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**3<sup>rd</sup> Generation Partnership Project (3GPP);  
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Physical channels and mapping of transport channels  
onto physical channels (TDD)**

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Reference

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## 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:

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

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## 1 Scope

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

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## 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 25.211: "Physical channels and mapping of transport channels onto physical channels (FDD)"
- [3] TS 25.212: "Multiplexing and channel coding (FDD)"
- [4] TS 25.213: "Spreading and modulation (FDD)"
- [5] TS 25.214: "Physical layer procedures (FDD)"
- [6] TS 25.215: "Physical layer – Measurements (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 25.225: "Physical layer – Measurements (TDD)"
- [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"

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## 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 an up- or downlink 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.

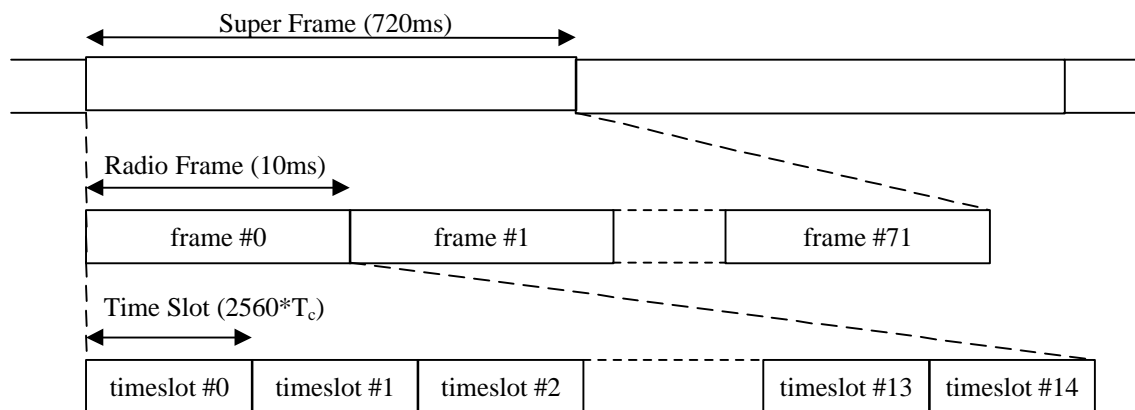
7. Downlink Shared Channel (DSCH)

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 OVFS 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  $0 \dots (\text{repetition period} - 1)$ . 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 OVFS 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 OVFS 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  $2560 \cdot T_c$  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.

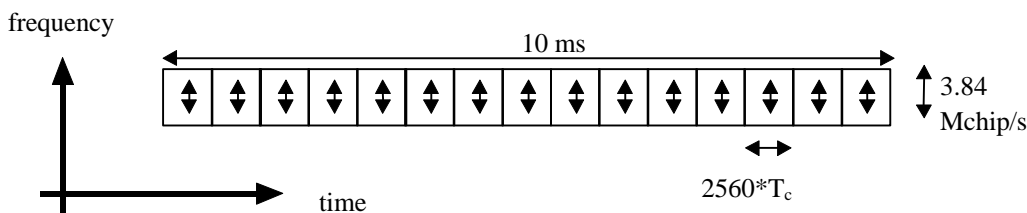


Figure 2 The TDD frame structure

Examples for multiple and single switching point configurations as well as for symmetric and asymmetric UL/DL allocations are given in Figure 3.

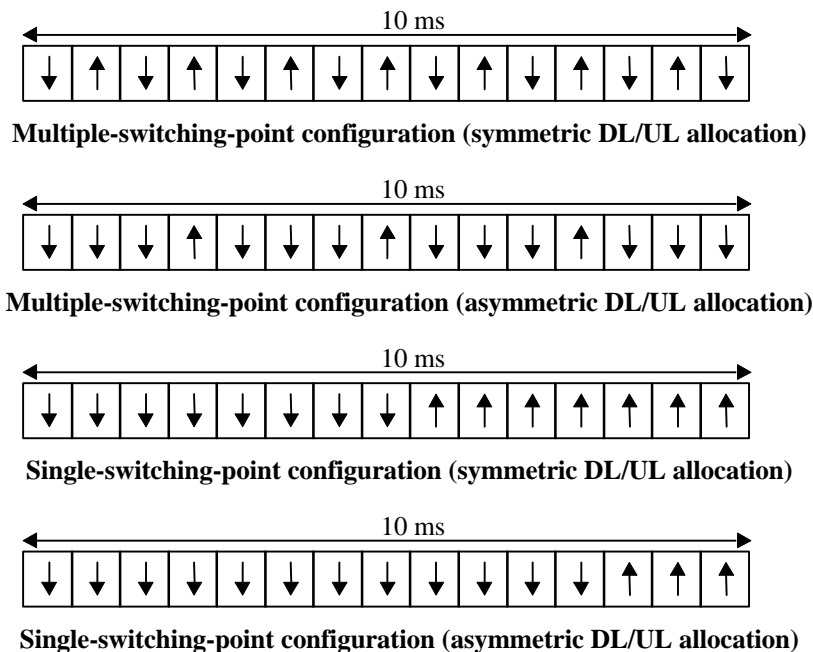


Figure 3 TDD frame structure examples

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.

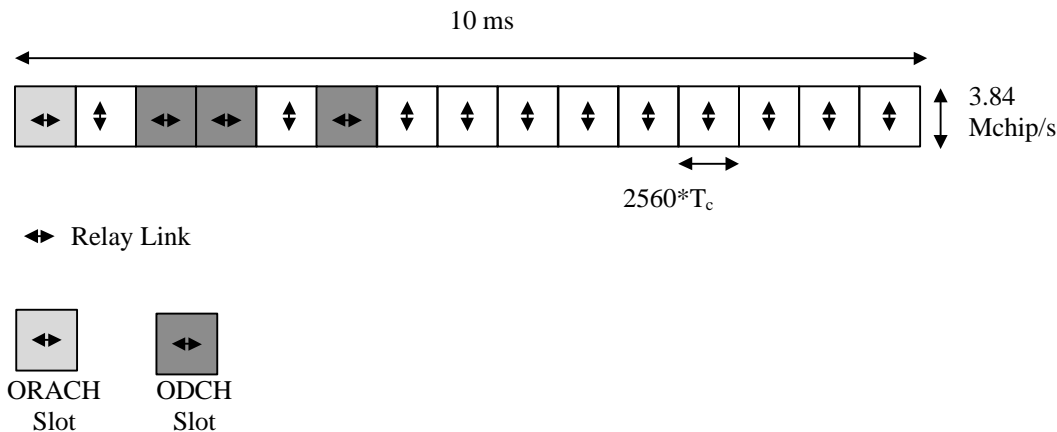


Figure 4 TDD frame structure example for ODMA operation.



## 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  $2560 \cdot T_c$ , an additional separation of user signals by spreading codes is used. This means, that within one time slot of length  $2560 \cdot T_c$ , 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  $2560 \cdot T_c$  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 burst 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 1 and type 2 is 96 chip periods long.

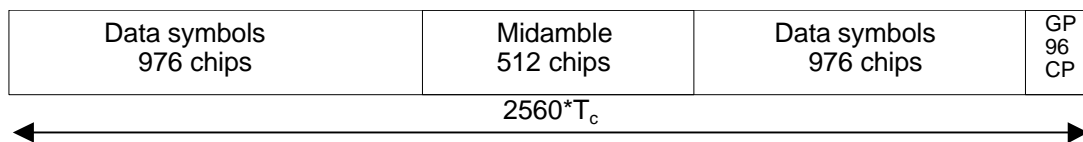
The bursts type 1 and type 2 are shown in Figure 5 and Figure 6. The contents of the burst fields are described in Table 2 and Table 3.

**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**

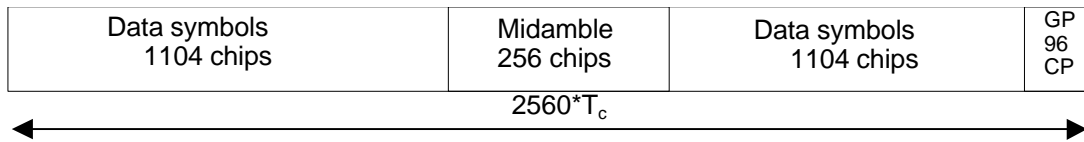
Chip number (CN)	Length of field in chips	Length of field in symbols	Contents of field
0-975	976	cf Table 1	Data symbols
976-1487	512	-	Midamble
1488-2463	976	cf Table 1	Data symbols
2464-2559	96	-	Guard period



**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



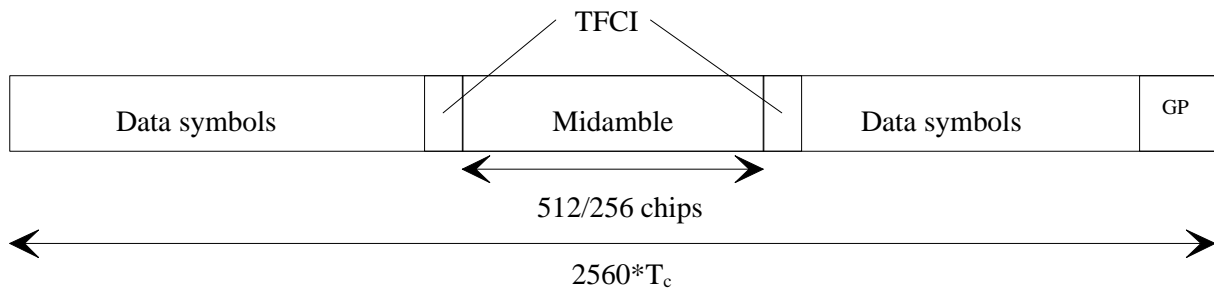
**Figure 6 Burst structure of the burst type 2. GP denotes the guard period and CP the chip periods.**

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.

