TSG-RAN Meeting #17 ***RP-020559***
Biarritz, France, 3 - 6 September 2002

Title: **Agreed and linked CRs (Rel-4 and Rel-5 category A) on Synchronisation for 1.28 Mcps TDD to TS 25.331 and 25.221**

Source: **TSG-RAN WG2**

Agenda item: **7.2.6**

Doc-1st-	Status-	Spec	CR	Rev	Phase	Subject	Cat	Versio	Vers
R2-022387	agreed	25.331	1660		Rel-4	Corrections to Synchronisation for 1.28 Mcps TDD	F	4.5.0	4.6.0
R2-022388	agreed	25.331	1661		Rel-5	Corrections to Synchronisation for 1.28 Mcps TDD	A	5.1.0	5.2.0
R1-02-0985	agreed	25.221	091	1	Rel-4	Corrections to channelisation code mapping for 1.28 Mcps TDD	F	4.5.0	4.6.0
R1-02-0985	agreed	25.221	092	1	Rel-5	Corrections to channelisation code mapping for 1.28 Mcps TDD	A	5.1.0	5.2.0

CR-Form-v7

CHANGE REQUEST

⌘	25.221	CR	091	⌘ 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 [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Corrections to channelisation code mapping for 1.28 Mcps TDD		
Source:	⌘	TSG-RAN WG2		
Work item code:	⌘	LCRTDD-phys	***Date:*** ⌘	26/06/2002
Category:	⌘	**F**	***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. 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. Also, the channelisation codes used for transmission of TFCI and/or TPC may currently be discarded by the rate matching function. The option to transmit more than one SS/TPC commands per time slot has not been described in detail by now. The rules to distribute the commands have to take into account 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. 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. A description for the option to transmit more than one SS/TPC commands per time slot is added. The distribution of the commands is cycled so that there are

		no uncontrolled UL time slots in static rate matching conditions.
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. An unclear option would remain, that causes implementation problems for the case of multiple L1 controlled time slots. In static rate matching conditions, there may be uncontrolled UL time slots.

Clauses affected:	⌘	6.2.2.1, 6.2.2.2, 6.2.2.3, B.2				
		Y	**N**			
Other specs affected:	⌘		**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.

6.2.2.1 Transmission of TFCI

The traffic burst format provides the possibility for transmission of TFCI in uplink and downlink.

The transmission of TFCI is configured by higher Layers. 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].~~the 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, this means that TFCI code word bits and data bits are subject to the same spreading procedure as depicted in [8]. Hence the midamble structure and length is not changed.

The TFCI code word bits are equally distributed between the two subframes and the respective data fields. The TFCI code word is to be transmitted possibly either directly adjacent to the midamble or after the SS and TPC symbols. Figure 23 shows the position of the TFCI code word in a traffic burst, if neither SS nor TPC are transmitted. Figure 24 shows the position of the TFCI code word in a traffic burst , if SS and TPC are transmitted.

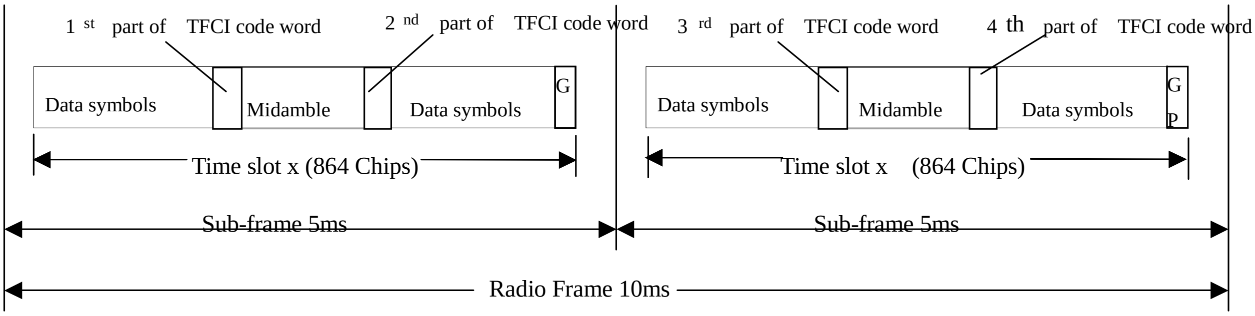


Figure 23: Position of the TFCI code word in the traffic burst in case of no TPC and SS in 1.28 Mcps TDD

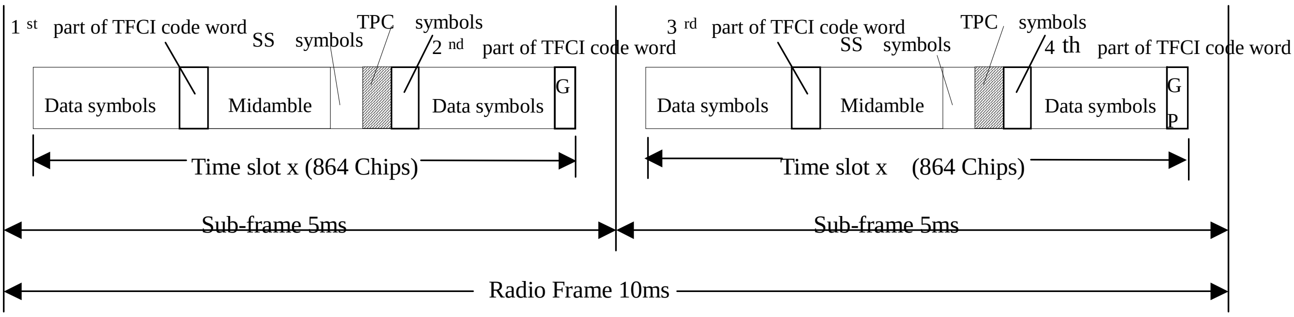


Figure 24:Position of the TFCI code word in the traffic burst in case of TPC and SS in 1.28 Mcps TDD

6.2.2.2 Transmission of TPC

The burst type for dedicated channels provides the possibility for transmission of TPC in uplink and downlink.

The 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 SS information, which is transmitted after the midamble. Figure 25 shows the position of the TPC command in a traffic burst.

For every user the TPC information is to be transmitted at least once per 5ms sub-frame. For each allocated timeslot it is signalled individually whether that timeslot carries TPC information or not. If applied in a timeslot, transmission of TPC symbols is done in the data parts of the traffic burst and they~~it~~ ~~can be~~are 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].~~the first allocated channelisation code and the first~~

~~allocated timeslot (according to the order in the higher layer allocation message). Other allocations (more than one TPC transmission in one sub-frame) of TPC are also possible.~~

TPC symbols may also be transmitted on more than one physical channel in a time slot. For this purpose, higher layers allocate an additional number of N_{TPC} physical channels, individually for each time slot. The TPC symbols shall then be transmitted using the physical channels with the $N_{TPC}+1$ lowest physical channel sequence numbers (p) in that time slot. Physical channel sequence numbering is determined by the rate matching function and is described in [7]. If the rate matching function results in $N_{RM} < N_{TPC}+1$ remaining physical channels in this time slot, TPC symbols shall be transmitted only on the N_{RM} remaining physical channels.

The TPC symbols are~~is~~ spread with the same spreading factor (SF) and spreading code as the data parts of the respective physical channel.

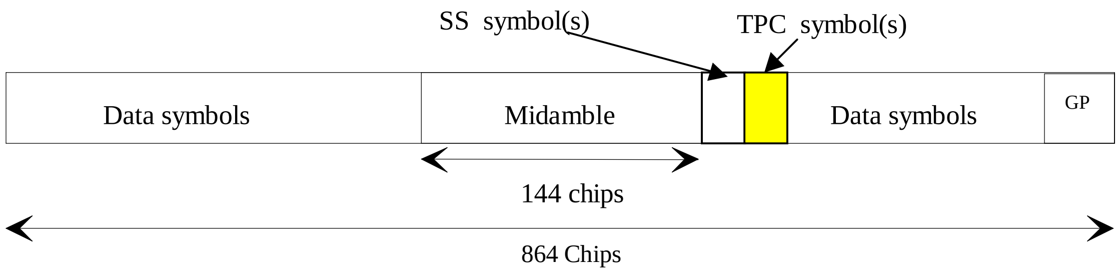


Figure 25: Position of TPC information in the traffic burst in downlink and uplink

For the number of ~~layer 1~~TPC symbols per time slot~~channelisation code~~ there are 3 possibilities~~ for each channelisation code~~, that can be configured by higher layers individually for each timeslot:

1) ~~one SS and~~ one TPC symbol

2) ~~no SS and~~ no TPC symbols

3) ~~16/SF SS and~~ 16/SF TPC symbols

So, in case 3), when SF=1, there are 16 TPC symbols which correspond to 32 bits (for QPSK) and 48 bits (for 8PSK).

In the following the uplink is described only. For the description of the downlink, downlink (DL) and uplink (UL) have to be interchanged.

Each of the TPC symbols for uplink power control in the DL will be associated with an UL time slot and an UL CCTrCH pair. This association varies with

- the number of allocated UL time slots and UL CCTrCHs on these time slots (time slot and CCTrCH pair) and

- the allocated TPC symbols in the DL.

In case a UE has

- more than one channelisation code

and/or

- channelisation codes being of lower spreading factor than 16 and using 16/SF SS and 16/SF TPC symbols,

the TPC commands for each ULtime slot CCTrCH pair (all channelisation codes on that time slot belonging to the same time slot and CCTrCH pair have the same TPC command) will be distributed to the following rules:

1. The ULtime slots and CCTrCH pairs the TPC commands are intended for will be numbered from the first to the last ULtime slot and CCTrCH pair allocated to the regarded UE (starting with 0). The number of a time slot and CCTrCH pair is smaller then the number of another time slot and CCTrCH pair within the same time slot if its spreading code with the lowest SC number according to the following table has a lower SC number then the spreading code with the lowest SC number of the other time slot and CCTrCH pair.

2. The commanding TPC symbols on all DL CCTrCHs allocated to one UE are numbered consecutively starting with zero according to the following rules:

    a) The numbers of the TPC commands of a regarded DL time slot are lower than those of DL time slots being transmitted after that time slot

    b) Within a DL time slot the numbers of the TPC commands of a regarded channelisation code are lower than those of channelisation codes having a higher spreading code number

    The spreading code number is defined by the following table (see[8]):

SC number	SF (Q)	Walsh code number (k)
0	16	$\mathbf{c}_{Q=16}^{(k=1)}$
	...	
15	16	$\mathbf{c}_{Q=16}^{(k=16)}$
16	8	$\mathbf{c}_{Q=8}^{(k=1)}$
	…	
23	8	$\mathbf{c}_{Q=8}^{(k=8)}$
24	4	$\mathbf{c}_{Q=4}^{(k=1)}$
	…	
27	4	$\mathbf{c}_{Q=4}^{(k=4)}$
28	2	$\mathbf{c}_{Q=2}^{(k=1)}$
29	2	$\mathbf{c}_{Q=2}^{(k=2)}$
30	1	$\mathbf{c}_{Q=1}^{(k=1)}$

Note: Spreading factors 2-8 are not used in DL

    c) Within a channelisation code numbers of the TPC commands are lower than those of TPC commands being transmitted after that time

The following equation is used to determine the UL time slot which is controlled by the regarded TPC symbol in the DL:

$$UL_{pos} = (SFN' \cdot N_{UL\_TPCsymbols} + TPC_{DLpos}) \bmod (N_{ULslot})$$

$$UL_{pos} = \left(SFN' \cdot N_{UL\_TPCsymbols} + TPC_{DLpos} + \left(\left(SFN' \cdot N_{UL\_TPCsymbols} + TPC_{DLpos}\right) \operatorname{div} \left(N_{ULslot}\right)\right)\right) \bmod \left(N_{ULslot}\right),$$

where

UL_{pos} is the number of the controlled uplink time slot and CCTrCH pairs.

SFN’ is the system frame number counting the sub-frames. The system frame number of the radio frames (SFN) can be derived from SFN’ by

SFN=SFN’ div 2, where div is the remainder free division operation.

$N_{UL\_PCsymbols}$ is the number of UL TPC symbols in a sub-frame.

TPC_{DLpos} is the number of the regarded UL TPC symbol in the DL within the sub-frame.

N_{ULslot} is the number of UL slots and CCTrCH pairs in a frame.

When one of the above parameters is changed due to higher layer reconfiguration, the new relationship between TPC symbols and controlled UL time slots shall be valid, beginning with the radio frame, for which the new parameters are set.

In Annex G two examples of the association of TPC commands to time slots and CCTrCH pairs are shown.

Coding of TPC:

The relationship between the TPC Bits and the transmitter power control command for QPSK is the same as in the 3.84Mcps TDD cf. [5.2.2.5 'Transmission of TPC'].

The relationship between the TPC Bits and the transmitter power control command for 8PSK is given in table 11

Table 11: TPC Bit Pattern for 8PSK

TPC Bits	TPC command	Meaning
000	'Down'	Decrease Tx Power
110	'Up'	Increase Tx Power

6.2.2.3 Transmission of SS

The burst type for dedicated channels provides the possibility for transmission of uplink synchronisation control (ULSC).

The transmission of ULSC is done in the data parts of the traffic burst. Hence the midamble structure and length is not changed. The ULSC information is to be transmitted directly after the midamble. Figure 26 shows the position of the SS command in a traffic burst.

For every user the ULSC information shall be transmitted at least once per transmitted sub-frame. ~~By default the following rules apply:~~

1. ~~If a TFCI is applied for a CCTrCH, the SS command(s) shall be transmitted using the same channelisation code and the same timeslots as the TFCI.~~

2. ~~If no TFCI is applied for a CCTrCH, the SS command(s) shall be transmitted using the first allocated channelisation code and the first allocated timeslot, according to the order in the higher layer allocation message.~~

~~Apart from the default rules other allocations of SS commands are possible according higher layer signalling – e.g. the transmission of more then one SS command (on more than one time slot).~~

For each allocated timeslot it is signalled individually whether that timeslot carries ULSC information or not. If applied in a time slot, transmission of SS symbols is done in the data parts of the traffic burst and they are 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].

SS symbols may also be transmitted on more than one physical channel in a time slot. For this purpose, higher layers allocate an additional number of N_{SS} physical channels, individually for each time slot. The SS symbols shall then be transmitted using the physical channels with the N_{SS}+1 lowest physical channel sequence numbers (*p*) in that time slot. Physical channel sequence numbering is determined by the rate matching function and is described in [7]. If the rate matching function results in $N_{RM} < N_{SS}+1$ remaining physical channels in this time slot, SS symbols shall be transmitted only on the N_{RM} remaining physical channels.

The SS symbols~~command~~ are~~is~~ spread with the same spreading factor (SF) and spreading code as the data parts of the respective physical channel.

The SS is utilised to command a timing adjustment by (k/8) Tc each M sub-frames, where Tc is the chip period. The k and M values are signalled by the network. The SS, as one of L1 signals, is to be transmitted once per 5ms sub-frame.

