



Poker Cards Analysis - September 2019

The Directors

GVC Plc

This is to confirm that iTech Labs has examined the game logs for Poker games for the period **September 01, 2019 to September 30, 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	7.71	0.56312
2	9	6.52	0.68665
3	9	8.59	0.47634
4	9	9.63	0.38094
5	9	6.50	0.68916
6	9	8.50	0.48511
7	9	7.13	0.62330
8	9	18.14	0.03360
9	9	10.06	0.34564
10	9	9.04	0.43320
11	9	6.53	0.68641
12	9	8.28	0.50616
13	9	16.69	0.05377
14	9	8.34	0.50060
15	9	12.11	0.20702
16	9	11.84	0.22250
17	9	11.14	0.26622
18	9	14.92	0.09303
19	9	7.32	0.60410
20	9	22.49	0.00746
21	9	18.90	0.02603

22	9	6.86	0.65210
23	9	13.10	0.15832
24	9	7.74	0.56046
25	9	5.84	0.75560
26	9	4.66	0.86291
27	9	5.33	0.80495
28	9	8.01	0.53348
29	9	2.70	0.97492
30	9	3.31	0.95057
31	9	5.25	0.81208
32	9	7.70	0.56413
33	9	3.77	0.92616
34	9	7.78	0.55618
35	9	9.73	0.37273
36	9	9.01	0.43668
37	9	6.14	0.72615
38	9	8.41	0.49325
39	9	13.91	0.12548
40	9	6.55	0.68344
41	9	9.51	0.39173
42	9	11.05	0.27199
43	9	3.32	0.95022
44	9	8.82	0.45432
45	9	3.40	0.94641
46	9	3.51	0.94069
47	9	9.15	0.42333
48	9	8.94	0.44313
49	9	23.09	0.00599
50	9	7.13	0.62391
51	9	1.23	0.99868
52	9	3.52	0.94011
53	9	3.51	0.94067
54	9	5.93	0.74685
55	9	20.14	0.01709
56	9	7.48	0.58776
57	9	12.53	0.18526
58	9	4.86	0.84613
59	9	16.01	0.06676
60	9	8.05	0.52882
61	9	11.53	0.24116
62	9	3.28	0.95238
63	9	3.97	0.91322
64	9	15.15	0.08685
65	9	7.07	0.62951
66	9	4.72	0.85814
67	9	5.69	0.77032
68	9	5.97	0.74274
69	9	8.27	0.50725
70	9	3.10	0.96041
71	9	10.66	0.29997
72	9	6.02	0.73759
73	9	7.25	0.61098
74	9	11.65	0.23405
75	9	8.76	0.45977
76	9	8.61	0.47414

77	9	13.42	0.14436
78	9	12.12	0.20661
79	9	12.20	0.20228
80	9	6.45	0.69457
81	9	5.34	0.80331
82	9	11.60	0.23686
83	9	8.62	0.47273
84	9	8.17	0.51676
85	9	11.31	0.25510
86	9	8.23	0.51080
87	9	3.67	0.93194
88	9	7.32	0.60418
89	9	2.32	0.98544
90	9	6.21	0.71832
91	9	4.46	0.87864
92	9	12.01	0.21277
93	9	12.27	0.19828
94	9	11.51	0.24260
95	9	19.11	0.02431
96	9	4.50	0.87558
97	9	19.95	0.01823
98	9	8.83	0.45338
99	9	8.59	0.47611
100	9	6.87	0.65049
Combined P-value for all tests (Using KS method)			0.33299

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	6.43	0.69657
2	9	6.55	0.68353
3	9	22.37	0.00778
4	9	11.81	0.22448
5	9	22.23	0.00819
6	9	8.64	0.47160
7	9	4.41	0.88215
8	9	9.06	0.43209
9	9	8.88	0.44839
10	9	7.84	0.55063
11	9	5.65	0.77461
12	9	13.82	0.12881
13	9	5.35	0.80293
14	9	5.02	0.83285
15	9	11.61	0.23625
16	9	11.91	0.21824
17	9	11.16	0.26516
18	9	4.38	0.88440
Combined P-value for all tests (Using KS method)			0.99996

