

TSG-RAN Working Group 1 meeting #16
Pusan, Korea
October 10 - 13, 2000

TSGR1#16(00)1226

Agenda item:

Source: NEC

Title: CR 25.214-128r1: Clarification of downlink quality measurement in SSDT mode (Revised)

Document for: Approval

In the meeting RAN1 #15, clarification of downlink quality measurement in SSDT mode was discussed. During SSDT, only the primary cell transmits downlink DPDCH, and non-primary cells switch off DPDCHs. Thus, UE should measure downlink reception quality only on the primary cell signal; otherwise, UE will wrongly calculate downlink TPC commands. This is the basic principle of SSDT, and has been considered from the beginning of the proposal. Since this principle has not been clearly mentioned in the current specifications, a CR was proposed (in Tdoc R1-00-1136). In the revision 1, since inconsistency in the procedure in the network was pointed out, the description is revised to resolve the inconsistency in the CR.

CHANGE REQUEST		<small>Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.</small>
25.214	CR	128_{r1}
<small>GSM (AA.BB) or 3G (AA.BBB) specification number ?</small>		<small>Current Version: 3.4.0</small>
<small>? CR number as allocated by MCC support team</small>		
For submission to: TSG RAN #10	For approval <input checked="" type="checkbox"/>	strategic <input type="checkbox"/> (for SMG use only)
<small>list expected approval meeting # here ?</small>	For information <input type="checkbox"/>	non-strategic <input type="checkbox"/>

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: <http://ftp.3gpp.org/Information/CR-Formv2.doc>

Proposed change affects: (U)SIM ME UTRAN / Radio Core Network
(at least one should be marked with an X)

Source: NEC **Date:** 2000-10-10

Subject: Clarification of downlink quality measurement in SSdT

Work item:

Category:	F Correction	<input checked="" type="checkbox"/>	Release:	Phase 2	<input type="checkbox"/>
<small>(only one category Shall be marked With an X)</small>	A Corresponds to a correction in an earlier release	<input type="checkbox"/>		Release 96	<input type="checkbox"/>
	B Addition of feature	<input type="checkbox"/>		Release 97	<input type="checkbox"/>
	C Functional modification of feature	<input type="checkbox"/>		Release 98	<input type="checkbox"/>
	D Editorial modification	<input type="checkbox"/>		Release 99	<input checked="" type="checkbox"/>
				Release 00	<input type="checkbox"/>

Reason for change: During SSdT, UE should measure downlink reception quality only on the primary cell signal, and calculate downlink TPC commands based on that measurement. This should be clarified. Also, ambiguity in the description of TPC procedure in the network should be removed.

Clauses affected: 5.2.1.4.2, 5.2.1.4.5, Annex B.2

Other specs Affected:	Other 3G core specifications	<input type="checkbox"/>	? List of CRs:	
	Other GSM core specifications	<input type="checkbox"/>	? List of CRs:	
	MS test specifications	<input type="checkbox"/>	? List of CRs:	
	BSS test specifications	<input type="checkbox"/>	? List of CRs:	
	O&M specifications	<input type="checkbox"/>	? List of CRs:	

Other comments:

5.2.1.4.2 TPC procedure in UE

The TPC procedure of the UE in SSDT is identical to that described in subclause 5.2.1.2 or 5.2.1.3 in compressed mode. The UE shall generate TPC commands to control the network transmit power and send them in the TPC field of the uplink DPCCCH. 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, Q_{th} , 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 $(int)N_{ID}/3$ 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 $(j+1+T_{os}) \bmod 15$, 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 DPCCCH transmission power level and this level is updated ~~as in~~ the same way with the downlink DPCCCH power adjustment specified in 5.2.1.2.2 (for normal mode) and ~~or~~ 5.2.1.3 (for ~~in~~ compressed mode) regardless of the selected state (primary or non-primary). The actual transmission power of TFCI, TPC and pilot fields of DPCCCH 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

State of cell	P1 (DPCCH)	P2 (DPDCH)
non primary	Updated by <u>in</u> the same way as <u>with the downlink DPCCH power adjustment</u> specified in 5.2.1.2. <u>2</u> and <u>or</u> 5.2.1.3 in compressed mode	Switched off
primary		= P1

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 DPCCCH/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 $(j+1+T_{os}) \bmod 15$, where T_{os} is defined as a constant of 2 time slots.