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Physical channels and mapping of transport channels
onto physical channels (TDD)**



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Foreword

This Technical Specification has been produced by the 3GPP.

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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.

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"

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.

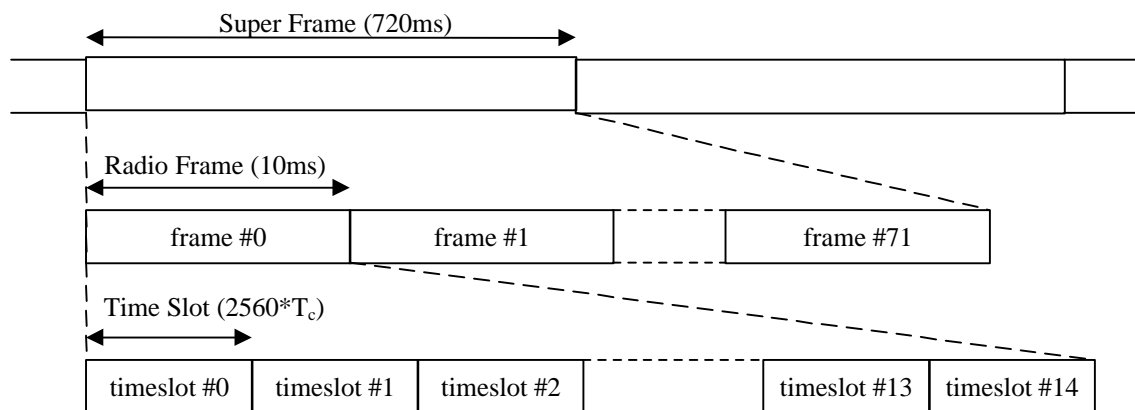


Figure 1 Physical channel signal format

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.

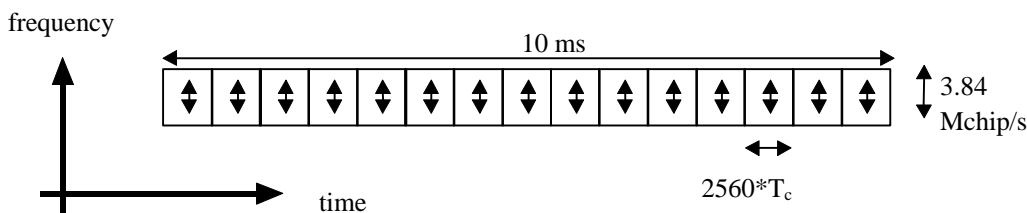


Figure 2 The TDD frame structure

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

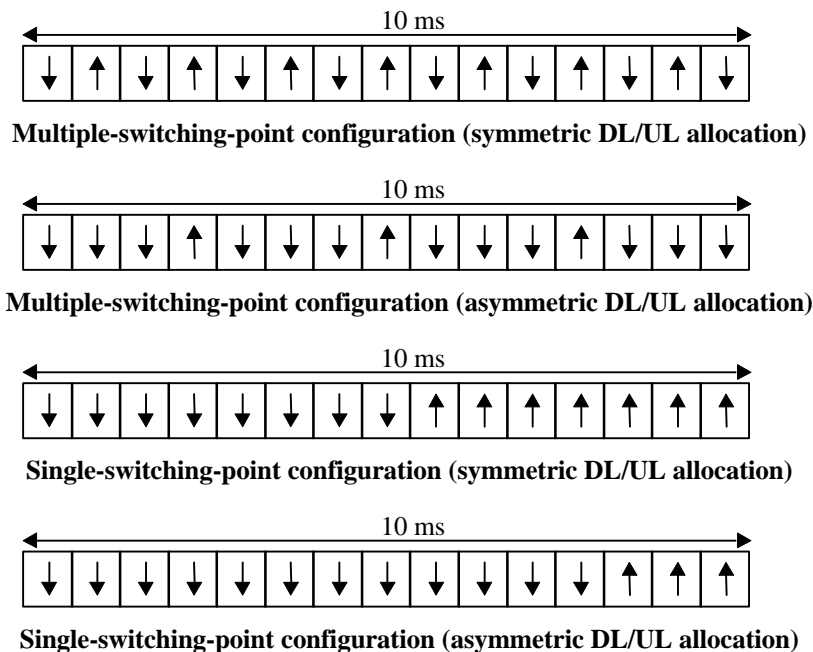


Figure 3 TDD frame structure examples

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.