M (1-8) and k (1-8) can be adjusted during call setup or readjusted during the call.

Note: The smallest step for the SS signalled by the UTRAN is 1/8 Tc. For the UE capabilities regarding the SS adjustment of the UE it is suggested to set the tolerance for the executed command to be [1/9;1/7] Tc.

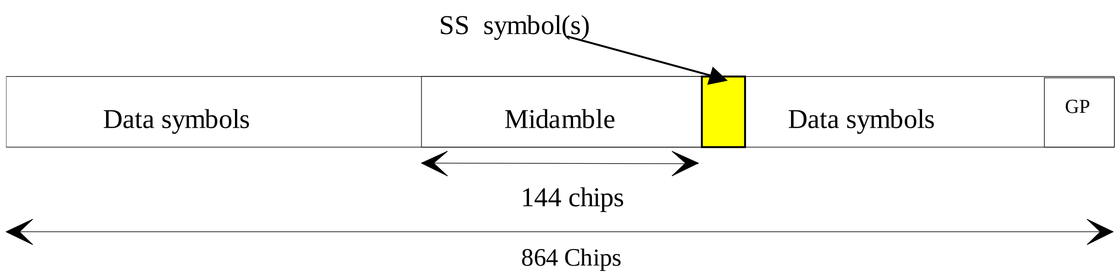


Figure 26: Position of ULSC information in the traffic burst (downlink and uplink)

Note that for the uplink where there is no SS symbol used, the SS symbol space is reserved for future use. This can keep UL and DL slots the same structure.

For the number of ~~layer 1~~ SS symbols per time slot there are 3 possibilities, that can be configured by higher layers individually for each time slot ~~configurable for each channelisation code during the call setup~~:

- one SS symbol
- no SS symbol
- 16/SF SS symbols

So, in case 3, when SF=1, there are 16 SS symbols which correspond to 32 bits (for QPSK) and 48 bits (for 8PSK).

Each of the SS symbols in the DL will be associated with an UL time slot depending on the allocated UL time slots and the allocated SS symbols in the DL.

Note: Even though the different time slots of the UE are controlled with independent SS commands, the UE is not in need to execute SS commands leading to a deviation of more than [3] chip with respect to the average timing advance applied by the UE.

The synchronisation shift commands for each UL time slot (all channelisation codes on that time slot have the same SS command) will be distributed to the following rules:

1. The UL time slots the SS commands are intended for will be numbered from the first to the last UL time slot occupied by the regarded UE (starting with 0) considering all CCTrCHs allocated to that UE.
2. The commanding SS symbols on all downlink CCTrCHs allocated to one UE are numbered consecutively starting with zero according to the following rules:
   a) The numbers of the SS commands of a regarded DL time slot are lower than those of DL time slots being transmitted after that time slot
   b) Within a DL time slot the numbers of the SS commands of a regarded channelisation code are lower than those of channelisation codes having a bigger spreading code number

   The spreading code number is defined by the following table: (see TS 25.223)

Spreading code number	SF (Q)	Walsh code number (k)
0	16	$\mathbf{c}_{Q=16}^{(k=1)}$
	...	
15	16	$\mathbf{c}_{Q=16}^{(k=16)}$
	Spreading factors 2-8 are nor used in DL	
30	1	$\mathbf{c}_{Q=1}^{(k=1)}$

c) Within a channelisation code numbers of the SS commands are lower than those of SS commands being transmitted after that time

The following equation is used to determine the UL time slot which is controlled by the regarded SS symbol:

$$UL_{pos} = (SFN' \cdot N_{SSsymbols} + SS_{pos}) \bmod (N_{ULslot})$$

$$UL_{pos} = \left(SFN' \cdot N_{SSsymbols} + SS_{pos} + \left(\left(SFN' \cdot N_{SSsymbols} + SS_{pos}\right) \operatorname{div}\left(N_{ULslot}\right)\right)\right) \bmod \left(N_{ULslot}\right),$$

where

UL_{pos} is the number of the controlled uplink time slot.

SFN' is the system frame number counting the sub-frames. The system frame number of the radio frames (SFN) can be derived from SFN' by

SFN=SFN' div 2, where div is the remainder free division operation.

$N_{SSsymbols}$ is the number of SS symbols in a frame.

SS_{pos} is the number of the regarded SS symbol within the sub-frame.

N_{ULslot} is the number of UL slots in a frame.

When one of the above parameters is changed due to higher layer reconfiguration, the new relationship between SS symbols and controlled UL time slots shall be valid, beginning with the radio frame, for which the new parameters are set.

The relationship between the SS Bits and the SS command for QPSK is the given in table 12:

Table 12: Coding of the SS for QPSK

SS Bits	SS command	Meaning
00	'Down'	Decrease synchronisation shift by k/8 Tc
11	'Up'	Increase synchronisation shift by k/8 Tc
01	'Do nothing'	No change

The relationship between the SS Bits and the SS command for 8PSK is given in table 13:

Table 13: Coding of the SS for 8PSK

SS Bits	SS command	Meaning
000	'Down'	Decrease synchronisation shift by k/8 Tc
110	'Up'	Increase synchronisation shift by k/8 Tc
011	'Do nothing'	No change

B.2 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 (*). These associations apply for both UL and DL.

B.2.1 Association for K=16 Midambles

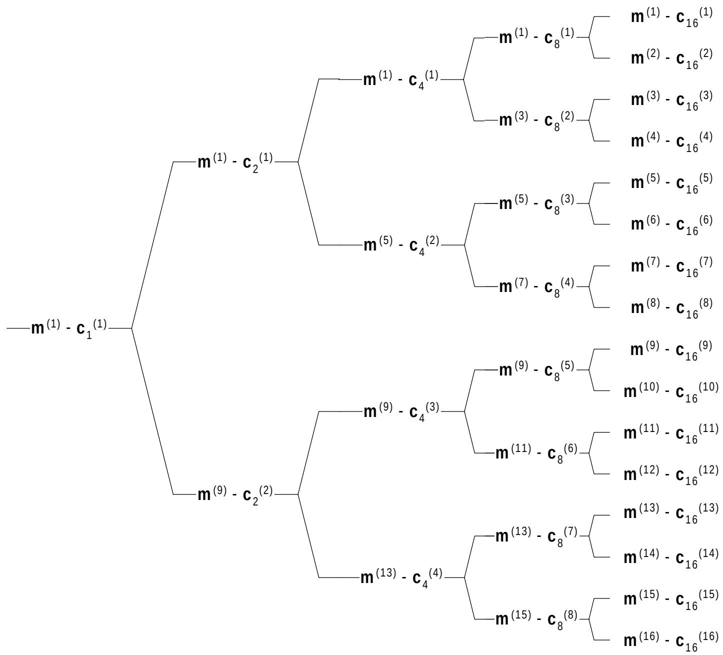


Figure B.2.1: Association of Midambles to Spreading Codes for K=16

B.2.2 Association for K=14 Midambles

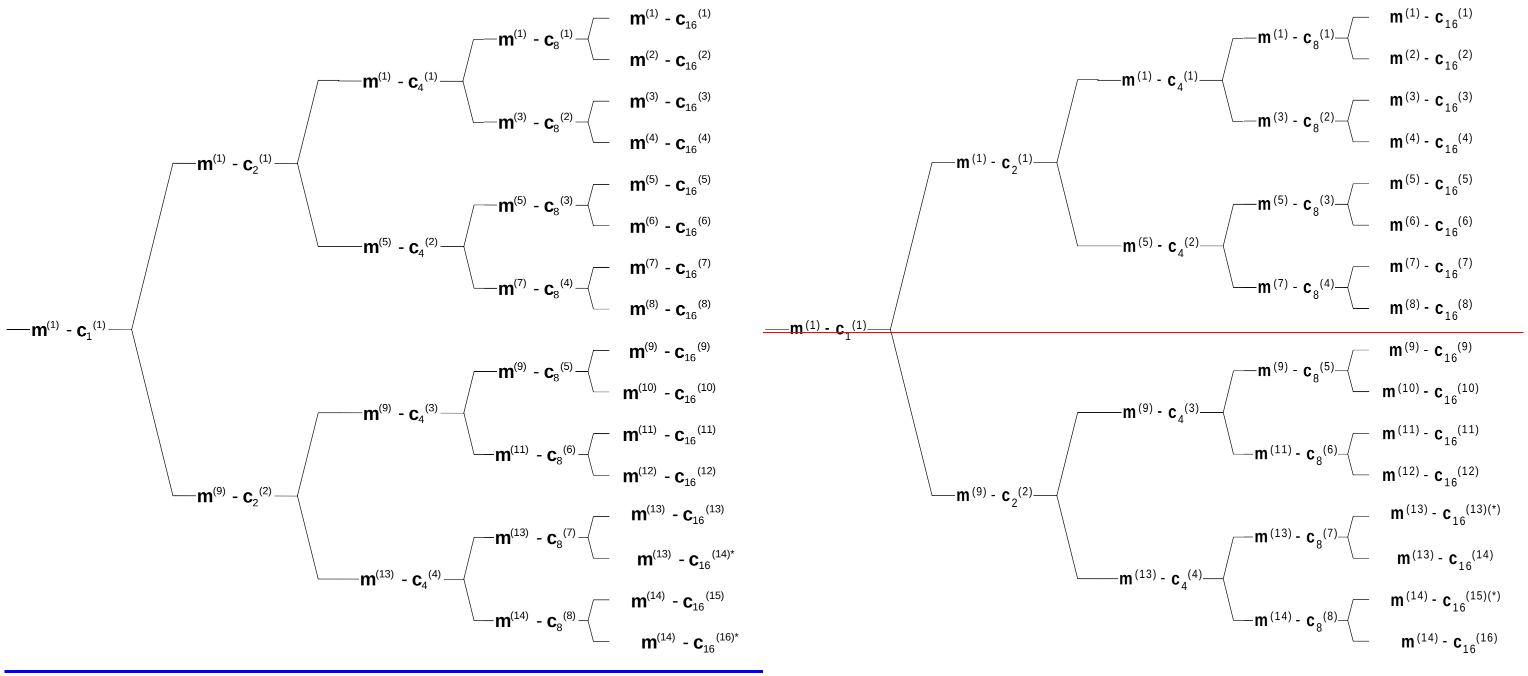
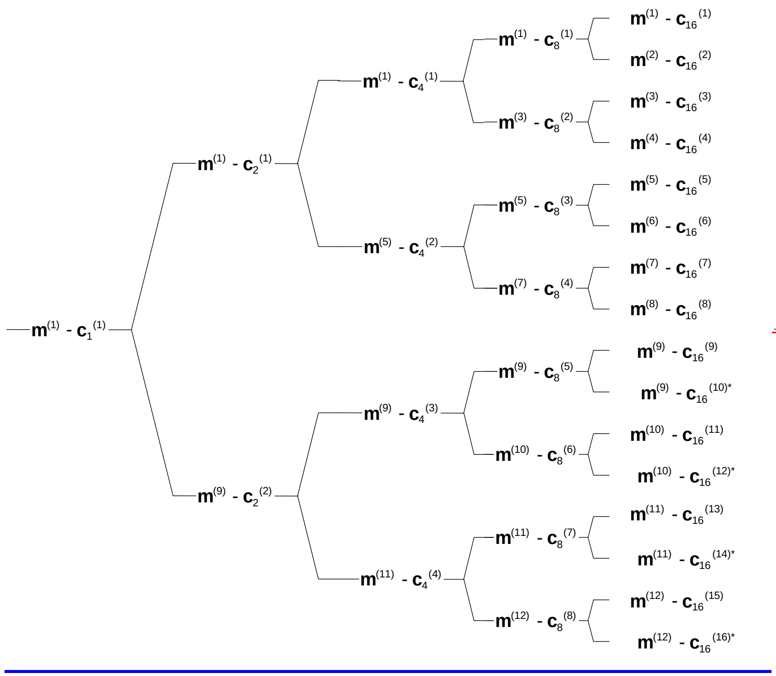


