UL TCP Low Throughput

Country/Region: S/C, G/O
Equipment: nCell-T5000 +RU4370
Version: BBU: ax.tdd.fr1 2.2.3.800375 +RRU: D.2.21.B11S+
Acceleration Card: FGAF2.2.0_220811_R

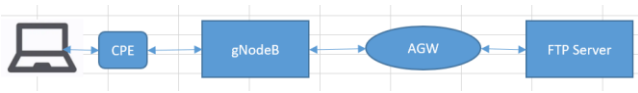
1. Issue Description:

TCP UL speed test is low as below.

Test Point	RSRP	SINR	DL TP	DL MCS	DL Layers on UE	UL TP	UL MCS	UL Layers on UE	Slot configuration
8	- 98	24	131	10	4	77	12	1	3U1D
9	- 90	30	231	19	4	148 → 73	22	1	3U1D
10	- 84	32	250	19	4	150 → 47	24	1	3U1D
11	- 110	18	21	4	4	34	4	1	3U1D
12	- 100	23	187	15	4	66	10	1	3U1D
13	- 97	24	218	18	4	158 → 47	22	1	3U1D
13	- 97	24	206	18	4	50	22	1	2U7D
14	- 85	32	193	15	4	140 → 35	24	1	3U1D
17	- 66	34.5	214	17	4	150 → 45	27	1	3U1D
17	-64	36	237	9	4	64	27	1	2U7D
19	- 79	34.5	218	18	4	120 → 25	23	1	3U1D
19	- 82	27.5	230	19	4	52	23	1	2U7D
23	- 75	33.5	184	15	4	180 → 27	27	1	3U1D

2. Achieve Network Topology and NE Information

Standard Networking.



3. Suggested Troubleshooting Methods:

a) Check the radio interface environment by pre-scheduling.
b) Determine if insufficient dispatch/Low MCS/ low RANK by mac-layer print watching.
c) Determine if transmission bandwidth is restricted by UDP testing.
d) Configuration parameter check by web check and xml comparation.
e) Gather log +User Plane + FAPI log analysis.
f) Collect CPE QXDM log

4. Troubleshooting Procedures:

a) Open UL pre-scheduling and observed full dispatch and good speed.

