TS 25.221 V2.0.0 (1999-09)

Technical Specification

3rd Generation Partnership Project (3GPP); Technical Specification Group (TSG) Radio Access Network (RAN); Working Group 1 (WG1); Physical channels and mapping of transport channels onto physical channels (TDD)

Reference

xxxx

Keywords

3GPP

Postal address

Office address

Internet

http://www.3gpp.org

Content

Intellectual Property Rights

<IPR notice shall be provided once correct notice is available within 3GPP>

Foreword

This Technical Specification has been produced by the 3GPP.

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of this TS, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x   the first digit:

    1   presented to TSG for information;

    2   presented to TSG for approval;

    3   Indicates TSG approved document under change control.

y   the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z   the third digit is incremented when editorial only changes have been incorporated in the specification;

1 Scope

This specification describes the characteristics of the physicals channels and the mapping of the transport channels to physical channels in the TDD mode of UTRA.

2 References

References may be made to:

  a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply;

  b) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

[1] TS 25.201: "Physical layer - general description"

[2] TS 25.102: "UE physical layer capabilities"

[3] TS 25.211: "Physical channels and mapping of transport channels onto physical channels (FDD)"

[4] TS 25.212: "Multiplexing and channel coding (FDD)"

[5] TS 25.213: "Spreading and modulation (FDD)"

[6] TS 25.214: "Physical layer procedures (FDD)"

[7] TS 25.222: "Multiplexing and channel coding (TDD)"

[8] TS 25.223: "Spreading and modulation (TDD)"

[9] TS 25.224: "Physical layer procedures (TDD)"

[10] TS 25.231: "Measurements"

[11] TS 25.301: "Radio Interface Protocol Architecture"

[12] TS 25.302: "Services Provided by the Physical Layer"

[13] TS 25.401: "UTRAN Overall Description"

3 Definitions and abbreviations

BCH   Broadcast Channel

CCPCH   Common Control Physical Channel
CCTrCH   Coded Composite Transport Channel
CDMA   Code Division Multiple Access

DPCH   Dedicated Physical Channel
DSCH   Downlink Shared Channel

FACH   Forward Access Channel
FDD   Frequency Division Duplex
FEC   Forward Error Correction

GP   Guard Period
GSM   Global System for Mobile Communication

NRT   Non-Real Time

ODCH   ODMA Dedicated Transport Channel
ODMA   Opportunity Driven Multiple Access
ORACH   ODMA Random Access Channel
OVSF   Orthogonal Variable Spreading Factor

PCH   Paging Channel
PDSCH   Physical Downlink Shared Channel
PDU   Protocol Data Unit
PRACH   Physical Random Access Channel
PSCH   Physical Synchronisation Channel
PUSCH   Physical Uplink Shared Channel

RACH   Random Access Channel
RLC   Radio Link Control
RF   Radio Frame
RT   Real Time

SACCH   Slow Associated Control Channel
SCH   Synchronisation Channel
SDCCH   Stand-alone Dedicated Control Channel

TCH   Traffic Channel
TDD   Time Division Duplex
TDMA   Time Division Multiple Access

USCH   Uplink Shared Channel

4 Transport channels

4.1 Transport channels

Transport channels are the services offered by layer 1 to the higher layers. A transport channel is defined by how and with what characteristics data is transferred over the air interface. A general classification of transport channels is into two groups:

- common channels (where there is a need for in-band identification of the UEs when particular UEs are addressed) and

- dedicated channels (where the UEs are identified by the physical channel)

General concepts about transport channels are described in 3GPP RAN TS25.302 (L2 specification).

4.1.1 Dedicated transport channels

The Dedicated Channel (DCH) is a up- or down-link transport channel that is used to carry user or control information between the UTRAN and a UE.

Two types of dedicated transport channels have been identified:

1. Dedicated Channel (DCH)

2. ODMA Dedicated Transport Channel (ODCH)

4.1.2 Common transport channels

Common transport channels are:

1. Broadcast Channel (BCH)

   The Broadcast Channel (BCH) is a downlink transport channel that is used to broadcast system- and cell-specific information.

2. Paging Channel (PCH)

   The Paging Channel (PCH) is a downlink transport channel that is used to carry control information to a mobile station when the system does not know the location cell of the mobile station.

3. Forward Access Channel(s) (FACH)

   The Forward Access Channel (FACH) is a downlink transport channel that is used to carry control information to a mobile station when the system knows the location cell of the mobile station. The FACH may also carry short user packets.

4. Random Access Channel(s) (RACH)

   The Random Access Channel (RACH) is an up link transport channel that is used to carry control information from mobile station. The RACH may also carry short user packets.

5. ODMA Random Access Channel (ORACH)

6. Synchronisation Channel (SCH)

7. Uplink Shared Channel (USCH)
   The uplink shared channel (USCH) is a uplink transport channel shared by several UEs carrying dedicated control or traffic data.

7. Downlink Shared Channel (DSCH)
   The downlink shared channel (DSCH) is a downlink transport channel shared by several UEs carrying dedicated control or traffic data.

5 Physical channels

All physical channels take three-layer structure of superframes, radio frames, and timeslots. 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 is presented in Figure 1.

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.
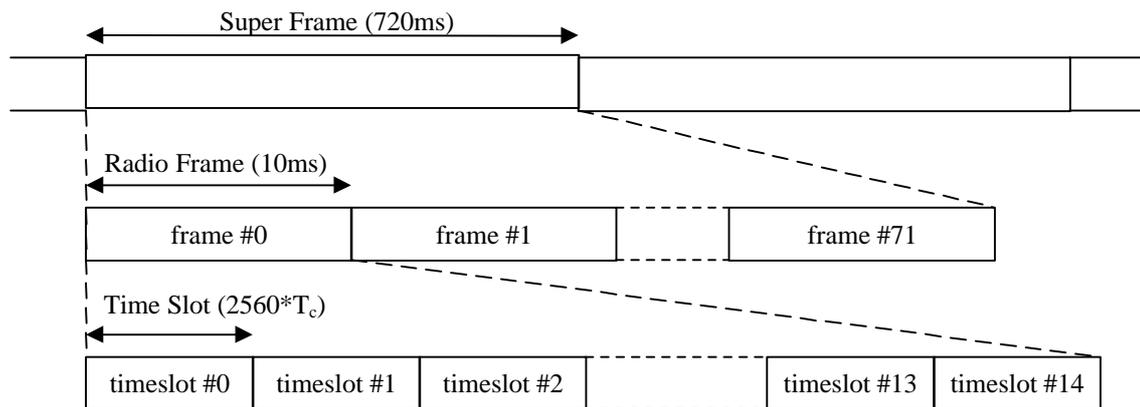
Figure 1 Physical channel signal format

A physical channel in TDD is a burst, which is repeated in the same timeslot with a certain repetition length of consecutive RF in and after each RF defined by a repetition period, starting at a certain frame number defined by the superframe offset in the multiframe, where the repetition period is a submultiple of 72, i.e. 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, or 72, and the superframe offset is in the interval 0...(repetition period-1). The repetition length of each repeated allocation can have the values 1, 2, 4 or 8 frames. It should be equal to the longest interleaving depth of all transport channels on this physical channel.

The data part of the burst is spread with a channelisation code. This 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.

The midamble part of the burst can contain two different types of midambles: a short one of length 256 chips, or a long one of 512 chips. The data rate of the physical channel is depending on the used midamble length.

So a physical channel is defined by frequency, timeslot, channelisation code, burst type, repetition period, superframe offset and repetition length. The scrambling code and the basic midamble code are broadcasted 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.

5.1 Frame structure

The TDMA frame has a duration of 10 ms and is subdivided into 15 time slots (TS) of $2560*T_c$ duration each. A time slot corresponds to 2560 chips. The physical content of the time slots are the bursts of corresponding length as described in section 5.2.2.

Each 10 ms frame consists of 15 time slots, each allocated to either the uplink or the downlink (Figure 2). With such a flexibility , the TDD mode can be adapted to different environments and deployment scenarios. In any configuration at least one time slot has to be allocated for the downlink and at least one time slot has to be allocated for the uplink.
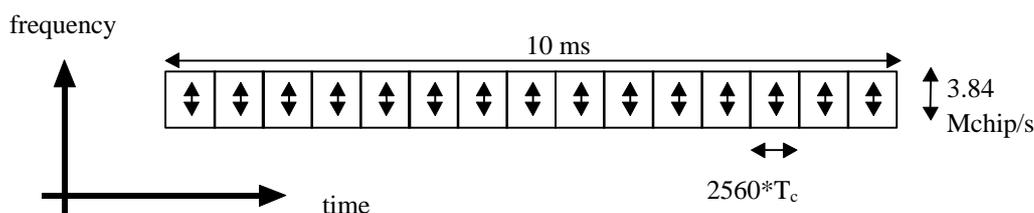
Figure 2 The TDD frame structure

Examples for multiple and single switching point configurations as well as for symmetric and asymmetric

UL/DL allocations are given in Figure 3.

Mulitple-switching-point configuration (symmetric DL/UL allocation)

Multiple-switching-point configuration (asymmetric DL/UL allocation)

Single-switching-point configuration (symmetric DL/UL allocation)

Single-switching-point configuration (asymmetric DL/UL allocation)
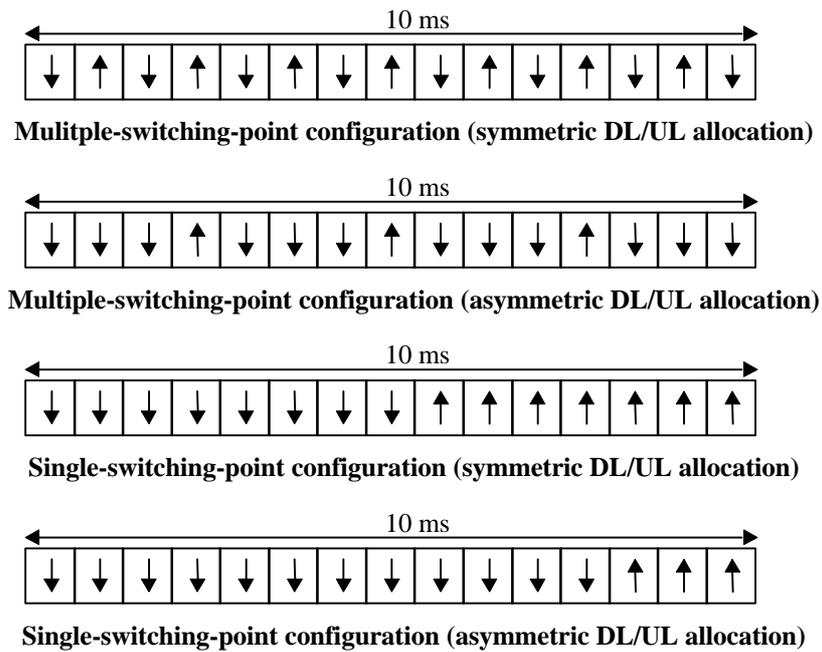
Figure 3   TDD frame structure examples

When operating ODMA at least one common timeslot has to be allocated for the ORACH. If large quantities of information have to be transferred between ODMA nodes then it is normal to use at least one timeslot for the ODCH (Figure 4). As Figure 4 shows, any timeslot in the TDD frame may potentially be used by the ODCH.
A common timeslot indicates a carrier-timeslot combination which can be used for transmission and reception by a group of mobiles operating ODMA.
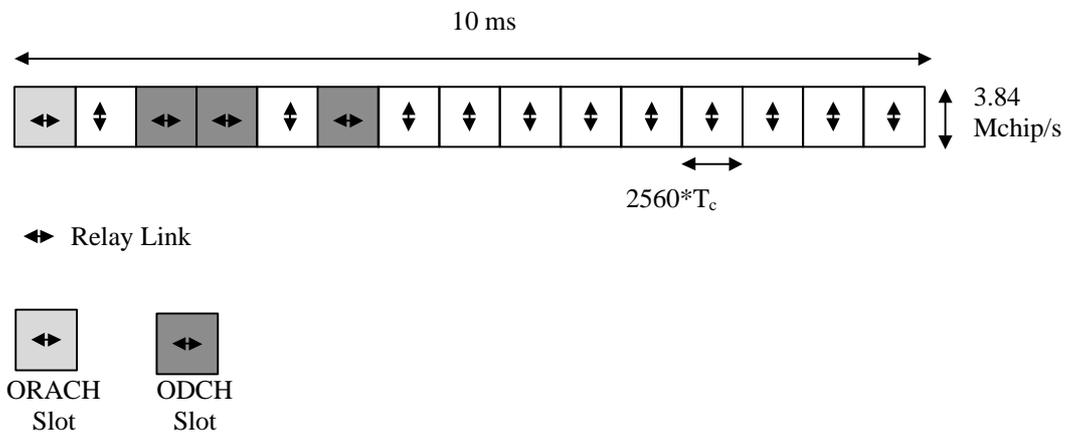
Figure 4 TDD frame structure example for ODMA operation.

5.2 Dedicated physical channel (DPCH)
The DCH or in case of ODMA networks the ODCH as described in section 4.1.1 are mapped onto the dedicated physical channel.

5.2.1 Spreading codes

Two options are being considered for the bursts that can be sent as described below. Both options allow a high degree of bit rate granularity and flexibility, thus allowing the implementation of the whole service range from low to high bit rates.

Spreading factor of and the number of codes for multicode transmission are assigned independently for uplink and downlink. The number of timeslots is also assigned independently for uplink and downlink.

