TSG-RAN Meeting #21 **RP-030547**
Frankfurt, Germany, 16 - 19 September 2003

Title: **CR (Rel-5) to TS 25.214**

Source: **QUALCOMM Europe, NOKIA**

Agenda item: **7.2.2 & 7.2.3**

TS 25.214 **(RP-030547)**

RP Tdoc #	WG Toc#	Spec	CR	R	Subject	Phase	Cat	Current
RP-030547		25.214	335	3	Uplink synchronization	Rel-5	F	5.5.0

Tdoc ⌘RP-030547

CR-Form-v7

CHANGE REQUEST

⌘	**25.214**	**CR**	**335**	⌘ **rev**	**3**	⌘ Current version:	**5.5.0** ⌘

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

Proposed change affects:	UICC apps⌘		ME		Radio Access Network	X	Core Network	

Title:	⌘	TPC pattern during loss of RL synchronisation
Source:	⌘	QUALCOMM Europe, Nokia
Work item code:	⌘	TEI — ***Date:*** ⌘ 18/09/2003
Category:	⌘	**F** — ***Release:*** ⌘ Rel-5
		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)* *Rel-6 (Release 6)*

Reason for change:	⌘	TPC commands transmitted by the Node B during loss of RL synchronization are not specified although the choice of TPC commands has a significant impact on the system operation in such situation.
Summary of change:	⌘	A section is added to the informative annex in order to clarify the expected Node B behaviour.
Consequences if not approved:	⌘	When the number of RLS is larger than 1, Node B which has lost UL synchronisation with a UE may transmit a TPC pattern which will lead the UE to decrease its UL DPCH transmit power to the point where the Node Bs will lose synchronisation with all the associated RL, which will in turn result in the call being dropped. If the expected Node B behaviour is not spelled out, UE may attempt to implement alternate TPC combining procedure not resulting in dropped calls but affecting the overall system performance under normal operation.

Clauses affected:	⌘	Annex B			
		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘	Isolated impact analysis: This CR provides guidance on the Node B behaviour in a scenario which was not			

	covered previously. Node B already operating as specified in this scenario will not be affected. For Node B operating differently than specified in this scenario this functionality should be corrected. The correction of this functionality is not linked to the correction of any other functionality; the CR therefore has an isolated impact.

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.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.