Figure B.2.2: Association of Midambles to Spreading Codes for K=14

B.2.3 Association for K=12 Midambles



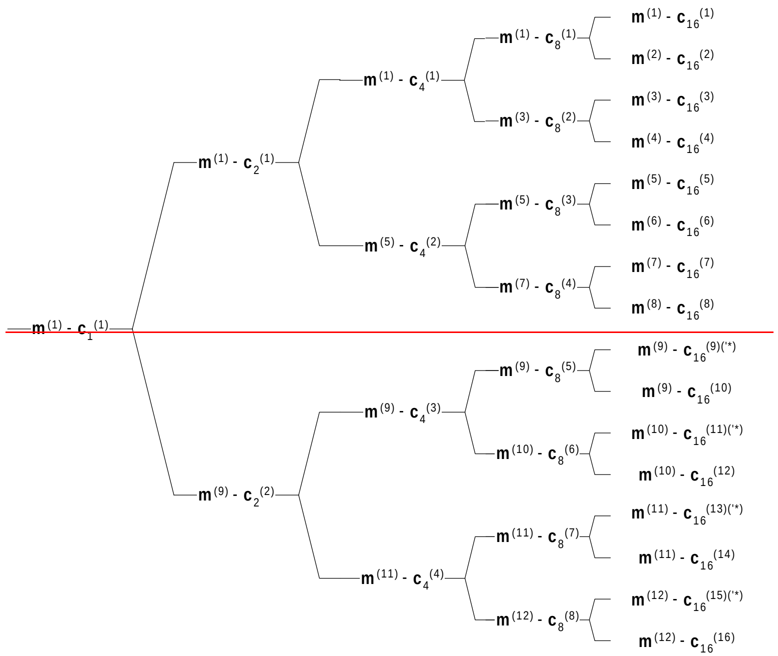


Figure B.2.3: Association of Midambles to Spreading Codes for K=12

B.2.4 Association for K=10 Midambles

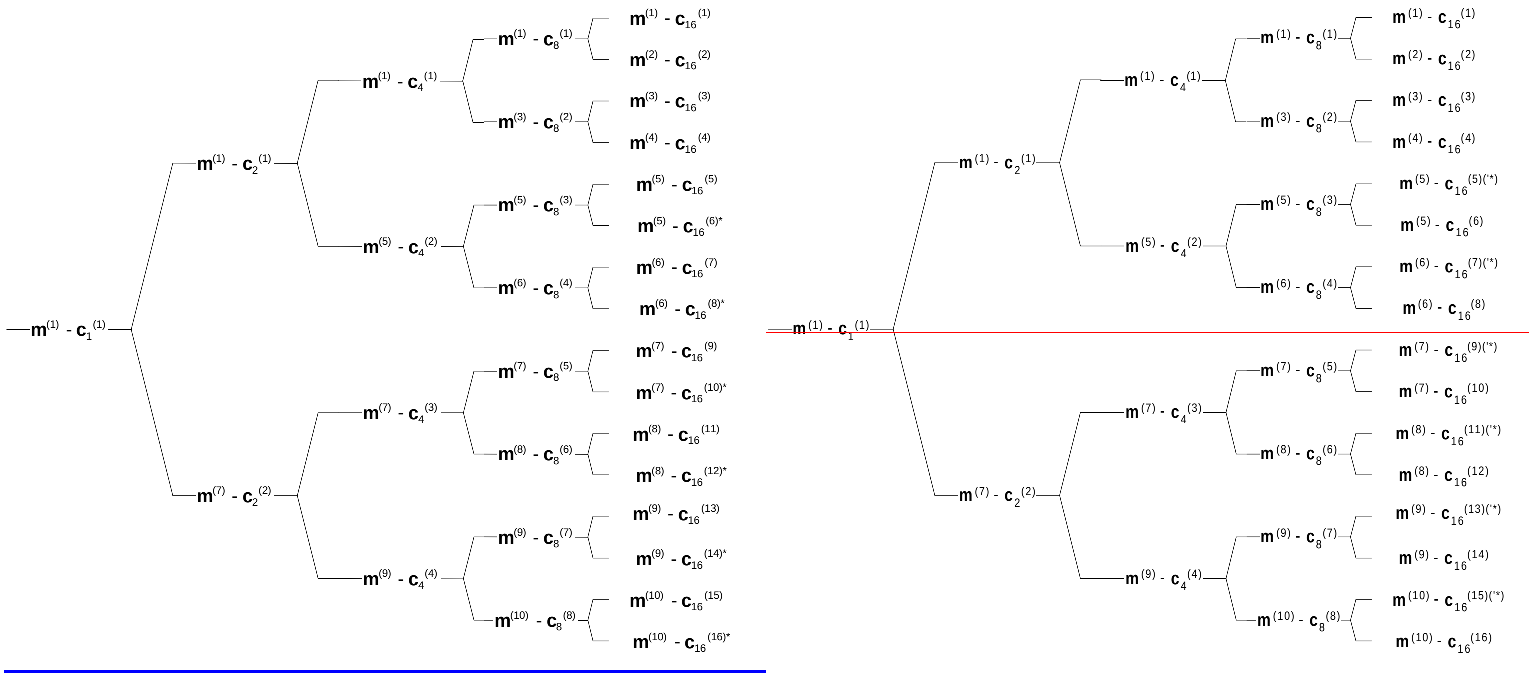


Figure B.2.4: Association of Midambles to Spreading Codes for K=10

B.2.5 Association for K=8 Midambles

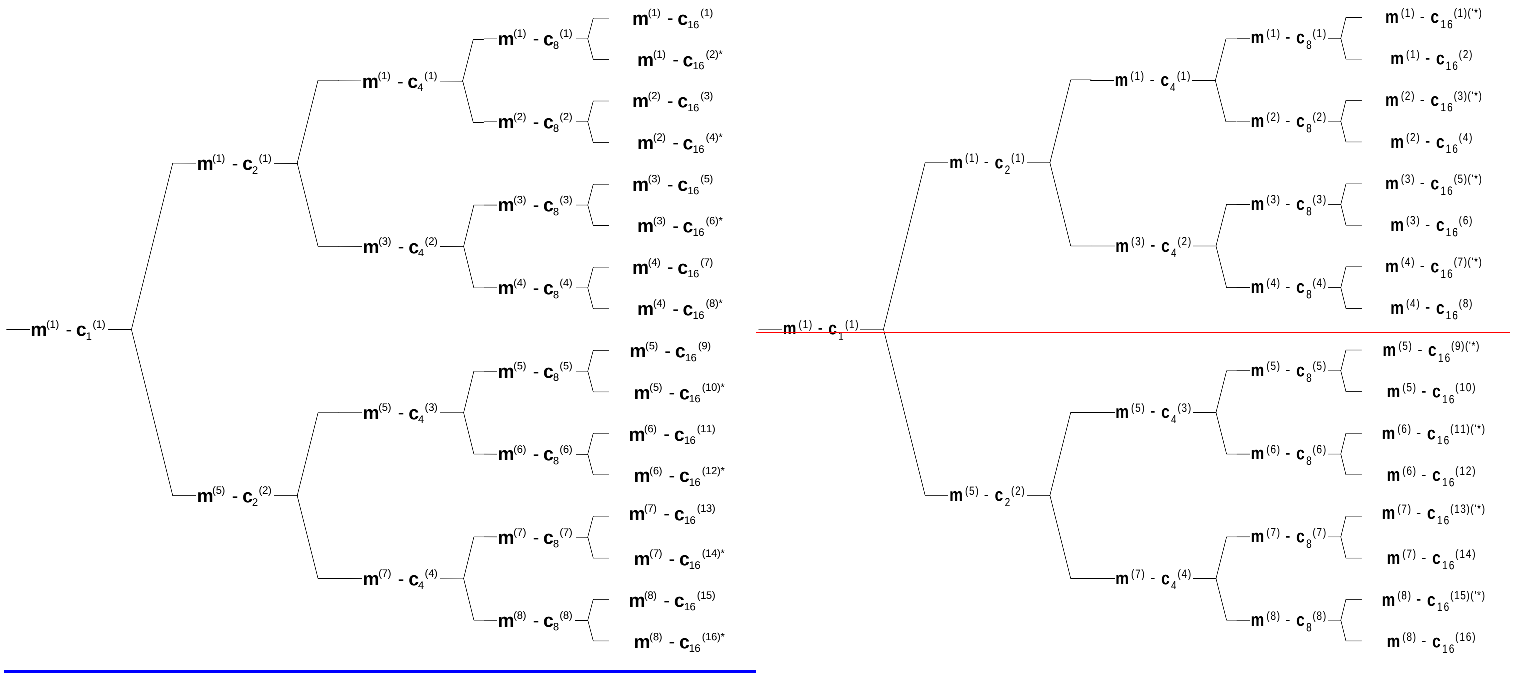


Figure B.2.5: Association of Midambles to Spreading Codes for K=8

B.2.6 Association for K=6 Midambles

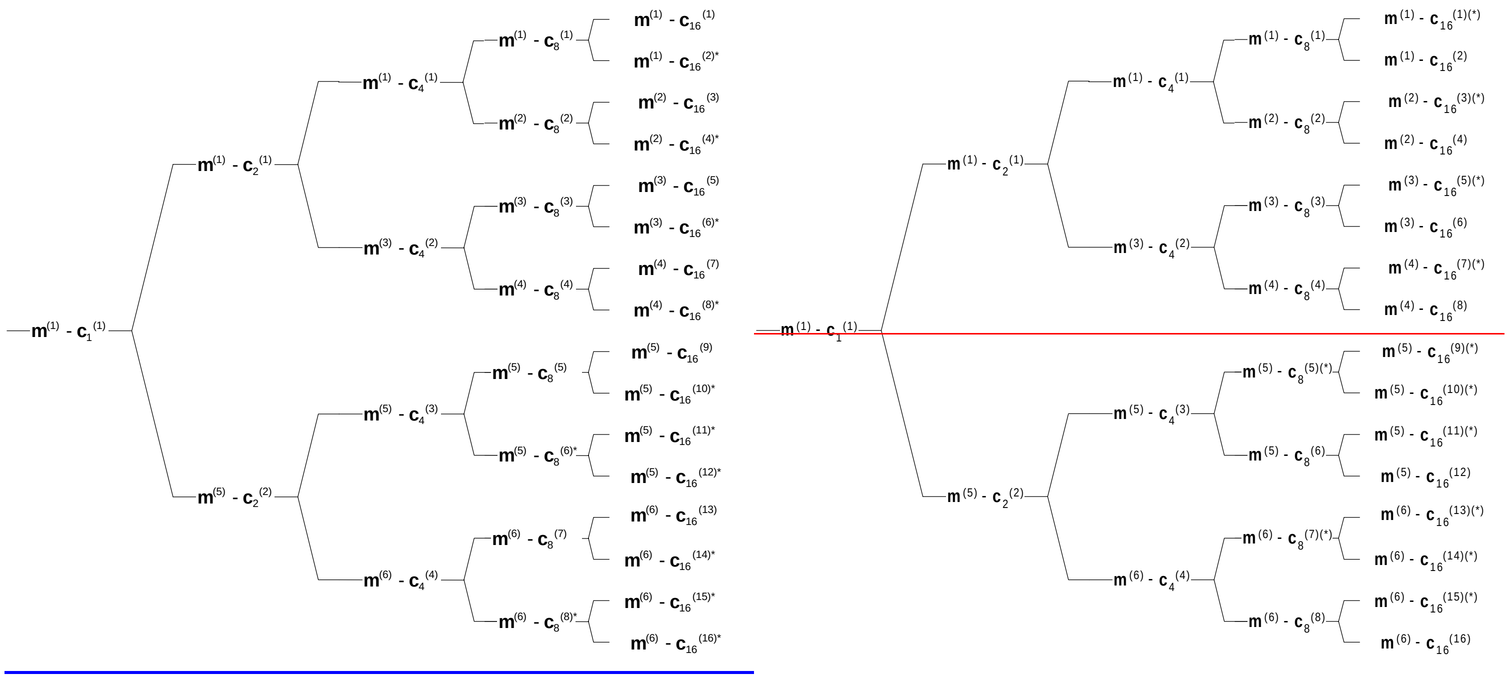


Figure B.2.6: Association of Midambles to Spreading Codes for K=6

B.2.7 Association for K=4 Midambles

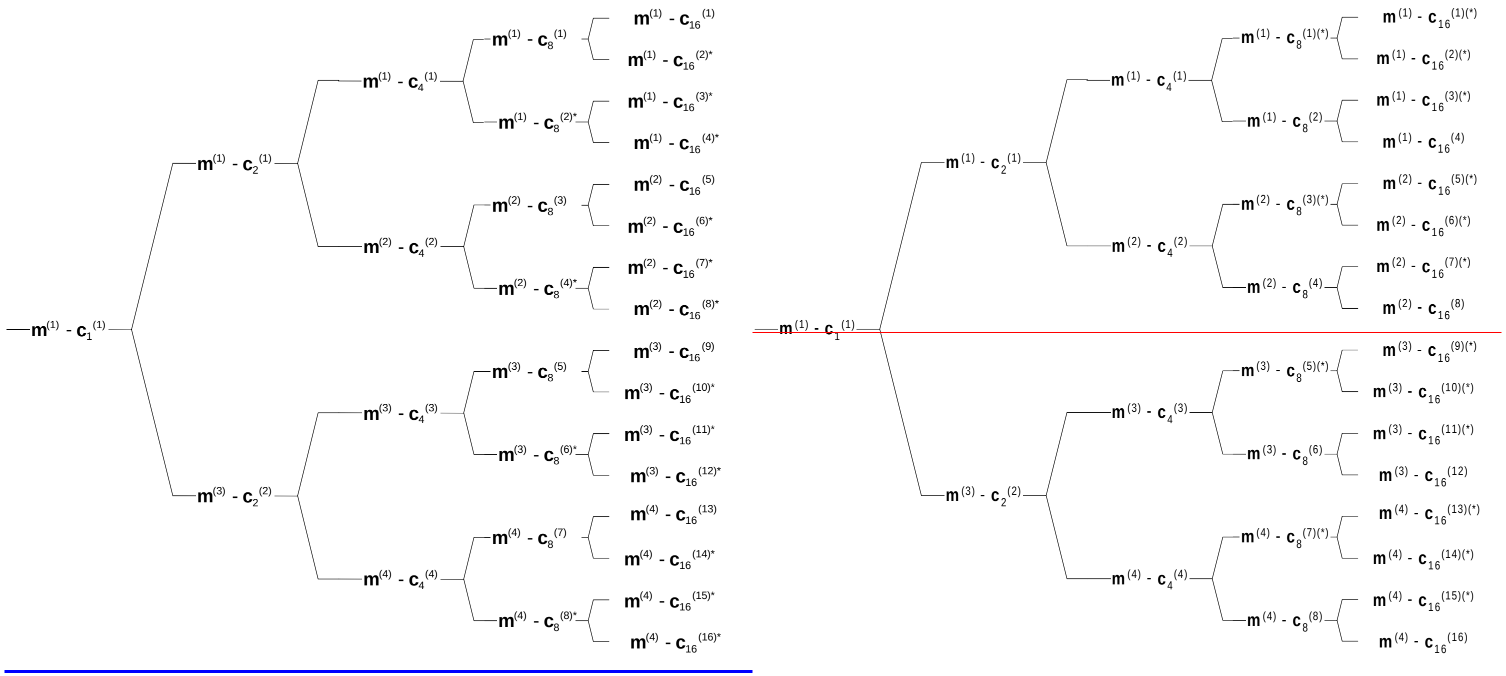


Figure B.2.7: Association of Midambles to Spreading Codes for K=4

B.2.8 Association for K=2 Midambles

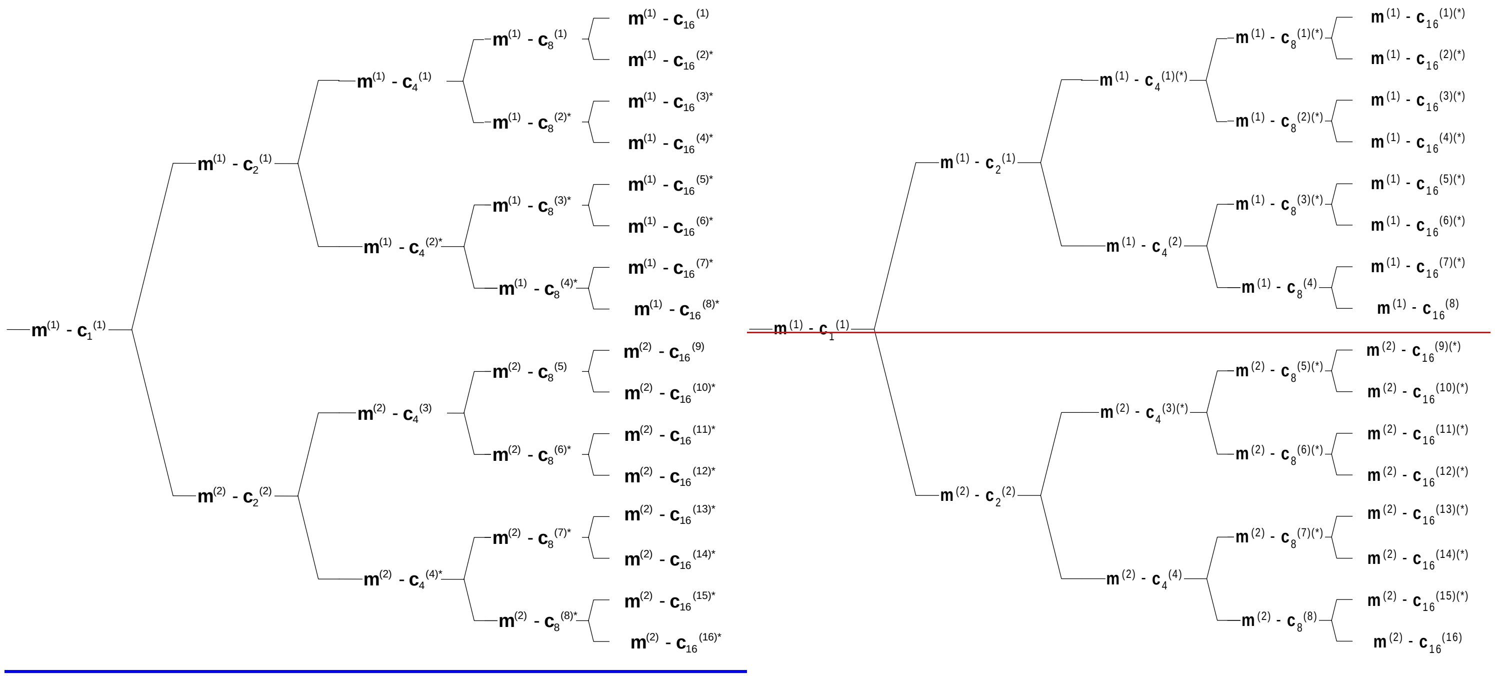


Figure B.2.8: Association of Midambles to Spreading Codes for K=2

Annex G (informative): Examples of the association of ~~DL~~ UL TPC commands to UL uplink time slots for 1.28 Mcps TDD

