# 3GPP TSG RAN Meeting #17 *RP-020569*
# Biarritz, France, 3 – 6, September 2002

**Title:** **Agreed CRs (R99 and Rel-4/Rel-5 Category A) to TS 25.221**

**Source:** **TSG-RAN WG1**

**Agenda item:** **7.1.3**

| No. | Spec | CR | Rev | R1 T-doc | Subject | Phase | Cat | Workitem | V_old | V_new |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 25.221 | 088 | 1 | R1-02-0989 | Corrections to channelisation code mappings for 3.84 Mcps TDD | R99 | F | TEI | 3.10.0 | 3.11.0 |
| 2 | 25.221 | 089 | 1 | R1-02-0989 | Corrections to channelisation code mappings for 3.84 Mcps TDD | Rel-4 | A | TEI | 4.5.0 | 4.6.0 |
| 3 | 25.221 | 090 | 1 | R1-02-0989 | Corrections to channelisation code mappings for 3.84 Mcps TDD | Rel-5 | A | TEI | 5.1.0 | 5.2.0 |

**R1-02-0989**

CR-Form-v7

# CHANGE REQUEST

⌘ 25.221 CR 088 ⌘rev 1 ⌘ Current version: 3.10.0 ⌘

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

***Proposed change affects:*** UICC apps⌘ ☐ ME [X] Radio Access Network [X] Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Corrections to Channelisation Code Mappings for 3.84 Mcps TDD |
| ***Source:*** | ⌘ | TSG RAN WG1 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 02/07/2002 |
| ***Category:*** | ⌘ | **F** |
| ***Release:*** | ⌘ | R99 |

*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)* |
| *Rel-6* | *(Release 6)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | The mapping of primary and secondary codes once was introduced to facilitate UE implementations as they can rely on the activity of particular codes, when the associated midambles are detected. The original mapping was adopted when defining the test specifications.<br><br>Due to a later CR, the mapping of primary and secondary codes was changed and is now inconsistent with the test specifications and also incompatible with the rate matching function, since the rate matching function switches off codes with higher index first, while the allocation rule assigns these codes first. Therefore, the UE cannot rely on the activity of these codes when the associated midambles are detected.<br><br>Also, the channelisation codes used for transmission of TFCI and/or TPC may currently be discarded by the rate matching function. |
| ***Summary of change:*** | ⌘ | The primary/secondary code mapping is changed to the original order so that primary codes have the lowest index, which matches the tests defined in RAN4.<br><br>The physical channel used for TFCI/TPC is that with the lowest physical channel sequence number in the respective timeslot, as determined by the rate matching function – thus it can not be discarded. |
| ***Consequences if not approved:*** | ⌘ | Test cases that have been defined in RAN4 would test service mappings that cannot be used in the system due to the inconsistency with rules for channelisation code mapping in RAN1. Hence, performance of real services would be unknown.<br><br>Isolated Impact Analysis: This is an isolated impact CR that corrects a functionality where the specification contained an essential error. This CR would not affect implementations behaving as indicated in the CR, would affect implementations supporting the corrected functionality otherwise. |

| | | | | | |
|---|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 5.2.2.4, 5.2.2.5, 5.6.1.2.1, A.3 | | | |
| ***Other specs affected:*** | ⌘ | **Y** | **N** | | |
| | | | **X** | Other core specifications | ⌘ |
| | | | **X** | Test specifications | |
| | | | **X** | 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/specs/CR.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.

### 5.2.2.4 Transmission of TFCI

All burst types 1, 2 and 3 provide the possibility for transmission of TFCI.

The transmission of TFCI is negotiated at call setup and can be re-negotiated during the call. For each CCTrCH it is indicated by higher layer signalling, which TFCI format is applied. Additionally for each allocated timeslot it is signalled individually whether that timeslot carries the TFCI or not. The TFCI is always present in the first timeslot in a radio frame for each CCTrCH. If a time slot contains the TFCI, then it is always transmitted using the physical channel with the lowest physical channel sequence number ($p$) in that timeslot. Physical channel sequence numbering is determined by the rate matching function and is described in [7].~~first allocated channelisation code in the timeslot, according to the order in the higher layer allocation message.~~

The transmission of TFCI is done in the data parts of the respective physical channel. In DL the TFCI code word bits and data bits are subject to the same spreading procedure as depicted in [8]. In UL, independent of the SF that is applied to the data symbols in the burst, the data in the TFCI field are always spread with SF=16 using the channelisation code in the branch with the highest code numbering of the allowed OVSF sub tree, as depicted in [8]. Hence the midamble structure and length is not changed. The TFCI code word is to be transmitted directly adjacent to the midamble, possibly after the TPC. Figure 7 shows the position of the TFCI code word in a traffic burst in downlink. Figure 8 shows the position of the TFCI code word in a traffic burst in uplink.

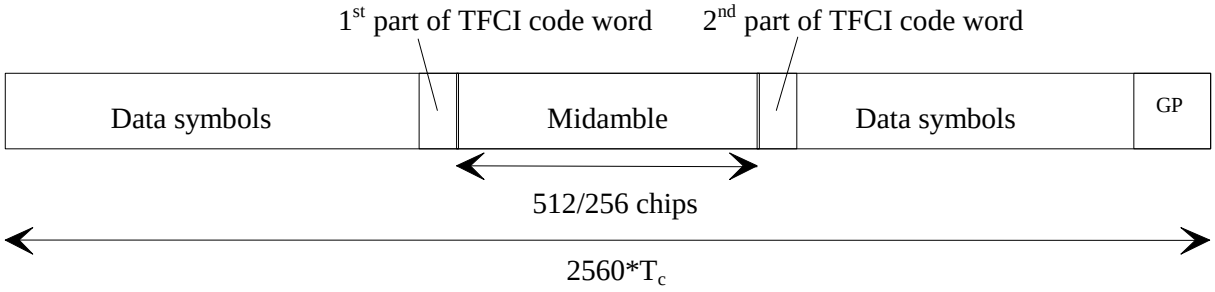


**Figure 7: Position of the TFCI code word in the traffic burst in case of downlink**

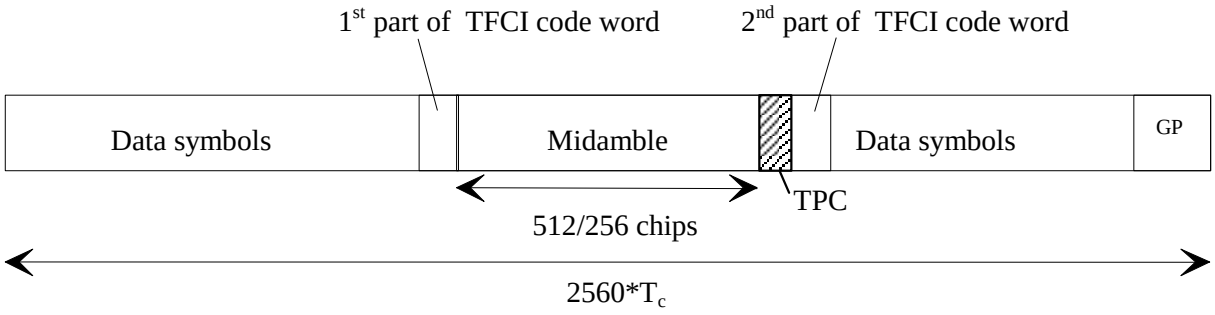


**Figure 8: Position of the TFCI code word in the traffic burst in case of uplink**

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.

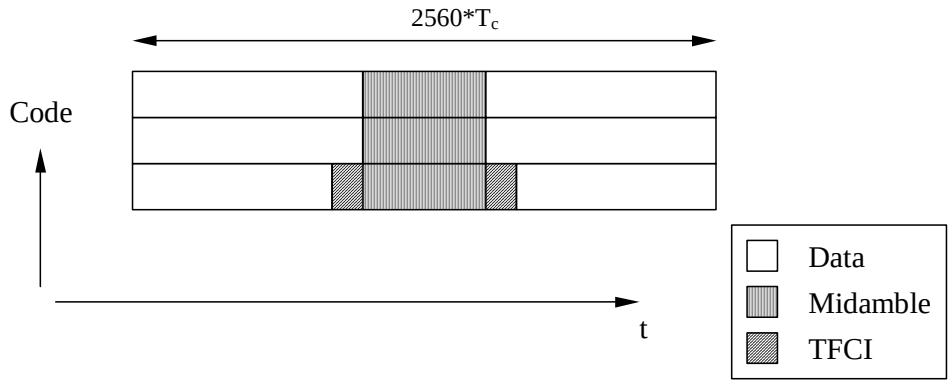


**Figure 9: Example of TFCI transmission with physical channels multiplexed in code domain**

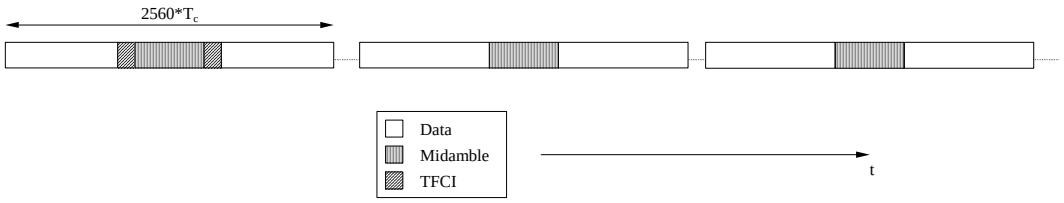


**Figure 10: Example of TFCI transmission with physical channels multiplexed in time domain**

In case the Node B receives an invalid TFI combination on the DCHs mapped to one CCTrCH the procedure described in [16] shall be applied. According to this procedure DTX shall be applied to all DPCHs to which the CCTrCH is mapped to.

### 5.2.2.5 Transmission of TPC

All burst types 1, 2 and 3 for dedicated channels provide the possibility for transmission of TPC in uplink.

The transmission of TPC is done in the data parts of the traffic burst. Independent of the SF that is applied to the data symbols in the burst, the data in the TPC field are always spread with SF=16 using the channelisation code in the branch with the highest code numbering of the allowed OVSF sub tree, as depicted in [8]. 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 shall be transmitted at least once per transmitted frame. If a TFCI is applied for a CCTrCH, TPC shall be transmitted with the same channelization codes and in the same timeslots as the TFCI. If no TFCI is applied for a CCTrCH, TPC shall be transmitted using the physical channel corresponding to physical channel sequence number $p$=1.~~first allocated channelisation code and the first allocated timeslot, according to the order in the higher layer allocation message.~~ Physical channel sequence numbering is determined by the rate matching function and is described in [7].

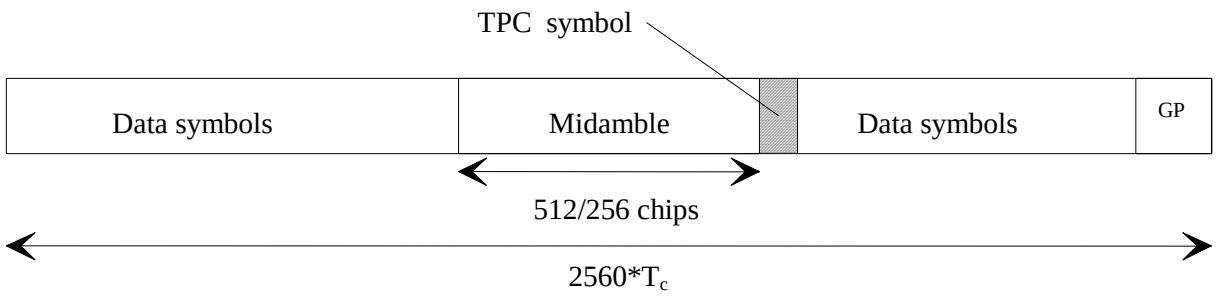


**Figure 11: Position of TPC information in the traffic burst**

The length of the TPC command is one symbol. The relationship between the TPC symbol and the TPC command is shown in table 4a.

