TSG-RAN Working Group 1 meeting #9 ***TSGR1#9(99)L32***
Dresden, Germany, Nov. 30 – Dec. 3, 1999

Agenda Item:
Source: **SK Telecom**
Title: **Initial synchronization and CR for Initial synchronization of USTS in 25.215**
Document for: **Decision**

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1. Introduction

The procedure for Uplink Synchronous Transmission Scheme (USTS) was accepted in text (in section 9 of TS25.214) at the last Kyongju meeting [1]. However it is required to elaborate the specification on the method of timing control for USTS in section 9 of TS25.214 which is the section for the procedure for USTS. This document have more detailed information on the method for Initial synchronization for USTS and CR for Initial synchronization in TS25.215.

2. Initial synchronisation for USTS

The transmission time control for USTS consists of two steps: Initial synchronization and tracking. We consider the Initial synchronization in this document.

The amount of timing adjustment for Initial synchronization is delivered through the message of higher layer. The unit of timing control is the minimum resolution which is dependent on oversampling rate for system or UE implementation, e.g., the unit of timing control step is 1/8chip for 8 times oversampling per chip.

The amount of timing control for initial synchronization (T_{INIT_SYNC}) is equal to the difference in time between the reference time of Node B and the time of reception of RACH as shown in Fig. 1.
The reference to the timing control for initial synchronization in UE is the time of reception of DPCH from Node B.
There are several offset times ($\tau_{DPCH,n}$) when Node B transmits DPCHs as shown in Fig. 2. Thus, the timing control for initial synchronization is practically carried out by $T_0 + \Delta T$ as shown in Fig. 2. and this value can be obtained with T_{INIT_SYNC}.