Annex B (Informative): Downlink pPower control

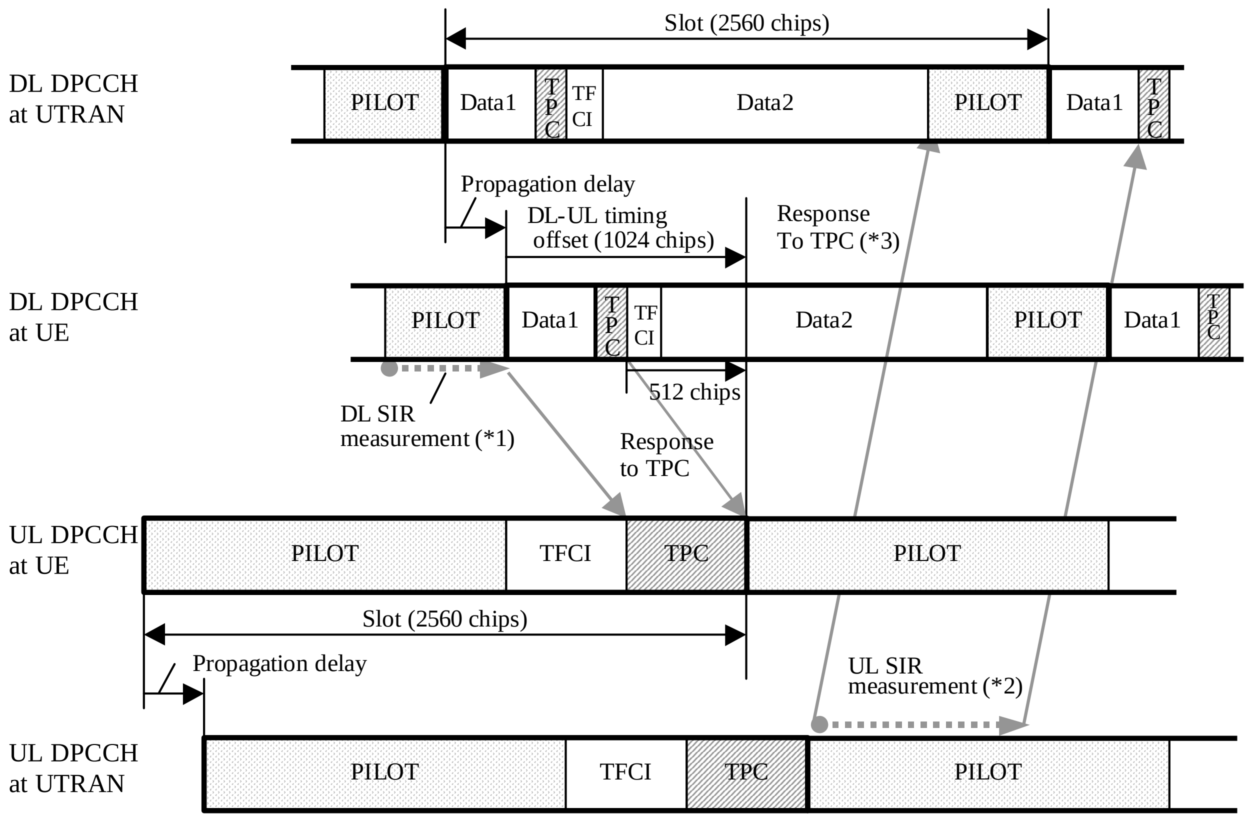
B.1 Downlink Ppower control timing

The power control timing described in this annex should be seen as an example on how the control bits have to be placed in order to permit a short TPC delay.

In order to maximise the cell radius distance within which one-slot control delay is achieved, the frame timing of an uplink DPCH is delayed by 1024 chips from that of the corresponding downlink DPCH measured at the UE antenna.

Responding to a downlink TPC command, the UE shall change its uplink DPCH output power at the beginning of the first uplink pilot field after the TPC command reception. Responding to an uplink TPC command, the UTRAN access point shall change its DPCH output power at the beginning of the next downlink pilot field after the reception of the whole TPC command. Note that in soft handover, the TPC command is sent over one slot when DPC_MODE is 0 and over three slots when DPC_MODE is 1. Note also that the delay from the uplink TPC command reception to the power change timing is not specified for UTRAN. The UE shall decide and send TPC commands on the uplink based on the downlink SIR measurement. The TPC command field on the uplink starts, when measured at the UE antenna, 512 chips after the end of the downlink pilot field. The UTRAN access point shall decide and send TPC commands based on the uplink SIR measurement. However, the SIR measurement periods are not specified either for UE nor UTRAN.

Figure B.1 illustrates an example of transmitter power control timings.



1,2 The SIR measurement periods illustrated here are examples. Other ways of measurement are allowed to achieve accurate SIR estimation.

3 If there is not enough time for UTRAN to respond to the TPC, the action can be delayed until the next slot.

Figure B.1: Transmitter power control timing

B.2 Example of implementation in the UE

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 and calculate the signal-to-interference ratio, SIR_{est}. SIR_{est} can be calculated as RSCP/ISCP, where RSCP refers to the received signal code power on one code and ISCP refers to the non-orthogonal interference signal code power of the received signal on one code. Note that due to the specific SIR target offsets described in [5] that can be applied during compressed frames, the spreading factor shall not be considered in the calculation of SIR_{est}.

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 in soft handover and SSDT is not activated, the UE should estimate SIR_{est} from the downlink signals of all cells in the active set.

When SSDT is activated, the UE should estimate SIR_{est} from the downlink signals of the primary cell as described in 5.2.1.4.2. If the state of the cells (primary or non-primary) in the active set is changed and the UE sends the last portion of the coded ID in uplink slot j, the UE should change the basis for the estimation of SIR_{est} at the beginning of downlink slot $(j+1+T_{os})$ mod 15, where T_{os} is defined as a constant of 2 time slots.

B.3 UL power control when losing UL synchronisation

Each Node B operates the uplink power control independently of the other Node Bs that may be providing RLS to the same UE. In case of multiple RLS the UE derives the decision on power adjustment based on all the commands received according the rules specified in section 5.1.2. In this scenario, transmission of a down command by one or more of the involved Node Bs will likely result in the UE decreasing its transmit power.

Consequently, if and when, after successful initial RL synchronisation, the Node B loses UL synchronisation for a UE and if the current number of RLS configured for that UE is greater than one and if the Node B reverts to a TPC pattern in such situation (i.e. generates DL TPC commands independently of actual RL measurements), the Node B should not use TPC commands “0” in the TPC pattern. [6] does not support transfer of information related to the number of RLS for a UE to the Node B after initial RL setup.