**Table 4a: TPC bit pattern**

| TPC Bits | TPC command | Meaning |
|---|---|---|
| 00 | 'Down' | Decrease Tx Power |
| 11 | 'Up' | Increase Tx Power |

#### 5.6.1.2.1 Default midamble

If a midamble is not explicitly assigned and the use of the common midamble allocation scheme is not signalled by higher layers, the UE shall derive the midambles from the allocated channelisation codes and shall use an individual midamble for each channelisation code group containing one primary and a set of secondary channelisation codes. The association between midambles and channelisation code groups is given in annex A.3. All the secondary channelisation codes within a set use the same midamble as the primary channelisation code to which they are associated.

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

Channelisation codes of one channelisation code group shall not be allocated to different UE's.

In the case that secondary channelisation codes are used, secondary channelisation codes of one channelisation code group ~~set~~ shall be allocated in ascending order, with respect to their numbering, and beginning with the lowest code index in this channelisation code group.

The UE shall assume different channel estimates for each of the individual midambles.

The default midamble allocation shall not apply for those downlink channels that are intended for a UE which will be the only UE assigned to a given time slot or slots for the duration of the assigned channel's existence (as in the case of high rate services).

# A.3 Association between Midambles and Channelisation Codes

The following mapping schemes apply for the association between midambles and channelisation codes if no midamble is allocated by higher layers. Secondary channelisation codes are marked with a ~~(~~*~~)~~. These associations apply both for UL and DL.

