3GPP TSG RAN WG1 Meeting #9
Dresden, Germany, Nov 30 – Dec 3, 1999

Document R1-99l04
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.214	CR	026r2	Current Version:	3.0.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG-RAN #6	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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: *(at least one should be marked with an X)*

(U)SIM		ME	X	UTRAN / Radio	X	Core Network	

Source: Nokia **Date:** 1999-12-02

Subject: Downlink power control

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: In TS 25.214, section 5.2.1.2 there are still some Notes left. It was agreed that the required addition to the specification text, based on these notes, is the more detailed definition of parameters Maximum_DL_Power and Minimum_DL_Power. The previous notes can be deleted from this section.

Clauses affected: 5.2.1.2 Ordinary transmit power control

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

The relative transmit power offset between DPCCH fields and DPDCHs is determined by the network The TFCI, TPC and pilot fields of the DPCCH are offset relative to the DPDCHs power by PO1, PO2 and PO3 dB respectively. The power offsets may vary in time.

5.2.1.2 Ordinary transmit power control

The downlink inner-loop power control adjusts the network transmit power in order to keep the received downlink SIR at a given SIR target, SIR_{target}. A higher layer outer loop adjusts SIR_{target} independently for each connection.

The UE should estimate the received downlink DPCCH/DPDCH power of the connection to be power controlled. Simultaneously, the UE should estimate the received interference. The obtained SIR estimate SIR_{est} is then used by the UE to generate TPC commands according to the following rule: if $SIR_{est} > SIR_{target}$ then the TPC command to transmit is "0", requesting a transmit power decrease, while if $SIR_{est} < SIR_{target}$ then the TPC command to transmit is "1", requesting a transmit power increase.

When the UE is not in soft handover the TPC command generated is transmitted in the first available TPC field in the uplink DPCCH.

When the UE is in soft handover it should check the downlink power control mode (DPC_MODE) before generating the TPC command

- if DPC_MODE = 0 : the UE sends a unique TPC command in each slot and the TPC command generated is transmitted in the first available TPC field in the uplink DPCCH
- if DPC_MODE = 1 : the UE repeats the same TPC command over 3 slots and the new TPC command is transmitted such that there is a new command at the beginning of the frame.

The DPC_MODE parameter is a UE specific parameter controlled by the UTRAN.

As a response to the received TPC commands, UTRAN may adjust the downlink DPCCH/DPDCH power. The average power of transmitted ~~DPCCH/~~DPDCH symbols~~power~~ over one timeslot shall ~~may~~ not exceed Maximum_DL_Power (dBm), nor shall ~~may~~ it be below Minimum_DL_Power (dBm). Transmitted DPDCH symbol means here a complex QPSK symbol before spreading which does not contain DTX.

<Note: It should still be clarified whether Maximum_DL_Power and Minimum_DL_Power are defined for one code or for one CCTrCH>

~~< Note: It should be clarified with WG3 if Maximum_DL_Power and Minimum_DL_Power are given as absolute values or relative. >~~

~~< Note: It is not clear to what extent the UTRAN response to the received TPC commands should be specified. Until this has been clarified, the text in the paragraph below should be seen as an example of UTRAN behaviour. >~~

Changes of power shall be a multiple of the minimum step size $\Delta_{TPC,min}$ dB. It is mandatory for UTRAN to support $\Delta_{TPC,min}$ of 1 dB, while support of 0.5 dB is optional.

~~< Note: It needs to be clarified if an upper limit on the downlink power step should be specified. >~~

When SIR measurements cannot be performed due to downlink out-of-synchronisation, the TPC command transmitted shall be set as "1" during the period of out-of-synchronisation.

5.2.1.3 Power control in compressed mode

The aim of downlink power control in uplink or/and downlink compressed mode is to recover as fast as possible a signal-to-interference ratio (SIR) close to the target SIR after each transmission gap.

The UE behaviour is the same in compressed mode as in normal mode, described in subclause 5.2.1.2, i.e. TPC commands should be generated based on the estimated received SIR.

The UTRAN behaviour during compressed mode is not specified. As an example, the algorithm can be similar to uplink power control in downlink compressed mode as described in sub-clause 5.1.2.3.

In downlink compressed mode or in simultaneous downlink and uplink compressed mode, the transmission of downlink DPCCH and DPDCH(s) is stopped.