3GPP TSG RAN WG1 Meeting #14
Oulu, Finland, 04-07 July 2000

***Document* R1-000967**
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.

25.221	**CR**	**xxx**	Current Version:	3.3.0

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

For submission to: RAN#10
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 [X] UTRAN / Radio [X] Core Network [ ]
(at least one should be marked with an X)

Source: CWTS **Date:**

Subject: CR for TS25.221 regarding the 1.28 Mcps TDD

Work item: Low Chip Rate TDD option, Physical Layer

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	
Release 00	X

Reason for change: This CR collects the principally agreed wording of the changes necessary for introducing the feature 'Low Chip Rate TDD option' in the TS25.221. In its last revision it should be editorially changed to reflect the correct changes needed for the latest approved version of this specification.

Clauses affected:

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: In this first version, a proposed structure has been included in this CR. The structure was copied from TS25.221 vers. 3.3.0. The sections on 'physical channels' and 'mapping of TrCH to physical channels' were duplicated to distinguish between the different chip rate options. In addition to that the proposals that were agreed in principle in WG1#14 were included in this CR.

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2 References

<For clarity, this chapter will currently collect only the references that are needed in addition to the already existing abbreviations. In its last version this chapter has to be modified, so that it includes the revisions with respect to the latest versions of TS25.221.>

3 Abbreviations

<For clarity, this chapter will currently collect only the abbreviations that are needed in addition to the already existing abbreviations. In its last version this chapter has to be modified, so that it includes the revisions with respect to the latest versions of TS25.221.>

UpPTS Uplink Pilot Time Slot

DwPTS Downlink Pilot Time Slot

4 Transport channels

<This section is included in the working CR for completeness only. No changes will be made in this chapter. This chapter can be removed from the CR in its final version.>

5 Physical channels for the 3.84 Mcps option

<No changes will be made in this chapter in this CR, only the title has to be changed. >

6 Physical channels for the 1.28 Mcps option

All physical channels take three-layer structure with respect to timeslots, radio frames and system frame numbering (SFN), see [14]. Depending on the resource allocation, the configuration of radio frames or timeslots becomes different. All physical channels need guard symbols in every timeslot. The time slots are used in the sense of a TDMA component to separate different user signals in the time and the code domain. The physical channel signal format for 1.28Mcps TDD is presented in figure [X1].

A physical channel in TDD is a burst, which is transmitted in a particular timeslot within allocated Radio Frames. The allocation can be continuous, i.e. the time slot in every frame is allocated to the physical channel or discontinuous, i.e. the time slot in a subset of all frames is allocated only. A burst is the combination of a data part, a midamble and a guard period. The duration of a burst is one time slot. Several bursts can be transmitted at the same time from one transmitter. In this case, the data part must use different OVSF channelisation codes, but the same scrambling code. The midamble part has to use the same basic midamble code, but can use different midambles.

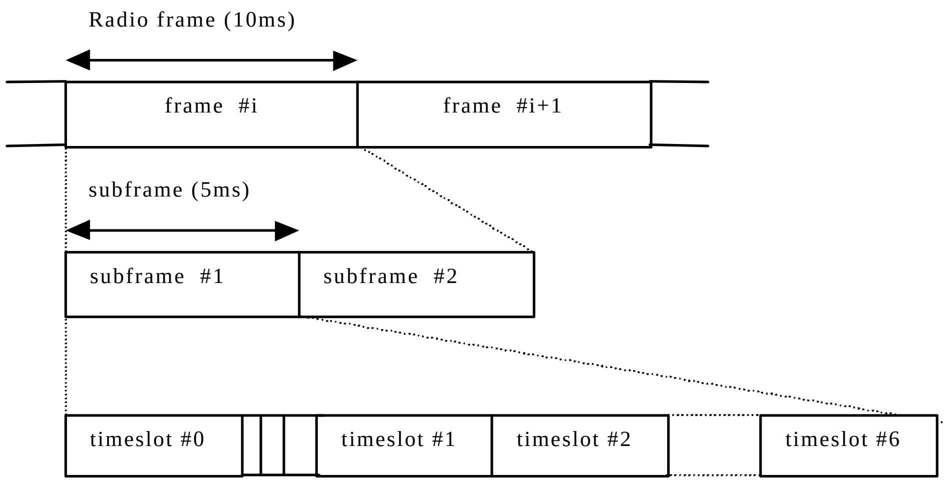


Figure [X1]: Physical channel signal format for 1.28Mcps TDD option

The data part of the burst is spread with a combination of channelisation code and scrambling code. The channelisation code is a OVSF code, that can have a spreading factor of 1, 2, 4, 8, or 16. The data rate of the physical channel is depending on the used spreading factor of the used OVSF code.

So a physical channel is defined by frequency, timeslot, channelisation code, burst type and Radio Frame allocation The scrambling code and the basic midamble code are broadcast and may be constant within a cell. When a physical channel is established, a start frame is given. The physical channels can either be of infinite duration, or a duration for the allocation can be defined.

