TSG-RAN Meeting #21 **RP-030513**
Frankfurt, Germany, 16 - 19 September 2003

Title: **CR (R99) to TS 25.214**

Source: **QUALCOMM Europe, NOKIA**

Agenda item: **7.2.2 & 7.2.3**

TS 25.214 **(RP-030513)**

RP Tdoc #	WG Toc#	Spec	CR	R	Subject	Phase	Cat	Current
RP-030513	(R1-030894)	25.214	332	2	Uplink synchronization	R99	F	3.12.0
RP-030513		25.214	334	-	Uplink synchronization	R99	A	4.6.0
RP-030513		25.214	335	-	Uplink synchronization	R99	A	5.5.0

3GPP TSG-RAN Meeting #21
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Tdoc ⌘RP-030513

CR-Form-v7

CHANGE REQUEST

⌘ **25.214** **CR** **332** ⌘ **rev** **2** ⌘ Current version: **3.12.0** ⌘

*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 ☒ Core Network ☐

Title:	⌘	TPC pattern during loss of RL synchronisation
Source:	⌘	QUALCOMM Europe, Nokia
Work item code:	⌘	TEI
Date:	⌘	27/08/2003
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),*
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D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
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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 RL failure are not specified although the choice of TPC commands has a significant impact on the system operation in such situation.
Summary of change:	⌘	A note is added 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:	⌘	5.1.2.2.1.2			
Other specs affected:	⌘	**Y**	**N**		⌘
			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.

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5.1.2 DPCCH/DPDCH

5.1.2.1 General

The initial uplink DPCCH transmit power is set by higher layers. Subsequently the uplink transmit power control procedure simultaneously controls the power of a DPCCH and its corresponding DPDCHs (if present). The relative transmit power offset between DPCCH and DPDCHs is determined by the network and is computed according to subclause 5.1.2.5 using the gain factors signalled to the UE using higher layer signalling.

The operation of the inner power control loop, described in sub clause 5.1.2.2, adjusts the power of the DPCCH and DPDCHs by the same amount, provided there are no changes in gain factors. Additional adjustments to the power of the DPCCH associated with the use of compressed mode are described in sub clause 5.1.2.3.

Any change in the uplink DPCCH transmit power shall take place immediately before the start of the pilot field on the DPCCH. The change in DPCCH power with respect to its previous value is derived by the UE and is denoted by Δ_{DPCCH} (in dB). The previous value of DPCCH power shall be that used in the previous slot, except in the event of an interruption in transmission due to the use of compressed mode, when the previous value shall be that used in the last slot before the transmission gap.

During the operation of the uplink power control procedure the UE transmit power shall not exceed a maximum allowed value which is the lower out of the maximum output power of the terminal power class and a value which may be set by higher layer signalling.

Uplink power control shall be performed while the UE transmit power is below the maximum allowed output power.

The provisions for power control at the maximum allowed value and below the required minimum output power (as defined in [7]) are described in sub-clause 5.1.2.6.

5.1.2.2 Ordinary transmit power control

5.1.2.2.1 General

The uplink inner-loop power control adjusts the UE transmit power in order to keep the received uplink signal-to-interference ratio (SIR) at a given SIR target, SIR_{target}.

The serving cells (cells in the active set) should estimate signal-to-interference ratio SIR_{est} of the received uplink DPCH. The serving cells should then generate TPC commands and transmit the commands once per slot according to the following rule: if $SIR_{est} > SIR_{target}$ then the TPC command to transmit is "0", while if $SIR_{est} < SIR_{target}$ then the TPC command to transmit is "1".

Upon reception of one or more TPC commands in a slot, the UE shall derive a single TPC command, TPC_cmd, for each slot, combining multiple TPC commands if more than one is received in a slot. This is also valid when SSDT transmission is used in the downlink. Two algorithms shall be supported by the UE for deriving a TPC_cmd. Which of these two algorithms is used is determined by a UE-specific higher-layer parameter, "PowerControlAlgorithm", and is under the control of the UTRAN. If "PowerControlAlgorithm" indicates "algorithm1", then the layer 1 parameter PCA shall take the value 1 and if "PowerControlAlgorithm" indicates "algorithm2" then PCA shall take the value 2.