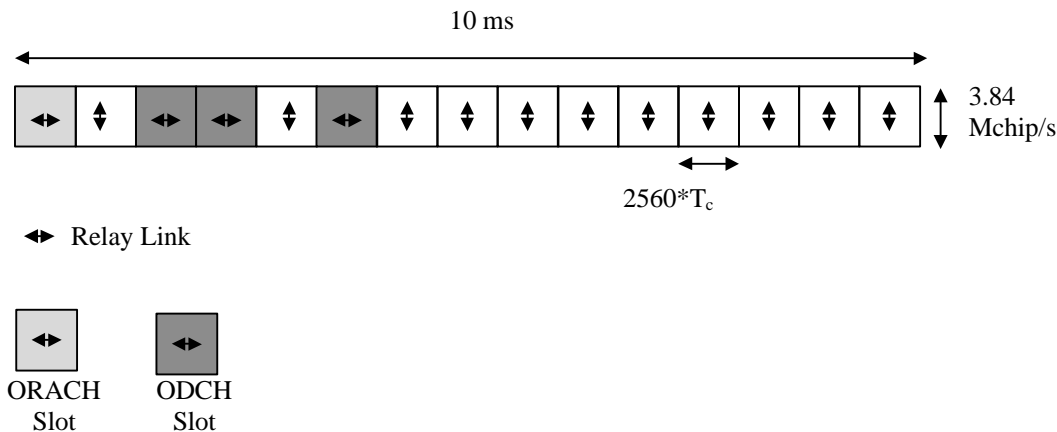


Figure 4 TDD frame structure example for ODMA operation.

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 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

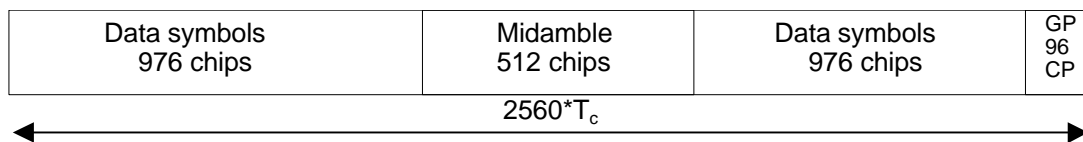


Figure 5 Burst structure of the burst type 1. GP denotes the guard period and CP the chip periods.

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

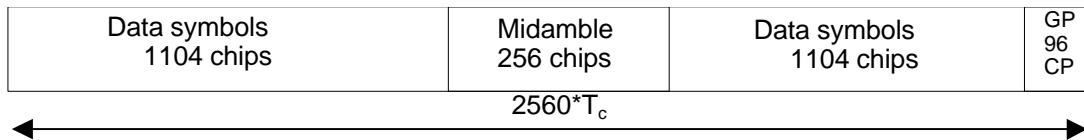


Figure 6 Burst structure of the burst type 2. GP denotes the guard period and CP the chip periods.

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.

