TSG-RAN Working Group 1 meeting #7bis *TSGR1#7bis(99)F29*
Kyongju, Korea, 4th – 5th October 1999

Agenda item : **3**
Source : NEC and Telecom MODUS
Title : SSDT text update for R99
Document for : Approval

Overview
Some discrepancies have been raised on the current SSDT text in TS25.214 in terms of the interface between RAN1 specs and the higher layer ones of this function. This document presents SSDT text update in order to achieve a correct matching between the inter-layer specs. The modifications are summarized as follows.

- The all contents relating to L3 signaling were deleted.
- The chapter describing Tx power management at cell was modified so that the corresponding parts refer to the way specified in 5.2.3.2.

Text update for TS25.214

5.2.3.5 Site selection diversity transmit power control

~~*< Editor's note: The text could also be made more specification-like. For the time being the text is kept with some cosmetic and language related changes. >*~~

5.2.3.5.1 General

Site selection diversity transmit power control (SSDT) is an optional macro diversity method in soft handover mode.
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 ~~best~~ 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 ~~identification~~ ID to the connecting cells. The non-primary cells selected by UE switch off the transmission power. The primary cell ~~identity code~~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 signaling.

~~5.2.3.5.2 Initiation of SSDT~~

~~The SSDT is initiated by the network, based on the soft handover active cell set. The cell and UE are subsequently informed by the network that the SSDT option has been activated during the current soft handover period. Otherwise, TPC is operated in the ordinary mode, i.e. each cell controls its power in accordance with an uplink TPC command by the way described in 5.2.3.2. The temporary cell identification assignment~~

~~(i.e. ID code assignment) is carried out by network which is communicated to all the active cells and the UE.~~

~~After the activation of the SSDT and the subsequent UE acknowledgements, the UE starts to send the "primary" cell ID code, described in the following subclauses. Following a successful activation of SSDT and reception of the UE acknowledgement, the active cells start detecting the "primary" cell ID information.~~

~~5.2.3.5.3 Settings of temporary cell identification~~

~~Each cell is given a temporary identification during SSDT and the identification is utilised as site selection signal. In the following, the temporary identification is referred to as "ID".~~

5.2.3.5.~~3~~2.~~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~~ and notifies it to both UE and cells by higher layer signaling message in the initiation of SSDT~~. Settings of ID codes for 1-bit and 2-bit FBI are exhibited in Table 1~~Table 1~~ and Table 2~~Table 2~~, respectively.

Table 1 Settings of ID codes for 1 bit FBI

ID label	ID code		
	"long"	**"medium"**	**"short"**
a	000000000000000	0000000(0)	00000
b	111111111111111	1111111(1)	11111
c	000000001111111	0000111(1)	00011
d	111111110000000	1111000(0)	11100
e	000011111111000	0011110(0)	00110
f	111100000000111	1100001(1)	11001
g	001111000011110	0110011(0)	01010
h	110000111100001	1001100(1)	10101

Table ~~2~~2 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	0000000(0) 0000000(0)	000(0) 000(0)	000 000
b	1111111(1) 1111111(1)	111(1) 111(1)	111 111
c	0000000(0) 1111111(1)	000(0) 111(1)	000 111
d	1111111(1) 0000000(0)	111(1) 000(0)	111 000
e	0000111(1) 1111000(0)	001(1) 110(0)	001 100
f	1111000(0) 0000111(1)	110(0) 001(1)	110 011
g	0011110(0) 0011110(0)	011(0) 011(0)	010 010
h	1100001(1) 1100001(1)	100(1) 100(1)	101 101

ID must be terminated within a frame. If FBI space for sending a given ID cannot be obtained within a frame, hence if the entire ID is not transmitted within a frame but must be split over two frames, the last bit(s) of the ID is(are) punctured. The relating bit(s) to be punctured are shown with brackets in Table 1~~Table 1~~ and Table 2~~Table 2~~.

~~5.2.3.5.3.2 Assignment of ID to each cell~~

~~The "ID" word assignment to each cell is carried out by network and the assignment result is informed to active cells and UE. Every time that the active list is changed, it shall be informed to all active cells and UE via the higher layer signaling.~~

5.2.3.5.~~4~~3 TPC procedure in UE

The TPC procedure of the UE in SSDT is identical to that described in subclause 5.2.3.2.

5.2.3.5.~~5~~4 Selection of primary cell

The UE selects a primary cell periodically by measuring reception levels of common pilots transmitted by the active cells. The cell with the highest pilot power is detected as a primary cell.

5.2.3.5.~~6~~5 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 two conditions are fulfilled simultaneously:

- the received primary ID code does not match with the own ID code,
- and the received uplink signal quality satisfies a quality threshold, Qth, a parameter defined by the network.

