TSG-RAN Meeting #14 **_RP-010741_**
Kyoto, Japan, 11 – 14, December, 2001

Title: **Agreed CRs (R99 and Rel-4 Category A) to TS 25.221**

Source: **TSG-RAN WG1**

Agenda item: **8.1.3**

No.	Spec	CR	Rev	R1 T-doc	Subject	Release	Cat	W/I Code	V_old	V_new
1	25.221	064	1	R1-01-1271	Transmit diversity for P-CCPCH and PICH	R99	F	TEI	3.8.0	3.9.0
2	25.221	065	1	R1-01-1271	Transmit diversity for P-CCPCH and PICH	Rel-4	A	TEI	4.2.0	4.3.0
3	25.221	066	-	R1-01-1110	Clarification of midamble transmit power in TS25.221	R99	F	TEI	3.8.0	3.9.0
4	25.221	067	-	R1-01-1110	Clarification of midamble transmit power in TS25.221	Rel-4	A	TEI	4.2.0	4.3.0

3GPP TSG RAN Meeting #14
Kyoto, Japan, 11th-14th, December, 2001

R1-01-1271

CR-Form-v3

CHANGE REQUEST

⌘	**25.221**	**CR**	**064**	⌘ rev	**1**	⌘	Current version:	**3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title: ⌘	Transmit Diversity for P-CCPCH and PICH		
Source: ⌘	TSG RAN WG1		
Work item code: ⌘	TEI	***Date:*** ⌘	November 15, 2001
Category: ⌘	**F**	***Release:*** ⌘	R99
	Use one of the following categories: ***F*** *(essential correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(Addition of feature),* ***C*** *(Functional modification of feature)* ***D*** *(Editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change: ⌘	Existing approach (STTD) for P-CCPCH imposes unacceptable HW complexity on UE
Summary of change: ⌘	Removal of STTD and introduction of the Space Code Transmit Diversity (SCTD) as a recommended approach for P-CCPCH and PICH.
Consequences if not approved: ⌘	Excessive HW complexity in UE Isolated impact analysis: The transmit diversity scheme for common control channels in changed. Some impact on WG1 specifications, minimal impact on other WGs.

Clauses affected: ⌘	3, 5.3.1.3, 5.3.7.3 (new), 5.4, 5.5.2, 5.7		
Other specs affected: ⌘	[X]	Other core specifications ⌘	25.224, 25.225, 25.102, 25.331, 25.423, 25.433
	[ ]	Test specifications	
	[ ]	O&M Specifications	
Other comments: ⌘			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

BCH	Broadcast Channel
CCPCH	Common Control Physical Channel
CCTrCH	Coded Composite Transport Channel
CDMA	Code Division Multiple Access
DCH	Dedicated Channel
DL	Downlink
DPCH	Dedicated Physical Channel
DRX	Discontinuous Reception
DSCH	Downlink Shared Channel
DTX	Discontinuous Transmission
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
OVSF	Orthogonal Variable Spreading Factor
P-CCPCH	Primary CCPCH
PCH	Paging Channel
PDSCH	Physical Downlink Shared Channel
PI	Paging Indicator (value calculated by higher layers)
PICH	Page Indicator Channel
P_q	Paging Indicator (indicator set by physical layer)
PRACH	Physical Random Access Channel
PUSCH	Physical Uplink Shared Channel
RACH	Random Access Channel
RF	Radio Frame
RT	Real Time
S-CCPCH	Secondary CCPCH
SCH	Synchronisation Channel
SCTD	Space Code Transmit Diversity
SF	Spreading Factor
SFN	Cell System Frame Number
~~STTD~~	~~Space Time Transmit Diversity~~
TCH	Traffic Channel
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
TFC	Transport Format Combination
TFCI	Transport Format Combination Indicator
TFI	Transport Format Indicator
TPC	Transmitter Power Control
TrCH	Transport Channel
TSTD	Time Switched Transmit Diversity
TTI	Transmission Time Interval
UE	User Equipment
UL	Uplink
UMTS	Universal Mobil Telecommunications System
USCH	Uplink Shared Channel
UTRAN	UMTS Terrestrial Radio Access Network

5.3.1.3 P-CCPCH Training sequences

The training sequences, i.e. midambles, as described in subclause 5.2.3 are used for the P-CCPCH. For those timeslots in which the P-CCPCH is transmitted, the midambles $m^{(1)}$ and $m^{(2)}$ are reserved for P-CCPCH in order to support ~~Block STTD~~ Space Code Transmit Diversity (SCTD) ~~antenna diversity~~ and the beacon function, see 5.4 and 5.5. The use of midambles depends on whether SCTD ~~Block STTD~~ is applied to the P-CCPCH:

- If no antenna diversity is applied to P-CCPCH, $m^{(1)}$ is used and $m^{(2)}$ is left unused. The maximum number K_{Cell} of midambles in a cell may be 4, 8 or 16.

- If SCTD ~~Block STTD~~ antenna diversity is applied to P-CCPCH, $m^{(1)}$ is used for the first antenna and $m^{(2)}$ is used for the diversity antenna. The maximum number K_{Cell} of midambles in a cell may be 8 or 16. The case of 4 midambles is not allowed for SCTD ~~Block STTD~~.

5.3.7 The Paging Indicator Channel (PICH)

The Paging Indicator Channel (PICH) is a physical channel used to carry the paging indicators.

5.3.7.1 Mapping of Paging Indicators to the PICH bits

Figure 15 depicts the structure of a PICH burst and the numbering of the bits within the burst. The same burst type is used for the PICH in every cell. N_{PIB} bits in a normal burst of type 1 or 2 are used to carry the paging indicators, where N_{PIB} depends on the burst type: N_{PIB}=240 for burst type 1 and N_{PIB}=272 for burst type 2. The bits s_{NPIB+1},..., s_{NPIB+4} adjacent to the midamble are reserved for possible future use.

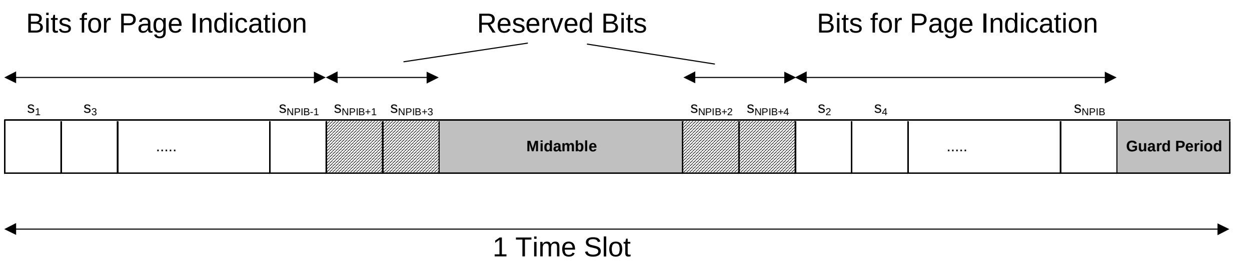


Figure 15: Transmission and numbering of paging indicator carrying bits in a PICH burst

Each paging indicator P_q in one time slot is mapped to the bits $\{s_{2Lpi*q+1},...,s_{2Lpi*(q+1)}\}$ within this time slot. Thus, due to the interleaved transmission of the bits half of the symbols used for each paging indicator are transmitted in the first data part, and the other half of the symbols are transmitted in the second data part, as exemplary shown in figure 16 for a paging indicator length L_{PI} of 4 symbols.