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Displaying MAC throughput from the oldest second to last full second
Histogram size is: 301
last s:  DL tput (Mbps[MAC/RLC]: RBs(slice0~3)/Times: Ratio: AvgMcs: AvgLayers: UdpSdu/AllSdu)   UL tput (Mbps[MAC/RLC]: RBs(slice0~3)/Times: AvgMc
gLayers)
20:     1.5536/0.0020 (1253(1253/0/0/0)/57: 0.5737% :13.6201: 3.4828: 0/4)      178.8855/0.0020 (182553(127473/0/0/0)/1201: 25.3981: 1.0000)
19:     6.0464/0.0173 (4857(4857/0/0/0)/81: 2.2239% :10.0000: 4.0000: 16/18)    177.8258/0.0234 (182553(92742/0/0/0)/1201: 25.0000: 1.0000)
18:     2.4883/0.0037 (2053(2053/0/0/0)/61: 0.9400% :10.0000: 4.0000: 1/6)      181.6714/0.0041 (182553(128085/0/0/0)/1201: 25.4769: 1.0000)
17:     0.4428/0.0005 (324(324/0/0/0)/52: 0.1484% :10.0000: 4.0000: 0/1)        182.0698/0.0005 (182399(117210/0/0/0)/1200: 25.4975: 1.0000)
16:     1.9636/0.0026 (1577(1577/0/0/0)/59: 0.7221% :10.0000: 4.0000: 1/4)      183.6098/0.0026 (182398(92106/0/0/0)/1200: 25.6243: 1.0000)
15:     15.9179/0.1167 (13694(13694/0/0/0)/132: 6.2701% :10.0000: 4.0000: 57/81)        182.5736/0.5565 (182553(94884/0/0/0)/1201: 25.9974: 1.0000)
14:     5.1642/0.0243 (5280(5280/0/0/0)/83: 2.4176% :10.9386: 4.0000: 14/19)    184.3526/0.0092 (182553(101463/0/0/0)/1201: 26.0141: 1.0000)
13:     1.4632/0.0010 (1458(1458/0/0/0)/59: 0.6676% :11.0000: 4.0000: 1/2)      189.1755/0.0019 (182553(106359/0/0/0)/1201: 26.4764: 1.0000)
12:     0.4672/0.0005 (648(648/0/0/0)/54: 0.2967% :11.0000: 4.0000: 0/1)        188.4714/0.0017 (182399(120117/0/0/0)/1200: 26.5059: 1.0000)
11:     1.1436/0.0017 (1134(1134/0/0/0)/57: 0.5192% :11.0000: 4.0000: 0/3)      188.4555/0.0009 (182400(134511/0/0/0)/1200: 26.5033: 1.0000)
10:     0.7664/0.0005 (615(615/0/0/0)/54: 0.2816% :11.0000: 4.0000: 0/1)        189.5987/0.0014 (182552(141089/0/0/0)/1201: 26.5029: 1.0000)
9:      0.7664/0.0005 (615(615/0/0/0)/54: 0.2816% :11.0000: 4.0000: 0/1)        190.4068/0.0014 (182553(123036/0/0/0)/1201: 26.5062: 1.0000)
8:      2.5862/0.0038 (2192(2192/0/0/0)/63: 1.0037% :11.0000: 4.0000: 4/6)      188.9425/0.0042 (182540(95166/0/0/0)/1201: 26.7073: 1.0000)
7:      0.6270/0.0005 (539(539/0/0/0)/53: 0.2468% :11.0000: 4.0000: 0/1)        190.8859/0.0014 (182399(91200/0/0/0)/1200: 26.5000: 1.0000)
6:      1.9304/0.0034 (1620(1620/0/0/0)/60: 0.7418% :11.0000: 4.0000: 4/5)      190.8862/0.0034 (182400(136806/0/0/0)/1200: 26.6499: 1.0000)
5:      4.3122/0.0067 (3984(3984/0/0/0)/75: 1.8242% :10.5203: 4.0000: 9/11)     189.2666/0.0114 (182553(139866/0/0/0)/1201: 26.8428: 1.0000)
4:      5.3290/0.0496 (4384(4384/0/0/0)/76: 2.0073% :10.0000: 4.0000: 26/27)    187.7028/0.1721 (182553(94272/0/0/0)/1201: 26.4389: 1.0000)
3:      1.0903/0.0009 (906(906/0/0/0)/56: 0.4148% :10.0000: 4.0000: 0/2)        183.9380/0.0019 (182553(155778/0/0/0)/1201: 25.9823: 1.0000)
2:      1.0249/0.0009 (810(810/0/0/0)/55: 0.3709% :10.0000: 4.0000: 0/2)        184.4176/0.0065 (182400(117069/0/0/0)/1200: 25.9864: 1.0000)
1:      1.6070/0.0018 (1296(1296/0/0/0)/58: 0.5934% :10.0000: 4.0000: 0/3)      185.0853/0.0022 (182399(103746/0/0/0)/1200: 25.9916: 1.0000)
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UL UDP iperf test, speed is good.