# A.3.1 Association for Burst Type 1/3 and $K_{Cell}$ =16 Midambles

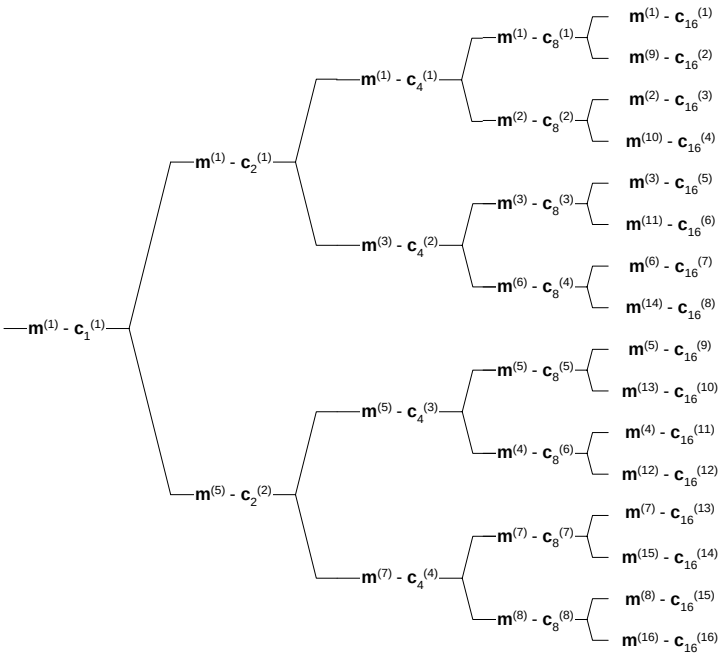


**Figure A-1: Association of Midambles to Spreading Codes for Burst Type 1/3 and $K_{Cell}$ =16**

## A.3.2 Association for Burst Type 1/3 and $K_{Cell}$ =8 Midambles

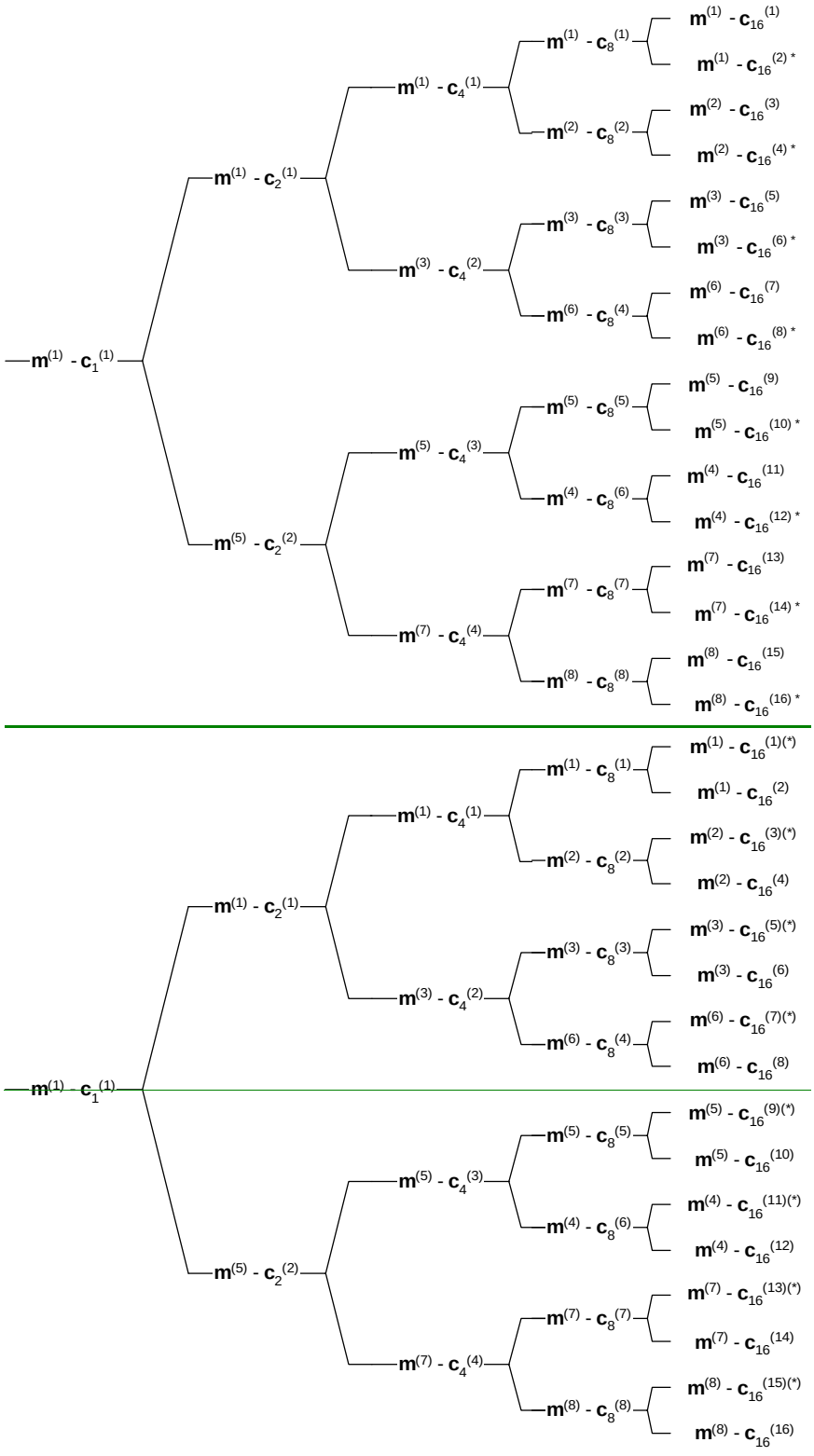


**Figure A-2: Association of Midambles to Spreading Codes for Burst Type 1/3 and $K_{Cell}$ =8**

# A.3.3 Association for Burst Type 1/3 and $K_{Cell}$ =4 Midambles

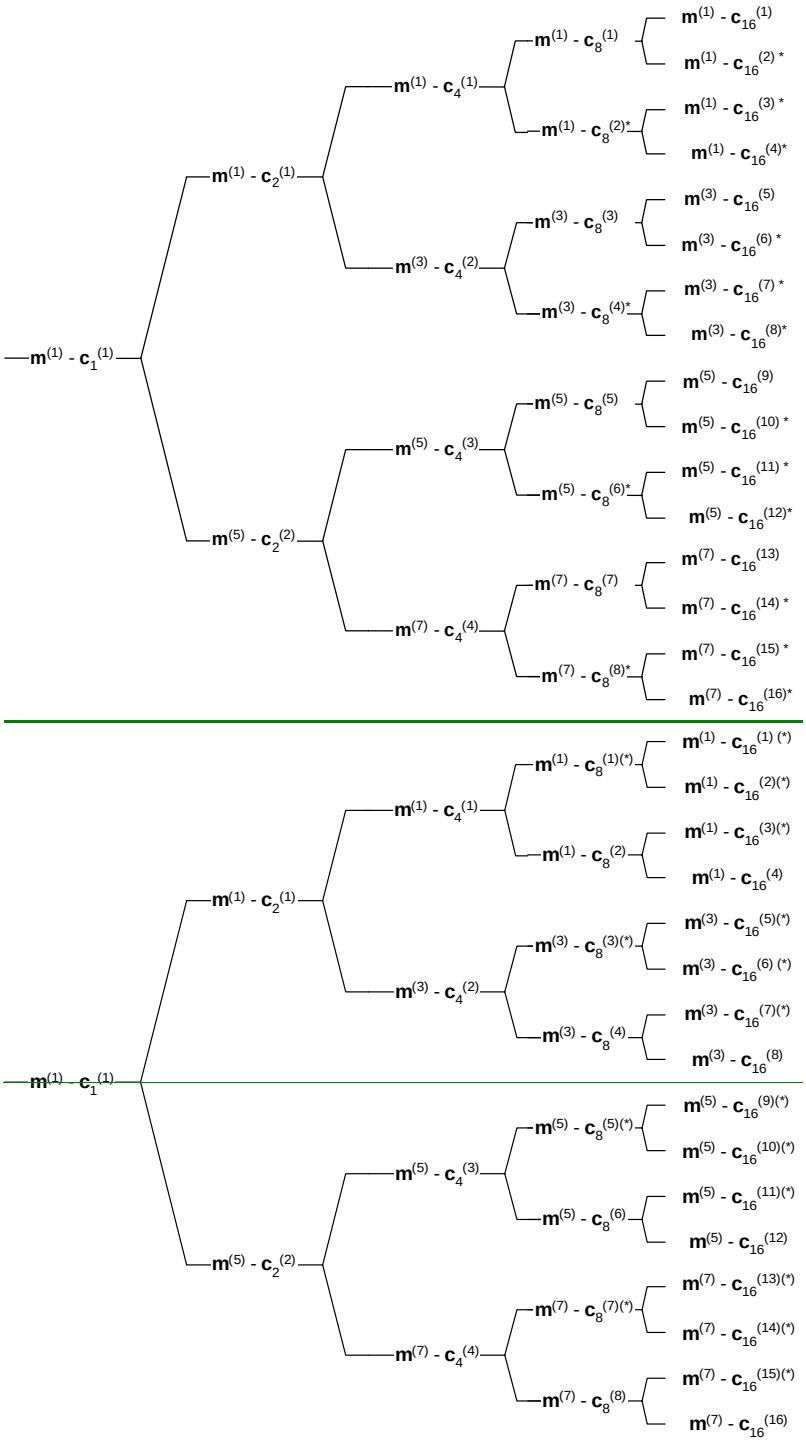


**Figure A-3: Association of Midambles to Spreading Codes for Burst Type 1/3 and $K_{Cell}$ =4**

# A.3.4 Association for Burst Type 2 and $K_{Cell}$ =6 Midambles

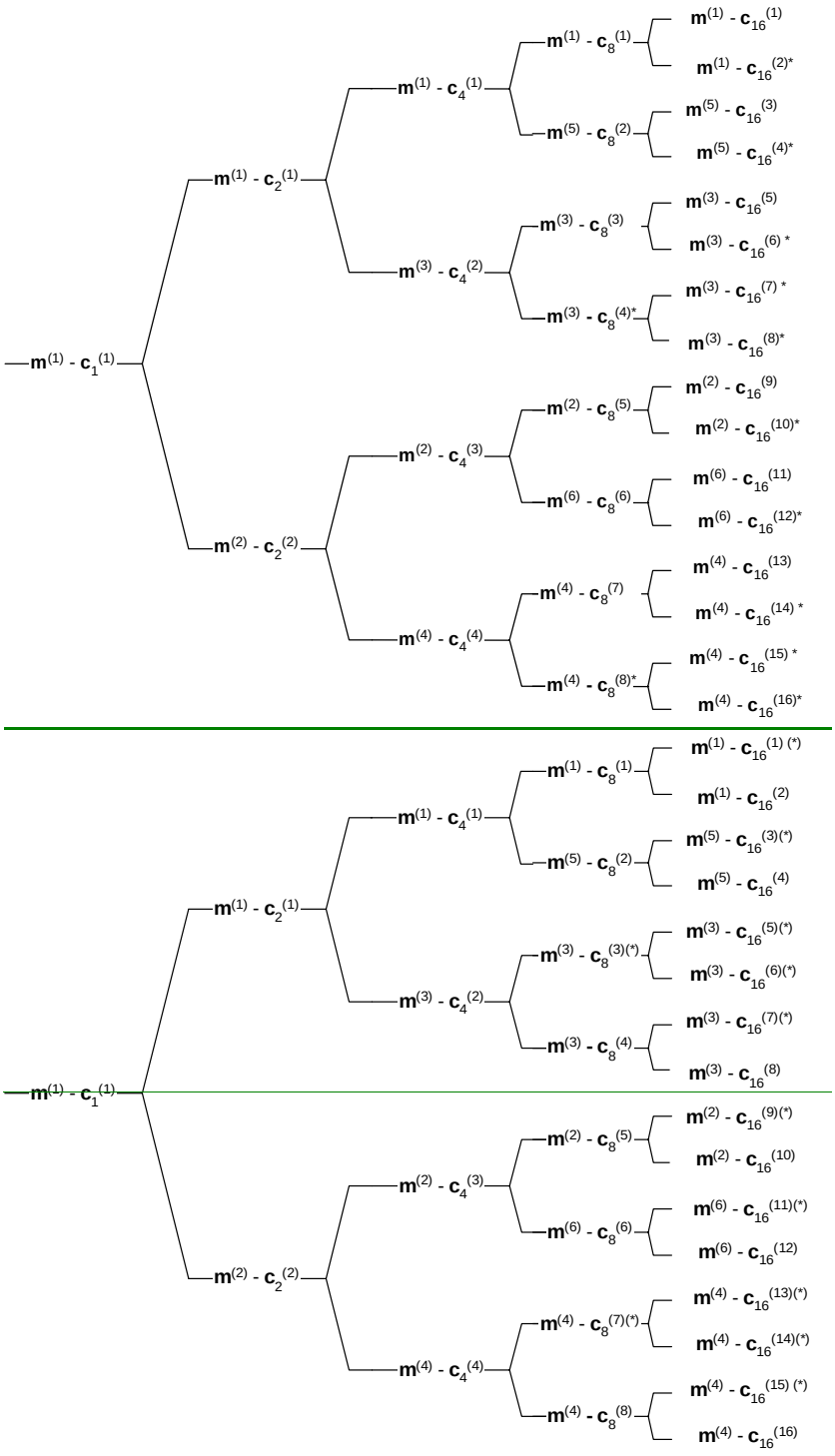


**Figure A-4: Association of Midambles to Spreading Codes for Burst Type 2 and $K_{Cell}$ =6**

# A.3.5 Association for Burst Type 2 and $K_{Cell}$ =3 Midambles

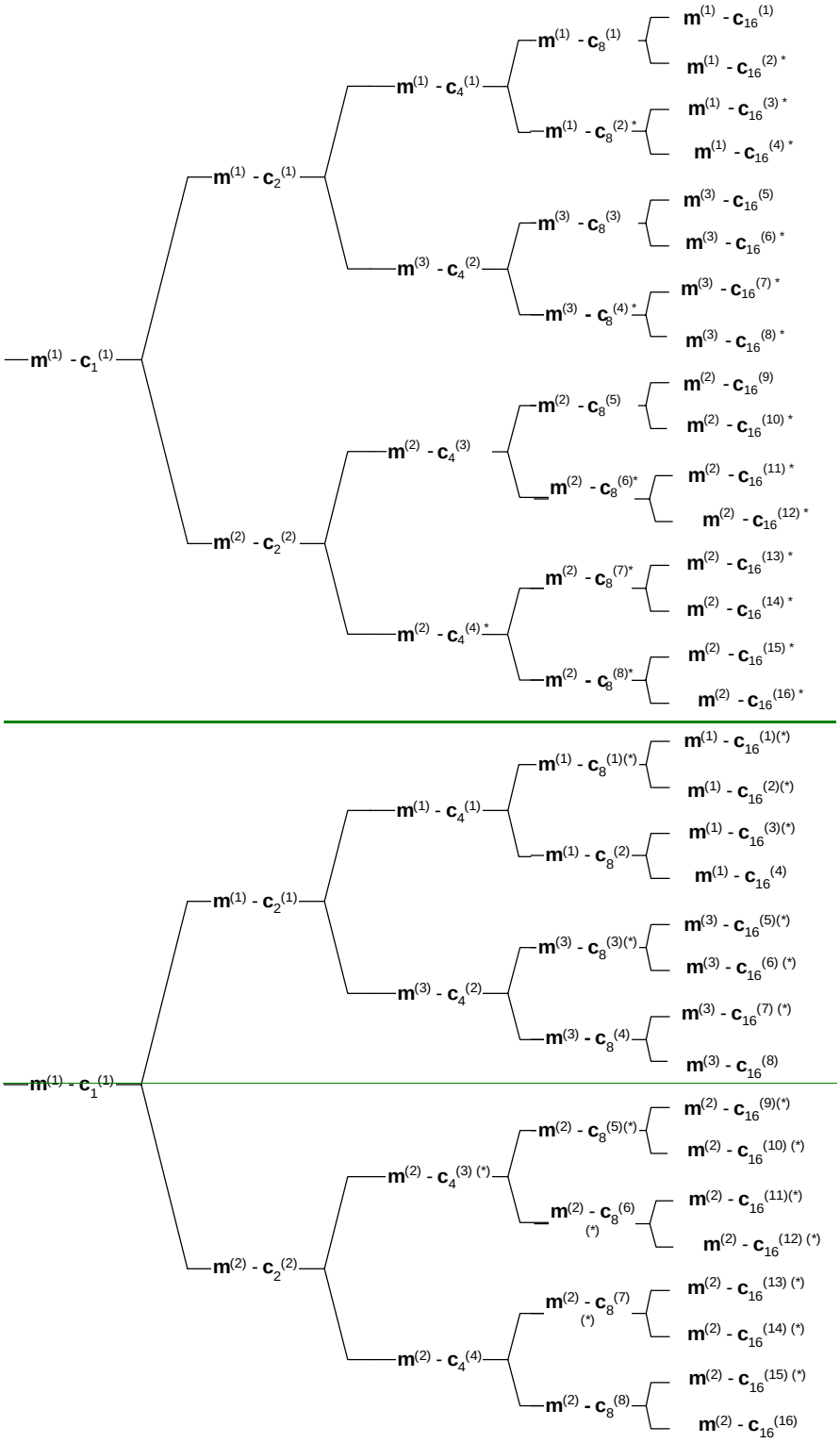


**Figure A-5: Association of Midambles to Spreading Codes for Burst Type 2 and $K_{Cell}$ =3**

Note that the association for burst type 2 can be derived from the association for burst type 1 and 3, using the following table:

| Burst Type 1/3 | m(1) | m(2) | m(3) | m(4) | m(5) | m(6) | m(7) | m(8) |
|---|---|---|---|---|---|---|---|---|
| Burst Type 2 | m(1) | m(5) | m(3) | m(6) | m(2) | m(4) | - | - |

**R1-02-0989**

CR-Form-v7

# CHANGE REQUEST

⌘ **25.221** **CR** **089** ⌘ **rev** **1** ⌘ Current version: **4.5.0** ⌘

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

***Proposed change affects:*** UICC apps⌘ ☐ ME ☒ Radio Access Network ☒ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Corrections to Channelisation Code Mappings for 3.84 Mcps TDD |
| ***Source:*** | ⌘ | TSG RAN WG1 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 02/07/2002 |
| ***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)*
*Rel-6 (Release 6)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | The mapping of primary and secondary codes once was introduced to facilitate UE implementations as they can rely on the activity of particular codes, when the associated midambles are detected. The original mapping was adopted when defining the test specifications.<br><br>Due to a later CR, the mapping of primary and secondary codes was changed and is now inconsistent with the test specifications and also incompatible with the rate matching function, since the rate matching function switches off codes with higher index first, while the allocation rule assigns these codes first. Therefore, the UE cannot rely on the activity of these codes when the associated midambles are detected.<br><br>Also, the channelisation codes used for transmission of TFCI and/or TPC may currently be discarded by the rate matching function. |
| ***Summary of change:*** | ⌘ | The primary/secondary code mapping is changed to the original order so that primary codes have the lowest index, which matches the tests defined in RAN4.<br><br>The physical channel used for TFCI/TPC is that with the lowest physical channel sequence number in the respective timeslot, as determined by the rate matching function – thus it can not be discarded. |
| ***Consequences if not approved:*** | ⌘ | Test cases that have been defined in RAN4 would test service mappings that cannot be used in the system due to the inconsistency with rules for channelisation code mapping in RAN1. Hence, performance of real services would be unknown.<br><br>Isolated Impact Analysis: This is an isolated impact CR that corrects a functionality where the specification contained an essential error. This CR would not affect implementations behaving as indicated in the CR, would affect implementations supporting the corrected functionality otherwise. |

| | | | | | |
|---|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 5.2.2.4, 5.2.2.5, 5.6.1.2.1, A.3 | | | |
| ***Other specs affected:*** | ⌘ | **Y** | **N** | | |
| | | | **X** | Other core specifications | ⌘ |
| | | | **X** | Test specifications | |
| | | | **X** | 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/specs/CR.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.

### 5.2.2.4 Transmission of TFCI

All burst types 1, 2 and 3 provide the possibility for transmission of TFCI.

The transmission of TFCI is negotiated at call setup and can be re-negotiated during the call. For each CCTrCH it is indicated by higher layer signalling, which TFCI format is applied. Additionally for each allocated timeslot it is signalled individually whether that timeslot carries the TFCI or not. The TFCI is always present in the first timeslot in a radio frame for each CCTrCH. If a time slot contains the TFCI, then it is always transmitted using the physical channel with the lowest physical channel sequence number ($p$) in that timeslot. Physical channel sequence numbering is determined by the rate matching function and is described in [7].~~first allocated channelisation code in the timeslot, according to the order in the higher layer allocation message.~~

The transmission of TFCI is done in the data parts of the respective physical channel. In DL the TFCI code word bits and data bits are subject to the same spreading procedure as depicted in [8]. In UL, independent of the SF that is applied to the data symbols in the burst, the data in the TFCI field are always spread with SF=16 using the channelisation code in the branch with the highest code numbering of the allowed OVSF sub tree, as depicted in [8]. Hence the midamble structure and length is not changed. The TFCI code word is to be transmitted directly adjacent to the midamble, possibly after the TPC. Figure 7 shows the position of the TFCI code word in a traffic burst in downlink. Figure 8 shows the position of the TFCI code word in a traffic burst in uplink.

