

## Poker Cards Analysis - August 2019

### The Directors

GVC Plc

This is to confirm that iTech Labs has examined the game logs for Poker games for the period **August 01, 2019** to **August 31, 2019** as recorded by the respective game servers and analyzed the Poker cards for statistical randomness. The results of the analysis are given below.

**URLs:** <https://www.bwin.be/>, <https://www.bwin.dk/>, <https://www.bwin.es/>, <https://www.bwin.fr/>, <https://www.bwin.it/>, <https://www.premiumbull.com/>, <https://www.bwin.gr/>, <https://www.bwin.com/>, <https://www.partypoker.cz/>, <https://da.partypoker.com/>, <https://danskspil.dk/>, <https://www.partypoker.fr/>, <https://www.giocodigitale.it/>, <https://www.br.betboo.com/en/>, <https://www.partypremium.com/>, <https://www.partypoker.es/en/>, <https://www.partypoker.com/>, <https://sports.premium.com/en/sports/>, <https://poker.partypoker.se/sv/poker/>, <https://sports.sportingbet.com/en/sports/>, <https://sports.sportingbet.gr/el/sports/>, <https://www.sh.bwin.de/>, <https://sports.vistabet.com/el/sports/>, <https://sports.sportingbet.co.za/en/sports/>

### 1. Poker hand types statistics

These calculations were done for Royal Flush, Straight Flush, Four of a Kind, Full House, Flush, Straight, 3 of a Kind, 2 pairs, 1 Pair, High Card.

The Poker hand types analysis involved creating subsets of data and conducting Chi-square tests on each subset.

The null hypothesis for the chi-square test is that the observed frequencies of each type of hand matches the theoretical values for a deck that has been shuffled using a perfect random number generator. The p-values observed in these multiple tests are expected to follow a uniform distribution for the range 0.0 to 1.0.

The analysis performs a KS Test (Kolmogorov-Smirnov test) for uniform distribution on the observed p-values, and the combined p-value result of this test is taken as the final result of the Poker hand types statistics tests.

#### 1.1 Poker hand types statistics for 52 cards deck:

Test No.	DOF	ChiSqr	P-Value
1	9	4.61	0.86704
2	9	3.94	0.91517
3	9	6.71	0.66708
4	9	10.73	0.29488
5	9	12.97	0.16377
6	9	11.49	0.24365
7	9	9.59	0.38439
8	9	6.33	0.70694
9	9	12.74	0.17486
10	9	20.81	0.01354
11	9	16.37	0.05948
12	9	10.70	0.29692
13	9	7.28	0.60777
14	9	10.47	0.31357
15	9	4.29	0.89133
16	9	14.15	0.11720
17	9	3.17	0.95731
18	9	6.96	0.64167
19	9	7.62	0.57278

20	9	12.46	0.18851
21	9	5.57	0.78202
22	9	6.14	0.72605
23	9	18.61	0.02873
24	9	11.94	0.21674
25	9	12.00	0.21306
26	9	4.38	0.88483
27	9	13.58	0.13793
28	9	6.39	0.70017
29	9	8.16	0.51823
30	9	3.80	0.92423
31	9	5.59	0.78062
32	9	7.90	0.54408
33	9	9.66	0.37876
34	9	11.36	0.25172
35	9	11.61	0.23650
36	9	11.03	0.27383
37	9	3.01	0.96388
38	9	4.69	0.86040
39	9	3.99	0.91235
40	9	23.87	0.00452
41	9	6.82	0.65593
42	9	11.34	0.25289
43	9	22.34	0.00786
44	9	11.65	0.23373
45	9	8.36	0.49810
46	9	11.22	0.26077
47	9	6.00	0.74012
48	9	20.75	0.01383
49	9	3.39	0.94664
50	9	6.68	0.67033
51	9	9.25	0.41452
52	9	8.46	0.48812
53	9	8.82	0.45408
54	9	3.05	0.96219
55	9	4.74	0.85628
56	9	8.14	0.52024
57	9	14.35	0.11028
58	9	8.21	0.51277
59	9	7.29	0.60676
60	9	6.08	0.73239
61	9	9.23	0.41652
62	9	5.46	0.79290
63	9	14.74	0.09828
64	9	3.95	0.91443
65	9	7.15	0.62125
66	9	8.02	0.53186
67	9	6.43	0.69584
68	9	3.12	0.95943
69	9	10.35	0.32271
70	9	9.89	0.35947
71	9	5.98	0.74202
72	9	6.59	0.67921
73	9	7.52	0.58302
74	9	3.39	0.94700