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Displaying MAC throughput from the oldest second to last full second
Histogram size is: 301
last s:  DL tput (Mbps[MAC/RLC]: RBs(slice0~3)/Times: Ratio: AvgMcs: AvgLayers: UdpSdu/AllSdu)   UL tput (Mbps[MAC/RLC]: RBs(slice0~3)/Times: AvgMcs: Av
gLayers)
20:     1.8421/0.0592 (1639(1639/0/0/0)/448: 0.7505% :10.8334: 3.3539: 17/17)   193.7307/192.6283 (182529(182529/0/0/0)/1201: 27.0000: 1.0000)
19:     2.0584/0.0020 (1524(1524/0/0/0)/430: 0.6978% :12.4698: 3.3255: 2/3)     193.0748/192.1294 (182541(182541/0/0/0)/1201: 27.0000: 1.0000)
18:     2.1086/0.0022 (1584(1584/0/0/0)/444: 0.7253% :14.1086: 3.0379: 3/3)     193.5667/192.6189 (182541(182541/0/0/0)/1201: 27.0000: 1.0000)
17:     1.9278/0.0124 (1581(1581/0/0/0)/443: 0.7239% :10.1512: 3.8431: 4/4)     192.4189/191.6483 (182364(182364/0/0/0)/1200: 27.0000: 1.0000)
16:     1.7046/0.0005 (1532(1532/0/0/0)/432: 0.7015% :10.0679: 3.4935: 1/1)     192.5828/191.6494 (182364(182364/0/0/0)/1200: 27.0000: 1.0000)
15:     1.8766/0.0005 (1592(1592/0/0/0)/445: 0.7289% :11.9045: 3.4045: 1/1)     189.9592/189.0273 (182481(182481/0/0/0)/1201: 27.0000: 1.0000)
14:     1.9960/0.0000 (1552(1552/0/0/0)/435: 0.7106% :12.0644: 3.5077: 0/0)     190.9431/189.8473 (182517(182517/0/0/0)/1201: 27.0000: 1.0000)
13:     1.6866/0.0015 (1684(1684/0/0/0)/467: 0.7711% :8.8242: 3.8622: 3/3)      193.0748/192.1389 (182541(182541/0/0/0)/1201: 27.0000: 1.0000)
12:     1.4429/0.0005 (1532(1532/0/0/0)/433: 0.7015% :7.6084: 3.6789: 1/1)      193.5667/192.7884 (182388(182388/0/0/0)/1200: 27.0000: 1.0000)
11:     1.5120/0.0000 (1476(1476/0/0/0)/419: 0.6758% :10.3496: 3.0000: 0/0)     192.7468/191.8086 (182400(182400/0/0/0)/1200: 27.0000: 1.0000)
10:     1.6965/0.0023 (1508(1508/0/0/0)/427: 0.6905% :11.0690: 3.1857: 1/5)     191.9269/190.8286 (182553(182553/0/0/0)/1201: 27.0000: 1.0000)
9:      1.6035/0.0019 (1556(1556/0/0/0)/439: 0.7125% :9.2699: 3.4936: 0/4)      192.7468/191.7982 (182553(182553/0/0/0)/1201: 27.0000: 1.0000)
8:      1.7582/0.0024 (1548(1548/0/0/0)/436: 0.7088% :10.3333: 3.4780: 2/2)     192.8984/191.9795 (182529(182529/0/0/0)/1201: 27.0000: 1.0000)
7:      1.8996/0.0014 (1508(1508/0/0/0)/426: 0.6905% :12.1910: 3.1592: 2/3)     192.2550/191.4578 (182399(182395/0/0/0)/1200: 27.0000: 1.0000)
6:      1.9263/0.0010 (1676(1676/0/0/0)/465: 0.7674% :13.7876: 3.0692: 2/2)     191.1070/190.1787 (182388(182388/0/0/0)/1200: 27.0000: 1.0000)
5:      1.8021/0.0139 (1578(1578/0/0/0)/442: 0.7225% :11.4854: 3.1876: 7/9)     192.4189/191.3200 (182541(182541/0/0/0)/1201: 27.0000: 1.0000)
4:      1.8070/0.0005 (1560(1560/0/0/0)/439: 0.7143% :11.1256: 3.2769: 1/1)     193.8946/192.9492 (182553(182553/0/0/0)/1201: 27.0000: 1.0000)
3:      1.8108/0.0022 (1560(1560/0/0/0)/440: 0.7143% :10.1667: 3.6128: 3/5)     192.5828/191.6380 (182529(182529/0/0/0)/1201: 27.0000: 1.0000)
2:      1.7713/0.0384 (1556(1556/0/0/0)/432: 0.7125% :10.9801: 3.2757: 6/12)    192.4189/191.6476 (182352(182352/0/0/0)/1200: 27.0000: 1.0000)
1:      1.8076/0.0390 (1554(1554/0/0/0)/433: 0.7115% :11.1068: 3.2780: 2/13)    191.7630/190.8276 (182340(182340/0/0/0)/1200: 27.0000: 1.0000)
Start Idx: 60    end Idx: 60
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UL TCP Iperf test with 5 thread, speed is low.

