TSG-RAN Meeting #11 ***RP-010060***
Palm Springs, CA, U.S.A., 13-16 March 2001

Title: **Agreed CRs to TS 25.214**

Source: **TSG-RAN WG1**

Agenda item: **5.1.3**

No.	R1 T-doc	Spec	CR	Rev	Subject	Cat	V_old	V_new
1	R1-01-0112	25.214	142	1	Uplink power control in compressed mode	F	3.5.0	3.6.0
2	R1-01-0052	25.214	144	-	Removal of the power balancing algorithm from TS 25.214	F	3.5.0	3.6.0
3	R1-01-0053	25.214	145	-	Clarification of Nid parameter – when SSDT and uplink compressed mode are in operation	F	3.5.0	3.6.0
4	R1-01-0085	25.214	146	-	Clarification of closed loop transmit diversity mode 1 and mode 2 operation during compressed mode	F	3.5.0	3.6.0
5	R1-01-0352	25.214	148	1	Clarification of UE SIR estimation	F	3.5.0	3.6.0
6	R1-01-0357	25.214	150	1	Clarification of the order of SSDT signalling in 2 bit FBI	F	3.5.0	3.6.0
7	R1-01-0359	25.214	154	1	Uplink power control preamble	F	3.5.0	3.6.0
8	R1-01-0279	25.214	155	-	Correction of limited power raise	F	3.5.0	3.6.0
9	R1-01-0282	25.214	156	-	Clarification of initialisation procedure	F	3.5.0	3.6.0
10	R1-01-0285	25.214	158	-	Definition of power control step size for algorithm 2	F	3.5.0	3.6.0
11	R1-01-0353	25.214	161	1	Correction of the UE behaviour in SSDT mode	F	3.5.0	3.6.0
12	R1-01-0419	25.214	163	-	Correction on downlink synchronisation primitives	F	3.5.0	3.6.0

3GPP TSG RAN Meeting #11
Palm Springs, CA, U.S.A., March 13-16, 2001

R1-01-0112

CR-Form-v3

CHANGE REQUEST

⌘ **25.214**	**CR 142**	⌘ rev **1**	⌘	Current version: **3.5.0**	⌘

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

Title: ⌘	Uplink power control in compressed mode		
Source: ⌘	TSG RAN WG1		
Work item code: ⌘		***Date:*** ⌘	2001-01-05
Category: ⌘	**F**	***Release:*** ⌘	R99
	Use one of the following categories: ***F*** *(essential 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: ⌘	Correction of the uplink power control algorithm in compressed mode
Summary of change: ⌘	Δ_{PILOT} is changed to ΔSIR_{PILOT}, which is then defined separately from Δ_{PILOT}.
Consequences if not approved: ⌘	The specification is otherwise ambiguous as Δ_{PILOT} takes two different meanings in different places.

Clauses affected: ⌘	5.1.2.3	
Other specs affected: ⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘
Other comments: ⌘		

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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.

5.1.2.3 Transmit power control in compressed mode

In compressed mode, one or more transmission gap pattern sequences are active. Therefore some frames are compressed and contain transmission gaps. The uplink power control procedure is as specified in clause 5.1.2.2, using the same UTRAN supplied parameters for Power Control Algorithm and step size (Δ_{TPC}), but with additional features which aim to recover as rapidly as possible a signal-to-interference ratio (SIR) close to the target SIR after each transmission gap.

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, except during downlink transmission gaps, according to the following rule: if $SIR_{est} > SIR_{cm\_target}$ then the TPC command to transmit is "0", while if $SIR_{est} < SIR_{cm\_target}$ then the TPC command to transmit is "1".

SIR_{cm_target} is the target SIR during compressed mode and fulfils

$SIR_{cm\_target} = SIR_{target} +$ ~~Δ~~ $\Delta SIR_{PILOT} + \Delta SIR1\_coding + \Delta SIR2\_coding$,

where ΔSIR1_coding and ΔSIR2_coding are computed from uplink parameters DeltaSIR1, DeltaSIR2, DeltaSIRafter1, DeltaSIRafter2 signalled by higher layers as:

- ΔSIR1_coding = DeltaSIR1 if the start of the first transmission gap in the transmission gap pattern is within the current uplink frame.
- ΔSIR1_coding = DeltaSIRafter1 if the current uplink frame just follows a frame containing the start of the first transmission gap in the transmission gap pattern.
- ΔSIR2_coding = DeltaSIR2 if the start of the second transmission gap in the transmission gap pattern is within the current uplink frame.
- ΔSIR2_coding = DeltaSIRafter2 if the current uplink frame just follows a frame containing the start of the second transmission gap in the transmission gap pattern.
- ΔSIR1_coding = 0 dB and ΔSIR2_coding = 0 dB in all other cases.

~~And Δ~~ ΔSIR_{PILOT} is defined ~~below.~~as: $\Delta SIR_{PILOT} = 10Log_{10} (N_{pilot,N}/N_{pilot,curr\_frame})$,

where $N_{pilot,curr\_frame}$ is the number of pilot bits per slot in the current uplink frame, and $N_{pilot,N}$ is the number of pilot bits per slot in a normal uplink frame without a transmission gap.

In the case of several compressed mode pattern sequences ~~are~~being used simultaneously, ΔSIR1_coding and ΔSIR2_coding offsets are computed for each compressed mode pattern and all ΔSIR1_coding and ΔSIR2_coding offsets are summed together.

In compressed mode, compressed frames may occur in either the uplink or the downlink or both. In uplink compressed frames, the transmission of uplink DPDCH(s) and DPCCH shall both be stopped during transmission gaps.

Due to the transmission gaps in compressed frames, there may be missing TPC commands in the downlink. If no downlink TPC command is transmitted, the corresponding TPC_cmd derived by the UE shall be set to zero.

Compressed and non-compressed frames in the uplink DPCCH may have a different number of pilot bits per slot. A change in the transmit power of the uplink DPCCH would be needed in order to compensate for the change in the total pilot energy. Therefore at the start of each slot the UE shall derive the value of a power offset Δ_{PILOT}. If the number of pilot bits per slot in the uplink DPCCH is different from its value in the most recently transmitted slot, Δ_{PILOT} (in dB) shall be given by:

$$\Delta_{PILOT} = 10Log_{10} (N_{pilot,prev}/N_{pilot,curr});$$

where $N_{pilot,prev}$ is the number of pilot bits in the most recently transmitted slot , and $N_{pilot,curr}$ is the number of pilot bits in the current slot. Otherwise, including during transmission gaps in the downlink, Δ_{PILOT} shall be zero.

Unless otherwise specified, in every slot during compressed mode the UE shall adjust the transmit power of the uplink DPCCH with a step of Δ_{DPCCH} (in dB) which is given by:

$$\Delta_{DPCCH} = \Delta_{TPC} \times TPC\_cmd + \Delta_{PILOT}.$$

At the start of the first slot after an uplink or downlink transmission gap the UE shall apply a change in the transmit power of the uplink DPCCH by an amount Δ_{DPCCH} (in dB), with respect to the uplink DPCCH power in the most recently transmitted uplink slot, where:

$$\Delta_{DPCCH} = \Delta_{RESUME} + \Delta_{PILOT.}$$

The value of Δ_{RESUME} (in dB) shall be determined by the UE according to the Initial Transmit Power mode (ITP). The ITP is a UE specific parameter, which is signalled by the network with the other compressed mode parameters (see [4]). The different modes are summarised in table 1.

