3GPP TSG-RAN WG1 Meeting #19 **R1-01-0227**
Las Vegas, USA, 27th February – 02nd March 2001

Agenda Item: Ad Hoc 29
Source: Siemens
Title: CR 25.224-048 Idle periods for IPDL location method
Document for: Decision

It has been shown that idle periods are necessary for OTDOA positioning methods for the UTRA TDD mode. The attached CR introduces the IPDL scheme according to the proposed scheme at the last RAN1-meeting in Boston. To avoid problems with cell search, the transmission of the SCH will not be switched off during idle periods.

CR-Formv3

CHANGE REQUEST

25.224	CR	048	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: ✍	CR 25.224-048 Idle periods for IPDL location method	
Source: ✍	Siemens AG	
Work item code: ✍	UE Positioning enhancements	**Date:** ✍ 23. Feb. 2001
Category: ✍	B	**Release:** ✍ REL-4

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: ✍	Introduction of IPDLs for UE positioning in UTRA TDD mode
Summary of change: ✍	This CR introduces IPDLs for UTRA TDD mode.
Consequences if not approved: ✍	IPDLs for the OTDOA UE positioning method are necessary for sufficient accuracy and coverage.

Clauses affected: ✍	5; 5.1; 5.2; 5.3			
Other specs Affected: ✍	[X]	Other core specifications	✍	25.331
	[ ]	Test specifications		
	[ ]	O&M Specifications		
Other comments: ✍				

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ✍ contain pop-up help information about the field that they are closest to.
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 Idle periods for IPDL location method

5.1 General

To support time difference measurements for location services, idle periods can be created in the downlink (hence the name IPDL) during which time transmission of all channels from a Node B is temporarily seized, except for the SCH transmission. During these idle periods the visibility of neighbour cells from the UE is improved.

The idle periods are arranged in a determined pattern according to higher layer parameters. An idle period has a duration of one time slot. During idle periods all channels are silent simultaneously, except for the SCH. No attempt is made to prevent data loss.

In general there are two modes for these idle periods:

- Continuous mode, and
- Burst mode.

In continuous mode the idle periods are active all the time. In burst mode the idle periods are arranged in bursts where each burst contains enough idle periods to allow a UE to make sufficient measurements for its location to be calculated. The bursts are separated by a period where no idle periods occur.

The time difference measurements can be performed on any channel. If the P-CCPCH falls in an idle slot, UTRAN may decide not to transmit the P-CCPCH in two consecutive frames, the first of these two frames containing the idle slot. This option is signalled by higher layers.

5.2 Parameters of IPDL

The following parameters are signalled to the UE via higher layers;

IP_Status: This is a logic value that indicates if the idle periods are arranged in continuous or burst mode.

IP_Spacing: The number of 10 ms radio frames between the start of a radio frame that contains an idle period and the next radio frame that contains the next idle period. Note that there is at most one idle period in a radio frame.

IP_Start: The number of the first frame with idle periods. In case of continuous mode IP_Start is the SFN of the first frame with idle periods and in case of burst mode IP_Start defines the number of frames after Burst_Start with the first frame with idle periods.

IP_Slot: The number of the slot that has to be idle [0..14].

IP_PCCPCH: This logic value indicates, if the P-CCPCH is switched off in two consecutive frames. The first of these two frames contains the idle period.

Additionally in the case of burst mode operation the following parameters are also communicated to the UE.

Burst_Start: The SFN where the first burst of idle periods starts.

Burst_Length: The number of idle periods in a burst of idle periods.

Burst_Freq: The number of radio frames between the start of a burst and the start of the next burst.

5.3 Calculation of idle period position

In burst mode, the first burst starts in the radio frame with SFN = Burst_Start. The n^{th} burst starts in the radio frame with SFN = Burst_Start + n? Burst_Freq. The sequence of bursts according to this formula continues up to and including the radio frame with SFN = 4095. At the start of the radio frame with SFN = 0, the burst sequence is

terminated (no idle periods are generated) and at SFN = Burst_Start the burst sequence is restarted with the first burst followed by the second burst etc., as described above.