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last s:  DL tput (Mbps[MAC/RLC]: RBs(slice0~3)/Times: Ratio: AvgMcs: AvgLayers: UdpSdu/AllSdu)   UL tput (Mbps[MAC/RLC]: RBs(slice0~3)/Time
gLayers)
20:     0.2229/0.0064 (100(100/0/0/0)/75: 0.0458% :17.1600: 4.0000: 3/13)       0.0929/0.0138 (88(88/0/0/0)/22: 27.0000: 1.0000)
19:     0.5099/0.1327 (269(269/0/0/0)/110: 0.1232% :18.0000: 4.0000: 26/54)     0.2387/0.1638 (225(225/0/0/0)/22: 27.0000: 1.0000)
18:     0.8303/0.1582 (444(444/0/0/0)/155: 0.2033% :17.2523: 4.0000: 9/438)     18.0321/15.3972 (16984(16984/0/0/0)/133: 27.0000: 1.0000)
17:     1.0536/0.1779 (500(500/0/0/0)/172: 0.2289% :17.0000: 4.0000: 5/480)     24.1907/18.4168 (22722(22722/0/0/0)/154: 27.0000: 1.0000)
16:     1.2540/0.3699 (610(610/0/0/0)/188: 0.2793% :17.0000: 4.0000: 23/710)    29.3625/24.5638 (27393(27393/0/0/0)/186: 27.0000: 1.0000)
15:     0.9590/0.2799 (475(475/0/0/0)/150: 0.2175% :17.4568: 4.0000: 3/310)     15.9205/12.6262 (14893(14893/0/0/0)/103: 27.0000: 1.0000)
14:     1.3468/0.2549 (692(692/0/0/0)/216: 0.3168% :17.2601: 4.0000: 5/688)     38.2815/28.8851 (35998(35998/0/0/0)/246: 27.0000: 1.0000)
13:     0.6960/0.1237 (340(340/0/0/0)/133: 0.1557% :17.0000: 4.0000: 6/312)     16.3653/12.9023 (15268(15268/0/0/0)/105: 27.0000: 1.0000)
12:     1.0724/0.2042 (532(532/0/0/0)/177: 0.2436% :17.0000: 4.0000: 4/588)     30.9808/23.8561 (29023(29023/0/0/0)/199: 27.0000: 1.0000)
11:     0.7598/0.1332 (381(381/0/0/0)/139: 0.1745% :17.0000: 4.0000: 2/357)     19.5510/14.7165 (19307(19307/0/0/0)/133: 27.0000: 1.0000)
10:     0.9550/0.1464 (464(464/0/0/0)/161: 0.2125% :17.4224: 4.0000: 2/421)     25.7294/16.7433 (23232(23232/0/0/0)/163: 27.0000: 1.0000)
9:      0.8492/0.1515 (422(422/0/0/0)/149: 0.1932% :17.4171: 4.0000: 5/390)     24.8832/16.2207 (23215(23215/0/0/0)/160: 27.0000: 1.0000)
8:      0.9770/0.2587 (479(479/0/0/0)/155: 0.2193% :17.0000: 4.0000: 9/449)     22.6131/16.9471 (21096(21096/0/0/0)/144: 27.0000: 1.0000)
7:      0.8563/0.1391 (416(416/0/0/0)/150: 0.1905% :17.0000: 4.0000: 4/373)     23.7425/15.2271 (22150(22150/0/0/0)/151: 27.0000: 1.0000)
6:      1.1718/0.3038 (584(584/0/0/0)/183: 0.2674% :17.6301: 4.0000: 1/606)     30.5860/22.5500 (29060(29060/0/0/0)/202: 27.0000: 1.0000)
5:      1.0138/0.2426 (516(516/0/0/0)/172: 0.2363% :17.0000: 4.0000: 0/648)     27.4994/24.2120 (26560(26560/0/0/0)/179: 27.0000: 1.0000)
4:      1.2480/0.3795 (602(602/0/0/0)/185: 0.2756% :17.0266: 3.9734: 2/825)     28.6329/25.0680 (25810(25803/0/0/0)/177: 26.9957: 1.0000)
3:      0.8937/0.1972 (495(495/0/0/0)/168: 0.2266% :17.7515: 4.0000: 0/543)     24.1470/20.8862 (23673(23673/0/0/0)/163: 27.0000: 1.0000)
2:      1.2452/0.3483 (588(588/0/0/0)/181: 0.2692% :17.0000: 4.0000: 7/697)     30.0142/25.2146 (27247(27247/0/0/0)/185: 27.0000: 1.0000)