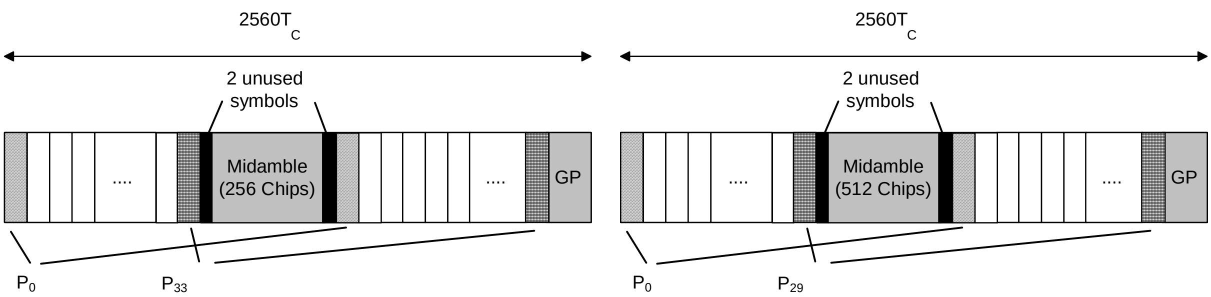


Figure 16: Example of mapping of paging indicators on PICH bits for L_{PI}=4

The setting of the paging indicators and the corresponding PICH bits (including the reserved ones) is described in [7].

In each radio frame, N_{PI} paging indicators are transmitted, using L_{PI}=2, L_{PI}=4 or L_{PI}=8 symbols. The number of paging indicators N_{PI} per radio frame is given by the paging indicator length and the burst type, which are both known by higher layer signalling. In table 7 this number is shown for the different possibilities of burst types and paging indicator lengths.

Table 7: Number N_{PI} of paging indicators per time slot for the different burst types and paging indicator lengths L_{PI}

	L_{PI}=2	L_{PI}=4	L_{PI}=8
Burst Type 1	N_{PI}=60	N_{PI}=30	N_{PI}=15
Burst Type 2	N_{PI}=68	N_{PI}=34	N_{PI}=17

5.3.7.2 Structure of the PICH over multiple radio frames

As shown in figure 17, the paging indicators of N_{PICH} consecutive frames form a PICH block, N_{PICH} is configured by higher layers. Thus, N_P=N_{PICH}*N_{PI} paging indicators are transmitted in each PICH block.

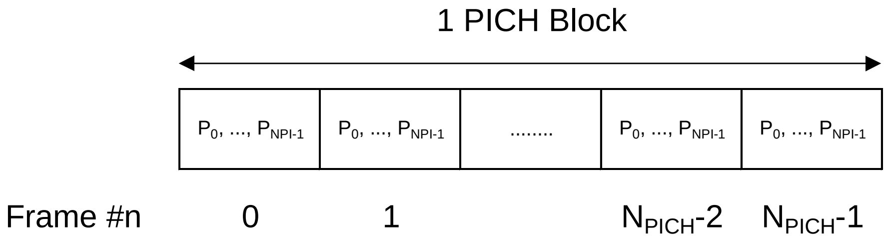


Figure 17: Structure of a PICH block

The value PI (PI = 0, ..., N_P-1) calculated by higher layers for use for a certain UE, see [15], is associated to the paging indicator P_q in the nth frame of one PICH block, where q is given by

$q = PI \bmod N_{PI}$

and n is given by

$n = PI \operatorname{div} N_{PI}$.

The PI bitmap in the PCH data frames over Iub contains indication values for all possible higher layer PI values, see [17]. Each bit in the bitmap indicates if the paging indicator P_q associated with that particular PI shall be set to 0 or 1. Hence, the calculation in the formulas above is to be performed in Node B to make the association between PI and P_q.

5.3.7.3. PICH Training sequences

The training sequences, i.e. midambles for the PICH are generated as described in subclause 5.2.3. The allocation of midambles depends on whether SCTD is applied to the PICH.

- If no antenna diversity is applied the PICH the midambles can be allocated as described in subclause 5.6.
- If SCTD antenna diversity is applied to the PICH the allocation of midambles shall be as described in [9].

5.4 Transmit Diversity for DL Physical Channels

Table 8 summarizes the different transmit diversity schemes for different downlink physical channel types that are described in [9].

Table 8: Application of Tx diversity schemes on downlink physical channel types
"X" – can be applied, "–" – must not be applied

Physical channel type	Open loop TxDiversity		Closed loop TxDiversity
	TSTD	SCTD ~~Block STTD~~	
P-CCPCH	–	X	–
SCH	X	–	–
DPCH	–	–	X
PDSCH	–	–	X
PICH	-	X	-

5.5 Beacon characteristics of physical channels

For the purpose of measurements, physical channels at particular locations (time slot, code) shall have particular physical characteristics, called beacon characteristics. Physical channels with beacon characteristics are called beacon channels. The locations of the beacon channels are called beacon locations. The ensemble of beacon channels shall provide the beacon function, i.e. a reference power level at the beacon locations, regularly existing in each radio frame. Thus, beacon channels must be present in each radio frame.

5.5.1 Location of beacon channels

The beacon locations are determined by the SCH and depend on the SCH allocation case, see subclause 5.3.4:

Case 1) The beacon function shall be provided by the physical channels that are allocated to channelisation code $c_{Q=16}^{(k=1)}$ and to TS#k, k=0,…,14.

Case 2) The beacon function shall be provided by the physical channels that are allocated to channelisation code $c_{Q=16}^{(k=1)}$ and to TS#k and TS#k+8, k=0,…,6.

Note that by this definition the P-CCPCH always has beacon characteristics.

5.5.2 Physical characteristics of beacon channels

The beacon channels shall have the following physical characteristics. They:

- are transmitted with reference power;
- are transmitted without beamforming;
- use burst type 1;
- use midamble $m^{(1)}$ and $m^{(2)}$ exclusively in this time slot; and
- midambles $m^{(9)}$ and $m^{(10)}$ are always left unused in this time slot, if 16 midambles are allowed in that cell.