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	89.57	0.31859
2	7	84	72.85	0.80231
3	7	84	63.15	0.95661
4	7	84	90.54	0.29359
5	7	84	121.15	0.00498
6	7	84	75.96	0.72218
7	7	84	72.50	0.81041
8	7	84	62.07	0.96515
9	7	84	91.09	0.27972
10	7	84	116.32	0.01128
11	7	84	47.02	0.99963
12	7	84	72.45	0.81146
13	7	84	77.30	0.68433
14	7	84	72.90	0.80104
15	7	84	75.26	0.74140
16	7	84	114.21	0.01584
17	7	84	68.66	0.88720
18	7	84	65.11	0.93712
19	7	84	81.66	0.55192
20	7	84	94.01	0.21346
21	7	84	71.13	0.84052
22	7	84	76.97	0.69370
23	7	84	100.74	0.10286
24	7	84	87.84	0.36581
25	7	84	91.04	0.28105
26	7	84	84.81	0.45475
27	7	84	89.97	0.30818
28	7	84	86.61	0.40107
29	7	84	75.96	0.72234
30	7	84	89.50	0.32038
31	7	84	89.75	0.31388
32	7	84	84.23	0.47245
33	7	84	86.51	0.40395
34	7	84	70.19	0.85953
35	7	84	80.84	0.57735
36	7	84	100.20	0.10964
37	7	84	100.00	0.11233
38	7	84	72.96	0.79950
39	7	84	94.94	0.19468

40	7	84	72.36	0.81363
41	7	84	85.20	0.44279
42	7	84	98.42	0.13457
43	7	84	97.26	0.15282
44	7	84	83.04	0.50907
45	7	84	73.33	0.79061
46	7	84	102.96	0.07844
47	7	84	90.40	0.29715
48	7	84	81.00	0.57239
49	7	84	73.98	0.77471
50	7	84	78.32	0.65425
51	7	84	73.05	0.79739
52	7	84	110.56	0.02768
53	7	84	82.74	0.51830
54	7	84	87.88	0.36463
55	7	84	85.71	0.42765
56	7	84	65.87	0.92816
57	7	84	72.26	0.81575
58	7	84	94.34	0.20657
59	7	84	104.93	0.06086
60	7	84	86.83	0.39471
61	7	84	63.51	0.95343
62	7	84	104.03	0.06839
63	7	84	87.04	0.38845
64	7	84	81.93	0.54366
65	7	84	77.56	0.67665
66	7	84	85.02	0.44826
67	7	84	88.60	0.34465
68	7	84	69.72	0.86849
69	7	84	72.94	0.80014
70	7	84	75.69	0.72952
71	7	84	69.66	0.86962
72	7	84	69.73	0.86818
73	7	84	95.34	0.18693
74	7	84	105.19	0.05881
75	7	84	79.13	0.62988
76	7	84	73.44	0.78812
77	7	84	65.18	0.93631
78	7	84	82.39	0.52932
79	7	84	89.19	0.32868
80	7	84	94.20	0.20956
81	7	84	84.69	0.45852
82	7	84	67.43	0.90685
83	7	84	78.21	0.65751
84	7	84	94.33	0.20687
85	7	84	89.52	0.31981
86	7	84	82.21	0.53477
87	7	84	100.63	0.10430
88	7	84	67.39	0.90733
89	7	84	104.05	0.06825
90	7	84	91.36	0.27329
91	7	84	69.57	0.87121
92	7	84	75.12	0.74494
93	7	84	80.00	0.60345
94	7	84	68.62	0.88789

95	7	84	96.53	0.16524
96	7	84	105.12	0.05931
97	7	84	74.47	0.76203
98	7	84	80.37	0.59197
99	7	84	94.92	0.19511
100	7	84	96.72	0.16191
Combined P-value for all tests (Using KS method)				0.65874

