3GPP TSG RAN WG1 ***TSGR1#7(99)D53***
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Agenda item: Ad hoc 14

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Title: Performance of CPCH with Channel Assignment

Document for: Discussion

1 Introduction

Common Packet Channel (CPCH) has been proposed and adopted as a working assumption for the efficient packet communication over uplink common channels [1, 2]. There have been many discussions related to the CPCH procedure. During the discussions, some inefficiency of the DCH/CPCH resource usage with current CPCH procedure has been pointed out and a couple of channel assignment schemes have been proposed to enhance the CPCH [3, 4, 5].

In this paper, we compare the performance of CPCH schemes with and without channel assignment. To compare the performance of both schemes, blocking ratio is simulated and analysed for different loading conditions.

2 Assumptions for Performance Comparison

In this paper, we compare the performance of CPCH schemes with and without channel assignment. The blocking ratio of CPCH is compared for different loading conditions. Without channel assignment, it is assumed that UE send an acquisition preamble after randomly selecting a DCH/CPCH pair and UTRAN can send a ACK or NAK for this preamble. With channel assignment, UE send a preamble and UTRAN assigns DCH/DPCH pair to UE. The assumptions for this performance comparison is give as follows

- The number of CPCH is assumed to be 8 or 16
- Two different distributions for message length are assumed. One is exponential distribution with average of 100ms. Another one is fixed length message of 100 ms or 250 ms.
- Without channel assignment, UE randomly selects a CPCH/DCH pair. But, in case of channel assignment, UTRAN assigns an available CPCH/DCH pair to UE.
- To simplify the analysis and simulation, it is assumed that there is no retransmission in case of blocking.
- There is no collision between preambles.

3 Performance Results

Figure 1(a) shows the block ratio vs. offered load for two schemes when 8 CPCH' s can be used and the message is exponentially distributed with average length 100ms. Figure 1(b) shows the same curve except that 16 CPCH's are used.

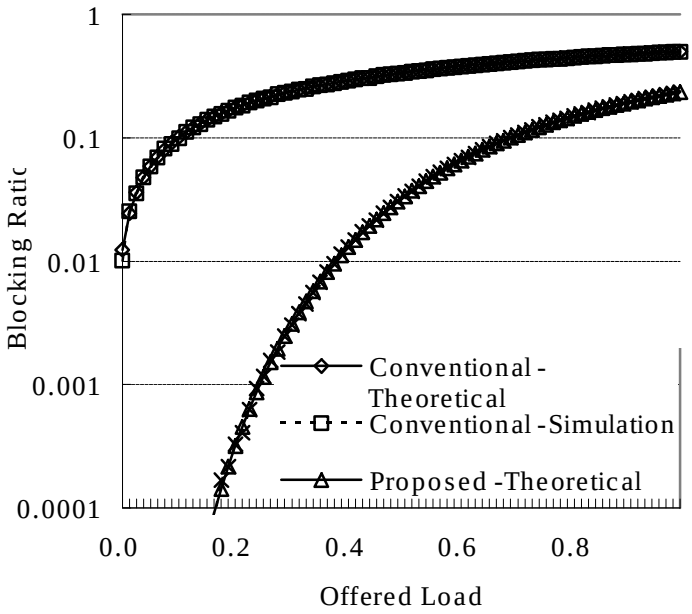

Figure 1(a) Blocking ratio vs. Offered Load (8 CPCH's)
(Exponentially distributed)