Note that in the time slot where the P-CCPCH is transmitted only the midambles $m^{(1)}$ to $m^{(8)}$ shall be used, see 5.6.1. Thus, midambles $m^{(9)}$ and $m^{(10)}$ are always left unused in this time slot.

The reference power corresponds to the sum of the power allocated to both midambles $m^{(1)}$ and $m^{(2)}$. Two possibilities exist:

- If no SCTD ~~Block STTD~~ antenna diversity is applied to the P-CCPCH and PICH , all the reference power of any beacon channel is allocated to $m^{(1)}$.
- If SCTD ~~Block STTD~~ antenna diversity is applied to the P-CCPCH and PICH for any beacon channel midambles $m^{(1)}$ and $m^{(2)}$ are each allocated half of the reference power. Midamble $m^{(1)}$ is used for the first antenna and $m^{(2)}$ is used for the diversity antenna. SCTD is applied to the P-CCPCH and PICH ~~Block STTD encoding is used for the data in P-CCPCH~~, see [9]; for all other beacon channels identical spread data sequences are transmitted on both antennas.

5.7 Midamble Transmit Power

There shall be no offset between the sum of the powers allocated to all midambles in a timeslot and the sum of the powers allocated to the data symbol fields. The transmit power within a timeslot is hence constant.

The midamble transmit power of beacon channels is equal to the reference power. If SCTD ~~Block STTD~~ is used for the P-CCPCH, the reference power is equally divided between the midambles $m^{(1)}$ and $m^{(2)}$.

The midamble transmit power of all other physical channels depends on the midamble allocation scheme used. The following rules apply

- In case of Default Midamble Allocation, every midamble is transmitted with the same power as the associated codes.
- In case of Common Midamble Allocation in the downlink, the transmit power of this common midamble is such that there is no power offset between the data parts and the midamble part of the overall transmit signal within one time slot.

- In case of UE Specific Midamble Allocation, the transmit power of the UE specific midamble is such that there is no power offset between the data parts and the midamble part of every user within one time slot.

The following figure depicts the midamble powers for the different channel types and midamble allocation schemes. For the UE Specific Midamble Allocation, as an example, code 1 and code 2 are both assigned to UE 1, whereas to UE m is assigned only the code n.

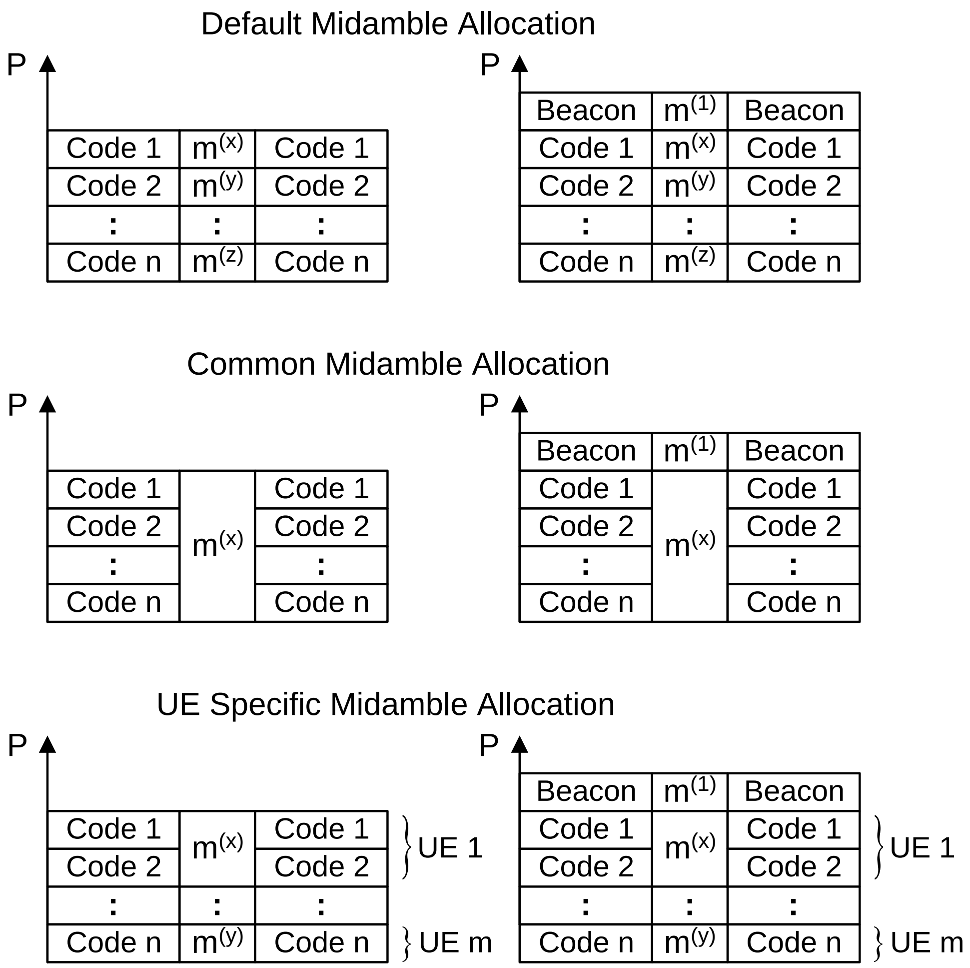


Figure 18: Midamble powers for the different midamble allocation schemes

3GPP TSG RAN Meeting #14
Kyoto, Japan, 11th-14th, December, 2001

R1-01-1271

CR-Form-v3

CHANGE REQUEST

⌘ **25.221 CR 065** ⌘ rev **1** ⌘ Current version: **4.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [ ] Core Network [x]

Title: ⌘	Transmit Diversity for P-CCPCH and PICH
Source: ⌘	TSG RAN WG1
Work item code: ⌘	TEI
Date: ⌘	November 15, 2001
Category: ⌘	**A**
Release: ⌘	REL-4

Use one of the following categories:
- ***F*** *(essential correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(Addition of feature),*
- ***C*** *(Functional modification of feature)*
- ***D*** *(Editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
- *2 (GSM Phase 2)*
- *R96 (Release 1996)*
- *R97 (Release 1997)*
- *R98 (Release 1998)*
- *R99 (Release 1999)*
- *REL-4 (Release 4)*
- *REL-5 (Release 5)*

Reason for change: ⌘	Existing approach (STTD) for P-CCPCH imposes unacceptable HW complexity on UE
Summary of change: ⌘	Removal of STTD and introduction of the Space Code Transmit Diversity (SCTD) as a recommended approach for P-CCPCH and PICH
Consequences if not approved: ⌘	Excessive HW complexity in UE Isolated impact analysis: The transmit diversity scheme for common control channels in changed. Some impact on WG1 specifications, minimal impact on other WGs.