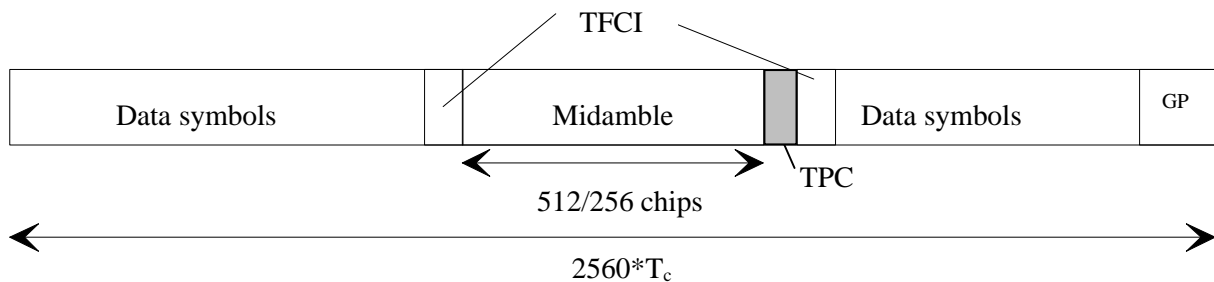
**5.2.2.1 Transmission of TFCI**

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.

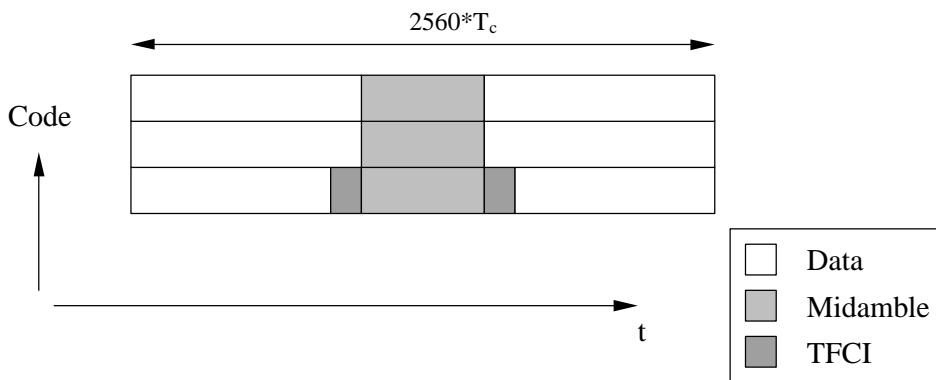


Figure 9 Example of TFCI transmission with physical channels multiplexed in code domain

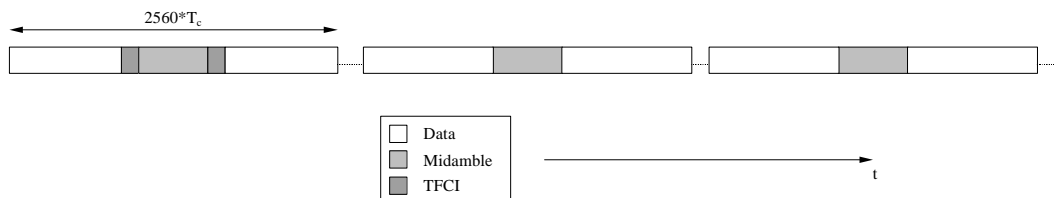


Figure 10 Example of TFCI transmission with physical channels multiplexed in time domain

### 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.

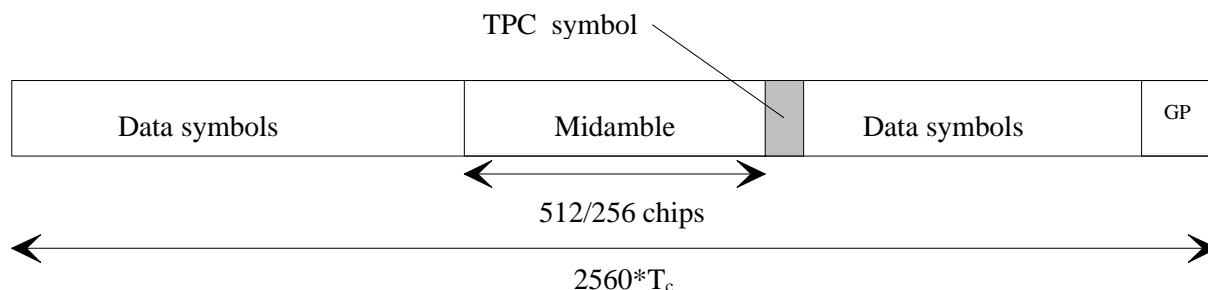


Figure 11 Position of TPC information in the traffic burst

### 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  $L_m$  midamble chips, which are also termed midamble elements. The  $L_m$  elements  $\underline{m}_i^{(k)}$ ;  $i=1,\dots,L_m$ ;  $k=1,\dots,K$ ; of the midamble codes  $\underline{\mathbf{m}}^{(k)}$ ;  $k=1,\dots,K$ ; are taken from the complex set

$$\underline{V}_m = \{1, j, -1, -j\}. \quad (1)$$

$K$  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

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

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  $L_m$  binary elements  $m_i^{(k)}$ ;  $i=1,\dots,L_m$ ;  $k=1,\dots,K$ ; of (2) for the complex midambles  $\underline{\mathbf{m}}^{(k)}$ ;  $k=1,\dots,K$ ; of the  $K$  users are generated according to the following method from a single periodic basic code

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

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

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

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

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

$$\mathbf{m}_p = (m_1, m_2, \dots, m_p)^T. \quad (5)$$

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

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

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

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

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  $\underline{\mathbf{m}}^{(k)}$ ;  $k=1,\dots,K$ . Different midamble code sets  $\underline{\mathbf{m}}^{(k)}$ ;  $k=1,\dots,K$ ; are specified based on different periods  $\mathbf{m}_p$  according to (5).

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

As mentioned above a single midamble code set  $\underline{\mathbf{m}}^{(k)}$ ;  $k=1,\dots,K$ ; 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  $\underline{\mathbf{m}}^{(k)}$ ;  $k=1,\dots,K$ ; 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 5.2.3 are 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).

### 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.

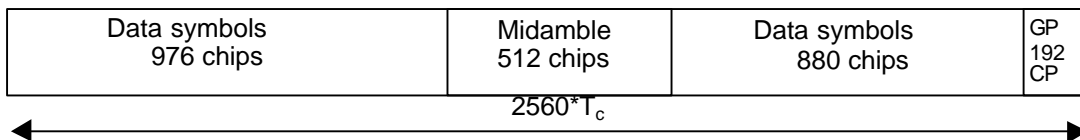


Figure 12 PRACH burst, GP denotes the guard period

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

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
1488-2367	880	cf Table 1	Data symbols
2368-2559	192	-	Guard period

### 5.3.2.3 PRACH Training sequences

The training sequences, i.e. midambles, of different users active in the same time slot are time shifted versions of a single periodic basic code. The basic midamble codes used for PRACH bursts are the same as for burst type 1 and are shown in Annex A. The necessary time shifts are obtained by choosing either *all*  $k=1,2,3,\dots,K'$  (for cells with small radius) or *uneven*  $k=1,3,5,\dots\leq K'$  (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  $m_1$ .