5.2.1.1 Multicode transmission with fixed spreading

Within each time slot of length $2560*T_c$, an additional separation of user signals by spreading codes is used. This means, that within one time slot of length $2560*T_c$, more than one burst of corresponding length as described in section 5.2.2 can be transmitted. These multiple bursts within the same time slot can be allocated to different users as well as partly or all to a single user. For the multiple bursts within the same time slot, different spreading codes are used to allow the distinction of the multiple bursts.

5.2.1.2 Single code transmission with variable spreading

Within each time slot of $2560*T_c$ duration,

- a UE always uses single code transmission by adapting the spreading factor as a function of the data rate. This limits the peak-to-average ratio of the modulated signal and consequently the stress imposed to the power amplifier resulting in an improved terminal autonomy. Several mobiles can be received in the same time slot by the base station, they are separated by their codes and the individual decoding can take profit of the joint detection.
- a base station should broadcast a single burst per mobile again by adapting the spreading as a function of the data rate. High rate data transmissions requiring more than one timeslot per mobile can be supported by terminals having the processing power for joint detection on a single slot : the required throughput occupies in a general way an integer number of slots plus a fraction of an extra slot. Single burst transmission should occur in the integer number of slots, while the extra slot can be occupied by a burst for the considered mobile plus extra bursts for other mobiles, joint detection is only needed for this last time slot in the considered mobile.

5.2.2 Burst Types

As explained in the section 5.2.1, two options are being considered for the spreading. The bursts described in this section can be used for both options.

Two types of bursts for dedicated physical channels are defined: The burst type 1 and the burst type 2. Both consist of two data symbol fields, a midamble and a guard period. The bursts type 1 has a longer midamble of 512 chips than the burst type 2 with a midamble of 256 chips. Sample sets of midambles are given in section 7.2.3.1 and 7.2.3.2.

Because of the longer midamble, the burst type 1 is suited for the uplink, where up to 16 different channel impulse responses can be estimated. The burst type 2 can be used for the downlink and, if the bursts within a time slot are allocated to less than four users, also for the uplink.

Thus the burst type 1 can be used for

- uplink, independent of the number of active users in one time slot

- downlink, independent of the number of active users in one time slot

The burst type 2 can be used for

- uplink, if the bursts within a time slot are allocated to less than four users

- downlink, independent of the number of active users in one time slot

The data fields of the burst type 1 are 976 chips long, whereas the data fields length of the burst type 2 are 1104 chips long. The corresponding number of symbols depends on the spreading factor, as indicated in

Table 1 below. The guard period for the burst type 1and type 2 is 96 chip periods long.

The bursts type 1 and type 2 are shown in Figure 5 and Figure 6. The contents of the burst fields are

described in Table 2 and Table 3.

Table 1 number of symbols per data field in bursts 1 and 2

Spreading factor (Q)	Number of symbols (N) per data field in Burst 1	Number of symbols (N) per data field in Burst 2
1	976	1104
2	488	552
4	244	276
8	122	138
16	61	69

Table 2   The contents of the burst type 1 fields

Chip number (CN)	Length of field in chips	Length of field in symbols		Contents of field
0-975	976	cf Table 1		Data symbols
976-1487	512	-		Midamble
1488-2463	976	cf Table 1		Data symbols
2464-2559	96	-		Guard period

Data symbols 976 chips	Midamble 512 chips	Data symbols 976 chips	GP 96 CP

$2560*T_c$
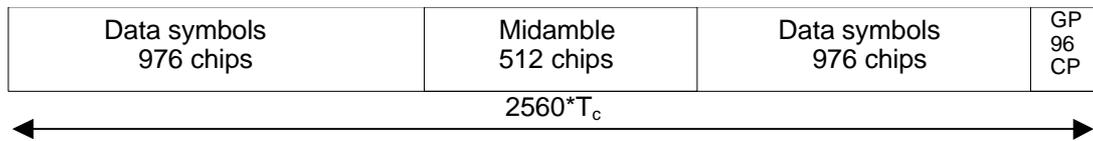
Figure 5 Burst structure of the burst type 1. GP denotes the guard period and CP the chip periods.

Table 3   The contents of the burst type 2 fields

Chip number (CN)	Length of field in chips	Length of field in symbols		Contents of field
0-1103	1104	cf Table 1		Data symbols
1104-1359	256	-		Midamble
1360-2463	1104	cf Table 1		Data symbols
2464-2559	96	-		Guard period

Data symbols 1104 chips	Midamble 256 chips	Data symbols 1104 chips	GP 96 CP

$2560*T_c$
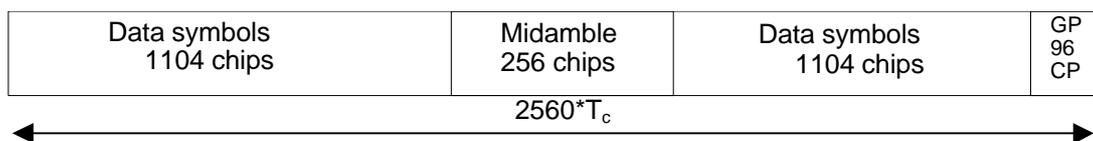
**Figure 6 Burst structure of the burst type 2. GP denotes the guard period and CP the chip periods.**

The two different bursts defined here are well-suited for the different applications mentioned above. It may be

possible to further optimise the burst structure for specific applications, for instance for unlicensed operation.

5.2.2.1 Transmission of TFCI

Both burst types 1 and 2 provide the possibility for transmission of TFCI both in up- and downlink.

The transmission of TFCI is negotiated at call setup and can be re-negotiated during the call. This means, it is indicated whether the TFCI is applied or not and how many bits are to be allocated for this purpose. If applied, transmission of TFCI is done in the data parts of the traffic burst. Hence the midamble structure and length is not changed. The TFCI information is to be transmitted directly adjacent to the midamble, possibly after the TPC. Figure 7 shows the position of the TFCI in a traffic burst, if no TPC is transmitted. Figure 8 shows the position of the TFCI in a traffic burst, if TPC is transmitted.
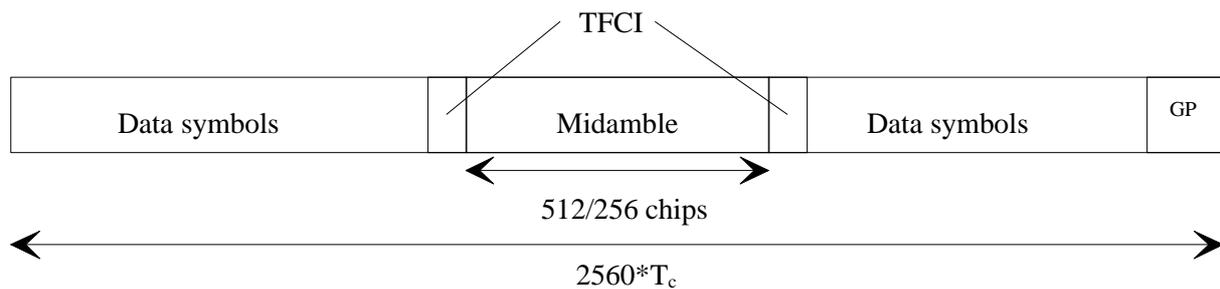
Figure 7 Position of TFCI information in the traffic burst in case of no TPC
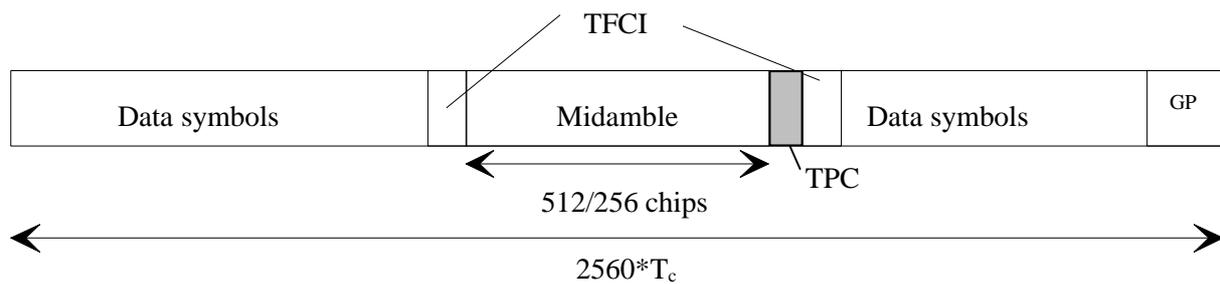
Figure 8 Position of TFCI information in the traffic burst in case of TPC

For every user the TFCI information is to be transmitted once per frame. Different numbers of symbols can be allocated for TFCI. The TFCI is spread with the same spreading factor (SF) as the data parts. The SF of the burst which contains the TFCI is applied to both data and signalling and shall be constant, except when a negotiation between transmitter and receiver initiates a change of the SF. Variable Data Rates shall be handled by DTX.

Two examples of TFCI transmission in the case of multiple DPCHs used for a connection are given in the Figure 9 and Figure 10 below. Combinations of the two schemes shown are also applicable. It should be noted that the SF can vary for the DPCHs not carrying TFCI information.
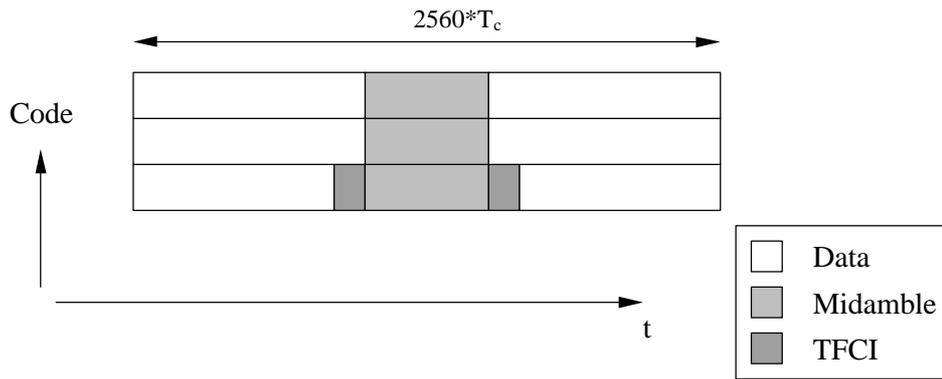
Figure 9 Example of TFCI transmission with physical channels multiplexed in code domain
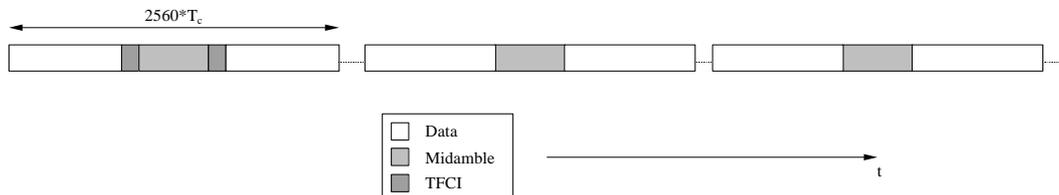
Figure 10 Example of TFCI transmission with physical channels multiplexed in time domain

5.2.2.2 Transmission of TPC

Both burst types 1 and 2 for dedicated channels provide the possibility for transmission of TPC in uplink.

The transmission of TPC is negotiated at call setup and can be re-negotiated during the call. If applied, transmission of TPC is done in the data parts of the traffic burst. Hence the midamble structure and length is not changed. The TPC information is to be transmitted directly after the midamble. Figure 11 shows the position of the TPC in a traffic burst.

For every user the TPC information is to be transmitted once per frame. The TPC is spread with the same spreading factor (SF) as the data parts. TPC and TFCI are always transmitted in the same physical channel.
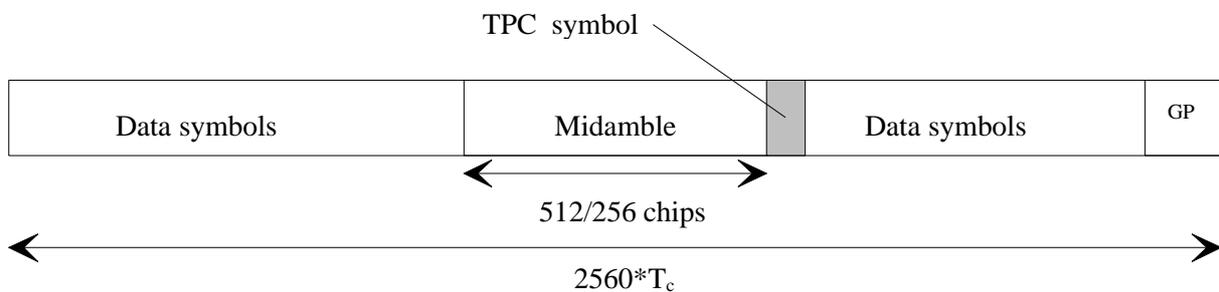
Figure 11 Position of TPC information in the traffic burst

5.2.3 Training sequences for spread bursts

As explained in the section 5.2.1, two options are being considered for the spreading. The training sequences presented here are common to both options.

The training sequences, i.e. midambles, of different users active in the same time slot are time shifted versions of one single periodic basic code. Different cells use different periodic basic codes, i.e. different midamble sets. In this way a joint channel estimation for the channel impulse responses of all active users within one time slot can be done by one single cyclic correlation. The different user specific channel impulse response estimates are obtained sequentially in time at the output of the correlator. Following this principle it is shown hereafter how to derive the midambles from the periodic basic code.