1:      1.2033/0.3594 (604(604/0/0/0)/180: 0.2766% :17.0000: 4.0000: 0/743)     27.1506/24.9957 (25637(25637/0/0/0)/175: 27.0000: 1.0000)
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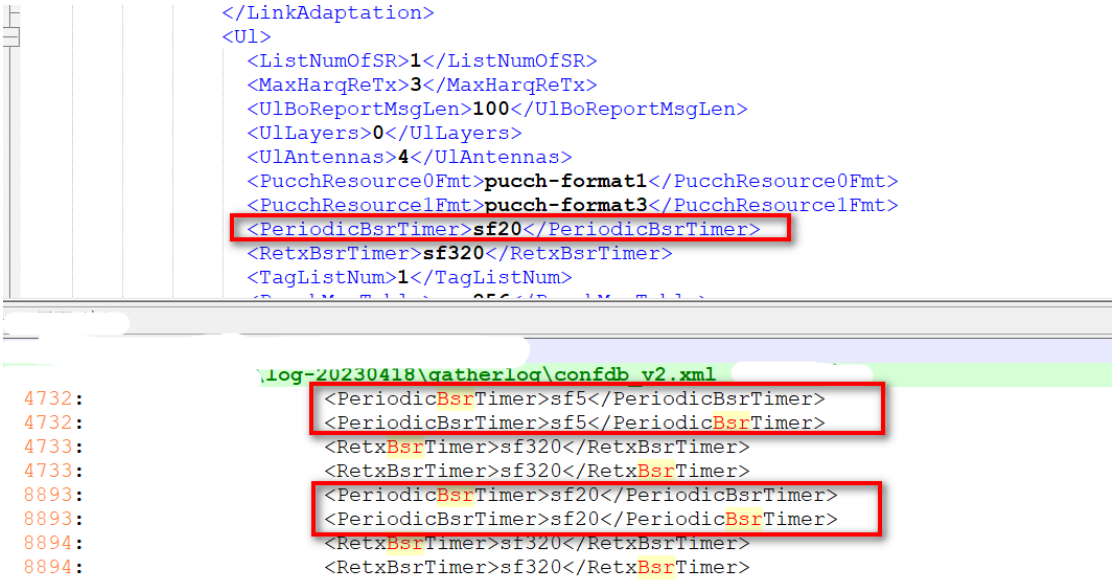
When do iperf test with 50 thread, it can achieve good speed sometimes, but degraded some time later. It indicates insufficient sending traffic.

```
Displaying MAC throughput from the oldest second to last full second
Histogram size is: 301
last s:  DL tput (Mbps[MAC/RLC]: RBs(slice0~3)/Times: Ratio: AvgMcs: AvgLayers: UdpSdu/AllSdu)   UL tput (Mbps[MAC/RLC]: RBs(slice0~3
)/Times: AvgMcs: AvgLayers)
20:     3.7162/2.0308 (3149(3149/0/0/0)/766: 1.4418% :11.0664: 4.0000: 1/5776)  192.4123/185.0962 (179575(179575/0/0/0)/1186: 27.0000
: 1.0000)
19:     3.6142/1.9248 (3033(3033/0/0/0)/745: 1.3887% :11.4131: 4.0000: 0/5488)  193.3781/178.0122 (180389(180389/0/0/0)/1189: 27.0000
: 1.0000)
18:     2.5942/1.3689 (2153(2153/0/0/0)/537: 0.9858% :11.2945: 4.0000: 0/3896)  127.8316/124.1449 (118351(118351/0/0/0)/782: 27.0000:
 1.0000)
17:     1.5112/0.8234 (1275(1275/0/0/0)/343: 0.5838% :11.1616: 4.0000: 0/2346)  78.1574/70.0842 (72944(72944/0/0/0)/484: 27.0000: 1.0
000)
16:     3.4247/1.9873 (3025(3025/0/0/0)/736: 1.3851% :10.5683: 4.0000: 1/5722)  182.6838/181.8226 (171319(171319/0/0/0)/1128: 27.0000
: 1.0000)
15:     2.4980/1.3020 (2042(2042/0/0/0)/513: 0.9350% :11.4471: 4.0000: 3/3686)  126.4651/115.0461 (117972(117972/0/0/0)/781: 27.0000:
 1.0000)
14:     3.6938/1.9309 (3066(3066/0/0/0)/751: 1.4038% :11.2045: 4.0000: 7/5509)  194.7883/184.1123 (181705(181705/0/0/0)/1197: 27.0000
: 1.0000)
13:     1.1100/0.4622 (865(865/0/0/0)/249: 0.3961% :11.7353: 4.0000: 0/1279)    56.3225/45.6409 (52541(52541/0/0/0)/352: 27.0000: 1.0
000)
12:     3.5021/2.0132 (3054(3054/0/0/0)/746: 1.3984% :10.6670: 4.0000: 0/5762)  189.1278/179.6642 (176754(176754/0/0/0)/1167: 27.0000
: 1.0000)
11:     2.4415/1.3603 (2092(2092/0/0/0)/526: 0.9579% :10.9479: 4.0000: 0/3909)  126.1397/119.1442 (117974(117974/0/0/0)/781: 27.0000:
 1.0000)
10:     3.7076/2.0855 (3146(3146/0/0/0)/760: 1.4405% :10.9714: 4.0000: 5/5948)  195.0794/189.3316 (181976(181976/0/0/0)/1198: 27.0000
: 1.0000)
9:      3.7675/2.0881 (3178(3178/0/0/0)/776: 1.4551% :11.1948: 4.0000: 2/5983)  195.0794/189.2021 (181976(181976/0/0/0)/1198: 27.0000
```

b) Check the configuration parameter and compare.
Parameter “PeriodicBsrTimer” was not modified properly, This is a cell level parameter, need modify the value from sf20 to sf5 for all cells.



After modify the parameters, UL throughput restored to normal.

5. Conclusion:
   Parameter “PeriodicBsrTimer” decides the frequency of UL sending frequency.
   Applicable to all the Low UL Throughput case, need be check in high priority.