Table 1: Initial Transmit Power modes during compressed mode

Initial Transmit Power mode	Description
0	$\Delta_{RESUME} = \Delta_{TPC} \times TPC\_cmd_{gap}$
1	$\Delta_{RESUME} = \delta_{last}$

In the case of a transmission gap in the uplink, TPC_cmd_{gap} shall be the value of TPC_cmd derived in the first slot of the uplink transmission gap, if a downlink TPC_command is transmitted in that slot. Otherwise TPC_cmd_{gap} shall be zero.

δ_{last} shall be equal to the most recently computed value of δ_i. δ_i shall be updated according to the following recursive relations, which shall be executed in all slots in which both the uplink DPCCH and a downlink TPC command are transmitted, and in the first slot of an uplink transmission gap if a downlink TPC command is transmitted in that slot:

$$\delta_i = 0.9375\delta_{i-1} - 0.96875 TPC\_cmd_i \Delta_{TPC} k_{sc}$$
$$\delta_{i-1} = \delta_i$$

where: TPC_cmd_i is the power control command derived by the UE in that slot;

k_{sc} = 0 if additional scaling is applied in the current slot and the previous slot as described in sub-clause 5.1.2.6, and k_{sc} = 1 otherwise.

δ_{i-1} is the value of δ_i computed for the previous slot. The value of δ_{i-1} shall be initialised to zero when the uplink DPCCH is activated, and also at the end of the first slot after each uplink transmission gap, and also at the end of the first slot after each downlink transmission gap. The value of δ_i shall be set to zero at the end of the first slot after each uplink transmission gap.

After a transmission gap in either the uplink or the downlink, the period following resumption of simultaneous uplink and downlink DPCCH transmission is called a recovery period. RPL is the recovery period length and is expressed as a number of slots. RPL is equal to the minimum value out of the transmission gap length and 7 slots. If a transmission gap is scheduled to start before RPL slots have elapsed, then the recovery period shall end at the start of the gap, and the value of RPL shall be reduced accordingly.

During the recovery period, 2 modes are possible for the power control algorithm. The Recovery Period Power control mode (RPP) is signalled with the other compressed mode parameters (see [4]). The different modes are summarised in the table 2:

Table 2: Recovery Period Power control modes during compressed mode

Recovery Period power control mode	Description
0	Transmit power control is applied using the algorithm determined by the value of PCA, as in subclause 5.1.2.2 with step size $\Delta_{TPC.}$
1	Transmit power control is applied using algorithm 1 (see subclause 5.1.2.2.2) with step size Δ_{RP-TPC} during RPL slots after each transmission gap.

For RPP mode 0, the step size is not changed during the recovery period and ordinary transmit power control is applied (see subclause 5.1.2.2), using the algorithm for processing TPC commands determined by the value of PCA (see sub clauses 5.1.2.2.2 and 5.1.2.2.3).

For RPP mode 1, during RPL slots after each transmission gap, power control algorithm 1 is applied with a step size $\Delta_{RP\text{-}TPC}$ instead of Δ_{TPC}, regardless of the value of PCA. Therefore, the change in uplink DPCCH transmit power at the start of each of the RPL+1 slots immediately following the transmission gap (except for the first slot after the transmission gap) is given by:

$$\Delta_{DPCCH} = \Delta_{RP\text{-}TPC} \times \text{TPC\_cmd} + \Delta_{PILOT}$$

$\Delta_{RP\text{-}TPC}$ is called the recovery power control step size and is expressed in dB. If PCA has the value 1, $\Delta_{RP\text{-}TPC}$ is equal to the minimum value of 3 dB and $2\Delta_{TPC}$. If PCA has the value 2 , $\Delta_{RP\text{-}TPC}$ is equal to 1 dB.

After the recovery period, ordinary transmit power control resumes using the algorithm specified by the value of PCA and with step size Δ_{TPC}.

If PCA has the value 2 , the sets of slots over which the TPC commands are processed shall remain aligned to the frame boundaries in the compressed frame. For both RPP mode 0 and RPP mode 1, if the transmission gap or the recovery period results in any incomplete sets of TPC commands, TPC_cmd shall be zero for those sets of slots which are incomplete.

3GPP TSG RAN Meeting #11
Palm Springs, CA, U.S.A., March 13-16, 2001

R1-01-0052

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CHANGE REQUEST

⌘	**25.214**	**CR 144**	⌘ rev	**-**	⌘ Current version:	**3.5.0**	⌘

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

Title:	⌘	Removal of the power balancing algorithm from TS 25.214		
Source:	⌘	TSG RAN WG1		
Work item code:	⌘		***Date:*** ⌘	2001-01-12
Category:	⌘	**F**	***Release:*** ⌘	R99
		Use one of the following categories: ***F*** *(essential 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:	⌘	The power balancing algorithm is now described in slightly different ways between TS 25.214 (V3.5.0) and TS 25.433 (V3.4.1). Since the description of that algorithm is essential in TS 25.433 but informative in TS 25.214, the permanent solution to the problem is the removal of the algorithm from TS 25.214.
Summary of change:	⌘	CR proposes removing the algorithm from TS 25.214.
Consequences if not approved:	⌘	The inconsistency between TS 25.214 and TS 25.433 is not solved.

Clauses affected:	⌘	5.2.1.2.2, 5.2.1.3, Annex B.3		
Other specs affected:	⌘	[ ] Other core specifications	⌘	
		[ ] Test specifications		
		[ ] O&M Specifications		
Other comments:	⌘			

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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

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

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

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

where

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

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 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 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].

5.2.1.3 Power control in compressed mode

The aim of downlink power control in uplink or/and downlink compressed mode is to recover as fast as possible a signal-to-interference ratio (SIR) close to the target SIR after each transmission gap.

The UE behaviour is the same in compressed mode as in normal mode, described in subclause 5.2.1.2.

In compressed mode, compressed frames may occur in either the uplink or the downlink or both. In compressed frames, the transmission of downlink DPDCH(s) and DPCCH shall be stopped during transmission gaps.

The power of the DPCCH and DPDCH in the first slot after the transmission gap should be set to the same value as in the slot just before the transmission gap.

In every slot during compressed mode except during downlink transmission gaps, UTRAN shall estimate the *k*:th TPC command and adjust the current downlink power $P(k-1)$ [dB] to a new power $P(k)$ [dB] according to the following formula:

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

where $P_{TPC}(k)$ is the *k*:th power adjustment due to the inner loop power control, $P_{SIR}(k)$ is the k-th power adjustment due to the downlink target SIR variation, 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~~.

Due to transmission gaps in uplink compressed frames, there may be missing TPC commands in the uplink. If no uplink TPC command is received, $P_{TPC}(k)$ derived by the Node B shall be set to zero. Otherwise, $P_{TPC}(k)$ is calculated the same way as in normal mode (see sub-clause 5.2.1.2.2) but with a step size Δ_{STEP} instead of Δ_{TPC}.