Section 5.2.2 contains a description of the spread speech/data bursts. These bursts contain Lm midamble chips, which are also termed midamble elements. The Lm elements $\underline{m}_i^{(k)}$; i=1,...,Lm; k=1,...,K; of the midamble codes $\underline{\mathbf{m}}^{(k)}$; k=1,...,K; are taken from the complex set

$$\underline{V}_m = \{1, j, -1, -j\}.\tag{1}$$

K is the maximum number of users, i.e. the available number of spreading codes per time slot.

The elements $\underline{m}_i^{(k)}$ of the complex midamble codes $\underline{\mathbf{m}}^{(k)}$ fulfil the relation

$$\underline{m}_i^{(k)} = (j)^i \cdot m_i^{(k)} \quad m_i^{(k)} \in \{1, -1\}; i = 1,...,L_m; k = 1,...,K.\tag{2}$$

Hence, the elements $\underline{m}_i^{(k)}$ of the complex midamble codes $\underline{\mathbf{m}}^{(k)}$ of the K users are alternating real and imaginary.

With W being the number of taps of the impulse response of the mobile radio channels, the Lm binary elements $m_i^{(k)}; i = 1,...,L_m; k = 1,...,K;$ of (2) for the complex midambles $\underline{\mathbf{m}}^{(k)}$; k=1,...,K; of the K users are generated according to the following method from a single periodic basic code

$$\mathbf{m} = \left(m_1, m_2, ..., m_{L_m + (K'-1)W + \lfloor P/K \rfloor}\right)^T \quad m_i \in \{1, -1\}; \ i = 1,...,(L_m + (K'-1)W + \lfloor P/K \rfloor).\tag{3}$$

$\lfloor x \rfloor$ denotes the largest integer smaller or equal to x, K' = K/2.

The elements $m_i; i = 1,...,(L_m + (K'-1)W + \lfloor P/K \rfloor),$ of (3) fulfil the relation

$$m_i = m_{i-P} \text{ for the subset } i = (P+1),...,(L_m + (K'-1)W + \lfloor P/K \rfloor).\tag{4}$$

The P elements $m_i; i = 1,...,P,$ of one period of m according to (3) are contained in the vector

$$\mathbf{m}_P = (m_1, m_2, ..., m_P)^T.\tag{5}$$

With $\mathbf{m}$ according to (3) the Lm binary elements $m_i^{(k)}; i = 1,...,L_m; k = 1,...,K;$ of (2) for the midambles of the first K' users are generated based on the following formula

$$m_i^{(k)} = m_{i+(K-k)W} \quad i = 1,...,L_m; k = 1,...,K.\tag{6}$$

The midambles for the second K' users are generated based on a slight modification of this formula introducing intermediate shifts

$$m_i^{(k)} = m_{i+(K'-k)W + \lfloor P/K \rfloor} \quad i = 1,...,L_m; k = K'+1,...,K.\tag{7}$$

Whether intermediate shifts are allowed in a cell is broadcast on the BCH.

In the following the term 'a midamble code set' or 'a midamble code family' denotes K specific midamble codes $\underline{\mathbf{m}}^{(k)}$; k=1,...,K. Different midamble code sets $\underline{\mathbf{m}}^{(k)}$; k=1,...,K; are specified based on different periods $\mathbf{m}_P$ according (5).

In adjacent cells of the cellular mobile radio system, different midamble codes sets $\underline{\mathbf{m}}^{(k)}$; k=1,...,K; should be used to guarantee a proper channel estimation.

As mentioned above a single midamble code set $\underline{\mathbf{m}}^{(k)}$; k=1,...,K; consisting of K midamble codes is based on a single period $\mathbf{m}_P$ according to (5).

In the Annex A the periods $\mathbf{m}_P$ according to (5), i.e. the Basic Midamble Codes, which shall be used to generate different midamble code sets $\underline{\mathbf{m}}^{(k)}$; k=1,...,K; are listed in tables in a hexadecimal representation. As shown in Table 4 always 4 binary elements m_i are mapped on a single hexadecimal digit.

Table 4   Mapping of 4 binary elements m_i on a single hexadecimal digits

4 binary elements m_i	Mapped on hexadecimal digit
-1 -1 -1 -1	0
-1 -1 -1 1	1
-1 -1 1 –1	2
-1 -1 1 1	3
-1 1 -1 –1	4
-1 1 -1 1	5
-1 1 1 –1	6
-1 1 1 1	7
1 -1 -1 –1	8
1 -1 -1 1	9
1 -1 1 –1	A
1 -1 1 1	B
1 1 -1 –1	C
1 1 -1 1	D
1 1 1 –1	E
1 1 1 1	F

As different Basic Midamble Codes are required for different burst formats, the Annex A shows the codes m_{PL} for burst type 1 and m_{PS} for burst type 2. It should be noted that the different burst types must not be mixed in the same timeslot of one cell.

5.2.3.1 Midamble Transmit Power
If in the downlink all users in one time slot have a common midamble, the transmit power of this common midamble is such that there is no power offset between the data part and the midamble part of the transmit signal within the time slot.

In the case of user specific midambles, the transmit power of the user specific midamble is such that there is no power offset between the data parts and the midamble part for this user within one slot.

5.2.4 Beamforming and Transmit Diversity

When DL beamforming or TX Diversity is used, at least that user to which beamforming/Tx Diversity is applied and which has a dedicated channel shall get one individual midamble according to chapter 5.2.3, even in DL.

5.3 Common control physical channels (CCPCH)

5.3.1 Downlink common control physical channel
Either the BCH, the PCH or the FACH as described in section 4.1.2 are mapped onto one or more downlink common control physical channels (CCPCH). In such a way the capacity of BCH, PCH and FACH can be adopted depending on the operators need.

5.3.1.1 Spreading codes
The downlink CCPCH uses fixed spreading with a spreading factor SF = 16 as described in section 5.2.1.1.

5.3.1.2 Burst Types
The burst type 1 as described in section 5.2.2 is used for the downlink CCPCH. No TFCI is applied for CCPCHs.

5.3.1.3 Training sequences for spread bursts
The training sequences, i.e. midambles, as described in section 5.2.3are used for the downlink CCPCH.

5.3.1.4 Primary Common Control Physical Channels (PCCPCH)
A CCPCH is referred to as Primary Common Control Physical Channel (PCCPCH) if it is characterised by:
* Transmitted with reference power
* No beamforming
* Known position (timeslot, burst format and code) in frame. The position is known from the Synchronisation Channel (SCH), see section 5.4.
* Carrying BCH

If another physical channel is allocated to the same channelisation code and same timeslot as a PCCPCH, i.e. the same physical resource is used in a multiframe pattern, then this channel has also to use reference power and no beamforming can be applied.

5.3.2 The physical random access channel (PRACH)
The RACH or in case of ODMA networks the ORACH as described in section 4.1.2 are mapped onto one or more uplink physical random access channels (PRACH). In such a way the capacity of RACH and ORACH can be flexibly scaled depending on the operators need.

This description of the physical properties of the PRACH also applies to bursts carrying other signaling or user traffic if they are scheduled on a time slot which is (partly) allocated to the RACH or ORACH.

5.3.2.1 PRACH Spreading codes
The uplink PRACH uses either spreading factor SF=16 or SF=8 as described in section 5.2.1.1. The set of admissible spreading codes for use on the PRACH and the associated spreading factors are broadcast on the BCH (within the RACH configuration parameters on the BCH, see Ref.[3])

5.3.2.2 PRACH Burst Types
The mobile stations send the uplink access bursts randomly in the PRACH. The PRACH burst consists of two data symbol fields, a midamble and a guard period. The second data symbol field is shorter than the first symbol data field by 96 chips in order to provide additional guard time at the end of the PRACH time slot.

The precise number of collision groups depends on the spreading codes (i.e. the selected RACH configuration. The access burst is depicted in Figure 10, the contents of the access burst fields are listed in Table 7 and Table 8.

Data symbols 976 chips	Midamble 512 chips	Data symbols 880 chips	GP 192 CP

2560*T_c
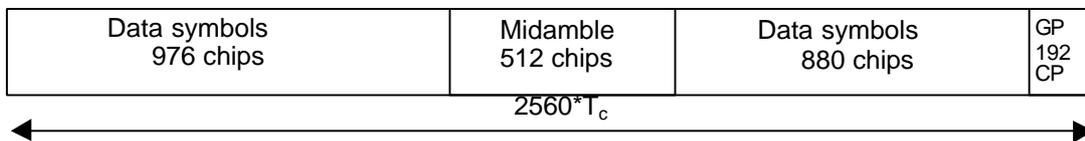
Figure 12 PRACH burst, GP denotes the guard period

Table 7 number of symbols per data field in PRACH burst

Spreading factor (Q)	Number of symbols in data field 1	Number of symbols in data field 2
8	122	110
16	61	55

Table 8   The contents of the PRACH burst field

uneven k=1,3,5,...≤K' (for cells with large radius). Different cells use different periodic basic codes, i.e. different midamble sets.

For cells with large radius additional midambles may be derived from the time-inverted Basic Midamble Sequence. Thus, the second Basic Midamble Code m_2 is the time inverted version of Basic Midamble Code m_1.

In this way, a joint channel estimation for the channel impulse responses of all active users within one time slot can be performed by a maximum of two cyclic correlations (in cells with small radius, a single cyclic correlator suffices). The different user specific channel impulse response estimates are obtained sequentially in time at the output of the cyclic correlators.

5.3.2.4 Association between Training Sequences and Spreading Codes

For the PRACH there exists a fixed association between the training sequence and the spreading code. The generic rule to define this association is based on the order of the spreading codes $\mathbf{a}_Q^{(k)}$ given by k and the order of the midambles $\mathbf{m}_j^{(k)}$ given by k, firstly, and j, secondly, with the constraint that the midamble for a spreading factor Q is the same as in the upper branch for the spreading factor $2Q$. The index $j=1$ or 2 indicates whether the original Basic Midamble Sequence (j=1) or the time-inverted Basic Midamble Sequence is used (j=2).

♦ For the case that all *k* are allowed and only one periodic basic code m_1 is available for the RACH, the association depicted in Figure 13 is straightforward.

♦ For the case that only odd *k* are allowed the principle of the association is shown in Figure 14. This association is applied for one and two basic periodic codes.