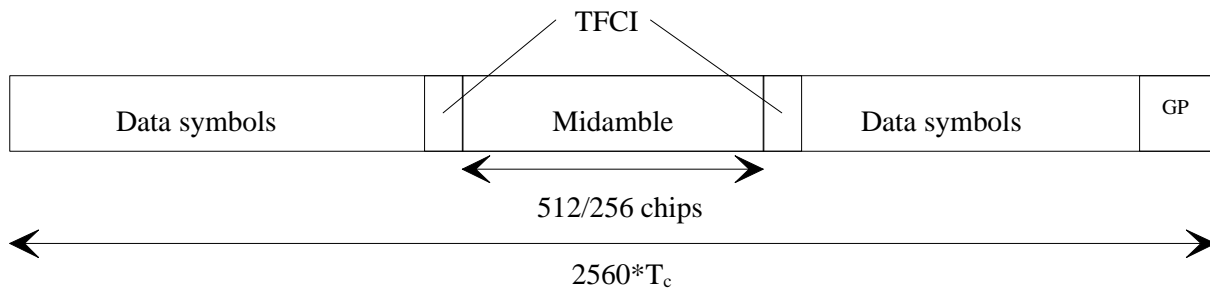


Figure 7 Position of TFCI information in the traffic burst in case of no TPC

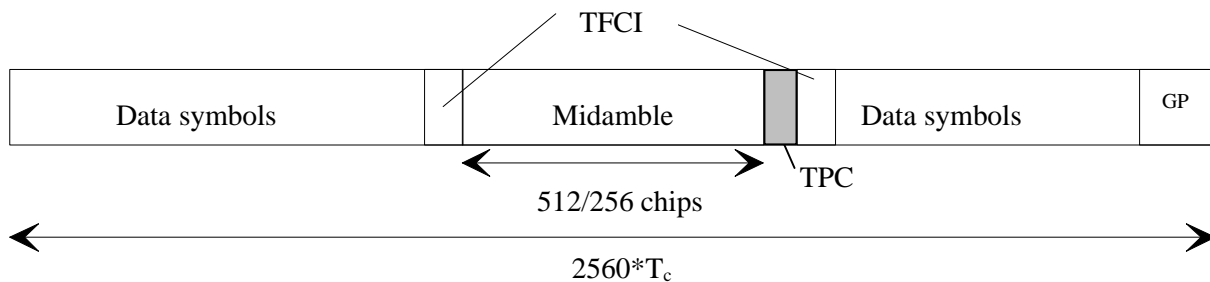


Figure 8 Position of TFCI information in the traffic burst in case of TPC

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.

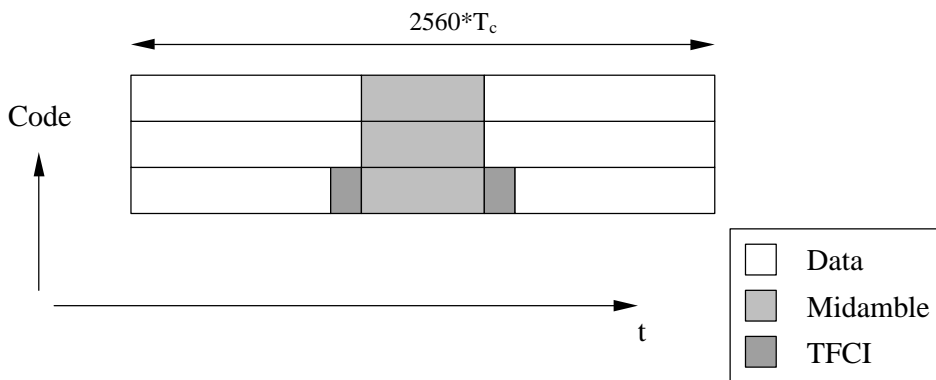


Figure 9 Example of TFCI transmission with physical channels multiplexed in code domain

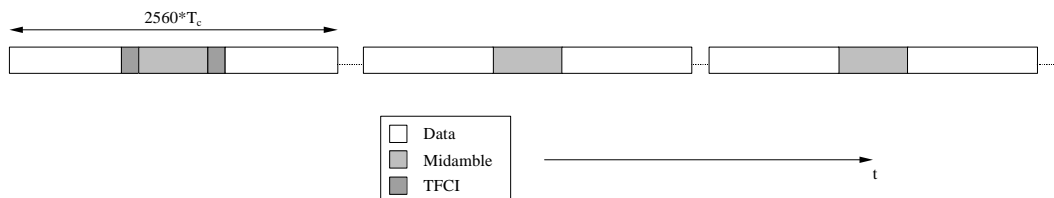


Figure 10 Example of TFCI transmission with physical channels multiplexed in time domain

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.

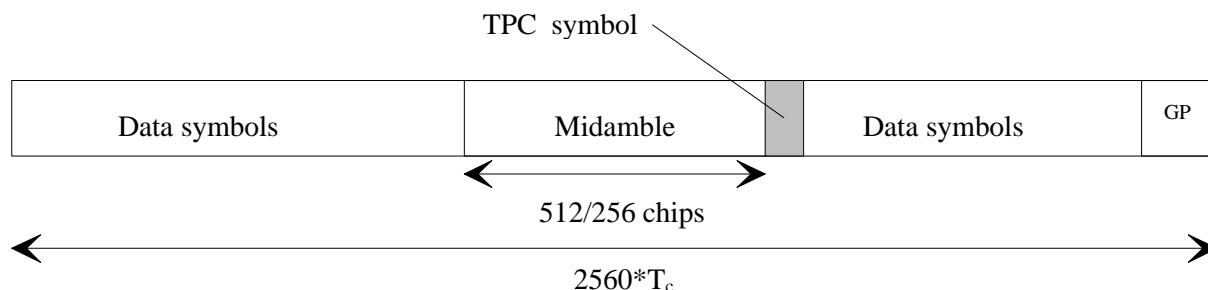


Figure 11 Position of TPC information in the traffic burst

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.