The power control step size $\Delta_{STEP} = \Delta_{RP-TPC}$ during RPL slots after each transmission gap and $\Delta_{STEP} = \Delta_{TPC}$ otherwise, where:

- RPL is the recovery period length and is expressed as a number of slots. RPL is equal to the minimum value out of the transmission gap length and 7 slots. If a transmission gap is scheduled to start before RPL slots have elapsed, then the recovery period shall end at the start of the gap, and the value of RPL shall be reduced accordingly.

– Δ_{RP-TPC} is called the recovery power control step size and is expressed in dB. Δ_{RP-TPC} is equal to the minimum value of 3 dB and $2\Delta_{TPC}$.

The power offset $P_{SIR}(k) = \delta P_{curr} - \delta P_{prev}$, where δP_{curr} and δP_{prev} are respectively the value of δP in the current slot and the most recently transmitted slot and δP is computed as follows:

$$\delta P = \max(\Delta P1\_compression, \ldots, \Delta Pn\_compression) + \Delta P1\_coding + \Delta P2\_coding$$

where n is the number of different TTI lengths amongst TTIs of all TrChs of the CCTrCh, where ΔP1_coding and ΔP2_coding are computed from uplink parameters DeltaSIR1, DeltaSIR2, DeltaSIRafter1, DeltaSIRafter2 signaled by higher layers as:

- ΔP1_coding = DeltaSIR1 if the start of the first transmission gap in the transmission gap pattern is within the current frame.

- ΔP1coding = DeltaSIRafter1 if the current frame just follows a frame containing the start of the first transmission gap in the transmission gap pattern.

- ΔP2_coding = DeltaSIR2 if the start of the second transmission gap in the transmission gap pattern is within the current frame.

- ΔP2_coding = DeltaSIRafter2 if the current frame just follows a frame containing the start of the second transmission gap in the transmission gap pattern.

- ΔP1_coding = 0 dB and ΔP2_coding = 0 dB in all other cases.

and ΔPi_compression is defined by :

- ΔPi_compression = 3 dB for downlink frames compressed by reducing the spreading factor by 2.

- ΔPi_compression = $10 \log (15 {*} F_i / (15 {*} F_i - TGL_i))$ if there is a transmission gap created by puncturing method within the current TTI of length F_i frames, where TGL_i is the gap length in number of slots (either from one gap or a sum of gaps) in the current TTI of length F_i frames.

- ΔPi_compression = 0 dB in all other cases.

In case several compressed mode patterns are used simultaneously, a δP offset is computed for each compressed mode pattern and the sum of all δP offsets is applied to the frame.

B.3 Radio link power balancing

In case of soft handover, UTRAN may employ downlink radio link power balancing, that tries to balance the radio link powers towards reference power. An example of a power balancing adjustment loop is given below.

The UTRAN access point radio link transmission power is adjusted by the power balancing term $P_{bal}(i)$ [dB] which is calculated according to the following equation:

- $P_{bal}(i) = \text{sign}\{(1 - r)(P_{REF} - P(i))\} \times \min\{|(1 - r)(P_{REF} - P(i))|, P_{bal,max}\}$;

where:

- $P_{bal}(i)$: radio link power balancing control in dB;
- $sign\{x\}$: sign function of the value x, i.e. +1 when x>0, 0 when x=0, and –1 when x<0;
- r: convergence coefficient ($0 \le r \le 1$);
- P_{REF}: reference transmission power in dBm;
- $P_{bal,max}$: maximum power change limit for radio link power balancing control in dB.

The actual transmission power level shall be a value which is the nearest allowed power level to $P(i)$. The parameters P_{REF}, and $P_{bal,max}$ are signalled by higher layers. $P_{bal,max}$ shall be a multiple of the power control step size Δ_{TPC} dB.

3GPP TSG RAN Meeting #11
Palm Springs, CA, U.S.A., March 13-16, 2001

R1-01-0053

CR-Form-v3

CHANGE REQUEST

⌘	**25.214**	**CR**	**145**	⌘ rev	**-**	⌘ Current version:	**3.5.0**	⌘

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

Title: ⌘	Clarification of Nid parameter – when SSDT and uplink compressed mode are in operation
Source: ⌘	TSG RAN WG1
Work item code: ⌘	
Date: ⌘	2001-01-12
Category: ⌘	**F**
Release: ⌘	R99

Use one of the following categories:
F *(essential 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: ⌘	The definition of N_{id} is unclear, in particular the phase *'length of coded ID'* can easily be miss interpreted, in the following cases: - 1) At the end of radio frames, when the ID code is punctured due to the lack of FBI space. 2) When the ID code is transmitted in pairs (as shown in table 4)
Summary of change: ⌘	The third condition in 5.2.1.4.4 is revised for clarification.
Consequences if not approved: ⌘	The specification is otherwise ambiguous.

Clauses affected: ⌘	5.2.1.4.4
Other specs affected: ⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
Other comments: ⌘	

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5.2.1.4 Site selection diversity transmit power control

5.2.1.4.1 General

Site selection diversity transmit power control (SSDT) is another macro diversity method in soft handover mode. This method is optional in UTRAN.

Operation is summarised as follows. The UE selects one of the cells from its active set to be 'primary', all other cells are classed as 'non primary'. The main objective is to transmit on the downlink from the primary cell, thus reducing the interference caused by multiple transmissions in a soft handover mode. A second objective is to achieve fast site selection without network intervention, thus maintaining the advantage of the soft handover. In order to select a primary cell, each cell is assigned a temporary identification (ID) and UE periodically informs a primary cell ID to the connecting cells. The non-primary cells selected by UE switch off the transmission power. The primary cell ID is delivered by UE to the active cells via uplink FBI field. SSDT activation, SSDT termination and ID assignment are all carried out by higher layer signalling.

5.2.1.4.1.1 Definition of temporary cell identification

Each cell is given a temporary ID during SSDT and the ID is utilised as site selection signal. The ID is given a binary bit sequence. There are three different lengths of coded ID available denoted as "long", "medium" and "short". The network decides which length of coded ID is used. Settings of ID codes for 1-bit and 2-bit FBI are exhibited in table 3 and table 4, respectively.

Table 3: Settings of ID codes for 1 bit FBI

ID label	ID code "long"	"medium"	"short"
a	000000000000000	(0)0000000	00000
b	101010101010101	(0)1010101	01001
c	011001100110011	(0)0110011	11011
d	110011001100110	(0)1100110	10010
e	000111100001111	(0)0001111	00111
f	101101001011010	(0)1011010	01110
g	011110000111100	(0)0111100	11100
h	110100101101001	(0)1101001	10101

Table 4: Settings of ID codes for 2 bit FBI

ID label	ID code (Column and Row denote slot position and FBI-bit position.) "long"	"medium"	"short"
a	(0)0000000 (0)0000000	(0)000 (0)000	000 000
b	(0)0000000 (1)1111111	(0)000 (1)111	000 111
c	(0)1010101 (0)1010101	(0)101 (0)101	101 101
d	(0)1010101 (1)0101010	(0)101 (1)010	101 010
e	(0)0110011 (0)0110011	(0)011 (0)011	011 011
f	(0)0110011 (1)1001100	(0)011 (1)100	011 100
g	(0)1100110 (0)1100110	(0)110 (0)110	110 110
h	(0)1100110 (1)0011001	(0)110 (1)001	110 001

The ID code bits shown in table 3 and table 4 are transmitted from left to right. The ID code(s) are transmitted aligned to the radio frame structure (i.e. ID codes shall be terminated within a frame). If FBI space for sending the last ID code within a frame cannot be obtained, the first bit(s) from that ID code are punctured. The bit(s) to be punctured are shown in brackets in table 3 and table 4.

