



## Poker Cards Analysis - May 2020

### The Directors

GVC Plc

This is to confirm that iTech Labs has examined the game logs for Poker games for the period **May 01, 2020** to **May 31, 2020** 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.party poker.cz/>, <https://da.party poker.com/>, <https://danske spil.dk/>, <https://www.party poker.fr/>, <https://www.giocodigitale.it/>, <https://www.br.betboo.com/en/>, <https://www.party premium.com/>, <https://www.party poker.es/en/>, <https://www.party poker.com/>, <https://sports.premium.com/en/sports/>, <https://poker.party poker.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	6.62	0.67712
2	9	3.76	0.92623
3	9	10.04	0.34727
4	9	8.45	0.48961
5	9	17.55	0.04083
6	9	6.80	0.65768
7	9	5.82	0.75739
8	9	17.05	0.04789
9	9	20.71	0.01400
10	9	10.95	0.27884
11	9	4.73	0.85700
12	9	9.91	0.35776
13	9	7.34	0.60184
14	9	3.88	0.91920
15	9	15.92	0.06857
16	9	10.32	0.32495
17	9	10.06	0.34547
18	9	10.79	0.29069
19	9	17.68	0.03913
20	9	7.62	0.57299
21	9	5.12	0.82372

22	9	8.62	0.47326
23	9	7.91	0.54283
24	9	12.16	0.20418
25	9	6.15	0.72459
26	9	7.48	0.58678
27	9	3.56	0.93807
28	9	10.98	0.27728
29	9	10.44	0.31638
30	9	8.98	0.43898
31	9	12.21	0.20170
32	9	6.32	0.70745
33	9	13.80	0.12948
34	9	8.03	0.53064
35	9	5.47	0.79123
36	9	12.89	0.16780
37	9	10.53	0.30898
38	9	10.35	0.32287
39	9	12.38	0.19265
40	9	6.32	0.70757
41	9	5.10	0.82516
42	9	9.43	0.39863
43	9	12.32	0.19591
44	9	16.38	0.05939
45	9	7.05	0.63234
46	9	9.15	0.42365
47	9	14.14	0.11743
48	9	20.67	0.01418
49	9	3.23	0.95436
50	9	10.86	0.28522
51	9	6.40	0.69888
52	9	6.64	0.67411
53	9	6.51	0.68791
54	9	4.71	0.85914
55	9	2.45	0.98209
56	9	15.58	0.07623
57	9	9.02	0.43511
58	9	13.56	0.13897
59	9	3.19	0.95639
60	9	17.72	0.03856
61	9	17.91	0.03623
62	9	8.94	0.44246
63	9	10.08	0.34396
64	9	5.74	0.76589
65	9	7.39	0.59703
66	9	2.46	0.98204
67	9	12.13	0.20598
68	9	12.47	0.18804
69	9	5.06	0.82906
70	9	21.22	0.01173
71	9	9.52	0.39109
72	9	4.93	0.84052
73	9	16.56	0.05600
74	9	14.30	0.11214
75	9	6.40	0.69979
76	9	1.90	0.99297

77	9	8.63	0.47201
78	9	6.76	0.66166
79	9	5.98	0.74188
80	9	9.94	0.35568
81	9	9.39	0.40219
82	9	17.77	0.03797
83	9	8.03	0.53139
84	9	5.99	0.74069
85	9	4.09	0.90572
86	9	17.57	0.04055
87	9	3.17	0.95706
88	9	4.47	0.87772
89	9	11.18	0.26356
90	9	12.30	0.19703
91	9	15.09	0.08860
92	9	6.83	0.65482
93	9	4.19	0.89868
94	9	8.85	0.45116
95	9	17.30	0.04428
96	9	4.51	0.87458
97	9	4.79	0.85184
98	9	4.78	0.85319
99	9	4.83	0.84859
100	9	14.33	0.11109
Combined P-value for all tests (Using KS method)			0.62735