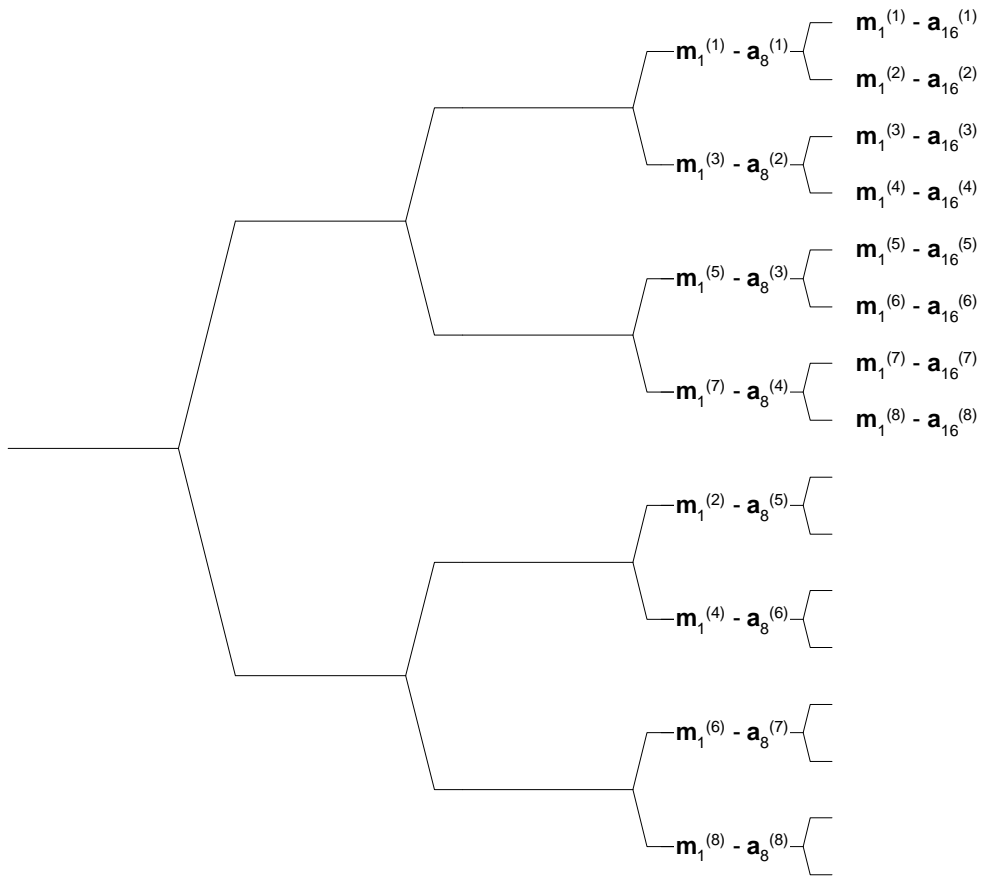
In this way, a joint channel estimation for the channel impulse responses of all active users within one time slot can be performed by a maximum of two cyclic correlations (in cells with small radius, a single cyclic correlator suffices). The different user specific channel impulse response estimates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





**Figure 13 Association of Midambles to Spreading Codes in the OVSF tree for all  $k$**

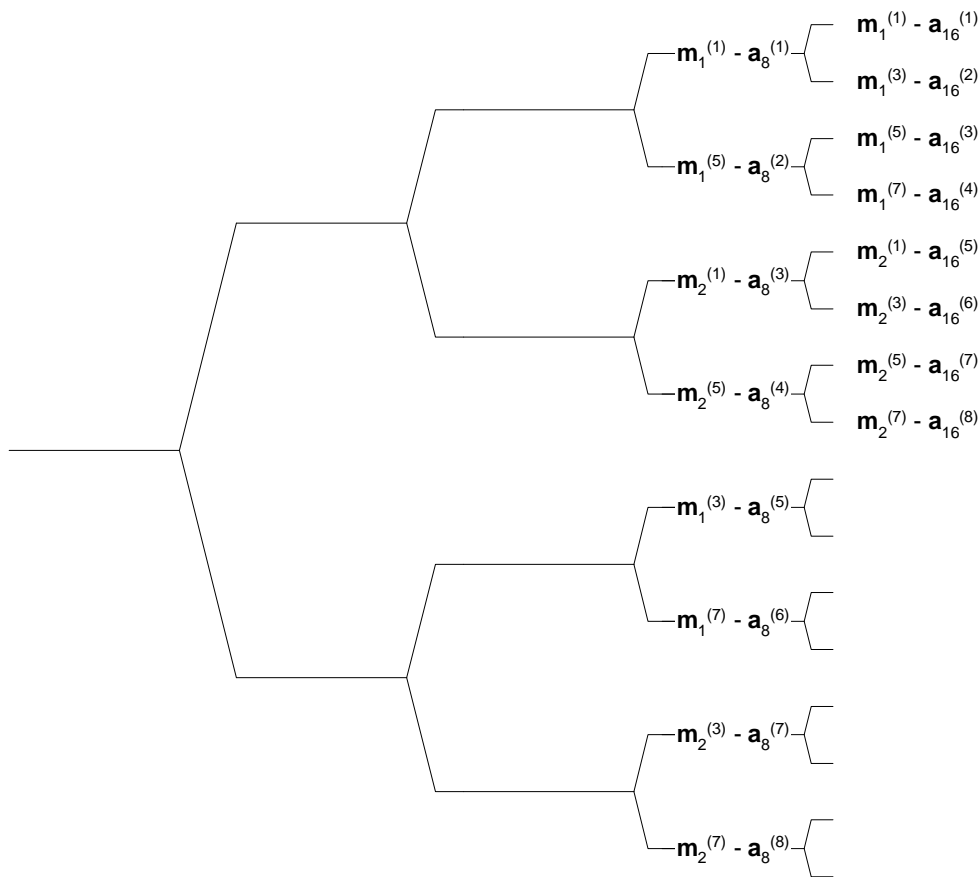


Figure 14 Association of Midambles to Spreading Codes in the OVFS tree for odd  $k$

## 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# $k$ ,  $k=0\dots14$

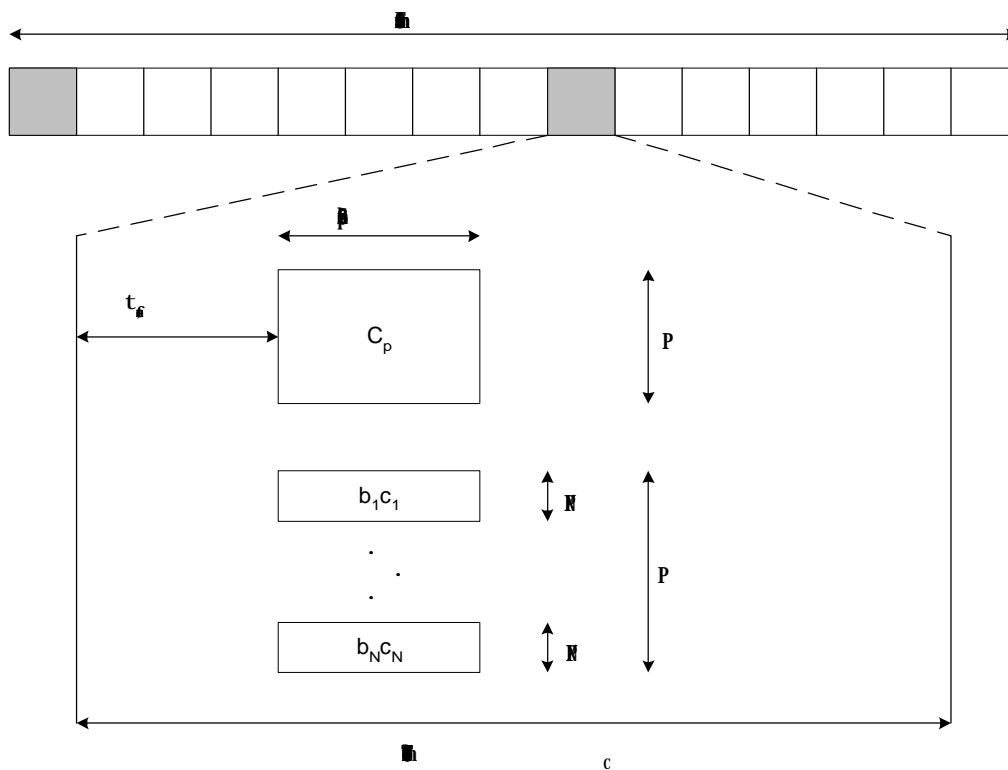
Case 2) PSCH in two TS and PCCPCH in the same two TS: TS# $k$  and TS# $k+8$ ,  $k=0\dots6$

Case 3) PSCH in two TS, TS# $k$  and TS# $k+8$ ,  $k=0\dots6$ , and the PCCPCH in TS# $i$ ,  $i=0\dots14$ , 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:

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

$$= n \cdot 71T_c ; \quad n = 0, \dots, 31$$

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 TFICI 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 16. 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 16 shows an example for  $L_{PI}=4$ , BT 1,  $N_{PICH}=4$ ,  $RF_{PI}=2$ .

