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Source: TSG RAN WG1
To: TSG RAN WG3
Cc: TSG RAN WG2

Title: Answer To Liaison from WG3 on DPC Mode

RAN WG1 would like to thank RAN WG3 for their Liaison Statement (R1-99h93: Liaison Statement on DPC Mode Support for Release '99). WG3 has asked WG1 to clarify when the DPC_mode will be applied and the impact of NodeB and the UE being unsynchronized when starting the rate reduction algorithm.
WG1 understands an unsynchronized activation for the DPC_mode to be when the UE and the NodeB(s) don't start the rate reduction scheme simultaneously. This can be the case when the UE repeats the same TPC command over three slots while the NodeB(s) thinks that these are three different commands.

The DPC_mode is used to allow the UE to reduce the rate at which the NodeBs adjust their powers. This is used during soft handover where the UE repeats the same TPC command over three slots. Simulations [1] show an increase in the average and variance of the NodeB transmitted power when one NodeB in the active set is not applying the rate reduction when the UE repeats three TPC commands. Also, an increase in the average and variance of the NodeBs transmitted powers is noticed when all the NodeBs in the active set don't apply the rate reduction algorithm when the UE repeats three commands per slot. The degradation in the system performance will depend on the duration of the unsynchronized operation. If the unsynchronized operation is expected to be long enough to affect the system performance, then having a synchronized operation will be the preferred choice. The reported degradation in [1] assumes the unsynchronized operation to be infinitely long (the whole simulation time). WG1 does not have a feeling about the length of the delay between starting the DPC_mode at the UE and starting to apply it at NodeB(s).

RAN WG1 would also like to inform RAN WG3 that synchronized activation times would also be beneficial in other situations, such as when switching between algorithm 1 and algorithm 2 for UL power control [2].

References

[1]   TSGR1#9(99)k03: Synchronization of NodeBs and UE for DPC_mode
[2]   TS 25.214 Sections 5.1.2.2.2 and 5.1.2.2.3.