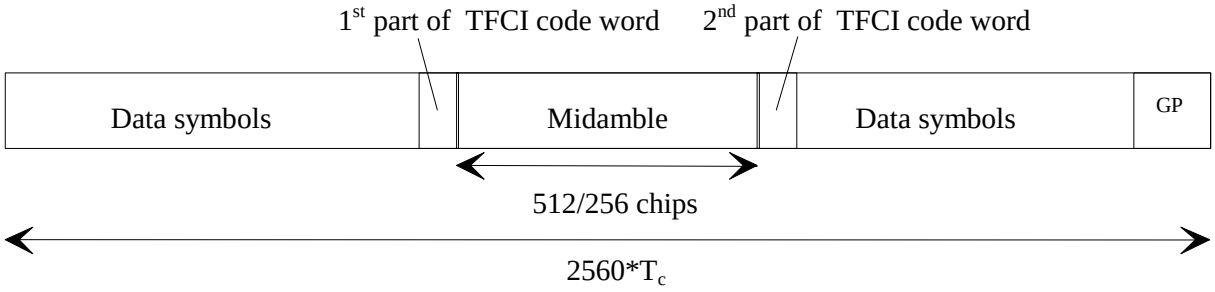


**Figure 7: Position of the TFCI code word in the traffic burst in case of downlink**

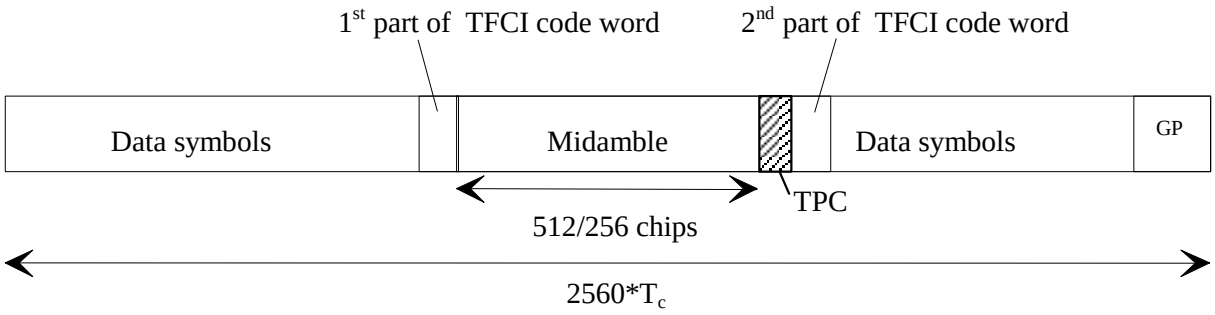


**Figure 8: Position of the TFCI code word in the traffic burst in case of uplink**

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.

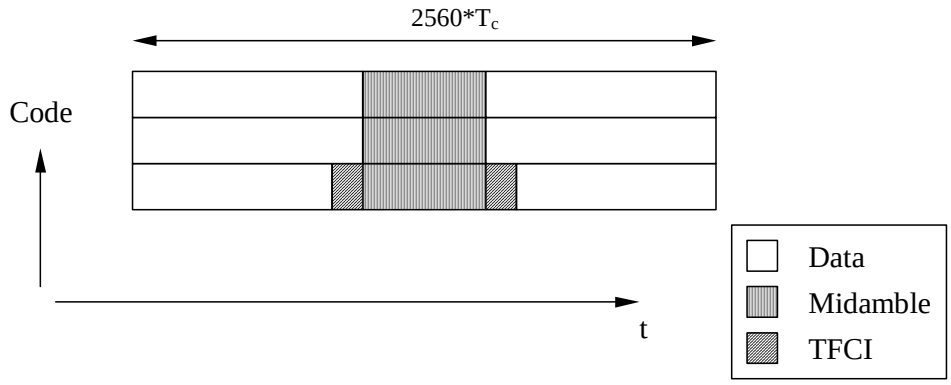


**Figure 9: Example of TFCI transmission with physical channels multiplexed in code domain**

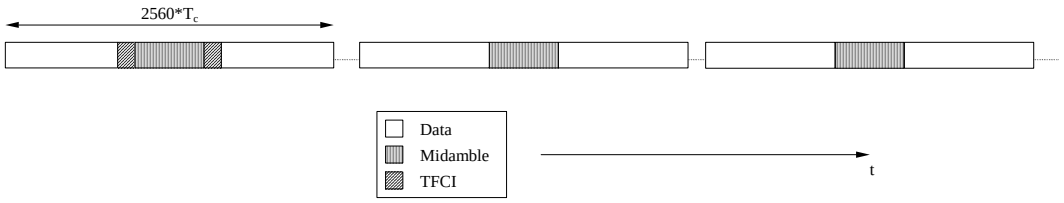


**Figure 10: Example of TFCI transmission with physical channels multiplexed in time domain**

In case the Node B receives an invalid TFI combination on the DCHs mapped to one CCTrCH the procedure described in [16] shall be applied. According to this procedure DTX shall be applied to all DPCHs to which the CCTrCH is mapped to.

### 5.2.2.5 Transmission of TPC

All burst types 1, 2 and 3 for dedicated channels provide the possibility for transmission of TPC in uplink.

The transmission of TPC is done in the data parts of the traffic burst. Independent of the SF that is applied to the data symbols in the burst, the data in the TPC field are always spread with SF=16 using the channelisation code in the branch with the highest code numbering of the allowed OVSF sub tree, as depicted in [8]. 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 shall be transmitted at least once per transmitted frame. If a TFCI is applied for a CCTrCH, TPC shall be transmitted with the same channelization codes and in the same timeslots as the TFCI. If no TFCI is applied for a CCTrCH, TPC shall be transmitted using the physical channel corresponding to physical channel sequence number $p$=1.~~first allocated channelisation code and the first allocated timeslot, according to the order in the higher layer allocation message.~~ Physical channel sequence numbering is determined by the rate matching function and is described in [7].

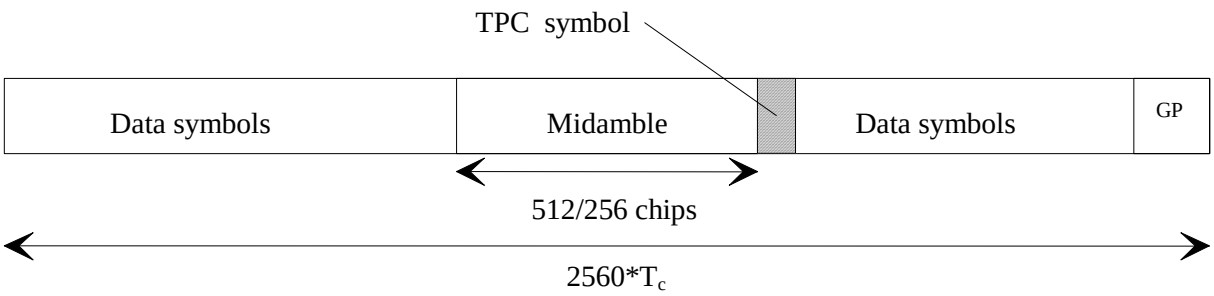


**Figure 11: Position of TPC information in the traffic burst**

The length of the TPC command is one symbol. The relationship between the TPC symbol and the TPC command is shown in table 4a.

**Table 4a: TPC bit pattern**

| TPC Bits | TPC command | Meaning |
|---|---|---|
| 00 | 'Down' | Decrease Tx Power |
| 11 | 'Up' | Increase Tx Power |

### 5.6.1.2.1 Default midamble

If a midamble is not explicitly assigned and the use of the common midamble allocation scheme is not signalled by higher layers, the UE shall derive the midambles from the allocated channelisation codes and shall use an individual midamble for each channelisation code group containing one primary and a set of secondary channelisation codes. The association between midambles and channelisation code groups is given in annex A.3. All the secondary channelisation codes within a set use the same midamble as the primary channelisation code to which they are associated.

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

Channelisation codes of one channelisation code group shall not be allocated to different UE's.

In the case that secondary channelisation codes are used, secondary channelisation codes of one channelisation code group~~set~~ shall be allocated in ascending order, with respect to their numbering, and beginning with the lowest code index in this channelisation code group.

The UE shall assume different channel estimates for each of the individual midambles.

The default midamble allocation shall not apply for those downlink channels that are intended for a UE which will be the only UE assigned to a given time slot or slots for the duration of the assigned channel's existence (as in the case of high rate services).

# A.3 Association between Midambles and Channelisation Codes

The following mapping schemes apply for the association between midambles and channelisation codes if no midamble is allocated by higher layers. Secondary channelisation codes are marked with a ~~(~~*~~)~~. These associations apply both for UL and DL.