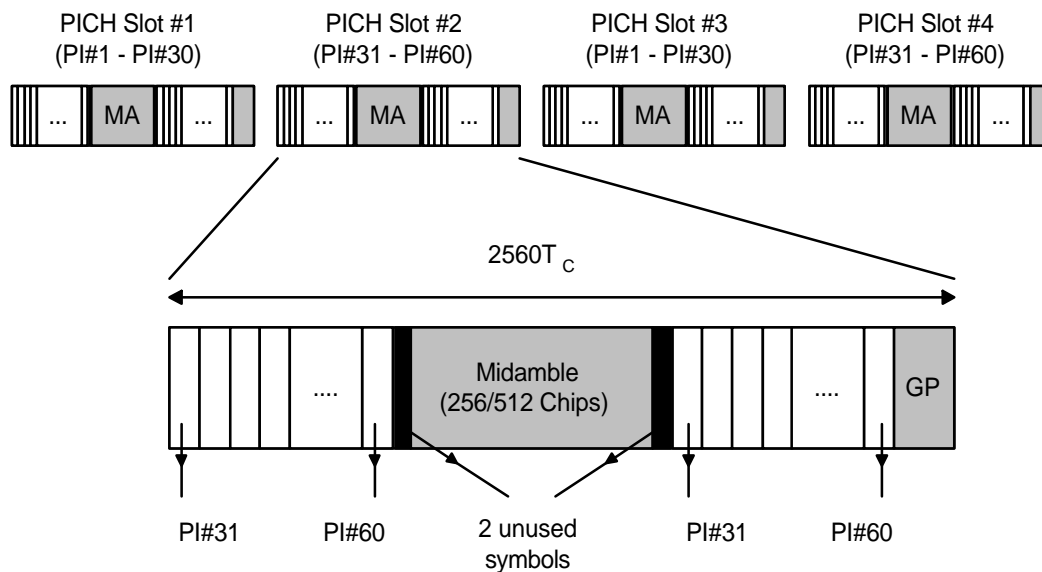


Figure 16 Example of PI Transmission in the PICH

## 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.

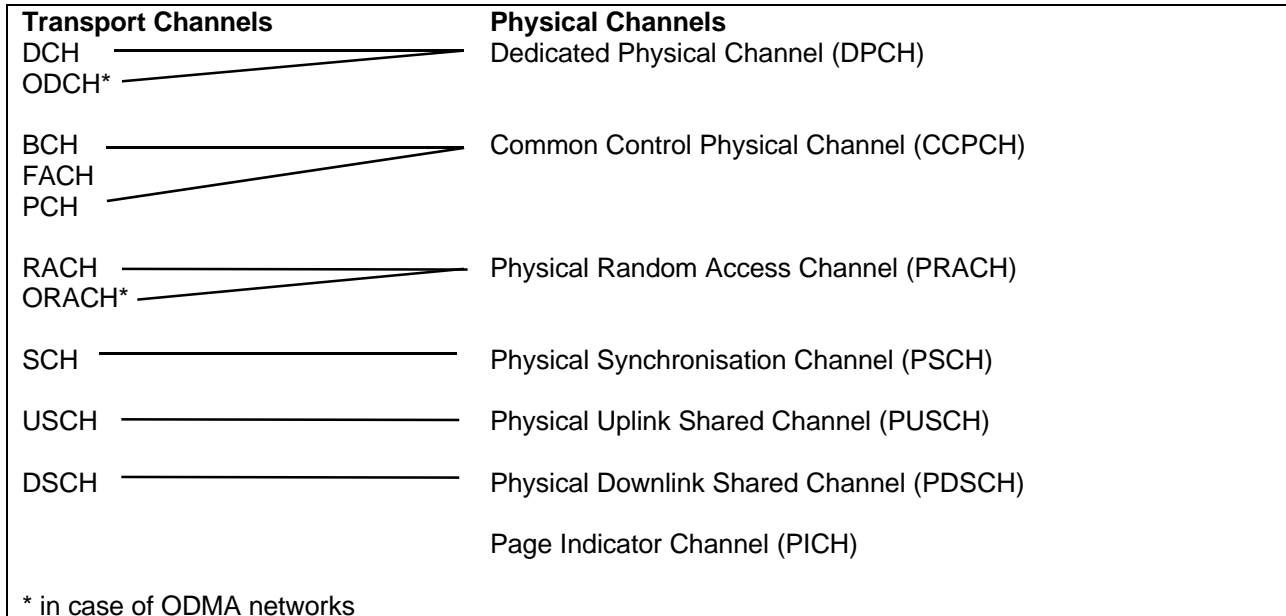


Figure 17 Transport channel to physical channel mapping

### 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”).

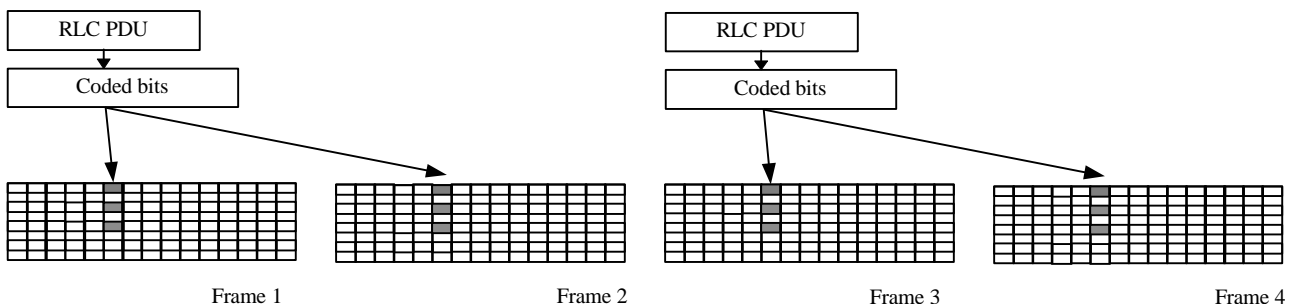


Figure 18 Mapping of PDU onto the physical bearer

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 4. 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 onto 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  $2560 \cdot T_c$  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  $L_m=512$ , 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  $k=1,2,\dots,K$ ;  $K=2K'$  or
- for  $k=1,2,\dots,K'$ , only, or
- for odd  $k=1,3,5,\dots,\leq K'$ , only.

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

- for  $k=1,2,\dots,K'$  or
- for odd  $k=1,3,5,\dots,\leq K'$ , 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  $m_p$  according to equation (5) from section 5.2.3 for case of burst type 1**

Code ID	Basic Midamble Codes $m_{pL}$ of length $P=456$
$m_{pL0}$	8DF65B01E4650910A4BF89992E48F43860B07FE55FA0028E454EDCD1F0A09A6F029668F55427253FB8A71E5EF2EF360E539C489584413C6DC4
$m_{pL1}$	4C63F9BC3FD7B655D5401653BE75E1018DC26D271AADA1CF13FD348386759506270F2F953E93A44468E0A76605EAE8526225903B1201077602
$m_{pL2}$	8522611FFCAEB55A5F07D966036C852E7B15B893B3ABA9672C327380283D168564B8E1200F0E2205AF1BB23A58679899785CFA2A6C131CFDC4
$m_{pL3}$	F58107E6B777C221999BDE9340E192DC6C31AB8AE85E70AA9BBEB39727435412A5A27C0EF73AB453ED0D28E5B032B94306EC1304736C91E922
$m_{pL4}$	89670985013DFD2223164B68A63BD58C7867E97316742D3ABD6CBDA4FC4E08C0B0CBE44451575C72F887507956BD1F27C466681800B4B016EE
$m_{pL5}$	FCDEF63500D6745CDB962594AF171740241E982E9210FC238C4DD85541F08C1A010F7B3161A7F4DF19BAD916FD308AB1CED2A32538C184E92C
$m_{pL6}$	DB04CE77A5BA7C0E09B6D3551072B11A7A43B6A355C1D6FDCF725D587874999895748DD09832ABC35CEC3008338249612E6FE5005E13B03103
$m_{pL7}$	D2F61A622D0BA9E448CD29587D398EF8CDC3B6582B6CDD50E9E20BF5FE2B3258041E14D60821DC6725132C22D787CD5D497780D4241E3B420D
$m_{pL8}$	7318524E62D806FA149ECC5435058A2B74111524B84727FE9A7923B4A1F0D8FCD89208F34BEE5CADEB90130F9954BB30605A98C11045FF173D
$m_{pL9}$	8E832B4FA1A11E0BF318E84F54725C8052E0D099EF0AF54BC342BEE44976C9F38DE701623C7BF6474DF90D2E2222A4915C8080E7CD3EC84DAC
$m_{pL10}$	CFA5BAC90780876C417933C43103B55699A8AD51164E590AF9DA6AF0C18804E1F74862F00CE7ECC899C85B6ABB0CAD5E50836AD7A39878FE2F
$m_{pL11}$	AD539094A19858A75458F1B98E286A4F7DC3A117083D04724CBE83F34102817C5531329CDB437FFF712241B644BDF0C1FEC8598A63C2F21BD7
$m_{pL12}$	BEB8483139529BDE23E42DA6AB8170DD0BFBB30CE28A4502FAF3C8EDA219B9A6D5B849D9C9E4451F74E2408EA046061201E0C1D69CF48F3A94
$m_{pL13}$	C482462CA7846266060D21688BA00B72E1EC84A3D5B7194C8DA39E21A3CE12BF512C8AAB6A7079F73C0D3E4F40AC555A4BCC453F1DFE3F6C82