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	8.15	0.51902
2	9	11.83	0.22302
3	9	6.49	0.68957
4	9	9.61	0.38274
5	9	4.89	0.84383
6	9	7.55	0.57999
7	9	11.66	0.23316
8	9	4.57	0.86968
9	9	5.41	0.79705
10	9	12.33	0.19559
11	9	7.67	0.56732
12	9	5.50	0.78875
13	9	19.12	0.02418
14	9	7.65	0.56982
15	9	19.59	0.02064
16	9	8.17	0.51685
17	9	16.26	0.06161
18	9	7.12	0.62425
19	9	12.36	0.19358
20	9	12.22	0.20122
21	9	7.78	0.55608
22	9	6.79	0.65949

23	9	8.97	0.43968
24	9	3.29	0.95152
25	9	4.22	0.89615
26	9	9.13	0.42540
27	9	6.20	0.71950
28	9	8.16	0.51826
29	9	5.34	0.80334
Combined P-value for all tests (Using KS method)			0.61042

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	96.13	0.17224
2	7	84	75.31	0.73985
3	7	84	103.93	0.06926
4	7	84	85.25	0.44157
5	7	84	77.35	0.68280
6	7	84	74.07	0.77244
7	7	84	90.23	0.30152
8	7	84	103.20	0.07605
9	7	84	96.48	0.16615
10	7	84	80.44	0.58993
11	7	84	82.17	0.53605
12	7	84	76.27	0.71368
13	7	84	70.30	0.85737
14	7	84	64.76	0.94104
15	7	84	86.76	0.39680
16	7	84	84.16	0.47466
17	7	84	93.14	0.23201
18	7	84	80.96	0.57356
19	7	84	88.89	0.33668
20	7	84	87.69	0.37000
21	7	84	89.49	0.32062
22	7	84	79.15	0.62935
23	7	84	79.97	0.60429
24	7	84	98.61	0.13171
25	7	84	108.80	0.03575
26	7	84	91.96	0.25878
27	7	84	84.06	0.47776
28	7	84	69.60	0.87068

29	7	84	72.32	0.81453
30	7	84	72.14	0.81853
31	7	84	81.45	0.55844
32	7	84	78.85	0.63842
33	7	84	67.29	0.90895
34	7	84	90.04	0.30638
35	7	84	89.13	0.33027
36	7	84	72.22	0.81679
37	7	84	92.47	0.24705
38	7	84	85.01	0.44865
39	7	84	85.85	0.42346
40	7	84	59.75	0.97915
41	7	84	70.60	0.85147
42	7	84	97.51	0.14876
43	7	84	67.95	0.89891
44	7	84	67.28	0.90902
45	7	84	87.63	0.37162
46	7	84	88.40	0.35010
47	7	84	79.29	0.62492
48	7	84	76.78	0.69926
49	7	84	89.65	0.31646
50	7	84	96.32	0.16898
51	7	84	89.27	0.32639
52	7	84	66.74	0.91671
53	7	84	68.38	0.89191
54	7	84	68.49	0.89014
55	7	84	102.82	0.07985
56	7	84	87.70	0.36981
57	7	84	70.44	0.85466
58	7	84	72.03	0.82099
59	7	84	87.04	0.38843
60	7	84	91.98	0.25852
61	7	84	87.32	0.38049
62	7	84	75.29	0.74057
63	7	84	91.10	0.27964
64	7	84	71.01	0.84302
65	7	84	55.00	0.99398
66	7	84	79.30	0.62483
67	7	84	74.51	0.76112
68	7	84	82.08	0.53899
69	7	84	78.31	0.65449
70	7	84	66.90	0.91445
71	7	84	79.95	0.60493
72	7	84	70.71	0.84921
73	7	84	64.20	0.94688
74	7	84	76.55	0.70570
75	7	84	92.88	0.23777
76	7	84	94.48	0.20382
77	7	84	89.55	0.31909
78	7	84	97.66	0.14627
79	7	84	51.44	0.99804
80	7	84	90.99	0.28225
81	7	84	78.81	0.63947
82	7	84	92.75	0.24070
83	7	84	87.26	0.38211

84	7	84	65.24	0.93570
85	7	84	85.84	0.42371
86	7	84	96.36	0.16811
87	7	84	75.25	0.74149
88	7	84	116.90	0.01026
89	7	84	93.23	0.22998
90	7	84	73.01	0.79834
91	7	84	70.63	0.85079
92	7	84	91.04	0.28103
93	7	84	77.04	0.69172
94	7	84	69.33	0.87565
95	7	84	68.73	0.88610
96	7	84	95.00	0.19340
97	7	84	101.04	0.09930
98	7	84	95.72	0.17986
99	7	84	102.97	0.07828
100	7	84	65.45	0.93318
Combined P-value for all tests (Using KS method)				0.45562