The alignment of the ID codes to the radio frame structure is not affected by transmission gaps resulting from uplink compressed mode.

5.2.1.4.2 TPC procedure in UE

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 is given in Annex B.2.

5.2.1.4.3 Selection of primary cell

The UE selects a primary cell periodically by measuring the RSCP of CPICHs transmitted by the active cells. The cell with the highest CPICH RSCP is detected as a primary cell.

5.2.1.4.4 Delivery of primary cell ID

The UE periodically sends the ID code of the primary cell via portion of the uplink FBI field assigned for SSDT use (FBI S field). A cell recognises its state as non-primary if the following three conditions are fulfilled simultaneously:

- T~~t~~he received ~~primary~~ ID code does not match with the own ID code.~~;~~
- T~~t~~he received uplink signal quality satisfies a quality threshold, Qth, a parameter defined by the network.~~;~~
- ~~and when~~If uplink compressed mode is used, the use of uplink compressed mode does not degrade the ID decoding performance excessively~~result in excessive levels of puncturing on the coded ID~~. ~~The acceptable level of puncturing on the coded ID is less than~~This occurs when $\lfloor N_{ID}/3 \rfloor$ or more bit~~symbol~~s are lost from~~in~~ the ~~coded~~ ID code (as a result of uplink compressed mode), where N_{ID} is the number~~length~~ of bits in the ~~coded~~ ID code (after puncturing according to clause 5.2.1.4.1.1, if puncturing has been done).

Otherwise the cell recognises its state as primary.

The state of the cells (primary or non-primary) in the active set is updated synchronously. If a cell receives the last portion of the coded ID in uplink slot j, the state of cell is updated in downlink slot $(j+1+T_{os})$ mod 15, where T_{os} is defined as a constant of 2 time slots. The updating of the cell state is not influenced by the operation of downlink compressed mode.

At the UE, the primary ID code to be sent to the cells is segmented into a number of portions. These portions are distributed in the uplink FBI S-field. The cell in SSDT collects the distributed portions of the primary ID code and then detects the transmitted ID. The period of the primary cell update depends on the settings of the code length and the number of FBI bits assigned for SSDT use as shown in table 5.

Table 5: Period of primary cell update

code length	The number of FBI bits per slot assigned for SSDT	
	1	2
"long"	1 update per frame	2 updates per frame
"medium"	2 updates per frame	4 updates per frame
"short"	3 updates per frame	5 updates per frame

3GPP TSG RAN Meeting #11
Palm Springs, CA, U.S.A., March 13-16, 2001

R1-00-0085

CR-Form-v3

CHANGE REQUEST

⌘	**3G TS 25.214**	**CR**	**146**	⌘ rev	**-**	⌘ Current version	**3.5.0**	⌘

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

Title: ⌘	Clarification of closed loop transmit diversity mode 1 and mode 2 operation during compressed mode.			
Source: ⌘	TSG RAN WG1			
Work item code: ⌘			***Date:*** ⌘	12/1/2001
Category: ⌘	**F**		***Release:*** ⌘	R99
	Use one of the following categories: **F** *(essential 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: ⌘	As discussed on the RAN1 reflector, the specification currently contains text, in section 7.2.3.1 and 7.3.3.1, that implies that a UE may be able to continue receiving the CPICH on the serving frequency during downlink compressed mode gaps. However, a UE that is capable of this would not require downlink compressed mode and so the text describes an irrelevant case. Furthermore, in section 7.3.3.1, the unnecessary text is followed by a bulleted list. This implies that the bulleted text is somehow conditional on the text above which is not the intention.
Summary of change: ⌘	The irrelevant text that implies a UE could receive CPICH during a downlink compressed mode gap is remove from the specification The bulleted text in section 7.3.3.1 is changed into normal paragraphs.
Consequences if not approved: ⌘	The specification will contain text that covers an irrelevant case. The bulleted list of section 7.3.3.1 could be mis-interpreted.

Clauses affected: ⌘	7.2.3.1, 7.3.3.1	
Other specs affected: ⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘
Other comments: ⌘		

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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. ⌘

7.2.3 Mode 1 operation during compressed mode

7.2.3.1 Downlink in compressed mode and uplink in normal mode

When downlink is in compressed mode but uplink is operating normally (i.e. not compressed) the UTRAN continues it's Tx diversity related functions in the same way as in non-compressed downlink mode.

~~If UE continues to calculate the phase adjustments based on the received CPICH from antennas 1 and 2 during the idle downlink slots there is no difference in UE operation when compared to non-compressed downlink operation.~~

~~If during the~~In compressed downlink transmission there are uplink slots for which no new estimate of the phase adjustment is ~~has been~~ calculated. During these slots the following rules are applied in UE when determining the feedback command:

1) If no new estimate of phase adjustment, ϕ_i, exist corresponding to the feedback command to be send in uplink slot *i*:

- If 1 < *i* < 15:
  - the feedback command sent in uplink slot *i*-2 is used;
- else if *i* = 0:
  - the feedback command sent in uplink slot 14 of previous frame is used;
- else if *i* = 1:
  - the feedback command sent in uplink slot 13 of previous frame is used;
- end if.

2) When transmission in downlink is started again in downlink slot $N_{last}+1$ (if $N_{last}+1 = 15$, then slot 0 in the next frame) the UE must resume calculating new estimates of the phase adjustment. The feedback command corresponding to the first new estimate of ϕ_i must be send in the uplink slot which is transmitted 1024 chips in offset from the downlink slot $N_{last}+1$.

7.2.3.2 Both downlink and uplink in compressed mode

During the uplink idle slots no FB commands are sent from UE to UTRAN. When transmission in downlink is started again in downlink slot $N_{last}+1$ (if $N_{last}+1 = 15$, then slot 0 in the next frame) the UE must resume calculating new estimates of the phase adjustment. The feedback command corresponding to the first new estimate of ϕ_i must be send in the uplink slot which is transmitted 1024 chips in offset from the downlink slot $N_{last}+1$.

The UTRAN continues to update the weight vector, w_2, until the uplink enters the compressed mode and no more FB commands are received. When the transmission in downlink resumes in slot $N_{last}+1$, the value of w_2 calculated after receiving the last FB command before uplink entered the compressed mode is applied to antenna 2 signal.

After UE resumes transmission in uplink and sends the first FB command the new value of w_2 is calculated as follows:

- S_1 = {0, 2, 4, 6, 8, 10, 12 14}.
- S_2 = {1, 3, 5, 7, 9, 11, 13}.
- i = number of uplink slot at which the transmission resumes.
- j = number of uplink slot at which the last FB command was send before uplink entered compressed mode.
- Do while ($i \in S_1$ *and* $j \in S_1$) or ($i \in S_2$ *and* $j \in S_2$):
  - j = j-1;
  - if j < 0;

  - j = 14;

- end if;

- end do;

- calculate w_2 based on FB commands received in uplink slots i and j.

7.3.3 Mode 2 operation during compressed mode

7.3.3.1 Downlink in compressed mode and uplink in normal mode

When the downlink is in compressed mode and the uplink is in normal mode, the closed loop mode 2 functions are described below.