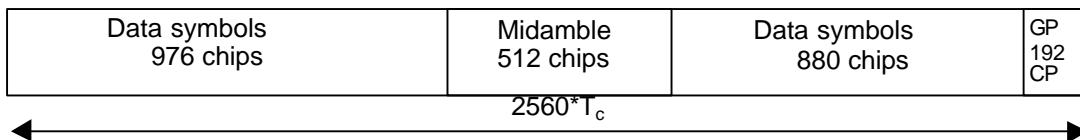


Figure 12 PRACH burst, GP denotes the guard period

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.

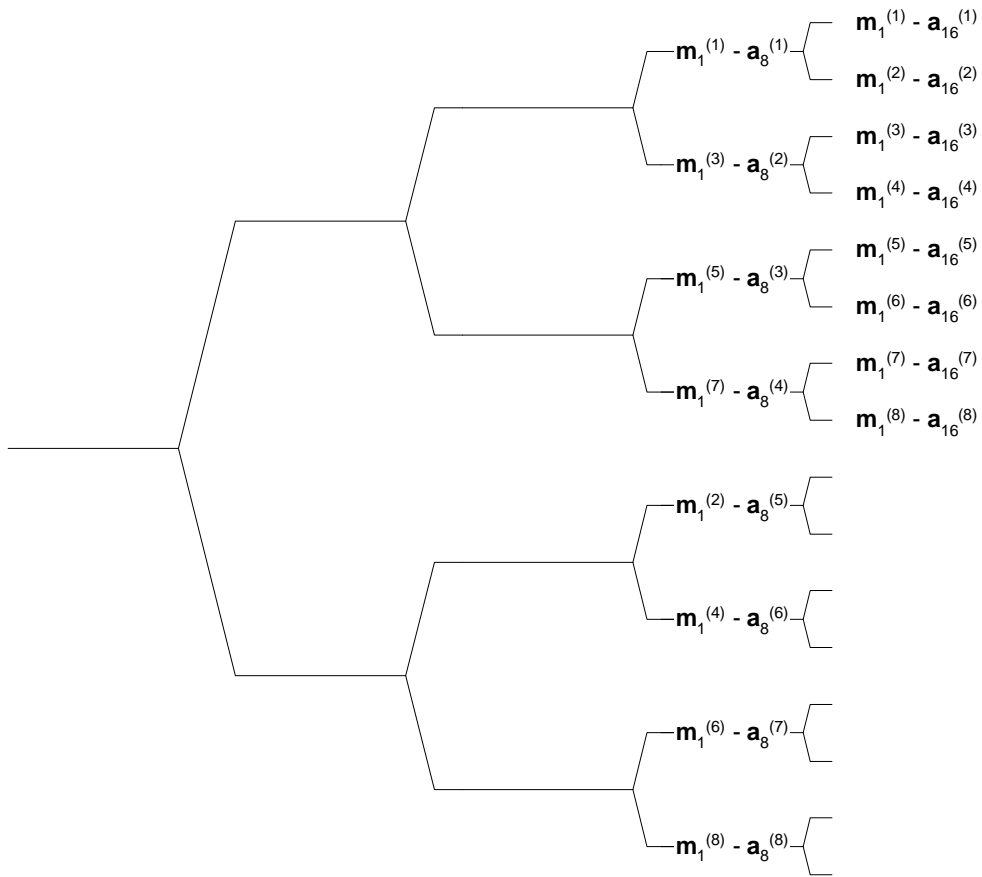


Figure 13 Association of Midambles to Spreading Codes in the OVFS tree for all k

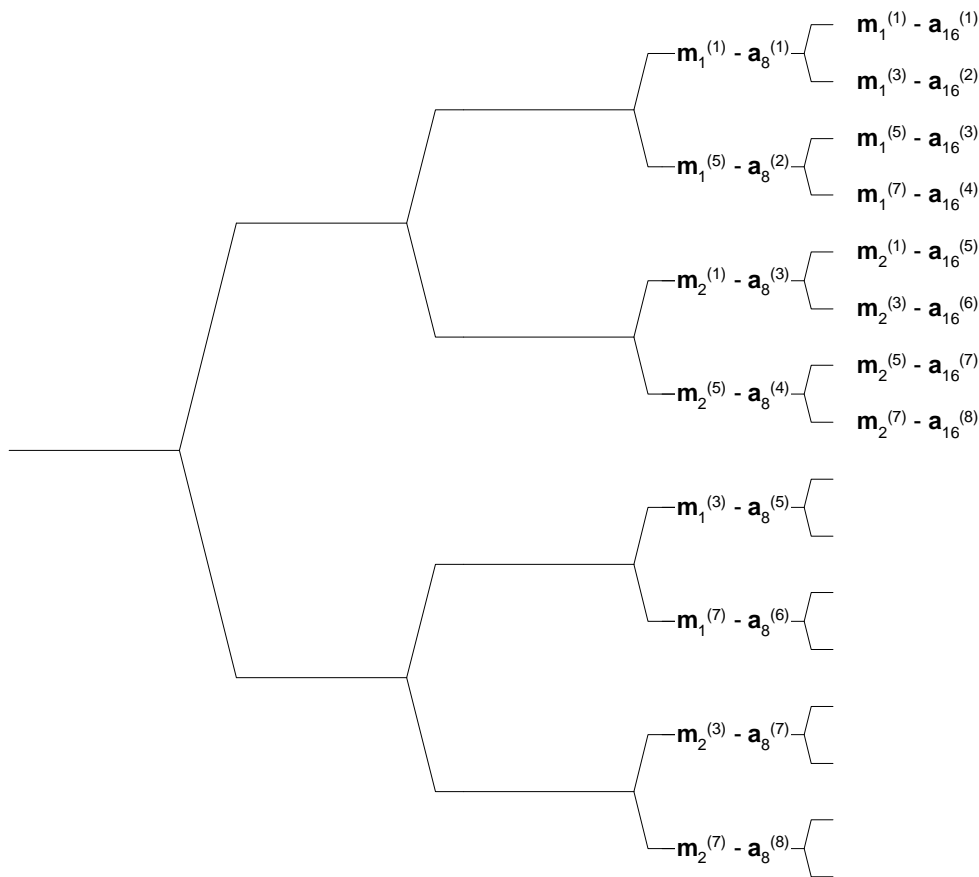


Figure 14 Association of Midambles to Spreading Codes in the OVFS tree for odd k

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 , $k=0\dots 14$

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