6.1 Frame structure

The TDMA frame has a duration of 10 ms and is divided into 2 sub-frames of 5ms. The frame structure for each sub-frame in the 10ms frame length is the same.

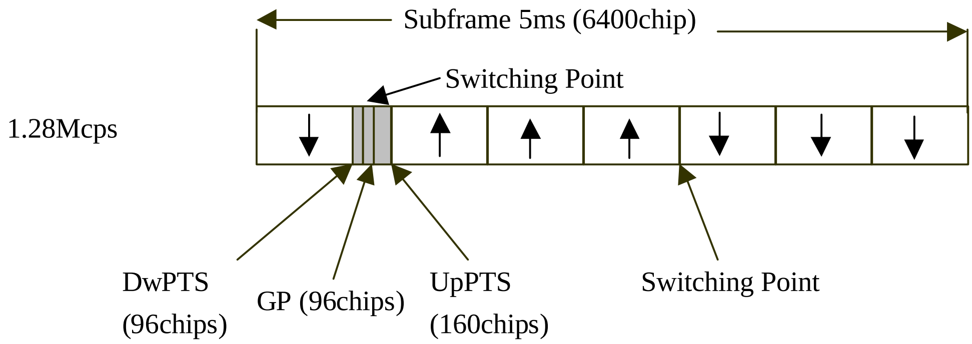


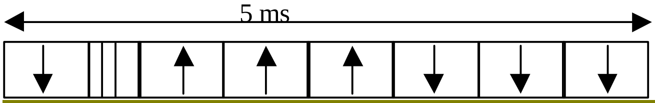
Figure [X2]: Structure of the sub-frame for 1.28Mcps TDD option

Time slot#n (n from 0 to 6): the nth normal time slot, 864 chips duration;
DwPTS: downlink pilot time slot, 96 chips duration;
UpPTS: uplink pilot time slot, 160 chips duration;
GP: main guard period for TDD operation, 96 chips duration;

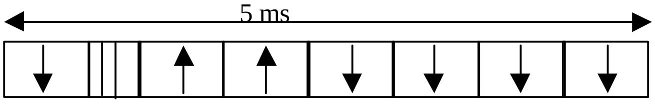
In Figure [X2], the total number of normal time slot for uplink and downlink is 7, and the length for each normal time slot is 864 chips duration. Among the 7 normal time slot, time slot#0 is always allocated as downlink while time slot#1 is always allocated as uplink. The time slots for the uplink and the downlink are separated by switching points. Between the downlink time slots and uplink time slots, the special period is the switching point to separate the uplink and downlink. In each sub-frame of 5ms for 1.28Mcps option, there are two switching points (uplink to downlink and vice versa).

Using the above frame structure, the 1.28Mcps TDD option can operate on both symmetric and asymmetric mode by properly configuring the number of downlink and uplink time slots. In any configuration at least one time slot (time slot#0) has to be allocated for the downlink and at least one time slot has to be allocated for the uplink (time slot#1).

Examples for symmetric and asymmetric UL/DL allocations are given in figure [X3].



symmetric DL/UL allocation



asymmetric DL/UL allocation

Figure [X3]: 1.28Mcps TDD sub-frame structure examples

6.2 Dedicated physical channel (DPCH)

6.2.1 Spreading

6.2.1.1 Spreading for Downlink Physical Channels

6.2.1.2 Spreading for Uplink Physical Channels

6.2.2 Burst Types

6.2.2.1 Transmission of TFCI

In the 1.28 Mcps TDD the burst type for normal time slot provides the possibility for transmission of TFCI in uplink and downlink.

The transmission of TFCI is negotiated at call setup and can be re-negotiated during the call. For each CCTrCH it is indicated by higher layer signalling, which TFCI format is applied. Additionally for each allocated timeslot it is signalled individually whether that timeslot carries the TFCI or not. If a time slot contains the TFCI, then it is always transmitted using the first allocated channelisation code in the timeslot, according to the order in the higher layer allocation message.

The transmission of TFCI is done in the data parts of the respective physical channel, this means TFCI and data bits are subject to the same spreading procedure as depicted in [8]. Hence the midamble structure and length is not changed.

The encoded TFCI symbols are equally distributed between the two subframes and the respective data fields. The TFCI information is to be transmitted possibly either directly adjacent to the midambleor after the SS and TPC symbols. Figure [X] shows the position of the TFCI in a traffic burst, if neither SS nor TPC are transmitted. Figure [Y] shows the position of the TFCI in a traffic burst , if SS and TPC are transmitted.

