3GPP TSG RAN Meeting #15
Jeju, Korea, 5 – 8, March, 2002

R1-02-0498

CR-Form-v4

CHANGE REQUEST

⌘ **25.214** **CR** **249** ⌘ rev **1** ⌘ Current version: **3.9.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Deferral of DPC_MODE=1 of downlink power control
Source:	⌘	Panasonic
Work item code:	⌘	TEI
Date:	⌘	22 Feb 2002
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	At the Joint RAN1-RAN2 meeting dedicated to R99 clean-up (5-6 Feb 2001 Sophia Antipolis) several R99 mandatory features in the UE have been identified as candidates for deferral to Release 4 in order to ease the UE implementation and therefore speed-up market readiness of UE terminals. DPC_MODE=1 was included in this list. However the discussions regarding the deferral to REL4 of the DPC_MODE=1 feature didn't reach consensus. The agreed way forward was to submit the CR to RAN1 for checking and then leave the final decision to RAN plenary. The proposed changes are isolated impact.
Summary of change:	⌘	It is specified that DPC_MODE=1 is removed from R99. However it is proposed to be kept in further releases.
Consequences if not approved:	⌘	

Clauses affected:	⌘	5.2.1.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.2.1.2 Ordinary transmit power control

5.2.1.2.1 UE behaviour

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

The UE shall 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.

DPC_MODE = 1 is not supported in this version of the specification.

The UE shall not make any assumptions on how the downlink power is set by UTRAN, in order to not prohibit usage of other UTRAN power control algorithms than what is defined in subclause 5.2.1.2.2.

5.2.1.2.2 UTRAN behaviour

Upon receiving the TPC commands UTRAN shall adjust its downlink DPCCH/DPDCH power accordingly. For DPC_MODE = 0, UTRAN shall estimate the transmitted TPC command TPC_{est} to be 0 or 1, and shall update the power every slot. If DPC_MODE = 1, UTRAN shall estimate the transmitted TPC command TPC_{est} over three slots to be 0 or 1, and shall update the power every three slots. DPC_MODE = 1 is not supported in this version of the specification.

After estimating the *k*:th TPC command, UTRAN shall adjust the current downlink power $P(k\text{-}1)$ [dB] to a new power $P(k)$ [dB] according to the following formula:

$P(k) = P(k - 1) + P_{TPC}(k) + P_{bal}(k)$,

where $P_{TPC}(k)$ is the *k*:th power adjustment due to the inner loop power control, and $P_{bal}(k)$ [dB] is a correction according to the downlink power control procedure for balancing radio link powers towards a common reference power. The power balancing procedure and control of the procedure is described in [6].

$P_{TPC}(k)$ is calculated according to the following.

If the value of *Limited Power Increase Used* parameter is 'Not used', then

$$\mathrm{P}_{\mathrm{TPC}}(k) = \begin{cases} +\Delta_{\mathrm{TPC}} & \text{if } \mathrm{TPC}_{\mathrm{est}}(k) = 1 \\ -\Delta_{\mathrm{TPC}} & \text{if } \mathrm{TPC}_{\mathrm{est}}(k) = 0 \end{cases}, \text{[dB]}. \quad (1)$$

If the value of *Limited Power Increase Used* parameter is 'Used', then the *k:*th inner loop power adjustment shall be calculated as:

$$P_{TPC}(k) = \begin{cases} +\Delta_{TPC} & \text{if } \mathrm{TPC}_{\mathrm{est}}(k) = 1 \text{ and } \Delta_{sum}(k) + \Delta_{TPC} < \text{Power\_Raise\_Limit} \\ 0 & \text{if } \mathrm{TPC}_{\mathrm{est}}(k) = 1 \text{ and } \Delta_{sum}(k) + \Delta_{TPC} \geq \text{Power\_Raise\_Limit} \\ -\Delta_{TPC} & \text{if } \mathrm{TPC}_{\mathrm{est}}(k) = 0 \end{cases}, \text{[dB]} \quad (2)$$

where

$$\Delta_{sum}(k) = \sum_{i=k-\text{DL\_Power\_Averaging\_Window\_Size}}^{k-1} P_{TPC}(i)$$

is the temporary sum of the last *DL_Power_Averaging_Window_Size* inner loop power adjustments (in dB).