Clauses affected: ⌘	3, 5.3.1.3,, 5.3.7.3 (new), 5.4, 5.5.2, 5.7	
Other specs affected: ⌘	[X] Other core specifications ⌘	25.224, 25.225, 25.102, 25.331, 25.423, 25.433
	[ ] Test specifications	
	[ ] O&M Specifications	
Other comments: ⌘		

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

BCH	Broadcast Channel
CCPCH	Common Control Physical Channel
CCTrCH	Coded Composite Transport Channel
CDMA	Code Division Multiple Access
DCH	Dedicated Channel
DL	Downlink
DPCH	Dedicated Physical Channel
DRX	Discontinuous Reception
DSCH	Downlink Shared Channel
DTX	Discontinuous Transmission
DwPCH	Downlink Pilot Channel
DwPTS	Downlink Pilot Time Slot
FACH	Forward Access Channel
FDD	Frequency Division Duplex
FEC	Forward Error Correction
GP	Guard Period
GSM	Global System for Mobile Communication
MIB	Master Information Block
NRT	Non-Real Time
OVSF	Orthogonal Variable Spreading Factor
P-CCPCH	Primary CCPCH
PCH	Paging Channel
PDSCH	Physical Downlink Shared Channel
PI	Paging Indicator (value calculated by higher layers)
PICH	Page Indicator Channel
P_q	Paging Indicator (indicator set by physical layer)
PRACH	Physical Random Access Channel
PUSCH	Physical Uplink Shared Channel
RACH	Random Access Channel
RF	Radio Frame
RT	Real Time
S-CCPCH	Secondary CCPCH
SCH	Synchronisation Channel
SCTD	Space Code Transmit Diversity
SF	Spreading Factor
SFN	Cell System Frame Number
~~STTD~~	~~Space Time Transmit Diversity~~
TCH	Traffic Channel
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
TFC	Transport Format Combination
TFCI	Transport Format Combination Indicator
TFI	Transport Format Indicator
TPC	Transmitter Power Control
TrCH	Transport Channel
TSTD	Time Switched Transmit Diversity
TTI	Transmission Time Interval
UE	User Equipment
UL	Uplink
UMTS	Universal Mobil Telecommunications System
UpPTS	Uplink Pilot Time Slot
UpPCH	Uplink Pilot Channel
USCH	Uplink Shared Channel
UTRAN	UMTS Terrestrial Radio Access Network

5.3.1.3 P-CCPCH Training sequences

The training sequences, i.e. midambles, as described in subclause 5.2.3 are used for the P-CCPCH. For those timeslots in which the P-CCPCH is transmitted, the midambles $m^{(1)}$ and $m^{(2)}$ are reserved for P-CCPCH in order to support Block STTD Space Code transmit Diversity (SCTD) antenna diversity and the beacon function, see 5.4 and 5.5. The use of midambles depends on whether SCTD Block STTD is applied to the P-CCPCH:

- If no antenna diversity is applied to P-CCPCH, $m^{(1)}$ is used and $m^{(2)}$ is left unused. The maximum number K_{Cell} of midambles in a cell may be 4, 8 or 16.

- If SCTD Block STTD antenna diversity is applied to P-CCPCH, $m^{(1)}$ is used for the first antenna and $m^{(2)}$ is used for the diversity antenna. The maximum number K_{Cell} of midambles in a cell may be 8 or 16. The case of 4 midambles is not allowed for SCTD Block STTD.

5.3.7 The Paging Indicator Channel (PICH)

The Paging Indicator Channel (PICH) is a physical channel used to carry the paging indicators.

5.3.7.1 Mapping of Paging Indicators to the PICH bits

Figure 15 depicts the structure of a PICH burst and the numbering of the bits within the burst. The same burst type is used for the PICH in every cell. N_{PIB} bits in a normal burst of type 1 or 2 are used to carry the paging indicators, where N_{PIB} depends on the burst type: N_{PIB}=240 for burst type 1 and N_{PIB}=272 for burst type 2. The bits s_{NPIB+1},..., s_{NPIB+4} adjacent to the midamble are reserved for possible future use.

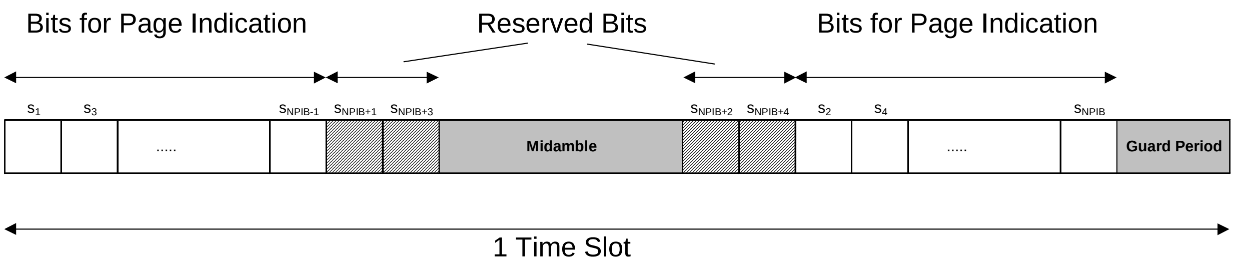


Figure 15: Transmission and numbering of paging indicator carrying bits in a PICH burst

Each paging indicator P_q in one time slot is mapped to the bits $\{s_{2Lpi*q+1},...,s_{2Lpi*(q+1)}\}$ within this time slot. Thus, due to the interleaved transmission of the bits half of the symbols used for each paging indicator are transmitted in the first data part, and the other half of the symbols are transmitted in the second data part, as exemplary shown in figure 16 for a paging indicator length L_{PI} of 4 symbols.

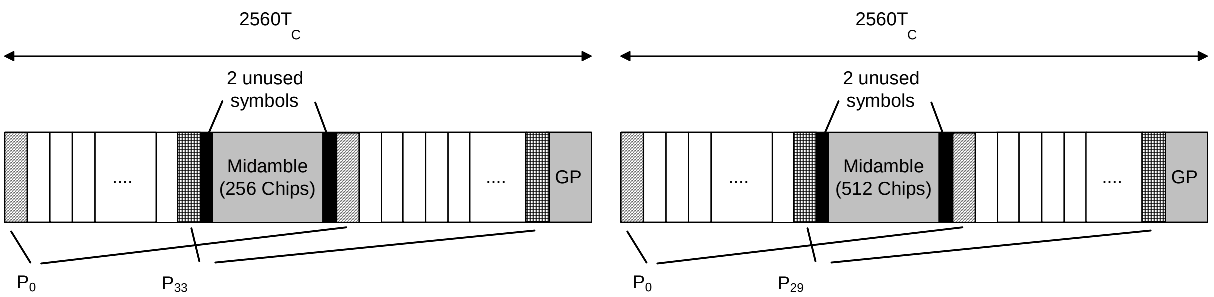


Figure 16: Example of mapping of paging indicators on PICH bits for L_{PI}=4

The setting of the paging indicators and the corresponding PICH bits (including the reserved ones) is described in [7].