If PCA has the value 1, Algorithm 1, described in subclause 5.1.2.2.2, shall be used for processing TPC commands.

If PCA has the value 2, Algorithm 2, described in subclause 5.1.2.2.3, shall be used for processing TPC commands.

The step size Δ_{TPC} is a layer 1 parameter which is derived from the UE-specific higher-layer parameter "TPC-StepSize" which is under the control of the UTRAN. If "TPC-StepSize" has the value "dB1", then the layer 1 parameter Δ_{TPC} shall take the value 1 dB and if "TPC-StepSize" has the value "dB2", then Δ_{TPC} shall take the value 2 dB. The parameter "TPC-StepSize" only applies to Algorithm 1 as stated in [5]. For Algorithm 2 Δ_{TPC} shall always take the value 1 dB.

After deriving of the combined TPC command TPC_cmd using one of the two supported algorithms, the UE shall adjust the transmit power of the uplink DPCCH with a step of Δ_{DPCCH} (in dB) which is given by:

$\Delta_{DPCCH} = \Delta_{TPC} \times \text{TPC\_cmd}$.

5.1.2.2.1.1 Out of synchronisation handling

After 160 ms after physical channel establishment (defined in [5]), the UE shall control its transmitter according to a downlink DPCCH quality criterion as follows:

- The UE shall shut its transmitter off when the UE estimates the DPCCH quality over the last 160 ms period to be worse than a threshold Q_{out}. Q_{out} is defined implicitly by the relevant tests in [7].
- The UE can turn its transmitter on again when the UE estimates the DPCCH quality over the last 160 ms period to be better than a threshold Q_{in}. Q_{in} is defined implicitly by the relevant tests in [7]. When transmission is resumed, the power of the DPCCH shall be the same as when the UE transmitter was shut off.

5.1.2.2.1.2 TPC command generation on downlink during RL initialisation

When commanded by higher layers the TPC commands sent on a downlink radio link from Node Bs that have not yet achieved uplink synchronisation shall follow a pattern as follows:

If higher layers indicate by "First RLS indicator" that the radio link is part of the first radio link set sent to the UE and the value 'n' obtained from the parameter "DL TPC pattern 01 count" passed by higher layers is different from 0 then :

- the TPC pattern shall consist of n instances of the pair of TPC commands ("0" ,"1"), followed by one instance of TPC command "1", where ("0","1") indicates the TPC commands to be transmitted in 2 consecutive slots,
- the TPC pattern continuously repeat but shall be forcibly re-started at the beginning of each frame where CFN mod 4 = 0.

else

- The TPC pattern shall consist only of TPC commands "1".

The TPC pattern shall terminate once uplink synchronisation is achieved.

Note: In case the Node B subsequently loses RL synchronisation, and if the number of RLS for the associated UE is greater than one, the Node B should not transmit the TPC command “0” until uplink synchronisation is achieved.

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CHANGE REQUEST

⌘ **25.214** **CR** **334** ⌘ **rev** ⌘ Current version: **4.6.0** ⌘

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

Title:	⌘	TPC pattern during loss of RL synchronisation
Source:	⌘	QUALCOMM Europe, Nokia
Work item code:	⌘	TEI
Date:	⌘	27/08/2003
Category:	⌘	**A**
Release:	⌘	Rel-4

Use one of the following categories:
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Clauses affected:	⌘	5.1.2.2.1.2

		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

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CHANGE REQUEST

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Work item code:	⌘	TEI
Date:	⌘	12/09/2003
Category:	⌘	**A**
Release:	⌘	Rel-5

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Note: In case the Node B subsequently loses RL synchronisation, and if the number of RLS for the associated UE is greater than one, the Node B should not transmit the TPC command “0” until uplink synchronisation is achieved.