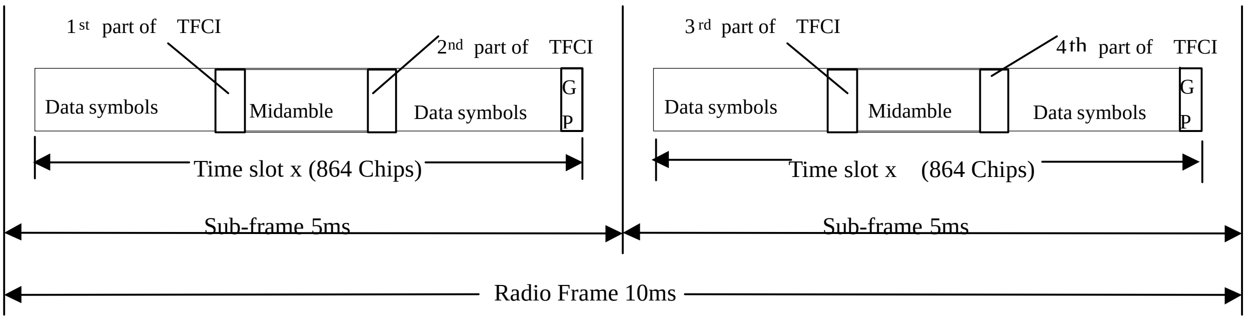


Figure X: Position of TFCI information in the traffic burst in case of no TPC and SS in 1.28 Mcps TDD

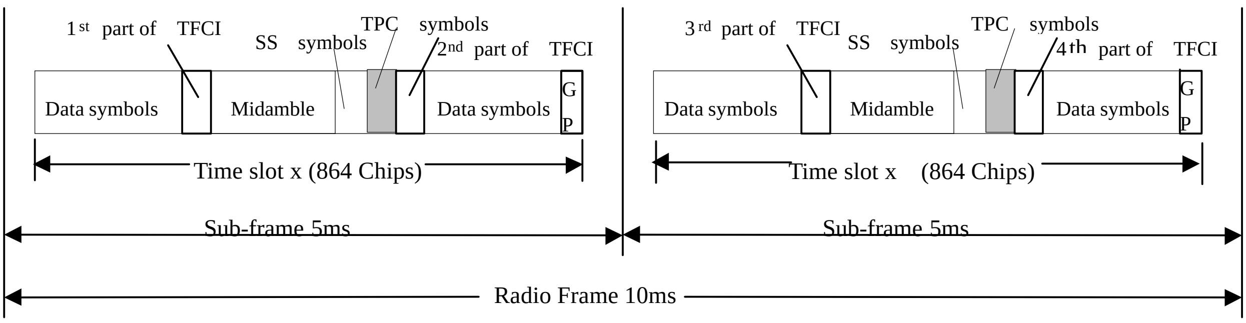


Figure Y:Position of TFCI information in the traffic burst in case of TPC and SS in 1.28 Mcps TDD

6.2.2.2 Transmission of TPC

6.2.2.3 Transmission of SS

6.2.2.4 Timeslot formats

6.2.2.4.1 time slot formats for QPSK

6.2.2.4.1.1 Downlink timeslot formats

6.2.2.4.1.2 Uplink timeslot formats

6.2.2.4.2 Time slot formats for 8PSK

6.2.2.4.2.1 Downlink timeslot formats

6.2.2.4.2.2 Uplink timeslot formats

6.5 Beacon function of physical channels

6.5.1 Location of physical channels with beacon function

6.5.2 Physical characteristics of the beacon function

6.6 Midamble Allocation for Physical Channels

6.6.1 Midamble Allocation for DL Physical Channels

6.6.1.1 Midamble Allocation by signalling

6.6.1.1.1 Common Midamble

6.6.1.1.2 UE specific Midamble

6.6.1.2 Midamble Allocation by default

6.6.2 Midamble Allocation for UL Physical Channels

~~6~~7 Mapping of transport channels to physical channels for the 3.84 Mcps option

<No changes will be made in this chapter in this CR, only the title and the section numbering have to be changed. >

8 Mapping of transport channels to physical channels for the 1.28 Mcps option

8.1 Dedicated Transport Channels

8.2 Common Transport Channels

8.2.1 The Broadcast Channel (BCH)

8.2.2 The Paging Channel (PCH)

8.2.2.1 PCH/PICH Association

8.2.3 The Forward Channel (FACH)

8.2.4 The Random Access Channel (RACH)

8.2.5 The Uplink Shared Channel (USCH)

8.2.6 The Downlink Shared Channel (DSCH)

Annex A (normative): Basic Midamble Codes for the 3.84 Mcps option

<No changes will be made in this chapter in this CR, only the title has to be changed. >

Annex B (Informative): CCPCH Multiframe Structure for the 3.84 Mcps option

<No changes will be made in this chapter in this CR, only the title has to be changed. >

Annex C (normative): Basic Midamble Codes for the 1.28 Mcps option

C.1 Basic Midamble Codes

C.2 Association between Midambles and Channelisation Codes

C.2.1 Association for K=16 Midambles

C.2.2 Association for K=14 Midambles

C.2.3 Association for K=12 Midambles

C.2.4 Association for K=10 Midambles

C.2.5 Association for K=8 Midambles

C.2.6 Association for K=6 Midambles

C.2.7 Association for K=4 Midambles

C.2.8 Association for K=2 Midambles

Annex D (Informative): CCPCH Multiframe Structure for the 1.28 Mcps option

Annex ~~C~~ E (informative): Change history

<No changes will be made in this chapter in this CR, only the numbering has to be changed. >