Case 3) PSCH in two TS, TS# k and TS# $k+8$, $k=0\dots 6$, and the PCCPCH in TS# i , $i=0\dots 14$, 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.

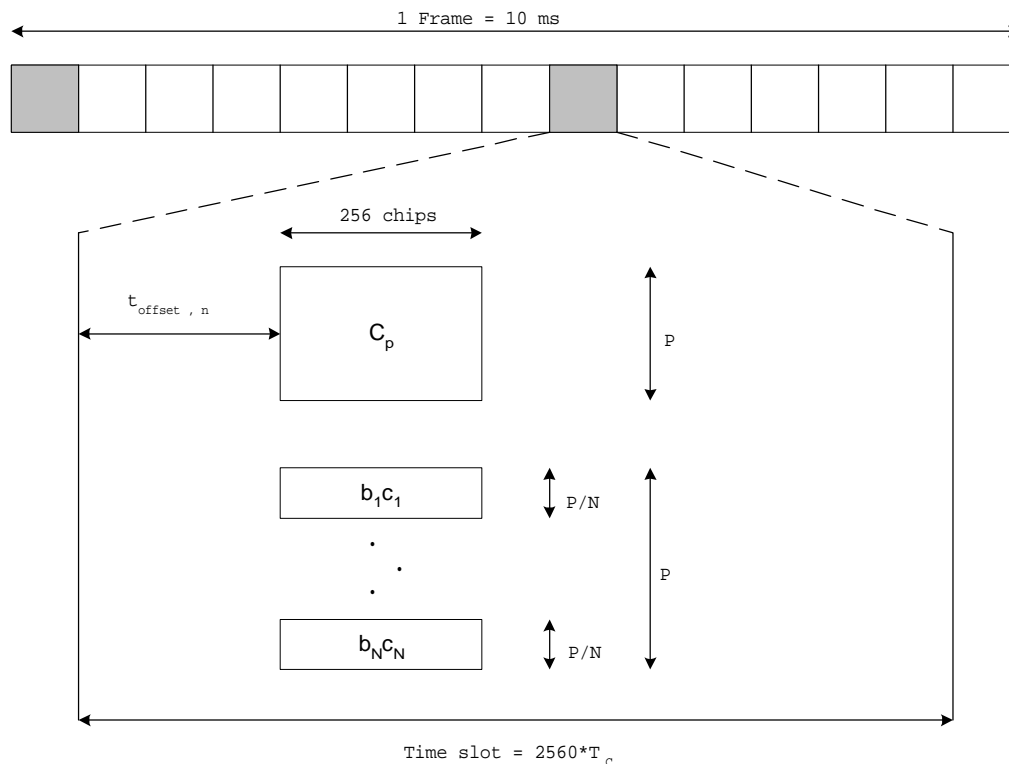


Figure 15 Scheme for Physical Synchronisation channel PSCH consisting of one primary sequence C_p and $N=3$ parallel secondary sequences in slot k and $k+8$ (example for $k=0$ in Case 2 or Case 3)

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:

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

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

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, $N_{PICH}=4$, $RF_{PI}=2$.