In the following two examples of the association of UL TPC commands to UL time slots and CCTrCHs are shown (see 6.2.2.2):

Table G.1 Two examples of the association of ~~DL~~ UL TPC commands to UL uplink time slots with NULslot=3

Case 1: $N_{UL\_TPCsymbols}$=2; Case 2: $N_{UL\_TPCsymbols}$=4

Sub-Frame Number	Case 1 (2 UL TPC symbols)		The order of the served UL time slot and CCTrCH pairs (UL time slot and CCTrCH number)	Case 2 (4 UL TPC symbols)	
	The order of UL TPC symbols			The order of UL TPC symbols	
SFN'=0	(1st UL_{pos}=0)	0	0 (TS3)	0	(1st UL_{pos}=0)
		1	1 (TS4)	1	
			2 (TS5)	2	
			0 (TS3)	3	
SFN'=1	(1st UL_{pos}=2)	0	0 (TS3)	0	(1st UL_{pos}=1)
		1	1 (TS4)	1	
			2 (TS5)	2	
			0 (TS3)	3	
			1 (TS4)		
SFN'=2	(1st UL_{pos}=1)	0	0 (TS3)	0	(1st UL_{pos}=2)
		1	1 (TS4)	1	
			2 (TS5)	2	
			0 (TS3)	3	
			1 (TS4)		
			2 (TS5)		
. . .	. . .		. . .	. . .	

Annex H (informative):
Examples of the association of ~~DL~~ UL SS commands to UL uplink time slots

In the following two examples of the association of ~~DL~~ UL SS commands to UL uplink time slots are shown (see 6.2.2.3):

Table H.1 Two examples of the association of ~~DL~~ UL SS commands to UL uplink time slots with N_{ULslot}=3

Case 1: $N_{SSsymbols}$=2; Case 2: $N_{SSsymbols}$=4

Sub-Frame Number	Case 1 (2 ~~DL~~ UL SS symbols)		The order of the served UL time slot (UL time slot number)	Case 2 (4 ~~DL~~ UL SS symbols)	
	The order of ~~DL~~ UL SS symbols			The order of ~~DL~~ UL SS symbols	
SFN'=0	(1st UL_{pos}=0)	0	0 (TS3)	0	(1st UL_{pos}=0)
		1	1 (TS4)	1	
			2 (TS5)	2	
			0 (TS3)	3	
SFN'=1	(1st UL_{pos}=2)	0	0 (TS3)	0	(1st UL_{pos}=1)
		1	1 (TS4)	1	
			2 (TS5)	2	
			0 (TS3)	3	
			1 (TS4)		
SFN'=2	(1st UL_{pos}=1)	0	0 (TS3)	0	(1st UL_{pos}=2)
		1	1 (TS4)	1	
			2 (TS5)	2	
			0 (TS3)	3	
			1 (TS4)		
			2 (TS5)		
. . .	. . .		. . .	. . .	

3GPP TSG-RAN WG1 Meeting #28
Seattle, USA, 19-22 August 2002

Tdoc ⌘R1-02-0985

CR-Form-v7

CHANGE REQUEST

⌘ 25.221	CR 092	⌘ 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 [X]	Radio Access Network [X]	Core Network [ ]

Title: ⌘	Corrections to channelisation code mapping for 1.28 Mcps TDD		
Source: ⌘	Siemens AG		
Work item code: ⌘	LCRTDD-phys	***Date:*** ⌘	26/06/2002
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. 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. Also, the channelisation codes used for transmission of TFCI and/or TPC may currently be discarded by the rate matching function. The option to transmit more than one SS/TPC commands per time slot has not been described in detail by now. The rules to distribute the commands have to take into account 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. 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. A description for the option to transmit more than one SS/TPC commands per time slot is added. The distribution of the commands is cycled so that there are

		no uncontrolled UL time slots in static rate matching conditions.
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. An unclear option would remain, that causes implementation problems for the case of multiple L1 controlled time slots. In static rate matching conditions, there may be uncontrolled UL time slots.

Clauses affected:	⌘	6.2.2.1, 6.2.2.2, 6.2.2.3, B.2				
		Y	**N**			
Other specs affected:	⌘		**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.

6.2.2.1 Transmission of TFCI

The traffic burst format provides the possibility for transmission of TFCI in uplink and downlink.

The transmission of TFCI is configured by higher Layers. 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].~~the 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, this means that TFCI code word bits and data bits are subject to the same spreading procedure as depicted in [8]. Hence the midamble structure and length is not changed.

The TFCI code word bits are equally distributed between the two subframes and the respective data fields. The TFCI code word is to be transmitted possibly either directly adjacent to the midamble or after the SS and TPC symbols. Figure 23 shows the position of the TFCI code word in a traffic burst, if neither SS nor TPC are transmitted. Figure 24 shows the position of the TFCI code word in a traffic burst , if SS and TPC are transmitted.

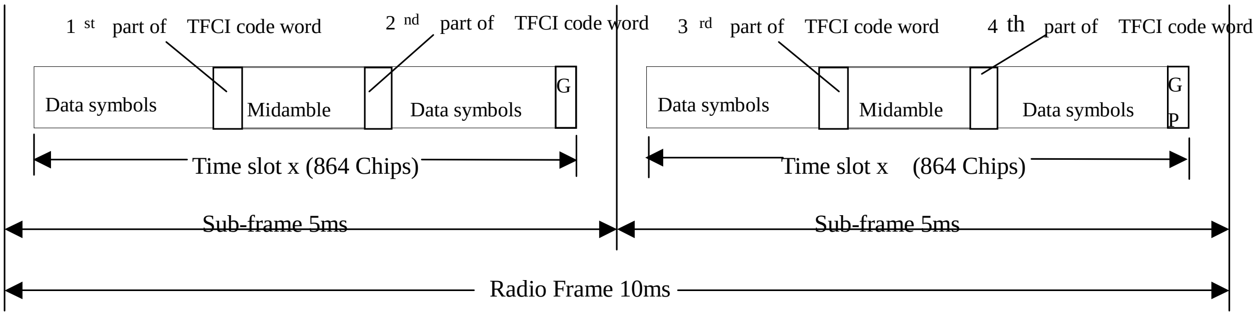


Figure 23: Position of the TFCI code word in the traffic burst in case of no TPC and SS in 1.28 Mcps TDD

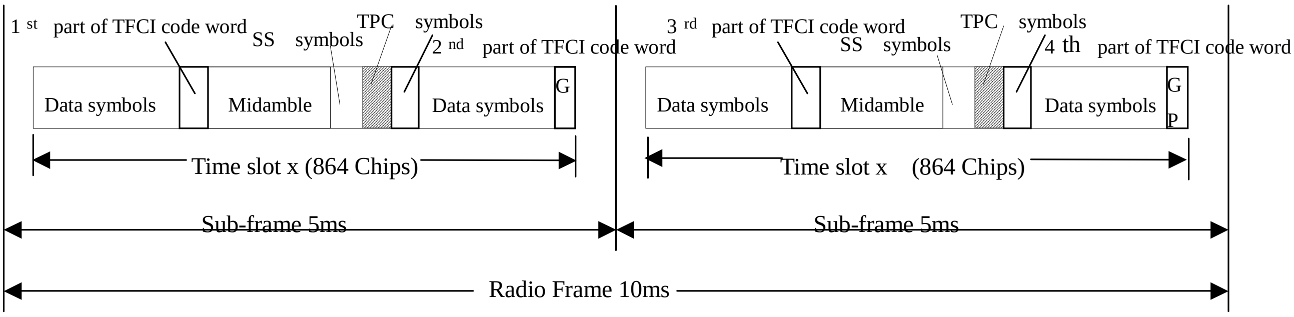


Figure 24:Position of the TFCI code word in the traffic burst in case of TPC and SS in 1.28 Mcps TDD

6.2.2.2 Transmission of TPC

The burst type for dedicated channels provides the possibility for transmission of TPC in uplink and downlink.

The 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 SS information, which is transmitted after the midamble. Figure 25 shows the position of the TPC command in a traffic burst.

For every user the TPC information is to be transmitted at least once per 5ms sub-frame. For each allocated timeslot it is signalled individually whether that timeslot carries TPC information or not. If applied in a timeslot, transmission of TPC symbols is done in the data parts of the traffic burst and they~~it~~ are~~can be~~ 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].~~the first allocated channelisation code and the first~~

~~allocated timeslot (according to the order in the higher layer allocation message). Other allocations (more than one TPC transmission in one sub-frame) of TPC are also possible.~~

TPC symbols may also be transmitted on more than one physical channel in a time slot. For this purpose, higher layers allocate an additional number of N_{TPC} physical channels, individually for each time slot. The TPC symbols shall then be transmitted using the physical channels with the $N_{TPC}+1$ lowest physical channel sequence numbers (p) in that time slot. Physical channel sequence numbering is determined by the rate matching function and is described in [7]. If the rate matching function results in $N_{RM} < N_{TPC}+1$ remaining physical channels in this time slot, TPC symbols shall be transmitted only on the N_{RM} remaining physical channels.

The TPC symbols are ~~is~~ spread with the same spreading factor (SF) and spreading code as the data parts of the respective physical channel.

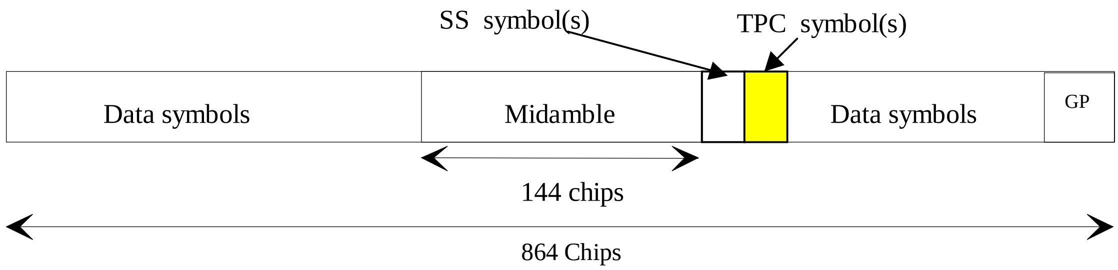


Figure 25: Position of TPC information in the traffic burst in downlink and uplink

For the number of ~~layer 1~~ TPC symbols per time slot~~channelisation code~~ there are 3 possibilities~~ for each channelisation code~~, that can be configured by higher layers, individually for each timeslot:

1) ~~one SS and~~ one TPC symbol

2) ~~no SS and~~ no TPC symbols

3) ~~16/SF SS and~~ 16/SF TPC symbols

So, in case 3), when SF=1, there are 16 TPC symbols which correspond to 32 bits (for QPSK) and 48 bits (for 8PSK).

In the following the uplink is described only. For the description of the downlink, downlink (DL) and uplink (UL) have to be interchanged.

Each of the TPC symbols for uplink power control in the DL will be associated with an UL time slot and an UL CCTrCH pair. This association varies with

- the number of allocated UL time slots and UL CCTrCHs on these time slots (time slot and CCTrCH pair) and
- the allocated TPC symbols in the DL.

In case a UE has

- more than one channelisation code

and/or

- channelisation codes being of lower spreading factor than 16 and using 16/SF SS and 16/SF TPC symbols,

the TPC commands for each ULtime slot CCTrCH pair (all channelisation codes on that time slot belonging to the same time slot and CCTrCH pair have the same TPC command) will be distributed to the following rules:

1. The ULtime slots and CCTrCH pairs the TPC commands are intended for will be numbered from the first to the last ULtime slot and CCTrCH pair allocated to the regarded UE (starting with 0). The number of a time slot and CCTrCH pair is smaller then the number of another time slot and CCTrCH pair within the same time slot if its spreading code with the lowest SC number according to the following table has a lower SC number then the spreading code with the lowest SC number of the other time slot and CCTrCH pair.
2. The commanding TPC symbols on all DL CCTrCHs allocated to one UE are numbered consecutively starting with zero according to the following rules:

a) The numbers of the TPC commands of a regarded DL time slot are lower than those of DL time slots being transmitted after that time slot

b) Within a DL time slot the numbers of the TPC commands of a regarded channelisation code are lower than those of channelisation codes having a higher spreading code number

The spreading code number is defined by the following table (see[8]):

SC number	SF (Q)	Walsh code number (k)
0	16	$\mathbf{c}_{Q=16}^{(k=1)}$
	…	
15	16	$\mathbf{c}_{Q=16}^{(k=16)}$
16	8	$\mathbf{c}_{Q=8}^{(k=1)}$
	…	
23	8	$\mathbf{c}_{Q=8}^{(k=8)}$
24	4	$\mathbf{c}_{Q=4}^{(k=1)}$
	…	
27	4	$\mathbf{c}_{Q=4}^{(k=4)}$
28	2	$\mathbf{c}_{Q=2}^{(k=1)}$
29	2	$\mathbf{c}_{Q=2}^{(k=2)}$
30	1	$\mathbf{c}_{Q=1}^{(k=1)}$

Note: Spreading factors 2-8 are not used in DL

c) Within a channelisation code numbers of the TPC commands are lower than those of TPC commands being transmitted after that time

The following equation is used to determine the UL time slot which is controlled by the regarded TPC symbol in the DL:

$$UL_{pos} = (SFN' \cdot N_{UL\_TPCsymbols} + TPC_{DLpos}) \bmod (N_{ULslot})$$

$$UL_{pos} = \left(SFN' \cdot N_{UL\_TPCsymbols} + TPC_{DLpos} + \left(\left(SFN' \cdot N_{UL\_TPCsymbols} + TPC_{DLpos}\right) \operatorname{div}\left(N_{ULslot}\right)\right)\right) \bmod \left(N_{ULslot}\right),$$

where

UL_{pos} is the number of the controlled uplink time slot and CCTrCH pairs.