m <sub>PL14</sub>	9663373935FD5C213AC58C0670206683D579D2526C05B0A81030DDF61A221D8A68EA D8D6F7AA0D662C07C6DCD0115A54D39F03F7122B0675AC
m <sub>PL15</sub>	387397AE5CD3F2B3912C26B8F87CE82CEFEC55507DB08FB0C4CF2FD6858896201A CA7264281D0298440DD3481E5E9DDB24C16F30EB7A22948A
m <sub>PL16</sub>	AFE9266843C892571B6230D808788C63B9065EA3BDF687B92B8734A8D7099559FEA 22C9416576D0C087EB4503E87E356471B330182A24A3E6
m <sub>PL17</sub>	6E6C550A4CB74010F6C3E0328651DF421C456D9A5E8AE9D3946C10189D72B579184 552EE3E799970969C870FE8A37B6C4BA890992103486DC0
m <sub>PL18</sub>	D803CA71B6F99CFB3105D40F4695D61EB0B62E803F79302EE3D2A6BF12EA70D304B 181E8B38B3B74F5022B67EB8109808C62532688C563D4BE
m <sub>PL19</sub>	E599ED48D01772055DBE9D343A4EA5EABE643DA38F06904FC7523B08C4101F021B1 99AF759A00D9AC298881D79413A77470992A75C771492D0
m <sub>PL20</sub>	9F30AC4162CE5D185953705F3D45F026F38E9B5721AEFE07370214D526A2C4B344B5 08B57BFB2492320C05903C79CBEE08C6E7F218B57E14D6
m <sub>PL21</sub>	B5971060DA84685B4D042ED0189FAF13C961B2EF61CC164E363B22AAB14AC8AF607 906C1C6E04F2054C687AA6741A9E70639857DA02B6FFFA
m <sub>PL22</sub>	97135FC2226C4B4A5CBA5FCA3732763B87455F73A1148006F3DF214BD4C936D061E0 4045160E2CE33B9CD09D08FDE2A37F4E998322B4401D27
m <sub>PL23</sub>	4D256D57C861B9791151A78D5299C56D116B6178B2A2D04BB95FB76540AF28341DC6 EC4E7ED3BF9E508478D9C8F44914805DA82429E1CF320E
m <sub>PL24</sub>	858EF5C84CE32D18D9ABA110EEA7474CF0CD70254D2928C3F4DFF6BB3A518587CA DA19029078AC90A8336C8178203BE3289E601F07D089CB64
m <sub>PL25</sub>	920A8796A511650AEF32F93DD3C39C624E07AE03CE8C96139973F54DCB9803C5164 ADB502D4FF561564D607037FCD172921F1982B102C3312C
m <sub>PL26</sub>	485C5DAE76B360A9C56E20B8422EA3E6ACF07CB093B5587CB0E6A5498A4714081EA 98DBCDB0482B26E0D097C03444473D233BEF3C8E440DEBF
m <sub>PL27</sub>	565A9D54EA789892B024F97E728E8EE112411942C48BD0C5BC8AA457D8DC9941F0F 7424B38643FFE6521CD306FBC56FE10F1428D4C245B5606
m <sub>PL28</sub>	5AEF2C0C2C378179A1AC36242E6B3EDB72C42D3624437674F8D51260C0898C20183 7CBA14E9E23D1EF6451C4ACF27AB031F457A8A1BFD148AE
m <sub>PL29</sub>	87D8FE685417822A23D925307E6C11081ADAC4702BCCD9BE448E78984D109B50DEF 5B7C58BC71EA1F0A6826BA8AD1978843E7697F3E416AADA
m <sub>PL30</sub>	84802B72AF27B5BE724D1FB629E0E627BDB0D9061292562F98350C1D0C9D4B9D8E2 BF71123C82EBB161003AE9829E07244D78F19926F8847A2
m <sub>PL31</sub>	8CCB5128238BCB088E30972D62792AEF02B9BDDCAD68C9916C00BF91CBE788B0F 03851FAAF88605534FD73436C259D270B1013CB14226F658
m <sub>PL32</sub>	62F4E6FAC2BF1979CE6854AA2D33534BFB2F946519101A6589131C3640707D40E67E D804AF8736AD213CAF5935741900061967E8285C27E34C
m <sub>PL33</sub>	4095E5B4EEAFCDF68A34B267EEA28D8444FA533900F41499E260D2E65C256A52E1D D5861F5227C98E00687D107233F51A1167BCF72FB184654
m <sub>PL34</sub>	5630E9A79FCAD303404D9E5A802299162657AAC734761C6E90DA8BCE4F61A763E0B B48D3FEB3F78468C828ABA4828DAD06E0F904CFD40421DC
m <sub>PL35</sub>	CD12B24C0BCA8AAC1FCBF0500A3BC684A180E863D888F2506B48C68ECF17F76CB2 85991FBA18EB6397211FAD002F482D57A258CD45DE3FF1A6
m <sub>PL36</sub>	AFCF2A50877286CD3405442730C45514F082D9EC296B367C0F64F04C4E0007DCA9E 50BEED5C102126E319ACBC64F1729272F2F72C9397029FE
m <sub>PL37</sub>	18F89EE8589D20882A72A44DCCDF0050F0A3D88DBA6531614973D26905FDF41E3F7 79FF0648E8AF1540928511BCF4C25D9C64AF34AC31B8965
m <sub>PL38</sub>	F890D550F33F032ECDA3A51FED427D634F64EB29AF1332A23CD961258E4BAED040E 7B336918E250EC272A12816B9EBFFA1E0AE401185F08C10
m <sub>PL39</sub>	ACE5DD61506047E80FB7D41BD3992DF4D7F18EB46CC145C0E9105428C2F8F299141 F5D66691904A7DC2513A3B83994ACB1292246B32818FE9D
m <sub>PL40</sub>	150680FF900C9B46E1E24D54BE2238CB950A934E5CCDE9BC3939EB51CB0AE202B7 D339EEC2018B33A0AB9B63DA5D512D64FB58C0E51A1C82C2
m <sub>PL41</sub>	51A579EED2663A002D32D10A0753173612F4D5BA167D1807C61F25C4D42C063682E8 E9DD019F79D446A046EB3F75E50FEB228DC52F08E694B6
m <sub>PL42</sub>	CDC644FE4C0C6897604F9D14D714123BF16FFF0E49F35F674908CA60653702FE27B CCA2A47098453AF8661055C8C549EB6A951A8396AD4B94D
m <sub>PL43</sub>	750A10366C595373C5001CA3E4239764B1409D602CF6052B39BC6A3255A15FE06C78



	2C4C5F847026A7E79838A2933A61C77BB6CBF5915B2DA5
m <sub>PL44</sub>	B7490686D78E409082C4C48FE18D4C35429C20AADF96076B92FC4E85490664753DB0891A0B27FD849BB7FCA99E3B38F22F8C662852C0D35AA6
m <sub>PL45</sub>	D86E1B575B47D23DA811806A54C231281F03317830E7BD305D3CAA7D6382A5233104CFD54D22DF9F34535E5B390D9040CF1375FEA44CEC29E2
m <sub>PL46</sub>	828655960C026EC67B683480992AC2ED2C43ABC606F5220C2945F373470BE7ED5BCCF7C1AA0986BBCCC84F11F1658AA568FAA0A60C5F0B5BFA
m <sub>PL47</sub>	D76230E02C8533653AAB99B288AA2ADE25A1C1BF28516C04239240EAF1EFC0B98974B51F886861D8A1E9F5D62CFFEC309F071A9716B325101B
m <sub>PL48</sub>	EA207662865B8A07D69648964DED818EE474A90B94473408871880E63EF0596B9FCFEC3C06B86EA6AD2B06C91672EFB33C70241A5450B59B8A
m <sub>PL49</sub>	9CB5459549909835FAB22F0D99298C120ACF479F814CCE749079D40688F28101037762F125C776DA9C5FA1FCE0E76E452F8185354FDCDE94E2
m <sub>PL50</sub>	227506304AEC1D6F93569B51FDC3405A0F38194F65BE17163A3CB9827A35AECEA757D020FE249377ECD561428A38FEED004EC859C272563185
m <sub>PL51</sub>	96B9AEC9938910F0E533422A3977519B05CD4AD3909BC15A7502D48D49C124FA192A8E57027CFEB11DF542010603CE5C9FDF8E626D4FBF8CF4
m <sub>PL52</sub>	A6AAD06E095A9BE0BD9F8A2ED40C3CBDBAE91C700CBB778C8696CC06F3A675C16BDB2918E5F2111005A8727206DC6A9684E05655185C398EEB
m <sub>PL53</sub>	CD168D384A78DA172991AD333EE2A9880905AFE59E2A2A4AC4414C40F82874F98A3CBE7B44F4C7F4710B35FD88AFC0399FAEB070EB9CA4D30A
m <sub>PL54</sub>	22016CA87AD1549174A8699DD65599697871091457E83E0912E7E77A06531C209394D283D18A38662B73681DD9C5BF330FED978BDA7D487CA8
m <sub>PL55</sub>	B9401B0843AA6F7827A13BD66C922287E8886C31EB5B90B82B472CCD6DA3D8D4FBF78B8F8496DFA8252B06429D5DD17142F1C908ACCD70EA0C
m <sub>PL56</sub>	E42B9EFDC5D09AC27B3C7DA28D02493A70521223B9D7A76A9D13E9C171017964D16A70C08EAD02C3DC948889C23E365AFCF01BF20B89B0BF5C
m <sub>PL57</sub>	9DA0180168DB915E9F3597B59312198E1B5CC00D743C2ECB0DBAADA3E35A2465ED1EAA9D74734D49A313CE4DFF020D0760E3153DC485603943
m <sub>PL58</sub>	B6C966619ECB98191D719C187C07BD503425650CAA3A2D1F2DF5212B1441D7A0C1D36A4C9C2550240AD17CA43BB3943DFFFBF1E283D81299CC
m <sub>PL59</sub>	DB0E8C41F08A03D477C1AA548799274C4BF3EB68F2636166FDC8D4B1E7132539930297E228BA232BB5C279FA5ECA3AC10E24361AF050A453B8
m <sub>PL60</sub>	89BCE2DE2974EEBA833CF32F224C85A2891484478527DB48FA6ECEA84C5E288CC3914CB54ADA0476278750187F68FBEA41017E1E58DF1A5A3D
m <sub>PL61</sub>	70A457D1314A278625443EEB52520815EC92CEF17417B97440DCB531BC1CE83212F63270418D0FBDE71F6DB9E0EA88772E1E4535B6633E4425
m <sub>PL62</sub>	C388460AD54B36C4452CF0433BD347100ACCC24C79C535AD3E1F23FE0425E93A044C553BFA116E09AA4BB32F13CFA76FBA1BC17520F45EFD44
m <sub>PL63</sub>	0BAFCADCDF9AA2846681782CD3B90CA036A863C78EE1507620BC394D0C6804B4C97A15BC9C0D7B79E6892EA1BFF1A0DD9573A9213AB140D0D2
m <sub>PL64</sub>	833B0226789A62882FCD27A30885E67872B1A1C2FA484AD498011599DD57E8E2A07A560B47167AA5F60EF47177DBB1632D5387A2896348640B
m <sub>PL65</sub>	8F52820323ABA5E6C6B465821B621600B980E59F53A599DA5646BA103214336836CF17E3386CE4FB2BC5F25CCB30CF7F500546828EC8786B8E
m <sub>PL66</sub>	E2E9A29C3C8207B9A4508FD2F667A159F068EEE8D00686F46EA904C3692C1D79DFF1B32E5103720D47B4B58AC35384A26087027E141B3126A8
m <sub>PL67</sub>	70E7C39FD2D3AE1DCE341699A544D801A8688A6EE47C5CB3630022147DDC06241FC5337A348A462B2472DEC5E104DD520ADA5114DB065D4B0D
m <sub>PL68</sub>	9E3483CAB164BD053C4971D4D87494CC689033D589EF80E5453376E4A8DCC02183B98C36B0FF7DDC0AD07FCE8B4D5164371BD03A2110AD1247
m <sub>PL69</sub>	04DA1C649B0608938DAADD3FE920A4F681690C54505429DBDCDCF10067AB5714BCDDFE1F28692710F794765781C1D233344E119BEE8A8416DC
m <sub>PL70</sub>	7A18D6D30BDF44410714C3DCA27D8F9EA8A542D87122205640B98313C91AD9A0B993A5A7BC3E035F93B88BBE6D4204BC82A9FA8D4C1A7618CF
m <sub>PL71</sub>	EB9525E10265A48733C8E0E77E459310112A71DCA680F68AC044B64BC0A31D02EEA0F7ACAAAB7F1E574E94FEA2D1301CB14B03263DA8122B76
m <sub>PL72</sub>	E706C6ED2D6F89153835079BE0C6D45310845EF2F9F6C6AE91B7419810508BA501C0148BF09955BAD90D6391BA8EBA5CEFB23221CC75143D7