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	70.99	0.08557
2	7	56	61.06	0.29924
3	7	56	43.38	0.89100
4	7	56	58.28	0.39139
5	7	56	63.05	0.24122
6	7	56	61.16	0.29605
7	7	56	53.65	0.56441
8	7	56	63.85	0.22006
9	7	56	59.04	0.36509
10	7	56	47.56	0.78162
11	7	56	41.39	0.92757
12	7	56	56.38	0.46065
13	7	56	68.20	0.12706
14	7	56	52.69	0.60079
15	7	56	60.33	0.32228
16	7	56	46.51	0.81312
17	7	56	44.10	0.87525
18	7	56	46.74	0.80633
19	7	56	50.87	0.66900
20	7	56	60.52	0.31607
21	7	56	37.24	0.97482
22	7	56	64.25	0.21007
23	7	56	54.79	0.52070
24	7	56	58.34	0.38933
25	7	56	37.62	0.97190
26	7	56	57.14	0.43269
27	7	56	62.00	0.27080
28	7	56	55.82	0.48175
29	7	56	54.63	0.52689
30	7	56	50.79	0.67179
31	7	56	59.28	0.35681
32	7	56	55.87	0.47989
33	7	56	60.11	0.32942
34	7	56	49.11	0.73118
35	7	56	50.77	0.67261
36	7	56	57.32	0.42595
37	7	56	37.06	0.97608
38	7	56	52.27	0.61680
39	7	56	64.88	0.19471
40	7	56	59.22	0.35895
41	7	56	75.04	0.04556

42	7	56	48.94	0.73682
43	7	56	65.29	0.18521
44	7	56	53.70	0.56235
45	7	56	45.82	0.83222
46	7	56	60.78	0.30795
47	7	56	67.45	0.14062
48	7	56	50.53	0.68109
49	7	56	44.83	0.85796
50	7	56	57.65	0.41404
51	7	56	37.19	0.97518
52	7	56	50.66	0.67637
53	7	56	57.12	0.43319
54	7	56	57.49	0.41974
55	7	56	51.18	0.65761
56	7	56	72.35	0.06976
57	7	56	54.67	0.52534
58	7	56	42.57	0.90704
59	7	56	39.98	0.94775
60	7	56	52.01	0.62680
61	7	56	63.98	0.21674
62	7	56	48.18	0.76194
63	7	56	57.62	0.41518
64	7	56	41.48	0.92627
65	7	56	54.12	0.54643
66	7	56	48.26	0.75934
67	7	56	46.95	0.80025
68	7	56	60.43	0.31897
69	7	56	73.59	0.05752
70	7	56	51.40	0.64926
71	7	56	54.30	0.53954
72	7	56	79.30	0.02196
73	7	56	56.85	0.44318
74	7	56	55.89	0.47890
75	7	56	48.45	0.75311
76	7	56	49.45	0.71935
77	7	56	67.57	0.13835
78	7	56	80.02	0.01928
79	7	56	47.75	0.77557
80	7	56	45.77	0.83375
81	7	56	58.74	0.37526
82	7	56	63.47	0.23000
83	7	56	71.24	0.08248
84	7	56	62.77	0.24881
85	7	56	53.00	0.58921
86	7	56	66.91	0.15088
87	7	56	73.00	0.06314
88	7	56	53.67	0.56365
89	7	56	52.63	0.60331
90	7	56	64.81	0.19645
91	7	56	34.53	0.98934
92	7	56	52.36	0.61353
93	7	56	58.29	0.39126
94	7	56	63.06	0.24080
95	7	56	54.78	0.52124
96	7	56	55.35	0.49959

97	7	56	57.81	0.40830
98	7	56	56.01	0.47443
99	7	56	31.73	0.99632
100	7	56	51.19	0.65725
Combined P-value for all tests (Using KS method)				0.76181

