TSG-RAN Meeting #13 ***TSGRP#13(01) 0602***
Beijing, China, 18 - 21, September, 2001

Title: **Agreed CRs to TS 25.937**

Source: **TSG-RAN WG3**

Agenda item: **8.3.3/8.3.4/9.4.3**

RP Tdoc	R3 Tdoc	Spec	CR_Num	Rev	Release	CR_Subject	Cat	Cur_Ver	New_Ver	Workitem
RP-010602	R3-012264	25.937	001		Rel-4	Rel4 correction on modulation type in LCR TDD	F	4.0.0	4.1.0	LCRTDD-lublur

CR-Form-v3

CHANGE REQUEST

⌘ **TR25.937** **001** ⌘ rev **1** ⌘ Current version: **4.0.0** ⌘

*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 ☐ Radio Access Network ☐ Core Network ☐

Title:	⌘	Correction on modulation type in LCR TDD
Source:	⌘	R-WG3
Work item code:	⌘	LCR TDD-Iublur
Date:	⌘	Jul 2001
Category:	⌘	**F**
Release:	⌘	Rel4

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:	⌘	Currently 8PSK modulation in the TR is only defined for spreading factor SF=1 in LCR TDD, but WG1 decided that 8PSK modulation can be used independent of the spreading factor, see TS 25.221 v4.0.0 section 6.2.2.4.2 and TS 25.223 v4.0.0 section 6.2.2.
Summary of change:	⌘	Rev1: 1. Correct the CR header. 2. Add 2 dots between (8/1)and (8/8)in 10.2.3. 3.indicate linking to CRs on NBAP and RNSAP. Rev0 1. 8PSK modulation is changed in the IE “TDD Channelisation Code LCR” 2. ‘SYNC’ and ‘SYNC1’ are replaced by ‘SYNC_DL’ and ‘SYNC_UL’ as RAN WG1 does. 3. some editorial errors.
Consequences if not approved:	⌘	If this CR is not approved, 8PSK modulation is not completely supported for LCR TDD

Clauses affected:	⌘	4.1.3, 5.4, 6.1.3, 8.1.1.2, 10.2.3		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications	⌘	CR 470 Rel4 25.433 CR 423 Rel4 25.423

	☐ 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.

4.1.3 Burst Types

In correspondence to the frame structure described above, the burst structures for Tsn, DwPCH and UpPCH are proposed. The burst structure for normal time slot (Tsn) is described in Figure 2.

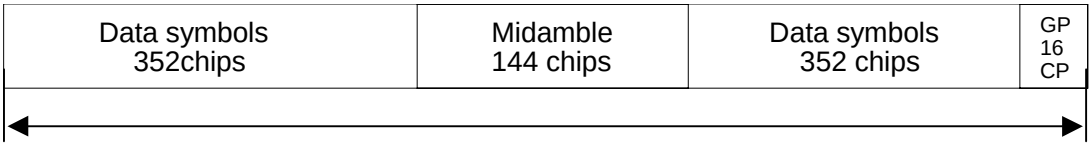

Figure 2 Burst structure for normal traffic time slot

The structure for DwPCH and UpPCH is described in Figure 3 and Figure 4.

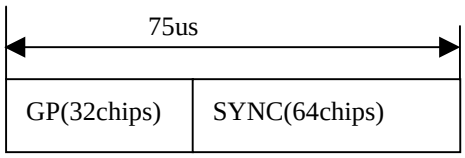

Figure 3: Structure for DwPCH

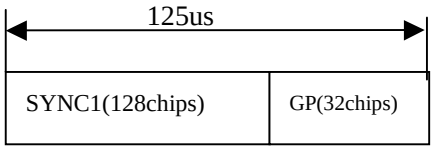

Figure 4: Structure for UpPCH

In Figure 2, the data symbols in each side of the midamble are 352 chips. The TPC bits for power control, the TFCI bits and the additional uplink synchronization bits (synchronization shift) are included in the Data symbols fields of the burst if they are needed. The amount of TFCI bits used is depending on the service and the details for TFCI, synchronization shift and TPC bits should be provided later with service mapping. For the power control symbols, the uplink synchronization control symbols and the TFCI the symbols around the midamble are used.

The GP field in Figure 2 for each time slot is used for protection between time slots to avoid the long delay multi-path interference. It should be noted that the GP of the TS0 together with the guard period in DwPCH is 48 chips long which is different with other normal guard period of 16 chips between time slots. This 'super long' guard period can be used to avoid the interference between the last normal downlink time slot and the downlink synchronization pilot burst. Otherwise, the interference to the last downlink time slot from the strong powered pilot will be serious to the traffic; and vice versa, the interference to the downlink pilot burst from the last downlink time slot will decrease the performance on downlink synchronization and cell search. Note that if the UEs serving Node B is far away and the UE makes handover measurements it will receive the beginning of the DwPCH of a close by Node B inside these 48 chip. 48 chip corresponds to 11 km difference in distance to the Node B. If the other Node B is more distant to the serving Node B, big guard period can be used for receiving the DwPCH of the handover candidate Node B.

