3GPP TSG RAN WG1#15 R1-00-1089

Berlin/Germany

August 22nd – 25th, 2000

Agenda Item: **Correction to R'99**

Source: **Mitsubishi Electric, Siemens AG**

Title: **CR031r1 for TS25.221**

Number of codes signalling for the DL common midamble case

Document for: **Approval**

Summary

By using variable shifts instead of a fixed shift to derive the common midamble for the UE's present in a timeslot, the number of simultaneously employed channelisation codes can be encoded and signalled to all UE's. The knowledge of the number of channelisation codes in turn simplifies the implementation of multiuser detection techniques in the UE, e.g. in the DL.

Section 5.6 in TS25.221 on midamble allocation in UL and DL is proposed to be revised for more clarity.

3GPP TSG RAN WG1 Meeting #15
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***Document* R1-00-1089**
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 031r1 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#9	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑	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: Mitsubishi Electric, Siemens AG **Date:** 22/08/2000

Subject: Number of codes signalling for the DL common midamble case

Work item:

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

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change:

- By using variable shifts instead of a fixed shift to derive the common midamble for the UE's present in a timeslot, the number of simultaneously employed channelisation codes can be encoded and signalled to all UE’s. The knowledge of the number of channelisation codes in turn simplifies the implementation of multiuser detection techniques in the UE, e.g. in the DL.
- Section 5.6 in TS25.221 on midamble allocation in UL and DL is proposed to be revised for more clarity.

Clauses affected: Section 5.6; Insertion of a new annex B, previous annex B moved to annex C, previous annex C moved to annex D

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	CR480 to TS25.331 CR169 to TS25.423 CR199 to TS25.433
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:

5.6 Midamble Allocation for Physical Channels

~~In general, m~~Midambles are part of the physical channel configuration which is performed by higher layers. Three different midamble allocation schemes exist:

- UE specific midamble allocation: A UE specific midamble for DL or UL is explicitly assigned by higher layers.
- Default midamble allocation: The midamble for DL or UL is allocated by layer 1 depending on the associated channelisation code.
- Common midamble allocation: The midamble for the DL is allocated by layer 1 depending on the number of channelisation codes currently being present in the DL time slot.

~~Optionally, i~~If ~~no~~ a midamble is not explicitly ~~allocated~~assigned ~~by higher layers~~and the use of the common midamble allocation scheme is not signalled by higher layers, ~~a default~~ the midamble ~~allocation~~ shall be ~~used~~allocated by layer 1, based on the default midamble allocation scheme. This default midamble allocation scheme is given by a fixed association between midambles and channelisation codes, see clause A.3, and shall be applied individually to all channelisation codes within one time slot. Different associations apply for different burst types and cell configurations with respect to the maximum number of midambles.

5.6.1 Midamble Allocation for DL Physical Channels

Physical channels providing the beacon function shall always use the reserved midambles, see 5.~~4~~5. For DL physical channels that are located in the same time slot as the P-CCPCH, midambles shall be allocated based on the default midamble allocation scheme, using the association for burst type 1 and K=8 midambles. For all other DL physical channels, the midamble ~~allocation~~ is explicitly ~~signalled~~ assigned by higher layers or ~~given by default~~ allocated by layer 1.

5.6.1.1 Midamble Allocation by signalling from higher layers

~~Either a common or a~~ UE specific midambles ~~shall~~ may be signalled by higher layers to ~~the~~ UE's as a part of the physical channel configuration~~.~~, ~~Common or UE specific midambles may be applied only if the conditions in subclauses 5.6.1.1.1 and subclause 5.6.1.1.2 hold respectively. If the midamble is not signalled as a part of the physical channel configuration, midamble allocation by default shall be used.~~

~~5.6.1.1.1 Common Midamble~~

~~A common midamble may be assigned to all physical channels in one time slot, if:~~

- ~~a single UE uses all physical channels in one time slot (as in the case of high rate service);~~