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	16.38	0.74766
2	7	21	18.03	0.64706
3	7	21	18.18	0.63788
4	7	21	21.99	0.40022
5	7	21	20.03	0.51942
6	7	21	16.48	0.74186
7	7	21	28.68	0.12199
8	7	21	11.72	0.94698
9	7	21	20.45	0.49307
10	7	21	18.74	0.60170
11	7	21	23.09	0.33915
12	7	21	30.00	0.09192
13	7	21	30.89	0.07553
14	7	21	14.25	0.85844
15	7	21	12.83	0.91456
16	7	21	17.54	0.67774
17	7	21	33.89	0.03720
18	7	21	25.23	0.23719
19	7	21	21.38	0.43612
20	7	21	12.59	0.92228
21	7	21	31.78	0.06156
22	7	21	20.15	0.51204
23	7	21	21.95	0.40230
24	7	21	12.65	0.92043
25	7	21	22.10	0.39359
26	7	21	29.26	0.10781
27	7	21	20.76	0.47398
28	7	21	18.40	0.62380
29	7	21	30.85	0.07626
30	7	21	13.76	0.87955
31	7	21	22.46	0.37362
32	7	21	16.82	0.72199
33	7	21	21.87	0.40694
34	7	21	26.67	0.18191
35	7	21	24.10	0.28803

36	7	21	32.41	0.05315
37	7	21	36.62	0.01859
38	7	21	15.02	0.82182
39	7	21	25.82	0.21326
40	7	21	19.46	0.55580
41	7	21	20.01	0.52038
42	7	21	14.44	0.85010
43	7	21	16.09	0.76438
44	7	21	26.21	0.19859
45	7	21	17.63	0.67224
46	7	21	20.93	0.46304
47	7	21	34.93	0.02874
48	7	21	10.43	0.97277
49	7	21	33.57	0.04026
50	7	21	23.82	0.30184
51	7	21	26.61	0.18422
52	7	21	23.27	0.32964
53	7	21	13.21	0.90101
54	7	21	19.98	0.52243
55	7	21	39.82	0.00782
56	7	21	15.32	0.80658
57	7	21	23.98	0.29393
58	7	21	20.92	0.46362
59	7	21	23.83	0.30122
60	7	21	17.13	0.70301
61	7	21	29.46	0.10339
62	7	21	23.80	0.30290
63	7	21	20.83	0.46909
64	7	21	24.40	0.27404
65	7	21	19.20	0.57211
66	7	21	23.92	0.29714
67	7	21	19.24	0.56981
68	7	21	33.55	0.04045
69	7	21	17.68	0.66911
70	7	21	6.11	0.99934
71	7	21	24.01	0.29252
72	7	21	22.33	0.38090
73	7	21	20.19	0.50917
74	7	21	28.96	0.11490
75	7	21	20.64	0.48137
76	7	21	12.16	0.93515
77	7	21	21.93	0.40347
78	7	21	17.14	0.70269
79	7	21	25.60	0.22218
80	7	21	18.20	0.63656
81	7	21	31.50	0.06570
82	7	21	22.05	0.39670
83	7	21	13.53	0.88876
84	7	21	12.80	0.91542
85	7	21	20.55	0.48641
86	7	21	11.92	0.94164
87	7	21	33.81	0.03796
88	7	21	28.42	0.12855
89	7	21	20.98	0.45993
90	7	21	20.54	0.48757

91	7	21	19.43	0.55750
92	7	21	13.42	0.89310
93	7	21	25.41	0.22985
94	7	21	17.25	0.69586
95	7	21	22.23	0.38634
96	7	21	32.43	0.05295
97	7	21	16.76	0.72529
98	7	21	26.68	0.18166
99	7	21	14.45	0.84968
100	7	21	20.78	0.47231
Combined P-value for all tests (Using KS method)				0.41074

