

## BMM EVALUATION TEST REPORT

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**Report Issue Date:** 12<sup>th</sup> December, 2017

**Issued To:** Roulette Holdings LLC

**Issued By:** BMM Testlabs  
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**Compliance Evaluation Tested By:** BMM Testlabs  
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Las Vegas, NV 89119  
NGCB Registration #31758-01

**Manufacturer:** Roulette Holdings LLC  
1848 Golf Ridge Drive S  
Bloomfield Hills, MI 48302

**Compliance Evaluation for:**

**Games:** 54 Card Roulette

**Mathematical Pay Percentages:**  
See page 2

**Reference Numbers:**

**BMM:** RHL.1001

**Report Number:** RHL10011\_E

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### Mathematical Pay Percentages for 54 Card Roulette – Poker Wagers:

Variation	RTP (%)	House Edge (%)
Five of a Kind	78.93	21.07
Royal Flush	79.69	20.31
Straight Flush	81.98	18.02
Four of a Kind	81.69	18.31
Flush	81.38	18.62
Straight	83.40	16.60
Three of a Kind	81.03	18.97

### Mathematical Pay Percentages for 54 Card Roulette – Roulette Wagers:

Variation	RTP (%)	House Edge (%)
Straight-Up	94.44	5.56
Split	96.30	3.70
Street	94.44	5.56
Corner	96.30	3.70
Rank	96.30	3.70
Two Ranks	88.89	11.11
Suit	96.30	3.70
Ace/Face	88.89	11.11
Black	96.30	3.70
Red	96.30	3.70

### Mathematical Pay Percentages for 54 Card Roulette – Progressive Wager:

Variation	RTP (%)	House Edge (%)
Paytable 1	84.66	15.34

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## 1. PURPOSE

Roulette Holdings LLC has requested BMM Testlabs to perform a mathematical evaluation of the game 54 Card Roulette which was prepared by Charles R. Mousseau of Total Gaming Science. The evaluations tested the math for correct Return to Player (RTP) and compliance of the Top Award odds.

The mathematical evaluations used algorithms which performed complete iterations of each possible combination of player and dealer hands to calculate the theoretical RTP and top award odds of 54 Card Roulette. The Progressive values were verified through simulation of one (1) billion game plays. The mathematical evaluations assumed the following:

- The game is played with one (1) standard deck of 52 cards plus two (2) jokers for a total of 54 cards.

## 2. RULES AND PAYTABLE

### 2.1. 54 Card Roulette – Poker Wagers

54 Card Roulette is a custom game consisting on three (3) wager types: Poker Wagers, Roulette Wagers, and a Progressive Wager. The rules are given below:

- To begin play, players make bets on the Poker, Roulette, and/or Progressive Wager.
- The dealer will draw five (5) random cards from the 54 card deck.
- One of the five (5) cards will be designated as the “Roulette Card”. The choosing of the “Roulette Card” needs to be done in a consistent manner, such as always using the first card dealt. As long as each of the five (5) choices is equally likely, the integrity of the game is unaffected.
- Poker Wagers are bets on a specific hand rank. The player will win if the final five (5) card hand is that rank and that rank only.
- The available Poker Wagers and corresponding payouts are listed below:

Wager wins on	Pay (to 1)
Five of a Kind only	32,000
Royal Flush only	30,000
Straight Flush only	4,800
Four of a Kind only	275
Flush only	225
Straight only	75
Three of a Kind only	10

- For the Poker Wagers, based on the table limit; there is the potential for a payout of more than \$250,000.00.
- Roulette Wagers are bets on one (1) or more cards and will win if the “Roulette Card” is one of the cards covered by the player’s wager.

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- The available Roulette Wagers and corresponding payouts are listed below:

Wager wins on	Pay (to 1)
Straight-Up	50
Split	25
Street	16
Corner	12
Rank	12
Two Ranks	5
Suit	3
Ace/Face	2
Black	1

- Progressive Wagers are bets of \$1.00 and are paid out based on the rank of the five (5) card hand.
- Progressive Wagers are paid out on a “for 1” basis, meaning the original \$1.00 bet is not returned to the player in the event of a winning hand.
- The Progressive Wager payouts are listed below:

Hand	Pay
Five of a Kind	100% of the Progressive pool
Royal Flush	20% of the Progressive pool
Straight Flush	5% of the Progressive pool

- The Progressive payouts split equally among all players that made the Progressive Wager.

### 3. COMPLIANCE EVALUATION DETAILS

#### 3.1. 54 Card Roulette

The following table details the relevant information for the mathematical pay percentages for the game: 54 Card Roulette.