m <sub>PL73</sub>	DF071A10AC4120CD1431590BEDCFF9483CA7047B19590D035D309240BDB4264E9A3A2761402EC97FD8BC51B4AF32E37FBC47162A2357D18751
m <sub>PL74</sub>	F0F952B2238139F46D8254D1A2C1C22A16BA71EC0C0C900ED1442452D7F44C798BC65FF40671B88074BA0B74C6510996EEAC495C5B49C37DEB
m <sub>PL75</sub>	1C86BD82EDA81FD65418D3837B5552A853791456D93B06C62C650D86CFBEC269AFFD772763064062C03751B9428C6DA2E60383025F9E404B70
m <sub>PL76</sub>	B390978DD2552C88AABA7838489A6F5A8E9C41E95FFA2215819BF8A5BFE39C8A706CC658E549E966611B843A1468406C41C09D1560BEDA4F1B
m <sub>PL77</sub>	1A69EC9D053C7E84BAE7A48CCC71857D0C6B06D1065E3EA4633B133AA022B8104F6EE7C69B6184B746C8822958B0A16686F27C8A0E3B4EFEAD
m <sub>PL78</sub>	C95B2070816DC97C6D8DD2583263E73F9AAAFD13F0548D2EBD835824418F11E54111005FB713AB234BE412347358281C7DE331EDD21B8BEA52
m <sub>PL79</sub>	56D6408399F23C2ED85EE0F68111D69A91A3AD9A732AC57CA08F86CC28B3CF4E4B02EBBA0BCE5CAE5BACC4D52004070797C04093A84BB18DBA
m <sub>PL80</sub>	E662E7043867BE250764DA0596D34A582A619B408B505E6211DD6286E93A37F95B1EA680C0C5F3E777E3F71E8D75495D59043217FC0E222E16
m <sub>PL81</sub>	27D5E681C222297AD478A079EF12F1A98F744B66335303322EF8880B931FEBF8322F4302944E80BED468A0A516D410B183D863795992DA7DDB
m <sub>PL82</sub>	5100336C05F9E5BF35201906C1C588858E0DAF56130DF5554B9AB21CA15311A90290624CD63E03F5EDA49DB7A0C32AB5F1CA427A2D5635FDA5
m <sub>PL83</sub>	C696DC993BF9A9A61B781B9C5C3F5CFAA4C8339D8B03A9B0387883D0482A41AC78D6522425959846E561D26A30FF79A205C801A85889736B2
m <sub>PL84</sub>	D562297561AFF42D3168296C1153E4E39BE7B2EB0348BC704625AA08391235075EE0DE0A79AB03222FEDB27218C56F96EAC2F91CC8FCE64B12
m <sub>PL85</sub>	DD0B6768FC01CC0A551F8ACC36907129623E975AB8B3FF58037F1859E2FA8C62C2D9D1E8506916029A2C3F8CAD9A26AE2CC652F48800859F5C
m <sub>PL86</sub>	923920696EB3AB413786C41854822282BB83F6900D33A232D470BE198BBF086067B72613300C593B74251E2F079857ADBBCD86583A9DCAA6DC
m <sub>PL87</sub>	B8EF30C797D8D2C4EF11244F137D806E556A436626D0115A621C92C34D166A68BCE DFA0040DA8FD6F987B1CD5C2AA1C1B045E64475F0F8DABD
m <sub>PL88</sub>	E1887001D414405ED6419E9EE1D1D346D924ED57ADF04B31B7948099976B2D1501A60DFFB287AD44C8783DF0C1EA5AA5D273D1389C8EA22DCC
m <sub>PL89</sub>	8C2E379A58AA96748141CA84C35987905F984A49D3AD9BFF7807AC244C16C1DF74343C2E1F25514F5A0954CFBB3C92E25EF783136844998AC5
m <sub>PL90</sub>	78F8A99E0A54E27F51C0726FE7A11EB26B1E29FE65F55AC8AC58011465900B958488A90F6DF614A58431DC8B6C6B9A6F032EE0E0B1306EC4B4
m <sub>PL91</sub>	88F7A31B7B20E0F05CA26E729B4F8A1933962D7BD7BE3E1EB130B28C794C0B4D01CADE09006FF97E80117509733F3A9DC225413A0AE08CA662
m <sub>PL92</sub>	BE4DFCEAC18905AC8D5DA27A794F88A4D3058D2EFA3B075A819DEAE688EAF8940A653ED7104E7B403D490F0A9030264E1F12B8922C75775E61
m <sub>PL93</sub>	5BA4B79FC4550234D8922963BF3537485E3C8745A5DB90D3E2E454B30FF61112F508155B7C2B3C4C628AF846240C2021ACDE547E5A41F666B8
m <sub>PL94</sub>	00556D35649F7610AB24A43C4F16D6AC0571FD126F11880C5CD72100D730E4E4D6BB73C33F837FAF1072743B249ADA2E09598B1EB23F1180A7
m <sub>PL95</sub>	7A0CC9F21BD69CF3023E944545C2176EF0D4F450B765C28359FB8A32137D043D0E5713E67B3F61320985D2C6106605081F87D2296321468A2F
m <sub>PL96</sub>	DA669880995B0671201172BABFF141D5854A245E211879EF3038A7C84170DADBD368455F24653161E7886E15B253F93E3A3C568EFB17CDEB1A
m <sub>PL97</sub>	4E294E53D1661C1F6F748302A7723DA951C00FDB8BEBBF67A68710BA0F1A255DFB1627059D41A23D3961726DE6FEB10E5D209CC4505B209812
m <sub>PL98</sub>	73385DF701414E144768A67EF72924B1653479E962FB1554B7E54BC5284D9B3E41C0C133F878972230721918AA425501B920B204FECE0C7F8A
m <sub>PL99</sub>	F4492160805F258CE592DF4D1200566F81D173458D78EA3ABED79A14AF88170DB1D4A9A5931D2B80C58C27FE17D806E3E6A66CDAAD09F118D4
m <sub>PL100</sub>	44D562D9012D8B07B8F44596467C11A163982BB7EAEAC184078B6B8CE46B5D7E17C39CEF576A025491183017FA09931D070B307B86524B03FF
m <sub>PL101</sub>	FCAEEFCC49A13B4FFA12C0CC6A2B90CF4F57D78B1E98294B04675C2F0991661FDC61A452A247F8C29E0284AA21026F368307375AA2C3F1E12C
m <sub>PL102</sub>	C486DF0510DCAD5AB86E178A686D398E11A0ECFAC5A326C10129257E5456B22FB8E