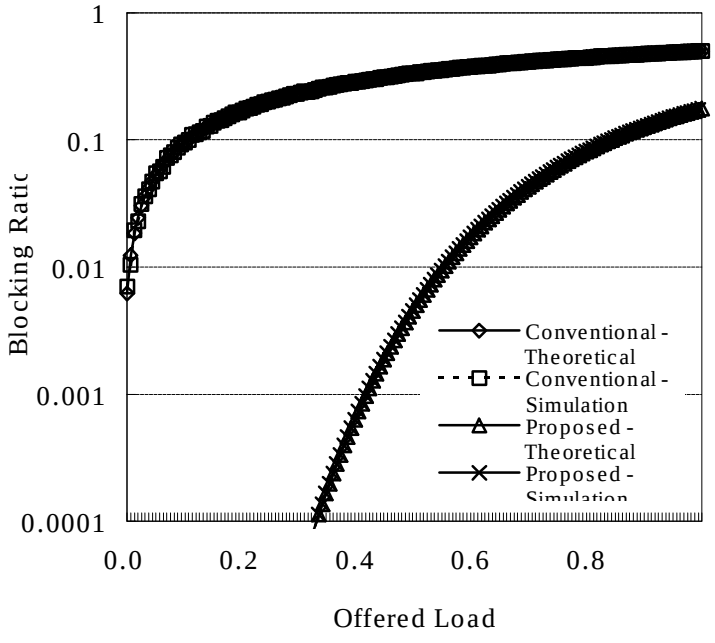

Figure 1(b) Blocking ratio vs. Offered Load (16 CPCH's)
(Exponentially distributed)

Figure 2(a) shows the block ratio vs. offered load for two schemes when 8 CPCH' s can be used and the message has fixed length 100ms. Figure 2(b) shows the same curve except that 16 CPCH' s are used.

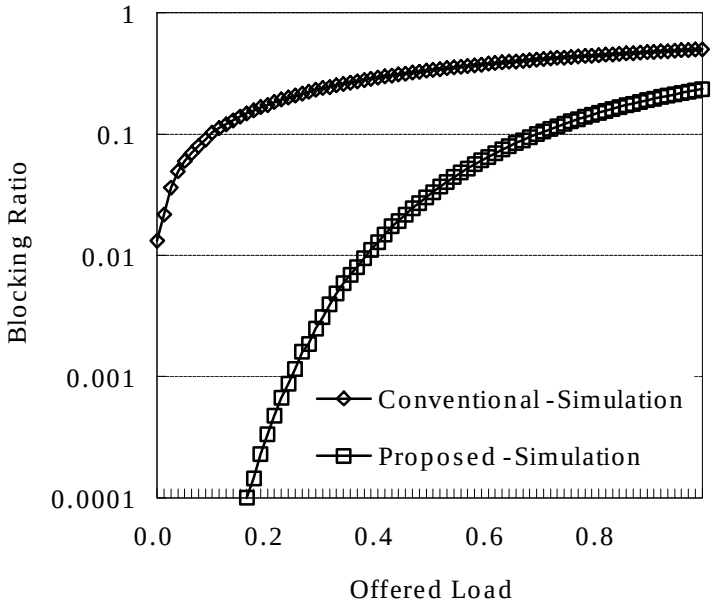

Figure 2(a) Blocking ratio vs. Offered Load (8 CPCH's)
(Fixed length of 100ms)

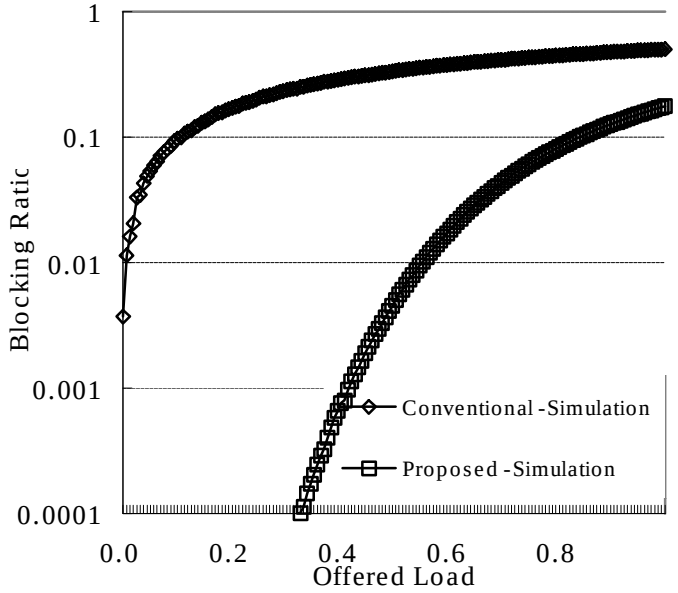

Figure 2(b) Blocking ratio vs. Offered Load (16 CPCH's)
(Fixed length of 100ms)

Figure 3(a) shows the block ratio vs. offered load for two schemes when 8 CPCH' s can be used and the message has fixed length 250 ms. Figure 3(b) shows the same curve except that 16 CPCH' s are used.