In each radio frame, N_{PI} paging indicators are transmitted, using L_{PI}=2, L_{PI}=4 or L_{PI}=8 symbols. The number of paging indicators N_{PI} per radio frame is given by the paging indicator length and the burst type, which are both known by higher layer signalling. In table 7 this number is shown for the different possibilities of burst types and paging indicator lengths.

Table 7: Number N_{PI} of paging indicators per time slot for the different burst types and paging indicator lengths L_{PI}

	L_{PI}=2	L_{PI}=4	L_{PI}=8
Burst Type 1	N_{PI}=60	N_{PI}=30	N_{PI}=15
Burst Type 2	N_{PI}=68	N_{PI}=34	N_{PI}=17

5.3.7.2 Structure of the PICH over multiple radio frames

As shown in figure 17, the paging indicators of N_{PICH} consecutive frames form a PICH block, N_{PICH} is configured by higher layers. Thus, N_P=N_{PICH}*N_{PI} paging indicators are transmitted in each PICH block.

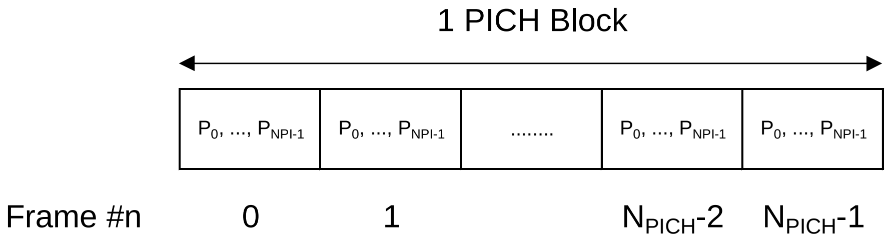


Figure 17: Structure of a PICH block

The value PI (PI = 0, ..., N_P-1) calculated by higher layers for use for a certain UE, see [15], is associated to the paging indicator P_q in the nth frame of one PICH block, where q is given by

$q = PI \bmod N_{PI}$

and n is given by

$n = PI \text{ div } N_{PI}$.

The PI bitmap in the PCH data frames over Iub contains indication values for all possible higher layer PI values, see [17]. Each bit in the bitmap indicates if the paging indicator P_q associated with that particular PI shall be set to 0 or 1. Hence, the calculation in the formulas above is to be performed in Node B to make the association between PI and P_q.

5.3.7.3. PICH Training sequences

The training sequences, i.e. midambles for the PICH.are generated as described in subclause 5.2.3. The allocation of midambles depends on whether SCTD is applied to the PICH.

- If no antenna diversity is applied the PICH the midambles can be allocated as described in subclause 5.6.
- If SCTD antenna diversity is applied to the PICH the allocation of midambles shall be as described in [9].

5.4 Transmit Diversity for DL Physical Channels

Table 8 summarizes the different transmit diversity schemes for different downlink physical channel types that are described in [9].

Table 8: Application of Tx diversity schemes on downlink physical channel types "X" – can be applied, "–" – must not be applied

Physical channel type	Open loop TxDiversity		Closed loop TxDiversity
	TSTD	SCTD ~~Block STTD~~	
P-CCPCH	–	X	–
SCH	X	–	–
DPCH	–	–	X
PDSCH	–	–	X
PICH	-	X	-

5.5.2 Physical characteristics of beacon channels

The beacon channels shall have the following physical characteristics. They:

- are transmitted with reference power;
- are transmitted without beamforming;
- use burst type 1;
- use midamble $m^{(1)}$ and $m^{(2)}$ exclusively in this time slot; and
- midambles $m^{(9)}$ and $m^{(10)}$ are always left unused in this time slot, if 16 midambles are allowed in that cell.

Note that in the time slot where the P-CCPCH is transmitted only the midambles $m^{(1)}$ to $m^{(8)}$ shall be used, see 5.6.1. Thus, midambles $m^{(9)}$ and $m^{(10)}$ are always left unused in this time slot.

The reference power corresponds to the sum of the power allocated to both midambles $m^{(1)}$ and $m^{(2)}$. Two possibilities exist:

- If no SCTD Block STTD antenna diversity is applied to the P-CCPCH, and PICH all the reference power of any beacon channel is allocated to $m^{(1)}$.
- If SCTD Block STTD antenna diversity is applied to the P-CCPCH and PICH for any beacon channel midambles $m^{(1)}$ and $m^{(2)}$ are each allocated half of the reference power. Midamble $m^{(1)}$ is used for the first antenna and $m^{(2)}$ is used for the diversity antenna. SCTD is applied to the P-CCPCH and PICH. Block STTD encoding is used for the data in P-CCPCH, see [9]; for all other beacon channels identical spread data sequences are transmitted on both antennas.

5.7 Midamble Transmit Power

There shall be no offset between the sum of the powers allocated to all midambles in a timeslot and the sum of the powers allocated to the data symbol fields. The transmit power within a timeslot is hence constant.

The midamble transmit power of beacon channels is equal to the reference power. If SCTD ~~Block STTD~~ is used for the P-CCPCH, the reference power is equally divided between the midambles $m^{(1)}$ and $m^{(2)}$.

The midamble transmit power of all other physical channels depends on the midamble allocation scheme used. The following rules apply

- In case of Default Midamble Allocation, every midamble is transmitted with the same power as the associated codes.

- In case of Common Midamble Allocation in the downlink, the transmit power of this common midamble is such that there is no power offset between the data parts and the midamble part of the overall transmit signal within one time slot.

- In case of UE Specific Midamble Allocation, the transmit power of the UE specific midamble is such that there is no power offset between the data parts and the midamble part of every user within one time slot.

The following figure 18 depicts the midamble powers for the different channel types and midamble allocation schemes. For the UE Specific Midamble Allocation, as an example, code 1 and code 2 are both assigned to UE 1, whereas to UE m is assigned only the code n.