$m_1^{(1)} - a_8^{(1)}$

$m_1^{(1)} - a_{16}^{(1)}$

$m_1^{(2)} - a_{16}^{(2)}$

$m_1^{(3)} - a_8^{(2)}$

$m_1^{(3)} - a_{16}^{(3)}$

$m_1^{(4)} - a_{16}^{(4)}$

$m_1^{(5)} - a_8^{(3)}$

$m_1^{(5)} - a_{16}^{(5)}$

$m_1^{(6)} - a_{16}^{(6)}$

$m_1^{(7)} - a_8^{(4)}$

$m_1^{(7)} - a_{16}^{(7)}$

$m_1^{(8)} - a_{16}^{(8)}$

$m_1^{(2)} - a_8^{(5)}$

$m_1^{(4)} - a_8^{(6)}$

$m_1^{(6)} - a_8^{(7)}$

$m_1^{(8)} - a_8^{(8)}$
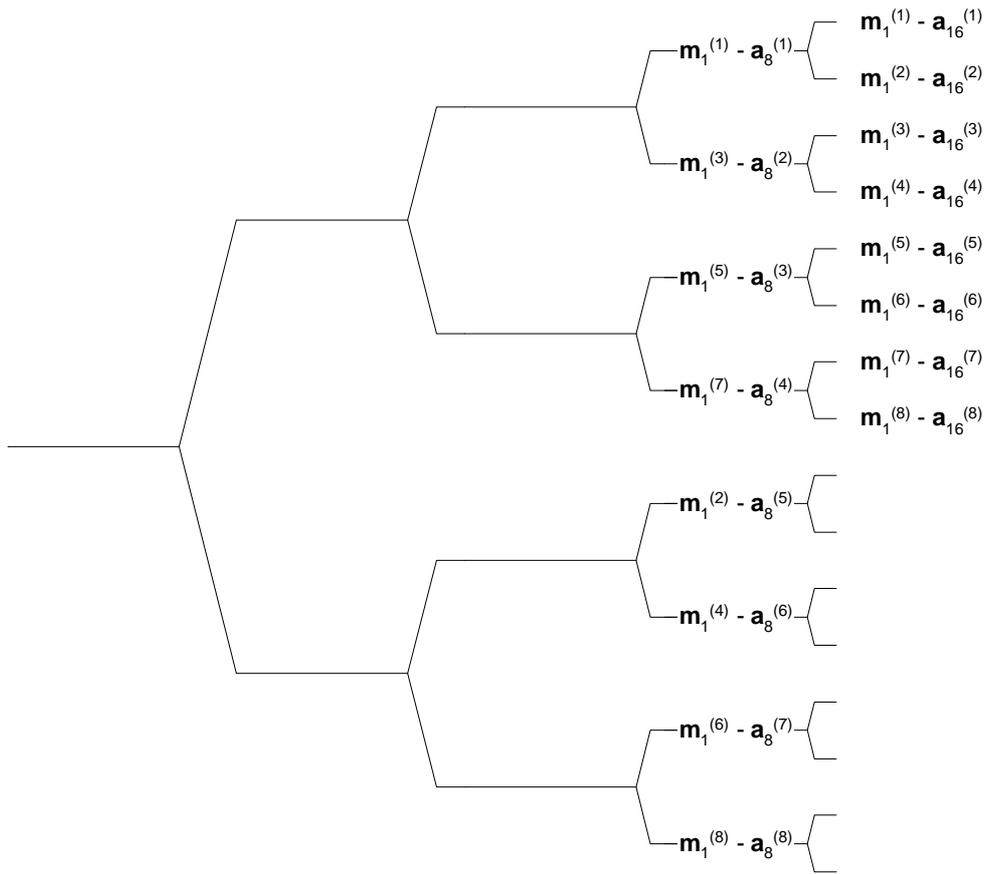
Figure 13 Association of Midambles to Spreading Codes in the OVSF tree for all *k*
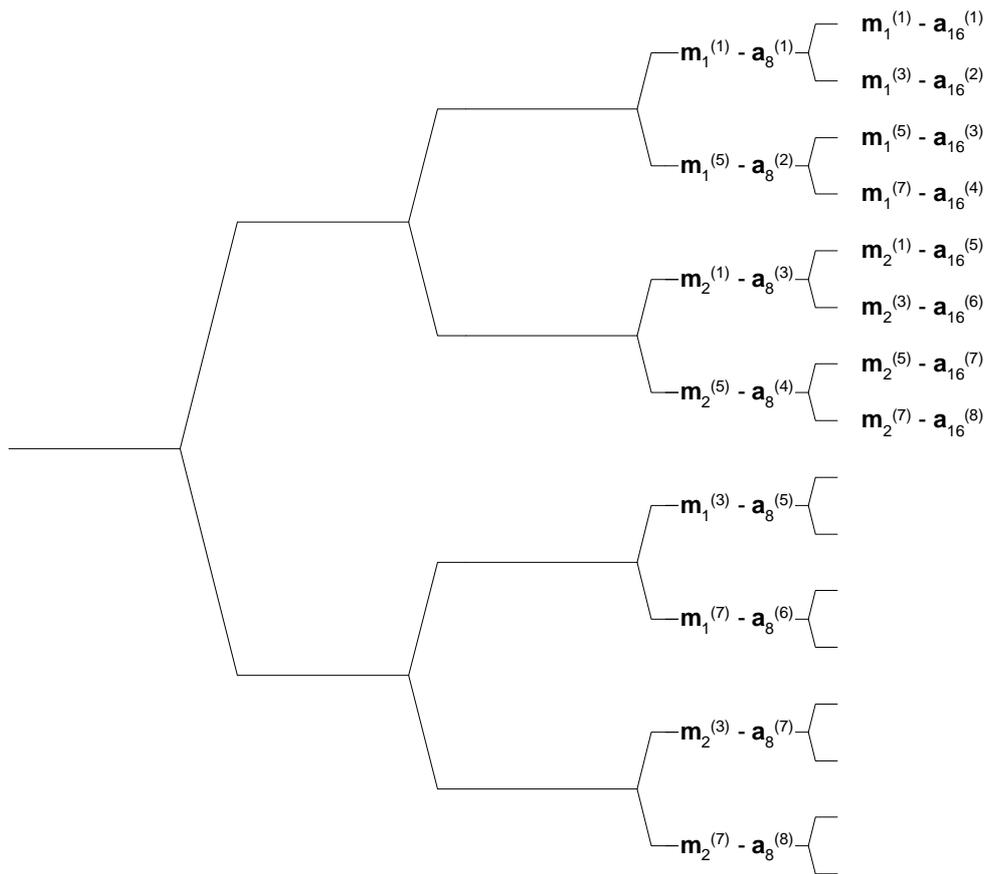
Figure 14 Association of Midambles to Spreading Codes in the OVSF tree for odd k

5.4 The physical synchronisation channel (PSCH)

In TDD mode code group of a cell can be derived from the synchronisation channel. Additional information, received from higher layers on SCH transport channel, is also transmitted to the UE in PSCH in case 3 from below. In order not to limit the uplink/downlink asymmetry the PSCH is mapped on one or two downlink slots per frame only.

There are three cases of PSCH and PCCPCH allocation as follows:

Case 1) PSCH and PCCPCH allocated in TS#k, k=0….14

Case 2) PSCH in two TS and PCCPCH in the same two TS: TS#k and TS#k+8, k=0…6

Case 3) PSCH in two TS, TS#k and TS#k+8, k=0…6, and the PCCPCH in TS#i, i=0…14, pointed by PSCH. Pointing is determined via the SCH from the higher layers.

These three cases are addressed by higher layers using the SCCH in TDD Mode. The position of PSCH (value of k) in frame can change on a long term basis in any case.

Due to this PSCH scheme, the position of PCCPCH is known from the PSCH. The PCCPCH are using burst type 1, spreading code $a_{Q=16}^{(k=1)}$ and midamble $m_1^{(1)}$. To simplify measurements of PCCPCH power, this midamble shall not be used by other physical channels in the same timeslot.

Figure 15 is an example for transmission of PSCH, k=0, of Case 2 or Case 3.
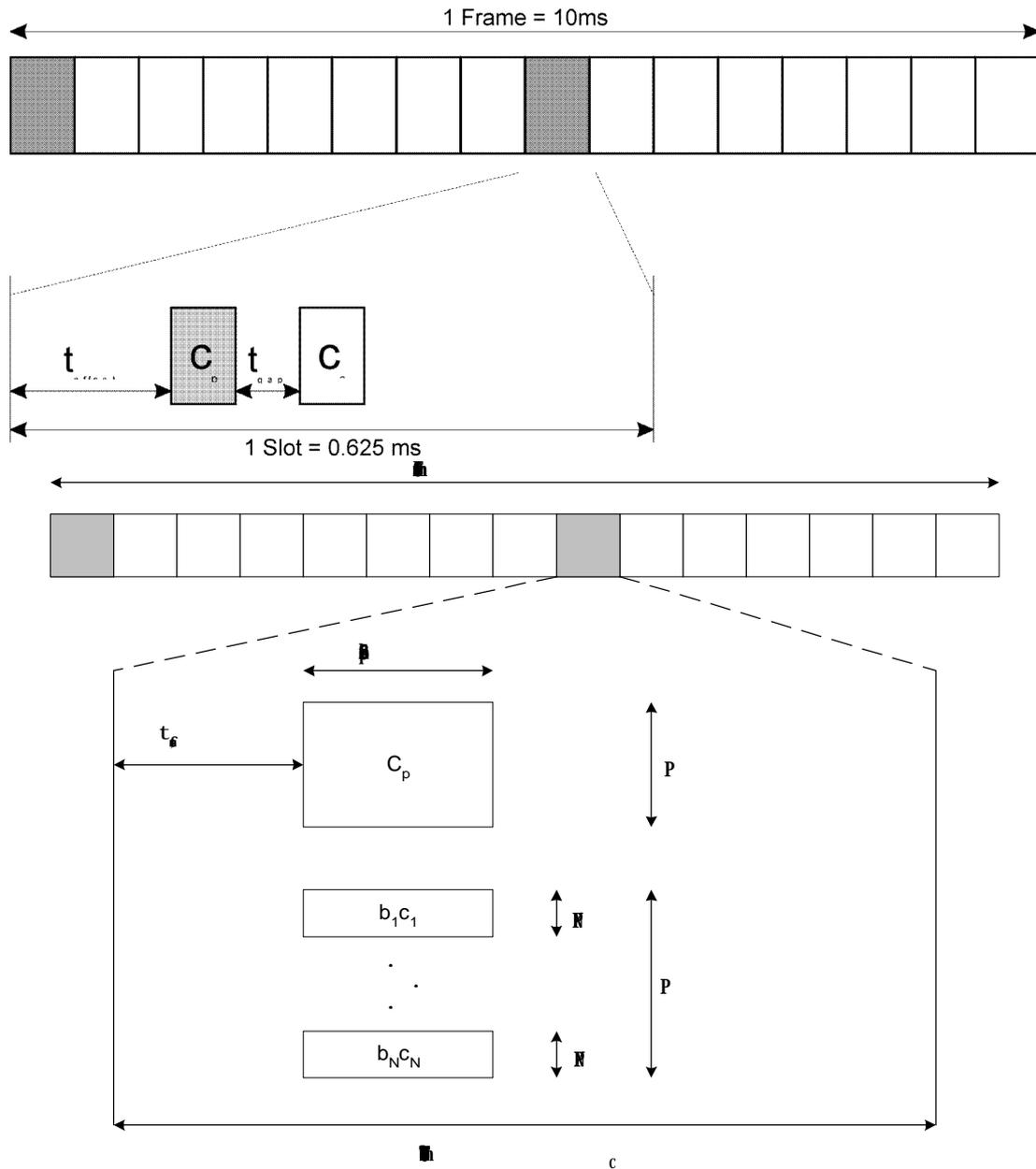
Figure 15 Scheme for Physical Synchronisation channel PSCH consisting of one primary sequence C_p and N=3 parallel secondary sequences in slot k and k+8

(example for k=0 in Case 2 or Case 3)

As depicted in Figure 15, the PSCH consists of a primary and three secondary code sequences with 256 chips length. The primary and secondary code sequences are defined in TS 25.223 chapter 7 'Synchronisation codes'. The secondary codes are transmitted either in the I channel or the Q channel, depending on the code group.

Due to mobile to mobile interference, it is mandatory for public TDD systems to keep synchronisation between base stations. As a consequence of this, a capture effect concerning PSCH can arise. The time offset t_{offset} enables the system to overcome the capture effect.

The time offset t_{offset} is one of 32 values, depending on the cell parameter, thus on the code group of the cell, cf. 'Table 7 Mapping scheme for Cell Parameters, Code Groups, Scrambling Codes, Midambles and t_{offset}' in [8]. The exact value for t_{offset}, regarding column 'Associated t_{offset}' in Table 7 from [8] is given by:

$$t_{offset,n} = n \cdot T_c \left\lfloor \frac{2560 - 96 - 256}{31} \right\rfloor$$
$$= n \cdot 71 T_c \; ; \quad n = 0, \ldots, 31$$

Please note that $\lfloor x \rfloor$ denotes the largest integer number less or equal to x and that T_c denotes the chip duration.

5.5 Physical Uplink Shared Channel (PUSCH)

For Physical Uplink Shared Channel (PUSCH) the burst structure of DPCH as described in section 5.2 shall be used. User specific physical layer parameters like power control, timing advance or directive antenna settings are derived from the associated channel (FACH or DCH). PUSCH provides the possibility for transmission of TFCI in uplink.

5.6 Physical Downlink Shared Channel (PDSCH)

For Physical Downlink Shared Channel (PDSCH) the burst structure of DPCH as described in section 5.2 shall be used. User specific physical layer parameters like power control or directive antenna settings are derived from the associated channel (FACH or DCH). PDSCH provides the possibility for transmission of TFCI in downlink.

To indicate to the UE that there is data to decode on the DSCH, three signalling methods are available:
1) using the TFCI field of the associated channel or PDSCH
2) using on the DSCH user specific midamble derived from the set of midambles used for that cell
3) using higher layer signalling.

When the midamble based method is used, the UE shall decode the PDSCH if the PDSCH was transmitted with the midamble indicated for the UE by UTRAN.

5.7 The Page Indicator Channel (PICH)

The Page Indicator Channel (PICH) is a physical channel used to carry the Page Indicators (PI). The PICH substitutes one or more paging sub-channels that are mapped on a CCPCH, see 6.2.2. The page indicator indicates a paging message for one or more UEs that are associated with it.

The page indicators of length $L_{PI}=2$, $L_{PI}=4$ or $L_{PI}=8$ symbols are transmitted in a normal burst (type 1 or 2) as seen in figure 24. The PI may be repeated within one superframe. The number of repetitions within one superframe is given by the repetition factor RF_{PI}. The number of page indicators N_{PI} per superframe is given by the number of time slots per superframe N_{PICH}, used for the PICH, the number L_{PI} of symbols for the page indicators, the burst type BT and the repetition factor of the paging indicators, RF_{PI}. The same burst type is used for the PICH in every cell. In case of $L_{PI}=4$ or $L_{PI}=8$, one symbol in each data part adjacent to the midamble is left over. These symbols are filled by dummy bits that are transmitted with the same power as the PI. Figure 24 shows an example for $L_{PI}=4$, BT 1, $N_{PICH}=4$, $RF_{PI}=2$.
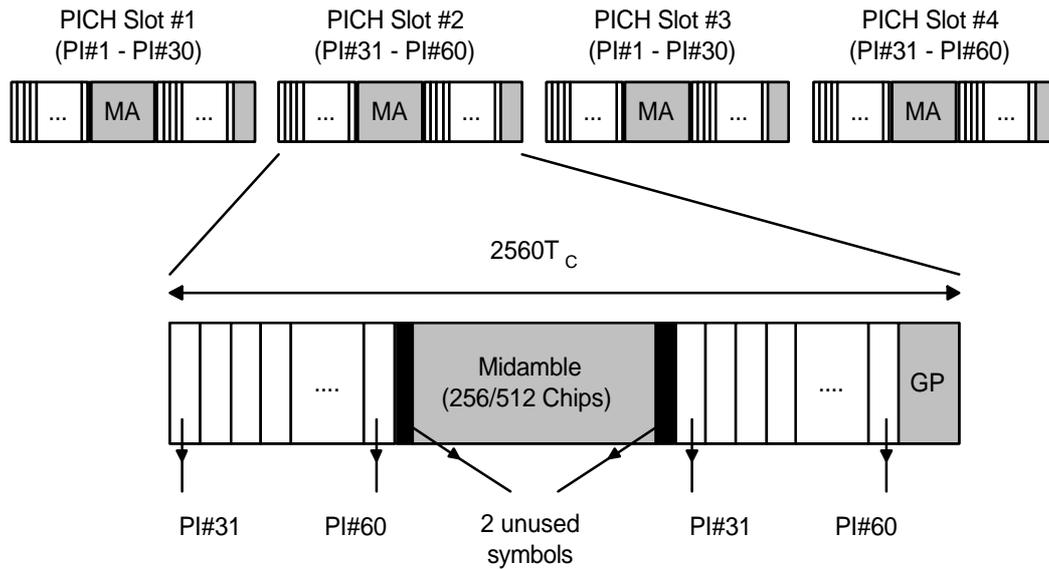
Figure 16 Example of PI Transmission in the PICH

6 Mapping of transport channels to physical channels

This section describes the way in which transport channels are mapped onto physical resources, see Figure 17.