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	60.26	0.32447
2	7	56	38.48	0.96433
3	7	56	58.49	0.38429
4	7	56	60.88	0.30472
5	7	56	52.06	0.62479
6	7	56	71.27	0.08213
7	7	56	57.68	0.41298
8	7	56	58.43	0.38607
9	7	56	68.97	0.11437
10	7	56	49.11	0.73109
11	7	56	56.53	0.45497
12	7	56	62.52	0.25595
13	7	56	47.80	0.77403
14	7	56	48.42	0.75405
15	7	56	56.53	0.45497
16	7	56	54.40	0.53579
17	7	56	78.64	0.02470
18	7	56	44.19	0.87310
19	7	56	60.72	0.30971
20	7	56	52.74	0.59904
21	7	56	63.44	0.23062
22	7	56	48.62	0.74742
23	7	56	66.93	0.15041
24	7	56	85.96	0.00617
25	7	56	44.38	0.86877
26	7	56	44.45	0.86701
27	7	56	43.75	0.88302
28	7	56	36.53	0.97957
29	7	56	55.09	0.50915
30	7	56	57.80	0.40862

31	7	56	57.68	0.41287
32	7	56	47.32	0.78898
33	7	56	60.33	0.32216
34	7	56	59.65	0.34433
35	7	56	70.58	0.09093
36	7	56	57.16	0.43165
37	7	56	58.00	0.40126
38	7	56	44.70	0.86103
39	7	56	48.28	0.75864
40	7	56	72.78	0.06527
41	7	56	63.00	0.24258
42	7	56	47.04	0.79761
43	7	56	47.49	0.78393
44	7	56	49.05	0.73301
45	7	56	53.43	0.57264
46	7	56	49.44	0.71971
47	7	56	65.62	0.17782
48	7	56	49.77	0.70825
49	7	56	63.16	0.23825
50	7	56	47.06	0.79692
51	7	56	46.98	0.79930
52	7	56	48.09	0.76496
53	7	56	35.91	0.98319
54	7	56	60.60	0.31361
55	7	56	67.58	0.13820
56	7	56	68.89	0.11560
57	7	56	69.33	0.10868
58	7	56	47.90	0.77104
59	7	56	40.61	0.93936
60	7	56	53.96	0.55238
61	7	56	48.96	0.73614
62	7	56	52.42	0.61118
63	7	56	50.30	0.68957
64	7	56	73.07	0.06241
65	7	56	35.16	0.98682
66	7	56	51.95	0.62872
67	7	56	71.30	0.08172
68	7	56	69.14	0.11169
69	7	56	61.38	0.28924
70	7	56	37.34	0.97406
71	7	56	77.40	0.03063
72	7	56	62.18	0.26548
73	7	56	44.96	0.85469
74	7	56	67.62	0.13740
75	7	56	57.86	0.40659
76	7	56	65.32	0.18451
77	7	56	50.77	0.67257
78	7	56	40.86	0.93578
79	7	56	65.78	0.17437
80	7	56	38.29	0.96613
81	7	56	63.54	0.22813
82	7	56	50.37	0.68698
83	7	56	40.84	0.93600
84	7	56	46.62	0.80996
85	7	56	56.07	0.47219

86	7	56	51.72	0.63757
87	7	56	76.03	0.03869
88	7	56	53.08	0.58618
89	7	56	52.41	0.61157
90	7	56	58.61	0.37995
91	7	56	55.59	0.49051
92	7	56	50.04	0.69882
93	7	56	36.44	0.98016
94	7	56	67.23	0.14460
95	7	56	41.02	0.93345
96	7	56	63.84	0.22032
97	7	56	52.91	0.59265
98	7	56	49.89	0.70391
99	7	56	63.99	0.21639
100	7	56	60.60	0.31360
Combined P-value for all tests (Using KS method)				0.74648