Otherwise the cell recognises its state as primary.
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. Period of primary cell update depends on the settings of code length and the number of FBI bits assigned for SSDT use as shown in Table 3~~Table 3~~

Table 3~~3~~ 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

5.2.3.5.~~7~~6 TPC procedure in the network

In SSDT, a non-primary cell can switch off its ~~output power~~DPDCH output (i.e. no transmissions).
~~5.2.3.5.7.1 Management of multiple transmission power levels~~
The cell manages two downlink transmission power levels, P1, and P2~~,~~. ~~for each UE in soft handover.~~ Power level P1 is used for downlink DPCCH transmission power level and this level is updated as the same way specified in 5.2.3.2 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 5.2.3.1. ~~keeps track of the minimum downlink power required, if the cell is chosen as the primary cell. The cell updates P1 regardless of the selected state (primary or non-primary).~~ 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 data fields from non-primary cells are transmitted at power level P2. When a cell is selected by the UE as the primary cell, P2 is set to P1, otherwise the cell maintains P2 at the minimum transmit level (i.e. data fields power off). P1 and P2, expressed in dBm, are updated in accordance with TPC commands from the UE as shown in Table 4.~~ The cell updates P1 first and P2 next, and then t~~T~~he two power settings P1 and P2 are maintained within the power control dynamic range. Table 4 summarizes the updating method of P1 and P2.

~~**Table 4: Updating of P1 and P2**~~

~~State of cell~~	~~TPC signal~~	~~P1~~	~~P2~~
~~non primary~~	~~down~~	~~P1 - Δ_{TPC}~~	~~Switched off~~
	~~up~~	~~P1 + Δ_{TPC}~~	~~Switched off~~
~~primary~~	~~down~~	~~P1 - Δ_{TPC}~~	~~= P1~~
	~~up~~	~~P1 + Δ_{TPC}~~	~~= P1~~

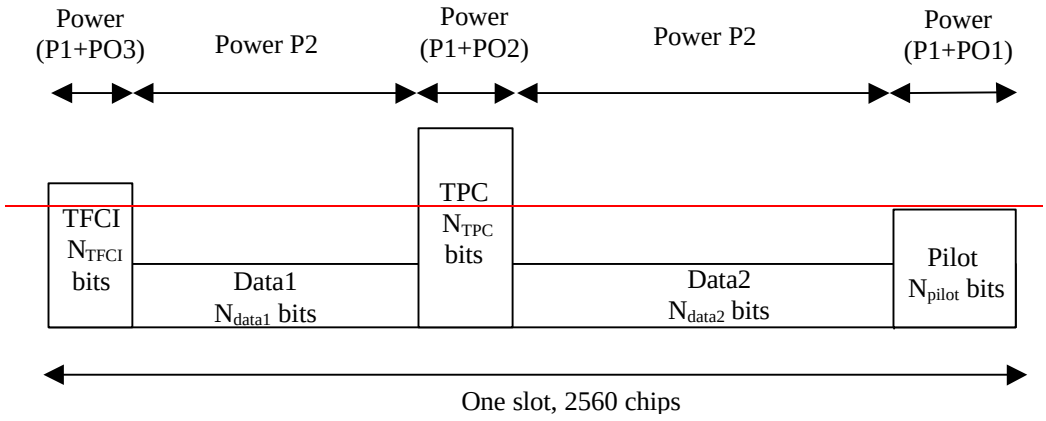
Table 54: Updating of P1 and P2

State of cell	P1 (DPCCH)	P2 (DPDCH)
non primary	Updated by the same way as specified in 5.2.3.2	Switched off
primary		= P1

~~Δ_{TPC} is defined in subclause 5.2.3.2. *< Editor's note: Maybe it is not defined in standard, see comment in 5.2.3.2. >* No regulation of initial value of P1and P2 is given.~~

~~5.2.3.5.7.2 Power setting of the downlink Dedicated Physical Channel~~

~~The downlink Dedicated Physical Channel is partitioned into 5 portions as shown in Figure 9 of S25.211. Power setting of each portion during SSDT is depicted in Figure 1.~~



~~**Figure 1: Power setting of the downlink Dedicated Physical Channel**~~

~~Transmission power of the TPC and TFI portions are always set to P1, in order to detect the control information at the UE with high reliability.~~

~~5.2.3.5.8 Termination of SSDT~~

~~The decision to terminate the SSDT is made by the network, The termination request should be informed by the network to both cells and UE The signaling methods regarding SSDT termination are described in the higher layer specifications in detail.~~