~~If UE continues to calculate the phase adjustments based on the received CPICH from antennas 1 and 2 during the idle downlink slots there is no difference in UE operation when compared to non-compressed downlink operation.~~

When the UE is not listening to the CPICH from antennas 1 and 2 during the idle downlink slots, the UE sends the last FSM bits calculated before entering in the compressed mode.

- For recovery after compressed mode, UTRAN Access Point sets the power in both antennas to 0.5 until a FSM_{po} bit is received. Until the first FSM_{ph} bit is received and acted upon, UTRAN uses the phase offset, which was applied before the transmission interruption (table 12).

- Normal initialisation of FSM_{ph} (table 12) occurs if the uplink signalling information resumes at the beginning of a FSM period (that is if signalling resumes in slots 0,4,8,12).

- If the uplink signalling does not resume at the beginning of a FSM period, the following operation is performed. In each of the remaining slots of the partial FSM period, and for the first slot of the next full FSM period, the UE sends the first (i.e. MSB) bit of the FSM_{ph} message, and at the UTRAN access point the phase offset applied between the antennas is updated according to the number and value of FSM_{ph} bits received as given in table 13. Initialisation then continues with the transmission by the UE of the remaining FSM_{ph} bits and the UTRAN operation according to table 12.

Table 13: FSM_{ph} subfield of closed loop mode 2 in compressed mode recovery period

FSM_{ph}	Phase difference between antennas (radians)
-	held from previous setting
0	π
1	0

7.3.3.2 Both downlink and uplink in compressed mode

During both downlink and uplink compressed mode, the UTRAN and the UE performs the functions of recovery after compressed mode as described in the previous subclause 7.3.3.1.

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R1-01-0352

CR-Form-v3

CHANGE REQUEST

⌘	**TS 25.214**	**CR**	**148**	⌘ rev	**1**	⌘	Current version:	**3.5.0** ⌘

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

Title:	⌘ Clarification of UE SIR estimation			
Source:	⌘ TSG RAN WG1			
Work item code:	⌘		***Date:*** ⌘	2001-02-27
Category:	⌘ **F**		***Release:*** ⌘	R99
	Use one of the following categories: ***F*** *(essential 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: ⌘	Clarify that UE internal SIR estimation for inner loop power control shall be done excluding the SF, and generally how SIR should be understood. This is necessary to ensure that the signalled SIR offsets for compressed frames are used correctly.
Summary of change: ⌘	It is clarified that UE internal SIR estimation for inner loop power control shall be done excluding the SF.
Consequences if not approved: ⌘	UE could misinterpret the signalled SIR offsets for compressed frames.

Clauses affected: ⌘	B.2	
Other specs affected: ⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications	
Other comments: ⌘		

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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.

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. 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.

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CHANGE REQUEST

⌘	25.214	CR 150	⌘ rev	1	⌘ Current version:	3.5.0	⌘

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

Title:	⌘	Clarification of the order of SSDT signalling in 2 bit FBI
Source:	⌘	TSG RAN WG1
Work item code:	⌘	
Date:	⌘	28th, February, 2001
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
- ***F*** *(essential 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:	⌘	The order of SSDT signalling in 2-bit FBI case is not described.
Summary of change:	⌘	The text was added to clarify the order.
Consequences if not approved:	⌘	The order of SSDT signalling is not defined. This may lead different understanding of the Uu interface.

Clauses affected:	⌘	5.2.1.4.1.1
Other specs affected:	⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
Other comments:	⌘	

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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.

5.2.1.4 Site selection diversity transmit power control

5.2.1.4.1 General

Site selection diversity transmit power control (SSDT) is another macro diversity method in soft handover mode. This method is optional in UTRAN.

Operation is summarised as follows. The UE selects one of the cells from its active set to be ‘primary’, all other cells are classed as ‘non primary’. The main objective is to transmit on the downlink from the primary cell, thus reducing the interference caused by multiple transmissions in a soft handover mode. A second objective is to achieve fast site selection without network intervention, thus maintaining the advantage of the soft handover. In order to select a primary cell, each cell is assigned a temporary identification (ID) and UE periodically informs a primary cell ID to the connecting cells. The non-primary cells selected by UE switch off the transmission power. The primary cell ID is delivered by UE to the active cells via uplink FBI field. SSDT activation, SSDT termination and ID assignment are all carried out by higher layer signalling.

5.2.1.4.1.1 Definition of temporary cell identification

Each cell is given a temporary ID during SSDT and the ID is utilised as site selection signal. The ID is given a binary bit sequence. There are three different lengths of coded ID available denoted as "long", "medium" and "short". The network decides which length of coded ID is used. Settings of ID codes for 1-bit and 2-bit FBI are exhibited in table 3 and table 4, respectively.

Table 3: Settings of ID codes for 1 bit FBI

ID label	ID code "long"	"medium"	"short"
a	000000000000000	(0)0000000	00000
b	101010101010101	(0)1010101	01001
c	011001100110011	(0)0110011	11011
d	110011001100110	(0)1100110	10010
e	000111100001111	(0)0001111	00111
f	101101001011010	(0)1011010	01110
g	011110000111100	(0)0111100	11100
h	110100101101001	(0)1101001	10101

Table 4: Settings of ID codes for 2 bit FBI

ID label	ID code (Column and Row denote slot position and FBI-bit position.) "long"	"medium"	"short"
a	(0)0000000 (0)0000000	(0)000 (0)000	000 000
b	(0)0000000 (1)1111111	(0)000 (1)111	000 111
c	(0)1010101 (0)1010101	(0)101 (0)101	101 101
d	(0)1010101 (1)0101010	(0)101 (1)010	101 010
e	(0)0110011 (0)0110011	(0)011 (0)011	011 011
f	(0)0110011 (1)1001100	(0)011 (1)100	011 100
g	(0)1100110 (0)1100110	(0)110 (0)110	110 110
h	(0)1100110 (1)0011001	(0)110 (1)001	110 001

The ID code bits shown in table 3 and table 4 are transmitted from left to right. In table 4, the first row gives the first FBI bit in each slot , the second row gives the 2nd FBI bit in each slot. The ID code(s) are transmitted aligned to the radio frame structure (i.e. ID codes shall be terminated within a frame). If FBI space for sending the last ID code within a frame cannot be obtained, the first bit(s) from that ID code are punctured. The bit(s) to be punctured are shown in brackets in table 3 and table 4.

The alignment of the ID codes to the radio frame structure is not affected by transmission gaps resulting from uplink compressed mode.

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CHANGE REQUEST

⌘	**TS 25.214**	**CR**	**154**	⌘	rev	**1**	⌘	Current version:	**3.5.0**	⌘

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

Title: ⌘	Uplink power control preamble			
Source: ⌘	TSG RAN WG1			
Work item code: ⌘			***Date:*** ⌘	2001-03-01
Category: ⌘	**F**		***Release:*** ⌘	R99
	Use one of the following categories: ***F*** *(essential 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: ⌘	UE behaviour between the end of the PCP and the actual start of DPDCH transmission (which is bound to certain CFNs) is not specified. RAN1 has been asked by RAN2 to clarify this. Also, the relation between selected TFC and no DPDCH transmission during the PCP is ambiguous.
Summary of change: ⌘	It is clarified that the DPDCH transmission starts directly after the end of the PCP, and thus the PCP transmission shall be aligned accordingly. It is also clarified that during the PCP no DPDCH transmission is done, indenpendent on the TFCI value during PCP.
Consequences if not approved: ⌘	UE behaviour between the end of the PCP and the actual start of DPDCH transmission (which is bound to certain CFNs) is not specified. Also, the relation between selected TFC and no DPDCH transmission during the PCP is ambiguous.