75	9	12.79	0.17226
76	9	14.09	0.11933
77	9	15.47	0.07889
78	9	3.70	0.93002
79	9	10.34	0.32378
80	9	7.06	0.63048
81	9	5.49	0.78943
82	9	2.99	0.96465
83	9	9.03	0.43461
84	9	18.85	0.02654
85	9	3.36	0.94823
86	9	9.07	0.43117
87	9	7.14	0.62236
88	9	4.68	0.86098
89	9	12.00	0.21317
90	9	10.00	0.35020
91	9	5.27	0.81058
92	9	5.31	0.80651
93	9	6.57	0.68227
94	9	8.81	0.45489
95	9	15.39	0.08070
96	9	0.78	0.99980
97	9	9.07	0.43092
98	9	11.39	0.24964
99	9	12.66	0.17852
100	9	25.56	0.00241
Combined P-value for all tests (Using KS method)			0.90110

Notes:

- 1) The P-values are observed probabilities from the Chi-Square tests. The last row shows the result of the KS Test performed on the p-values for all Chi-Square tests, where there are sufficient data.

### 1.2 Poker hand types statistics for 36 cards deck:

Test No.	DOF	ChiSqr	P-Value
1	9	7.17	0.61985
2	9	19.82	0.01905
3	9	9.99	0.35125
4	9	2.86	0.96943
5	9	8.35	0.49967
6	9	6.02	0.73748
Combined P-value for all tests (Using KS method)			N/A (Insufficient data)

Notes:

- 1) The P-values are observed probabilities from the Chi-Square tests. The last row shows the result of the KS Test performed on the p-values for all Chi-Square tests, where there are sufficient data.

## 2. Poker rank statistics

The Poker rank analysis aims to establish that the rank of the cards in each position was equally distributed in one of the 13 possible ranks (2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K, A) for a 52 card deck and 9 ranks (6, 7, 8, 9, 10, J, Q, K, A) for a 36 card deck.

The Poker rank analysis involved creating subsets of data and conducting Chi-square tests on each subset. The analysis performs a KS Test (Kolmogorov-Smirnov test) for uniform distribution on the observed p-

values, and the combined p-value result of this test is taken as the final result of the Ranks statistics tests.

## 2.1 Poker rank statistics for 52 cards deck:

Test No.	Positions	DOF	ChiSqr	P-Value
1	7	84	81.17	0.56731
2	7	84	85.88	0.42271
3	7	84	89.22	0.32796
4	7	84	87.08	0.38753
5	7	84	89.66	0.31616
6	7	84	75.89	0.72409
7	7	84	78.92	0.63619
8	7	84	91.05	0.28084
9	7	84	78.11	0.66046
10	7	84	93.99	0.21390
11	7	84	86.50	0.40440
12	7	84	88.57	0.34549
13	7	84	93.01	0.23494
14	7	84	63.12	0.95690
15	7	84	80.65	0.58325
16	7	84	81.30	0.56315
17	7	84	98.44	0.13415
18	7	84	84.21	0.47297
19	7	84	112.00	0.02230
20	7	84	98.60	0.13181
21	7	84	84.64	0.45977
22	7	84	81.92	0.54376
23	7	84	77.31	0.68400
24	7	84	99.69	0.11643
25	7	84	91.61	0.26708
26	7	84	95.50	0.18384
27	7	84	96.81	0.16037
28	7	84	85.55	0.43239
29	7	84	67.06	0.91220
30	7	84	104.58	0.06371
31	7	84	69.14	0.87898
32	7	84	87.34	0.37982
33	7	84	61.30	0.97041
34	7	84	73.21	0.79368
35	7	84	83.57	0.49283
36	7	84	91.37	0.27295
37	7	84	92.93	0.23676
38	7	84	107.83	0.04099
39	7	84	86.02	0.41838
40	7	84	92.54	0.24557
41	7	84	83.41	0.49753
42	7	84	77.03	0.69202
43	7	84	80.84	0.57747
44	7	84	102.69	0.08106
45	7	84	103.64	0.07190
46	7	84	69.60	0.87065
47	7	84	95.80	0.17828