~~or~~

- ~~multiple UEs use the physical channels in one time slot; and~~
- ~~no beamforming is applied to any of these DL physical channels; and~~
- ~~no closed loop TxDiversity is applied to any of these DL physical channels; and~~

  ~~midambles are not used for PDSCH physical layer signalling.~~

~~5.6.1.1.2 UE specific Midamble~~

~~An individual midamble may be assigned to each of the UEs in one time slot,~~ if:

- multiple UEs use the physical channels in one DL time slot; and
- beamforming is applied to all of these DL physical channels; and
- no closed loop TxDiversity is applied to any of these DL physical channels;

or

- PDSCH physical layer signalling based on the midamble is used.

5.6.1.2 Midamble Allocation by ~~default~~layer 1

5.6.1.2.1 Default midamble

If ~~no~~a midamble is not explicitly ~~allocated~~assigned and the use of the common midamble allocation scheme is not signalled by higher layers~~by signalling~~, the UE shall derive the midamble from the associated channelisation code and shall use an individual midamble for each channelisation code. For each association between midambles and channelisation codes in annex A.3, there is one primary channelisation code associated to each midamble. A set of secondary channelisation codes is associated to each primary channelisation code. All the secondary channelisation codes within a set use the same midamble as the primary channelisation code to which they are associated.

Higher layers shall allocate the channelisation codes in a particular order. Primary channelisation codes shall be allocated prior to associated secondary channelisation codes. If midambles are reserved for the beacon ~~function~~channels, all primary and secondary channelisation codes that are associated with the reserved midambles shall not be used.

Primary and its associated secondary channelisation codes shall not be allocated to different UE's.

In the case that secondary channelisation codes are used, secondary channelisation codes of one set shall be allocated in ascending order, with respect to their numbering.

5.6.1.2.2 Common Midamble

The use of the common midamble allocation scheme is signalled to the UE by higher layers as a part of the physical channel configuration. A common midamble may be assigned by layer 1 to all physical channels in one DL time slot, if:

- a single UE uses all physical channels in one DL time slot (as in the case of high rate service);

or

- multiple UEs use the physical channels in one DL time slot; and
- no beamforming is applied to any of these DL physical channels; and
- no closed loop TxDiversity is applied to any of these DL physical channels; and
- midambles are not used for PDSCH physical layer signalling.

The number of channelisation codes currently employed in the DL time slot is associated with the use of a particular common midamble. Different associations apply for different burst types and cell configurations with respect to the maximum number of midambles, see annex B.

5.6.2 Midamble Allocation for UL Physical Channels

If the midamble is ~~part of the physical channel configuration~~explicitly assigned by higher layers, an individual midamble shall be assigned to all UE's in one UL time slot.

If no midamble is explicitly ~~allocated~~ assigned by higher layers, the UE shall derive the midamble from the assigned channelisation code as for DL physical channels. If the UE changes the SF according to the data rate, it shall always vary the channelisation code along the lower branch of the OVSF tree.

Annex B (normative) Signalling of the number of channelisation codes for the DL common midamble case

The following mapping schemes shall apply for the association between the number of channelisation codes employed in a timeslot and the use of a particular midamble shift in the DL common midamble case. In the following tables the presence of a particular midamble shift is indicated by '1'. Midamble shifts marked with '0' are left unused. Mapping schemes B.3 and B.4 are not applicable to beacon timeslots where a P-CCPCH is present, because the default midamble allocation scheme is applied to these timeslots. Note that in mapping schemes B.3 and B.4, the fixed and pre-allocated channelisation code for the beacon channel is included into the number of indicated channelisation codes.