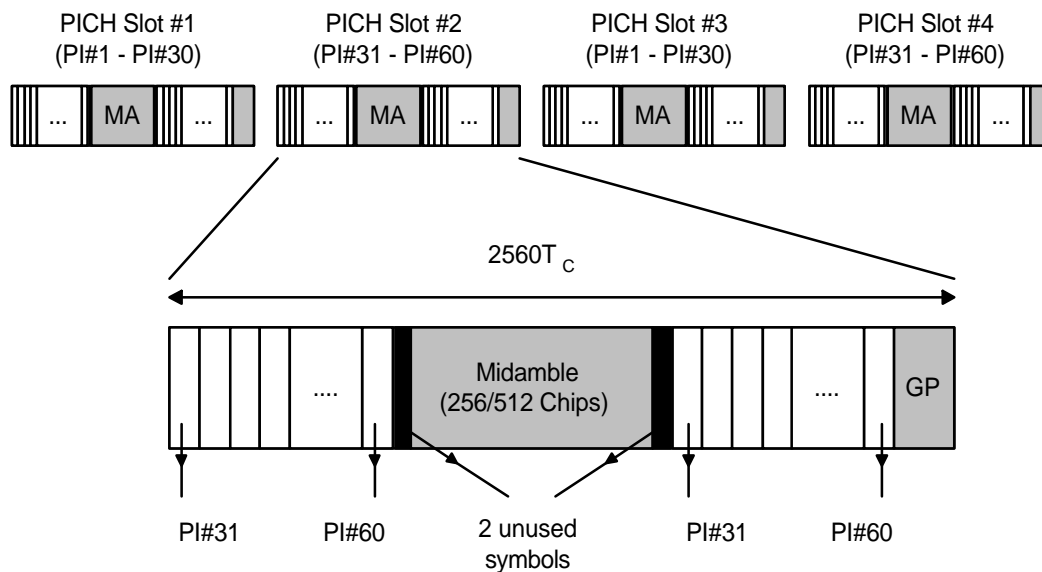


Figure 16 Example of PI Transmission in the PICH

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.