Figure 17 Transport channel to physical channel mapping

6.1 Dedicated Transport Channels

A dedicated transport channel is mapped onto one or more physical channels. An interleaving period is associated with each allocation. The frame is subdivided into slots that are available for uplink and downlink information transfer. The mapping of transport blocks on physical channels is described in TS25.222 ("multiplexing and channel coding").
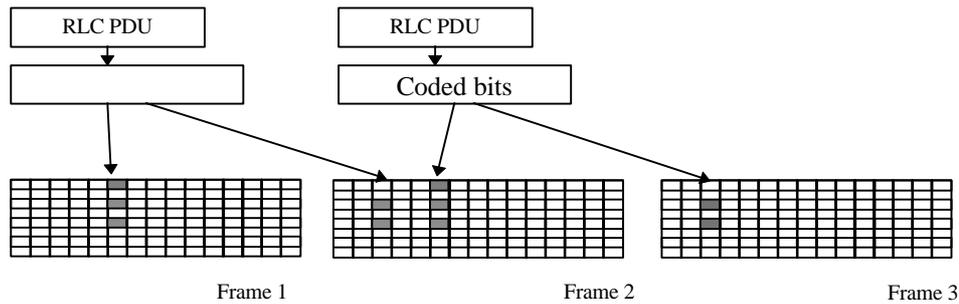
Figure 18 Mapping of PDU onto the physical bearer

For NRT packet data services, shared channels (USCH and DSCH) can be used to allow efficient allocations for a short period of time.

An ODCH is also mapped onto one or more sets of slots and codes within a TDD frame as shown in Figure 6. The actual transmission mode (i.e. combination of slots, codes, TX power, interleaving depth etc.) chosen for a relay link will be negotiated between nodes prior to transmission. Several of these transmission mode parameters can be adapted during transmission due to changes in propagation and data traffic.

6.2 Common Transport Channels

6.2.1 The Broadcast Channel (BCH)

The BCH is mapped on one or several CCPCHs. The secondary SCH indicates in which timeslot a mobile can find the PCCPCH containing BCH. If the BCH uses more resources than PCCPCH, the BCH in PCCPCH comprises a pointer to additional CCPCH resources for BCH. The CCPCHs allocated by BCH can be shared with other common control channels, e.g. PCH or FACH, according to a multi-frame structure.

6.2.2 The Paging Channel (PCH)

The PCH is mapped onto one or several CCPCHs so that capacity can be matched to requirements. The location of the PCH is indicated on the BCH. It is always transmitted at a reference power level.

To allow an efficient DRX, the PCH is divided into several paging sub-channels within the multiframe structure of one superframe. Examples of multiframe structures are given in the Annex B of this document. Each paging sub-channel is mapped on 2 consecutive frames that are allocated to the PCH on the same CCPCH. Thus, the number of paging sub-channels per CCPCH is half of the number of frames used for the PCH in one superframe. Layer 3 information to a particular paging group is transmitted only in the associated paging sub-channel. The assignment of UEs to paging groups is independent of the assignment of UEs to page indicators.

6.2.3 The Forward Channel (FACH)

The FACH is mapped one or several CCPCHs. The location of the FACH is indicated on the BCH and both, capacity and location can be changed, if required. FACH may or may not be power controlled.

6.2.4 The Random Access Channel (RACH)

The RACH has intraslot interleaving only and is mapped onto PRACH. The same slot may be used for PRACH by more than one cell. Multiple transmissions using different spreading codes may be received in parallel. More than one slot per frame may be administered for the PRACH. The location of slots allocated to PRACH is broadcast on the BCH. The PRACH uses open loop power control. The details of the employed open loop power control algorithm may be different from the corresponding algorithm on other channels.

6.2.5 The Synchronisation Channel (SCH)
The SCH is mapped onto the PSCH as described in section 5.4.

6.2.6 Common Transport Channels for ODMA networks

The ORACH is used to transfer short probes or short protocol data units (PDU) between one or more nodes for routing and resource allocation control.

To limit the transmission time of short probe PDUs on the ORACH then this data should be transmitted as one burst on one code. That is, one probe burst should be transmitted on one $2560*T_c$ timeslot (which as described in section 5.1 would be configured as an ORACH slot).

Since the ORACH is a common control channel used to transfer probes between one or more nodes a common fixed spreading factor should be adopted.

6.2.7 The Uplink Shared Channel (USCH)
The uplink shared channel is mapped on one or several PUSCH, see section 5.5.

6.2.8 The Downlink Shared Channel (DSCH)
The downlink shared channel is mapped on one or several PDSCH, see section 5.6.

Annex A

A.1 Basic Midamble Codes for Burst Type 1 and PRACH Burst Type

In the case of burst type 1 (see section 5.2.2) or in the case of PRACH burst the midamble has a length of Lm=512 , which is corresponding to:

K'=8; W=57; P=456.

Depending on the possible delay spread cells are configured to use midambles which are generated from the Basic Midamble Codes (see Table A-1)

- for all k=1,2,...,K; K=2K' or

- for k=1,2,...,K', only, or

- for odd k=1,3,5,...,≤ K', only.

Depending on the cell size midambles for PRACH are generated from the Basic Midamble Codes (see Table A-1)

- for k=1,2,...,K' or

- for odd k=1,3,5,...,≤ K', only.

The cell configuration is broadcast on BCH.

The mapping of these Basic Midamble Codes to Cell Parameters is shown in TS25.223.

Table A-1: **Basic Midamble Codes** $\mathbf{m}_P$ **according to equation (5) from section 5.2.3 for case of burst type 1**

Code ID	Basic Midamble Codes m_{PL} of length P=456
m_{PL0}	8DF65B01E4650910A4BF89992E48F43860B07FE55FA0028E454EDCD1F0A09A6F0296 68F55427253FB8A71E5EF2EF360E539C489584413C6DC4
m_{PL1}	4C63F9BC3FD7B655D5401653BE75E1018DC26D271AADA1CF13FD348386759506270 F2F953E93A44468E0A76605EAE8526225903B1201077602
m_{PL2}	8522611FFCAEB55A5F07D966036C852E7B15B893B3ABA9672C327380283D168564B8 E1200F0E2205AF1BB23A58679899785CFA2A6C131CFDC4
m_{PL3}	F58107E6B777C221999BDE9340E192DC6C31AB8AE85E70AA9BBEB39727435412A5A 27C0EF73AB453ED0D28E5B032B94306EC1304736C91E922
m_{PL4}	89670985013DFD2223164B68A63BD58C7867E97316742D3ABD6CBDA4FC4E08C0B0C BE44451575C72F887507956BD1F27C466681800B4B016EE
m_{PL5}	FCDEF63500D6745CDB962594AF171740241E982E9210FC238C4DD85541F08C1A010 F7B3161A7F4DF19BAD916FD308AB1CED2A32538C184E92C
m_{PL6}	DB04CE77A5BA7C0E09B6D3551072B11A7A43B6A355C1D6FDCF725D5878749998957 48DD09832ABC35CEC3008338249612E6FE5005E13B03103
m_{PL7}	D2F61A622D0BA9E448CD29587D398EF8CDC3B6582B6CDD50E9E20BF5FE2B325804 1E14D60821DC6725132C22D787CD5D497780D4241E3B420D
m_{PL8}	7318524E62D806FA149ECC5435058A2B74111524B84727FE9A7923B4A1F0D8FCD892 08F34BEE5CADEB90130F9954BB30605A98C11045FF173D
m_{PL9}	8E832B4FA1A11E0BF318E84F54725C8052E0D099EF0AF54BC342BEE44976C9F38DE 701623C7BF6474DF90D2E2222A4915C8080E7CD3EC84DAC
m_{PL10}	CFA5BAC90780876C417933C43103B55699A8AD51164E590AF9DA6AF0C18804E1F748 62F00CE7ECC899C85B6ABB0CAD5E50836AD7A39878FE2F
m_{PL11}	AD539094A19858A75458F1B98E286A4F7DC3A117083D04724CBE83F34102817C5531 329CDB437FFF712241B644BDF0C1FEC8598A63C2F21BD7
m_{PL12}	BEB8483139529BDE23E42DA6AB8170DD0BFBB30CE28A4502FAF3C8EDA219B9A6D5 B849D9C9E4451F74E2408EA046061201E0C1D69CF48F3A94
m_{PL13}	C482462CA7846266060D21688BA00B72E1EC84A3D5B7194C8DA39E21A3CE12BF512 C8AAB6A7079F73C0D3E4F40AC555A4BCC453F1DFE3F6C82

m_{PL14}	9663373935FD5C213AC58C0670206683D579D2526C05B0A81030DDF61A221D8A68EA D8D6F7AA0D662C07C6DCD0115A54D39F03F7122B0675AC
m_{PL15}	387397AE5CD3F2B3912C26B8F87CE82CEFEC55507DB08FB0C4CF2FD6858896201A CA7264281D0298440DD3481E5E9DDB24C16F30EB7A22948A
m_{PL16}	AFE9266843C892571B6230D808788C63B9065EA3BDFF687B92B8734A8D7099559FEA 22C9416576D0C087EB4503E87E356471B330182A24A3E6
m_{PL17}	6E6C550A4CB74010F6C3E0328651DF421C456D9A5E8AE9D3946C10189D72B579184 552EE3E799970969C870FE8A37B6C4BA890992103486DC0
m_{PL18}	D803CA71B6F99CFB3105D40F4695D61EB0B62E803F79302EE3D2A6BF12EA70D304B 181E8B38B3B74F5022B67EB8109808C62532688C563D4BE
m_{PL19}	E599ED48D01772055DBE9D343A4EA5EABE643DA38F06904FC7523B08C4101F021B1 99AF759A00D9AC298881D79413A77470992A75C771492D0
m_{PL20}	9F30AC4162CE5D185953705F3D45F026F38E9B5721AEFE07370214D526A2C4B344B5 08B57BFB2492320C05903C79CBEE08C6E7F218B57E14D6
m_{PL21}	B5971060DA84685B4D042ED0189FAF13C961B2EF61CC164E363B22AAB14AC8AF607 906C1C6E04F2054C687AA6741A9E70639857DA02B6FFFFA
m_{PL22}	97135FC2226C4B4A5CBA5FCA3732763B87455F73A1148006F3DF214BD4C936D061E0 4045160E2CE33B9CD09D08FDE2A37F4E998322B4401D27
m_{PL23}	4D256D57C861B9791151A78D5299C56D116B6178B2A2D04BB95FB76540AF28341DC6 EC4E7ED3BF9E508478D9C8F44914805DA82429E1CF320E
m_{PL24}	858EF5C84CE32D18D9ABA110EEA7474CF0CD70254D2928C3F4DFF6BB3A518587CA DA19029078AC90A8336C8178203BE3289E601F07D089CB64
m_{PL25}	920A8796A511650AEF32F93DD3C39C624E07AE03CE8C96139973F54DCB9803C5164 ADB502D4FF561564D607037FCD172921F1982B102C3312C
m_{PL26}	485C5DAE76B360A9C56E20B8422EA3E6ACF07CB093B5587CB0E6A5498A4714081EA 98DBCDB0482B26E0D097C03444473D233BEF3C8E440DEBF
m_{PL27}	565A9D54EA789892B024F97E728E8EE112411942C48BD0C5BC8AA457D8DC9941F0F 7424B38643FFE6521CD306FBC56FE10F1428D4C245B5606
m_{PL28}	5AEF2C0C2C378179A1AC36242E6B3EDB72C42D3624437674F8D51260C0898C20183 7CBA14E9E23D1EF6451C4ACF27AB031F457A8A1BFD148AE
m_{PL29}	87D8FE685417822A23D925307E6C11081ADAC4702BCCD9BE448E78984D109B50DEF 5B7C58BC71EA1F0A6826BA8AD1978843E7697F3E416AADA
m_{PL30}	84802B72AF27B5BE724D1FB629E0E627BDB0D9061292562F98350C1D0C9D4B9D8E2 BF71123C82EBB161003AE9829E07244D78F19926F8847A2
m_{PL31}	8CCB5128238BCB088E30972D62792AEF02B9BBDDCAD68C9916C00BF91CBE788B0F 03851FAAF88605534FD73436C259D270B1013CB14226F658
m_{PL32}	62F4E6FAC2BF1979CE6854AA2D33534BFB2F946519101A6589131C3640707D40E67E D804AF8736AD213CAF5935741900061967E8285C27E34C
m_{PL33}	4095E5B4EEAFCDF68A34B267EEA28D8444FA533900F41499E260D2E65C256A52E1D D5861F5227C98E00687D107233F51A1167BCF72FB184654
m_{PL34}	5630E9A79FCAD303404D9E5A802299162657AAC734761C6E90DA8BCE4F61A763E0B B48D3FEB3F78468C828ABA4828DAD06E0F904CFD40421DC
m_{PL35}	CD12B24C0BCA8AAC1FCBF0500A3BC684A180E863D888F2506B48C68ECF17F76CB2 85991FBA18EB6397211FAD002F482D57A258CD45DE3FF1A6
m_{PL36}	AFCF2A50877286CD3405442730C45514F082D9EC296B367C0F64F04C4E0007DCA9E 50BEED5C102126E319ACBC64F1729272F2F72C9397029FE
m_{PL37}	18F89EE8589D20882A72A44DCCDF0050F0A3D88DBA6531614973D26905FDF41E3F7 79FF0648E8AF1540928511BCF4C25D9C64AF34AC31B8965
m_{PL38}	F890D550F33F032ECDA3A51FED427D634F64EB29AF1332A23CD961258E4BAED040E 7B336918E250EC272A12816B9EBFFA1E0AE401185F08C10
m_{PL39}	ACE5DD61506047E80FB7D41BD3992DF4D7F18EB46CC145C0E9105428C2F8F299141 F5D66691904A7DC2513A3B83994ACB1292246B32818FE9D
m_{PL40}	150680FF900C9B46E1E24D54BE2238CB950A934E5CCDE9BC3939EB51CB0AE202B7 D339EEC2018B33A0AB9B63DA5D512D64FB58C0E51A1C82C2
m_{PL41}	51A579EED2663A002D32D10A0753173612F4D5BA167D1807C61F25C4D42C063682E8 E9DD019F79D446A046EB3F75E50FEB228DC52F08E694B6
m_{PL42}	CDC644FE4C0C6897604F9D14D714123BF16FFF0E49F35F674908CA60653702FE27B CCA2A47098453AF8661055C8C549EB6A951A8396AD4B94D
m_{PL43}	750A10366C595373C5001CA3E4239764B1409D602CF6052B39BC6A3255A15FE06C78