	147E9190D9929A5DFFE44715FA47D62F04CFC9B1C201414
m <sub>PL103</sub>	C10AF383DC708E257E15A8AB337BCE684A2F4AC7A22DC2C25C277F8E8D0858E79317CDDD9AA2EA6CBE604D24AC0945026103E7B4126FD361A4
m <sub>PL104</sub>	A5C60A181148D9A931B2DDDB9D169648BA54F366B4EFAE88F6861909EE0F07C037EE349D0EC59A823286E366CA3943589EEA7F828C3728085F
m <sub>PL105</sub>	96136AEBD5E28462B0421DF292BA899FFA660D80EA01620D2C7490E5347127884AA3C3D1FF44BCEEF6C29EC589CDEF200C5742C5964F8B2B52
m <sub>PL106</sub>	40F63C04ACAD986255D1E16B769A6D4C11A1D075E804BDC0AC61923E9A67F5D7417756328072455F6E22B1C64E06F367D1B0808295C2D90E22
m <sub>PL107</sub>	F4B82D413578C4888C5F002CF6D0E03778134A860436551FD57537E4CED334B3C9CEBACE615238271717AA762448B86FA53D2074BCE35658A7
m <sub>PL108</sub>	BCCC92D72C920E685530591FC351743D1E23DE044BF81D32650406113E23ECC757FDE4E386B6E2E7195EE4969717A7BD0812AC312B33A54308
m <sub>PL109</sub>	6ED59DE0D44370A861CE2B42CF5E578E764A682AB5777905EE027D7160490EDC6C28989B23805AA697FCD215CB401BC5E4D430624C01B16192
m <sub>PL110</sub>	DE80C0E273B92CC3C5034F7A20DB3914643C430B425C8B9249EAF73ACE8C3BCF17957242CF534D87A67D4DC0252275262E737F4095450CFA14
m <sub>PL111</sub>	9505C4FEF2A397D5059F4729D013292A8321FFFA929ACB0A210D0A13E13061227C44A68FBD8CE6B66CE3D783363CD039AB35EE52603E09B758
m <sub>PL112</sub>	E8BE90D7F954B14D8002A4CAC20765ABEED80634498C836D79B0F9338DBC17B28F05CF4E79136779E1C55AA30B6215F890882887B3B53C23E2
m <sub>PL113</sub>	9F4B622C1358AE5468DC31E4B2CA320E5E20458C1DE5405BF4F9AD7D45A5BCAA39EC0626FFFC698C16A009CCCB7A18A64E85E70BA71731BA24
m <sub>PL114</sub>	B91B2624843CF48299AFC2B1442570B41F28F578530D1E322E0B54282372131C71ACB924E70768A243EEC3200E7A5EBFA77111D9FB07FEA8AE
m <sub>PL115</sub>	965F42DDA3A4650FE2F5103932B68F166FA424B9F0F7045311D962C2A9F66B9BC6C66FB480F9800354E0C5A72251071422CF1DFC44F94C00C
m <sub>PL116</sub>	08ADCE48699FC30FA0788073BDAADB9177BBB4C1CED41F93085218364B8BAD8488561EF0FE1B0DDAA403C602494CB35697D62AA0A2B93A64CF
m <sub>PL117</sub>	9A313BED80B1220D77C8ADA4B2E0B3D284A5120A94B741380923C78D3AD32BC3E71EC6EEA520E9D447D8727697598BB987F17506F482003ABD
m <sub>PL118</sub>	24C9AD4C14EFEC002A3473FCAB04E492F2E269161A2960BA8AF09FD710B444A40C4E8B138418E62301E91FBA97AFDC58759A76D00F676736C7
m <sub>PL119</sub>	6514C7733711CE4942CD2123AB37186EB7FECB7E78ABB28744864942FCF4C0F810054AF55B1042EB53064F0857C61D85B2CF0D2DC5826AF22F
m <sub>PL120</sub>	B2C80CDC83E48C36BC6FDAB8661208EAD392F3A0571BE41DFAD765E744932ADEA50061E66C05498A5381B2A1F1B446587089DC4E4A2DF03D82
m <sub>PL121</sub>	639368BA75CC709A3D9F28EDA237E32C2017A9BF1E382045B9426AEE0A4049DCB4E1D7EBE4647B855212824557497CFA039885A3BA42F98F63
m <sub>PL122</sub>	6A70DDC17D0C8024B1C853F0C1948561EF32510151BE0C63BCA9171F20217891D1021EE72586CAFF557F8973336913A94A2A699B8740B054B8
m <sub>PL123</sub>	2E32E3A35CCD001172CE310B63B4E406126045A0FA3795BE3E3D9B56F72405FC94FD89946818BAECD24A61BABBBE2D23052AB01EF73CA0CF4A
m <sub>PL124</sub>	829395C35205A480AC1351C25E234BF52D384A3DE1C5138A650A6F82F739757D812D9C38231AB9FD81AA0648B11F6F6113F9312C57624FC746
m <sub>PL125</sub>	D98FFE19C0AAAAB0571A9075ECDFD3E7373F5255DC669116A8C6913F0123E598F930934C5F6A601C37C529C371A0C391B59AC5A9E286D04011
m <sub>PL126</sub>	C1A108192BCE96C2430A63C189BB33856BE6B8B524703FCB205DAEF37EF544CD43CA09B6181B417398083FF2F781BA4AE89A5CA291DB928D71
m <sub>PL127</sub>	42568DF9F61849BF9E7DEE750604BE2E0BC16CC464B1CDE15015E01D6498E9F3E6D6950E5824651F212BA0057CE9529B9CCAB88D8136B8545E

## 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  $L_m=256$ , 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  $k=1,2,\dots,K$ ;  $K=2K'$  or
- for  $k=1,2,\dots,K'$ , 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  $m_p$  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
$m_{PS30}$	50ADB27DA2A3701470186B699118E16DDB0D10F705607B1
$m_{PS31}$	656C0692B4E22023590A906D2A74DFD471C883A7B1E0B3A2
$m_{PS32}$	C21FDACD09A3CDCE74C4794010A3E45769B142505C56A0E6
$m_{PS33}$	CD9392A87C2D4D7CE5801CDDA8A76339B6F900F008B290E2
$m_{PS34}$	956426FEFD8B8D52073E87984E10C4D255064E1372C04A24

m <sub>PS35</sub>	C4F4D6DF1B754AD6063FD10C331C1428ABB27B0700134B94
m <sub>PS36</sub>	B65548082B34E9FAF43F33C4070F79099758CFD41B491A11
m <sub>PS37</sub>	C8317EA111A82B04E78B88B864B1EF5D711BBEB4A0527036
m <sub>PS38</sub>	8FB7AD1188E8D1A5219845013672560FD38904E70537403B
m <sub>PS39</sub>	B41A324E0D80AA0598A8D391C1D7FFC82B4A075218E98EC3
m <sub>PS40</sub>	49A6350A62E208B011E86528B9A481A0E76D723F6675FF82
m <sub>PS41</sub>	C344C8C23C42A7B7442E6022E95AE4B08A4BFA786F35F911
m <sub>PS42</sub>	28F430CF67D69C9DF60E25656413BC5F932A022DB1406C44
m <sub>PS43</sub>	2FA5D70CF0FED4213F32116051450391C2A627D9B670C428
m <sub>PS44</sub>	959537D988FDD4F1360B4E84701AE5409229C30EDF8BC404
m <sub>PS45</sub>	CDD2E0450F9EC12F81391AD4633CB29F315B4A0A890A9A22
m <sub>PS46</sub>	158776A20B4B82C563EC08F086830EA66DBD2DCCB4DF6026
m <sub>PS47</sub>	431FCACBE48208975950342709D11F19AD5FB047F3B440C9
m <sub>PS48</sub>	86B141AC571BA6B42653B12FF04D4F0E6C81F3EB608660A2
m <sub>PS49</sub>	86D297ABD34E8510F6CDB0EA617F1F1051C8799117B02211
m <sub>PS50</sub>	80B2D9530B34E781311D95CFA3857F277CC07014D324AF5A
m <sub>PS51</sub>	2B607B93FD8B45601C1E574E14CFC6912C22AEC1045ADC49
m <sub>PS52</sub>	D234C5C45E105A837E6DD74BC4E534523A20317BA0625A29
m <sub>PS53</sub>	768CCDB3E2A7A2B863128382590946B25472BE2BFFC40641
m <sub>PS54</sub>	3DA38212E0A987EE1F665D4E13C2AA4446E00A76C948A073
m <sub>PS55</sub>	09173135E4A2CFC8F2678750AB5257110906F013587BDE82
m <sub>PS56</sub>	522E070B266F35E99C1F3C42D2017F8E415550492B72F086
m <sub>PS57</sub>	D63E4BD805262A3DEF05C7D86C422E5048921E5531784132
m <sub>PS58</sub>	564AF806E28131611E5F884229265D446A50E1E488EAFBBA
m <sub>PS59</sub>	A2603E009D3D30147727B750C35C62299AF754D3E4A54E1C
m <sub>PS60</sub>	938504B02599D33E28246E4271C375AE81A3BBE8D3F8A920
m <sub>PS61</sub>	461516B2CAC6FC42A4B707CC6073BBE573C014892C811776
m <sub>PS62</sub>	29186DE4CCAAB2CD0100BB19EA595879D63F0F0CFA881AA5
m <sub>PS63</sub>	A064B449CB784A91B803369CDC5EF61A670AAAC044BA3E68
m <sub>PS64</sub>	8719C454D88FF5149DB943CB6CADA01D0B9664B357A18203
m <sub>PS65</sub>	A27EC68720F00A714AA2C45A7EF232286984D7B193F5C916
m <sub>PS66</sub>	AC8361676AB424E48F0789082B0CD2EFB8D2E627D041DD66
m <sub>PS67</sub>	ABA1BEB0064733A0620906BF2B29C95883F069D7E4C35D39
m <sub>PS68</sub>	9E22EDED47D92CA1D0B7530EC6062287BD83A04874AE00C
m <sub>PS69</sub>	0BADEF288B20F5686C5DE3A71219AC2172054326BE831696
m <sub>PS70</sub>	953801EB2AF58C2F80E49A6CC46085CB554243E3B3BBEC8C
m <sub>PS71</sub>	333A504C51C8FAC5025994565C3F600F154F64FAEF4EA484
m <sub>PS72</sub>	A6583E19647662005474153A6F8DD88A473853E94B720CE7
m <sub>PS73</sub>	90ACAF707D18AF34F5848C58166830AF620ACDC1B2DFDDA8
m <sub>PS74</sub>	39C5C598A374EA82F3F83378258248DAD3808812DD0E74BB
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m <sub>PS77</sub>	449B50C2A52996FA5A828A907F30F9F460EE3D99930DF890
m <sub>PS78</sub>	62CEC9574D30184BCB4F94EECF0CC23D2D2A8D0003F0AA33