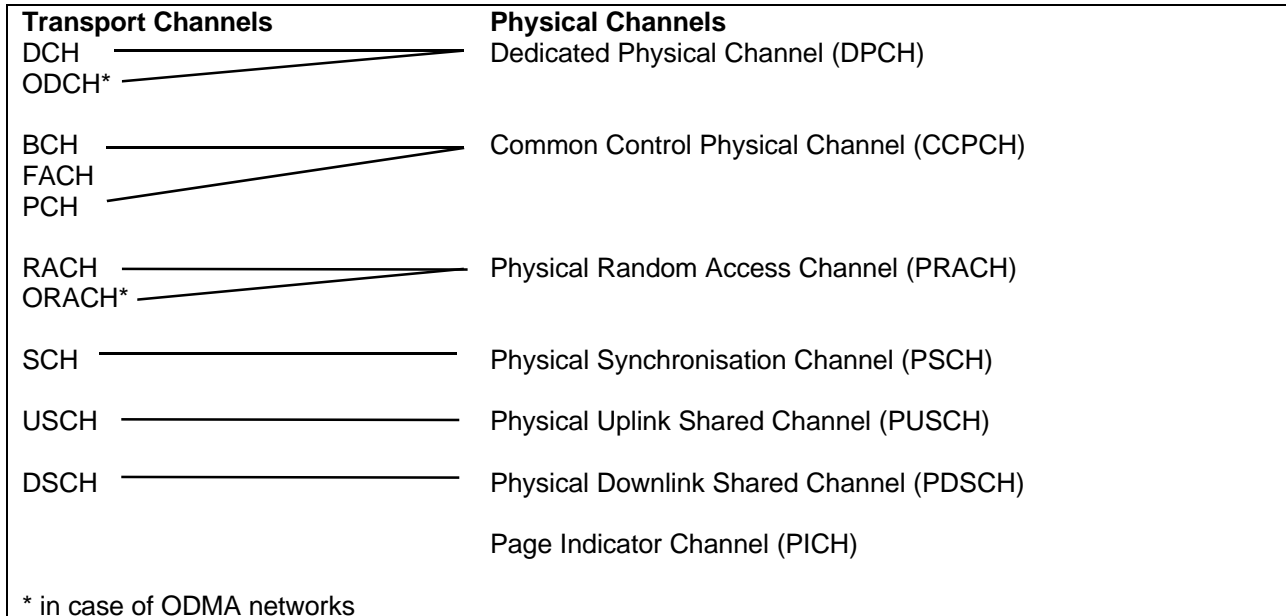


Figure 17 Transport channel to physical channel mapping

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”).

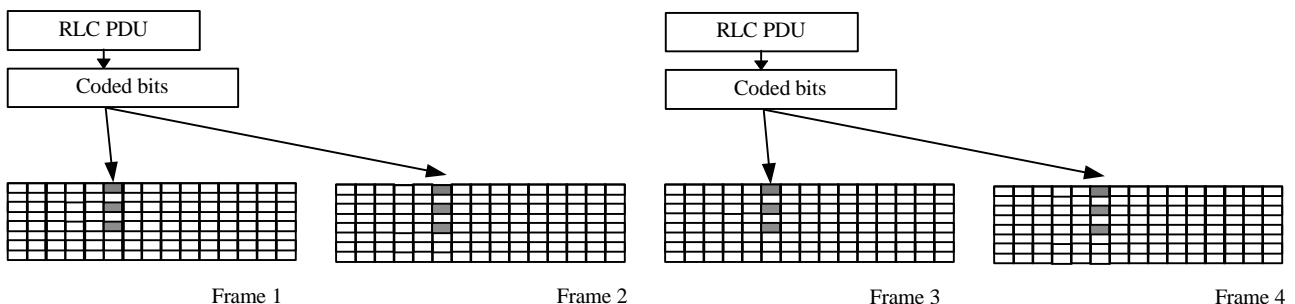


Figure 18 Mapping of PDU onto the physical bearer

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}	8E832B4FA1A11E0BF318E84F54725C8052E0D099EF0AF54BC342BEE44976C9F38DE701623C7BF6474DF90D2E222A4915C8080E7CD3EC84DAC
m_{pL10}	CFA5BAC90780876C417933C43103B55699A8AD51164E590AF9DA6AF0C18804E1F74862F00CE7ECC899C85B6ABB0CAD5E50836AD7A39878FE2F
m_{pL11}	AD539094A19858A75458F1B98E286A4F7DC3A117083D04724CBE83F34102817C5531329CDB437FFF712241B644BDF0C1FEC8598A63C2F21BD7
m_{pL12}	BEB8483139529BDE23E42DA6AB8170DD0BFBB30CE28A4502FAF3C8EDA219B9A6D5B849D9C9E4451F74E2408EA046061201E0C1D69CF48F3A94

m _{PL13}	C482462CA7846266060D21688BA00B72E1EC84A3D5B7194C8DA39E21A3CE12BF512C8AAB6A7079F73C0D3E4F40AC555A4BCC453F1DFE3F6C82
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 906C1C6E04F2054C687AA6741A9E70639857DA02B6FFFA
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}	4095E5B4EEAFCD68A34B267EEA28D8444FA533900F41499E260D2E65C256A52E1D D5861F5227C98E00687D107233F51A1167BCF72FB184654
m _{PL34}	5630E9A79FCAD303404D9E5A802299162657AAC734761C6E90DA8BCE4F61A763E0B B48D3FEB3F78468C828ABA4828DAD06E0F904CFD40421DC
m _{PL35}	CD12B24C0BCA8AAC1FCBF0500A3BC684A180E863D888F2506B48C68ECF17F76CB2 85991FBA18EB6397211FAD002F482D57A258CD45DE3FF1A6
m _{PL36}	AFCF2A50877286CD3405442730C45514F082D9EC296B367C0F64F04C4E0007DCA9E 50BEED5C102126E319ACBC64F1729272F2F72C9397029FE
m _{PL37}	18F89EE8589D20882A72A44DCCDF0050F0A3D88DBA6531614973D26905FDF41E3F7 79FF0648E8AF1540928511BCF4C25D9C64AF34AC31B8965
m _{PL38}	F890D550F33F032ECD3A5A1FED427D634F64EB29AF1332A23CD961258E4BAED040E 7B336918E250EC272A12816B9EBFFA1E0AE401185F08C10
m _{PL39}	ACE5DD61506047E80FB7D41BD3992DF4D7F18EB46CC145C0E9105428C2F8F299141 F5D66691904A7DC2513A3B83994ACB1292246B32818FE9D
m _{PL40}	150680FF900C9B46E1E24D54BE2238CB950A934E5CCDE9BC3939EB51CB0AE202B7 D339EEC2018B33A0AB9B63DA5D512D64FB58C0E51A1C82C2
m _{PL41}	51A579EED2663A002D32D10A0753173612F4D5BA167D1807C61F25C4D42C063682E8 E9DD019F79D446A046EB3F75E50FEB228DC52F08E694B6
m _{PL42}	CDC644FE4C0C6897604F9D14D714123BF16FFF0E49F35F674908CA60653702FE27B