	2C4C5F847026A7E79838A2933A61C77BB6CBF5915B2DA5
m_{PL44}	B7490686D78E409082C4C48FE18D4C35429C20AADF96076B92FC4E85490664753DB0891A0B27FD849BB7FCA99E3B38F22F8C662852C0D35AA6
m_{PL45}	D86E1B575B47D23DA811806A54C231281F03317830E7BD305D3CAA7D6382A5233104CFD54D22DF9F34535E5B390D9040CF1375FEA44CEC29E2
m_{PL46}	828655960C026EC67B683480992AC2ED2C43ABC606F5220C2945F373470BE7ED5BCCF7C1AA0986BBCCC84F11F1658AA568FAA0A60C5F0B5BFA
m_{PL47}	D76230E02C8533653AAB99B288AA2ADE25A1C1BF28516C04239240EAF1EFC0B98974B51F886861D8A1E9F5D62CFFEC309F071A9716B325101B
m_{PL48}	EA207662865B8A07D69648964DED818EE474A90B94473408871880E63EF0596B9FCFEC3C06B86EA6AD2B06C91672EFB33C70241A5450B59B8A
m_{PL49}	9CB5459549909835FAB22F0D99298C120ACF479F814CCE749079D40688F28101037762F125C776DA9C5FA1FCE0E76E452F8185354FDCDE94E2
m_{PL50}	227506304AEC1D6F93569B51FDC3405A0F38194F65BE17163A3CB9827A35AECEA757D020FE249377ECD561428A38FEED004EC859C2272563185
m_{PL51}	96B9AEC9938910F0E533422A3977519B05CD4AD3909BC15A7502D48D49C124FA192A8E57027CFEB11DF542010603CE5C9FDF8E626D4FBF8CF4
m_{PL52}	A6AAD06E095A9BE0BD9F8A2ED40C3CBDBAE91C700CBB778C8696CC06F3A675C16BDB2918E5F2111005A8727206DC6A9684E05655185C398EEB
m_{PL53}	CD168D384A78DA172991AD333EE2A9880905AFE59E2A2A4AC4414C40F82874F98A3CBE7B44F4C7F4710B35FD88AFC0399FAEB070EB9CA4D30A
m_{PL54}	22016CA87AD1549174A8699DD65599697871091457E83E0912E7E77A06531C209394D283D18A38662B73681DD9C5BF330FED978BDA7D487CA8
m_{PL55}	B9401B0843AA6F7827A13BD66C922287E8886C31EB5B90B82B472CCD6DA3D8D4FBF78B8F8496DFA8252B06429D5DD17142F1C908ACCD70EA0C
m_{PL56}	E42B9EFDC5D09AC27B3C7DA28D02493A70521223B9D7A76A9D13E9C171017964D16A70C08EAD02C3DC948889C23E365AFCF01BF20B89B0BF5C
m_{PL57}	9DA0180168DB915E9F3597B59312198E1B5CC00D743C2ECB0DBAADA3E35A2465ED1EAA9D74734D49A313CE4DFF020D0760E3153DC485603943
m_{PL58}	B6C966619ECB98191D719C187C07BD503425650CAA3A2D1F2DF5212B1441D7A0C1D36A4C9C2550240AD17CA43BB3943DFFFBF1E283D81299CC
m_{PL59}	DB0E8C41F08A03D477C1AA548799274C4BF3EB68F2636166FDC8D4B1E7132539930297E228BA232BB5C279FA5ECA3AC10E24361AF050A453B8
m_{PL60}	89BCE2DE2974EEBA833CF32F224C85A2891484478527DB48FA6ECEA84C5E288CC3914CB54ADA0476278750187F68FBEA41017E1E58DF1A5A3D
m_{PL61}	70A457D1314A278625443EEB52520815EC92CEF17417B97440DCB531BC1CE83212F63270418D0FBDE71F6DB9E0EA88772E1E4535B6633E4425
m_{PL62}	C388460AD54B36C4452CF0433BD347100ACCC24C79C535AD3E1F23FE0425E93A044C553BFA116E09AA4BB32F13CFA76FBA1BC17520F45EFD44
m_{PL63}	0BAFCADCDF9AA2846681782CD3B90CA036A863C78EE1507620BC394D0C6804B4C97A15BC9C0D7B79E6892EA1BFF1A0DD9573A9213AB140D0D2
m_{PL64}	833B0226789A62882FCD27A30885E67872B1A1C2FA484AD498011599DD57E8E2A07A560B47167AA5F60EF47177DBB1632D5387A2896348640B
m_{PL65}	8F52820323ABA5E6C6B465821B621600B980E59F53A599DA5646BA103214336836CF17E3386CE4FB2BC5F25CCB30CF7F500546828EC8786B8E
m_{PL66}	E2E9A29C3C8207B9A4508FD2F667A159F068EEE8D00686F46EA904C3692C1D79DFF1B32E5103720D47B4B58AC35384A26087027E141B3126A8
m_{PL67}	70E7C39FD2D3AE1DCE341699A544D801A8688A6EE47C5CB3630022147DDC06241FC5337A348A462B2472DEC5E104DD520ADA5114DB065D4B0D
m_{PL68}	9E3483CAB164BD053C4971D4D87494CC689033D589EF80E5453376E4A8DCC02183B98C36B0FF7DDC0AD07FCE8B4D5164371BD03A2110AD1247
m_{PL69}	04DA1C649B0608938DAADD3FE920A4F681690C54505429DBDCDCF10067AB5714BCDDFE1F28692710F794765781C1D233344E119BEE8A8416DC
m_{PL70}	7A18D6D30BDF44410714C3DCA27D8F9EA8A542D87122205640B98313C91AD9A0B993A5A7BC3E035F93B88BBE6D4204BC82A9FA8D4C1A7618CF
m_{PL71}	EB9525E10265A48733C8E0E77E459310112A71DCA680F68AC044B64BC0A31D02EEA0F7ACAAAB7F1E574E94FEA2D1301CB14B03263DA8122B76
m_{PL72}	E706C6ED2D6F89153835079BE0C6D45310845EF2F9F6C6AE91B7419810508BA501C0148BF09955BAD90D6391BA8EBA5CEFBD23221CC75143D7

m_{PL73}	DF071A10AC4120CD1431590BEDCFF9483CA7047B19590D035D309240BDB4264E9A3A2761402EC97FD8BC51B4AF32E37FBC47162A2357D18751
m_{PL74}	F0F952B2238139F46D8254D1A2C1C22A16BA71EC0C0C900ED1442452D7F44C798BC65FF40671B88074BA0B74C6510996EEAC495C5B49C37DEB
m_{PL75}	1C86BD82EDA81FD65418D3837B5552A853791456D93B06C62C650D86CFBEC269AFFD772763064062C03751B9428C6DA2E60383025F9E404B70
m_{PL76}	B390978DD2552C88AABA7838489A6F5A8E9C41E95FFA2215819BF8A5BFE39C8A706CC658E549E966611B843A1468406C41C09D1560BEDA4F1B
m_{PL77}	1A69EC9D053C7E84BAE7A48CCC71857D0C6B06D1065E3EA4633B133AA022B8104F6EE7C69B6184B746C8822958B0A16686F27C8A0E3B4EFEAD
m_{PL78}	C95B2070816DC97C6D8DD2583263E73F9AAAFD13F0548D2EBD835824418F11E54111005FB713AB234BE412347358281C7DE331EDD21B8BEA52
m_{PL79}	56D6408399F23C2ED85EE0F68111D69A91A3AD9A732AC57CA08F86CC28B3CF4E4B02EBBA0BCE5CAE5BACC4D52004070797C04093A84BB18DBA
m_{PL80}	E662E7043867BE250764DA0596D34A582A619B408B505E6211DD6286E93A37F95B1EA680C0C5F3E777E3F71E8D75495D59043217FC0E222E16
m_{PL81}	27D5E681C222297AD478A079EF12F1A98F744B66335303322EF8880B931FEBF8322F4302944E80BED468A0A516D410B183D863795992DA7DDB
m_{PL82}	5100336C05F9E5BF35201906C1C588858E0DAF56130DF5554B9AB21CA15311A90290624CD63E03F5EDA49DB7A0C32AB5F1CA427A2D5635FDA5
m_{PL83}	C696DC993BFAEA9A61B781B9C5C3F5CFAA4C8339D8B03A9B0387883D0482A41AC78D6522425959846E561D26A30FF79A205C801A85889736B2
m_{PL84}	D562297561AFF42D3168296C1153E4E39BE7B2EB0348BC704625AA08391235075EE0DE0A79AB03222FEDB27218C56F96EAC2F91CC8FCE64B12
m_{PL85}	DD0B6768FC01CC0A551F8ACC36907129623E975AB8B3FF58037F1859E2FA8C62C2D9D1E8506916029A2C3F8CAD9A26AE2CC652F48800859F5C
m_{PL86}	923920696EB3AB413786C41854822282BB83F6900D33A232D470BE198BBF086067B72613300C593B74251E2F079857ADBBCD86583A9DCAA6DC
m_{PL87}	B8EF30C797D8D2C4EF11244F137D806E556A436626D0115A621C92C34D166A68BCEDFA0040DA8FD6F987B1CD5C2AA1C1B045E64475F0F8DABD
m_{PL88}	E1887001D414405ED6419E9EE1D1D346D924ED57ADF04B31B7948099976B2D1501A60DFFB287AD44C8783DF0C1EA5AA5D273D1389C8EA22DCC
m_{PL89}	8C2E379A58AA96748141CA84C35987905F984A49D3AD9BFF7807AC244C16C1DF74343C2E1F25514F5A0954CFBB3C92E25EF783136844998AC5
m_{PL90}	78F8A99E0A54E27F51C0726FE7A11EB26B1E29FE65F55AC8AC58011465900B958488A90F6DF614A58431DC8B6C6B9A6F032EE0E0B1306EC4B4
m_{PL91}	88F7A31B7B20E0F05CA26E729B4F8A1933962D7BD7BE3E1EB130B28C794C0B4D01CADE09006FF97E80117509733F3A9DC225413A0AE08CA662
m_{PL92}	BE4DFCEAC18905AC8D5DA27A794F88A4D3058D2EFA3B075A819DEAE688EAF8940A653ED7104E7B403D490F0A9030264E1F12B8922C75775E61
m_{PL93}	5BA4B79FC4550234D8922963BF3537485E3C8745A5DB90D3E2E454B30FF61112F508155B7C2B3C4C628AF846240C2021ACDE547E5A41F666B8
m_{PL94}	00556D35649F7610AB24A43C4F16D6AC0571FD126F11880C5CD72100D730E4E4D6BB73C33F837FAF1072743B249ADA2E09598B1EB23F1180A7
m_{PL95}	7A0CC9F21BD69CF3023E944545C2176EF0D4F450B765C28359FB8A32137D043D0E5713E67B3F61320985D2C6106605081F87D2296321468A2F
m_{PL96}	DA669880995B0671201172BABFF141D5854A245E211879EF3038A7C84170DADBD368455F24653161E7886E15B253F93E3A3C568EFB17CDEB1A
m_{PL97}	4E294E53D1661C1F6F748302A7723DA951C00FDB8BEBBF67A68710BA0F1A255DFB1627059D41A23D3961726DE6FEB10E5D209CC4505B209812
m_{PL98}	73385DF701414E144768A67EF72924B1653479E962FB1554B7E54BC5284D9B3E41C0C133F878972230721918AA425501B920B204FECE0C7F8A
m_{PL99}	F4492160805F258CE592DF4D1200566F81D173458D78EA3ABED79A14AF88170DB1D4A9A5931D2B80C58C27FE17D806E3E6A66CDAAD09F118D4
m_{PL100}	44D562D9012D8B07B8F44596467C11A163982BB7EAEAC184078B6B8CE46B5D7E17C39CEF576A025491183017FA09931D070B307B86524B03FF
m_{PL101}	FCAEEFCC49A13B4FFA12C0CC6A2B90CF4F57D78B1E98294B04675C2F0991661FDC61A452A247F8C29E0284AA21026F368307375AA2C3F1E12C
m_{PL102}	C486DF0510DCAD5AB86E178A686D398E11A0ECFAC5A326C10129257E5456B22FB8E