m <sub>PS79</sub>	B56D258889703F76A0738EE3A7D355994159A4851833E198
m <sub>PS80</sub>	65894AA54C0F6C9A206521C9FC379A8AAF6E621C03CF849C
m <sub>PS81</sub>	2D47F3414E30CC02C6835D95C9BA204488F0FFCB4852677D
m <sub>PS82</sub>	12BE4DD8B906B584010F8A330AB67B278E8642FA33D51B68
m <sub>PS83</sub>	BC928A90A4B10906CAEE638BF768E08542F48F1676006DF0
m <sub>PS84</sub>	30C544E437C8ADA143566CD1BC4E9E7BA84139A08505C2F4
m <sub>PS85</sub>	84FD5B05506192B753FBA2C719B584E0EDA01814999867D2
m <sub>PS86</sub>	191F14DD00034E03AB5BB4342F1138B2CD33784E60CFD75A
m <sub>PS87</sub>	B8ACE7990B6A98A80A61162C4D2D5F88F24E8F7DE4207590
m <sub>PS88</sub>	EC1DBE72E8EED0C61054FC2695422AC0AD2D888265B21AB0
m <sub>PS89</sub>	9A1B4CA467AB7E082AF4278E44D177EA78424508C23E8B08
m <sub>PS90</sub>	999EE541C608164AC975214F3A37A677FC2CA03E2C2A4B20
m <sub>PS91</sub>	1BDCC20265031432917A2EB828FB356A22DF9CB609C0F8F3
m <sub>PS92</sub>	EB4A81859C93338B8A1B87C02C815AE09D765F6F2249B958
m <sub>PS93</sub>	E6A5D1629F4CF09A1F280DE0C480D4C73B26ADE321A50AEE
m <sub>PS94</sub>	BAAB7286DD24C80B15A7958039B904F1CA83C310C8C7AFF2
m <sub>PS95</sub>	12220F72619E983717C68FFE1C4148F2354B7B1955B65620
m <sub>PS96</sub>	A198706E24FAA08BD09EE392414816038E667BB34307D6B2
m <sub>PS97</sub>	30B3493B4C035881A7A722E4546527AAE787FA2C0893AC46
m <sub>PS98</sub>	5A7318126522843DCB7F00A2D9F9BA8F88963E4152BC923C
m <sub>PS99</sub>	844844B0CACAB702C332CE2692B4166F4B0C63E62BF151BF
m <sub>PS100</sub>	B8297389526410313692F861DC60DA86A23607F7DDE24755
m <sub>PS101</sub>	6C1144CF8BC01538D655D29ED62DE6E74A3180EC905BF1E0
m <sub>PS102</sub>	E9DB3221FACFC5C88691A7013EF09672A130D52C3413AAE2
m <sub>PS103</sub>	2FD0508615EC4CD4BF18ADD46D777078869130C8921A4F0E
m <sub>PS104</sub>	40911B4E0525AC874228F6EF642E59154730CB187C7E417A
m <sub>PS105</sub>	2034C6A027D4D850F5184AA64C3153231F4651B616BBFCF9
m <sub>PS106</sub>	57833235451525A1DFA213FCE0B419B6494BC7B99F488410
m <sub>PS107</sub>	6DC3D57F2E39158D036825F8804810D77CA1ECA610ECD894
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m <sub>PS111</sub>	9D6D8992482FB885AA5E878C3BA2045538B09886C23CDC2D
m <sub>PS112</sub>	C0A5AB67D1CEA126F6476C75443F0A11CBE749412EF03104
m <sub>PS113</sub>	1853A5C20CDF968C5A180D8EB5E72BF15517D06680D98412
m <sub>PS114</sub>	8CEA1223227ADF37D0DAAB320906E1C79029F480D25181A7
m <sub>PS115</sub>	5561038E96A658EF3EC665612FF92B064065D1ACC1F54812
m <sub>PS116</sub>	C55A6263F08D664A1E53584560DFF5E611640D8281D9A843
m <sub>PS117</sub>	4386A8EA59124D043F29056A4598735A4FC7BC11119B90C1
m <sub>PS118</sub>	D6571B20668BED50BD7C80388C162632BCB069AA67C7FC22
m <sub>PS119</sub>	4F9F09ABBC1391EC2CCA5359FB52250E533BF04324154106
m <sub>PS120</sub>	662659F42188C9453F6E6DF00C579627045DA1461A3A0EA5
m <sub>PS121</sub>	8DCC9274C0C2A9BA6096BF27FACA542CD01CA8653D60A80F
m <sub>PS122</sub>	5C1210A1E50E505F6B73C90156C9D9F19AE2310BBD820DF0

m <sub>PS123</sub>	B1E0A7CE26202E223D4FC06D5C9BBA4E5F6D98204D2D5286
m <sub>PS124</sub>	DB506776958E34552F7E60E4B400D836153218F918E22FA6
m <sub>PS125</sub>	ECAA60300439B2360B2AC3C43FB6241ACDE5055B295FA71C
m <sub>PS126</sub>	BF1E6D9AA9CA4AC092BE60500C77D0DC7A6A236520F86722
m <sub>PS127</sub>	051C5FA122845A30B4EC306B38016B45667C7754F92F13A0

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## 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 5.4. 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.



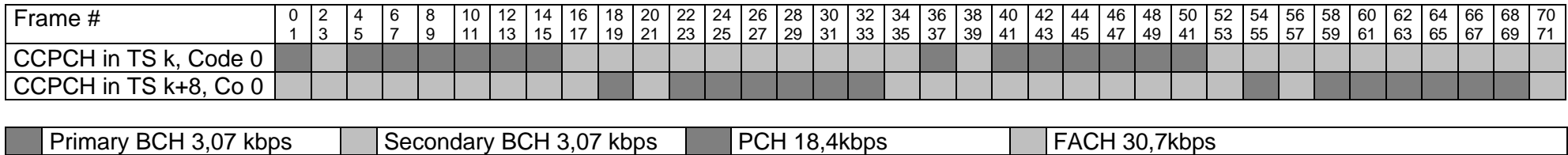


Figure B.1: Example for a multiframe structure for DL-CCPCH.

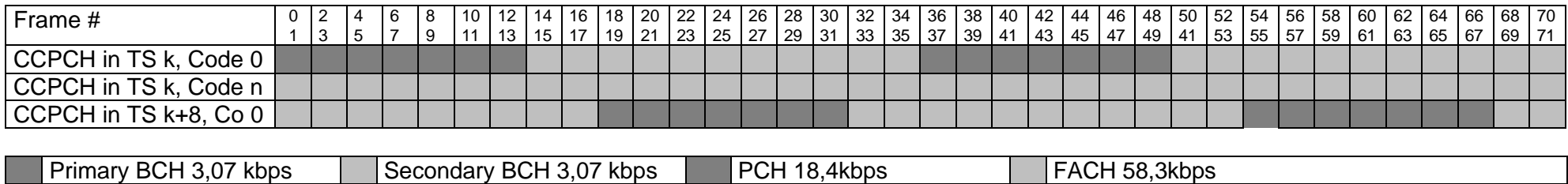


Figure B.2: Example for a multiframe structure for DL-CCPCH. n=1...7

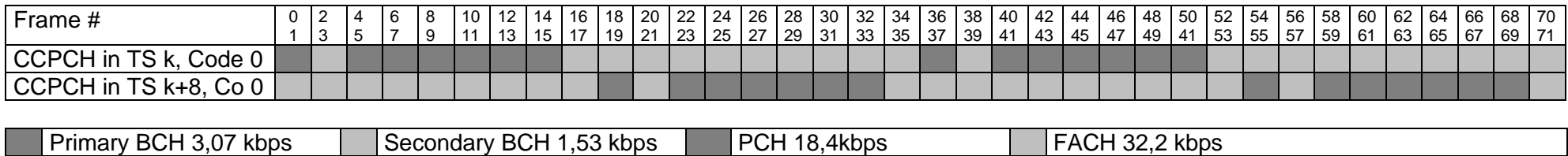


Figure B.3: Example for a multiframe structure for DL-CCPCH.

## 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
V2.1.0	1999-10-04	Approved at WG1#7bis meeting in Kyongju
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