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	23.27	0.32967
2	7	21	35.26	0.02646
3	7	21	31.64	0.06365
4	7	21	23.98	0.29411
5	7	21	25.42	0.22928
6	7	21	17.09	0.70573
7	7	21	28.02	0.13948
8	7	21	37.28	0.01565
9	7	21	17.90	0.65558
10	7	21	24.79	0.25626
11	7	21	12.93	0.91094
12	7	21	24.72	0.25958
13	7	21	17.98	0.65010
14	7	21	14.78	0.83363
15	7	21	30.65	0.07960
16	7	21	22.81	0.35397
17	7	21	14.42	0.85108
18	7	21	21.48	0.43013
19	7	21	23.17	0.33492
20	7	21	19.01	0.58457
21	7	21	26.67	0.18200
22	7	21	16.33	0.75060
23	7	21	20.34	0.49977
24	7	21	12.88	0.91268



25	7	21	19.38	0.56093
26	7	21	15.90	0.77541
27	7	21	18.74	0.60205
28	7	21	24.89	0.25189
29	7	21	31.01	0.07343
30	7	21	20.31	0.50147
31	7	21	28.86	0.11749
32	7	21	25.79	0.21444
33	7	21	18.85	0.59471
34	7	21	15.77	0.78227
35	7	21	39.99	0.00745
36	7	21	26.75	0.17917
37	7	21	23.14	0.33661
38	7	21	24.94	0.24985
39	7	21	33.50	0.04091
40	7	21	30.12	0.08953
41	7	21	29.04	0.11299
42	7	21	20.37	0.49777
43	7	21	24.22	0.28239
44	7	21	17.05	0.70821
45	7	21	15.22	0.81154
46	7	21	31.92	0.05963
47	7	21	29.26	0.10796
48	7	21	14.86	0.83002
49	7	21	16.26	0.75462
50	7	21	20.70	0.47745
51	7	21	23.65	0.31011
52	7	21	39.61	0.00829
53	7	21	17.68	0.66901
54	7	21	18.02	0.64792
55	7	21	21.85	0.40812
56	7	21	16.54	0.73858
57	7	21	19.06	0.58124
58	7	21	17.74	0.66515
59	7	21	26.47	0.18922
60	7	21	19.06	0.58139
61	7	21	17.22	0.69795
62	7	21	11.75	0.94601
63	7	21	19.10	0.57865
64	7	21	23.77	0.30435
65	7	21	17.67	0.66949
66	7	21	16.74	0.72667
67	7	21	11.90	0.94230
68	7	21	12.21	0.93376
69	7	21	19.01	0.58434
70	7	21	16.89	0.71770
71	7	21	20.49	0.49070
72	7	21	24.25	0.28107
73	7	21	21.80	0.41104
74	7	21	21.68	0.41828
75	7	21	19.21	0.57192
76	7	21	9.24	0.98715
77	7	21	28.99	0.11435
78	7	21	29.87	0.09469
79	7	21	18.70	0.60413

80	7	21	22.41	0.37619
81	7	21	29.72	0.09771
82	7	21	31.97	0.05898
83	7	21	13.93	0.87277
84	7	21	19.91	0.52711
85	7	21	18.44	0.62119
86	7	21	19.91	0.52707
87	7	21	12.04	0.93866
88	7	21	20.57	0.48539
89	7	21	21.83	0.40961
90	7	21	25.22	0.23765
91	7	21	20.93	0.46338
92	7	21	26.17	0.20016
93	7	21	20.69	0.47807
94	7	21	18.42	0.62217
95	7	21	25.10	0.24292
96	7	21	22.69	0.36069
97	7	21	19.72	0.53877
98	7	21	18.05	0.64573
99	7	21	34.22	0.03433
100	7	21	19.68	0.54151
Combined P-value for all tests (Using KS method)				0.25089

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	18.87	0.59327
2	7	21	9.08	0.98855
3	7	21	16.29	0.75303
4	7	21	25.55	0.22405
5	7	21	36.39	0.01974
6	7	21	19.70	0.54024
7	7	21	20.61	0.48310
8	7	21	15.87	0.77695
9	7	21	25.39	0.23048
10	7	21	20.37	0.49765
11	7	21	28.01	0.13992
12	7	21	25.24	0.23698
13	7	21	29.19	0.10953
14	7	21	40.52	0.00642
15	7	21	15.41	0.80158
16	7	21	18.02	0.64757
17	7	21	12.17	0.93486
18	7	21	26.62	0.18388
19	7	21	16.33	0.75056
20	7	21	15.87	0.77673
21	7	21	22.86	0.35134
22	7	21	15.30	0.80781
23	7	21	21.31	0.43988
24	7	21	21.79	0.41181
25	7	21	12.30	0.93104
26	7	21	23.81	0.30234