	147E9190D9929A5DFFE44715FA47D62F04CFC9B1C201414
m_{PL103}	C10AF383DC708E257E15A8AB337BCE684A2F4AC7A22DC2C25C277F8E8D0858E793 17CDDD9AA2EA6CBE604D24AC0945026103E7B4126FD361A4
m_{PL104}	A5C60A181148D9A931B2DDDB9D169648BA54F366B4EFAE88F6861909EE0F07C037E E349D0EC59A823286E366CA3943589EEA7F828C3728085F
m_{PL105}	96136AEBD5E28462B0421DF292BA899FFA660D80EA01620D2C7490E5347127884AA3 C3D1FF44BCEEF6C29EC589CDEF200C5742C5964F8B2B52
m_{PL106}	40F63C04ACAD986255D1E16B769A6D4C11A1D075E804BDC0AC61923E9A67F5D7417 756328072455F6E22B1C64E06F367D1B0808295C2D90E22
m_{PL107}	F4B82D413578C4888C5F002CF6D0E03778134A860436551FD57537E4CED334B3C9C EBACE615238271717AA762448B86FA53D2074BCE35658A7
m_{PL108}	BCCC92D72C920E685530591FC351743D1E23DE044BF81D32650406113E23ECC757F DE4E386B6E2E7195EE4969717A7BD0812AC312B33A54308
m_{PL109}	6ED59DE0D44370A861CE2B42CF5E578E764A682AB5777905EE027D7160490EDC6C2 8989B23805AA697FCD215CB401BC5E4D430624C01B16192
m_{PL110}	DE80C0E273B92CC3C5034F7A20DB3914643C430B425C8B9249EAF73ACE8C3BCF17 957242CF534D87A67D4DC0252275262E737F4095450CFA14
m_{PL111}	9505C4FEF2A397D5059F4729D013292A8321FFFA929ACB0A210D0A13E13061227C44 A68FBD8CE6B66CE3D783363CD039AB35EE52603E09B758
m_{PL112}	E8BE90D7F954B14D8002A4CAC20765ABEED80634498C836D79B0F9338DBC17B28F0 5CF4E79136779E1C55AA30B6215F890882887B3B53C23E2
m_{PL113}	9F4B622C1358AE5468DC31E4B2CA320E5E20458C1DE5405BF4F9AD7D45A5BCAA39 EC0626FFFC698C16A009CCCB7A18A64E85E70BA71731BA24
m_{PL114}	B91B2624843CF48299AFC2B1442570B41F28F578530D1E322E0B544282372131C71AC B924E70768A243EEC3200E7A5EBFA77111D9FB07FEA8AE
m_{PL115}	965F42DDA3A4650FE2F5103932B68F166FA424B9F0F7045311D962C2A9F66B9BC6C6 6FB480F9800354E0C54A72251071422CF1DFC44F94C00C
m_{PL116}	08ADCE48699FC30FA0788073BDAADB9177BBB4C1CED41F93085218364B8BAD8488 561EF0FE1B0DDAA403C602494CB35697D62AA0A2B93A64CF
m_{PL117}	9A313BED80B1220D77C8ADA4B2E0B3D284A5120A94B741380923C78D3AD32BC3E7 1EC6EEA520E9D447D8727697598BB987F17506F482003ABD
m_{PL118}	24C9AD4C14EFEC002A3473FCAB04E492F2E269161A2960BA8AF09FD710B444A40C4 E8B138418E62301E91FBA97AFDC58759A76D00F676736C7
m_{PL119}	6514C7733711CE4942CD2123AB37186EB7FECB7E78ABB28744864942FCF4C0F81005 4AF55B1042EB53064F0857C61D85B2CF0D2DC5826AF22F
m_{PL120}	B2C80CDC83E48C36BC6FDAB8661208EAD392F3A0571BE41DFAD765E744932ADEA5 0061E66C05498A5381B2A1F1B446587089DC4E4A2DF03D82
m_{PL121}	639368BA75CC709A3D9F28EDA237E32C2017A9BF1E382045B9426AEE0A4049DCB4E 1D7EBE4647B855212824557497CFA039885A3BA42F98F63
m_{PL122}	6A70DDC17D0C8024B1C853F0C1948561EF32510151BE0C63BCA9171F20217891D10 21EE72586CAFF557F8973336913A94A2A699B8740B054B8
m_{PL123}	2E32E3A35CCD001172CE310B63B4E406126045A0FA3795BE3E3D9B56F72405FC94F D89946818BAECD24A61BABBBE2D23052AB01EF73CA0CF4A
m_{PL124}	829395C35205A480AC1351C25E234BF52D384A3DE1C5138A650A6F82F739757D812D 9C38231AB9FD81AA0648B11F6F6113F9312C57624FC746
m_{PL125}	D98FFE19C0AAAAB0571A9075ECDFD3E7373F5255DC669116A8C6913F0123E598F93 0934C5F6A601C37C529C371A0C391B59AC5A9E286D04011
m_{PL126}	C1A108192BCE96C2430A63C189BB33856BE6B8B524703FCB205DAEF37EF544CD43 CA09B6181B417398083FF2F781BA4AE89A5CA291DB928D71
m_{PL127}	42568DF9F61849BF9E7DEE750604BE2E0BC16CC464B1CDE15015E01D6498E9F3E6 D6950E5824651F212BA0057CE9529B9CCAB88D8136B8545E

A.2 Basic Midamble Codes for Burst Type 2

In the case of burst type 2 (see section 5.2.2) the midamble has a length of Lm=256 , which is corresponding to:

K'=3; W=64; P=192.

Depending on the possible delay spread cells are configured to use midambles which are generated from the Basic Midamble Codes (see Table A-2)

- for all k=1,2,...,K; K=2K' or

- for k=1,2,...,K', only.

The cell configuration is broadcast on BCH.

The mapping of these Basic Midamble Codes to Cell Parameters is shown in TS25.223.

Table A-2:   **Basic Midamble Codes $\mathbf{m}_P$ according to equation (5) from section 6.2.3 for case of burst type 2**

Code ID	Basic Midamble Codes m_{PS} of length P=192
m_{PS0}	5D253744435A24EF0ECC21F43AA5B8144FBDB348C746080C
m_{PS1}	9D7174187201B5CE0136B7A6D85D39A9DD8D4B00E23835E4
m_{PS2}	AE90B477C294E55D28467476C6011029CDE29B7325DF0683
m_{PS3}	BC8A44125F823E51E568641EC12A6C68EAFDFA2350E3233C
m_{PS4}	898B7317B830D207C9BC7B521D5715680824DC08347B2943
m_{PS5}	466C7482C8827655BC13F479C7C1417290679A9841297C4A
m_{PS6}	AC0734C27C7DC1B818A8492744290DFE866B0EBA62B0B56E
m_{PS7}	0A92106325B15A8C15FC3764724CE67A5056D50A77F9360E
m_{PS8}	AE69F62E23035083E6094B89493D33E06FDB6532D473A280
m_{PS9}	B485D4E3614C9C373EA1365FA6FA890E9844084EBA90EB0C
m_{PS10}	66182885E2D28360D2FEAB842C65304FFC956CE8DC8A90C7
m_{PS11}	CC30A9B0A742FCC1E9A408415368391F1299AEA3CB6509FE
m_{PS12}	673928915886947F464FDDAAD29A07D182328EBC5839089A
m_{PS13}	4418861C14D62B46EE6D70D4BF05A3ED801A01BD6CDC5235
m_{PS14}	DAD62DC88F52F2D140062C2330BE6540E6F86192322AFB04
m_{PS15}	A2122BAF24529CEA9855FB43CE40923E7CA7B30D92E40702
m_{PS16}	6C44AB41E11F54B0929DF65673BD231F92A380132D9F1712
m_{PS17}	1DC2742E756CDA6421340D0087DD087A615E4B8688CB2F75
m_{PS18}	2E0105328B56E9E07D9B5A62F38B08AF8D8C2817B54F3302
m_{PS19}	88315EC30A94CA4EDB2C77079D9BD810A2E280B50DABB213
m_{PS20}	440E0093D28CB2B2B0A95D18CEB4AB934C33FA45C1CFC7B0
m_{PS21}	CC9BF85D41A96A6EC314F9611D5E1C0672556C8850801BB4
m_{PS22}	1ABEA04C99BC26972715F01957C0B6B959CC71CD88120817
m_{PS23}	EC5A33DA0BA4470442C5CB324A8E47B0A9F7968FC8108EE8
m_{PS24}	F82086290271DB446B5B1DC15D9BE96414B19B3D5E0F540C
m_{PS25}	11A1A790D6958FD3A9157DF1E05D1378248CA201EBCC7592
m_{PS26}	AA8564882231907BCE78092DC6C9DD4F5A0E4A34AFCFB809
m_{PS27}	912EE2238212F87BC7CDA7F30441ED184A6AA954EC4D20C8
m_{PS28}	2D200D8B8891B804673E380A1AF5AB875986E29D37D3FDC9
m_{PS29}	75E086B6C818423491BF9D6365C52FD1C5E42A576E268170
m_{PS30}	50ADBF27DA2A3701470186B699118E16DDB0D10F705607B1
m_{PS31}	656C0692B4E22023590A906D2A74DFD471C883A7B1E0B3A2
m_{PS32}	C21FDACD09A3CDCE74C4794010A3E45769B142505C56A0E6
m_{PS33}	CD9392A87C2D4D7CE5801CDDA8A76339B6F900F008B290E2
m_{PS34}	956426FEFD8B8D52073E87984E10C4D255064E1372C04A24

m_{PS35}	C4F4D6DF1B754AD6063FD10C331C1428ABB27B0700134B94
m_{PS36}	B65548082B34E9FAF43F33C4070F79099758CFD41B491A11
m_{PS37}	C8317EA111A82B04E78B88B864B1EF5D711BBEB4A0527036
m_{PS38}	8FB7AD1188E8D1A5219845013672560FD38904E70537403B
m_{PS39}	B41A324E0D80AA0598A8D391C1D7FFC82B4A075218E98EC3
m_{PS40}	49A6350A62E208B011E86528B9A481A0E76D723F6675FF82
m_{PS41}	C344C8C23C42A7B7442E6022E95AE4B08A4BFA786F35F911
m_{PS42}	28F430CF67D69C9DF60E25656413BC5F932A022DB1406C44
m_{PS43}	2FA5D70CF0FED4213F32116051450391C2A627D9B670C428
m_{PS44}	959537D988FDD4F1360B4E84701AE5409229C30EDF8BC404
m_{PS45}	CDD2E0450F9EC12F81391AD4633CB29F315B4A0A890A9A22
m_{PS46}	158776A20B4B82C563EC08F086830EA66DBD2DCCB4DF6026
m_{PS47}	431FCACBE48208975950342709D11F19AD5FB047F3B440C9
m_{PS48}	86B141AC571BA6B42653B12FF04D4F0E6C81F3EB608660A2
m_{PS49}	86D297ABD34E8510F6CDB0EA617F1F1051C8799117B02211
m_{PS50}	80B2D9530B34E781311D95CFA3857F277CC07014D324AF5A
m_{PS51}	2B607B93FD8B45601C1E574E14CFC6912C22AEC1045ADC49
m_{PS52}	D234C5C45E105A837E6DD74BC4E534523A20317BA0625A29
m_{PS53}	768CCDB3E2A7A2B863128382590946B25472BE2BFFC40641
m_{PS54}	3DA38212E0A987EE1F665D4E13C2AA4446E00A76C948A073
m_{PS55}	09173135E4A2CFC8F2678750AB5257110906F013587BDE82
m_{PS56}	522E070B266F35E99C1F3C42D2017F8E415550492B72F086
m_{PS57}	D63E4BD805262A3DEF05C7D86C422E5048921E5531784132
m_{PS58}	564AF806E28131611E5F884229265D446A50E1E488EAFBBA
m_{PS59}	A2603E009D3D30147727B750C35C62299AF754D3E4A54E1C
m_{PS60}	938504B02599D33E28246E4271C375AE81A3BBE8D3F8A920
m_{PS61}	461516B2CAC6FC42A4B707CC6073BBE573C014892C811776
m_{PS62}	29186DE4CCAAB2CD0100BB19EA595879D63F0F0CFA881AA5
m_{PS63}	A064B449CB784A91B803369CDC5EF61A670AAAC044BA3E68
m_{PS64}	8719C454D88FF5149DB943CB6CADA01D0B9664B357A18203
m_{PS65}	A27EC68720F00A714AA2C45A7EF232286984D7B193F5C916
m_{PS66}	AC8361676AB424E48F0789082B0CD2EFB8D2E627D041DD66
m_{PS67}	ABA1BEB0064733A0620906BF2B29C95883F069D7E4C35D39
m_{PS68}	9E22EEDED47D92CA1D0B7530EC6062287BD83A04874AE00C
m_{PS69}	0BADEF288B20F5686C5DE3A71219AC2172054326BE831696
m_{PS70}	953801EB2AF58C2F80E49A6CC46085CB554243E3B3BBEC8C
m_{PS71}	333A504C51C8FAC5025994565C3F600F154F64FAEF4EA484
m_{PS72}	A6583E19647662005474153A6F8DD88A473853E94B720CE7
m_{PS73}	90ACAF707D18AF34F5848C58166830AF620ACDC1B2DFDDA8
m_{PS74}	39C5C598A374EA82F3F83378258248DAD3808812DD0E74BB
m_{PS75}	F79525DE694629346D73F6256CC0F140F82603197AAA1844
m_{PS76}	B8C2A8F139097699A693022E78588D4058DB0A65FF52F813
m_{PS77}	449B50C2A52996FA5A828A907F30F9F460EE3D99930DF890
m_{PS78}	62CEC9574D30184BCB4F94EECF0CC23D2D2A8D0003F0AA33

