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December 30, 2019

Mr. Brandon Zyxfryx, Owner
ZFX Gaming LLC
142 Coburn Woods
Nashua, NH 03063

Scope of Evaluation: Mathematical Analysis of *21 Stud* (Proposal #LO-20191113-6324 dated November 13, 2019)

REF: LO-394-ZFX-19-01

Evaluating Location
GLI-1

Nevada Registration Number: 31668-01

Dear Mr. Zyxfryx,

As per ZFX Gaming LLC's request, please find **Gaming Laboratories International, LLC's (GLI)** analysis of the table game, *21 Stud*, to be submitted to and reviewed by the Nevada Gaming Control Board for determination as to its suitability.

Game Description

INTRODUCTION AND GAME PLAY

21 Stud is a game played with a shoe of six, seven or eight decks of playing cards. The decks may be standard 52-card decks, or they may be 48-card "Spanish" decks, with Tens removed. When using Spanish decks, the game may also be known as *21 Stud SP*. The player begins by placing a main wager. Additionally, the player may also place a Mirror Match and/or one or more Match the Dealer wagers. Two cards are then dealt to each player and to the dealer. All wagers are then resolved.



BASE WAGER

All cards are assigned a point value: face cards are worth 10 points, Aces are worth 11 points and all other card values are equal to their rank. If a hand totals 21 or 22, it is considered a Blackjack.

If the player has Blackjack and the dealer does not, the wager wins and pays according to the configuration. If both the player and the dealer have Blackjack, the wager either wins or pushes, according to the configuration, as listed in [Table 1](#). If the dealer has Blackjack and the player does not, the wager loses.

Table 1. Pays — Main Wager, Player Blackjack

Scenario	Paytable 1	Paytable 2	Paytable 3	Paytable 4
Blackjack Win	3 to 2	6 to 5	3 to 2	6 to 5
Blackjack Tie	Push	Push	3 to 2	6 to 5

If neither the player nor the dealer has Blackjack, the hand totals are compared. If the player beats the dealer, the wager wins and pays 1 to 1. If the player and the dealer tie or if the player is beaten by the dealer, the wager loses.

MATCH THE DEALER

The Match the Dealer wager is evaluated based on the player hand and one of the dealer cards. The player may place a wager on the first or second dealer card or a separate wager on each. If one or more of the player cards match the dealer card in rank, the wager wins and pays according to the number of matches and whether they are suited matches, as listed in [Table 2](#). Otherwise, the wager loses.

Table 2. Pays — Match the Dealer

Scenario	Standard Decks	"Spanish" Decks
2 Suited Matches	22 to 1	18 to 1
1 Suited Match and 1 Non-Suited Match	15 to 1	13 to 1
1 Suited Match	11 to 1	9 to 1
2 Non-Suited Matches	8 to 1	8 to 1
1 Non-Suited Match	4 to 1	4 to 1

MIRROR MATCH

The Mirror Match wager is evaluated based on the player cards. If the two cards match in rank (form a pair), the wager wins and pays according to highest eligible scenario, as listed in [Table 3](#).

Table 3. Pays — Mirror Match

Scenario	Standard Decks	"Spanish" Decks
Suited Aces	40 to 1	30 to 1
Suited Pair	25 to 1	25 to 1
Same Color Pair	12 to 1	10 to 1
Pair	5 to 1	5 to 1

Mathematical Analysis

For the main wager, the analysis was performed by iterating through each possible player and dealer hand, evaluating the result and combining with the probability and the pay information to produce the Return to Player (RTP) and the House Edge (HE) figures. Return summaries for each payable and deck configuration are listed in [Table 4](#) and [Table 5](#).

Table 4. Return Summary — Main Wager, Standard Decks

Decks		Paytable 1	Paytable 2	Paytable 3	Paytable 4
6	RTP	95.73%	94.22%	96.14%	94.54%
	HE	4.27%	5.78%	3.86%	5.46%
7	RTP	95.72%	94.21%	96.13%	94.53%
	HE	4.28%	5.79%	3.87%	5.47%
8	RTP	95.71%	94.20%	96.12%	94.52%
	HE	4.29%	5.80%	3.88%	5.48%

Table 5. Return Summary — Main Wager, "Spanish" Decks

Decks		Paytable 1	Paytable 2	Paytable 3	Paytable 4
6	RTP	95.77%	94.39%	96.11%	94.65%
	HE	4.23%	5.61%	3.89%	5.35%
7	RTP	95.76%	94.38%	96.10%	94.65%
	HE	4.24%	5.62%	3.90%	5.35%
8	RTP	95.76%	94.37%	96.10%	94.64%
	HE	4.24%	5.63%	3.90%	5.36%

For the other wagers, the analysis was performed through direct computation. For each wager and deck configuration, the probability of winning each award was calculated and combined with the pays to produce returns. Summaries can be found in [Table 6](#) and [Table 7](#).

Table 6. Return Summary — Match the Dealer

Decks	RTP	HE
6 Standard	95.94%	4.06%
7 Standard	96.99%	3.01%
8 Standard	97.77%	2.23%
6 "Spanish"	96.94%	3.06%
7 "Spanish"	97.88%	2.12%
8 "Spanish"	98.58%	1.42%

Table 7. Return Summary — Mirror Match

Decks	RTP	HE
6 Standard	91.89%	8.11%
7 Standard	93.09%	6.91%
8 Standard	93.99%	6.01%
6 "Spanish"	94.11%	5.89%
7 "Spanish"	95.37%	4.63%
8 "Spanish"	96.32%	3.68%

Summary

The highest individual wager RTP is 98.58%, from the Match the Dealer wager when 8 "Spanish" decks are used. The highest aggregate RTP that can be achieved by a player will depend on allowable wagering ratios, decks used and paytables configured, but in any case will not exceed 98.58%. The lowest individual wager RTP is 91.89%, from the Mirror Match wager when 6 Standard decks are used.

Concerns Identified:

The following concerns were raised during the evaluation of the aforementioned game. The details are as follows:

- NONE

Conclusion

Gaming Laboratories International, LLC attests that it has reviewed the mathematics of the game as submitted by ZFX Gaming LLC, and has performed an independent review of the game play to confirm that the submission documents are accurate.

Please visit Gaminglabs.com to view the applicable Terms and Conditions.

It is declared and affirmed under penalty of perjury that to the best of GLI's knowledge and belief the GLI certification process was conducted in accordance with Nevada Gaming Control Board's (NGCB) requirements and that the product being certified in this Report meets the requirements of the Nevada Gaming Control Act and all regulations, technical standards, control standards and procedures, policies, and industry notices implemented or issued by the NGCB.

21 Stud

LO-394-ZFX-19-01-394

GLI-1

Page 6 of 8

Should you have any questions or need any additional information, please feel free to contact our office.

Sincerely,

GAMING LABORATORIES INTERNATIONAL, LLC

A handwritten signature in black ink, appearing to read 'CM Gallo', is centered on a light gray rectangular background.

Christine M. Gallo

Vice President of Technical Compliance and Quality Assurance

Enclosure

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21 Stud

LO-394-ZFX-19-01-394

GLI-1

Page 7 of 8

APPENDIX I

Nevada Test Cases Evaluated and Test Results:

Test Cases Relating to Return Percentage:

Test Case	Version	Test Results
14.040.1 (a)	2.0	Pass ①

- ① Please note that the test case listed above is related to Gaming Devices and may factor into determination of suitability for Nevada.