Clauses affected: ⌘	4.3.2.2, 5.1.2.4	
Other specs affected: ⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications	
Other comments: ⌘		

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4.3.2.2 No existing radio link

When one or several radio links are to be established and there is no existing radio link for the UE already, a dedicated physical channel is to be set up in uplink and at least one dedicated physical channel is to be set up in downlink. This corresponds to the case when a dedicated physical channel is initially set up on a frequency.

The radio link establishment is as follows:

a) Node B considers the radio link sets which are to be set up to be in the initial state. UTRAN shall start the transmission of the downlink DPCCH. and may start the transmission of DPDCH if any data is to be transmitted. The initial downlink DPCCH transmit power is set by higher layers [6]. Downlink TPC commands are generated as described in 5.1.2.2.1.2.

b) The UE establishes downlink chip and frame synchronisation of DPCCH, using the P-CCPCH timing and timing offset information notified from UTRAN. Frame synchronisation can be confirmed using the frame synchronisation word. Downlink synchronisation status is reported to higher layers every radio frame according to subclause 4.3.1.2.

c) If no activation time for uplink DPCCH has been signalled to the UE, uplink DPCCH transmission shall start when higher layers consider the downlink physical channel established. If an activation time has been given, uplink DPCCH transmission shall not start before the downlink physical channel has been established and the activation time has been reached. Physical channel establishment and activation time are defined in [5]. The initial uplink DPCCH transmit power is set by higher layers [5]. The total signalling response delay for the establishment of a new DPCH shall not exceed the requirements given in [8] sub-clause 7.3. ~~The uplink DPDCH transmission shall not start before the end of the power control preamble.~~ The ~~length~~ transmission of the uplink DPCCH power control preamble ~~is~~ shall start N_{pcp} radio frames ~~beginning at~~ prior to the start of uplink ~~DPCCH~~ DPDCH transmission if any data is to be transmitted, where N_{pcp} is a higher layer parameter set by UTRAN [5]. Note that the transmission start delay between DPCCH and DPDCH may be cancelled using a power control preamble of 0 length. The starting time for transmission of DPDCHs shall also satisfy the constraints on adding transport channels to a CCTrCH, as defined in [2] sub-clause 4.2.14. During the uplink DPCCH power control preamble, independently on the selected TFC, no transmission is done on the DPDCH.

d) UTRAN establishes uplink chip and frame synchronisation. Frame synchronisation can be confirmed using the frame synchronisation word. Radio link sets remain in the initial state until N_INSYNC_IND successive in-sync indications are received from layer 1, when Node B shall trigger the RL Restore procedure indicating which radio link set has obtained synchronisation. When RL Restore has been triggered the radio link set shall be considered to be in the in-sync state. The parameter value of N_INSYNC_IND is configurable, see [6]. The RL Restore procedure may be triggered several times, indicating when synchronisation is obtained for different radio link sets.

5.1.2.4 Transmit power control in the uplink DPCCH power control preamble

An UL uplink DPCCH power control preamble is a period of UL uplink DPCCH transmission prior to the frame where start of the uplink DPDCH transmission can start. The DL downlink DPCCH shall also be transmitted during an uplink DPCCH power control preamble.

The length of the uplink DPCCH power control preamble is a higher layer parameter signalled by the network as defined in [5]. The UL uplink DPDCH transmission shall not commence before after the end of the uplink DPCCH power control preamble.

During the uplink DPCCH power control preamble the change in uplink DPCCH transmit power shall be given by:

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

During the uplink DPCCH power control preamble 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 after the end of the uplink DPCCH power control preamble.

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CHANGE REQUEST

⌘ **25.214 CR 155** ⌘ rev **-** ⌘ Current version: **3.5.0** ⌘

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

Title: ⌘	Correction of Limited Power Raise		
Source: ⌘	TSG RAN WG1		
Work item code: ⌘		***Date:*** ⌘	22 February, 2001
Category: ⌘	**F**	***Release:*** ⌘	R99
	Use one of the following categories: ***F*** *(essential 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: ⌘	Inconsistency between text and formula for DL_Power_Averaging_Window_Size.
Summary of change: ⌘	Delta_sum(k) is corrected to include the whole window as described in the text.
Consequences if not approved: ⌘	Ambiguity between text and formula for DL_Power_Averaging_Window_Size.

Clauses affected: ⌘	5.2.1.2.2	
Other specs affected: ⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘
Other comments: ⌘		

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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

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

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

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

where

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

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 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 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].

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Palm Springs, CA, U.S.A., March 13-16, 2001

R1-01-0282

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CHANGE REQUEST

⌘	**25.214**	**CR**	**156**	⌘ rev	**-**	⌘	Current version:	**3.5.0** ⌘

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

Title: ⌘	Clarification of initialisation procedure			
Source: ⌘	TSG RAN WG1			
Work item code: ⌘			***Date:*** ⌘	2001-02-23
Category: ⌘	**F**		***Release:*** ⌘	R99
	Use one of the following categories: ***F*** *(essential 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: ⌘	To prevent future misunderstandings regarding when phase 1 of the synchronisation reporting begins, because some misinterpretations of the current text have arisen.
Summary of change: ⌘	A clear statement is added stating when phase 1 begins and cross-referencing TS25.331.
Consequences if not approved: ⌘	Further misunderstandings may occur.

Clauses affected: ⌘	4.3.1.2	
Other specs affected: ⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘
Other comments: ⌘		

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4.3 DPCCH/DPDCH synchronisation

4.3.1 Synchronisation primitives

4.3.1.1 General

For the dedicated channels, synchronisation primitives are used to indicate the synchronisation status of radio links, both in uplink and downlink. The definition of the primitives is given in the following subclauses.

4.3.1.2 Downlink synchronisation primitives

Layer 1 in the UE shall every radio frame check synchronisation status of the downlink dedicated channels. Synchronisation status is indicated to higher layers using the CPHY-Sync-IND and CPHY-Out-of-Sync-IND primitives.

The criteria for reporting synchronisation status are defined in two different phases.

The first phase starts when higher layers initiate physical dedicated channel establishment (as described in [5]) and lasts until 160 ms after the downlink dedicated channel is considered established by higher layers (physical channel establishment is defined in [5]). During this time out-of-sync shall not be reported and in-sync shall be reported using the CPHY-Sync-IND primitive if the following criterion is fulfilled:

- The UE estimates the DPCCH quality over the previous 40 ms period to be better than a threshold Q_{in}. This criterion shall be assumed not to be fulfilled before 40 ms of DPCCH quality measurements have been collected. Q_{in} is defined implicitly by the relevant tests in [7].

The second phase starts 160 ms after the downlink dedicated channel is considered established by higher layers. During this phase both out-of-sync and in-sync are reported as follows.

Out-of-sync shall be reported using the CPHY-Out-of-Sync-IND primitive if either of the following criteria are fulfilled:

- The UE estimates the DPCCH quality over the previous 160 ms period to be worse than a threshold Q_{out}. Q_{out} is defined implicitly by the relevant tests in [7].