In DwPCH and UpPCH, the content of ~~SYNC~~ SYNC_DL and ~~SYNC1~~ SYNC_UL field are used for downlink and uplink pilot. The GP fields are used to separate the downlink (uplink) pilot from the normal downlink (uplink) channel.

It should be pointed out that the uplink synchronization burst (~~SYNC1~~SYNC_UL) is not followed by a RACH immediately. First the UL synchronization burst is sent by the UE. It is used for Node B to determine the received power level and the received timing. Second, the Node B transmits timing and power control information to the UE using the FPACH (one burst message) within the next 4 frames. Then the P-RACH is transmitted. Both FPACH and P-RACH are carrying single burst messages transmitted on a normal traffic time slot (see Fig. 2).

/* Partly omitted */

5.4 Agreements and associated contributions

As a result of the studies, it was agreed to introduce the following new IEs in NBAP and/or RNSAP, in support of the new Frame Structure and radio burst parameters for 1.28Mcps TDD:

Existing IE for 3.84 Mcps TDD	**New Rel.4 *LCR* IE for 1.28 Mcps TDD**	**What is the difference of the 1.28Mcps IE compared to 3.84?**
Time Slot IE	*Time Slot LCR* IE	Range 0..6 rather than 0..14
TDD Channelisation Code IE	*TDD Channelisation Code LCR* IE	8PSK modulation option ~~in case of SF = 1~~
Midamble Shift and Burst Type IE	*Midamble Shift LCR* IE	Midamble not dependent on burst type; just 1 burst type.
DL Timeslot Information IE	*DL Timeslot Information LCR* IE	Includes *Time Slot LCR* IE, *Midamble Shift LCR* IE, *DL Code Information LCR* IE
UL Timeslot Information IE	*UL Timeslot Information LCR* IE	Includes *Time Slot LCR* IE, *Midamble Shift LCR* IE, *UL Code Information LCR* IE
TDD DL Code Information IE	*TDD DL Code Information LCR* IE	Includes *TDD Channelisation Code LCR* IE
TDD UL Code Information IE	*TDD UL Code Information LCR* IE	Includes *TDD Channelisation Code LCR* IE
UL Time Slot ISCP Info IE	*UL Time Slot ISCP Info LCR* IE	Includes *Time Slot LCR* IE
DL Time Slot ISCP Info IE	*DL Time Slot ISCP Info LCR* IE	Includes *Time Slot LCR* IE
Neighbouring TDD Cell Information IE	*Neighbouring TDD Cell Information LCR* IE	Includes *Time Slot LCR* IE

For the details of the definition of these IEs, see the proposed Change Requests to NBAP and RNSAP for introducing the 1.28 Mcps TDD option.

/* Partly omitted */

6.1.3 UpPCH

- ~~SYNC_DL~~ SYNC_UL code ID. The Node B derives this parameter from the channelisation code parameters of FPACH and PRACH in a standardised way [3], therefore the UpPCH is not explicitly configured in the Node B.

/* Partly omitted */

8.1.1.2 Establishment uplink synchronization

Although the UE can receive the downlink synchronization signal from the Node B, the distance to Node B is still uncertain which would lead unsynchronised uplink transmission. Therefore, the first transmission in uplink direction is performed in a special Channel UpPCH to reduce interference in traffic time-slots.

The timing used for the ~~SYNC1~~ SYNC_UL burst are set e.g. according to the received power level of DwPCH and/or P-CCPCH.

At the detection of the ~~SYNC1~~ SYNC_UL sequence in the searching window, the Node B will evaluate the received power levels and timing, and reply by sending the adjustment information to UE to modify its timing and power level for next transmission and for establishment of the uplink synchronisation procedure. . Within the next 4 sub-frames, the Node B will send the adjustment information to the UE (in a single subframe message in the FPACH) The uplink synchronisation procedure, normally used for a random access to the system, can also be used for the re-establishment of the uplink synchronisation when uplink is out of synchronisation.

/* Partly omitted */

10.2.3 TDD Channelisation Code LCR

The Channelisation Code Number indicates which Channelisation Code is used for a given Physical Channel. In TDD the Channelisation Code is an Orthogonal Variable Spreading Factor code that can have a spreading factor of 1, 2, 4, 8 or 16.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
~~CHOICE SF~~				
~~>SF=1~~			~~Enumerated(QPSK,8PSK)~~	~~Modulation options in contrast to 3.84Mcps TDD mode~~
~~>Otherwise~~				
~~>>~~TDD Channelisation Code			ENUMERATED ((1/1), (2/1), (2/2), (4/1),~~….~~..,(4/4), (8/1), ...(8/8), (16/1),~~….~~.., (16/16) ,…)	
Modulation			ENUMERATED (QPSK, 8PSK,...)	

~~CHOICE SF~~	~~Condition under which the given SF is chosen~~
~~SF =1~~	~~"spreading factor" is set to 1~~
~~Otherwise~~	~~"spreading factor" is set to a value distinct from 1~~

See also chapters 5.4 and 6.4 for information on the IEs needed for 1.28 Mcps TDD.