3GPP/SMG Meeting #16
Pusan, Korea, 10th – 13th October 2000

Document R1-00-1009
e.g. for 3GPP use the format TP-99xxx
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CHANGE REQUEST

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25.221	**CR**	**035r1**	Current Version:	3.4.0

GSM (AA.BB) or 3G (AA.BBB) specification number ? *? CR number as allocated by MCC support team*

For submission to:	RAN#10	for approval	X	strategic		(for SMG
list expected approval meeting # here ?		for information		non-strategic		use only)

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Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME		UTRAN / Radio	X	Core Network	

Source: Siemens **Date:** 05-October-2000

Subject: Clarifications on Midamble Associations

Work item:

Category:	F	Correction	X	**Release:**	Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:

The specification of the P-CCPCH in TS 25.221 is currently not consistent, when Block STTD is applied to the P-CCPCH and only four midambles are used in a cell. This is because in the four midamble case only the odd midambles m(1), m(3), m(5) and m(7) are available. However, when Block STTD is applied to the P-CCPCH midambles m(1) and m(2) shall be used. In order to make the spec consistent, we propose to forbid the use of Block-STTD and four midambles at the same time.

Revision of Section 5.2.2.2 for more clarity on where to use Burst Type 2

Clarifications on the midamble transmit power

Modification of the midamble to spreading codes associations so that the primary code appears on the lower part of the tree, in accordance with the rule about the use of variable spreading factors described in section 5.5.2.

Clauses affected: 5.2.2.2, 5.2.3.1, 5.3.1.3, Annex A.3, Annex B

Other specs affected:	Other 3G core specifications		?	List of CRs:
	Other GSM core specifications		?	List of CRs:
	MS test specifications		?	List of CRs:
	BSS test specifications		?	List of CRs:
	O&M specifications		?	List of CRs:

Other comments:

5.2.2 Burst Types

Three types of bursts for dedicated physical channels are defined. All of them consist of two data symbol fields, a midamble and a guard period, the lengths of which are different for the individual burst types. Thus, the number of data symbols in a burst depends on the SF and the burst type, as depicted in table 1.

Table 1: Number of data symbols (N) for burst type 1, 2, and 3

Spreading factor (SF)	Burst Type 1	Burst Type 2	Burst Type 3
1	1952	2208	1856
2	976	1104	928
4	488	552	464
8	244	276	232
16	122	138	116

The support of all three burst types is mandatory for the UE. The three different bursts defined here are well suited for different applications, as described in the following sections.

5.2.2.1 Burst Type 1

The burst type 1 can be used for uplink and downlink. Due to its longer midamble field this burst type supports the construction of a larger number of training sequences, see 5.2.3.~~, which shall be used to estimate the different channels for different UEs in UL and, in case of TxDiversity or Beamforming, also in DL.~~ The maximum number of training sequences depend on the cell configuration, see annex A. For the burst type 1 this number may be 4, 8, or 16.

The data fields of the burst type 1 are 976 chips long. The corresponding number of symbols depends on the spreading factor, as indicated in table 1 above. The midamb le of burst type 1 has a length of 512 chips. The guard period for the burst type 1 is 96 chip periods long. The burst type 1 is shown in Figure 4. The contents of the burst fields are described in table 2.

Table 2: The contents of the burst type 1 fields

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

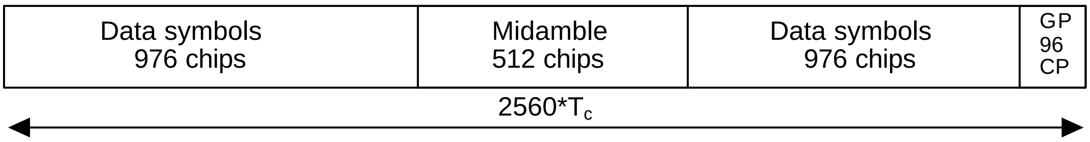

Figure 4: Burst structure of the burst type 1. GP denotes the guard period and CP the chip periods

5.2.2.2 Burst Type 2

The burst type 2 can be used for uplink and downlink. It~~The burst type 2~~ offers a longer data field than burst type 1 on the cost of a shorter midamble. Due to the shorter midamble field the burst type 2 supports a maximum number of training sequences of 3 or 6 only, depending on the cell configuration, see annex A.

The data fields of the burst type 2 are 1104 chips long. The corresponding number of symbols depends on the spreading factor, as indicated in table 1 above. The guard period for the burst type 2 is 96 chip periods long.The burst type 2 is shown in Figure 5. The contents of the burst fields are described in table 3.