- The 20 most recently received transport blocks with a CRC attached, as observed on all TrCHs using CRC, have been received with incorrect CRC. In addition, over the previous 160 ms, all transport blocks with a CRC attached have been received with incorrect CRC.

In-sync shall be reported using the CPHY-Sync-IND primitive if both of the following criteria are fulfilled:

- The UE estimates the DPCCH quality over the previous 160 ms period to be better than a threshold Q_{in}. Q_{in} is defined implicitly by the relevant tests in [7].

- At least one transport block with a CRC attached, as observed on all TrCHs using CRC, is received in a TTI ending in the current frame with correct CRC. If no transport blocks are received, or no transport block has a CRC attached, this criterion shall be assumed to be fulfilled.

How the primitives are used by higher layers is described in [5]. The above definitions may lead to radio frames where neither the in-sync nor the out-of-sync primitives are reported.

4.3.1.3 Uplink synchronisation primitives

Layer 1 in the Node B shall every radio frame check synchronisation status of all radio link sets. Synchronisation status is indicated to the RL Failure/Restored triggering function using either the CPHY-Sync-IND or CPHY-Out-of-Sync-IND primitive. Hence, only one synchronisation status indication shall be given per radio link set.

The exact criteria for indicating in-sync/out-of-sync is not subject to specification, but could e.g. be based on received DPCCH quality or CRC checks. One example would be to have the same criteria as for the downlink synchronisation status primitives.

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⌘	**25.214**	**CR**	**158**	⌘ rev	**-**	⌘ Current version:	**3.5.0** ⌘

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

Title:	⌘	Definition of power control step size for algorithm 2		
Source:	⌘	TSG RAN WG1		
Work item code:	⌘		***Date:*** ⌘	
Category:	⌘	**F**	***Release:*** ⌘	R99
		Use one of the following categories: ***F*** *(essential 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:	⌘	TS25.331 (RRC) speficication only defines PC step size IE for algorithm 1. Since algorithm two is used for emulating small step sizes or no PC, it does not need the 2 dB step size.
Summary of change:	⌘	It is stated in section 5.1.2.2.1 that algorithm 2 will always use step size of 1 dB.
Consequences if not approved:	⌘	There is ambiguity between signaling elements in RRC and L1 specification

Clauses affected:	⌘	5.1.2.2.1	
Other specs affected:	⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘
Other comments:	⌘		

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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. 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:

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

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

- a value 'n' is obtained from the parameter "DL TPC pattern 01 count" passed by higher layers,
- the TPC pattern shall consist of n instances of "01" plus one instance of "1",
- 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 of all "1".

The TPC pattern shall terminate once uplink synchronisation is achieved.

5.1.2.2.2 Algorithm 1 for processing TPC commands

5.1.2.2.2.1 Derivation of TPC_cmd when only one TPC command is received in each slot

When a UE is not in soft handover, only one TPC command will be received in each slot. In this case, the value of TPC_cmd shall be derived as follows:

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⌘	**25.214**	**CR**	**161**	⌘	rev	**1**	⌘	Current version:	**3.5.0** ⌘

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

Title:	⌘	Correction of the UE behaviour in SSDT mode		
Source:	⌘	TSG RAN WG1		
Work item code:	⌘		***Date:*** ⌘	27 February, 2001
Category:	⌘	**F**	***Release:*** ⌘	R99
		Use one of the following categories: ***F*** *(essential 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:	⌘	Currently, along the specifications UE could derive the uplink TPC commands in different ways during SSDT. There is an example of potential implementation proposed in annex B.2 but no actual behaviour specified for the derivation of TPC commands within the UE in SSDT. Since SSDT will be supported by all Release 99 UE, it is essential for the good operation of the network to rely on the same behaviour from all UE in SSDT. The specifications must therefore mandate that the derivation of the TPC commands are based on the primary cell signals only.
Summary of change:	⌘	The example of UE behaviour in SSDT from Annex B.2 is moved into the section describing the derivation of the TPC commands in the UE. The term “should” is then replaced by “shall” in order to mandate the behaviour.
Consequences if not approved:	⌘	If not approved, variations in UE implementation may undermine the performance of a network operating SSDT.

Clauses affected:	⌘	5.2.1.4.2, Annex B.2		
Other specs affected:	⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘	
Other comments:	⌘			

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5.2.1.4 Site selection diversity transmit power control

5.2.1.4.1 General

Site selection diversity transmit power control (SSDT) is another macro diversity method in soft handover mode. This method is optional in UTRAN.
Operation is summarised as follows. The UE selects one of the cells from its active set to be 'primary', all other cells are classed as 'non primary'. The main objective is to transmit on the downlink from the primary cell, thus reducing the interference caused by multiple transmissions in a soft handover mode. A second objective is to achieve fast site selection without network intervention, thus maintaining the advantage of the soft handover. In order to select a primary cell, each cell is assigned a temporary identification (ID) and UE periodically informs a primary cell ID to the connecting cells. The non-primary cells selected by UE switch off the transmission power. The primary cell ID is delivered by UE to the active cells via uplink FBI field. SSDT activation, SSDT termination and ID assignment are all carried out by higher layer signalling.

5.2.1.4.1.1 Definition of temporary cell identification

Each cell is given a temporary ID during SSDT and the ID is utilised as site selection signal. The ID is given a binary bit sequence. There are three different lengths of coded ID available denoted as "long", "medium" and "short". The network decides which length of coded ID is used. Settings of ID codes for 1-bit and 2-bit FBI are exhibited in table 3 and table 4, respectively.

Table 3: Settings of ID codes for 1 bit FBI

ID label	ID code "long"	ID code "medium"	ID code "short"
a	000000000000000	(0)0000000	00000
b	101010101010101	(0)1010101	01001
c	011001100110011	(0)0110011	11011
d	110011001100110	(0)1100110	10010
e	000111100001111	(0)0001111	00111
f	101101001011010	(0)1011010	01110
g	011110000111100	(0)0111100	11100
h	110100101101001	(0)1101001	10101

Table 4: Settings of ID codes for 2 bit FBI

ID label	ID code (Column and Row denote slot position and FBI-bit position.) "long"	"medium"	"short"
a	(0)0000000 (0)0000000	(0)000 (0)000	000 000
b	(0)0000000 (1)1111111	(0)000 (1)111	000 111
c	(0)1010101 (0)1010101	(0)101 (0)101	101 101
d	(0)1010101 (1)0101010	(0)101 (1)010	101 010
e	(0)0110011 (0)0110011	(0)011 (0)011	011 011
f	(0)0110011 (1)1001100	(0)011 (1)100	011 100
g	(0)1100110 (0)1100110	(0)110 (0)110	110 110
h	(0)1100110 (1)0011001	(0)110 (1)001	110 001

The ID code bits shown in table 3 and table 4 are transmitted from left to right. The ID code(s) are transmitted aligned to the radio frame structure (i.e. ID codes shall be terminated within a frame). If FBI space for sending the last ID code within a frame cannot be obtained, the first bit(s) from that ID code are punctured. The bit(s) to be punctured are shown in brackets in table 3 and table 4.

The alignment of the ID codes to the radio frame structure is not affected by transmission gaps resulting from uplink compressed mode.

