TSG RAN Working Group 1 (Radio layer 1) *TSGR1#14 (00) 0809*
Oulu (Finland), 4th July – 7th July 2000

Agenda Item: 5

Source: Alcatel

Title: CR 25.214-111: DPCCH power control preamble

Document for: Decision

Introduction

Before the last 3GPP RAN WG1 meeting, the power control algorithm used for DPCCH power control preamble consisted to have a step size twice as much as in normal mode in order for the SIR to converge faster towards the target SIR. Indeed, in the first slots of the DPCCH power control preamble, the SIR may be significantly different from the target SIR, since the power control was not previously active.

At the last 3GPP RAN WG1 meeting, it was proposed to change the number of slots for DPCCH power control preamble from 8 to 15 in order to increase the probability of success for uplink DCH setup [1].

Because of this change, the power control algorithm that was previously specified was also modified. The reason for that change is that in case of non-detection of the DPCCH power control preamble by the network, the transmit power could be increased too much (approximately twice as much as before the modification of the number of slots). Therefore, the current power control algorithm specified for the DPCCH power control preamble is the same as in normal mode (i.e. the step size is not increased anymore).

However, this is not optimal at all and will cause a degradation of the performance (a lower probability of success for uplink DCH setup). Indeed, since the power control step size is not increased during the DPCCH power control preamble, the convergence of the SIR towards the target SIR will be slower. Therefore, a longer time will be required before reaching a sufficient power to enable the detection of the DPCCH power control preamble by the network.

Therefore, we propose to come back to the previous power control algorithm, i.e. to use a larger step size during the DPCCH power control preamble than in normal mode, but to limit the usage of this larger step size during 8 slots in order avoid having a too large increase of the transmit power.

Conclusion

The proposed algorithm enables to have an efficient power control algorithm and avoids a too large increase of the transmit power that is not desirable (this transmit power increase will not be larger than when the number of slots was 8).

The proposed algorithm is similar to the one specified in compressed mode and therefore does not require any additional implementation effort.

Reference

[1] 3GPP R1-00-0783, “Number of slots for DPCCH power control preamble”, Motorola & Philips, May 200

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Oulu, Finland, July 4th – 7th, 2000

Document R1-00-0809
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	111	Current Version:	3.3.0

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

For submission to: TSG-RAN #9 *list expected approval meeting # here ↑*

for approval [X]
for information [ ]

strategic [ ]
non-strategic [ ]
(for SMG use only)

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: Alcatel **Date:** 2000-07-4

Subject: DPCCH power control preamble

Work item:

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

F	Correction	[ ]
A	Corresponds to a correction in an earlier release	[ ]
B	Addition of feature	[ ]
C	Functional modification of feature	[X]
D	Editorial modification	[ ]

Release:

Phase 2	[ ]
Release 96	[ ]
Release 97	[ ]
Release 98	[ ]
Release 99	[X]
Release 00	[ ]

Reason for change: This CR will increase the probability of success for uplink DCH setup by improving the power control algorithm used for the DPCCH power control preamble.

Clauses affected: 5.1.2.4

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

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5.1.2.4 Transmit power control in DPCCH power control preamble

A power control preamble may be used for initialisation of a DCH. Both the UL and DL DPCCHs shall be transmitted during the uplink power control preamble. The UL DPDCH shall not commence before the end of the power control preamble.

The length of the power control preamble is a UE-specific parameter signalled by the network, and can take the values 0 slots or 15 slots.

If the length of the power control preamble is greater than zero, the details of power control used during the power control preamble differ from the ordinary power control which is used afterwards. After the first slot of the power control preamble the change in uplink DPCCH transmit power shall initially be given by:

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

~~For PCA equal to 1 and 2, the value of $\Delta_{TPC\text{-}init}$ is set to Δ_{TPC}.~~

If the value of PCA is 1 then $\Delta_{TPC\text{-}init}$ is equal to the minimum value out of 3 dB and $2\Delta_{TPC}$.

If the value of PCA is 2 then $\Delta_{TPC\text{-}init}$ is equal to 2dB.

TPC_cmd is derived according to algorithm 1 as described in sub clause 5.1.2.2.1, regardless of the value of PCA.

Ordinary power control (see subclause 5.1.2.2), with the power control algorithm determined by the value of PCA and step size $\Delta_{TPC,}$ shall be used as soon as the sign of TPC_cmd reverses for the first time, or ~~at the end of the power control preamble if the power control preamble ends first~~after 7 slots.