## A.3.1 Association for Burst Type 1/3 and $K_{Cell}$ =16 Midambles

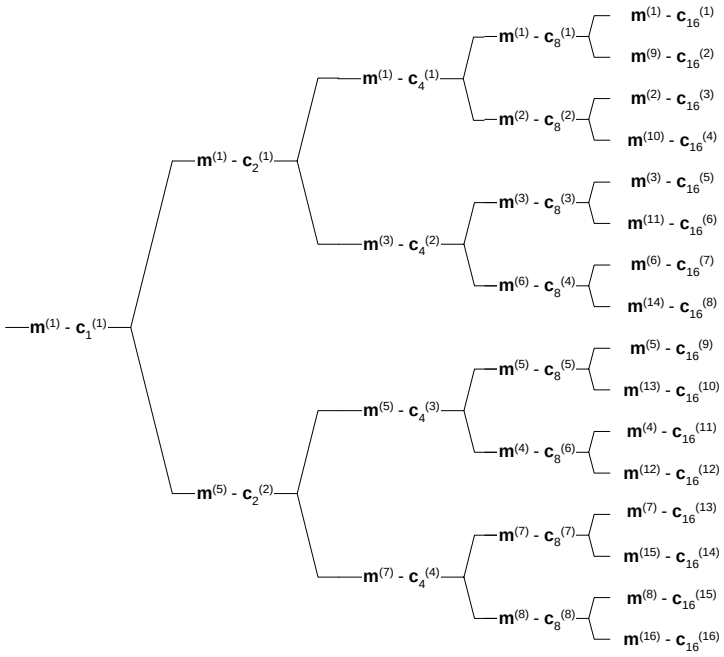


**Figure A-1: Association of Midambles to Spreading Codes for Burst Type 1/3 and $K_{Cell}$ =16**

## A.3.2 Association for Burst Type 1/3 and $K_{Cell}$ =8 Midambles

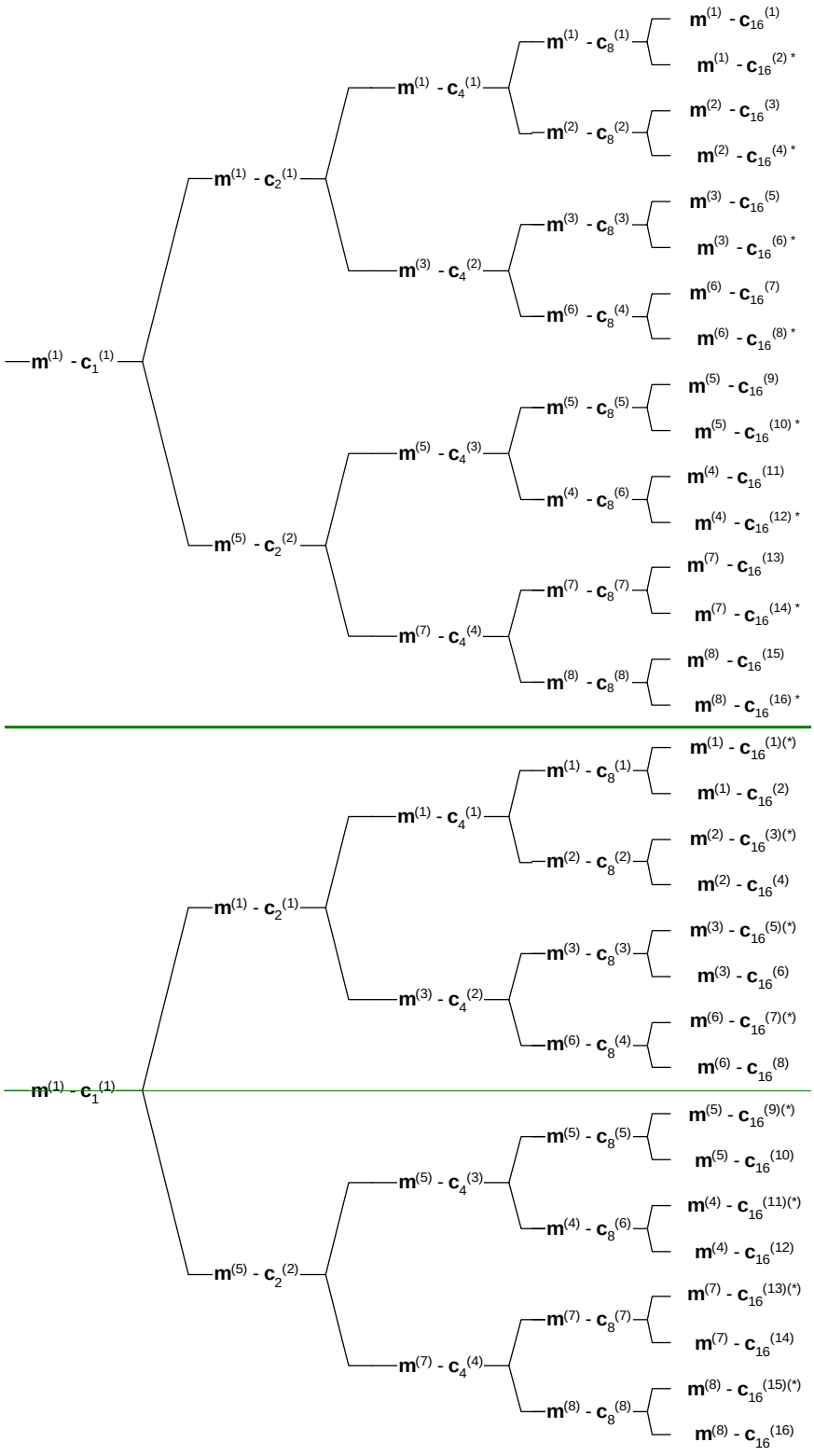


**Figure A-2: Association of Midambles to Spreading Codes for Burst Type 1/3 and $K_{Cell}$ =8**

# A.3.3 Association for Burst Type 1/3 and $K_{Cell}$ =4 Midambles

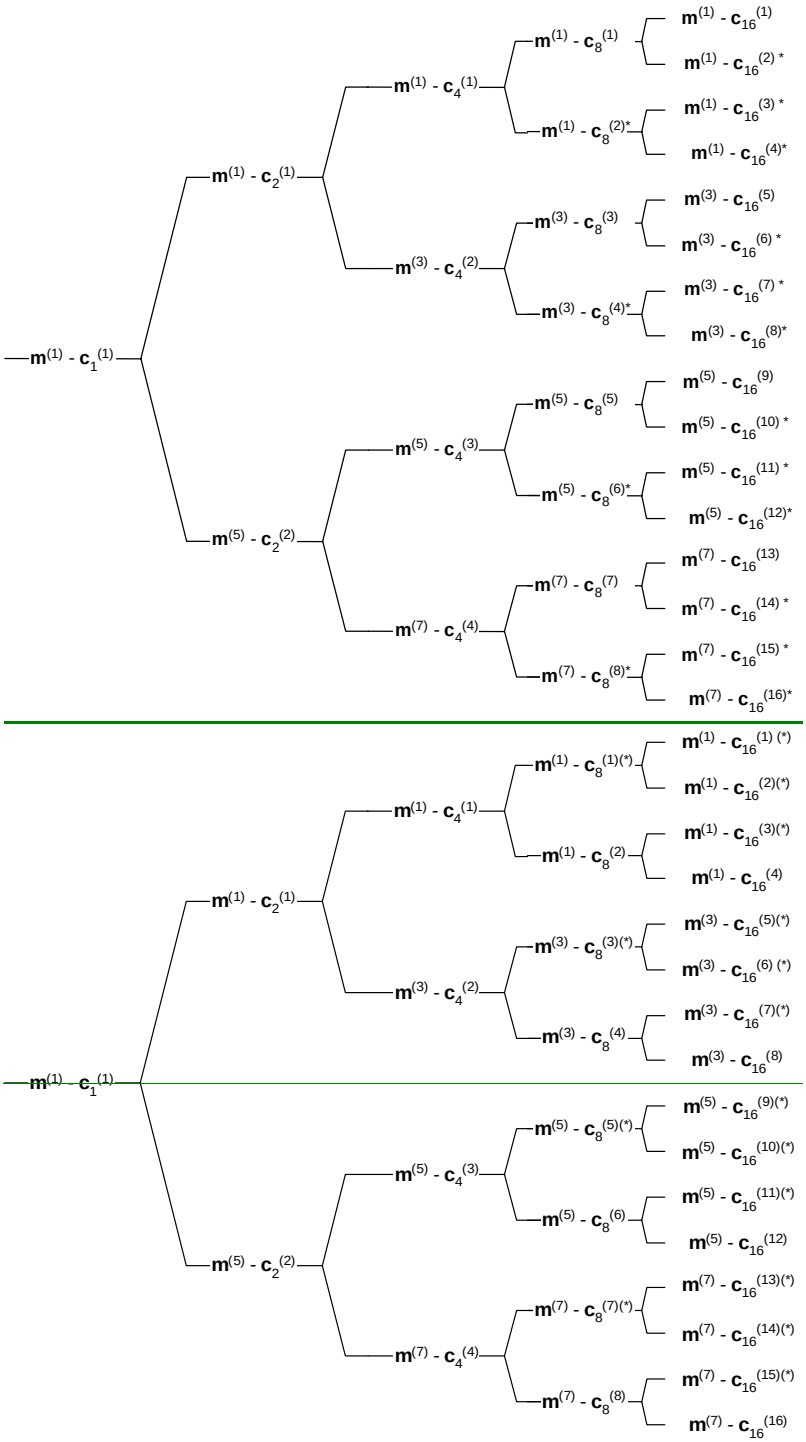


**Figure A-3: Association of Midambles to Spreading Codes for Burst Type 1/3 and $K_{Cell}$ =4**

## A.3.4 Association for Burst Type 2 and $K_{Cell}$ =6 Midambles

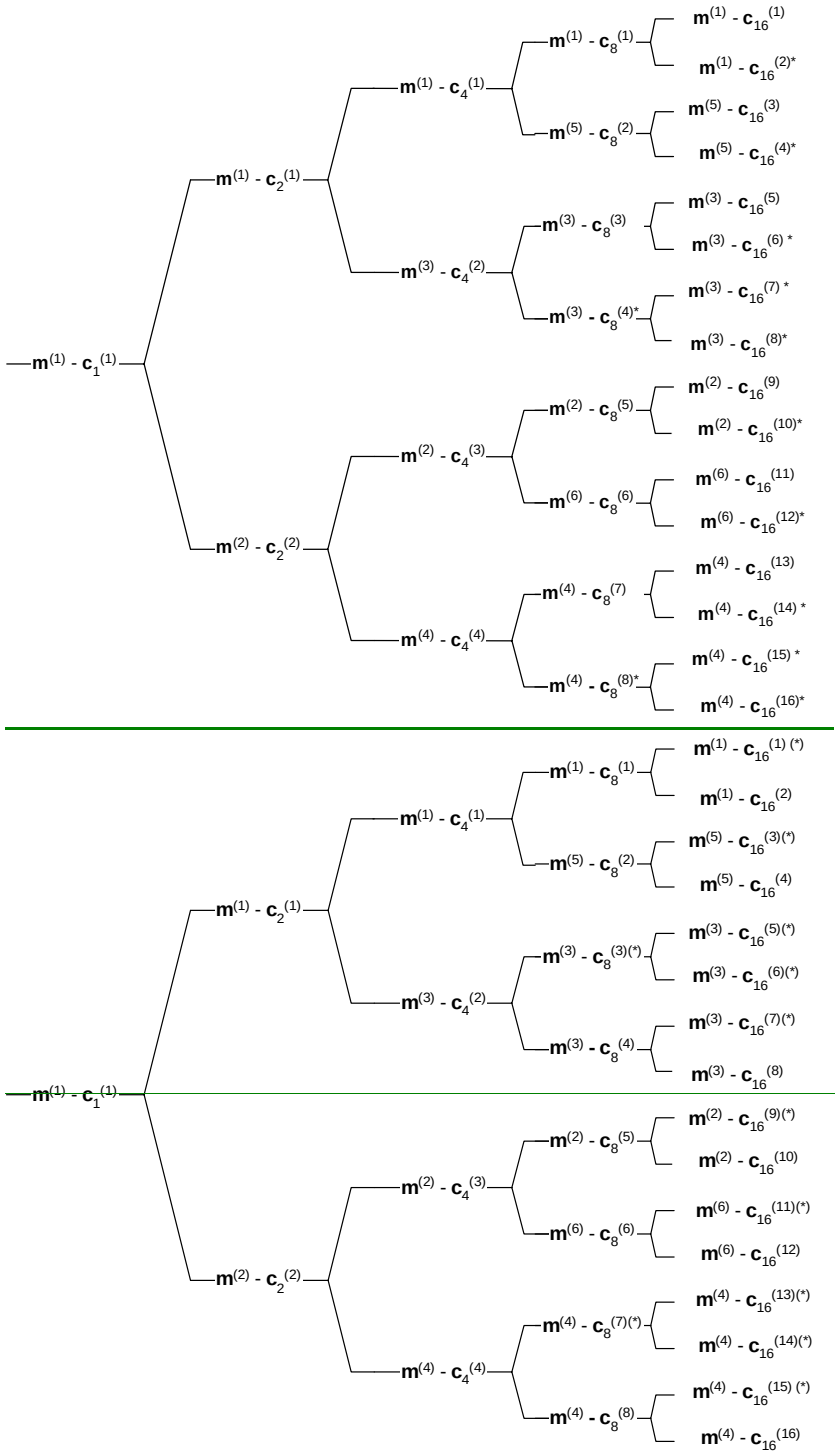


**Figure A-4: Association of Midambles to Spreading Codes for Burst Type 2 and $K_{Cell}$ =6**

## A.3.5 Association for Burst Type 2 and $K_{Cell}$ =3 Midambles

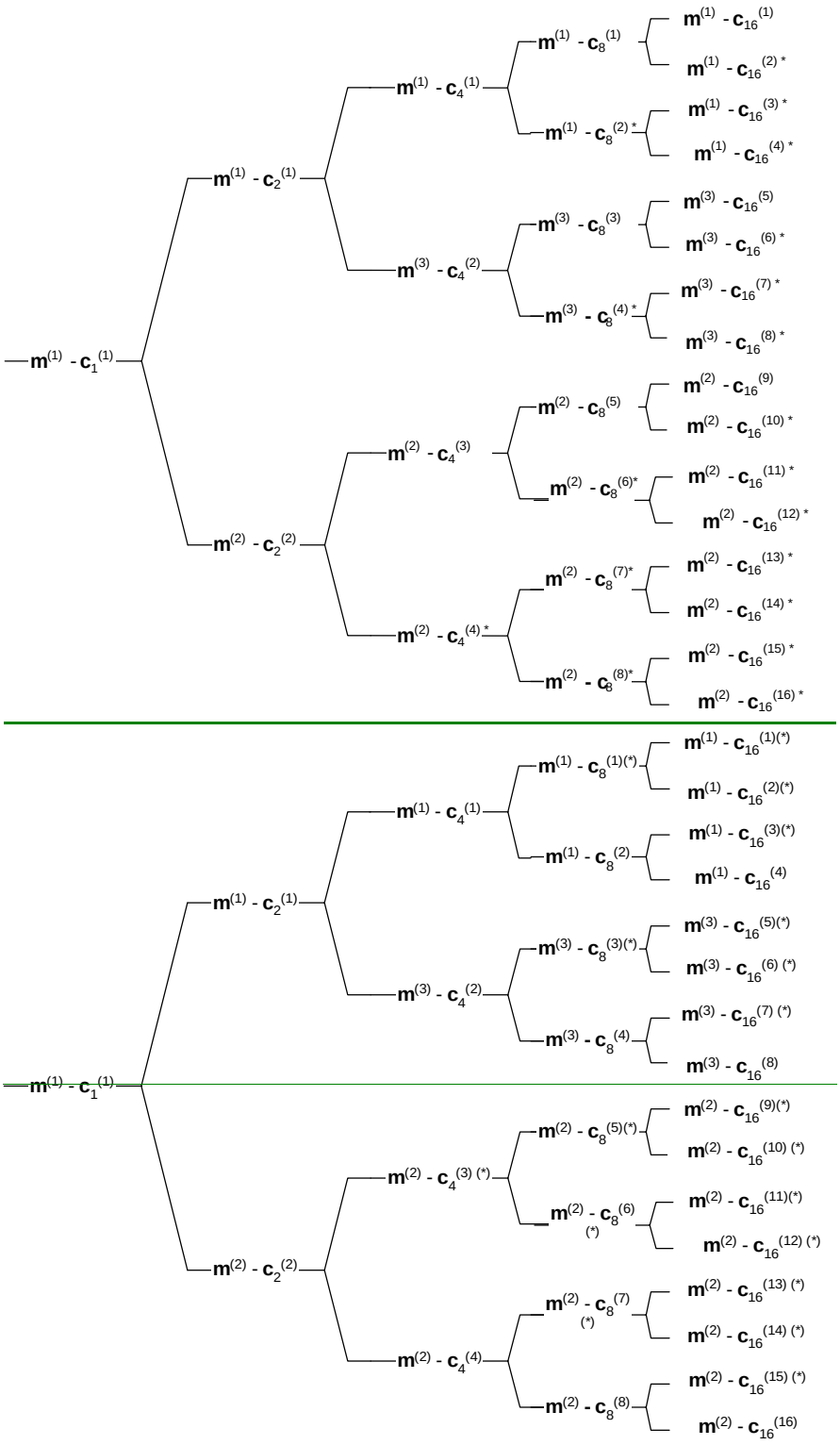


**Figure A-5: Association of Midambles to Spreading Codes for Burst Type 2 and $K_{Cell}$ =3**

Note that the association for burst type 2 can be derived from the association for burst type 1 and 3, using the following table:

| Burst Type 1/3 | m(1) | m(2) | m(3) | m(4) | m(5) | m(6) | m(7) | m(8) |
|---|---|---|---|---|---|---|---|---|
| Burst Type 2 | m(1) | m(5) | m(3) | m(6) | m(2) | m(4) | - | - |

**R1-02-0989**

CR-Form-v7

# CHANGE REQUEST

⌘ **25.221** **CR** **090** ⌘ **rev** **1** ⌘ Current version: **5.1.0** ⌘

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

***Proposed change affects:*** UICC apps⌘ ☐ ME ☒ Radio Access Network ☒ Core Network ☐

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Corrections to Channelisation Code Mappings for 3.84 Mcps TDD |
| ***Source:*** | ⌘ | TSG RAN WG1 |
| ***Work item code:*** | ⌘ | TEI |
| ***Date:*** | ⌘ | 02/07/2002 |
| ***Category:*** | ⌘ | **A** |
| ***Release:*** | ⌘ | Rel-5 |

*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)*
*Rel-6 (Release 6)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | The mapping of primary and secondary codes once was introduced to facilitate UE implementations as they can rely on the activity of particular codes, when the associated midambles are detected. The original mapping was adopted when defining the test specifications.<br><br>Due to a later CR, the mapping of primary and secondary codes was changed and is now inconsistent with the test specifications and also incompatible with the rate matching function, since the rate matching function switches off codes with higher index first, while the allocation rule assigns these codes first. Therefore, the UE cannot rely on the activity of these codes when the associated midambles are detected.<br><br>Also, the channelisation codes used for transmission of TFCI and/or TPC may currently be discarded by the rate matching function. |
| ***Summary of change:*** | ⌘ | The primary/secondary code mapping is changed to the original order so that primary codes have the lowest index, which matches the tests defined in RAN4.<br><br>The physical channel used for TFCI/TPC is that with the lowest physical channel sequence number in the respective timeslot, as determined by the rate matching function – thus it can not be discarded. |
