TSG-RAN Working Group 1 Meeting #18 **TSG*R1#18(01)0074***

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Agenda Item:	**AH24: High Speed Downlink Packet Transmission**
Source:	**SONY Corporation**
Title:	**Use of TPC for DL Channel Quality Estimation**
Document for:	**Discussion**

1. Introduction

At the last meeting in Sweden, throughput enhancement technique using transmission power control commands (TPC) in conjunction with explicit DL channel quality report was presented [1]. This document extends the use of TPC to reduce the reporting frequency for explicit DL channel quality. In this scheme, UTRAN may control reporting frequency depending on the DPCH status, availability of UL resource, and/or required accuracy for DL quality.

2. Use of TPC for DL Channel Quality Estimation

In [1], a benefit of using TPCs to compensate delay associated with reporting was shown. The evaluated scheme is re-introduced in Fig. 1 for convenience. The assumption used here is UE reports DL channel quality continuously so that TPCs are used only to compensate for transmission and decoding delay.

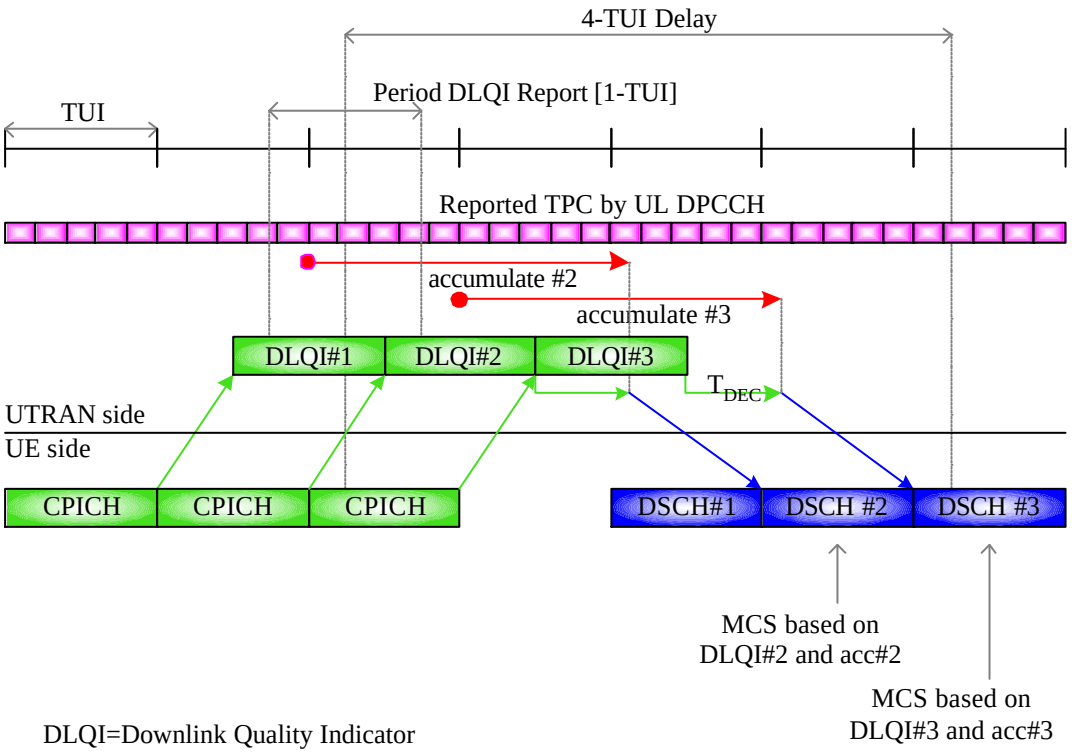

Fig. 1 Use of TPC for delay compensation

The idea above can be further extended for the case where UE only reports DL quality every T-th frame as shown in Fig. 2(T=4 is shown as an example). TPCs are used to fill in the reporting gap as well as to compensate for transmission/decoding delay. Ideally, one would like to limit reporting as much as possible to use UL resource efficiently without sacrificing the accuracy of DL channel quality estimate. An extreme case is to set reporting frequency to zero where only TPC (or DPCH transmission power) is used for DL channel quality estimation. However, correlation between TPC (or DPCH Tx-power) and DL channel quality may not be large enough if associated DPCH is in soft-handover state. Furthermore, UE dependent TPC algorithm is expected to contribute to non-ideal mapping between DPCH Tx-power and actual DL channel quality. Based on these reasons, explicit reporting of DL channel quality periodically would be beneficial. Allowing UTRAN to determine explicit reporting rate is flexible in a way that both accuracy and efficiency can be controlled depending on the system operation.