B.1 Mapping scheme for Burst Type 1 and K=16 Midambles.

m1	m2	m3	m4	m5	m6	m7	M8	m9	m10	m11	m12	m13	m14	m15	m16	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 code
0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 codes
0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	3 codes
0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	4 codes
0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	5 codes
0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	6 codes
0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	7 codes
0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	8 codes
0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	9 codes
0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	10 codes
0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	11 codes
0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	12 codes
0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	13 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	14 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	15 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	16 codes

B.2 Mapping scheme for Burst Type 1 and K=8 Midambles.

M1	m2	m3	m4	m5	m6	m7	m8	
1	0	0	0	0	0	0	0	1 code or 9 codes
0	**1**	0	0	0	0	0	0	2 codes or 10 codes

0	0	**1**	0	0	0	0	0	3 codes or 11 codes
0	0	0	**1**	0	0	0	0	4 codes or 12 codes
0	0	0	0	**1**	0	0	0	5 codes or 13 codes
0	0	0	0	0	**1**	0	0	6 codes or 14 codes
0	0	0	0	0	0	**1**	0	7 codes or 15 codes
0	0	0	0	0	0	0	**1**	8 codes or 16 codes

B.3 Mapping scheme for beacon timeslots and K=16 Midambles.

m1	m2	m3	M4	m5	m6	m7	M8	m9	m10	m11	M12	m13	m14	m15	m16	
1	$x^{(*)}$	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	1 codes or 13 codes
1	$x^{(*)}$	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	2 codes or 14 codes
1	$x^{(*)}$	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	3 codes or 15 codes
1	$x^{(*)}$	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	4 codes or 16 codes
1	$x^{(*)}$	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	5 codes
1	$x^{(*)}$	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	6 codes
1	$x^{(*)}$	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	7 codes
1	$x^{(*)}$	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	8 codes
1	$x^{(*)}$	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	9 codes
1	$x^{(*)}$	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	10 codes
1	$x^{(*)}$	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	11 codes
1	$x^{(*)}$	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	12 codes

(*) In case of Block-STTD encoding for the P-CCPCH, midamble shift 2 is used by the diversity antenna

B.4 Mapping scheme for beacon timeslots and K=8 Midambles.

m1	m2	m3	m4	m5	m6	m7	M8	
1	$x^{(*)}$	**1**	0	0	0	0	0	1 or 7 or 13 codes
1	$x^{(*)}$	0	**1**	0	0	0	0	2 or 8 or 14 codes
1	$x^{(*)}$	0	0	**1**	0	0	0	3 or 9 or 15 codes
1	$x^{(*)}$	0	0	0	**1**	0	0	4 or 10 or 16 codes
1	$x^{(*)}$	0	0	0	0	**1**	0	5 codes or 11 codes
1	$x^{(*)}$	0	0	0	0	0	**1**	6 codes or 12 codes

(*) In case of Block-STTD encoding for the P-CCPCH, midamble shift 2 is used by the diversity antenna

B.5 Mapping scheme for Burst Type 2 and K=6 Midambles.

m1	m2	m3	m4	m5	m6	
1	0	0	0	0	0	1 or 7 or 13 codes
0	**1**	0	0	0	0	2 or 8 or 14 codes
0	0	**1**	0	0	0	3 or 9 or 15 codes
0	0	0	**1**	0	0	4 or 10 or 16 codes
0	0	0	0	**1**	0	5 or 11 codes
0	0	0	0	0	**1**	6 or 12 codes

B.6 Mapping scheme for Burst Type 2 and K=3 Midambles.

m1	m2	m3	
1	0	0	1 or 4 or 7 or 10 or 13 or 16 codes
0	**1**	0	2 or 5 or 8 or 11 or 14 codes
0	0	**1**	3 or 6 or 9 or 12 or 15 codes

Annex ~~B~~C (Informative): CCPCH Multiframe Structure

In the following figures B.1 to B.3 some examples for Multiframe Structures on Primary and Secondary CCPCH are given. The figures show the placement of Common Transport Channels on the Common Control Physical Channels. Additional S-CCPCH capacity can be allocated on other codes and timeslots of course, e.g. FACH capacity is related to overall cell capacity and can be configured according to the actual needs. Channel capacities in the annex are derived using bursts with long midambles (Burst format 1). Every TrCH-box in the figures is assumed to be valid for two frames (see row 'Frame #'), i.e. the transport channels in CCPCHs have an interleaving time of 20msec.