Game Details – 54 Card Roulette – Poker Wagers – Five of a Kind:

Hand	Probability	Pay (to 1)	EV
Five of a Kind	0.00002466	32000	0.78924652
Other	0.99997534	-1	-0.99997534
<b>House Edge</b>			21.07%
<b>RTP</b>			78.93%

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Game Details – 54 Card Roulette – Poker Wagers – Royal Flush:

Hand	Probability	Pay (to 1)	EV
Royal Flush	0.00002656	30000	0.79683543
Other	0.99997344	-1	-0.99997344
<b>House Edge</b>			20.31%
<b>RTP</b>			79.69%

Game Details – 54 Card Roulette – Poker Wagers – Straight Flush:

Hand	Probability	Pay (to 1)	EV
Straight Flush	0.00017075	4800	0.81960215
Other	0.99982925	-1	-0.99982925
<b>House Edge</b>			18.02%
<b>RTP</b>			81.98%

Game Details – 54 Card Roulette – Poker Wagers – Four of a Kind:

Hand	Probability	Pay (to 1)	EV
Four of a Kind	0.00295967	275	0.81391047
Other	0.99704033	-1	-0.99704033
<b>House Edge</b>			18.31%
<b>RTP</b>			81.69%

Game Details – 54 Card Roulette – Poker Wagers – Flush:

Hand	Probability	Pay (to 1)	EV
Flush	0.00360094	225	0.81021150
Other	0.99639906	-1	-0.99639906
<b>House Edge</b>			18.62%
<b>RTP</b>			81.38%

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Game Details – 54 Card Roulette – Poker Wagers – Straight:

Hand	Probability	Pay (to 1)	EV
Straight	0.01097356	75	0.82301716
Other	0.98902644	-1	-0.98902644
<b>House Edge</b>			16.60%
<b>RTP</b>			83.40%

Game Details – 54 Card Roulette – Poker Wagers – Three of a Kind:

Hand	Probability	Pay (to 1)	EV
Three of a Kind	0.07366554	10	0.73665538
Other	0.92633446	-1	-0.92633446
<b>House Edge</b>			18.97%
<b>RTP</b>			81.03%

Top Award Details for 54 Card Roulette – Poker Wagers:

Variation	Top Award (to 1)	Top Award Odds	Top Award Description
Five of a Kind	32,000	1 in 40,545	Five of a Kind
Royal Flush	30,000	1 in 37,649	Royal Flush
Straight Flush	4,800	1 in 5,857	Straight Flush
Four of a Kind	275	1 in 338	Four of a Kind
Flush	225	1 in 278	Flush
Straight	75	1 in 92	Straight
Three of a Kind	10	1 in 14	Three of a Kind

Game Details – 54 Card Roulette – Roulette Wagers – Straight-up:

Hand	Probability	Pay (to 1)	EV
Straight-up	50	0.01851852	0.92592593
Other	-1	0.98148148	-0.98148148
<b>House Edge</b>			5.56%
<b>RTP</b>			94.44%

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### Game Details – 54 Card Roulette – Roulette Wagers – Split:

Hand	Probability	Pay (to 1)	EV
Split	25	0.03703704	0.92592593
Other	-1	0.96296296	-0.96296296
<b>House Edge</b>			3.70%
<b>RTP</b>			96.30%

### Game Details – 54 Card Roulette – Roulette Wagers – Street:

Hand	Probability	Pay (to 1)	EV
Street	16	0.05555556	0.88888889
Other	-1	0.94444444	-0.94444444
<b>House Edge</b>			5.56%
<b>RTP</b>			94.44%

### Game Details – 54 Card Roulette – Roulette Wagers – Corner:

Hand	Probability	Pay (to 1)	EV
Corner	12	0.07407407	0.88888889
Other	-1	0.92592593	-0.92592593
<b>House Edge</b>			3.70%
<b>RTP</b>			96.30%

### Game Details – 54 Card Roulette – Roulette Wagers – Rank:

Hand	Probability	Pay (to 1)	EV
Rank	12	0.07407407	0.88888889
Other	-1	0.92592593	-0.92592593
<b>House Edge</b>			3.70%
<b>RTP</b>			96.30%

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Game Details – 54 Card Roulette – Roulette Wagers – Two Ranks:

Hand	Probability	Pay (to 1)	EV
Two Ranks	5	0.14814815	0.74074074
Other	-1	0.85185185	-0.85185185
<b>House Edge</b>			11.11%
<b>RTP</b>			88.89%

Game Details – 54 Card Roulette – Roulette Wagers – Suit:

Hand	Probability	Pay (to 1)	EV
Suit	3	0.24074074	0.72222222
Other	-1	0.75925926	-0.75925926
<b>House Edge</b>			3.70%
<b>RTP</b>			96.30%

Game Details – 54 Card Roulette – Roulette Wagers – Ace/Face:

Hand	Probability	Pay (to 1)	EV
Ace/Face	2	0.29629630	0.59259259
Other	-1	0.70370370	-0.70370370
<b>House Edge</b>			11.11%
<b>RTP</b>			88.89%

Game Details – 54 Card Roulette – Roulette Wagers – Black:

Hand	Probability	Pay (to 1)	EV
Black	1	0.48148148	0.48148148
Other	-1	0.51851852	-0.51851852
<b>House Edge</b>			3.70%
<b>RTP</b>			96.30%

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Game Details – 54 Card Roulette – Roulette Wagers – Red:

Hand	Probability	Pay (to 1)	EV
Red	1	0.48148148	0.48148148
Other	-1	0.51851852	-0.51851852
<b>House Edge</b>			3.70%
<b>RTP</b>			96.30%

Top Award Details for 54 Card Roulette – Roulette Wagers:

Variation	Top Award (to 1)	Top Award Odds	Top Award Description
Straight-Up	50	1 in 54	The “Roulette Card” matches the one (1) selected card.
Split	25	1 in 27	The “Roulette Card” matches one (1) of the two (2) selected cards.
Street	16	1 in 18	The “Roulette Card” matches one (1) of the three (3) selected cards.
Corner	12	1 in 14	The “Roulette Card” matches one (1) of the four (4) selected cards.
Rank	12	1 in 14	The rank of the “Roulette Card” matches the selected rank.
Two Ranks	5	1 in 7	The rank of the “Roulette Card” matches one (1) of the two (2) selected ranks.
Suit	3	1 in 5	The suit of the “Roulette Card” matches the selected suit.
Ace/Face	2	1 in 4	The “Roulette Card” is an Ace, King, Queen, or Jack.
Black	1	1 in 3	The color of the “Roulette Card” matches the selected color.
Red	1	1 in 3	The color of the “Roulette Card” matches the selected color.

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Game Details – 54 Card Roulette – Progressive Wager – Paytable 1:

Hand	Probability	Average Pay (for 1)	EV
Five of a Kind	0.00002466	\$21,982.81	0.54218295
Royal Flush	0.00002656	\$4,396.56	0.11677787
Straight Flush	0.00017075	\$1,099.14	0.18767871
<b>Progressive Rate</b>			60.00%
<b>Progressive Seed</b>			\$10,000.00
<b>House Edge</b>			15.34%
<b>RTP</b>			84.66%

1. A \$1.00 bet is required for the Progressive Wager.
2. The payouts are “for 1”, meaning the original bet is not returned to the player in the event of a winning hand.

Top Award Details for 54 Card Roulette – Progressive Wager:

Variation	Top Award (to 1)	Top Award Odds	Top Award Description
Paytable 1	100% of the Progressive	1 in 40,545	Five of a Kind

#### 4. CHECKLISTS USED

The following table details the testing checklists used:

Checklist Number	Version	Checklist Description
AMS-NAM-CH-259	1.7	Game Math Checklist
AMS-NAM-CH-382	1.4	Math Evaluation Test Checklist
AMS-NAM-MO-382	1.4	Math Evaluation Method

#### 5. PROJECT HISTORY

The following table details milestone dates of the project;

Date	Description
01/11/2017	Original Submitted Date
14/11/2017	Testing Start Date
5/12/2017	Testing Completion Date

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### 6. TERMS AND CONDITIONS

BMM Testlabs (“BMM”) has conducted a level of testing of the gaming product which has historically been adequate for a submission of this type. However, inherent in testing in a laboratory environment are the unavoidable limitations of not being able to verify the effects of all possible configurations and environments that occur in actual gaming venues.

This evaluation report is for use by the client for the jurisdiction (“Jurisdiction”) referenced in the report (the “Report”) and only verifies, as of the date stated, the gaming product described in the Report subject to any conditions or limitations set forth therein.

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The undersigned certifies under penalty of perjury that the compliance testing of the gaming product detailed in this Report and any accompanying documents was conducted in accordance with the requirements of the Jurisdiction and that the gaming product meets the requirements of its laws and the regulations adopted thereunder, and all published technical standards, control standards, control procedures, policies, industry notices and similar requirements implemented or issued by the Jurisdiction to the best of BMM’s knowledge and belief.

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Please feel free to contact BMM Testlabs if you have any questions in regards to this evaluation report.

Yours sincerely,



Travis Foley  
Executive Vice President, Operations  
BMM Testlabs

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