| ***Consequences if not approved:*** | ⌘ | Test cases that have been defined in RAN4 would test service mappings that cannot be used in the system due to the inconsistency with rules for channelisation code mapping in RAN1. Hence, performance of real services would be unknown.<br><br>Isolated Impact Analysis: This is an isolated impact CR that corrects a functionality where the specification contained an essential error. This CR would not affect implementations behaving as indicated in the CR, would affect implementations supporting the corrected functionality otherwise. |

| | | | | | | |
|---|---|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | 5.2.2.4, 5.2.2.5, 5.6.1.2.1, A3 | | | | |
| ***Other specs affected:*** | ⌘ | **Y** | **N** | | ⌘ | |
| | | | **X** | Other core specifications | | |
| | | | **X** | Test specifications | | |
| | | | **X** | 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/specs/CR.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.

### 5.2.2.4 Transmission of TFCI

All burst types 1, 2 and 3 provide the possibility for transmission of TFCI.

The transmission of TFCI is negotiated at call setup and can be re-negotiated during the call. For each CCTrCH it is indicated by higher layer signalling, which TFCI format is applied. Additionally for each allocated timeslot it is signalled individually whether that timeslot carries the TFCI or not. The TFCI is always present in the first timeslot in a radio frame for each CCTrCH. If a time slot contains the TFCI, then it is always transmitted using the physical channel with the lowest physical channel sequence number ($p$) in that timeslot. Physical channel sequence numbering is determined by the rate matching function and is described in [7].~~first allocated channelisation code in the timeslot, according to the order in the higher layer allocation message.~~

The transmission of TFCI is done in the data parts of the respective physical channel. In DL the TFCI code word bits and data bits are subject to the same spreading procedure as depicted in [8]. In UL, independent of the SF that is applied to the data symbols in the burst, the data in the TFCI field are always spread with SF=16 using the channelisation code in the branch with the highest code numbering of the allowed OVSF sub tree, as depicted in [8]. Hence the midamble structure and length is not changed. The TFCI code word is to be transmitted directly adjacent to the midamble, possibly after the TPC. Figure 7 shows the position of the TFCI code word in a traffic burst in downlink. Figure 8 shows the position of the TFCI code word in a traffic burst in uplink.

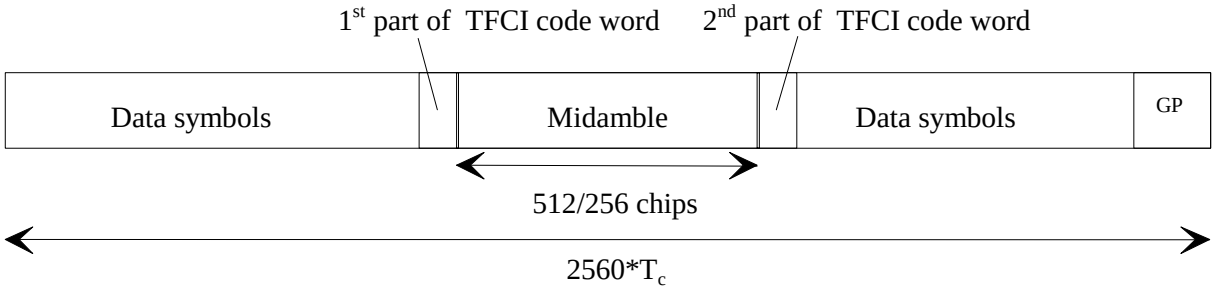


**Figure 7: Position of the TFCI code word in the traffic burst in case of downlink**

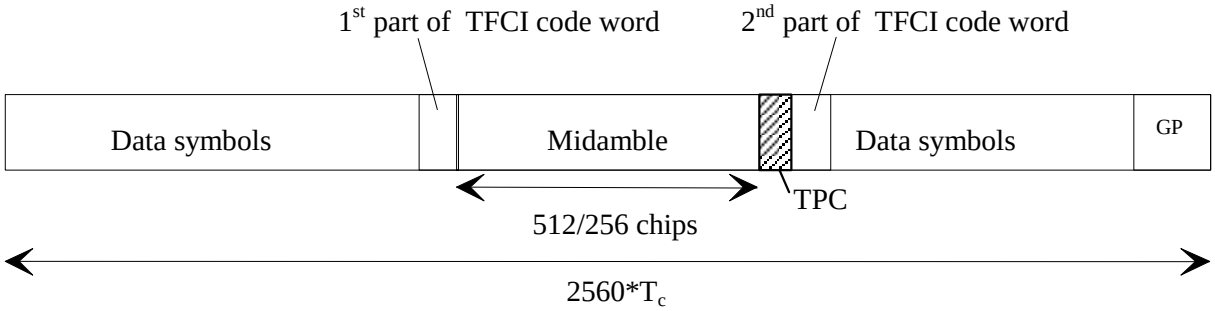


**Figure 8: Position of the TFCI code word in the traffic burst in case of uplink**

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.

