

Source: InterDigital Comm. Corp., Siemens

Title: Proposed CR 027 to 25.224 on CCTrCh UL/DL Pairing for DL Inner Loop Power Control

Agenda Item: AdHoc 99

Document for: Decision

Introduction:

In TDD several UL and DL CCTrCH's may exist simultaneously. DL CCTrCH's in different timeslots will likely require different power adjustments. To allow for independent DL CCTrCH power control, it is necessary to define the association ("pairing") between TPC command streams on uplink DPCH and USCH CCTrCH's, with downlink DPCH and DSCH CCTrCH's.

Discussion:

A flexible solution is needed which considers that an unequal number of UL and DL CCTrCH's may exist, and that CCTrCH's may be discontinuous. The solution should also not limit the possible UL/DL CCTrCH combinations. For example the solution should allow:

- a. Any combination of equal UL & DL CCTrCH pairs
- b. Any group of DL CCTrCH's to be controlled by a single UL CCTrCH
- c. Any group of UL CCTrCH's to control (provide TPC to) a single DL CCTrCH

Note that combinations of cases "a", "b", and "c" may exist simultaneously.

To allow for this flexibility it is proposed to define the UL/DL CCTrCH associations ("pairing") in higher layer signalling. Specifically each DL DPCH or DSCH CCTrCH configuration will indicate identities of UL DPCH or USCH CCTrCH's that will provide TPC commands for the respective DL CCTrCH.

This CR also clarifies the procedures in case of a transmission pause.

CHANGE REQUEST		Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.
TS 25.224	CR 027rev1	Current Version: 3.3.0
GSM (AA.BB) or 3G (AA.BBB) specification number ↑	↑ CR number as allocated by MCC support team	
For submission to: RAN#9 <i>list expected approval meeting # here</i> ↑	For approval <input checked="" type="checkbox"/> For information <input type="checkbox"/>	Strategic <input type="checkbox"/> Non-strategic <input type="checkbox"/> <i>(for SMG Use only)</i>

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: <ftp://ftp.3gpp.org/Information/CR-Form-v2.doc>

Proposed change affects: (U)SIM ME UTRAN / Radio Core Network
(at least one should be marked with an X)

Source: InterDigital Comm. Corp., Siemens **Date:** 24/08/00

Subject: CCTrCH UL/DL pairing for DL Inner Loop Power Control

Work item: 25.224

Category:	F Correction <input checked="" type="checkbox"/> A Corresponds to a correction in an earlier release <input type="checkbox"/> B Addition of feature <input type="checkbox"/> C Functional modification of feature <input type="checkbox"/> D Editorial modification <input type="checkbox"/>	Release:	Phase 2 <input type="checkbox"/> Release 96 <input type="checkbox"/> Release 97 <input type="checkbox"/> Release 98 <input type="checkbox"/> Release 99 <input checked="" type="checkbox"/> Release 00 <input type="checkbox"/>
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(only one category Shall be marked With an X)

Reason for change: The present specification does allow for independent DL CCTrCH power control, it is necessary to define the association ("pairing") between TPC command streams on uplink DPCH and USCH CCTrCH's, with downlink DPCH and DSCH CCTrCH's. It is also necessary to more specifically state the rules for cases where there are multiple TPC commands applicable to the same CCTrCH due to either asymmetry or downlink pauses.

Clauses affected: 4.2.3.3

Other specs Affected:	Other 3G core specifications <input type="checkbox"/> Other GSM core specifications <input type="checkbox"/> MS test specifications <input type="checkbox"/> BSS test specifications <input type="checkbox"/> O&M specifications <input type="checkbox"/>	→ List of CRs: → List of CRs: → List of CRs: → List of CRs: → List of CRs:	
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Other comments:

4.2.3.3 Dedicated Physical Channel, PDSCH

The initial transmission power of the downlink Dedicated Physical Channel and the PDSCH is set by the network. After the initial transmission, the UTRAN transits into SIR-based inner loop power control.

The UE shall generate TPC commands to control the network transmit power and send them in the TPC field of the uplink DPCH and PUSCH. An example on how to derive the TPC commands is given in Annex A.2

As a response to the received TPC command, UTRAN may adjust the transmit power of all downlink DPCHs and PDSCHs of this radio link

The association between TPC commands sent on uplink DPCH and PUSCH, with the power controlled downlink DPCH and PDSCH is signaled by higher layers.-

In the case that no associated downlink data is scheduled within 15 timeslots before the transmission of a TPC command then this is regarded as a transmission pause. The TPC commands in this case shall be derived from measurements on the P-CCPCH. An example solution for the generation of the TPC command is given in Annex A.2.

Each TPC command shall always be based on all associated downlink transmissions received since the previous related TPC command. Related TPC commands are defined as TPC commands associated with the same downlink CCTrCHs. If there are no associated downlink transmissions between two or more uplink transmissions carrying related TPC commands, then these TPC commands shall be identical and they shall be regarded by the UTRAN as a single TPC command. This rule applies both to the case where the measurements are based on a CCTrCH or, in the case of a pause, on the P-CCPCH.

As a response to the received TPC command, UTRAN may adjust the transmit power. When the TPC command is judged as "down", the transmission power may be reduced by one step, whereas if judged as "up", the transmission power may be raised by one step. The UTRAN may apply an individual offset to the transmission power in each timeslot according to the downlink interference level at the UE. The transmission power of one DPCH or PDSCH shall not exceed the limits set by higher layer signalling by means of Maximum_DL_Power (dB) and Minimum_DL_Power (dB). The transmission power is defined as the average power of the complex QPSK symbols of a single DPCH before spreading.

During a downlink transmission pause, the UTRAN may accumulate the TPC commands received. The initial UTRAN transmission power for the first data transmission after the pause may then be set to the sum of transmission power before the pause and a power offset according to the accumulated TPC commands. Additionally this sum may include a constant set by the operator and a correction term due to uncertainties in the reception of the TPC bits.

The total downlink transmission power at the nodeB within one timeslot shall not exceed Maximum Transmission Power set by higher layer signalling. In case the total power of the sum of all transmissions would exceed this limit, then the transmission power of all downlink DPCHs is reduced by the amount that allows fulfilling the requirement. The same amount of power reduction is applied to all DPCHs.

A higher layer outer loop adjusts the target SIR.