Continuous mode is equivalent to burst mode, with only one burst spanning the whole SFN cycle of 4096 radio frames, this burst starts in the radio frame with SFN = 0. In case of continuous mode the parameter IP_Start defines the first frame with idle periods.

The time slot that has to be idle is defined by two values: IP_Frame(x) and IP_Slot. IP_Frame(x) defines the x^{th} frame within a burst in which the slot with the number IP_Slot has to be switched off.

The actual frame with idle periods within a burst is calculated as follows:

IP_Frame(x) = IP_Start + (x-1) ? IP_Spacing with x = 1, 2, 3, ...

If the parameter IP_PCCPCH is set to 1, then the P-CCPCH will not be transmitted in the frame IP_Frame(x) +1 within a burst.

Figure 6 below illustrates the idle periods for the burst mode case, if the IP_P-CCPCH parameter is set to 0.

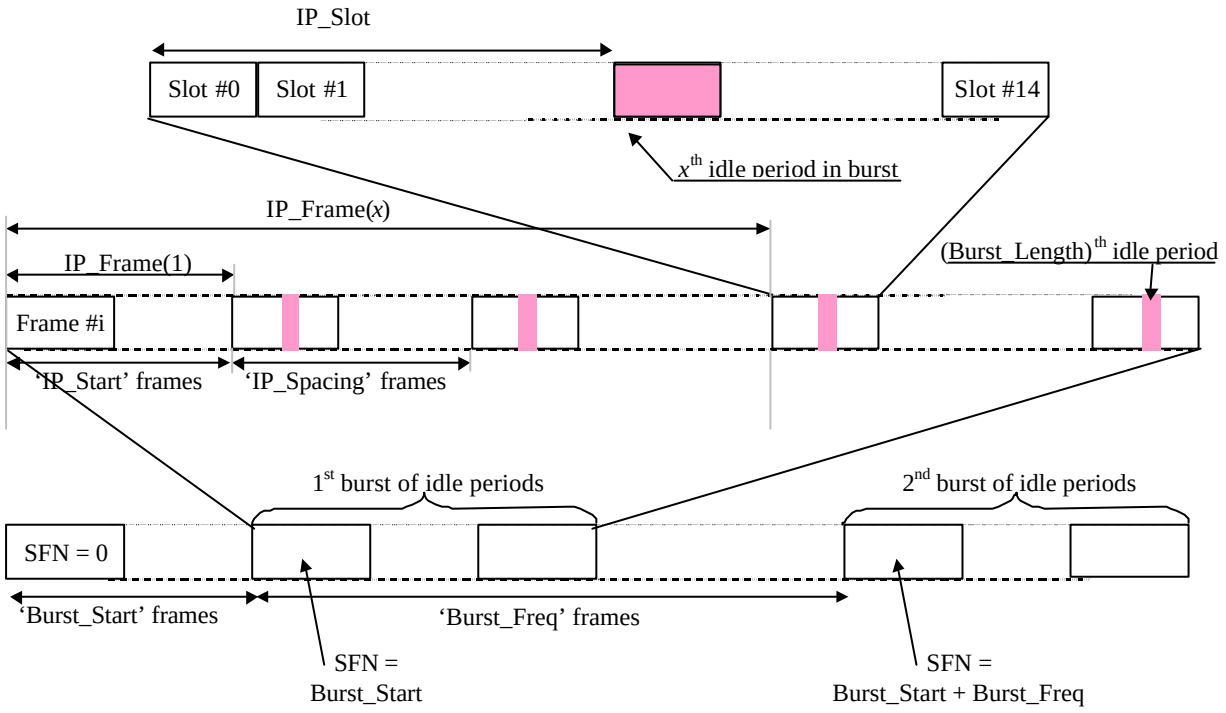

Figure 6: Idle Period placement in the case of burst mode operation with IP_P-CCPCH parameter set to 0