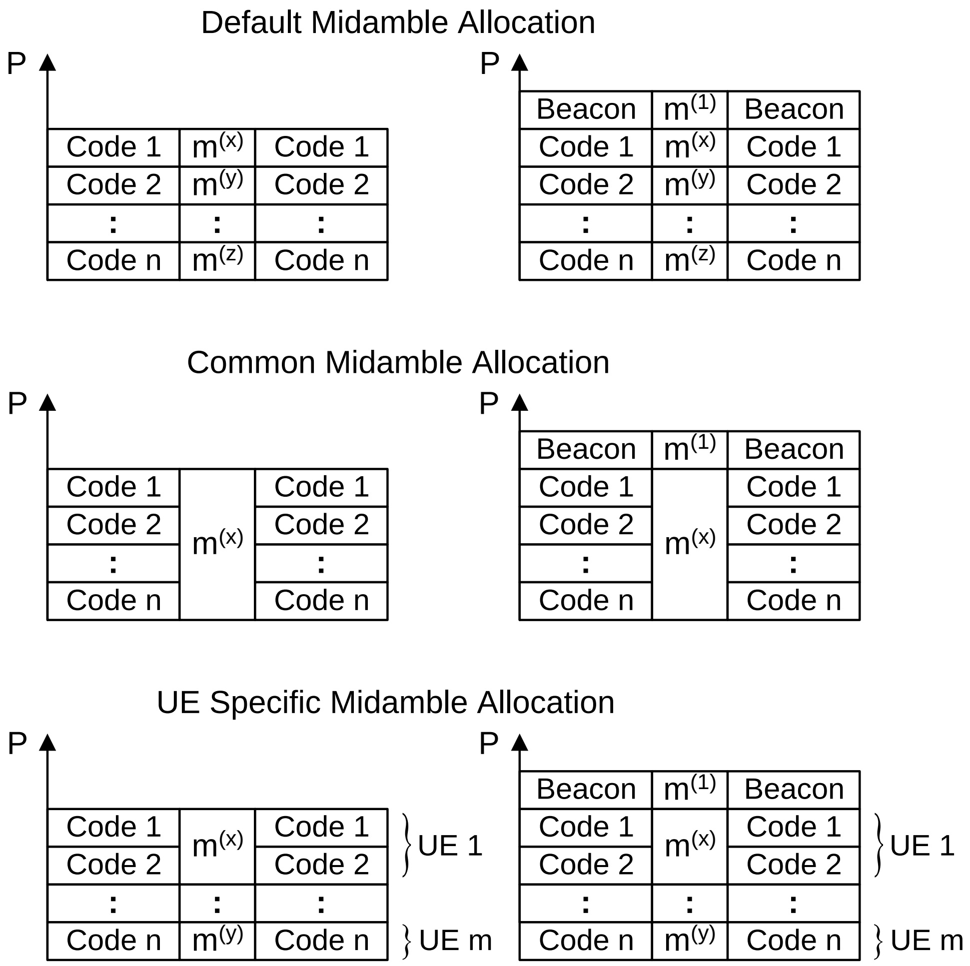


Figure 18: Midamble powers for the different midamble allocation schemes

3GPP TSG RAN Meeting #14
Kyoto, Japan, 11th-14th, December, 2001
R1-01-1110

CR-Form-v4

CHANGE REQUEST

⌘ **25.221**	**CR 066**	⌘ rev	**-**	⌘ Current version:	**3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title: ⌘	Clarification of midamble transmit power in TS25.221		
Source: ⌘	TSG RAN WG1		
Work item code: ⌘	TEI	***Date:*** ⌘	14-11-2001
Category: ⌘	**F** *Use one of the following categories:* ***F** (correction)* ***A** (corresponds to a correction in an earlier release)* ***B** (addition of feature),* ***C** (functional modification of feature)* ***D** (editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.	***Release:*** ⌘	R99 *Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change: ⌘	The figures in section 5.7 suggest that for the default midamble allocation, there is always a one-to-one mapping of codes and midambles. However, a midamble may be associated with several channelisation codes, depending on the number of possible midamble shifts in a cell.
Summary of change: ⌘	Correction of the figure
Consequences if not approved: ⌘	Analysis: This CR corrects a function where the specification was ambiguous or not sufficiently explicit. It would not affect implementations behaving like indicated in the CR, but would affect implementations supporting the corrected functionality otherwise. The CR clarifies the midamble allocation only.

Clauses affected: ⌘	5.5, 5.6, 5.7	
Other specs Affected: ⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications	
Other comments: ⌘		

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.7 Midamble Transmit Power

There shall be no offset between the sum of the powers allocated to all midambles in a timeslot and the sum of the powers allocated to the data symbol fields. The transmit power within a timeslot is hence constant.

The midamble transmit power of beacon channels is equal to the reference power. If Block STTD is used for the P-CCPCH, the reference power is equally divided between the midambles $m^{(1)}$ and $m^{(2)}$.

The midamble transmit power of all other physical channels depends on the midamble allocation scheme used. The following rules apply

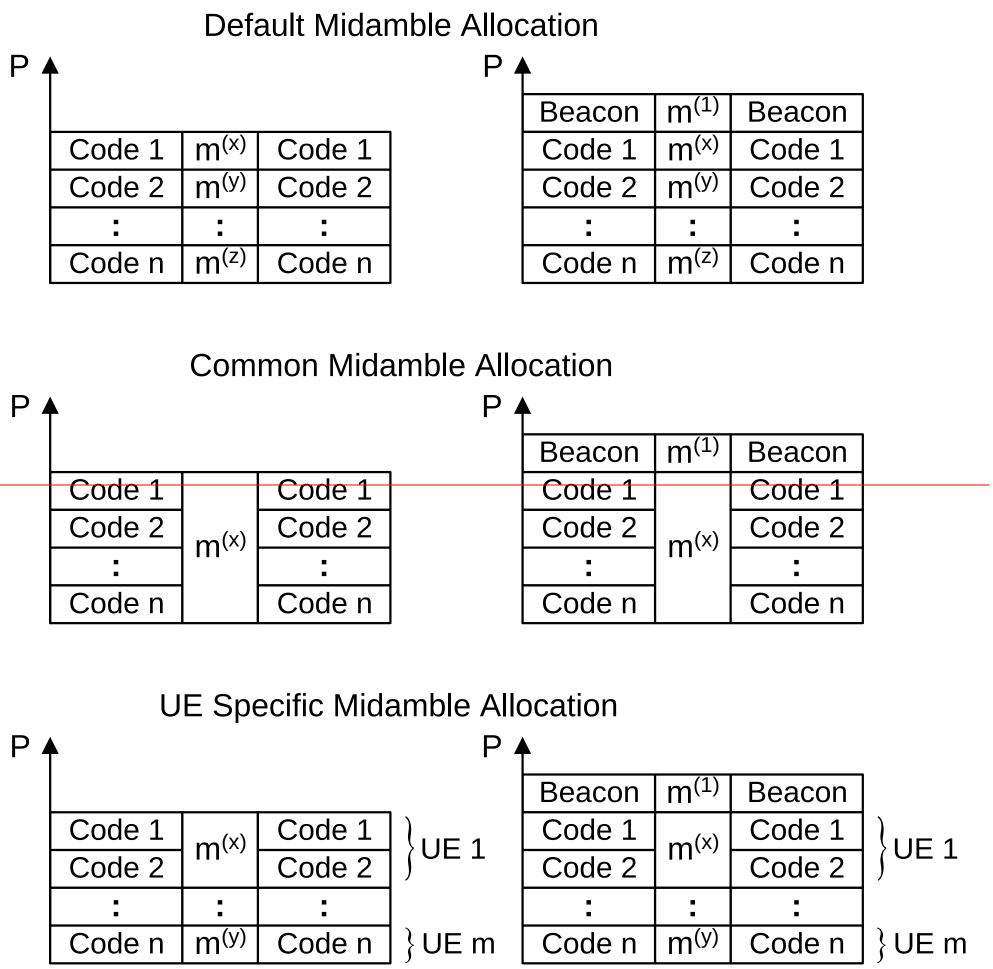
- In case of Default Midamble Allocation, every midamble is transmitted with the same power as the associated codes.
- In case of Common Midamble Allocation in the downlink, the transmit power of this common midamble is such that there is no power offset between the data parts and the midamble part of the overall transmit signal within one time slot.
- In case of UE Specific Midamble Allocation, the transmit power of the UE specific midamble is such that there is no power offset between the data parts and the midamble part of every user within one time slot.