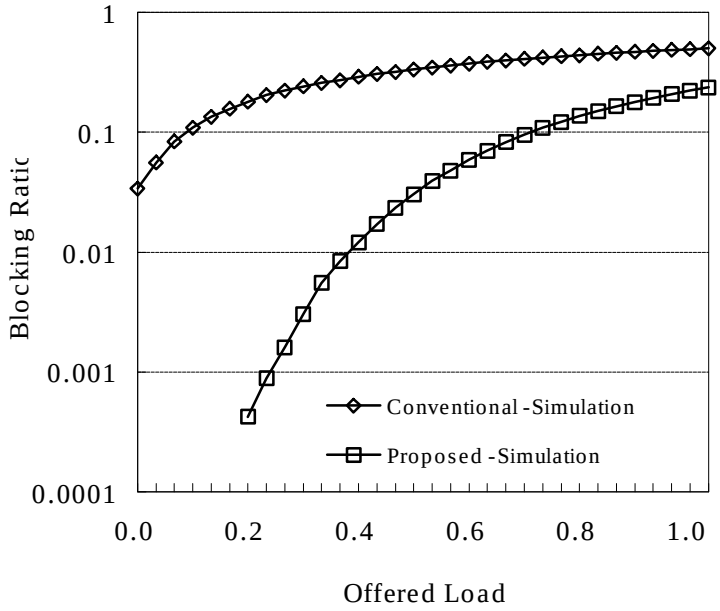

Figure 3(a) Blocking ratio vs. Offered Load (8 CPCH's)
(Fixed length of 250 ms)

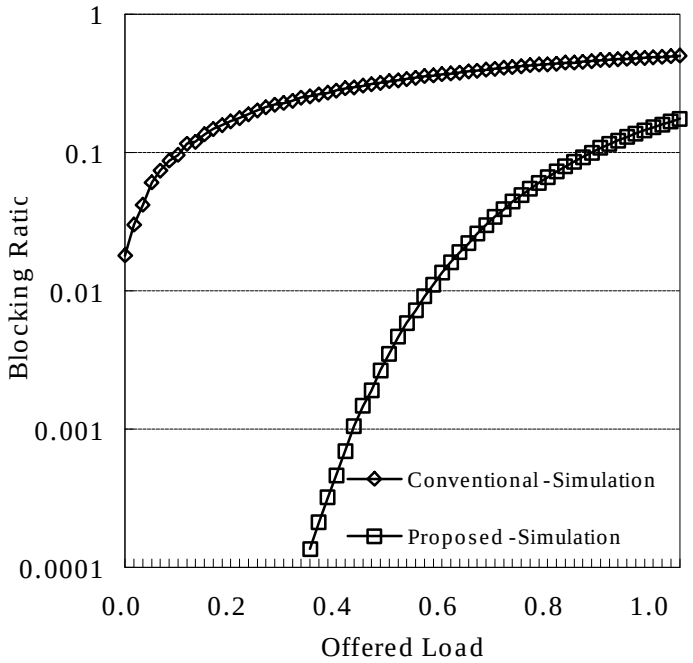

Figure 3(a) Blocking ratio vs. Offered Load (8 CPCH's)
(Fixed length of 250 ms)

4. Conclusions

In this paper, we presented the performance result of CPCH with and without channel assignment. It can be observed that blocking probability of CPCH can be reduced with proposed channel assignment scheme. From the performance results, it can also be observed that blocking probability cannot be reduced so much without channel assignment even though the number of CPCH's is increased.

References

[1] GBT/ Tdoc 592: CPCH physical layer procedures

[2] GBT/Tdoc 594: Overview of System-wide CPCH Access procedures

[3] Samsung Electronics Co./Tdoc906: Enhanced CPCH Procedure

[4] Philips/TdocABC: Enhanced CPCH with status monitoring and code assignment

[5] Samsung & Philips/TdocB13: Enhanced CPCH with Channel Assignment