TSG-RAN Working Group 1 meeting #9 ***TSGR1#9(99)j86***
Dresden, Germany, Nov. 30 – Dec. 3, 1999

Agenda Item:
Source: **SK Telecom**
Title: **CR for the procedure for USTS in TS25.214**
Document for: **Discussion**

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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 methods of channelisation code allocation and timing control for USTS in section 9 of TS25.214 which is the section for the procedure for USTS. This document have CR which is the revised version on section 9 of TS25.214.

2. References

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

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Document* *R1-99j86
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.

25.214	**CR**	034	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: *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [X] Core Network [ ]

Source: SK Telecom **Date:** 1999-11-26

Subject: Physical Layer Procedure 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	
C	Functional modification of feature	X
D	Editorial modification	

Release:

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

Reason for change: The additional descriptions are required to support the procedure for USTS.

Clauses affected: 9

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:

9 Uplink synchronous transmission

9.1 General

<Note: This scheme is not a base-line implementation capability.>

Uplink Synchronous Transmission Scheme (USTS) is an alternative technology applicable for low mobility terminals. USTS can reduce uplink intra-cell interference by means of making a cell receive orthogonalized signals from UEs. To orthogonalize receiving signals from UEs,

- the same scrambling code is allocated to all dedicated physical channels in a cell, the network may allocate the same scrambling code to more than one UE,
- the different channelization codes are allocated to all dedicated physical channels across all UEs in a cell and the spreading factor and node number of channelization code are delivered from network to each UE, and
- the channelization codes for DPDCH and DPCCH in a UE are chosen from either upper half part or the lower half part of the OVSF code tree in a UE to reduce peak to average power ratio,
- additional scrambling codes can be allocated if all channelization codes are occupied, and
- the signal transmission time of each UE is adjusted by UTRAN.

The spreading and modulation scheme for USTS is same as section 4 of TS 25.213. In case of USTS, the long scrambling code described in section 4.3.2.2. of TS 25.213 is used. However, this long scrambling code is not UE specific, but cell specific. In order to generate the cell specific long scrambling code, the initial loading value of PN generator is determined by the network.

For single code transmission, the channelisation codes for DPDCH and DPCCH in a UE are chosen from either upper half part or the lower half part of the OVSF code tree in a UE to reduce peak to average power ratio. However for multicode transmission, this rule may not be preserved. More information about the method on the channelization codes allocation for USTS are described in section 4.3.1 of TS 25.213. Orthogonal Variable Spreading Factor (OVSF) codes that preserve the orthogonality between USTS uplink channels of different rates and spreading factors.

The transmission time control is carried out by two steps. The first step is initial Initial synchronization and the second is tracking.

- Initial synchronization: Adjust transmission time through the initial timing control message over FACH given by higher layer.
- Tracking Process process (Closed Loop Timing control): Adjust the transmission time through the Time Alignment Bit (TAB) over DPCCH.

9.2 Initial synchronisation

- When the cell receives signal from UE over RACH, cell measures the difference in time between the received timing and the reference time in the unit of 1/8 chip duration..
- The message for initial synchronization, which contains the difference in time, is delivered to UE via FACH. Initial synchronisation time(T_{INIT_SYNC}), given in [1/oversamples] chip units is set by higher layers.
- The reference to the timing control for initial synchronization in UE is the time of reception of the beginning (the first significant path) of DPCCH/DPDCH frame from the Node B.
- The amount of time offset for initial synchronization is equal to $T_{INIT\_SYNC} + t_{RACH,n} - t_{p-a} - t_{DPCH,n}$, where

$t_{RACH,n}$ is the difference in time between the starting timing of #0 access slot and that of RACH access slot number at UE. ~~UE adjust its transmission time according to the message~~.

9.3 Tracking process

- Node B ~~Cell periodically~~ compares the reference time with received signal timing from UE every 20msec.
- When the received timing is earlier than the reference time at Node B, Time Alignment Bit (TAB) = “0”. When this is later than the reference time, TAB = “1”.
- TAB replaces the TPC bit in slot #14 in frames with CFN mod 2 = 0. ~~every timing control period of 20 msec and the last TPC bit of every two frames is replaced by TAB.~~
- At the UE, hard decision on the TAB shall be performed, and when it is judged as “0”, the transmission time shall be delayed by 1/oversamples~~8~~ chip, whereas if it is judged as “1”, the transmission time shall be advanced by 1/oversamples~~8~~ chip.