

RGS EVALUATION TESTING REPORT

Compliance testing report

Brand - Evolution

Item:

“RNG”

Reference regulation:

UK Gambling Commission – *Remote gambling and software Technical Standards*, February 2021

19/07/2022



INTRODUCTION

The findings reported in this summary are the results of a broader set of documents and testing activities results archived in QUINEL Ltd's facilities. It is intended that the requester declares that:

- Any Hardware provided or described for analysis and testing is configured identically to hardware in commercial use
- Game software/ function provided for the testing and code review is declared by the customer to have the same behaviour to the software/code in commercial use
- Functionality made by the software in automatic test mode has a realistic behaviour

and that

- all the files and modules,
- the database schemas and all the specific programming resources,
- all the parameters contained into any databases and/or configuration file

that have been subject to the audit process guarantee the same behaviour of what is going to be published/deployed according to this audit results.

The Recipient, by accepting and using this Report, declares to be aware and accept unconditionally all the terms and conditions set forth. If the Applicant and / or the Recipient does not agree on the terms and conditions set forth, QUINEL Ltd reserves the right to cancel the certification provided with this Report, it follows therefore that the Recipient would have to immediately hand all copies of this Report to QUINEL Ltd and would not be able to use them.

Any copy of this compliance report must also include the page number and total number of pages.

Copy of this test report cannot be reproduced except in full, without written approval of the laboratory.

A) Audit ID

J22072363_R001_RNG_REV.1

B) Reference regulation

UK Gambling Commission – *Remote gambling and software Technical Standards*, February 2021

C) Test methods

QISI001 – Software source inspection method
QIRT000 – RNG qualitative analysis
QIRT001 - Statistical analysis on scaled numbers in the range [0, 36] (Frequency, Couples, Serial Correlation and Run Tests)
QIRT002 - Statistical analysis on scaled numbers in the range [0, 51] (Frequency, Couples, Serial Correlation and Run Tests)
QIRT003 - Statistical analysis on float numbers in the range [0, 1] (Gap, Frequency, Poker, Serial and Order Tests)
QIRT004 - Statistical analysis on shuffled numbers (Frequency, Distance, Serial Correlation and Closed Circle Tests)
QIRT005 – DIEHARD battery of tests
QIRT006 – NIST battery of tests

D) Auditor / Test lab

QUINEL Ltd
M Space M3, Zone 3, Central Business District
Triq L-Ghajn tan-Nofs
Birkirkara CBD 3060 - Malta
info@quinel.com.mt

E) Audit subject / Scope

Description: Compliance of the following test items (games):

Test Item	Item Name	Version	Interface
R001	RNG	Main Service: 3.20220705.122111-58445c89 Extras Services: 2.20220705.123203-c0e3a575	N.A

Receipt date:

05/07/2022 – first submission for testing against the regulation as per Section (B)

Inspection date:

11/07/2022 - 19/07/2022

F) Requester

Evolution Malta Limited
Level 1, Spinola Park, Mikiel Ang. Borg Street,

QUINEL Ltd

M Space M3 – Zone 3, Central Business District – Triq L-Ghajn tan-Nofs – Birkirkara CBD 3060- Malta

info@quinel.com.mt

St. Julians SPK1000, Malta
mmartin@evolution.com

G) Owner/Producer of the system/software

Ref. to Section F)

H) Companies and organizations involved in the process

Producer(s): Ref. to Section G)

Requester: Ref. to Section F)

Licensee/Operator: N.A.

I) Individuals involved in the process

On the Requester side: Marisol Martín - Technical Compliance Team Lead.

On the Producer(s) / Integrator(s) side: same as for Requester

On the Licensee/Operator side: N.A.

J) Processes, rules and parameters of the games / Limitation of use

Evaluation of game rules was conducted to ensure that they satisfy the requirements as per the regulation in the Section (B). Refer to the Annex I for the full list of requirements satisfied.

Game / Test item type: **Random Number Generator**

Game / Test item use Jackpot: N.A.

Here follows the theoretical pay-out of the test item(s):

<i>Test Item</i>	<i>Test Item / Game name</i>	<i>Theor. RTP [%]</i>
R001	RNG	N.A.

K) Specifications of the gaming system

Type: software-based RNG

Programming language: Scala 2.13

OS: CentOS Linux 7 5.5.2-1

Description of the RNG:

The RNG is written entirely with Scala.

The function *nextInt()* generates integers in the range from *Int.MinValue* to *Int.MaxValue*, covering full 32 bits and it is used across the other functions.

Security:

The entropy engine used as a singleton provides the numbers with a background cycle and is shared between instance and games, to further guarantee the unpredictability of the results.

