

CR-Formv3
<b>CHANGE REQUEST</b>
⚡ <b>25.214 CR 155</b> ⚡ rev <b>-</b> ⚡ Current version: <b>3.5.0</b> ⚡

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  Radio Access Network  Core Network

<b>Title:</b> ⚡	Correction of Limited Power Raise		
<b>Source:</b> ⚡	Ericsson		
<b>Work item code:</b> ⚡		<b>Date:</b> ⚡	22 February, 2001
<b>Category:</b> ⚡	<b>F</b>	<b>Release:</b> ⚡	R99
Use <u>one</u> of the following categories: <b>F</b> (essential correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (Addition of feature), <b>C</b> (Functional modification of feature) <b>D</b> (Editorial modification)		Use <u>one</u> 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)	
Detailed explanations of the above categories can be found in 3GPP TR 21.900.			

<b>Reason for change:</b> ⚡	Inconsistency between text and formula for DL_Power_Averaging_Window_Size.
<b>Summary of change:</b> ⚡	Delta_sum(k) is corrected to include the whole window as described in the text.
<b>Consequences if not approved:</b> ⚡	Ambiguity between text and formula for DL_Power_Averaging_Window_Size.

<b>Clauses affected:</b> ⚡	5.2.1.2.2		
<b>Other specs affected:</b> ⚡	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⚡	
<b>Other comments:</b> ⚡			

**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](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://www.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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

5.2.1.2.2 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.

After estimating the  $k$ :th TPC command, UTRAN shall adjust the current downlink power  $P(k-1)$  [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], and an example of how  $P_{bal}(k)$  can be calculated is given in Annex B.3.

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

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

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

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

$$P_{TPC}(k) = \begin{cases} \Delta_{TPC} & \text{if } TPC_{est}(k) = 1 \text{ and } \sum_{sum}(k) \leq \Delta_{TPC} \cdot Power\_Raise\_Limit \\ 0 & \text{if } TPC_{est}(k) = 1 \text{ and } \sum_{sum}(k) > \Delta_{TPC} \cdot Power\_Raise\_Limit \\ -\Delta_{TPC} & \text{if } TPC_{est}(k) = 0 \end{cases}, \text{ [dB]} \quad (2)$$

where

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

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 raise 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  $\Delta_{TPC}$  can take four values: 0.5, 1, 1.5 or 2 dB. It is mandatory for UTRAN to support  $\Delta_{TPC}$  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].