SFN' is the system frame number counting the sub-frames. The system frame number of the radio frames (SFN) can be derived from SFN' by

SFN=SFN' div 2, where div is the remainder free division operation.

$N_{UL\_PCsymbols}$ is the number of UL TPC symbols in a sub-frame.

TPC_{DLpos} is the number of the regarded UL TPC symbol in the DL within the sub-frame.

N_{ULslot} is the number of UL slots and CCTrCH pairs in a frame.

When one of the above parameters is changed due to higher layer reconfiguration, the new relationship between TPC symbols and controlled UL time slots shall be valid, beginning with the radio frame, for which the new parameters are set.

In Annex G two examples of the association of TPC commands to time slots and CCTrCH pairs are shown.

Coding of TPC:

The relationship between the TPC Bits and the transmitter power control command for QPSK is the same as in the 3.84Mcps TDD cf. [5.2.2.5 'Transmission of TPC'].

The relationship between the TPC Bits and the transmitter power control command for 8PSK is given in table 12

Table 12: TPC Bit Pattern for 8PSK

TPC Bits	TPC command	Meaning
000	'Down'	Decrease Tx Power
110	'Up'	Increase Tx Power

6.2.2.3 Transmission of SS

The burst type for dedicated channels provides the possibility for transmission of uplink synchronisation control (ULSC).

The transmission of ULSC is done in the data parts of the traffic burst. Hence the midamble structure and length is not changed. The ULSC information is to be transmitted directly after the midamble. Figure 26 shows the position of the SS command in a traffic burst.

For every user the ULSC information shall be transmitted at least once per transmitted sub-frame.~~ By default the following rules apply:~~

~~1. If a TFCI is applied for a CCTrCH, the SS command(s) shall be transmitted using the same channelisation code and the same timeslots as the TFCI.~~

~~2. If no TFCI is applied for a CCTrCH, the SS command(s) shall be transmitted using the first allocated channelisation code and the first allocated timeslot, according to the order in the higher layer allocation message.~~

~~Apart from the default rules other allocations of SS commands are possible according higher layer signalling – e.g. the transmission of more then one SS command (on more than one time slot).~~

For each allocated timeslot it is signalled individually whether that timeslot carries ULSC information or not. If applied in a time slot, transmission of SS symbols is done in the data parts of the traffic burst and they are 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].

SS symbols may also be transmitted on more than one physical channel in a time slot. For this purpose, higher layers allocate an additional number of N_{SS} physical channels, individually for each time slot. The SS symbols shall then be transmitted using the physical channels with the N_{SS}+1 lowest physical channel sequence numbers (*p*) in that time slot. Physical channel sequence numbering is determined by the rate matching function and is described in [7]. If the rate matching function results in $N_{RM} < N_{SS}+1$ remaining physical channels in this time slot, SS symbols shall be transmitted only on the N_{RM} remaining physical channels.

The SS symbols ~~command~~ are~~is~~ spread with the same spreading factor (SF) and spreading code as the data parts of the respective physical channel.

The SS is utilised to command a timing adjustment by (k/8) Tc each M sub-frames, where Tc is the chip period. The k and M values are signalled by the network. The SS, as one of L1 signals, is to be transmitted once per 5ms sub-frame.

M (1-8) and k (1-8) can be adjusted during call setup or readjusted during the call.

Note: The smallest step for the SS signalled by the UTRAN is 1/8 Tc. For the UE capabilities regarding the SS adjustment of the UE it is suggested to set the tolerance for the executed command to be [1/9;1/7] Tc.

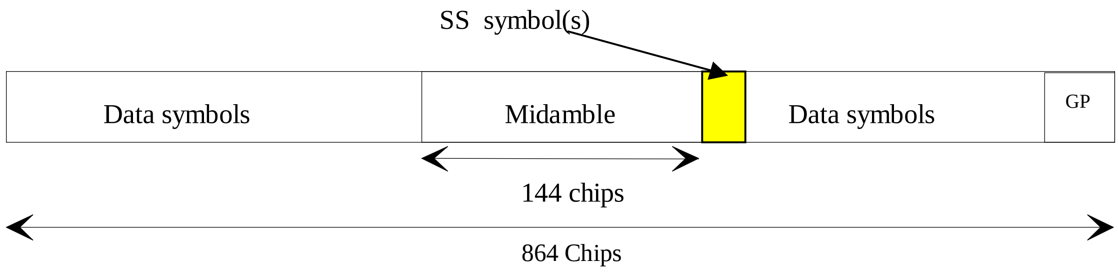


Figure 26: Position of ULSC information in the traffic burst (downlink and uplink)

Note that for the uplink where there is no SS symbol used, the SS symbol space is reserved for future use. This can keep UL and DL slots the same structure.

For the number of ~~layer~~ SS~~1~~ symbols per time slot there are 3 possibilities, that cn be configured by higher layers individually for each time slot ~~configurable for each channelisation code during the call setup~~:

- one SS symbol
- no SS symbol
- 16/SF SS symbols

So, in case 3, when SF=1, there are 16 SS symbols which correspond to 32 bits (for QPSK) and 48 bits (for 8PSK).

Each of the SS symbols in the DL will be associated with an UL time slot depending on the allocated UL time slots and the allocated SS symbols in the DL.

Note: Even though the different time slots of the UE are controlled with independent SS commands, the UE is not in need to execute SS commands leading to a deviation of more than [3] chip with respect to the average timing advance applied by the UE.

The synchronisation shift commands for each UL time slot (all channelisation codes on that time slot have the same SS command) will be distributed to the following rules:

1. The UL time slots the SS commands are intended for will be numbered from the first to the last UL time slot occupied by the regarded UE (starting with 0) considering all CCTrCHs allocated to that UE.
2. The commanding SS symbols on all downlink CCTrCHs allocated to one UE are numbered consecutively starting with zero according to the following rules:
   a) The numbers of the SS commands of a regarded DL time slot are lower than those of DL time slots being transmitted after that time slot
   b) Within a DL time slot the numbers of the SS commands of a regarded channelisation code are lower than those of channelisation codes having a bigger spreading code number

   The spreading code number is defined by the following table: (see TS 25.223)

Spreading code number	SF (Q)	Walsh code number (k)
0	16	$\mathbf{c}_{Q=16}^{(k=1)}$
	...	
15	16	$\mathbf{c}_{Q=16}^{(k=16)}$
	Spreading factors 2-8 are nor used in DL	
30	1	$\mathbf{c}_{Q=1}^{(k=1)}$

c) Within a channelisation code numbers of the SS commands are lower than those of SS commands being transmitted after that time

The following equation is used to determine the UL time slot which is controlled by the regarded SS symbol:

$$UL_{pos} = (SFN' \cdot N_{SSsymbols} + SS_{pos}) \bmod (N_{ULslot})$$

$$UL_{pos} = \left(SFN' \cdot N_{SSsymbols} + SS_{pos} + \left(\left(SFN' \cdot N_{SSsymbols} + SS_{pos}\right) \operatorname{div}(N_{ULslot})\right)\right) \bmod (N_{ULslot}),$$

where

UL_{pos} is the number of the controlled uplink time slot.

SFN' is the system frame number counting the sub-frames. The system frame number of the radio frames (SFN) can be derived from SFN' by

SFN=SFN' div 2, where div is the remainder free division operation.

$N_{SSsymbols}$ is the number of SS symbols in a frame.

SS_{pos} is the number of the regarded SS symbol within the sub-frame.

N_{ULslot} is the number of UL slots in a frame.

When one of the above parameters is changed due to higher layer reconfiguration, the new relationship between SS symbols and controlled UL time slots shall be valid, beginning with the radio frame, for which the new parameters are set.

The relationship between the SS Bits and the SS command for QPSK is the given in table 13:

Table 13: Coding of the SS for QPSK

SS Bits	SS command	Meaning
00	'Down'	Decrease synchronisation shift by k/8 Tc
11	'Up'	Increase synchronisation shift by k/8 Tc
01	'Do nothing'	No change

The relationship between the SS Bits and the SS command for 8PSK is given in table 14:

Table 14: Coding of the SS for 8PSK

SS Bits	SS command	Meaning
000	'Down'	Decrease synchronisation shift by k/8 Tc
110	'Up'	Increase synchronisation shift by k/8 Tc
011	'Do nothing'	No change

B.2 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 (*). These associations apply for both UL and DL.