5.2.1.4.2 TPC procedure in UE

The UE shall generate TPC commands to control the network transmit power and send them in the TPC field of the uplink DPCCH based on the downlink signals from the primary cell only. An example on how to derive the TPC commands is given in Annex B.2.

5.2.1.4.3 Selection of primary cell

The UE selects a primary cell periodically by measuring the RSCP of CPICHs transmitted by the active cells. The cell with the highest CPICH RSCP is detected as a primary cell.

5.2.1.4.4 Delivery of primary cell ID

The UE periodically sends the ID code of the primary cell via portion of the uplink FBI field assigned for SSDT use (FBI S field). A cell recognises its state as non-primary if the following conditions are fulfilled simultaneously:

- the received primary ID code does not match with the own ID code;
- the received uplink signal quality satisfies a quality threshold, Qth, a parameter defined by the network;
- and when the use of uplink compressed mode does not result in excessive levels of puncturing on the coded ID. The acceptable level of puncturing on the coded ID is less than $\lfloor N_{ID}/3 \rfloor$ symbols in the coded ID, where N_{ID} is the length of the coded ID.

Otherwise the cell recognises its state as primary.

The state of the cells (primary or non-primary) in the active set is updated synchronously. If a cell receives the last portion of the coded ID in uplink slot j, the state of cell is updated in downlink slot $(j+1+T_{os})$ mod 15, where T_{os} is defined as a constant of 2 time slots. The updating of the cell state is not influenced by the operation of downlink compressed mode.

At the UE, the primary ID code to be sent to the cells is segmented into a number of portions. These portions are distributed in the uplink FBI S-field. The cell in SSDT collects the distributed portions of the primary ID code and then detects the transmitted ID. The period of the primary cell update depends on the settings of the code length and the number of FBI bits assigned for SSDT use as shown in table 5.

Table 5: Period of primary cell update

code length	The number of FBI bits per slot assigned for SSDT	
	1	**2**
"long"	1 update per frame	2 updates per frame
"medium"	2 updates per frame	4 updates per frame
"short"	3 updates per frame	5 updates per frame

5.2.1.4.5 TPC procedure in the network

In SSDT, a non-primary cell can switch off its DPDCH output (i.e. no transmissions).

The cell manages two downlink transmission power levels, P1, and P2. Power level P1 is used for downlink DPCCH transmission power level and this level is updated in the same way with the downlink DPCCH power adjustment specified in 5.2.1.2.2 (for normal mode) and 5.2.1.3 (for compressed mode) regardless of the selected state (primary or non-primary). The actual transmission power of TFCI, TPC and pilot fields of DPCCH is set by adding P1 and the offsets PO1, PO2 and PO3, respectively, as specified in 5.2.1.1. P2 is used for downlink DPDCH transmission power level and this level is set to P1 if the cell is selected as primary, otherwise P2 is switched off. The cell updates P1 first and P2 next, and then the two power settings P1 and P2 are maintained within the power control dynamic range. Table 6 summarizes the updating method of P1 and P2.

Table 6: Updating of P1 and P2

<table>
<tr><th>State of cell</th><th>P1 (DPCCH)</th><th>P2 (DPDCH)</th></tr>
<tr><td>non primary</td><td rowspan="2">Updated in the same way with the downlink DPCCH power adjustment specified in 5.2.1.2.2 and 5.2.1.3</td><td>Switched off</td></tr>
<tr><td>primary</td><td>= P1</td></tr>
</table>

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. 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. 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.

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CR-Form-v3

CHANGE REQUEST

⌘ **TS 25.214**	**CR 163**	⌘ rev **-**	⌘	Current version: **3.5.0**	⌘

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

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

Title: ⌘	Correction on downlink synchronisation primitives		
Source: ⌘	TSG RAN WG1		
Work item code: ⌘		***Date:*** ⌘	2001-03-01
Category: ⌘	**F**	***Release:*** ⌘	R99
	Use one of the following categories: ***F*** *(essential 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: ⌘	The current description of downlink synchronisation primitives has ambiguity in case of blind transport format detection i.e. no TFCI used. If there is a transport channel, which includes a transport format with zero transport blocks, this transport channel should be excluded from the criterion of the downlink synchronisation primitives because no CRC is attached on the zero transport blocks.
Summary of change: ⌘	It is clarified that the downlink synchronisation primitives in case of blind transport format detection i.e. no TFCI used. A transport channel, which includes a transport format with zero transport blocks, will be excluded from the criterion of the downlink synchronisation primitives.
Consequences if not approved: ⌘	Incorrect downlink synchronisation primitives will be indicated to higher layer in case of blind transport format detection i.e. no TFCI used.

Clauses affected: ⌘	4.3.1.2	
Other specs affected: ⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications	
Other comments: ⌘		

4.3 DPCCH/DPDCH synchronisation

4.3.1 Synchronisation primitives

4.3.1.1 General

For the dedicated channels, synchronisation primitives are used to indicate the synchronisation status of radio links, both in uplink and downlink. The definition of the primitives is given in the following subclauses.

4.3.1.2 Downlink synchronisation primitives

Layer 1 in the UE shall every radio frame check synchronisation status of the downlink dedicated channels. Synchronisation status is indicated to higher layers using the CPHY-Sync-IND and CPHY-Out-of-Sync-IND primitives. The criteria for reporting synchronisation status are defined in two different phases.

The first phase lasts until 160 ms after the downlink dedicated channel is considered established by higher layers (physical channel establishment is defined in [5]). During this time out-of-sync shall not be reported and in-sync shall be reported using the CPHY-Sync-IND primitive if the following criterion is fulfilled:

The UE estimates the DPCCH quality over the previous 40 ms period to be better than a threshold Q_{in}. This criterion shall be assumed not to be fulfilled before 40 ms of DPCCH quality measurements have been collected. Q_{in} is defined implicitly by the relevant tests in [7].

The second phase starts 160 ms after the downlink dedicated channel is considered established by higher layers. During this phase both out-of-sync and in-sync are reported as follows.

Out-of-sync shall be reported using the CPHY-Out-of-Sync-IND primitive if either of the following criteria are fulfilled:

- The UE estimates the DPCCH quality over the previous 160 ms period to be worse than a threshold Q_{out}. Q_{out} is defined implicitly by the relevant tests in [7].

- The 20 most recently received transport blocks with a CRC attached, as observed on all TrCHs using CRC, have been received with incorrect CRC. In addition, over the previous 160 ms, all transport blocks with a CRC attached have been received with incorrect CRC. In case of no TFCI is used this criterion shall be considered only for TrCHs using CRC in all transport formats.

In-sync shall be reported using the CPHY-Sync-IND primitive if both of the following criteria are fulfilled:

- The UE estimates the DPCCH quality over the previous 160 ms period to be better than a threshold Q_{in}. Q_{in} is defined implicitly by the relevant tests in [7].

- At least one transport block with a CRC attached, as observed on all TrCHs using CRC, is received in a TTI ending in the current frame with correct CRC. If no transport blocks are received, or no transport block has a CRC attached, this criterion shall be assumed to be fulfilled. In case of no TFCI is used this criterion shall be considered only for TrCHs using CRC in all transport formats.

How the primitives are used by higher layers is described in [5]. The above definitions may lead to radio frames where neither the in-sync nor the out-of-sync primitives are reported.