The following figure depicts the midamble powers for the different channel types and midamble allocation schemes.

Note 1: In figure 18, the codes c(1) to c(16) represent the set of usable codes and not the set of used codes.

Note 2: The common midamble allocation and the midamble allocation by higher layers are not applicable in those beacon time slots, in which the P-CCPCH is located, see section 5.6.1.

~~For the UE Specific Midamble Allocation, as an example, code 1 and code 2 are both assigned to UE 1, whereas to UE m is assigned only the code n.~~



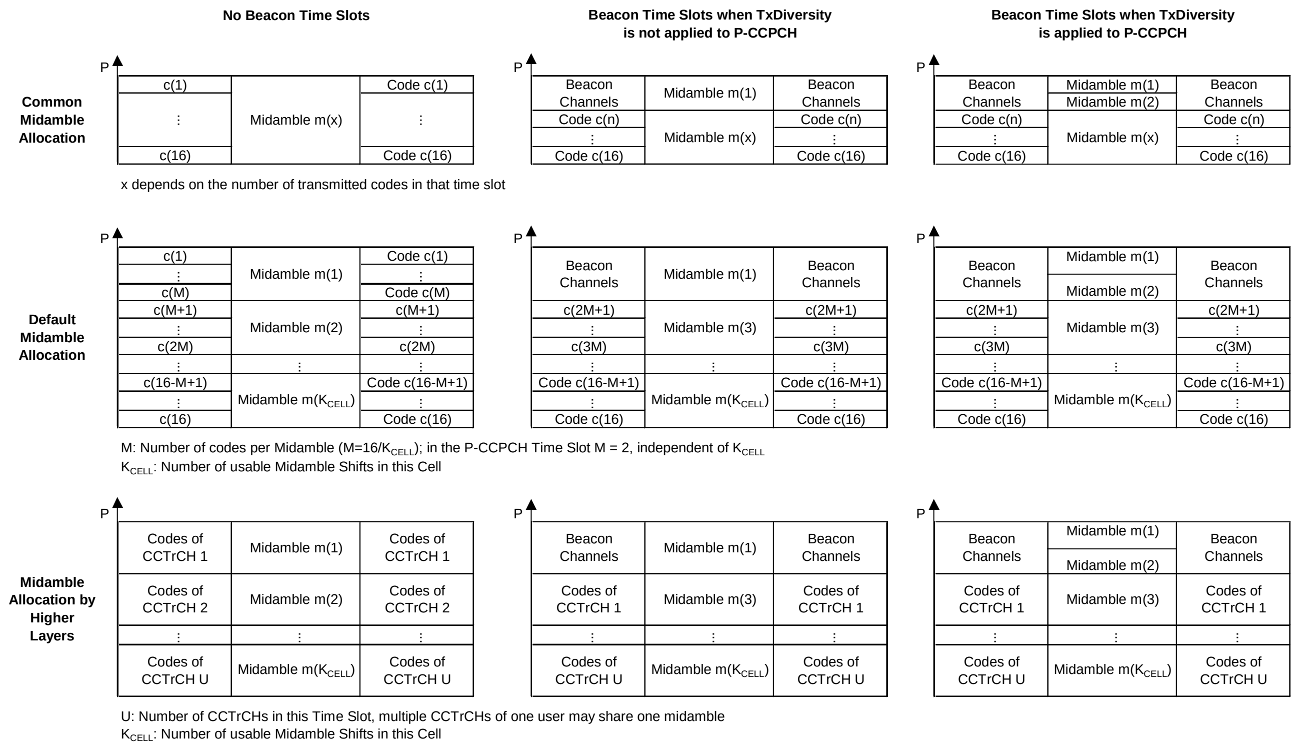


Figure 18: Midamble powers for the different midamble allocation schemes

3GPP TSG RAN Meeting #14
Kyoto, Japan, 11th-14th, December, 2001

R1-01-1110

CR-Form-v4

CHANGE REQUEST

⌘ **25.221 CR 067** ⌘ rev **-** ⌘ Current version: **4.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Clarification of midamble transmit power in TS25.221		
Source:	⌘	TSG RAN WG1		
Work item code:	⌘	TEI	***Date:*** ⌘	14-11-2001
Category:	⌘	**A**	***Release:*** ⌘	REL-4
		Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change:	⌘	The figures in section 5.7 suggest that for the default midamble allocation, there is always a one-to-one mapping of codes and midambles. However, a midamble may be associated with several channelisation codes, depending on the number of possible midamble shifts in a cell.
Summary of change:	⌘	Correction of the figure
Consequences if not approved:	⌘	Analysis: This CR corrects a function where the specification was ambiguous or not sufficiently explicit. It would not affect implementations behaving like indicated in the CR, but would affect implementations supporting the corrected functionality otherwise. The CR clarifies the midamble allocation only.

Clauses affected:	⌘	5.5, 5.6, 5.7	
Other specs Affected:	⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘
Other comments:	⌘		

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.7 Midamble Transmit Power

There shall be no offset between the sum of the powers allocated to all midambles in a timeslot and the sum of the powers allocated to the data symbol fields. The transmit power within a timeslot is hence constant.

The midamble transmit power of beacon channels is equal to the reference power. If Block STTD is used for the P-CCPCH, the reference power is equally divided between the midambles $m^{(1)}$ and $m^{(2)}$.