B.2.1 Association for K=16 Midambles

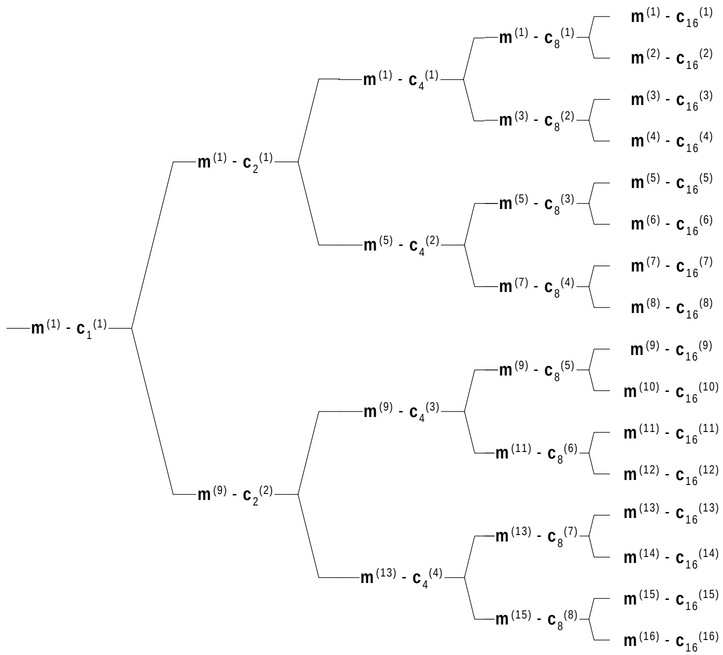


Figure B.2.1: Association of Midambles to Spreading Codes for K=16

B.2.2 Association for K=14 Midambles

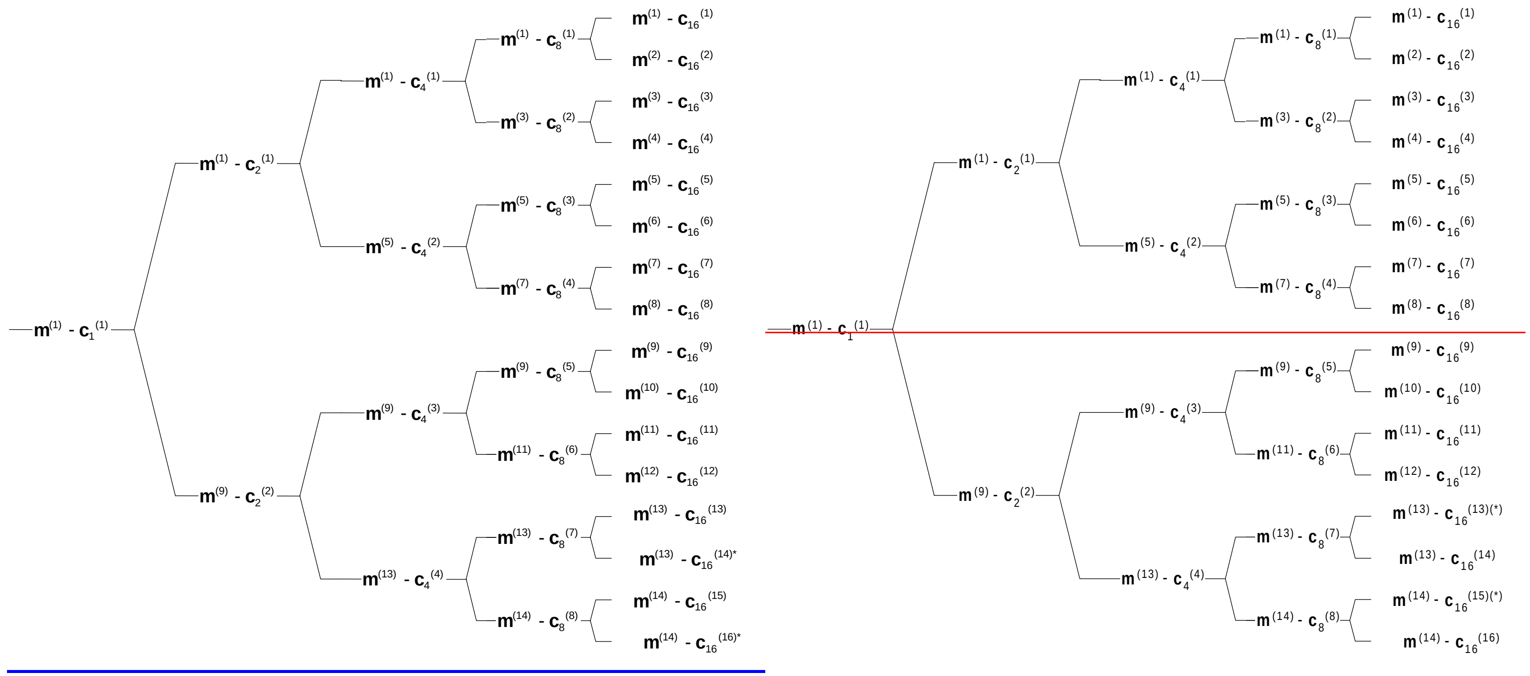


Figure B.2.2: Association of Midambles to Spreading Codes for K=14

B.2.3 Association for K=12 Midambles

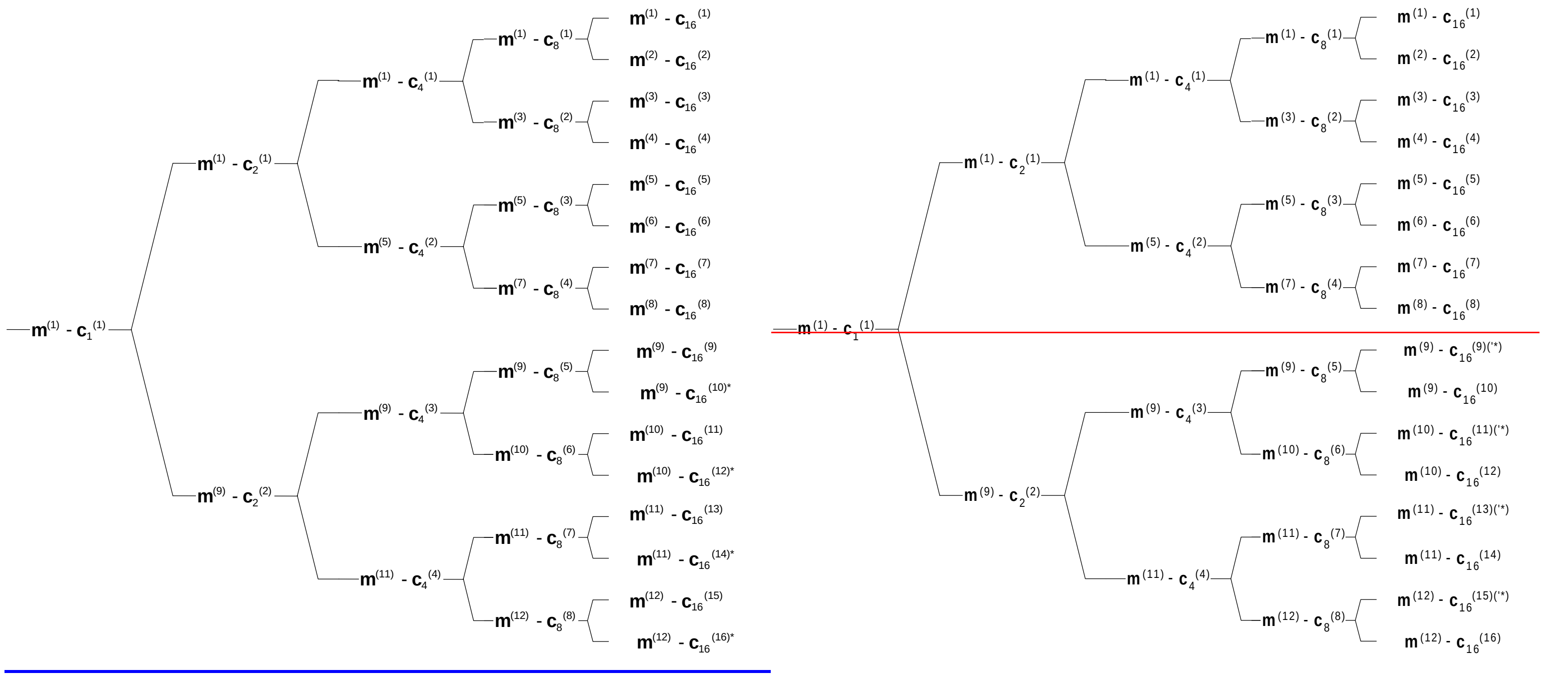


Figure B.2.3: Association of Midambles to Spreading Codes for K=12

B.2.4 Association for K=10 Midambles

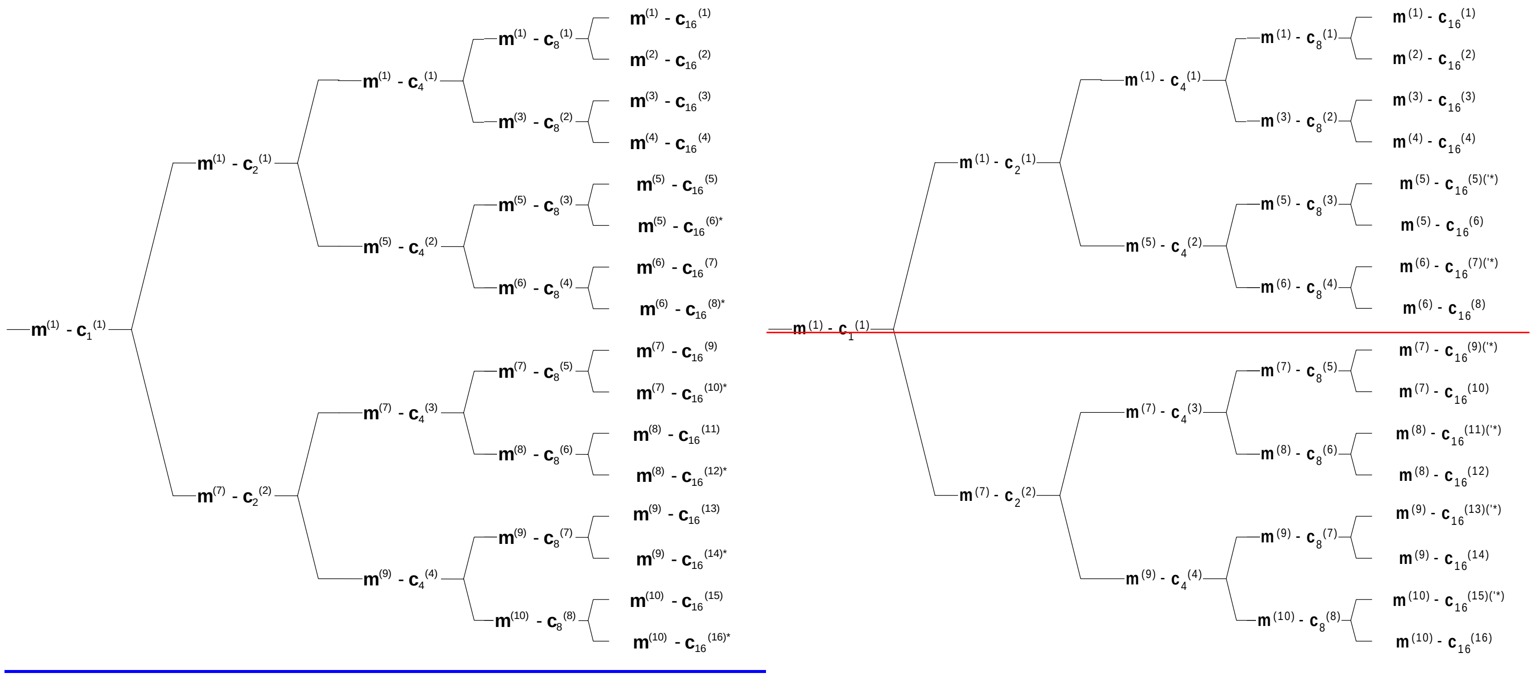


Figure B.2.4: Association of Midambles to Spreading Codes for K=10

B.2.5 Association for K=8 Midambles

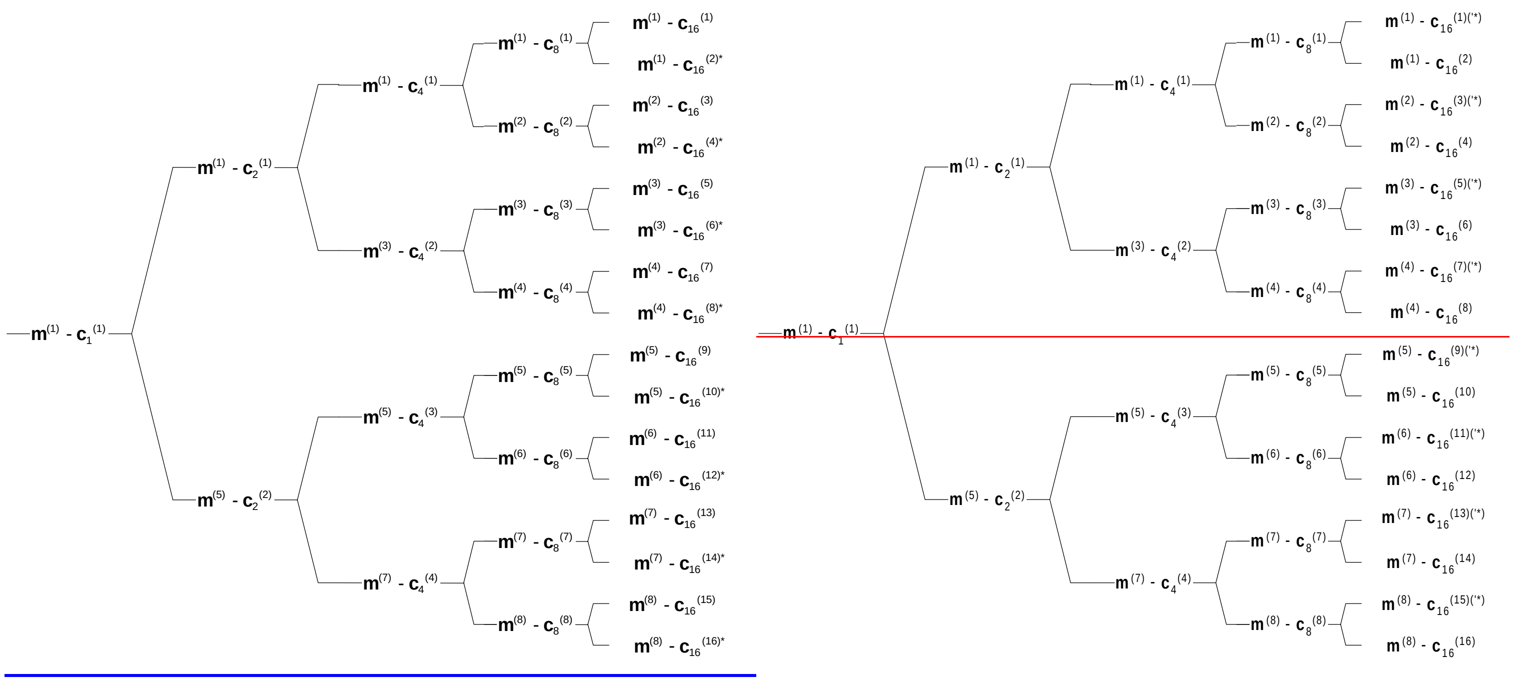


Figure B.2.5: Association of Midambles to Spreading Codes for K=8

B.2.6 Association for K=6 Midambles

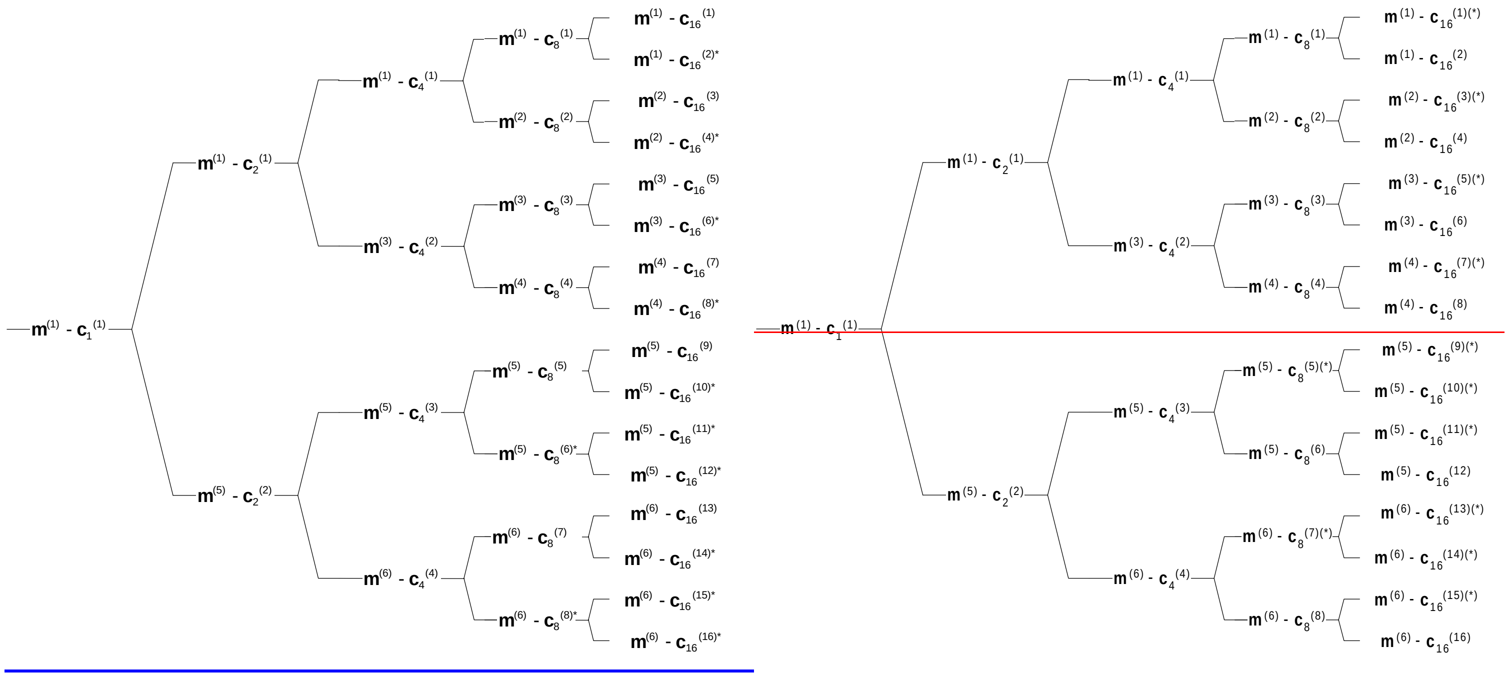


Figure B.2.6: Association of Midambles to Spreading Codes for K=6

B.2.7 Association for K=4 Midambles

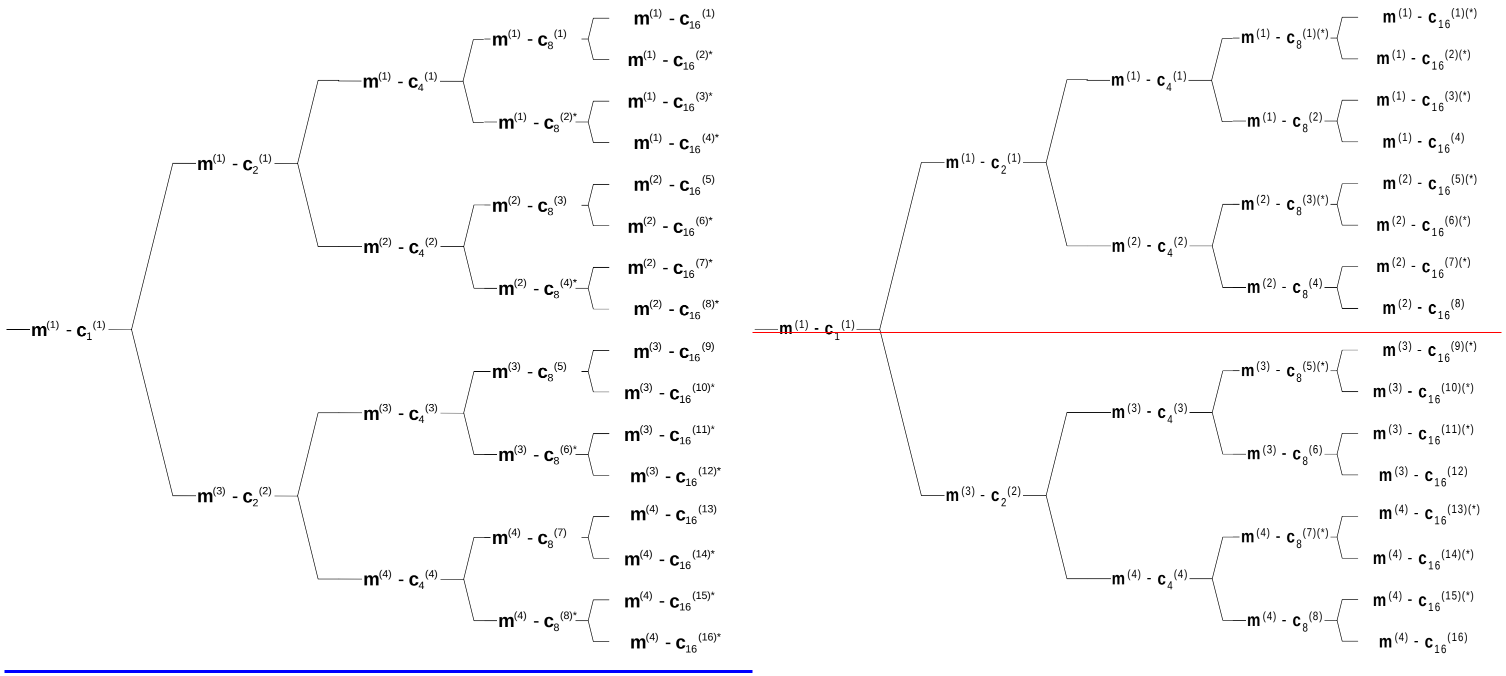


Figure B.2.7: Association of Midambles to Spreading Codes for K=4

B.2.8 Association for K=2 Midambles

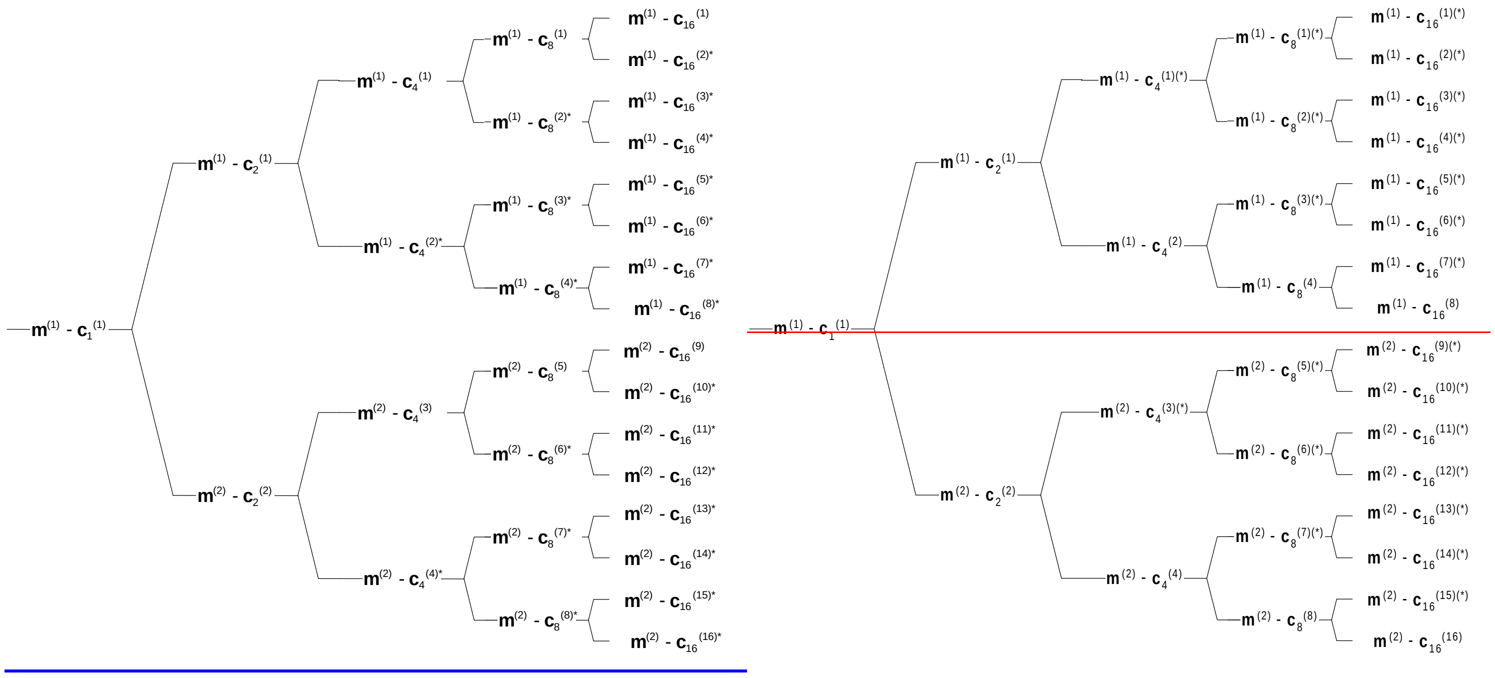


Figure B.2.8: Association of Midambles to Spreading Codes for K=2

Annex G (informative): Examples of the association of ~~DL~~ UL TPC commands to UL uplink time slots for 1.28 Mcps TDD

In the following two examples of the association of UL TPC commands to UL time slots and CCTrCHs are shown (see 6.2.2.2):

Table G.1 Two examples of the association of ~~DL~~ UL TPC commands to UL uplink time slots with NULslot=3

Case 1: $N_{UL\_TPCsymbols}$=2; Case 2: $N_{UL\_TPCsymbols}$=4

Sub-Frame Number	Case 1 (2 UL TPC symbols)		The order of the served UL time slot and CCTrCH pairs (UL time slot and CCTrCH number)	Case 2 (4 UL TPC symbols)	
	The order of UL TPC symbols			The order of UL TPC symbols	
SFN'=0	(1st UL_{pos}=0)	0	0 (TS3)	0	(1st UL_{pos}=0)
		1	1 (TS4)	1	
			2 (TS5)	2	
			0 (TS3)	3	
SFN'=1	(1st UL_{pos}=2)	0	0 (TS3)	0	(1st UL_{pos}=1)
		1	1 (TS4)	1	
			2 (TS5)	2	
			0 (TS3)	3	
			1 (TS4)		
SFN'=2	(1st UL_{pos}=1)	0	0 (TS3)	0	(1st UL_{pos}=2)
		1	1 (TS4)	1	
			2 (TS5)	2	
			0 (TS3)	3	
			1 (TS4)		
			2 (TS5)		
. . .	. . .		. . .	. . .	

Annex H (informative): Examples of the association of ~~DL~~ UL SS commands to UL uplink time slots

In the following two examples of the association of ~~DL~~ UL SS commands to UL uplink time slots are shown (see 6.2.2.3):

Table H.1 Two examples of the association of ~~DL~~ UL SS commands to UL uplink time slots with N_{ULslot}=3

Case 1: $N_{SSsymbols}$=2; Case 2: $N_{SSsymbols}$=4

Sub-Frame Number	Case 1 (2 ~~DL~~ UL SS symbols) The order of ~~DL~~ UL SS symbols		The order of the served UL time slot (UL time slot number)	Case 2 (4 ~~DL~~ UL SS symbols) The order of ~~DL~~ UL SS symbols	
SFN'=0	(1st UL_{pos}=0)	0	0 (TS3)	0	(1st UL_{pos}=0)
		1	1 (TS4)	1	
			2 (TS5)	2	
			0 (TS3)	3	
SFN'=1	(1st UL_{pos}=2)	0	0 (TS3)	0	(1st UL_{pos}=1)
		1	1 (TS4)	1	
			2 (TS5)	2	
			0 (TS3)	3	
			1 (TS4)		
SFN'=2	(1st UL_{pos}=1)	0	0 (TS3)	0	(1st UL_{pos}=2)
		1	1 (TS4)	1	
			2 (TS5)	2	
			0 (TS3)	3	
			1 (TS4)		
			2 (TS5)		
. . .	. . .		. . .	. . .	

3GPP TSG-WG2 Meeting #31
Arlanda, Stockholm, Sweden, 19th – 23rd August 2002

Tdoc ⌘ R2-022387

CR-Form-v7

CHANGE REQUEST

⌘	25.331	CR	1660	⌘ rev	-	⌘	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 [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Corrections to Synchronisation for 1.28 Mcps TDD		
Source:	⌘	TSG-RAN WG2		
Work item code:	⌘	LCRTDD-L23	***Date:*** ⌘	9/08/2002
Category:	⌘	F	***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: ⌘

To correct ommissions from the specification of synchronisation for 1.28 Mcps TDD.

Currently the response to receiving the IE "Timing Advance Control" containing "Synchronisation parameters" is only specified for the case where a cell change occurs. The procedure triggered by receipt of these parameters may also be used when a UE is moved from Cell_FACH to Cell_DCH state and before transmitting in the uplink on USCH. It is proposed to modify 8.6.6.26 to encompass these uses.

The description of the synchronisation process has been omitted and it is proposed to add text to 8.6.6.26 to correct this.

The description in 8.6.6.26 does not say what should happen if the synchronisation process fails. It is proposed to introduce text to correct this omission.

An initial power target for the initial UpPCH transmission has been omitted from 10.3.6.96 and it is proposed to correct this.

The SYNC_UL codes bitmap in 10.3.6.96 is specified as MD whereas it should be MP.