The algorithm is based on JAVA *SecureRandom* library which is considered cryptographically strong.

For more information: <https://docs.oracle.com/javase/8/docs/api/java/security/SecureRandom.html>

The scope of the current certification is to verify the RNG described above with the usage of the programming language Scala 2.13. The logic and the functionality of the current RNG are the same as the previously certified through the report with ID “J19120867_R001_RNG_REV.1” issued and signed by QUINEL Limited. For this reason, both RNG can be used with every game with reference to the previously mentioned RNG report.

Refer to the Annex I for the full list of requirements satisfied.

Refer to the Annex II for details related to RNG testing.

L) Security of the system

N.A.

M)Critical modules

Refer to section R)

N) Evaluation performed

The test evaluation, required by the Requester, was completed against the “UK Gambling Commission – *Remote gambling and software Technical Standards*, February 2021”, to meet the requirements listed in the current “*Testing strategy for compliance with remote gambling and software technical standards*, February 2021”.

Refer to the Annex I for a full detailed list of requirements tested.

Refer to the Annex II for details related to RNG testing.

O) Testing activities applied

Internal procedure followed:

Rif. “TOP 02-02 TEST METHODS”.

P) Additional information

None

Q) Setup and application/system architecture

Refer to section K)

R) Product Tested

The tests were performed on the files listed below:

<i>File name</i>	<i>SHA1</i>	<i>Version</i>	<i>Critical</i>	<i>Test Item</i>
RngService.class	06242ea1d62e620707e0cfb9f3bd77c01fac8183	3.20220705.122111-58445c89	Yes	R001
RngServiceExtras.class	c567ded9539043425ab362564f0282ba95ffe8a3	2.20220705.123203-c0e3a575	Yes	R001
FloatRngService.class	4b5b324c80d0e64e9317b7e23795372ef3c8fd6d	2.20220705.123203-c0e3a575	Yes	R001
ShufflingRngService.class	50741b2c3b26f063fad62f530978eef53144c2b2	2.20220705.123203-c0e3a575	Yes	R001
Weighted.class	fb855dc1de72cc935bcc1a793e1b5abb22a76cb5	2.20220705.123203-c0e3a575	Yes	R001
WeightedChoice.class	3faabb401b97c9cd8a07b5ef82bb151483f1d727	2.20220705.123203-c0e3a575	Yes	R001
WeightedRngService.class	584681bbb6ceb7fa7eb6dfa800e0df5e0cd2b111	2.20220705.123203-c0e3a575	Yes	R001

S) Report revisions

N.A.

T) CERTIFICATION

Job ID: J22072363_R001_RNG_REV.1

Date: 19/07/2022

Requester: Evolution Malta Limited
Level 1, Spinola Park, Mikiel Ang. Borg Street,
St. Julians SPK1000, Malta

Total Number of Pages: **14**

QUINEL Ltd certifies that the game / test item identified at section E)

R001: RNG

complies with the “UK Gambling Commission – *Remote gambling and software Technical Standards*, February 2021” reference standard based on the current “*Testing strategy for compliance with remote gambling and software technical standards*, February 2021”.

Refer to the Annex I for the full list of requirements satisfied.

Refer to the Annex II for details related to RNG testing.

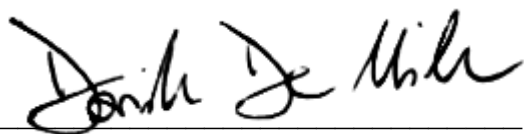
U) CONDITIONS

None.

V) CONCLUSIONS

QUINEL Ltd certifies that the item tested complies with the Technical Standards requested.

Date: 19/07/2022

Signed:

Davide De Nobile – Laboratory Manager
(QUINEL Ltd)

