

## **RGS EVALUATION TESTING REPORT**

### **Compliance testing report**

*Game:*

*“Tiger Rush” – HTML5 (Desktop & Mobile)*

*Client Revision: 1.0.3*

*Engine Version: 1.0.0*

*RNG Version: 3.5.0*

### **Reference regulation:**

UK Gambling Commission - *Remote gambling and software technical standards*, June 2017

**September 20, 2018**



## INTRODUCTION

The findings reported in this summary are the results of a broader set of documents and testing activities results archived in QUINEL Limited'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 Limited 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 Limited and would not be able to use them.

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

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**A) Audit ID**

J18090438\_G001\_Tiger Rush\_REV.1

**B) Reference regulation**

UK Gambling Commission – Remote gambling and software Technical Standards, June 2017

**C) Test methods**

QIVI001 – Visual inspection  
 QISI001 – Software source inspection method  
 QIMT001 – Mathematical analysis  
 QIAF001 – Accounting functionalities

**D) Auditor / Test lab**

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**E) Audit subject / Scope**

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

<i>Test Item</i>	<i>Game Name</i>	<i>Version</i>	<i>Interface</i>
G001	Tiger Rush	Client rev: 1.0.3 Engine vers: 1.0.0 RNG vers: 3.5.0	HTML5 (Desktop & Mobile)

**Receipt date:**  
 11/07/2018 – first submission for testing against the regulation as per Section (B)

**Inspection date:**  
 11/09/2018 - 19/09/2018

**Note:** Compliance of the RNG used by the test items was certified through report with ID “MDI\_02-08\_J16030078\_RNG\_rev.1\_UK” issued and signed by Quinel M. LTD, dated March 25<sup>th</sup>, 2016.

**F) Requester**

Thunderkick Malta LTD  
 Level 5, The Mall Complex,  
 Floriana, Malta

**G) Owner/Producer of the system/software**

Thunderkick AB  
 Vasagatan 11, 111 20 Stockholm,  
 Sweden

**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:** Mr. Sven Grip, Mr. Stéphane Redon, Mr. Johnny Aspelin, Mr. Daniel Gjørwell, Ms. Jeanette Karlsson.  
  
**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: **Slot Game**  
 Game / Test item use Jackpot: **N**  
 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>
G001	Tiger Rush	96.3%

**K) Specifications of the gaming system**

Both games (server-side logic) and platform are developed entirely with the Java Language.

Game was provided through the following URLs on a QA environment:  
<https://quinel.thunderkick.com/games/> (player’s interface)  
<https://qa-int-backoffice.thunderkick.com> (Back office / Admin interface)  
<http://ext-qa-gameservice.thunderkick.com> (Runtime game configuration)

The QA environment used for RNG testing relies on a Linux environment hosted by Amazon’s cloud services and runs on Oracle Java JDK 1.7.0\_09, Apache Tomcat application server 7.0.42

Live environment is reachable at the following IPs (primary site, secondary site omitted):  
 Game traffic: 37.114.73.113

API: 37.114.73.114  
 Back office 37.114.73.115  
 Firewall 37.114.73.120

Live environment servers are running Linux “Ubuntu 12.04.5 LT; Precise Pangolin”, with Oracle Java JDK 1.7.0\_51, Apache Tomcat application server 7.0.50.

Simulation environment for game testing used a virtualized server with the same Linux distribution “Ubuntu 12.04.5 LT; Precise Pangolin” with Oracle Java JDK 1.7.0\_76 – no application server was required.

The difference between the Java JDK is negligible considered the change log and that the source code inspection couldn’t find any specific binding to those releases nor dependencies on system APIs. Same considerations apply with regards to differences between QA and Live environment.

**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 “*Remote gambling and software Technical Standards*” – June 2017, to meet the requirements listed in the current “*Testing strategy for compliance with remote gambling and software technical standards*”

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

**O) Testing activities applied**

Internal procedure followed:  
 Rif. “IOP 02-02 TEST METHODS”. The following testing methods were used:

- Mathematical calculation of the Pay out
- Fairness of the game and associated rules
- Requirements of the player’s interface
- Source code inspection
- Simulation and inspection for verification of the actual RTP

**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>SHA1:</i>	<i>Critical</i>	<i>Test Item</i>	<i>File name</i>
e0d59194f18c87e7c39a7a24e597279a7a2e8fce	Yes	G001	gp-game-s1-g18.json
1941f747b6a1e25517acf738dc623a3e34979ce0	Yes	G001	gp-game-s1-g18-core-1.0.0-RELEASE.jar
d5e01a5f41deae3b63b46b2ccb7125278e3ebc29	Yes	All (*)	MersenneTwister32.java
ea8940a1cd7d561eb944c42f101ddfd7cce2ec7	Yes	All (*)	RandomNumberGenerator.java
f2dc4e8ed46eb5653d99ff54f60c4e4047ad4ec	Yes	All	gp-rng-3.5.0-RELEASE.jar
ea01386be069745202580bd50c3de32c33f3553f	Yes	All	gp-rng-api-3.5.0-RELEASE.jar

(\*) RNG main source code files.