m_{PS79}	B56D258889703F76A0738EE3A7D355994159A4851833E198
m_{PS80}	65894AA54C0F6C9A206521C9FC379A8AAF6E621C03CF849C
m_{PS81}	2D47F3414E30CC02C6835D95C9BA204488F0FFCB4852677D
m_{PS82}	12BE4DD8B906B584010F8A330AB67B278E8642FA33D51B68
m_{PS83}	BC928A90A4B10906CAEE638BF768E08542F48F1676006DF0
m_{PS84}	30C544E437C8ADA143566CD1BC4E9E7BA84139A08505C2F4
m_{PS85}	84FD5B05506192B753FBA2C719B584E0EDA01814999867D2
m_{PS86}	191F14DD00034E03AB5BB4342F1138B2CD33784E60CFD75A
m_{PS87}	B8ACE7990B6A98A80A61162C4D2D5F88F24E8F7DE4207590
m_{PS88}	EC1DBE72E8EED0C61054FC2695422AC0AD2D888265B21AB0
m_{PS89}	9A1B4CA467AB7E082AF4278E44D177EA78424508C23E8B08
m_{PS90}	999EE541C608164AC975214F3A37A677FC2CA03E2C2A4B20
m_{PS91}	1BDCC20265031432917A2EB828FB356A22DF9CB609C0F8F3
m_{PS92}	EB4A81859C93338B8A1B87C02C815AE09D765F6F2249B958
m_{PS93}	E6A5D1629F4CF09A1F280DE0C480D4C73B26ADE321A50AEE
m_{PS94}	BAAB7286DD24C80B15A7958039B904F1CA83C310C8C7AFF2
m_{PS95}	12220F72619E983717C68FFE1C4148F2354B7B1955B65620
m_{PS96}	A198706E24FAA08BD09EE392414816038E667BB34307D6B2
m_{PS97}	30B3493B4C035881A7A722E4546527AAE787FA2C0893AC46
m_{PS98}	5A7318126522843DCB7F00A2D9F9BA8F88963E4152BC923C
m_{PS99}	844844B0CACAB702C332CE2692B4166F4B0C63E62BF151BF
m_{PS100}	B82973895264103136 92F861DC60DA86A23607F7DDE24755
m_{PS101}	6C1144CF8BC01538D655D29ED62DE6E74A3180EC905BF1E0
m_{PS102}	E9DB3221FACFC5C88691A7013EF09672A130D52C3413AAE2
m_{PS103}	2FD0508615EC4CD4BF18ADD46D777078869130C8921A4F0E
m_{PS104}	40911B4E0525AC874228F6EF642E59154730CB187C7E417A
m_{PS105}	2034C6A027D4D850F5184AA64C3153231F4651B616BBFCF9
m_{PS106}	57833235451525A1DFA213FCE0B419B6494BC7B99F488410
m_{PS107}	6DC3D57F2E39158D036825F8804810D77CA1ECA610ECD894
m_{PS108}	F5C50DE43AA7B731CAB7683524021701F97650499A7070E4
m_{PS109}	F2184D2699785442E09FA22CC2D60A5A13FFF22AE660A470
m_{PS110}	EF0029DE0D79207205458CF4D7328E81A93518D93C9A74BD
m_{PS111}	9D6D8992482FB885AA5E878C3BA2045538B09886C23CDC2D
m_{PS112}	C0A5AB67D1CEA126F6476C75443F0A11CBE749412EF03104
m_{PS113}	1853A5C20CDF968C5A180D8EB5E72BF15517D06680D98412
m_{PS114}	8CEA1223227ADF37D0DAAB320906E1C79029F480D25181A7
m_{PS115}	5561038E96A658EF3EC665612FF92B064065D1ACC1F54812
m_{PS116}	C55A6263F08D664A1E53584560DFF5E611640D8281D9A843
m_{PS117}	4386A8EA59124D043F29056A4598735A4FC7BC11119B90C1
m_{PS118}	D6571B20668BED50BD7C80388C162632BCB069AA67C7FC22
m_{PS119}	4F9F09ABBC1391EC2CCA5359FB52250E533BF04324154106
m_{PS120}	662659F42188C9453F6E6DF00C579627045DA1461A3A0EA5
m_{PS121}	8DCC9274C0C2A9BA6096BF27FACA542CD01CA8653D60A80F
m_{PS122}	5C1210A1E50E505F6B73C90156C9D9F19AE2310BBD820DF0

m_{PS123}	B1E0A7CE26202E223D4FC06D5C9BBA4E5F6D98204D2D5286
m_{PS124}	DB506776958E34552F7E60E4B400D836153218F918E22FA6
m_{PS125}	ECAA60300439B2360B2AC3C43FB6241ACDE5055B295FA71C
m_{PS126}	BF1E6D9AA9CA4AC092BE60500C77D0DC7A6A236520F86722
m_{PS127}	051C5FA122845A30B4EC306B38016B45667C7754F92F13A0

Annex B (Informative)

B.1 CCPCH Multiframe Structure

In the following figures B.1 to B.3 some examples for Multiframe Structures on CCPCH are given. The figures show the placement of Common Transport Channels on the Common Control Physical Channel. Especially those CCPCH containing the BCH are depicted. Additional 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 short midambles (Burst format 2). Every TrCH-box in the figures is assumed to be valid for two frames (see row 'Frame #'), i.e. the transport channels in CCPCH have an interleaving time of 20msec.

The figures B.1 to B.3 as given below are considered for case 2) of Physical Synchronisation Channel (PSCH), cf. section 7.4. In this case CCPCH is to be transmitted in timeslots k and k+8. The BCH is split on those timeslots k and k+8 in a redundant way, thus a UE can collect the BCH information even if one of both slots is interfered.

The actual CCPCH Multiframe Scheme used in the cell is described and broadcast on Primary 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 primary BCH.

Figure B.1

Frame #	0 1	2 3	4 5	6 7	8 9	10 11	12 13	14 15	16 17	18 19	20 21	22 23	24 25	26 27	28 29	30 31	32 33	34 35	36 37	38 39	40 41	42 43	44 45	46 47	48 49	50 41	52 53	54 55	56 57	58 59	60 61	62 63	64 65	66 67	68 69	70 71
CCPCH in TS k, Code 0																																				
CCPCH in TS k+8, Co 0																																				

Primary BCH 3,07 kbps   Secondary BCH 3,07 kbps   PCH 18,4kbps   FACH 30,7kbps
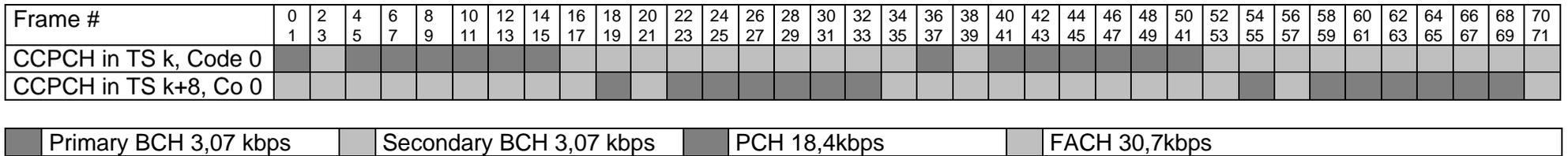
Figure B.1: Example for a multiframe structure for DL-CCPCH.

Figure B.2

Frame #	0 1	2 3	4 5	6 7	8 9	10 11	12 13	14 15	16 17	18 19	20 21	22 23	24 25	26 27	28 29	30 31	32 33	34 35	36 37	38 39	40 41	42 43	44 45	46 47	48 49	50 41	52 53	54 55	56 57	58 59	60 61	62 63	64 65	66 67	68 69	70 71
CCPCH in TS k, Code 0																																				
CCPCH in TS k, Code n																																				
CCPCH in TS k+8, Co 0																																				

Primary BCH 3,07 kbps   Secondary BCH 3,07 kbps   PCH 18,4kbps   FACH 58,3kbps
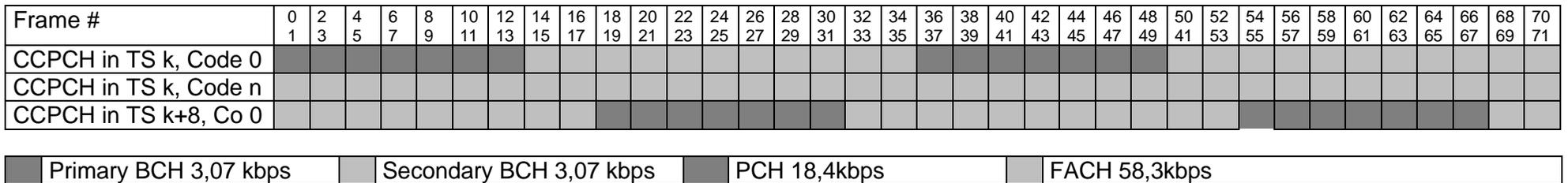
Figure B.2: Example for a multiframe structure for DL-CCPCH. n=1…7

Figure B.3

Frame #	0 1	2 3	4 5	6 7	8 9	10 11	12 13	14 15	16 17	18 19	20 21	22 23	24 25	26 27	28 29	30 31	32 33	34 35	36 37	38 39	40 41	42 43	44 45	46 47	48 49	50 41	52 53	54 55	56 57	58 59	60 61	62 63	64 65	66 67	68 69	70 71
CCPCH in TS k, Code 0																																				
CCPCH in TS k+8, Co 0																																				

Primary BCH 3,07 kbps   Secondary BCH 1,53 kbps   PCH 18,4kbps   FACH 32,2 kbps
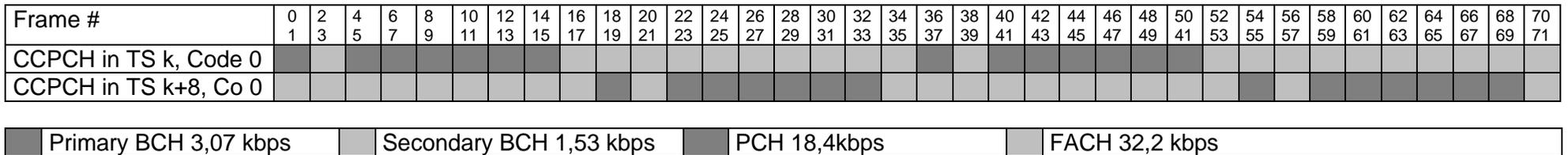
Figure B.3: Example for a multiframe structure for DL-CCPCH.

History

Document history		
v0.0.1	1999-01-29	Document created based on the documents UMTS (xx.09) V 1.2.0 and ARIB Volume 3 Ver.1.0
v0.0.2 (v0.1.0)	1999-02-23	Document updated based on the TRGR1 #2(99) 115 which was agreed in the TSG RAN WG1#2 meeting, Yokohama, Feb.23,1999. The usage of ODMA is still under study.
v0.1.1	1999-02-26	Small changes (Modification of the editorial errors)
v0.1.2	1999-03-11	Small changes (Modification of the editorial errors)
v1.1.0	1999-04-6	Small changes (Modification of the editorial errors)
v1.2.0	1999-04-19	Document updated based on the TRGR1 #4(99)357 which was agreed in the TSG RAN WG1#4 meeting, Yokohama, April 19,1999. Number of Chapters are changed ("Scope" starts from section 1.)
v2.0.0	1999-04-20	Document updated based on the TSG RAN WG1#4 meeting, Yokohama, April 19,1999.
V1.0.0	1999-04-22	Noted by TSG-RAN as TS 25.221 V1.0.0
V1.0.1	1999-06-4	Document updated based on the TSG RAN WG1#3 meeting, Nynäshamn, March 22-26 1999. Small changes (Changed from 'S1.2x' to 'TS25.22x', 'MS' to 'UE', 'Reverse link' to 'Down link', 'Forward link' to 'Up link'.)
V1.1.0	1999-06-4	Document updated based on the TSG RAN WG1#5 meeting, Cheju, June 4,1999.
V1.1.1	1999-07-6	TS25.221 V1.0.1 was not updated completely based on TSG RAN WG1#3 meeting, Nynäshamn, March 22-26 1999. So update the document again.
V1.2.0	1999-07-13	Document updated based on the TSG RAN WG1#6 meeting, Espoo, July 13,1999.
V1.2.1	1999-07-15	Proposal for update according to decisions at WG1#6 meeting in Espoo
V1.3.0	1999-08-30	Proposal for update (V1.2.1) approved at WG1#7 meeting in Hanover
V1.3.1	1999-09-02	Proposal for update according to decisions at WG1#7 meeting in Hanover
V2.0.0	1999-09-03	Approved at WG1#7 meeting in Hanover
Editor for TS 25.221 Physical Layer Procedures, TDD Parts, is: Katsuhiko Hiramatsu Matsushita Communication Ind. Co., Ltd. (Panasonic) Tel: +81-468-40-5161 Fax: +81-468-40-5183 Email: Katsuhiko.Hiramatsu@yrp.mci.mei.co.jp This document is written in Microsoft Word 97.		