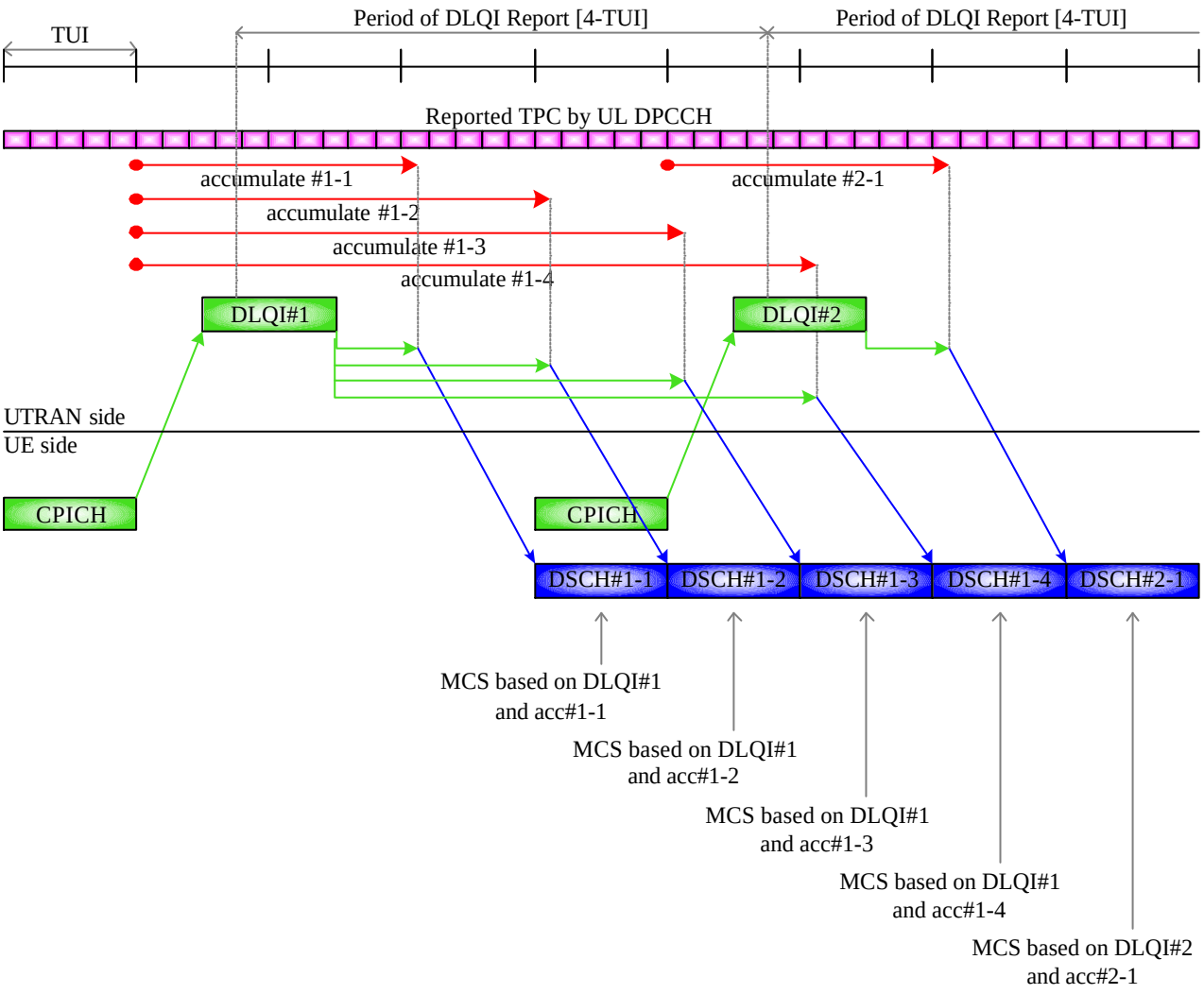

Fig. 2 Use of TPC to fill reporting gap

3. Impacts

An additional signaling message to indicate reporting frequency will be required. (WG2 issue)

4. Conclusion

A method to reduce reporting frequency of explicit downlink channel quality message for AMCS is presented. This scheme uses TPCs to allow control of reporting rate by UTRAN depending on

?? DPCH status--e.g. Less frequent reporting if DPCH is not in a SHO state.

?? Availability of UL resources.

?? Accuracy required for DL channel estimation.

A result of performance evaluation will be provided in the next meeting if the proposed scheme is found to be feasible.

5. Reference

[1] SONY: "Delay on Control Information for HS-DSCH", TSGR1#17(00)1378, Nov. 2000

[2] Ericsson: "Comments and discussion on HSDPA proposals", TSGR1#17(00)1434, Nov. 2000

[3] Motorola: "High Speed Downlink Packet Access", TSGR1#13(00)0727, May 2000