W1J 6BD, United Kingdom
ACCREDITED BODY ACCREDITATIONS HELD:	An Accredited Testing Body No. 4656. ISO/IEC 17025:2017, Issued by The United Kingdom Accreditation Service (Issue: 021, Issue Date: 15 April 2021).
ACCREDITED BODY EXPERIENCE:	18 years' testing and inspection of Online Gambling Systems; 5 years' auditing and certifying Information Security Management Systems; 6 years' of Risk and Vulnerability analyses.

ACCREDITED BODY REPRESENTATIVE: Gary Lupton-Smith
ACCREDITED BODY CONTACT EMAIL: info@ecogra.org
ACCREDITED BODY CONTACT NUMBER: Tel: +44 20 7887 1480
ASSESSMENT DATE: 23 November 2015 - 19 January 2016
PLACE OF TESTING: The Accredited Body's premises.
REPORT TYPE: Conformity Assessment Report
REPORT REFERENCE NUMBER: e213047TTSIMN
REPORT ISSUE DATE: 18 June 2021
ASSESSMENT RESULT: Compliant
ACCREDITED BODY REPORT APPROVAL:

A handwritten signature in black ink, appearing to read "Gary Lupton-Smith".

Gary Lupton-Smith
Technical Services Manager, eCOGRA

SECTION 3. TESTING AND INSPECTION WORK – QUALIFICATIONS AND EXPERIENCE

3.1. TESTING AND INSPECTION SUPERVISORS

Name:	Gary Lupton-Smith
Education/Qualification:	Bachelor of Commerce
Date Obtained:	1991
Other Relevant Qualifications:	Certified Information Systems Auditor (CISA)
Date Obtained:	2000
Number of Years' Experience in Testing and Inspection of Online Gaming Systems:	14 years

3.2. TESTING AND INSPECTION ASSESSORS

Name:	Rachel Chinyoka
Position:	Team Lead

Name:	Whitney Novela
Position:	Data Analyst

SECTION 4. SOFTWARE DETAILS

The scope of the RNG evaluation and certification applies solely to the files, file versions and associated hashes provided in the tables below:

File Name	Version	Digital Signature (SHA1 Hash)
MersenneTwister.cs	MT19937	d652ff270908bb64c4f0829b7f32c6967a03d982

SECTION 5. ASSESSMENT RESULTS

Testing procedures were performed against certifiable sections of the following laws and regulations of Isle of Man Supervision Commission, as applicable to the components relevant to the products within scope:

- Online Gambling (Systems Verification) (No.2) Regulations 2007 – Schedule 1

Different values used in the “Assessment Result” column is described as follows:

- **Compliant:** The components within the assessment scope conform to the assessment standards and criteria.
- **Not Applicable:** The requirement is not applicable for the assessment of conformance. Refer to comments for further information.
- **Out of Scope:** The requirement for the assessment of conformance cannot be evaluated at this stage due to the current scope of testing/inspection or limitation of the test/inspection environment. Refer to comments for further information.
- **Compliant with Observation:** The components within the assessment scope conform to the assessment standards and criteria with certain limitations or an area of moderate risk of potential non-compliance identified. Refer to comments for further information.

Online Gambling (Systems Verification) (No.2) Regulations 2007 – Schedule 1			
Requirement No.	Requirement Assessed	Assessment Result	Comments
Randomness			
(3)	The System must satisfy the following criteria for randomness for any Gaming or Lottery (save where different rules apply and have been approved by the Commissioners and published to the Participant or potential Participant prior to its participation), following Schneier : (a) the data must be randomly generated, passing appropriate statistical non static output results tests of randomness (e.g., Marsaglia's "Diehard" set of tests) uniformly distributed over the set range; (b) the data must be unpredictable, i.e. it must not be computationally feasible to predict what the next number will be, given complete knowledge of the algorithm or hardware generating the sequence, and all previously generated numbers; and; (c) the series cannot reliably be reproduced, i.e. if the sequence generator is activated again with the same input (as exactly as humanly possible) it will produce two completely unrelated random sequences.	Compliant	The compliance assessment is based on a limited scope of testing which includes the assessment of the RNG as a standalone component without integration with any games. Further testing may be required in individual game assessments to validate full compliance of this requirement for each applicable game.
(4)	The Operator must disclose the methodology of any random seeding and any seeding must be proven to result in an unpredictable output	Compliant	The compliance assessment is based on a limited scope of testing which includes the assessment of the RNG as a standalone component without integration with any games. Further testing may be required in individual game assessments to validate full compliance of this requirement for each applicable game.

SCHEDULE 1. RNG TESTING

1. TESTS PERFORMED

An overview of the assessment approach of the Random Number Generator (RNG) is outlined below. We evaluated the RNG to ensure that it meets the relevant certifiable requirements. The scope of the evaluation consisted of an assessment of the following aspects:

Documentation	The RNG documentation is reviewed to allow for understanding the implementation of the RNG in the gaming system. Research is conducted on the RNG algorithm/hardware to ensure that there are no widely known weaknesses within the RNG under review.
Functionality	This involves an understanding of how random numbers received, following a call to the RNG requesting a sequence of random numbers, and how they are used. They must be used in the order in which they are received.
Source Code	The source code is reviewed to ensure that the implementation of the RNG is in accordance with the RNG documentation provided by the client. A walkthrough is conducted to show the nature of calls to the RNG as well as how the results are utilised.
Seeding and Reseeding	This involves gaining an understanding of the norms of initialisation of the RNG, including seeding sources which are verifiable sources of entropy. The seeding and reseeding used should not introduce predictability.
Mapping and Scaling	Any scaling applied to the output of the random number generator maintains uniform distribution over the entire output range. It should be ensured that game event outcomes are distributed in accordance with the expected/theoretical probabilities.
Security of RNG	Understanding the security of generated numbers during transmission between the RNG server and the gaming server.
Monitoring of RNG	Understanding the systems in place to monitor functionality of the RNG during live use, with the purpose of identifying early detection of irregularities in RNG output.
Cryptographic Strength	Review published documentation on the RNG algorithm. Evaluation of the algorithm, period length and seeding/re-seeding characteristics of the RNG and established that it contains features associated with cryptographically strong RNGs to ensure the sequence of random values generated cannot be predicted or reliably reproduced.

Test Suites	The test suite used to perform the evaluation consisted of the following: • Chi-Squared Tests; • Central Limits Theorem Tests; • Runs Tests; • Frequency Tests; and • Wald-Wolfowitz Tests. Application of numerous mathematical and statistical tests to verify: • the variation in the data is due to random chance; • the results are within the acceptable parameters to demonstrate statistical independence; • the results calculate the correct standard deviations from their expected values; and • the results of the output values are unpredictable.
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2. TEST RESULTS

1. Recognised statistical and mathematical tests were performed to certify the RNG operated in compliance with the requirements and general advice on technical requirements and accreditation of bodies for anyone who is to check, test and certify gaming activities. 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 are a pass at a 95% confidence level.