For the first (*DL_Power_Averaging_Window_Size* – 1) adjustments after the activation of the limited power increase method, formula (1) shall be used instead of formula (2). *Power_Raise_Limit* and *DL_Power_Averaging_Window_Size* are parameters configured in the UTRAN.

The power control step size Δ_{TPC} can take four values: 0.5, 1, 1.5 or 2 dB. It is mandatory for UTRAN to support Δ_{TPC} of 1 dB, while support of other step sizes is optional.

In addition to the above described formulas on how the downlink power is updated, the restrictions below apply.

In case of congestion (commanded power not available), UTRAN may disregard the TPC commands from the UE.

The average power of transmitted DPDCH symbols over one timeslot shall not exceed Maximum_DL_Power (dB), nor shall it be below Minimum_DL_Power (dB). Transmitted DPDCH symbol means here a complex QPSK symbol before spreading which does not contain DTX. Maximum_DL_Power (dB) and Minimum_DL_Power (dB) are power limits for one channelisation code, relative to the primary CPICH power [6].

3GPP TSG-RAN2 Meeting #27
Orlando, U.S.A, 18-22 February, 2002

Tdoc R2-020567

CR-Form-v5

CHANGE REQUEST

⌘ **25.331** **CR** **1334** ⌘ **rev** **-** ⌘ Current version: **3.9.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Removal of Power control DPC Mode 1 from R99 only
Source:	⌘	Panasonic
Work item code:	⌘	TEI
Date:	⌘	18 Feb 2002
Category:	⌘	**C**
Release:	⌘	R99

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R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘ At Joint RAN1-2 meeting held on 5-8th Feb 2002, it was agreed that several features that are mandatory in R'99 should be deferred to later release. Power control DPC Mode 1 was one of candidates for deferral. This CR needs to be checked for technical correctness (not for consensus) by WG2 as decision is left to RAN plenary.

The proposed changes are isolated impact.

Affected functionality is Power Control.

If UTRAN does not implent this CR but the UE implements it then the UE behavior is unspecified.

If UTRAN implements this CR then there is no impact on the UE.

Summary of change: ⌘ Power control DPC mode 1 is ~~removed~~ deferred from R'99 to later releases, it shall not be send by the UTRAN. No modification in RRC procedure description(8.6.6.28) is necessary. ~~The IE "DPC mode" with 'TPC triplet in soft' is modified to 'dummy'and should be processed according to subclause 11.0.~~

Consequences if not approved: ⌘ Unnecessary complexity in early stage terminals.

Clauses affected: ⌘ 10.3.6.23, 11.3

Other specs affected: ⌘

X	Other core specifications	25.214 No change to 25.331 v4.3.0!
	Test specifications	
	O&M Specifications	

Other comments: ⌘	

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10.3.6.23 Downlink DPCH power control information

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE *mode*	MP			
>FDD				
>>DPC Mode	MP		Enumerated (Single TPC, TPC triplet in soft)	"Single TPC" is DPC_Mode=0 and "TPC triplet in soft" is DPC_mode=1 in [29].
>TDD				
>>TPC Step Size	OP		Integer (1, 2, 3)	In dB

NOTE: DPC Mode 1 is not supported in Release 99 and UTRAN should not send the IE with "DPC Mode" set to "TPC triplet in soft". If a Release 99 UE receives the IE "DPC Mode" set to "TPC triplet in soft", its behavior is unspecified. This superseedes other descriptions of UE behaviour that could be found in Release 99 specifications.

11.3 Information element definitions

```
/******** omitted *********/

DL-DPCH-PowerControlInfo ::=            SEQUENCE {
    modeSpecificInfo                        CHOICE {
        fdd                                     SEQUENCE {
            dpc-Mode                                DPC-Mode
        },
        tdd                                     SEQUENCE {
            tpc-StepSizeTDD                         TPC-StepSizeTDD         OPTIONAL
        }
    }
}

/******** omitted *********/
-- DPC Mode 1 is not supported in Release 99 and UTRAN should not send the IE with DPC-Mode set to
-- tpcTripletInSoft. If a Release 99 UE receives the IE DPC-Mode set to tpcTripletInSoft, its
-- behavior is unspecified.  This superseedes other descriptions of UE behaviour that could  be
-- found in Release 99 specifications.
DPC-Mode ::=                        ENUMERATED {
                                        singleTPC,
                                        tpcTripletInSoft }
```