

RGS EVALUATION TESTING REPORT

RNG - Random Number Generator

Reference regulation:
Malta Online Gaming Regulation

29/05/2025

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 must immediately return all copies to QUINEL Ltd of this Report and cannot use them nor refer to.

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

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

A) Audit ID

MT_OEG006RNG_R001_RNG_REV.1

B) Reference regulation

- Gaming Authorisations Regulations - Subsidiary Legislation 583.05 - L.N. 243 of 2018
- Directive 2 of 2018 - Player Protection Directive - V3 – January 2023

C) Test methods

QISI001– Software source code inspection
QIRT000 – RNG qualitative analysis
QIRT001 - Statistical analysis on scaled numbers in the range [0, 36]
QIRT002 - Statistical analysis on scaled numbers in the range [0, 51]
QIRT003 - Statistical analysis on float numbers in the range [0, 1)
QIRT004 - Statistical analysis on shuffled numbers
QIRT005 – DIEHARD battery of tests
QIRT006 – NIST battery of test

D) Auditor / Test lab

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

E) Audit subject

Description: Compliance of the following test items:

<i>Test Item</i>	<i>Item Name</i>	<i>Revision</i>	<i>Interface</i>
R001	RNG	1.1	N.A.

Receipt date:

15/05/2025 – first submission for testing against the regulation as per Section (B).

Inspection date:

28/05/2025

Note: -

F) Requester

Balkan International B.V..
Chuchubiweg, 17
Willemstad, Curacao
balkan.international23@gmail.com

QUINEL Ltd

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

G) Owner of the system/software

Refer 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: Bozhin Zafirov (System Administrator), Angel Anastasov (CTO)

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

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

Game(s) / Test item(s) use(s) Jackpot: **N.A.**

Here follows the theoretical pay-out of the test items:

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

K) Protocols and specifications of the gaming system

Type: software-based RNG

Programming language: C

Operating System: Debian 11.6 Linux Kernel 6.0

Description of the RNG:

The RNG is written entirely with C and it is based on *getrandom()* system call, that on Linux machine it wraps to */dev/urandom* device.

The RNG provides methods for integer generation, permutation and scaled integer, namely *getRandom()*, *getRandomPermutation()* and *getRandInt()*.

Security:

The usage of *getrandom()* system call can be considered cryptographically secure.

See: <https://man7.org/linux/man-pages/man2/getrandom.2.html>

Additional details:

Background cycling is performed every 100 ms extracting randomly between 1 and 8 random numbers. *Reseeding* is not performed explicitly, but it is handled directly by the device itself.

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

L) Security of the system

N.A.

M) Critical modules

File name	SHA1	Description	Critical	Test Item
rng-server	321b59d038eed55ed0fb4be77a046a72bc99b75	RNG	Y	R001

N) Evaluation performed

The test evaluation, required by the Requester, was completed against the applicable requirements of regulations as per section B).

O) Testing activities applied

Internal procedure followed: Rif. "IOP 02-02 TEST METHODS"

P) Additional information

None

Q) Setup and application/system architecture

Refer to Section K)

R) Product Tested

Refer to Section M)

S) Report revisions

N.A.

T) CERTIFICATION

Date: 29/05/2025
Requester: Balkan International B.V..
Chuchubiweg, 17
Willemstad, Curacao

Total Number of Pages: 9

QUINEL Ltd certifies that the games / test items identified at section E) comply with the Malta Online Gaming Regulation as per section B).

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

U) CONDITIONS

QUINEL Ltd tested only the RNG on the producer's environment. It will be Operator's responsibility to comply with all the requirement requested by the regulation, as per Section B).

V) CONCLUSIONS

The test item identified at section E) is compliant with RNG-specific requirements of the technical standards requested.

Date: 29/05/2025

Signed:



Fabio Valenti – Laboratory Manager
(QUINEL Ltd)



Isacco Ceci – CEO
(QUINEL Ltd)

ANNEX I - RNG test details

A) Testing results for raw output of RNG

1) Data sets of 3.500.000 outcomes each of raw 32-bit integers
Confidence level: 95% and 99%

DIEHARD battery of tests

Overall results: POSITIVE

Test results:

BIRTHDAY SPACINGS 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
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

B) Testing results for scaled data

Confidence level: 95% and 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

C) Testing results for float data

Confidence level: 95% and 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

D) Testing results for shuffled decks data

Confidence level: 95% and 99%

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

Overall results: POSITIVE

Test results:

POKER HAND TESTS:	PASS
CLOSED CYCLE TESTS:	PASS
DISTANCE INSIDE DECK TESTS:	PASS
DISTANCE BETWEEN DECK TESTS:	PASS

END OF
COMPLIANCE
REPORT