1.

m : channel number, P : blocking rate

ρ is the root of Erlang B formula for given m and P

Thus, I use secant method to find ρ (use liner scale for $m = 1 \sim 20$,and use log scale for $m = 200 \sim 220$)

m \ P	1%	3%	5%	10%
1	0.0101	0.0309	0.0526	0.1111
2	0.1587	0.2821	0.3837	0.5956
3	0.4619	0.7183	0.8998	1.2710
4	0.8707	1.2625	1.5249	2.0454
5	1.3621	1.8774	2.2185	2.8814
6	1.9026	2.5331	2.9467	3.7383
7	2.4944	3.2396	3.7247	4.6464
8	3.1209	3.9761	4.5301	5.5770
9	3.7758	4.7379	5.3573	6.5270
10	4.4545	5.5193	6.2022	7.4912
11	5.1533	6.3174	7.0639	8.4673
12	5.8692	7.1313	7.9375	9.4530
13	6.6001	7.9570	8.8222	10.4511
14	7.3452	8.7937	9.7162	11.4547
15	8.1016	9.6399	10.6207	12.4649
16	8.8685	10.4944	11.5316	13.4807
17	9.6450	11.3589	12.4493	14.5012
18	10.4301	12.2291	13.3731	15.5301
19	11.2229	13.1057	14.3024	16.5608
20	12.0244	13.9881	15.2365	17.5953
200	179.7345	190.8753	198.4998	214.2996
201	180.7023	191.8835	199.5381	215.4042
202	181.6703	192.8917	200.5764	216.5089
203	182.6385	193.9000	201.6148	217.6136
204	183.6067	194.9084	202.6533	218.7183
205	184.5752	195.9169	203.6918	219.8230
206	185.5438	196.9255	204.7305	220.9277
207	186.5125	197.9341	205.7692	222.0325
208	187.4814	198.9429	206.8079	223.1372
209	188.4504	199.9517	207.8467	224.2420
210	189.4196	200.9606	208.8856	225.3467
211	190.3889	201.9696	209.9246	226.4515
212	191.3583	202.9786	210.9636	227.5562
213	192.3279	203.9878	212.0027	228.6610
214	193.2976	204.9970	213.0419	229.7658
215	194.2675	206.0063	214.0811	230.8706
216	195.2375	207.0156	215.1203	231.9753
217	196.2076	208.0250	216.1597	233.0801
218	197.1779	209.0345	217.1991	234.1849
219	198.1483	210.0441	218.2385	235.2896
220	199.1188	211.0537	219.2781	236.3944

2.

(a)

It is possible that the total offered traffic load is larger than the number of available channels and this situation can be seen as taking $m = 220, P = 0.1$, then the corresponding ρ is 236.3944. And this is because the total offered traffic ρ that we computed corresponds to some blocking rate P.

Here I give an extreme example, choose $m = 1$ then $P = B(\rho, m) = \frac{\rho}{1+\rho}$

Then $\rho \to \infty$ as $P \to 1$

The total offered traffic ρ is much larger then 1 but almost all traffic is blocked. Thus, ρ can't represent the exact traffic that has been served

(b)

Depend on previous discussion, the traffic that has been served ρ_{served} can be determined as following

$$\rho_{served} = \rho(1 - P)$$

3.

600 channels, reuse factor $N = 5$, 1 operator $\Rightarrow$ 120 channels per cell

m \ P	1%	3%	5%	10%
120	102.9596	110.6423	115.7625	126.0655
max per cell	102.9596	110.6423	115.7625	126.0655

600 channels, reuse factor $N = 5$, 2 operators $\Rightarrow$ 60 channels per cell per operator

m \ P	1%	3%	5%	10%
60	46.9442	51.5625	54.5557	60.3761
max per cell	93.8884	103.1251	109.1115	120.7522

600 channels, reuse factor $N = 5$, 3 operators $\Rightarrow$ 40 channels per cell per operator

m \ P	1%	3%	5%	10%
40	29.0013	32.4038	34.5853	38.7715
max per cell	58.0026	64.8077	69.1706	77.5430

It can be seen that it is more efficient if 600 channels are shared by only one operator.

I think this is due to that if the channels are shared by fewer operators, then more resources can be used by per operator. It gives more flexibility to use the channels.

Otherwise, many countries prefer that channels are shared by more than one operator may be due to market competition or other reasons that relates to market