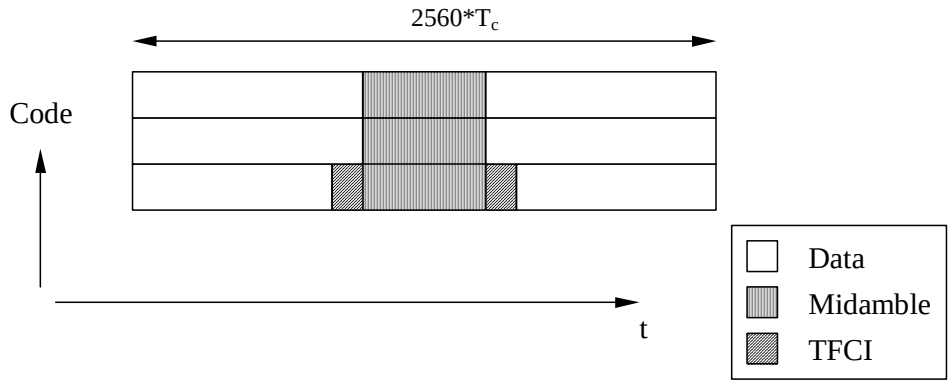


**Figure 9: Example of TFCI transmission with physical channels multiplexed in code domain**

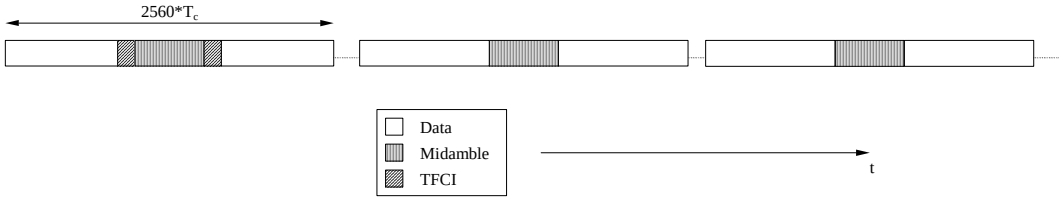


**Figure 10: Example of TFCI transmission with physical channels multiplexed in time domain**

In case the Node B receives an invalid TFI combination on the DCHs mapped to one CCTrCH the procedure described in [16] shall be applied. According to this procedure DTX shall be applied to all DPCHs to which the CCTrCH is mapped to.

### 5.2.2.5 Transmission of TPC

All burst types 1, 2 and 3 for dedicated channels provide the possibility for transmission of TPC in uplink.

The transmission of TPC is done in the data parts of the traffic burst. Independent of the SF that is applied to the data symbols in the burst, the data in the TPC field are always spread with SF=16 using the channelisation code in the branch with the highest code numbering of the allowed OVSF sub tree, as depicted in [8]. 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 shall be transmitted at least once per transmitted frame. If a TFCI is applied for a CCTrCH, TPC shall be transmitted with the same channelization codes and in the same timeslots as the TFCI. If no TFCI is applied for a CCTrCH, TPC shall be transmitted using the physical channel corresponding to physical channel sequence number $p$=1.~~first allocated channelisation code and the first allocated timeslot, according to the order in the higher layer allocation message.~~ Physical channel sequence numbering is determined by the rate matching function and is described in [7].

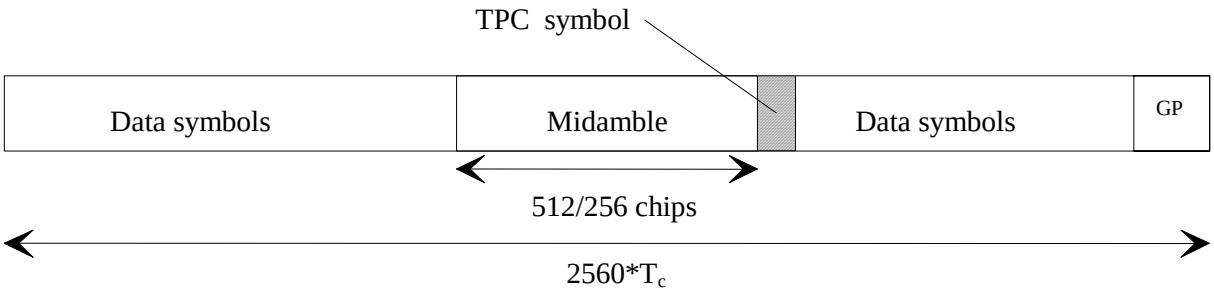


**Figure 11: Position of TPC information in the traffic burst**

The length of the TPC command is one symbol. The relationship between the TPC symbol and the TPC command is shown in table 4a.

**Table 4a: TPC bit pattern**

| TPC Bits | TPC command | Meaning |
|---|---|---|
| 00 | 'Down' | Decrease Tx Power |
| 11 | 'Up' | Increase Tx Power |

### 5.6.1.2.1 Default midamble

If a midamble is not explicitly assigned and the use of the common midamble allocation scheme is not signalled by higher layers, the UE shall derive the midambles from the allocated channelisation codes and shall use an individual midamble for each channelisation code group containing one primary and a set of secondary channelisation codes. The association between midambles and channelisation code groups is given in annex A.3. All the secondary channelisation codes within a set use the same midamble as the primary channelisation code to which they are associated.

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

Channelisation codes of one channelisation code group shall not be allocated to different UE's.

In the case that secondary channelisation codes are used, secondary channelisation codes of one channelisation code group ~~set~~ shall be allocated in ascending order, with respect to their numbering, and beginning with the lowest code index in this channelisation code group.

The UE shall assume different channel estimates for each of the individual midambles.

The default midamble allocation shall not apply for those downlink channels that are intended for a UE which will be the only UE assigned to a given time slot or slots for the duration of the assigned channel's existence (as in the case of high rate services).

# A.3 Association between Midambles and Channelisation Codes

The following mapping schemes apply for the association between midambles and channelisation codes if no midamble is allocated by higher layers. Secondary channelisation codes are marked with a (*). These associations apply both for UL and DL.