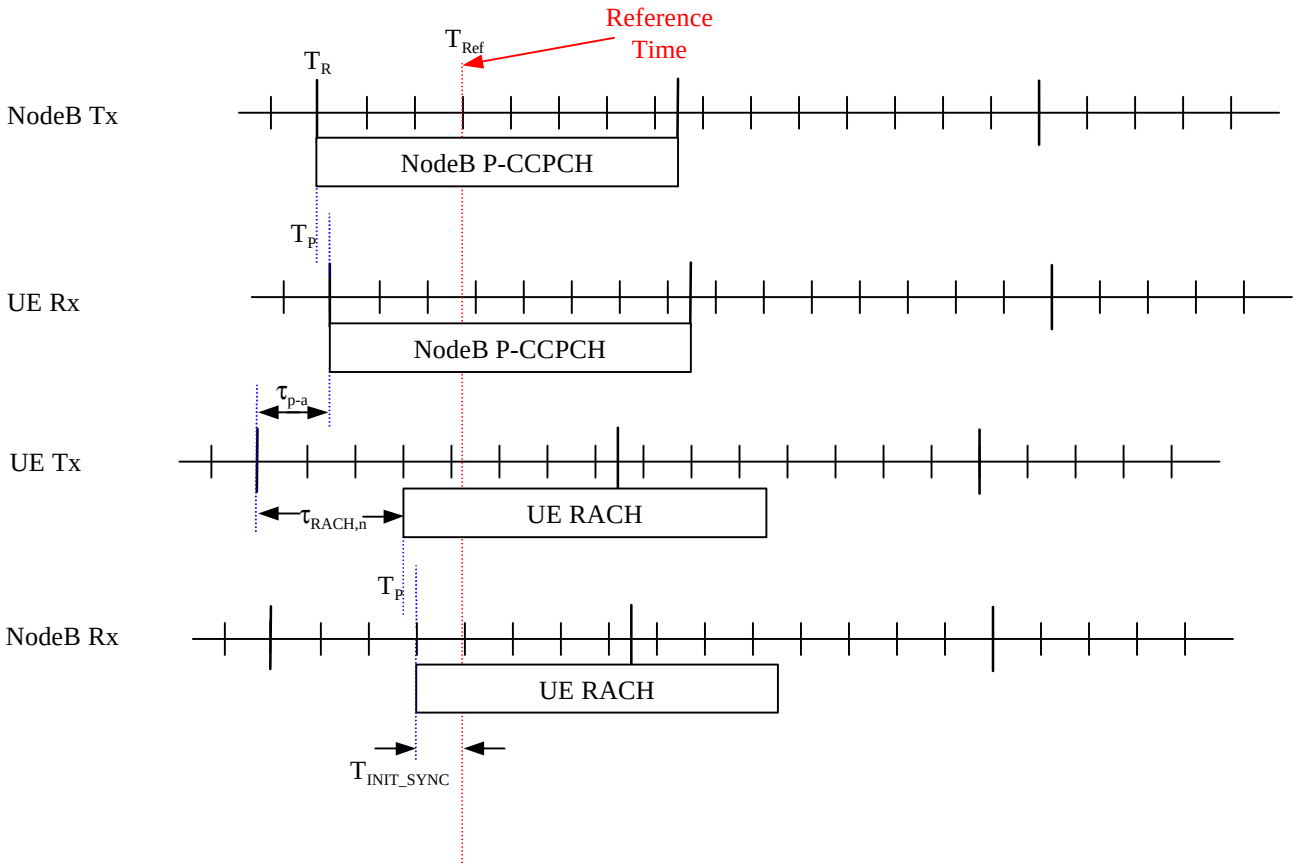

Fig. 1. The Initial Synchronization Time

- When AICH_Transmission_Timing is set to 0, then $\tau_{p\text{-}a}$ = 7680 chips
- When AICH_Transmission_Timing is set to 1, then $\tau_{p\text{-}a}$ = 12800 chips
- $\tau_{RACH,n}$: the difference in time between the start timing of #0 slot and that of selected access slot number