48	7	84	80.55	0.58644
49	7	84	99.58	0.11796
50	7	84	78.26	0.65611
51	7	84	77.33	0.68332
52	7	84	63.89	0.94986
53	7	84	102.55	0.08255
54	7	84	109.21	0.03369
55	7	84	89.86	0.31095
56	7	84	84.93	0.45097
57	7	84	83.12	0.50663
58	7	84	95.88	0.17678
59	7	84	66.09	0.92532
60	7	84	85.02	0.44822
61	7	84	71.15	0.84016
62	7	84	83.93	0.48163
63	7	84	93.66	0.22075
64	7	84	84.85	0.45366
65	7	84	82.03	0.54049
66	7	84	94.45	0.20445
67	7	84	101.13	0.09826
68	7	84	71.64	0.82955
69	7	84	100.51	0.10571
70	7	84	85.64	0.42982
71	7	84	55.68	0.99268
72	7	84	85.23	0.44190
73	7	84	89.66	0.31616
74	7	84	82.99	0.51073
75	7	84	82.00	0.54151
76	7	84	78.30	0.65493
77	7	84	96.39	0.16761
78	7	84	80.56	0.58616
79	7	84	67.53	0.90531
80	7	84	76.55	0.70583
81	7	84	99.88	0.11393
82	7	84	59.87	0.97854
83	7	84	85.46	0.43512
84	7	84	77.44	0.68018
85	7	84	85.09	0.44617
86	7	84	76.48	0.70777
87	7	84	89.54	0.31939
88	7	84	70.27	0.85791
89	7	84	94.86	0.19627
90	7	84	93.80	0.21774
91	7	84	77.05	0.69148
92	7	84	84.99	0.44940
93	7	84	96.57	0.16459
94	7	84	91.02	0.28150
95	7	84	78.25	0.65627
96	7	84	88.09	0.35882
97	7	84	86.97	0.39063
98	7	84	102.07	0.08760
99	7	84	72.36	0.81348
100	7	84	77.93	0.66578
Combined P-value for all tests (Using KS method)				0.09312

Notes:

- 1) The P-values are observed probabilities from the Chi-Square tests. The last row shows the result of the KS Test performed on the p-values for all Chi-Square tests, where there are sufficient data.

**2.2 Poker rank statistics for 36 cards deck:**

Test No.	Positions	DOF	ChiSqr	P-Value
1	7	56	42.91	0.90046
2	7	56	41.56	0.92483
3	7	56	54.04	0.54949
4	7	56	40.90	0.93520
5	7	56	52.99	0.58938
6	7	56	46.73	0.80664
7	7	56	52.02	0.62618
8	7	56	64.35	0.20744
9	7	56	59.17	0.36068
10	7	56	47.83	0.77321
11	7	56	56.31	0.46340
12	7	56	61.04	0.29971
13	7	56	70.08	0.09777
14	7	56	60.50	0.31669
15	7	56	54.06	0.54880
16	7	56	56.88	0.44201
17	7	56	54.11	0.54673
18	7	56	55.10	0.50892
19	7	56	55.26	0.50276
20	7	56	49.38	0.72199
21	7	56	52.24	0.61805
22	7	56	55.93	0.47757
23	7	56	64.69	0.19913
24	7	56	57.78	0.40924
25	7	56	51.70	0.63831
26	7	56	45.78	0.83348
27	7	56	55.93	0.47757
28	7	56	39.35	0.95531
29	7	56	65.18	0.18772
30	7	56	43.65	0.88519
31	7	56	54.88	0.51715
32	7	56	62.52	0.25598
33	7	56	39.85	0.94935
34	7	56	66.67	0.15555
35	7	56	50.83	0.67020
36	7	56	54.94	0.51509
37	7	56	54.76	0.52196
38	7	56	63.29	0.23471
39	7	56	62.21	0.26471
40	7	56	60.16	0.32771
41	7	56	43.26	0.89356
42	7	56	83.94	0.00921
43	7	56	36.09	0.98217
44	7	56	68.98	0.11419
45	7	56	59.26	0.35762
46	7	56	49.93	0.70252
47	7	56	60.39	0.32015
48	7	56	59.11	0.36252
49	7	56	60.34	0.32189