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	18.51	0.61680
2	7	21	11.09	0.96097
3	7	21	17.96	0.65141
4	7	21	20.95	0.46176
5	7	21	18.23	0.63453
6	7	21	6.19	0.99927
7	7	21	19.89	0.52837
8	7	21	10.41	0.97308
9	7	21	37.12	0.01631
10	7	21	21.54	0.42618
11	7	21	24.36	0.27594
12	7	21	18.36	0.62587
13	7	21	18.13	0.64102
14	7	21	33.83	0.03775
15	7	21	16.72	0.72770
16	7	21	26.30	0.19524
17	7	21	25.28	0.23516
18	7	21	22.24	0.38557
19	7	21	20.95	0.46212
20	7	21	23.35	0.32571
21	7	21	14.61	0.84210
22	7	21	14.81	0.83217
23	7	21	23.92	0.29695
24	7	21	16.07	0.76571
25	7	21	19.83	0.53205
26	7	21	13.35	0.89572
27	7	21	10.18	0.97651
28	7	21	20.79	0.47171
29	7	21	15.61	0.79126
30	7	21	18.78	0.59938
31	7	21	21.39	0.43512
32	7	21	19.62	0.54530
33	7	21	32.68	0.04994
34	7	21	15.78	0.78199
35	7	21	20.61	0.48285
36	7	21	33.61	0.03988
37	7	21	25.23	0.23726

38	7	21	13.72	0.88149
39	7	21	20.58	0.48496
40	7	21	18.73	0.60220
41	7	21	17.64	0.67178
42	7	21	29.57	0.10102
43	7	21	19.76	0.53638
44	7	21	29.70	0.09814
45	7	21	12.76	0.91693
46	7	21	17.21	0.69818
47	7	21	21.15	0.44982
48	7	21	27.79	0.14627
49	7	21	19.77	0.53574
50	7	21	28.17	0.13534
51	7	21	32.10	0.05725
52	7	21	18.98	0.58617
53	7	21	21.65	0.41968
54	7	21	13.31	0.89738
55	7	21	17.65	0.67091
56	7	21	34.63	0.03099
57	7	21	24.61	0.26454
58	7	21	21.00	0.45870
59	7	21	19.02	0.58360
60	7	21	19.53	0.55131
61	7	21	21.61	0.42204
62	7	21	22.88	0.35063
63	7	21	22.27	0.38421
64	7	21	16.33	0.75060
65	7	21	21.59	0.42334
66	7	21	20.73	0.47546
67	7	21	27.98	0.14065
68	7	21	12.31	0.93081
69	7	21	26.84	0.17627
70	7	21	24.87	0.25289
71	7	21	21.02	0.45748
72	7	21	21.19	0.44737
73	7	21	20.12	0.51398
74	7	21	23.52	0.31689
75	7	21	22.42	0.37580
76	7	21	30.16	0.08876
77	7	21	22.07	0.39565
78	7	21	31.37	0.06772
79	7	21	19.95	0.52430
80	7	21	19.52	0.55213
81	7	21	22.60	0.36541
82	7	21	21.52	0.42770
83	7	21	23.19	0.33391
84	7	21	26.28	0.19597
85	7	21	30.40	0.08415
86	7	21	24.27	0.28007
87	7	21	41.38	0.00503
88	7	21	18.70	0.60422
89	7	21	24.07	0.28981
90	7	21	16.19	0.75913
91	7	21	20.48	0.49137
92	7	21	18.02	0.64779

93	7	21	16.29	0.75307
94	7	21	18.95	0.58842
95	7	21	14.96	0.82479
96	7	21	33.51	0.04089
97	7	21	20.82	0.47023
98	7	21	15.30	0.80756
99	7	21	14.20	0.86086
100	7	21	25.26	0.23628
Combined P-value for all tests (Using KS method)				0.27125

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	0.65874	0.99896
Suits Test	0.41074	0.99896
Hand Types Test	0.33299	0.99896
Combined P-Value using Holm's Method		0.99896

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	0.76181	1.00000
Suits Test	0.27125	0.81374
Hand Types Test	0.99996	1.00000
Combined P-Value using Holm's Method		0.81374

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

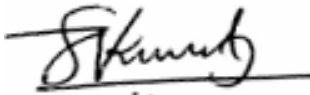
Analysis of actual data from game logs for 'Hand Types, 'Ranks' and 'Suits' for **52-card decks** and **36-card decks** indicated statistical randomness.

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: 25 November, 2019

Signed:



Geoff Nicoll
Principal Consultant
iTech Labs Australia

Date: 25 November, 2019

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.