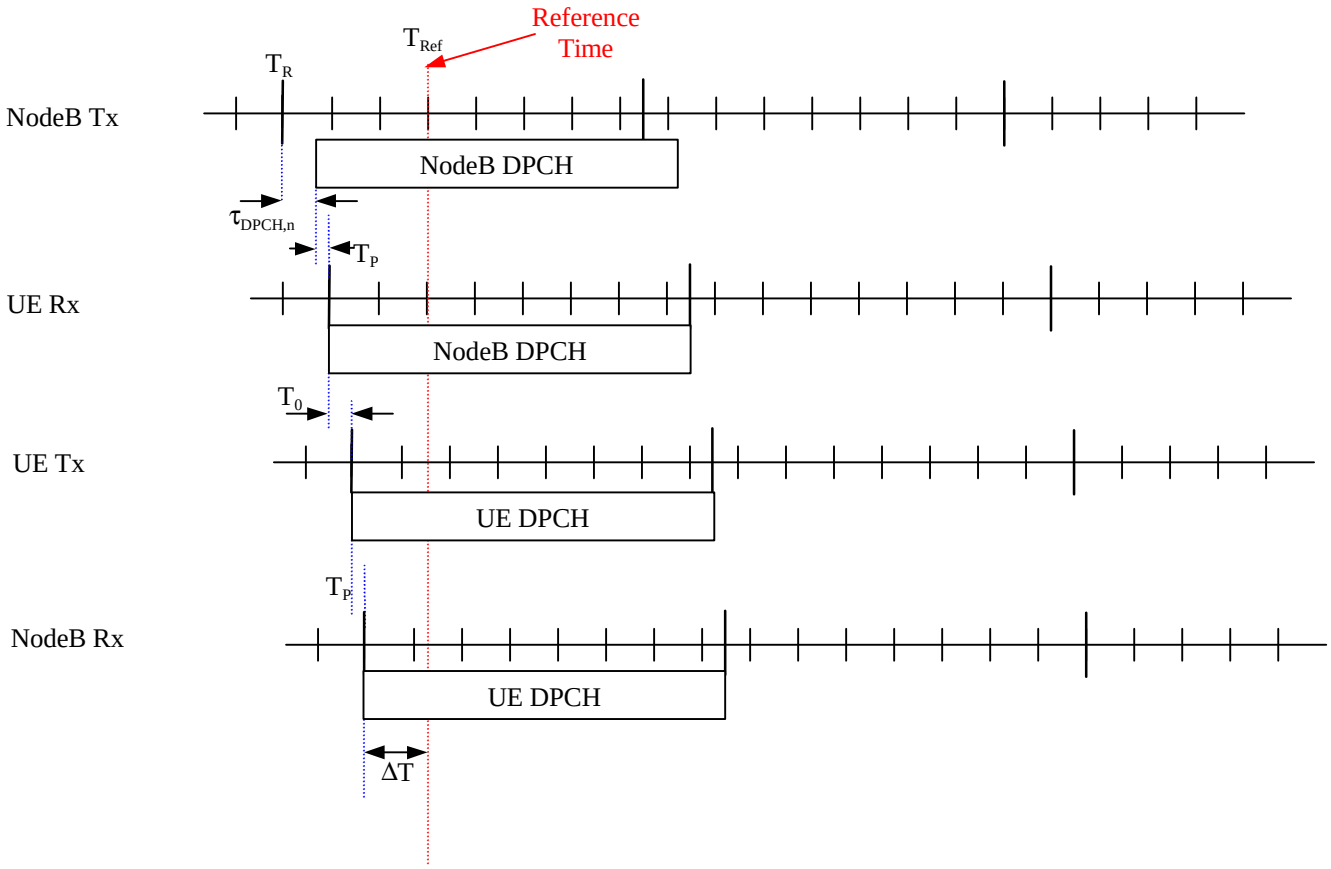

Fig 2. The timing control for Initial Synchronization

- The DPCH timing may be different for different DPCHs, but the offset from the P-CCPCH frame timing is a multiple of 256 chips, i.e. $\tau_{DPCH,n} = T_n \times 256$ chip, $T_n \in \{0, 1, \ldots, 149\}$.
- At the UE, the uplink DPCCH/DPDCH frame transmission takes place approximately T_0 chips after the reception of the first significant path of the corresponding downlink DPCCH/DPDCH frame. T_0 is a constant defined to be 1024 chips.

The time of transmission of the beginning of a uplink DPCH frame from a UE ($T_{DPCH,Tx,UE}$) can be written by

$T_{DPCH,Tx,UE} = T_{DPCH,Rx,UE} + T_0 + \Delta T$.

If we set $\Delta T = T_{INIT\_SYNC}$, then it make the received signals from UEs keep the orthogonality. Therefore the time of transmission of DPCH from UE is

$T_{DPCH,Tx,UE} = T_{DPCH,Rx,UE} + T_0 + T_{INIT\_SYNC}$.

As a results, the UE sets the reference time ($T_{DPCH,Rx,UE}$) at the time of reception of the beginning of a downlink DPCH frame from Node B and the amount of time offset for initial synchronization is equal to $T_0 + T_{INIT\_SYNC}$.

3. References

[1] SK Telecom, “Uplink Synchronous Transmission Scheme,” TSGR1#7 (99)e68.

3GPP TSG RAN WG1 Meeting #9
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Document* *R1-99L32
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.215	**CR**	018	Current Version:	3.0.0

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

For submission to: TSG-RAN #6 *list expected approval meeting # here ↑*	for approval	X	Strategic		*(for SMG use only)*
	for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

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

Source: SK Telecom **Date:** 1999-12-03

Subject: Measurement of Initial synchronisation time for USTS

Work item:

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

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

Release:

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

Reason for change: The additional feature is required to support the measurements for USTS.

Clauses affected: 5.2.8

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments:

5.2.8 Initial synchronization time

Note: This measurement is required to support USTS described in section 9 of TS25.214.

Definition	Initial synchronisation time (T_{INIT_SYNC}) is defined as $T_{INIT\_SYNC} = T_{Ref} - T_{RACH,Rx}$, where T_{Ref} = The reference time at UTRAN access point. $T_{RACH,Rx}$ = The time of reception of the beginning (the first significant path) of the RACH from a UE. Note 1: The definition of “first significant path" needs further elaboration. Note 2: The value of T_{Ref} is set by UTRAN.
Range/mapping	