The midamble transmit power of all other physical channels depends on the midamble allocation scheme used. The following rules apply

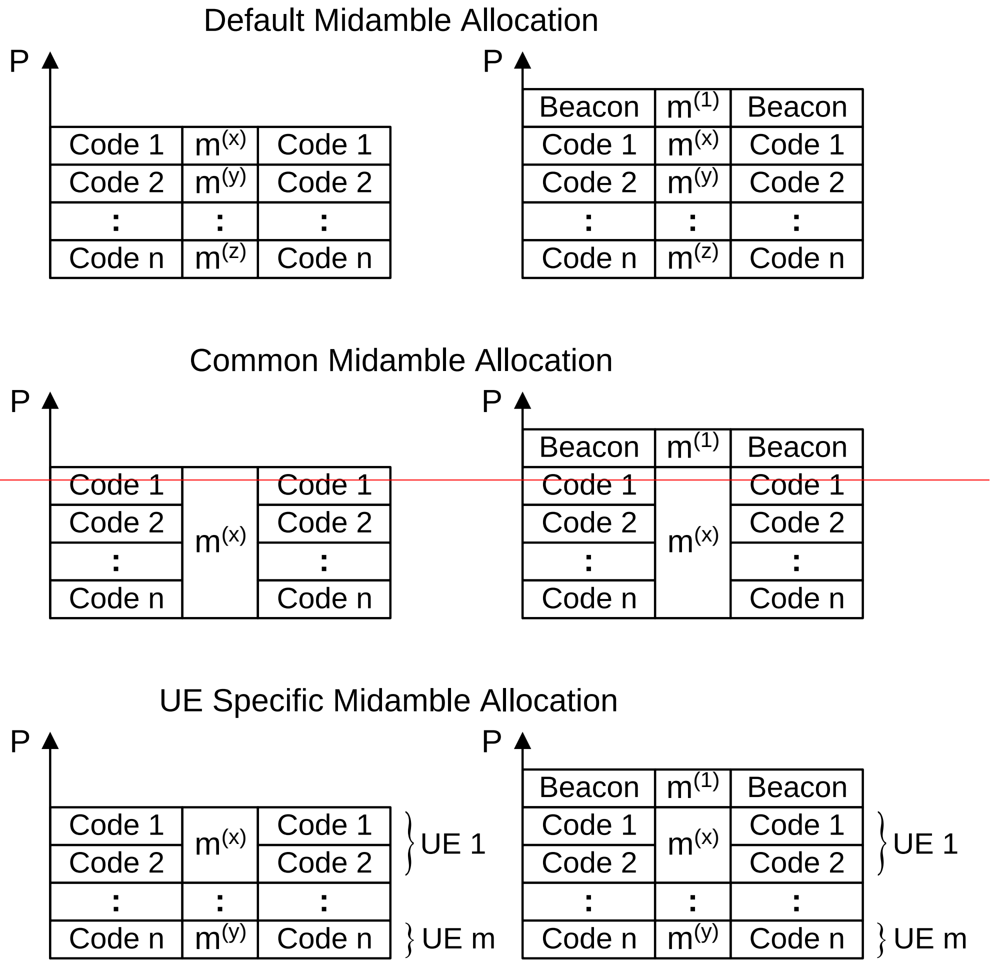
- In case of Default Midamble Allocation, every midamble is transmitted with the same power as the associated codes.
- In case of Common Midamble Allocation in the downlink, the transmit power of this common midamble is such that there is no power offset between the data parts and the midamble part of the overall transmit signal within one time slot.
- In case of UE Specific Midamble Allocation, the transmit power of the UE specific midamble is such that there is no power offset between the data parts and the midamble part of every user within one time slot.

The following figure depicts the midamble powers for the different channel types and midamble allocation schemes.

Note 1: In figure 18, the codes c(1) to c(16) represent the set of usable codes and not the set of used codes.

Note 2: The common midamble allocation and the midamble allocation by higher layers are not applicable in those beacon time slots, in which the P-CCPCH is located, see section 5.6.1.

~~For the UE Specific Midamble Allocation, as an example, code 1 and code 2 are both assigned to UE 1, whereas to UE m is assigned only the code n.~~



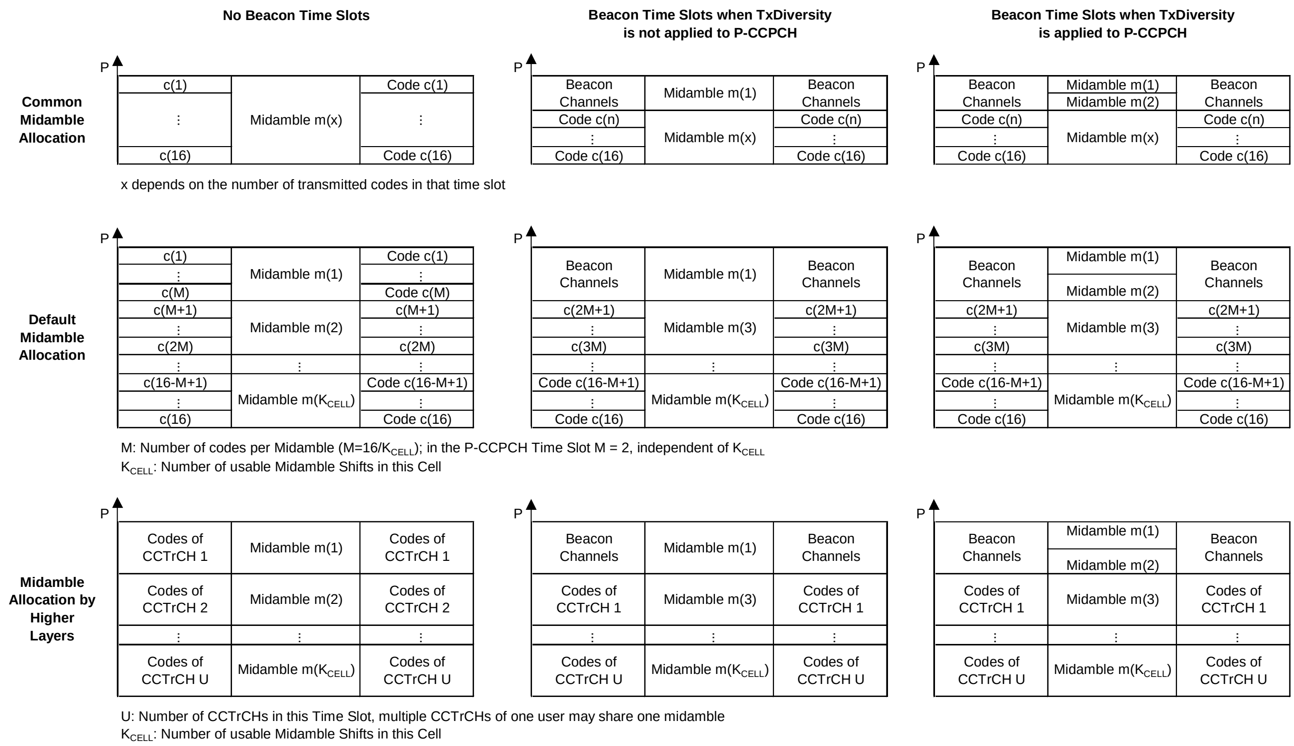


Figure 18: Midamble powers for the different midamble allocation schemes