50	7	56	55.98	0.47554
51	7	56	40.15	0.94555
52	7	56	53.63	0.56525
53	7	56	52.33	0.61458
54	7	56	42.75	0.90359
55	7	56	58.09	0.39823
56	7	56	61.59	0.28291
57	7	56	49.45	0.71943
58	7	56	66.30	0.16324
59	7	56	77.96	0.02780
60	7	56	64.04	0.21524
61	7	56	56.64	0.45092
62	7	56	42.66	0.90549
63	7	56	52.75	0.59855
64	7	56	48.92	0.73756
65	7	56	64.12	0.21320
66	7	56	64.75	0.19779
67	7	56	60.30	0.32328
68	7	56	57.79	0.40884
69	7	56	36.49	0.97984
70	7	56	52.36	0.61356
71	7	56	66.31	0.16305
72	7	56	42.49	0.90855
73	7	56	97.35	0.00052
74	7	56	45.73	0.83463
75	7	56	64.55	0.20255
76	7	56	47.71	0.77683
77	7	56	70.37	0.09376
78	7	56	62.80	0.24812
79	7	56	75.81	0.04012
80	7	56	46.65	0.80894
81	7	56	53.88	0.55561
82	7	56	60.92	0.30356
83	7	56	51.16	0.65826
84	7	56	55.42	0.49688
85	7	56	63.20	0.23707
86	7	56	53.61	0.56594
87	7	56	70.45	0.09266
88	7	56	74.93	0.04640
89	7	56	43.40	0.89052
90	7	56	73.65	0.05698
91	7	56	47.79	0.77457
92	7	56	74.91	0.04654
93	7	56	53.97	0.55217
94	7	56	54.63	0.52669
95	7	56	60.93	0.30300
96	7	56	55.78	0.48326
97	7	56	47.00	0.79860
98	7	56	55.11	0.50851
99	7	56	41.51	0.92568
100	7	56	67.20	0.14520
Combined P-value for all tests (Using KS method)				0.79359

Notes:

- 1) The P-values are observed probabilities from the Chi-Square tests. The last row shows the result of the KS Test performed on the p-values for all Chi-Square tests, where there are sufficient data.

### 3. Poker suits statistics

The Poker suits analysis aims to verify that the cards dealt exhibit an equal probability of all 4 suits (Clubs, Diamonds, Hearts and Spades) in all positions.

The Poker suits analysis involved creating subsets of data and conducting Chi-square tests on each subset. The analysis performs a KS Test (Kolmogorov-Smirnov test) for uniform distribution on the observed p-values, and the combined p-value result of this test is taken as the final result of the Suits statistics tests.

#### 3.1 Poker suits statistics for 52 cards deck:

Test No.	Positions	DOF	ChiSqr	P-Value
1	7	21	27.07	0.16852
2	7	21	20.98	0.46045
3	7	21	28.51	0.12630
4	7	21	24.81	0.25543
5	7	21	17.05	0.70821
6	7	21	19.55	0.55000
7	7	21	23.08	0.33973
8	7	21	6.88	0.99837
9	7	21	17.75	0.66500
10	7	21	11.55	0.95103
11	7	21	19.02	0.58407
12	7	21	21.88	0.40667
13	7	21	22.07	0.39539
14	7	21	17.21	0.69855
15	7	21	15.24	0.81066
16	7	21	24.15	0.28576
17	7	21	26.84	0.17637
18	7	21	21.20	0.44694
19	7	21	32.97	0.04657
20	7	21	17.61	0.67365
21	7	21	7.54	0.99680
22	7	21	19.42	0.55834
23	7	21	24.97	0.24827
24	7	21	36.21	0.02068
25	7	21	33.24	0.04362
26	7	21	15.42	0.80110
27	7	21	21.99	0.40025
28	7	21	14.20	0.86082
29	7	21	24.82	0.25513
30	7	21	21.79	0.41168
31	7	21	21.06	0.45512
32	7	21	20.15	0.51160
33	7	21	11.82	0.94439
34	7	21	22.86	0.35158
35	7	21	24.30	0.27894
36	7	21	12.07	0.93780
37	7	21	23.69	0.30828
38	7	21	12.91	0.91183
39	7	21	10.18	0.97653
40	7	21	26.77	0.17847
41	7	21	25.13	0.24159