ANNEX I – REQUIREMENTS SATISFIED

Definitions

Compensated games or events
Games or virtual events that adjust the likelihood of winning outcomes occurring based on previous payouts or intake. Sometimes referred to as adaptive behaviour or percentage compensation.
Easily accessible
This term generally means the facilities or information is either on the screen, or can be intuitively accessed via efficient navigation or other means
Game
A game of chance as defined in section 6(2) of the Act
Gambling
The Act defines gambling as: (a) gaming (within the meaning of sec.6) (b) betting (within the meaning of sec 9), and (c) participating in a lottery (within the meaning of sec. 14 and subject to sec 15)
Gaming session
A gaming session is the playing of any of the applicable activities (e.g. bingo or casino games) and commences when a player starts playing a game for real money. A gaming session ends when a player exits a game
High frequency lottery
A lottery in which any draw takes place less than one hour after a draw in a previous lottery promoted on behalf of the same non-commercial society or local authority or as part of the same multiple lottery scheme
Instant lottery
A lottery in which the draw takes place before any of the tickets in the lottery are offered for sale.
Lottery ticket
As described by section 253 of the Act and a reference in this document to a lottery ticket includes: • a lottery ticket which is sent by post following entry by means of remote communication • a message sent or displayed to a person electronically in a manner which enables him to (a) retain the message electronically or (b) print it.
Mapping
Is the process of selecting an outcome using the result from a Random Number Generator (RNG). For example, the result from a RNG is mapped to a reel strip symbol.
Peer-to-peer gambling
A type of gambling where customers gamble against each other rather than against the house. For example, equal chance gaming such as poker or peer-to-peer betting through betting exchanges.
Play-for-free
Also known as play-for-fun. Demonstration version of a real money game where the customer is not staking or winning any money or money's worth.
Progressive or progressive jackpot
An incremental prize that increases as a result of contributions from the monies staked within a game from pre-set base value.
Random Number Generator (RNG)
Refers to any item of hardware or software which is used to generate random numbers with the intended property of statistical randomness.
Restricted display device

A device such as a mobile phone which has limited space on which to display information, when used to access gambling facilities that the operator intends a customer to use by means of such a device.

We expect that a player using a restricted display device would still have the ability to use all required responsible gambling tools, such as financial limits or self-exclusion. We would not consider it acceptable to require a player to login via, for example, the desktop website version of the gambling facilities in order to access responsible gambling tools. Such an approach would create unreasonable barriers and may deter or prevent mobile users from utilising the available tools.

Scaling

Scaling is the process used to convert the output from a RNG into the format required to produce a result for a particular gambling product. To illustrate, an RNG may produce a result of between 1 and 100,000 but these possible outcomes need to be scaled to the potential game outcomes of, for example, between 1 – 52 (i.e. to correspond to a standard pack of cards).

Seeding

Refers to the process used to determine the initial state of the RNG.

Slots

Casino games of a reel-based type (includes games that have non-traditional reels).

Subscription lottery

A series of lotteries (other than instant lotteries) promoted on behalf of the same non-commercial society or local authority in respect of which participants pay for participation in one or more future lotteries by regular subscription over a fixed or indefinite period.

Telephone gambling

Gambling which takes place via a telephone, without the use of visual displays, by interaction with a customer service agent or an automated system, such as intelligent voice recognition systems or touch tone.

Third Party Software

Refers to software that is separately available from the core software product and is designed to add optional features. It includes additional software, supplied, or used, by the gambling operator, or player, which wasn't part of the basic package.

Virtual

As described by s353(3) of the Act. Virtual event and virtual game are to be construed accordingly.

Unless differently specified, the results are related to all the test items.

Requirements			Result
RTS	Aim	Req.	PASS / FAIL / N.A.
RTS 1	To provide customers with easily accessible information about their current balances and facilities that enable them to review previous gambling and account transactions.	A	N.A.
		B	N.A.
		C	N.A.
RTS 2	To enable the customer to understand the value and content of their transactions.	A	N.A.
		B	N.A.
		C	N.A.
		D	N.A.
		E	N.A.
RTS 3	To enable customers to make informed decisions about whether to gamble based on their chances of winning, the way the game, lottery or event works, the prizes or payouts on offer and the current state of multi-state games or events.	A	N.A.
		B	N.A.
		C	N.A.
		D	N.A.
RTS 4	To reduce the risk that customers are unfairly disadvantaged by technical factors that may affect speed of response, and to ensure customers are made aware of the risk	A	N.A.
		B	N.A.
RTS 5	To ensure that the gambling system implements the operator's rules, game rules and betting rules as they are described to the customer.	A	N.A.
RTS 6	To minimise the risk that customers are misled about the likelihood of winning due to the behaviour of play-for-free games	A	N.A.
RTS 7	To ensure that games and other virtual events operate fairly.	A	PASS
		B	N.A.
		C	N.A.
		D	N.A.
		E	N.A.
RTS 8	To ensure that the customer is still in control of the gambling where auto-play functionality is provided and to minimise the risk that the functionality disadvantages a customer or that auto-play or other strategy advice is misleading.	A	N.A.
		B	N.A.
		C	N.A.
RTS 9	To ensure that progressive jackpot systems operate fairly	A	N.A.
		B	N.A.
RTS 10	To ensure that customers are treated fairly in the event of interrupted play or betting and that they are aware of how they will be treated if interruptions occur	A	N.A.
		B	N.A.
		C	N.A.
RTS 11	To reduce the risk that cheating or collusion by players unfairly disadvantages another player and to inform customers about the risks posed	A	N.A.
		B	N.A.