The actual CCPCH Multiframe Scheme used in the cell is described and broadcast on BCH. Thus the system information structure has its roots in this particular transport channel and allocations of other Common Channels can be handled this way, i.e. by pointing from BCH.

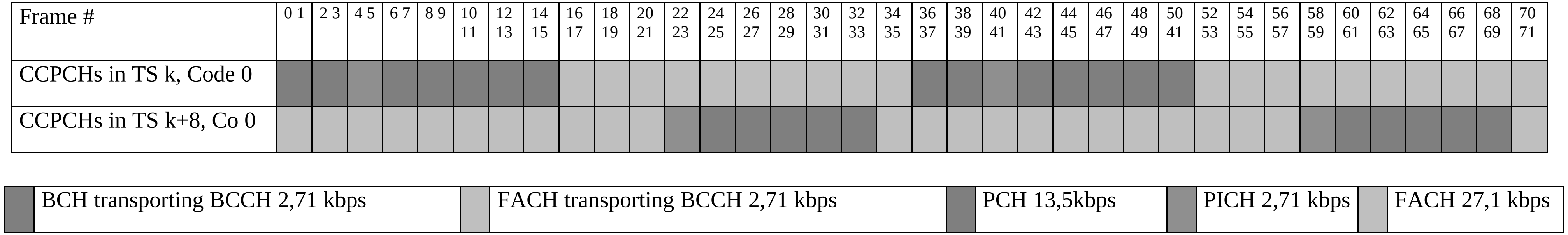

Figure B.1: Example for a multiframe structure for CCPCHs that is repeated every 72th frame

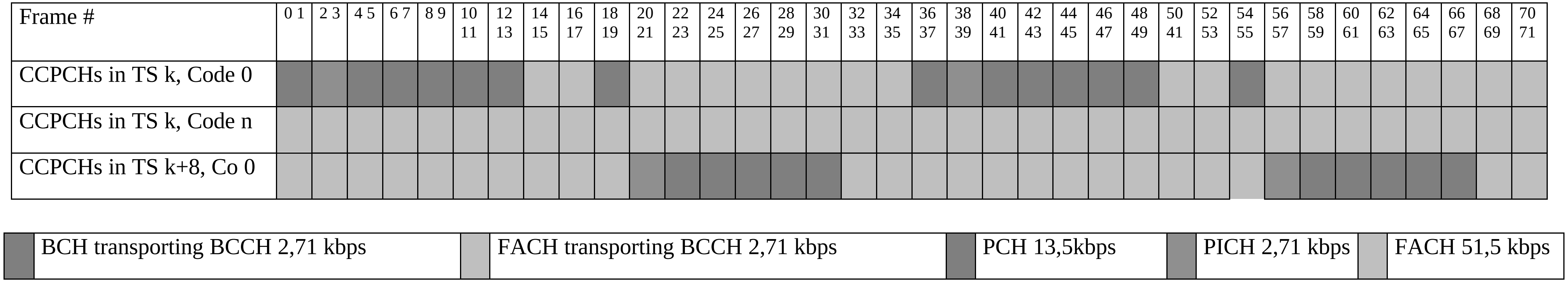

Figure B.2: Example for a multiframe structure for CCPCHs that is repeated every 72th frame, n=1…7