42	7	21	15.96	0.77197
43	7	21	26.23	0.19780
44	7	21	15.90	0.77501
45	7	21	22.94	0.34724
46	7	21	29.66	0.09899
47	7	21	25.64	0.22055
48	7	21	22.14	0.39140
49	7	21	29.25	0.10809
50	7	21	26.92	0.17345
51	7	21	19.85	0.53075
52	7	21	18.99	0.58600
53	7	21	26.14	0.20111
54	7	21	13.25	0.89956
55	7	21	28.52	0.12612
56	7	21	25.46	0.22773
57	7	21	14.81	0.83233
58	7	21	21.90	0.40504
59	7	21	25.79	0.21449
60	7	21	12.26	0.93223
61	7	21	22.56	0.36762
62	7	21	16.79	0.72350
63	7	21	20.33	0.50032
64	7	21	20.65	0.48034
65	7	21	18.18	0.63760
66	7	21	21.91	0.40466
67	7	21	24.32	0.27767
68	7	21	11.33	0.95597
69	7	21	24.94	0.24990
70	7	21	13.13	0.90402
71	7	21	20.66	0.48006
72	7	21	19.70	0.54007
73	7	21	21.25	0.44363
74	7	21	26.89	0.17458
75	7	21	14.58	0.84340
76	7	21	27.28	0.16169
77	7	21	19.20	0.57238
78	7	21	27.44	0.15688
79	7	21	20.21	0.50808
80	7	21	16.38	0.74806
81	7	21	18.21	0.63542
82	7	21	8.03	0.99499
83	7	21	23.47	0.31964
84	7	21	35.02	0.02807
85	7	21	22.98	0.34499
86	7	21	12.49	0.92531
87	7	21	12.50	0.92501
88	7	21	11.22	0.95832
89	7	21	26.34	0.19375
90	7	21	23.71	0.30746
91	7	21	15.86	0.77737
92	7	21	25.29	0.23500
93	7	21	15.86	0.77764
94	7	21	16.72	0.72811
95	7	21	9.27	0.98693
96	7	21	10.91	0.96453

97	7	21	29.99	0.09213
98	7	21	19.52	0.55214
99	7	21	23.02	0.34316
100	7	21	23.61	0.31221
Combined P-value for all tests (Using KS method)				0.70343

**Notes:**

- 1) The P-values are observed probabilities from the Chi-Square tests. The last row shows the result of the KS Test performed on the p-values for all Chi-Square tests, where there are sufficient data.

**3.2 Poker suits statistics for 36 cards deck:**

Test No.	Positions	DOF	ChiSqr	P-Value
1	7	21	27.87	0.14382
2	7	21	20.39	0.49657
3	7	21	16.75	0.72603
4	7	21	13.59	0.88648
5	7	21	25.39	0.23059
6	7	21	36.33	0.02008
7	7	21	20.94	0.46237
8	7	21	15.78	0.78210
9	7	21	31.14	0.07129
10	7	21	8.29	0.99380
11	7	21	15.23	0.81113
12	7	21	27.51	0.15454
13	7	21	20.07	0.51670
14	7	21	8.30	0.99372
15	7	21	18.83	0.59592
16	7	21	21.14	0.45067
17	7	21	22.07	0.39537
18	7	21	19.77	0.53600
19	7	21	15.69	0.78692
20	7	21	29.86	0.09492
21	7	21	26.85	0.17594
22	7	21	21.62	0.42145
23	7	21	31.62	0.06388
24	7	21	33.46	0.04140
25	7	21	22.98	0.34526
26	7	21	24.37	0.27557
27	7	21	12.58	0.92275
28	7	21	22.10	0.39354
29	7	21	9.80	0.98139
30	7	21	13.59	0.88648
31	7	21	22.91	0.34869
32	7	21	13.00	0.90862
33	7	21	23.91	0.29734
34	7	21	22.05	0.39675
35	7	21	27.92	0.14243
36	7	21	21.64	0.42050
37	7	21	11.30	0.95671
38	7	21	23.34	0.32591
39	7	21	22.93	0.34783
40	7	21	15.38	0.80320
41	7	21	26.82	0.17675
42	7	21	40.34	0.00677
43	7	21	28.75	0.12008

44	7	21	8.55	0.99232
45	7	21	15.06	0.82013
46	7	21	13.42	0.89305
47	7	21	12.86	0.91331
48	7	21	20.27	0.50410
49	7	21	26.83	0.17648
50	7	21	17.86	0.65810
51	7	21	22.62	0.36457
52	7	21	16.96	0.71377
53	7	21	31.26	0.06944
54	7	21	11.24	0.95799
55	7	21	16.72	0.72817
56	7	21	22.00	0.39951
57	7	21	13.52	0.88948
58	7	21	15.62	0.79082
59	7	21	8.75	0.99106
60	7	21	29.48	0.10286
61	7	21	13.51	0.88964
62	7	21	16.82	0.72196
63	7	21	27.24	0.16318
64	7	21	19.98	0.52227
65	7	21	34.40	0.03285
66	7	21	11.74	0.94647
67	7	21	31.72	0.06248
68	7	21	28.24	0.13337
69	7	21	22.28	0.38331
70	7	21	20.22	0.50762
71	7	21	19.30	0.56565
72	7	21	24.74	0.25842
73	7	21	29.11	0.11143
74	7	21	16.84	0.72100
75	7	21	41.80	0.00446
76	7	21	22.09	0.39422
77	7	21	24.46	0.27149
78	7	21	24.30	0.27875
79	7	21	17.95	0.65204
80	7	21	16.35	0.74956
81	7	21	12.59	0.92224
82	7	21	28.14	0.13623
83	7	21	13.24	0.89999
84	7	21	29.64	0.09946
85	7	21	16.36	0.74933
86	7	21	10.41	0.97311
87	7	21	16.67	0.73079
88	7	21	32.10	0.05715
89	7	21	21.74	0.41462
90	7	21	21.37	0.43644
91	7	21	16.22	0.75694
92	7	21	15.54	0.79470
93	7	21	15.75	0.78342
94	7	21	22.51	0.37054
95	7	21	14.48	0.84830
96	7	21	15.11	0.81749
97	7	21	27.95	0.14152
98	7	21	22.54	0.36899