Requirements			Result
RTS	Aim	Req.	PASS / FAIL / N.A.
RTS 12	To provide customers with facilities that may assist them in sticking to their personal budgets for gambling with the operator. Customers must be also be given the option to set financial limits at an account level.	A	N.A.
		B	N.A.
RTS 13	To provide customers with facilities to assist them to keep track of the time they spend gambling.	A	N.A.
		B	N.A.
		C	N.A.
RTS 14	To ensure that products are designed responsibly and to minimise the likelihood that they exploit or encourage problem gambling behaviour.	A	N.A.
		B	N.A.
		C	N.A.
		D	N.A.
		E	N.A.
		F	N.A.
RTS 15	To make the customer aware that they may not have the latest information available when betting on live events, and that they may be at a disadvantage to operators or other customers who have more up-to-date information	A	N.A.
RTS 16	To make customers in peer-to-peer gambling aware that they may be gambling against a software program (designed to automatically participate in gambling within certain parameters, sometimes referred to as a bot), or a human aided by third party software.	A	N.A.
		B	N.A.
		C	N.A.
RTS 17	To ensure that live dealer operations are fair	A	N.A.

ANNEX II – RNG TEST DETAILS

A) Security

RNG output is used immediately and not stored in memory. Restarting of RNG is not performed programmatically and requires the entire platform to restart. The RNG has a background cycle of 50Hz and is shared between instances and games.

B) Testing results for raw output of RNG

Confidence level: 95% - 99%

1) Data sets of 3.500.000 outcomes each of raw 32-bit integers

DIEHARD battery of tests

Overall results:

POSITIVE

Test results:

BIRTHDAY SPACINGS TEST:	PASS
OVERLAPPING 5-PERMUTATION TEST:	PASS
BINARY RANK TEST for 31x31M:	PASS
BINARY RANK TEST for 32x32M:	PASS
BINARY RANK TEST for 6x8M:	PASS
BITSTREAM TEST:	PASS
OPSO, OQSO and DNA TESTS:	PASS
COUNT-THE-1's TEST (stream):	PASS
COUNT-THE-1's TEST (specific):	PASS
PARKING LOT TEST:	PASS
MINIMUM DISTANCE TEST:	PASS
3DSPHERES TEST:	PASS
SQUEEZE TEST:	PASS
OVERLAPPING SUMS TEST:	PASS
RUNS TEST:	PASS
CRAPS TEST:	PASS

NIST battery of tests:

Overall results:

POSITIVE

Test results:

FREQUENCY:	PASS
BLOCK FREQUENCY:	PASS
CUMULATIVE SUM:	PASS
RUNS:	PASS
LONGEST RUN:	PASS
RANK:	PASS
FFT:	PASS

NONOVERLAPPING TEMPLATE:	PASS
OVERLAPPING TEMPLATE:	PASS
UNIVERSAL:	PASS
APPROXIMATE ENTROPY:	PASS
RANDOM EXCURSIONS:	PASS
RANDOM EXCURSIONS VARIANT:	PASS
SERIAL:	PASS
LINEAR COMPLEXITY:	PASS

C) Testing results for scaled data

Confidence level: 95% - 99%

- 1) Data sets of 300.000 integer outcomes each in the range [0,36] (included)
- 2) Data sets of 300.000 integer outcomes each in the range [0,51] (included)

Overall results: POSITIVE

Test results:

RUNS TESTS:	PASS
FREQUENCY TESTS:	PASS
SERIAL CORRELATION TESTS:	PASS
COUPLES TESTS:	PASS

D) Testing results for float data

Confidence level: 95% - 99%

- 1) Data sets of 300.000 float outcomes each in the range [0,1] (included)

Overall results: POSITIVE

Test results:

GAP TESTS:	PASS
FREQUENCY TESTS:	PASS
SERIAL TESTS:	PASS
POKER TESTS:	PASS
ORDER TESTS:	PASS

E) Testing results for shuffled decks data

Confidence level: 95% - 99%

- 1) Data sets of 150.000 of shuffled decks with cards in the range [0,51] (included)

Overall results: POSITIVE

Test results:

FREQUENCY TESTS (for position):	PASS
FREQUENCY TESTS (for card value):	PASS
SERIAL CORRELATION TESTS:	PASS
DISTANCE TESTS:	PASS
RECIPROCAL POSITION TESTS:	PASS
SEQUENCE LENGTH TESTS:	PASS

END
OF
COMPLIANCE
REPORT