RAN1 has specified slot specific synchronisation. Therefore there is a need for the possibility to specify the number of SS-TPC symbols accordingly. A new IE "Additional SS-TPC Symbols" is used to enable this.

Impact analysis: The changes correct UL synchronisation and power control for 1.28 Mcps TDD

The corrections do not have isolated impact.

Summary of change: ⌘	(i)	Section 8.6.6.26 is modified to include the use of the synchronisation procedure initiated by “IE Timing Advance Control” containing “Synchronisation parameters” for cases other than when a cell change occurs. A description of the synchronisation procedure and action to be taken should the process change is added.
	(ii)	An initial power target for the SYNC_UL power ramp sequence is added to the IE “Timing Advance Control” in section 10.3.6.96 and SynchronisationParameters-r4 in section 11.3.
	(iii)	The IE SYNC_UL codes bitmap is changed from MD to MP and Optional is removed from sync-UL-CodesBitmap in 11.3.
	(iv)	RAN1 has specified slot specific synchronisation. Therefore there is a need for the possibility to specify the number of SS-TPC symbols accordingly. A new IE “Additional SS-TPC Symbols” is used to enable this.
Consequences if not approved: ⌘	UE synchronisation for the 1.28 Mcps TDD option will not be completely specified.	

Clauses affected: ⌘	8.6.6.26, 10.3.6.96, 11.3				
	Y	**N**			
Other specs affected: ⌘	**X**		Other core specifications	⌘	RAN1, 25.224, CR96
		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.

8.6.6.26 UL Timing Advance Control (TDD only)

If the IE "UL Timing Advance Control" is present, the UE shall:

1> if IE "Uplink Timing Advance Control" has the value "disabled":

2> reset timing advance to 0;

2> disable calculated timing advance following handover;

2> in case of handover:

3> start uplink transmissions in the target cell without applying timing advance.

1> if IE "Uplink Timing Advance Control" has the value "enabled":

2> in 3.84 Mcps TDD~~case of no cell change~~:

3> in case of no cell change~~3.84 Mcps TDD~~:

4> evaluate and apply the timing advance value for uplink transmission as indicated in IE "Uplink Timing Advance" at the CFN indicated in the IE "Activation Time".

~~3> in 1.28 Mcps TDD~~:

~~4> continue to use the current uplink timing.~~

~~2> in case of cell change:~~

3> in case of cell change:~~3.84 Mcps TDD~~

4> use the IE "Uplink Timing Advance" as TA_{old} and apply TA_{new} for uplink transmission in the target cell at the CFN indicated in the IE "Activation Time" as specified in [33];

4> include the value of the applied timing advance in the IE "Timing Advance" in the COMPLETE message.

2~~3~~> in 1.28 Mcps TDD:

3~~4~~> if the IE "Synchronisation parameters" is included:

4> initiate a sequence of UpPCH SYNC_UL code transmissions using a code selected from the set specified and continue until a timing correction is received in the specified FPACH (received for WT sub-frames following the sub-frame in which the transmission was made) or until Max SYNC_UL transmissions have been completed. The power used for each SYNC_UL transmission is as specified in 8.5.7. Each transmission is made in the first sub-frame possible following the end of each FPACH reception interval using the timing specified in [33]. A new code is selected for each transmission. Detection that the FPACH relates to the transmitted SYNC_UL code is described in [33].

4> if a timing correction is received within Max SYNC_UL transmissions the procedure is completed. The assigned uplink resources may then be used, commencing at the first possible TTI boundary or the SFN in which the assignment commences whichever is the later. The timing of the uplink transmission is described in [33].

4> if no timing correction has been received within Max SYNC_UL transmissions, the synchronisation procedure has failed. If the assigned resources are DCH, the UE should not transmit using these resources and should respond as if a physical channel failure has occurred as specified in 8.1.3.7, or 8.2.2.7, or 8.3.1.7, or 8.3.6.5. If the assigned resources are USCH then the UE should ignore the USCH allocation.

5> initiate SYNC_UL code transmissions as specified in [33] using the parameters as indicated in IE "Synchronisation parameters".

34> if the IE "Synchronisation parameters" is not included:

4> in case of no cell change:

5> continue to use the current uplink timing.

4> in case of cell change:

5> evaluate and apply the timing correction TA_{new} for uplink transmissions using the procedureas specified in [33].