27	7	21	19.69	0.54095
28	7	21	12.43	0.92718
29	7	21	25.23	0.23740
30	7	21	11.89	0.94265
31	7	21	29.12	0.11120
32	7	21	23.61	0.31209
33	7	21	25.38	0.23096
34	7	21	18.09	0.64307
35	7	21	16.40	0.74691
36	7	21	15.80	0.78053
37	7	21	14.51	0.84678
38	7	21	12.13	0.93600
39	7	21	11.53	0.95139
40	7	21	14.07	0.86649
41	7	21	14.72	0.83696
42	7	21	26.95	0.17241
43	7	21	23.14	0.33677
44	7	21	19.26	0.56858
45	7	21	31.14	0.07135
46	7	21	40.30	0.00683
47	7	21	17.24	0.69632
48	7	21	18.36	0.62634
49	7	21	12.51	0.92475
50	7	21	17.45	0.68348
51	7	21	19.08	0.58023
52	7	21	32.69	0.04979
53	7	21	18.16	0.63893
54	7	21	20.21	0.50819
55	7	21	16.95	0.71422
56	7	21	35.26	0.02643
57	7	21	11.11	0.96058
58	7	21	19.89	0.52837
59	7	21	20.35	0.49922
60	7	21	15.54	0.79470
61	7	21	19.42	0.55825
62	7	21	25.73	0.21706
63	7	21	29.76	0.09699
64	7	21	18.18	0.63755
65	7	21	21.65	0.42010
66	7	21	15.94	0.77292
67	7	21	25.33	0.23305
68	7	21	22.17	0.38995
69	7	21	24.12	0.28706
70	7	21	13.63	0.88479
71	7	21	15.17	0.81437
72	7	21	38.44	0.01144
73	7	21	23.38	0.32415
74	7	21	16.67	0.73092
75	7	21	17.50	0.68035
76	7	21	14.87	0.82943
77	7	21	26.20	0.19876
78	7	21	11.87	0.94307
79	7	21	9.61	0.98359
80	7	21	29.04	0.11299
81	7	21	12.39	0.92863

82	7	21	19.56	0.54926
83	7	21	17.88	0.65630
84	7	21	23.58	0.31388
85	7	21	20.27	0.50402
86	7	21	17.47	0.68220
87	7	21	19.01	0.58433
88	7	21	17.73	0.66622
89	7	21	12.41	0.92784
90	7	21	19.66	0.54313
91	7	21	17.74	0.66514
92	7	21	16.99	0.71166
93	7	21	11.44	0.95344
94	7	21	16.03	0.76804
95	7	21	21.25	0.44389
96	7	21	13.17	0.90258
97	7	21	21.26	0.44320
98	7	21	24.51	0.26913
99	7	21	31.74	0.06217
100	7	21	24.79	0.25657
Combined P-value for all tests (Using KS method)				0.18515

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	0.45562	0.91124
Suits Test	0.25089	0.75267
Hand Types Test	0.62735	0.91124
<b>Combined P-Value using Holm's Method</b>		0.75267

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	0.74648	1.00000
Suits Test	0.18515	0.55544
Hands Type Test	0.61042	1.00000
<b>Combined P-Value using Holm's Method</b>		0.55544

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

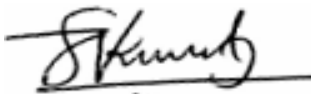
Analysis of actual data from game logs for 'Hand Types', 'Ranks' and 'Suits' for **52-card decks** and **36-card decks** indicated statistical randomness.

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.

Signed:



**Kiren Sreekumar**  
Principal Consultant  
iTech Labs Australia

Date: 19 June, 2020

Signed:



**Geoff Nicoll**  
Principal Consultant  
iTech Labs Australia

Date: 19 June, 2020

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.