99	7	21	17.92	0.65406
100	7	21	11.51	0.95192
Combined P-value for all tests (Using KS method)				0.21902

Notes:

- 1) The P-values are observed probabilities from the Chi-Square tests. The last row shows the result of the KS Test performed on the p-values for all Chi-Square tests, where there are sufficient data.

#### 4. Summary of the analysis

##### 4.1 Summary of the analysis of 52 cards deck:

The analysis of 52 cards completes by combining the result of the KS Test performed in the 3 types of analysis (Hand Types, Ranks and Suits) for 52 card decks using the Holm's method and producing a single Combined P -value.

The combined p-value produced using the Holm's method is used as indication for statistical randomness.

Combination of p-values using Holm's Method		
Test	P-Value	P-Adjusted
Ranks Test	0.09312	0.27935
Suits Test	0.70343	1.00000
Hand Types Test	0.90110	1.00000
<b>Combined P-Value using Holm's Method</b>		0.27935

Notes:

- 1) The combined p-value of all statistical tests using Holm's Method conducted for 52 card decks is greater than the minimum value of 0.05 which indicates that the randomness of the observed data falls within 95% confidence limits.

The final outcome of the analysis of 52 cards deck indicates that the RNG is working correctly.

##### 4.2 Summary of the analysis of 36 cards deck:

The analysis of 36 cards completes by combining the result of the KS Test performed in the 3 types of analysis (Hand Types, Ranks and Suits) for 36 card decks using the Holm's method and producing a single Combined P -value. Where there are insufficient data the individual Chi-Square tests results are used in the Holm's method for producing a combined p-value.

The combined p-value produced from the using the Holm's method is used as indication for statistical randomness.

Combination of p-values using Holm's Method		
Test	P-Value	P-Adjusted
Ranks Test	0.79359	1.00000
Suits Test	0.21902	1.00000
Hands Type Test 1	0.61985	1.00000
Hands Type Test 2	0.01905	0.15242
Hands Type Test 3	0.35125	1.00000
Hands Type Test 4	0.96943	1.00000
Hands Type Test 5	0.49967	1.00000
Hands Type Test 6	0.73748	1.00000
<b>Combined P-Value using Holm's Method</b>		0.15242

Notes:

- 1) The combined p-value of all statistical tests using Holm's Method conducted for 36 card decks is greater than the minimum value of 0.05 which indicates that the randomness of the observed data falls within 95% confidence limits.

The final outcome of the analysis of 36 cards deck indicates that the RNG is working correctly.

## 5. Conclusion

Analysis of actual data from game logs for 'Hand Types', 'Ranks' and 'Suits' for **52-card decks** and **36-card decks** indicated statistical randomness.

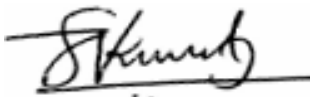
iTech Labs has done limited sanity checks to verify the integrity of the game logs. iTech Labs also maintains a copy of the game logs for verification purposes. There were a large enough number of game records to give the calculations sufficient statistical power.

We conclude that the Random Number Generator (RNG) is working correctly.

Please click here to see the [Original](#) report.

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**Signed:**



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**Kiren Sreekumar**  
**Principal Consultant**  
**iTech Labs Australia**

Date: 25 November, 2019

**Signed:**



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**Geoff Nicoll**  
**Principal Consultant**  
**iTech Labs Australia**

Date: 25 November, 2019

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Disclaimer.

While it is not possible to test all possible scenarios in a laboratory environment, iTech Labs has conducted a level of testing appropriate for a component test of this type.