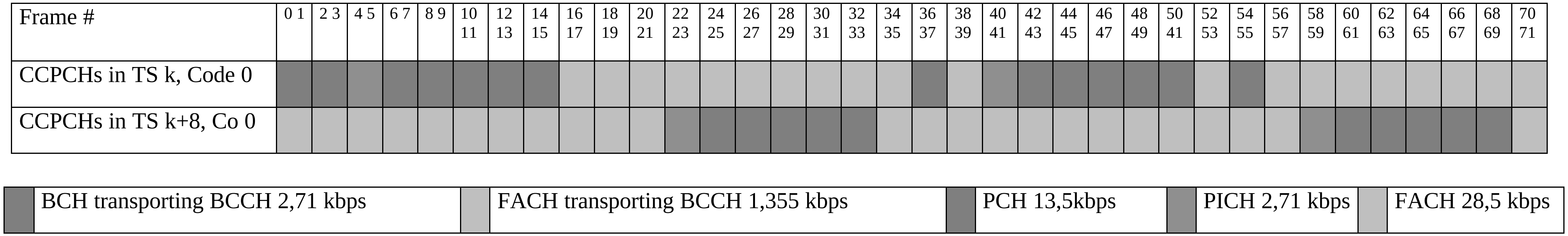

Figure B.3: Example for a multiframe structure for CCPCHs that is repeated every 72th frame

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

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
14/01/00	RAN_05	RP-99591	-		Approved at TSG RAN #5 and placed under Change Control	-	3.0.0
14/01/00	RAN_06	RP-99691	001	02	Primary and Secondary CCPCH in TDD	3.0.0	3.1.0
14/01/00	RAN_06	RP-99691	002	02	Removal of Superframe for TDD	3.0.0	3.1.0
14/01/00	RAN_06	RP-99691	006	-	Corrections to TS25.221	3.0.0	3.1.0
14/01/00	RAN_06	RP-99691	007	1	Clarifications for Spreading in UTRA TDD	3.0.0	3.1.0
14/01/00	RAN_06	RP-99691	008	-	Transmission of TFCI bits for TDD	3.0.0	3.1.0
14/01/00	RAN_06	RP-99691	009	-	Midamble Allocation in UTRA TDD	3.0.0	3.1.0
14/01/00	RAN_06	RP-99690	010	-	Introduction of the timeslot formats to the TDD specifications	3.0.0	3.1.0
14/01/00	-	-	-		Change history was added by the editor	3.1.0	3.1.1
31/03/00	RAN_07	RP-000067	003	2	Cycling of cell parameters	3.1.1	3.2.0
31/03/00	RAN_07	RP-000067	011	-	Correction of Midamble Definition for TDD	3.1.1	3.2.0
31/03/00	RAN_07	RP-000067	012	-	Introduction of the timeslot formats for RACH to the TDD specifications	3.1.1	3.2.0
31/03/00	RAN_07	RP-000067	013	-	Paging Indicator Channel reference power	3.1.1	3.2.0
31/03/00	RAN_07	RP-000067	014	1	Removal of Synchronisation Case 3 in TDD	3.1.1	3.2.0
31/03/00	RAN_07	RP-000067	015	1	Signal Point Constellation	3.1.1	3.2.0
31/03/00	RAN_07	RP-000067	016	-	Association between Midambles and Channelisation Codes	3.1.1	3.2.0
31/03/00	RAN_07	RP-000067	017	-	Removal of ODMA from the TDD specifications	3.1.1	3.2.0
26/06/00	RAN_08	RP-000271	018	1	Removal of the reference to ODMA	3.2.0	3.3.0
26/06/00	RAN_08	RP-000271	019	-	Editorial changes in transport channels section	3.2.0	3.3.0
26/06/00	RAN_08	RP-000271	020	1	TPC transmission for TDD	3.2.0	3.3.0
26/06/00	RAN_08	RP-000271	021	-	Editorial modification of 25.221	3.2.0	3.3.0
26/06/00	RAN_08	RP-000271	023	-	Clarifications on TxDiversity for UTRA TDD	3.2.0	3.3.0
26/06/00	RAN_08	RP-000271	024	-	Clarifications on PCH and PICH in UTRA TDD	3.2.0	3.3.0