## A.3.1 Association for Burst Type 1/3 and $K_{Cell}$ =16 Midambles

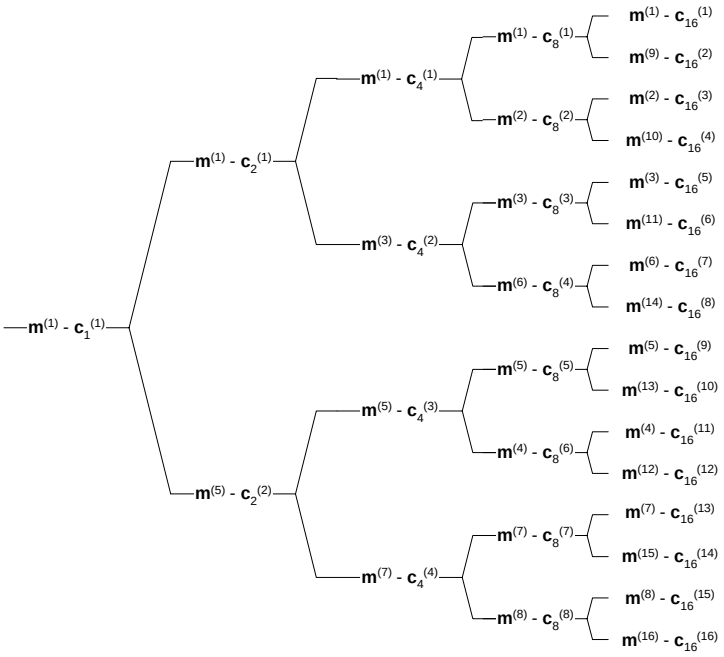


**Figure A-1: Association of Midambles to Spreading Codes for Burst Type 1/3 and $K_{Cell}$ =16**

## A.3.2 Association for Burst Type 1/3 and $K_{Cell}$ =8 Midambles

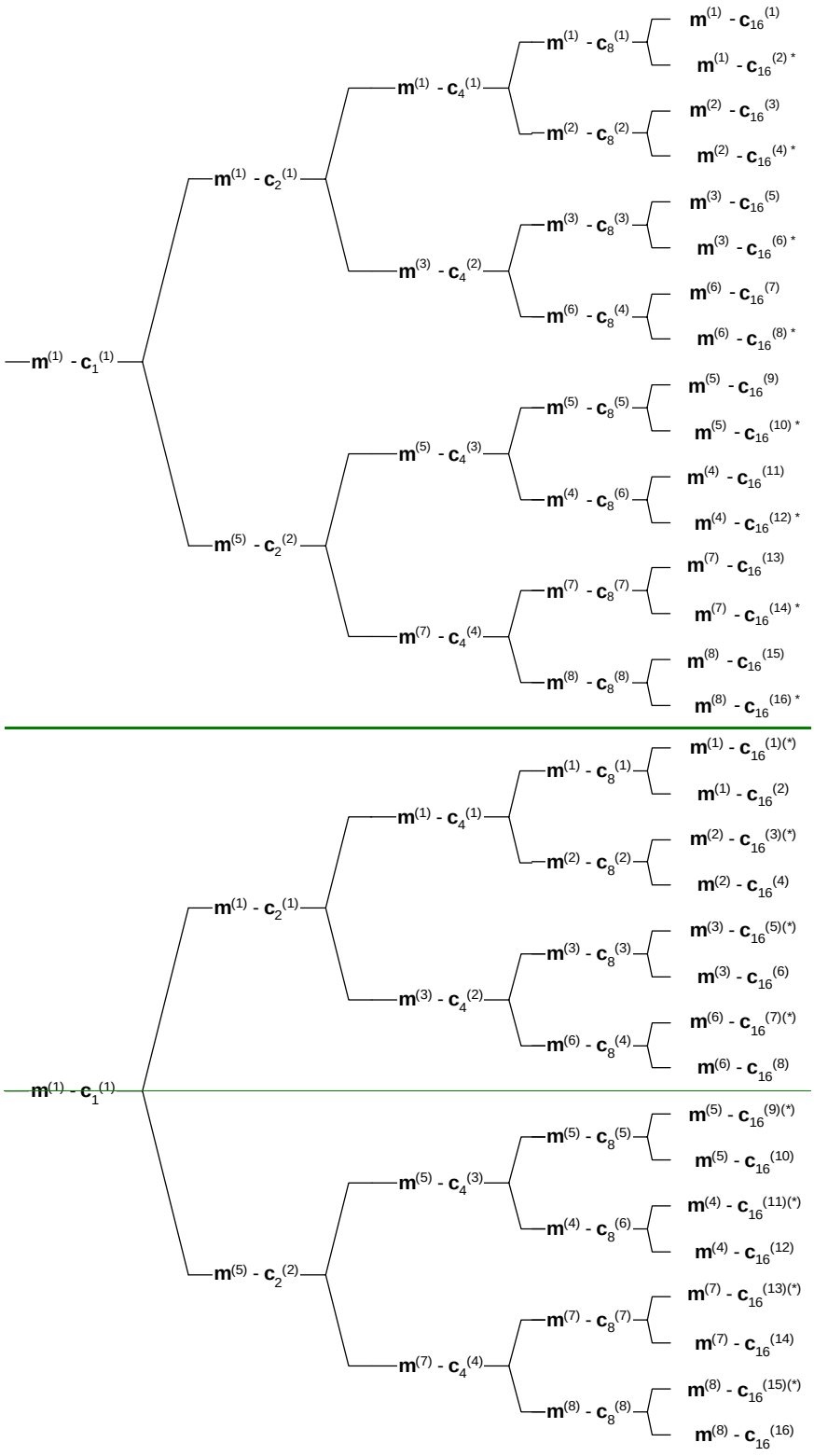


**Figure A-2: Association of Midambles to Spreading Codes for Burst Type 1/3 and $K_{Cell}$ =8**

# A.3.3 Association for Burst Type 1/3 and $K_{Cell}$ =4 Midambles

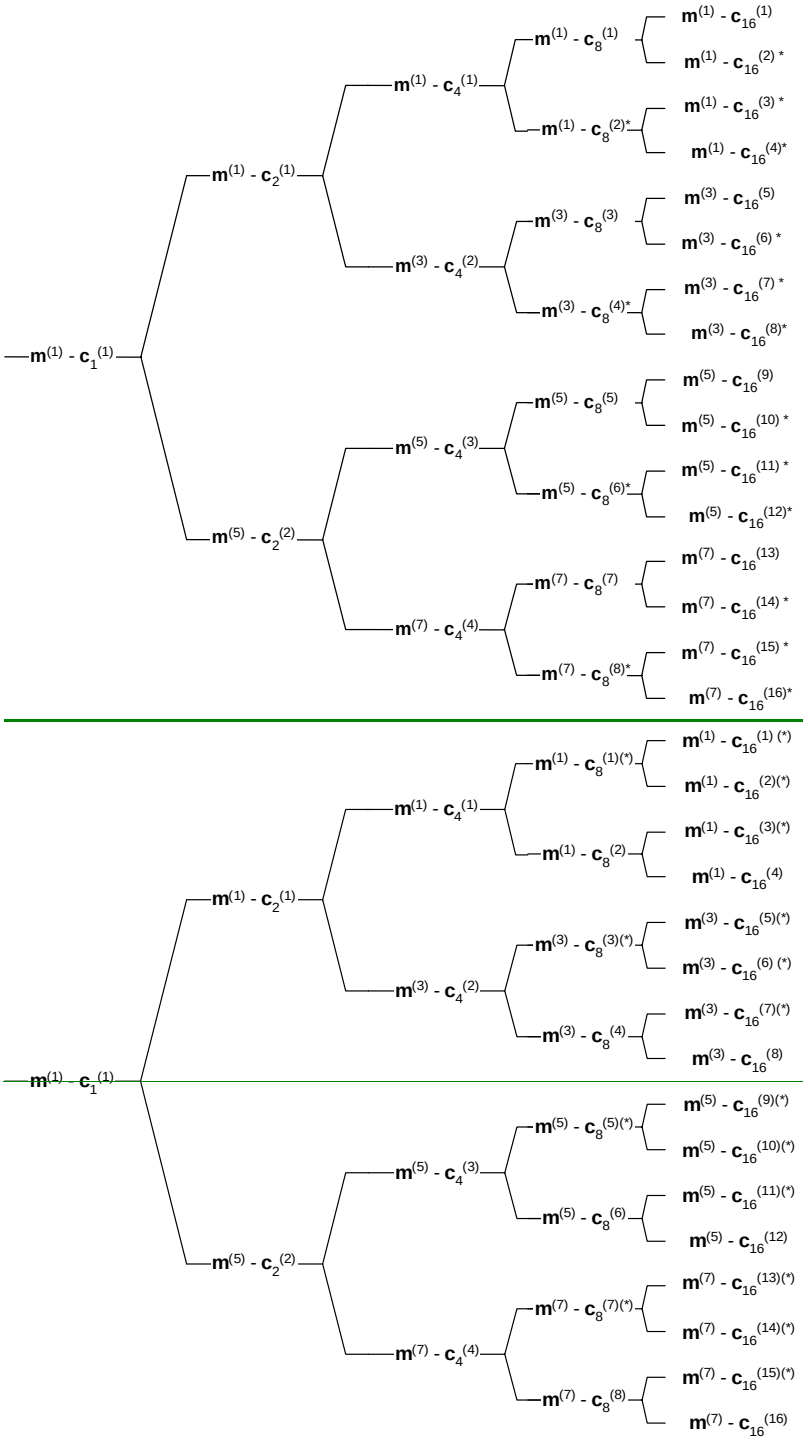


**Figure A-3: Association of Midambles to Spreading Codes for Burst Type 1/3 and $K_{Cell}$ =4**

## A.3.4 Association for Burst Type 2 and $K_{Cell}$ =6 Midambles

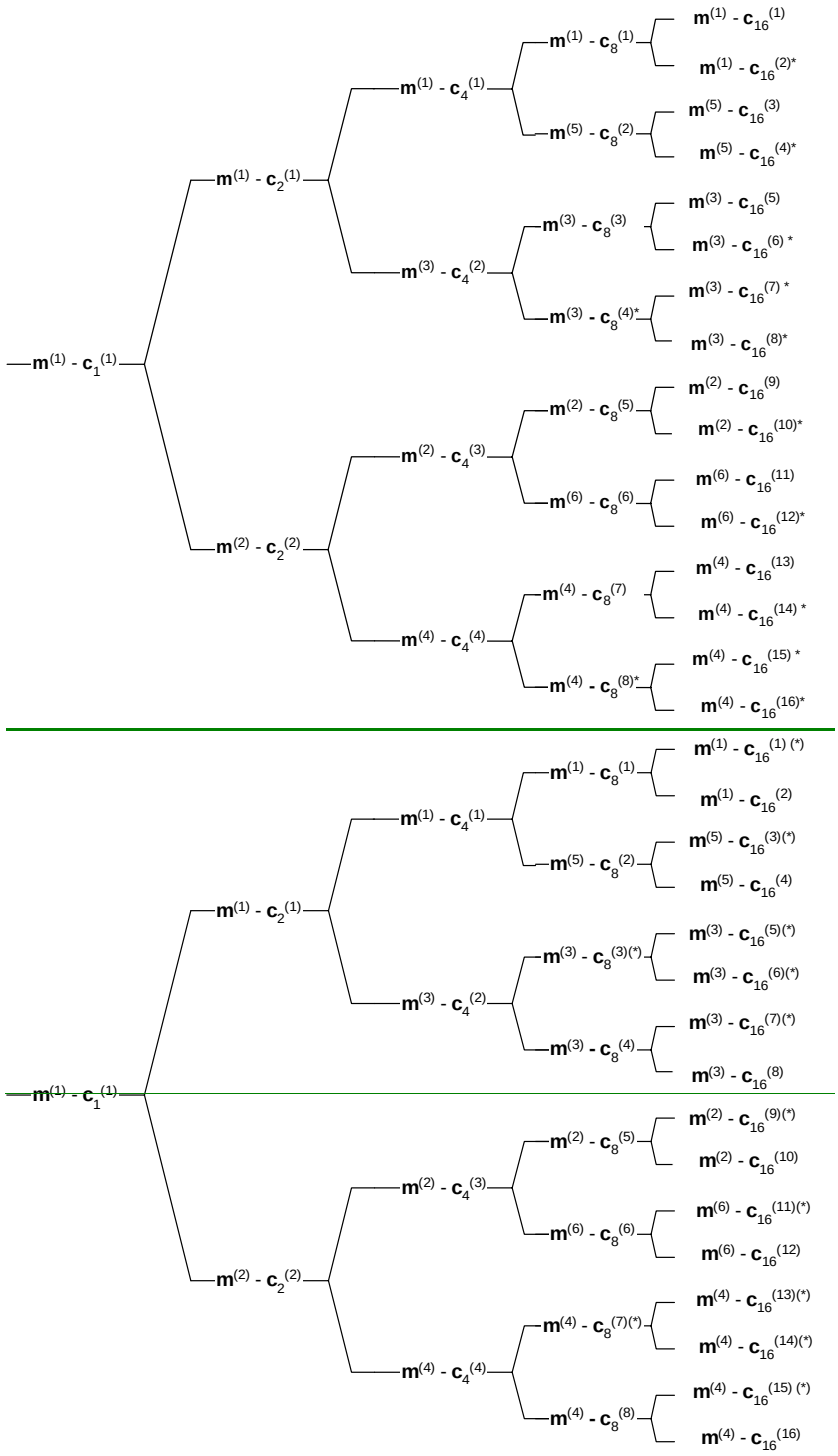


**Figure A-4: Association of Midambles to Spreading Codes for Burst Type 2 and $K_{Cell}$ =6**

## A.3.5 Association for Burst Type 2 and $K_{Cell}$ =3 Midambles

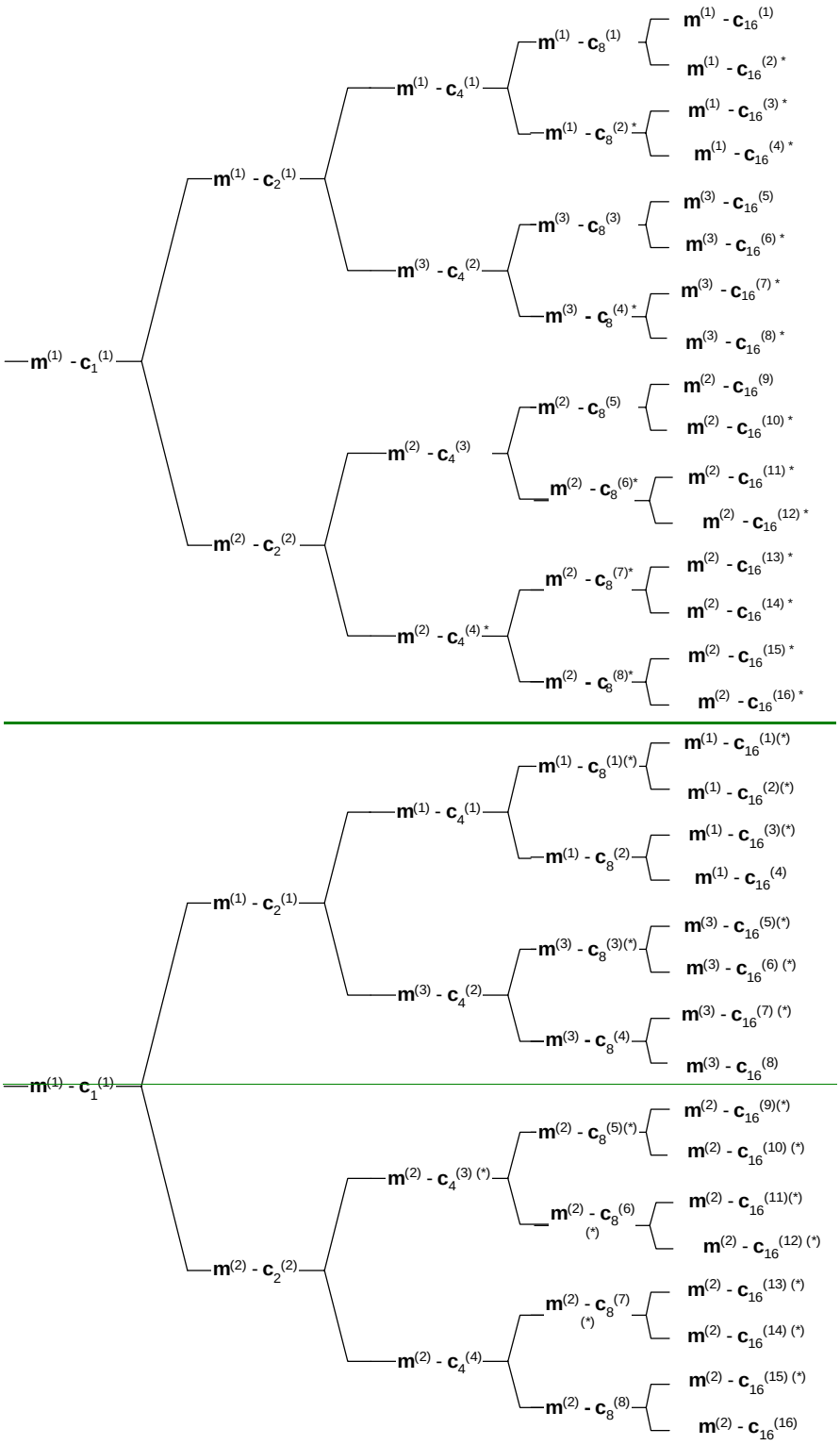


**Figure A-5: Association of Midambles to Spreading Codes for Burst Type 2 and $K_{Cell}$ =3**

Note that the association for burst type 2 can be derived from the association for burst type 1 and 3, using the following table:

| Burst Type 1/3 | m(1) | m(2) | m(3) | m(4) | m(5) | m(6) | m(7) | m(8) |
|---|---|---|---|---|---|---|---|---|
| Burst Type 2 | m(1) | m(5) | m(3) | m(6) | m(2) | m(4) | - | - |