10.3.6.37 Individual timeslot info

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Timeslot number	MP		Timeslot number 10.3.6.84	Timeslot within a frame	
TFCI existence	MP		Boolean	TRUE indicates that the TFCI exists. It shall be coded in the first physical channel of this timeslot.	
Midamble Shift and burst type	MP		Midamble shift and burst type 10.3.6.41		
CHOICE *TDD option*	MP				REL-4
>3.84 Mcps TDD				(no data)	REL-4
>1.28 Mcps TDD					REL-4
>>Modulation	MP		Enumerated(QPSK, 8PSK)		REL-4
>>SS-TPC Symbols	MP		Enumerated(0, 1, 16/SF)	Denotes amount of SS and TPC bits send in this timeslot	REL-4
>>Additional TPC-SS Symbols	OP		Integer(1..15)	Specifies number of additional SS symbols as specified in [33]	REL-4

10.3.6.96 Uplink Timing Advance Control

NOTE: Only for TDD

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE *Timing Advance*	MP				
>Disabled			Null	Indicates that no timing advance is applied	
>Enabled					
>>CHOICE *TDD option*	MP				REL-4
>>>3.84 Mcps TDD					REL-4
>>>>UL Timing Advance	MD		Uplink Timing Advance 10.3.6.95	Absolute timing advance value to be used to avoid large delay spread at the NodeB. Default value is the existing value for uplink timing advance.	
>>>>Activation Time	OP		Activation Time 10.3.3.1	Frame number timing advance is to be applied. This IE is required when a new UL Timing Advance adjustment is specified and Activation Time is not otherwise specified in the RRC message.	
>>1.28 Mcps TDD				(no data)	REL-4
>>>Uplink synchronisation parameters	MD			Default: Uplink synchronisation step size is 1. Uplink synchronisation frequency is 1.	REL-4
>>>>Uplink synchronisation step size	MP		Integer(1..8)	This parameter specifies the step size to be used for the adjustment of the uplink transmission timing	REL-4
>>>>Uplink synchronisation frequency	MP		Integer(1..8)	This parameter specifies the frequency of the adjustment of the uplink transmission timing	REL-4
>>>Synchronisation parameters	OP				
>>>>SYNC_UL codes bitmap	~~MD~~MP		Bitstring(8)	Each bit indicates availability of a SYNC_UL code, where the SYNC_UL codes	REL-4

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
				are numbered "code 0" to "code 7". The value 1 of a bit indicates that the corresponding SYNC_UL code can be used. The value 0 of a bit indicates that the corresponding SYNC_UL code can not be used.	
>>>>FPACH info	MP		FPACH info 10.3.6.35a		REL-4
>>>>$PRX_{UpPCHdes}$	MP		Integer(-120…-58 by step of 1)	In dBm	REL-4
>>>>SYNC_UL procedure	MD			Default is: Max SYNC_UL Transmission is 2. Power Ramp Step is 2.	REL-4
>>>>>Max SYNC_UL Transmissions	MP		Integer(1,2,4,8)	Maximum numbers of SYNC_UL transmissions in a power ramping sequence.	REL-4
>>>>>Power Ramp Step	MP		Integer(0,1,2,3)	In dB	REL-4

11.3 Information element definitions

```
[...]
IndividualTimeslotInfo-LCR-r4 ::=   SEQUENCE {
    timeslotNumber                      TimeslotNumber-LCR-r4,
    tfci-Existence                      BOOLEAN,
    midambleShiftAndBurstType           MidambleShiftAndBurstType-LCR-r4,
    modulation                          ENUMERATED { mod-QPSK, mod-8PSK },
    ss-TPC-Symbols                      ENUMERATED { zero, one, sixteenOverSF },
    additionalSS-TPC-Symbols            INTEGER(1..15)      OPTIONAL
}

IndividualTimeslotInfo-LCR-r4-ext ::=       SEQUENCE {
-- timeslotNumber and tfci-Existence is taken from IndividualTimeslotInfo.
-- midambleShiftAndBurstType in IndividualTimeslotInfo shall be ignored.
    midambleShiftAndBurstType           MidambleShiftAndBurstType-LCR-r4,
    modulation                          ENUMERATED { mod-QPSK, mod-8PSK },
    ss-TPC-Symbols                      ENUMERATED { zero, one, sixteenOverSF }
}

IndividualTS-Interference ::=       SEQUENCE {
    timeslot                            TimeslotNumber,
    ul-TimeslotInterference             TDD-UL-Interference
}
```

```
[...]

SSDT-Information-r4 ::=             SEQUENCE {
    s-Field                             S-Field,
    codeWordSet                         CodeWordSet,
    ssdt-UL                             SSDT-UL-r4                              OPTIONAL
}

-- SSDT-UL-r4 is used to extend the
-- SSDT-Information IE from Release 4 onwards.
SSDT-UL-r4 ::=                      ENUMERATED {
                                        ul, ul-AndDL }

SynchronisationParameters-r4 ::=    SEQUENCE {
    sync-UL-CodesBitmap                 BIT STRING {
                                            code7(0),
                                            code6(1),
                                            code5(2),
                                            code4(3),
                                            code3(4),
                                            code2(5),
                                            code1(6),
                                            code0(7)
                                            } (SIZE (8))                    OPTIONAL,
    fpach-Info                          FPACH-Info-r4,
    -- Actual value prxUpPCHdes = IE value – 120
    prxUpPCHdes                         INTEGER (0..62),
    sync-UL-Procedure                   SYNC-UL-Procedure-r4                    OPTIONAL
}

SYNC-UL-Procedure-r4 ::=            SEQUENCE {
    max-SYNC-UL-Transmissions           ENUMERATED { tr1, tr2, tr4, tr8 },
    powerRampStep                       INTEGER (0..3)
}

[...]
```

3GPP TSG-WG2 Meeting #31 **Tdoc ⌘ R2-022388**
Arlanda, Stockholm, Sweden, 19th – 23rd August 2002

CR-Form-v7

CHANGE REQUEST

⌘ **25.331**	**CR 1661**	⌘ **rev -** ⌘	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 [X] Radio Access Network [X] Core Network [ ]

Title: ⌘	Corrections to Synchronisation for 1.28 Mcps TDD		
Source: ⌘	TSG-RAN WG2		
Work item code: ⌘	LCRTDD-L23	***Date:*** ⌘	9/08/2002
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: ⌘

To correct ommissions from the specification of synchronisation for 1.28 Mcps TDD.

Currently the response to receiving the IE "Timing Advance Control" containing "Synchronisation parameters" is only specified for the case where a cell change occurs. The procedure triggered by receipt of these parameters may also be used when a UE is moved from Cell_FACH to Cell_DCH state and before transmitting in the uplink on USCH. It is proposed to modify 8.6.6.26 to encompass these uses.

The description of the synchronisation process has been omitted and it is proposed to add text to 8.6.6.26 to correct this.

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The SYNC_UL codes bitmap in 10.3.6.96 is specified as MD whereas it should be MP.

RAN1 has specified slot specific synchronisation. Therefore there is a need for the possibility to specify the number of SS-TPC symbols accordingly. A new IE "Additional SS-TPC Symbols" is used to enable this.

Impact analysis: The changes correct UL synchronisation and power control for 1.28 Mcps TDD

Summary of change: ⌘	(i)	Section 8.6.6.26 is modified to include the use of the synchronisation procedure initiated by "IE Timing Advance Control" containing "Synchronisation parameters" for cases other than when a cell change occurs. A description of the synchronisation procedure and action to be taken should the process change is added.
	(ii)	An initial power target for the SYNC_UL power ramp sequence is added to the IE "Timing Advance Control" in section 10.3.6.96 and SynchronisationParameters-r4 in section 11.3.
	(iii)	The IE SYNC_UL codes bitmap is changed from MD to MP and Optional is removed from sync-UL-CodesBitmap in 11.3.
	(iv)	RAN1 has specified slot specific synchronisation. Therefore there is a need for the possibility to specify the number of SS-TPC symbols accordingly. A new IE "Additional SS-TPC Symbols" is used to enable this.
Consequences if not approved: ⌘	UE synchronisation for the 1.28 Mcps TDD option will not be completely specified.	

Clauses affected: ⌘	8.6.6.26, 10.3.6.96, 11.3				
	Y	**N**			
Other specs affected: ⌘	**X**		Other core specifications	⌘	RAN1, 25.224, CR 97
		X	Test specifications		
		X	O&M Specifications		
Other comments: ⌘					

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8.6.6.26 UL Timing Advance Control (TDD only)

If the IE "UL Timing Advance Control" is present, the UE shall:

1> if IE "Uplink Timing Advance Control" has the value "disabled":

2> reset timing advance to 0;

2> disable calculated timing advance following handover;

2> in case of handover:

3> start uplink transmissions in the target cell without applying timing advance.

1> if IE "Uplink Timing Advance Control" has the value "enabled":

2> in 3.84 Mcps TDD~~case of no cell change~~:

3> in case of no cell change~~3.84 Mcps TDD~~:

4> evaluate and apply the timing advance value for uplink transmission as indicated in IE "Uplink Timing Advance" at the CFN indicated in the IE "Activation Time".

~~3> in 1.28 Mcps TDD~~:

~~4> continue to use the current uplink timing.~~

~~2> in case of cell change:~~

3> in case of cell change:~~3.84 Mcps TDD~~

4> use the IE "Uplink Timing Advance" as TA_{old} and apply TA_{new} for uplink transmission in the target cell at the CFN indicated in the IE "Activation Time" as specified in [33];

4> include the value of the applied timing advance in the IE "Timing Advance" in the COMPLETE message.

2~~3~~> in 1.28 Mcps TDD:

3~~4~~> if the IE "Synchronisation parameters" is included:

4> initiate a sequence of UpPCH SYNC_UL code transmissions using a code selected from the set specified and continue until a timing correction is received in the specified FPACH (received for WT sub-frames following the sub-frame in which the transmission was made) or until Max SYNC_UL transmissions have been completed. The power used for each SYNC_UL transmission is as specified in 8.5.7. Each transmission is made in the first sub-frame possible following the end of each FPACH reception interval using the timing specified in [33]. A new code is selected for each transmission. Detection that the FPACH relates to the transmitted SYNC_UL code is described in [33].

4> if a timing correction is received within Max SYNC_UL transmissions the procedure is completed. The assigned uplink resources may then be used, commencing at the first possible TTI boundary or the SFN in which the assignment commences whichever is the later. The timing of the uplink transmission is described in [33].

4> if no timing correction has been received within Max SYNC_UL transmissions, the synchronisation procedure has failed. If the assigned resources are DCH, the UE should not transmit using these resources and should respond as if a physical channel failure has occurred as specified in 8.1.3.7, or 8.2.2.7, or 8.3.1.7, or 8.3.6.5. If the assigned resources are USCH then the UE should ignore the USCH allocation.

5> initiate SYNC_UL code transmissions as specified in [33] using the parameters as indicated in IE "Synchronisation parameters".

34> if the IE "Synchronisation parameters" is not included:

4> in case of no cell change:

5> continue to use the current uplink timing.

4> in case of cell change:

5> evaluate and apply the timing correction TA_{new} for uplink transmissions using the procedureas specified in [33].

10.3.6.37 Individual timeslot info

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Timeslot number	MP		Timeslot number 10.3.6.84	Timeslot within a frame	
TFCI existence	MP		Boolean	TRUE indicates that the TFCI exists. It shall be coded in the first physical channel of this timeslot.	
Midamble Shift and burst type	MP		Midamble shift and burst type 10.3.6.41		
CHOICE *TDD option*	MP				REL-4
>3.84 Mcps TDD				(no data)	REL-4
>1.28 Mcps TDD					REL-4
>>Modulation	MP		Enumerated(QPSK, 8PSK)		REL-4
>>SS-TPC Symbols	MP		Enumerated(0, 1, 16/SF)	Denotes amount of SS and TPC bits send in this timeslot	REL-4
>>Additional SS Symbols	OP		Integer(1..15)	Specifies number of additional SS symbols as specified in [33]	REL-4

10.3.6.96 Uplink Timing Advance Control

NOTE: Only for TDD

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE *Timing Advance*	MP				
>Disabled			Null	Indicates that no timing advance is applied	
>Enabled					
>>CHOICE *TDD option*	MP				REL-4
>>>3.84 Mcps TDD					REL-4
>>>>UL Timing Advance	MD		Uplink Timing Advance 10.3.6.95	Absolute timing advance value to be used to avoid large delay spread at the NodeB. Default value is the existing value for uplink timing advance.	
>>>>Activation Time	OP		Activation Time 10.3.3.1	Frame number timing advance is to be applied. This IE is required when a new UL Timing Advance adjustment is specified and Activation Time is not otherwise specified in the RRC message.	
>>1.28 Mcps TDD				(no data)	REL-4
>>>Uplink synchronisation parameters	MD			Default: Uplink synchronisation step size is 1. Uplink synchronisation frequency is 1.	REL-4
>>>>Uplink synchronisation step size	MP		Integer(1..8)	This parameter specifies the step size to be used for the adjustment of the uplink transmission timing	REL-4
>>>>Uplink synchronisation frequency	MP		Integer(1..8)	This parameter specifies the frequency of the adjustment of the uplink transmission timing	REL-4
>>>Synchronisation parameters	OP				
>>>>SYNC_UL codes bitmap	~~MD~~MP		Bitstring(8)	Each bit indicates availability of a SYNC_UL code, where the SYNC_UL codes	REL-4

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
				are numbered "code 0" to "code 7". The value 1 of a bit indicates that the corresponding SYNC_UL code can be used. The value 0 of a bit indicates that the corresponding SYNC_UL code can not be used.	
>>>>FPACH info	MP		FPACH info 10.3.6.35a		REL-4
>>>>$PRX_{UpPCHdes}$	MP		Integer(-120…-58 by step of 1)	In dBm	REL-4
>>>>SYNC_UL procedure	MD			Default is: Max SYNC_UL Transmission is 2. Power Ramp Step is 2.	REL-4
>>>>>Max SYNC_UL Transmissions	MP		Integer(1,2,4,8)	Maximum numbers of SYNC_UL transmissions in a power ramping sequence.	REL-4
>>>>>Power Ramp Step	MP		Integer(0,1,2,3)	In dB	REL-4

11.3 Information element definitions

```
[...]
IndividualTimeslotInfo ::=          SEQUENCE {
    timeslotNumber                      TimeslotNumber,
    tfci-Existence                      BOOLEAN,
    midambleShiftAndBurstType           MidambleShiftAndBurstType
}

IndividualTimeslotInfo-LCR-r4 ::=   SEQUENCE {
    timeslotNumber                      TimeslotNumber-LCR-r4,
    tfci-Existence                      BOOLEAN,
    midambleShiftAndBurstType           MidambleShiftAndBurstType-LCR-r4,
    modulation                          ENUMERATED { mod-QPSK, mod-8PSK },
    ss-TPC-Symbols                      ENUMERATED { zero, one, sixteenOverSF },
    additionalSS-TPC-Symbols            INTEGER(1..15)      OPTIONAL
}

IndividualTimeslotInfo-LCR-r4-ext ::=       SEQUENCE {
-- timeslotNumber and tfci-Existence is taken from IndividualTimeslotInfo.
-- midambleShiftAndBurstType in IndividualTimeslotInfo shall be ignored.
    midambleShiftAndBurstType           MidambleShiftAndBurstType-LCR-r4,
    modulation                          ENUMERATED { mod-QPSK, mod-8PSK },
    ss-TPC-Symbols                      ENUMERATED { zero, one, sixteenOverSF }
}

IndividualTS-Interference ::=       SEQUENCE {
    timeslot                            TimeslotNumber,
    ul-TimeslotInterference             TDD-UL-Interference
}
[...]

SSDT-Information-r4 ::=             SEQUENCE {
    s-Field                             S-Field,
    codeWordSet                         CodeWordSet,
    ssdt-UL                             SSDT-UL-r4                              OPTIONAL
}

-- SSDT-UL-r4 is used to extend the
-- SSDT-Information IE from Release 4 onwards.
SSDT-UL-r4 ::=                      ENUMERATED {
                                        ul, ul-AndDL }

SynchronisationParameters-r4 ::=    SEQUENCE {
    sync-UL-CodesBitmap                 BIT STRING {
                                            code7(0),
                                            code6(1),
                                            code5(2),
                                            code4(3),
                                            code3(4),
                                            code2(5),
                                            code1(6),
                                            code0(7)
                                            } (SIZE (8))                    OPTIONAL,
    fpach-Info                          FPACH-Info-r4,
    -- Actual value prxUpPCHdes = IE value - 120
    prxUpPCHdes                         INTEGER (0..62),
    sync-UL-Procedure                   SYNC-UL-Procedure-r4                    OPTIONAL
}

SYNC-UL-Procedure-r4 ::=            SEQUENCE {
    max-SYNC-UL-Transmissions           ENUMERATED { tr1, tr2, tr4, tr8 },
    powerRampStep                       INTEGER (0..3)
}

[...]
```