## S) CERTIFICATION

Job ID: J18090438\_G001\_Tiger Rush\_REV.1  
Date: September 20, 2018  
Requester: Thunderkick Malta LTD  
Level 5, The Mall Complex,  
Floriana, Malta

Total Number of Pages: **12**

QUINEL Limited certifies that the games / test items identified at section E)

G001: **Tiger Rush** HTML5 (Desktop & Mobile)

comply with the UK Gambling Commission “*Remote gambling and software Technical Standards, June 2017*” reference standard based on the current “*Testing strategy for compliance with remote gambling and software technical standards*”.

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

## T) CONDITIONS

None.

## U) CONCLUSIONS

The games / test items identified at section E) are compliant with the abovementioned technical standards when integrated with the RNG certified and identified into compliance Report ID “*MDI\_02-08\_J16030078\_RNG\_rev.1\_UK*” issued and signed by Quinel M. LTD, dated March 25<sup>th</sup>, 2016.

Date: September 20, 2018

**Signed:**



Davide De Nobile – Laboratory Technical Director  
(QUINEL Limited)

## ANNEX I – REQUIREMENTS SATISFIED

### Definitions

<b>Compensated games or events</b>
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.
<b>Easily accessible</b>
This term generally means the facilities or information is either on the screen, or can be intuitively accessed via efficient navigation or other means
<b>Game</b>
A game of chance as defined in section 6(2) of the Act
<b>Gambling</b>
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)
<b>Gaming session</b>
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
<b>High frequency lottery</b>
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
<b>Instant lottery</b>
A lottery in which the draw takes place before any of the tickets in the lottery are offered for sale.
<b>Lottery ticket</b>
As described by section 253 of the Act and a reference in this document to a lottery ticket includes: <ul style="list-style-type: none"> <li>• a lottery ticket which is sent by post following entry by means of remote communication</li> <li>• 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.</li> </ul>
<b>Mapping</b>
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.
<b>Peer-to-peer gambling</b>
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.
<b>Play-for-free</b>
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.
<b>Progressive or progressive jackpot</b>
An incremental prize that increases as a result of contributions from the monies staked within a game from pre-set base value.
<b>Random Number Generator (RNG)</b>
Refers to any item of hardware or software which is used to generate random numbers with the intended property of statistical randomness.
<b>Restricted display device</b>



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.

**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.
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	PASS (Strictly limited to UI)
		B	PASS (Strictly limited to UI)
		C	PASS (Strictly limited to UI)
		D	PASS (Strictly limited to UI)
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	PASS (Speed does not affect game)
		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	PASS
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	PASS (Strictly limited to UI)
RTS 7	To ensure that games and other virtual events operate fairly.	A	N.A. (ref. to RNG report)
		B	PASS
		C	PASS
		D	PASS
		E	PASS
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	PASS (Strictly limited to UI)
		B	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	PASS (Strictly limited to UI)
		B	PASS (Strictly limited to UI)
		C	N.A.

Requirements			Result
RTS	Aim	Req.	PASS / FAIL / 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.
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.
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.
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– simulation details for game compliance

### A) Environment used / Setup information

Simulation and verification of the correspondence of the files certified vs file deployed was completed following the information at Section K) of the compliance report.

### B) Simulation outcomes

<i>Test Item</i>	<i>Game name</i>	<i>Theor. RTP</i>	<i>Real RTP</i>	<i>No. spins</i>	<i>Absolute deviation</i>	<i>Result</i>
G001	Tiger Rush	96.3%	96.32%	267G	0.02%	PASS

<i>Test Item</i>	<i>Game name</i>	<i>Sha1of simulation results log file</i>
G001	Tiger Rush	Tiger Rush - Simulation Summary.pdf - db3963b90a6ff790b802a1c5d4d28f54fd69a281

END  
OF  
COMPLIANCE  
REPORT