	CCA2A47098453AF8661055C8C549EB6A951A8396AD4B94D
m _{PL43}	750A10366C595373C5001CA3E4239764B1409D602CF6052B39BC6A3255A15FE06C782C4C5F847026A7E79838A2933A61C77BB6CBF5915B2DA5
m _{PL44}	B7490686D78E409082C4C48FE18D4C35429C20AADF96076B92FC4E85490664753DB0891A0B27FD849BB7FCA99E3B38F22F8C662852C0D35AA6
m _{PL45}	D86E1B575B47D23DA811806A54C231281F03317830E7BD305D3CAA7D6382A5233104CFD54D22DF9F34535E5B390D9040CF1375FEA44CEC29E2
m _{PL46}	828655960C026EC67B683480992AC2ED2C43ABC606F5220C2945F373470BE7ED5BCCF7C1AA0986BBCCC84F11F1658AA568FAA0A60C5F0B5BFA
m _{PL47}	D76230E02C8533653AAB99B288AA2ADE25A1C1BF28516C04239240EAF1EFC0B98974B51F886861D8A1E9F5D62CFFEC309F071A9716B325101B
m _{PL48}	EA207662865B8A07D69648964DED818EE474A90B94473408871880E63EF0596B9FCFEC3C06B86EA6AD2B06C91672EFB33C70241A5450B59B8A
m _{PL49}	9CB5459549909835FAB22F0D99298C120ACF479F814CCE749079D40688F28101037762F125C776DA9C5FA1FCE0E76E452F8185354FDCDE94E2
m _{PL50}	227506304AEC1D6F93569B51FDC3405A0F38194F65BE17163A3CB9827A35AECEA757D020FE249377ECD561428A38FEED004EC859C272563185
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}	E706C6ED2D6F89153835079BE0C6D45310845EF2F9F6C6AE91B7419810508BA501C0148BF09955BAD90D6391BA8EBA5CEFB23221CC75143D7
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}	B8EF30C797D8D2C4EF11244F137D806E556A436626D0115A621C92C34D166A68BCE DFA0040DA8FD6F987B1CD5C2AA1C1B045E64475F0F8DABD
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}	FCAEEFCC49A13B4FFA12C0CC6A2B90CF4F57D78B1E98294B04675C2F0991661FDC

	61A452A247F8C29E0284AA21026F368307375AA2C3F1E12C
m _{PL102}	C486DF0510DCAD5AB86E178A686D398E11A0ECFAC5A326C10129257E5456B22FB8E147E9190D9929A5DFFE44715FA47D62F04CFC9B1C201414
m _{PL103}	C10AF383DC708E257E15A8AB337BCE684A2F4AC7A22DC2C25C277F8E8D0858E79317CDDD9AA2EA6CBE604D24AC0945026103E7B4126FD361A4
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}	B91B2624843CF48299AFC2B1442570B41F28F578530D1E322E0B54282372131C71AC 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 D89946818BAECD24A61BABB2E2D23052AB01EF73CA0CF4A
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 $L_m=256$, 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}	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}	9E22EDED47D92CA1D0B7530EC6062287BD83A04874AE00C
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}	B8297389526410313692F861DC60DA86A23607F7DDE24755
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 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.

Frame #	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70				
CCPCH in TS k, Code 0	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71				
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.

Frame #	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70				
CCPCH in TS k, Code 0	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71				
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

Frame #	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70				
CCPCH in TS k, Code 0	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71				
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)
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V1.0.0	1999-04-22	Noted by TSG-RAN as TS 25.221 V1.0.0
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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
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