Table 3: The contents of the burst type 2 fields

Chip number (CN)	Length of field in chips	Length of field in symbols		Contents of field
0-1103	1104	cf table 1		Data symbols
1104-1359	256	-		Midamble
1360-2463	1104	cf table 1		Data symbols
2464-2559	96	-		Guard period

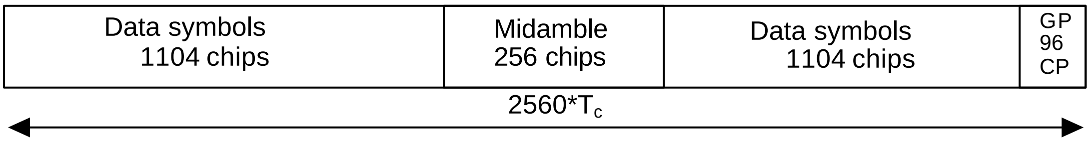

Figure 5: Burst structure of the burst type 2. GP denotes the guard period and CP the chip periods

~~5.2.3.1 Midamble Transmit Power~~

~~If in the downlink all users in one time slot have a common midamble, the transmit power of this common midamble is such that there is no power offset between the data part and the midamble part of the transmit signal within the time slot.~~

~~In the case of user specific midambles, the transmit power of the user specific midamble is such that there is no power offset between the data parts and the midamble part for this user within one slot.~~

5.3.1.3 P-CCPCH Training sequences

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

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

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

5.7 Midamble Transmit Power

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

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

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

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

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

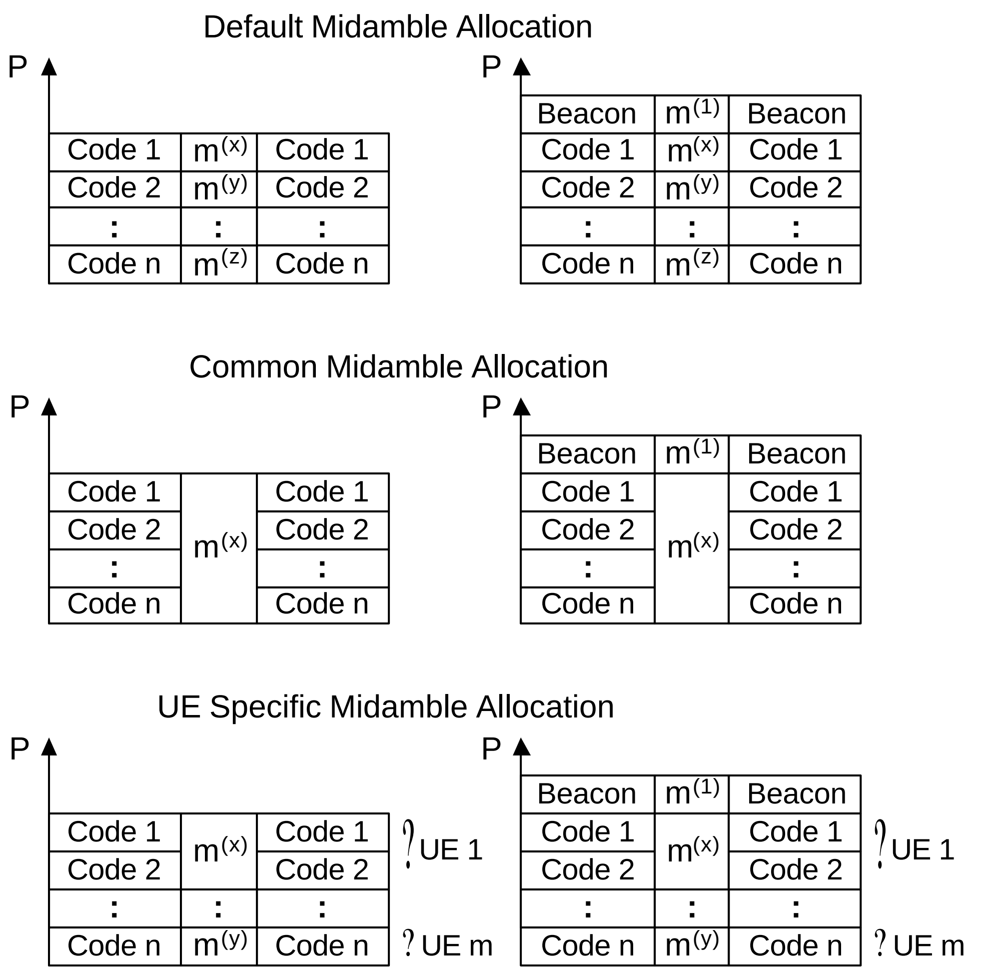

Figure 18: Midamble powers for the different midamble allocation schemes

A.3.2 Association for Burst Type 1/3 and K=8 Midambles

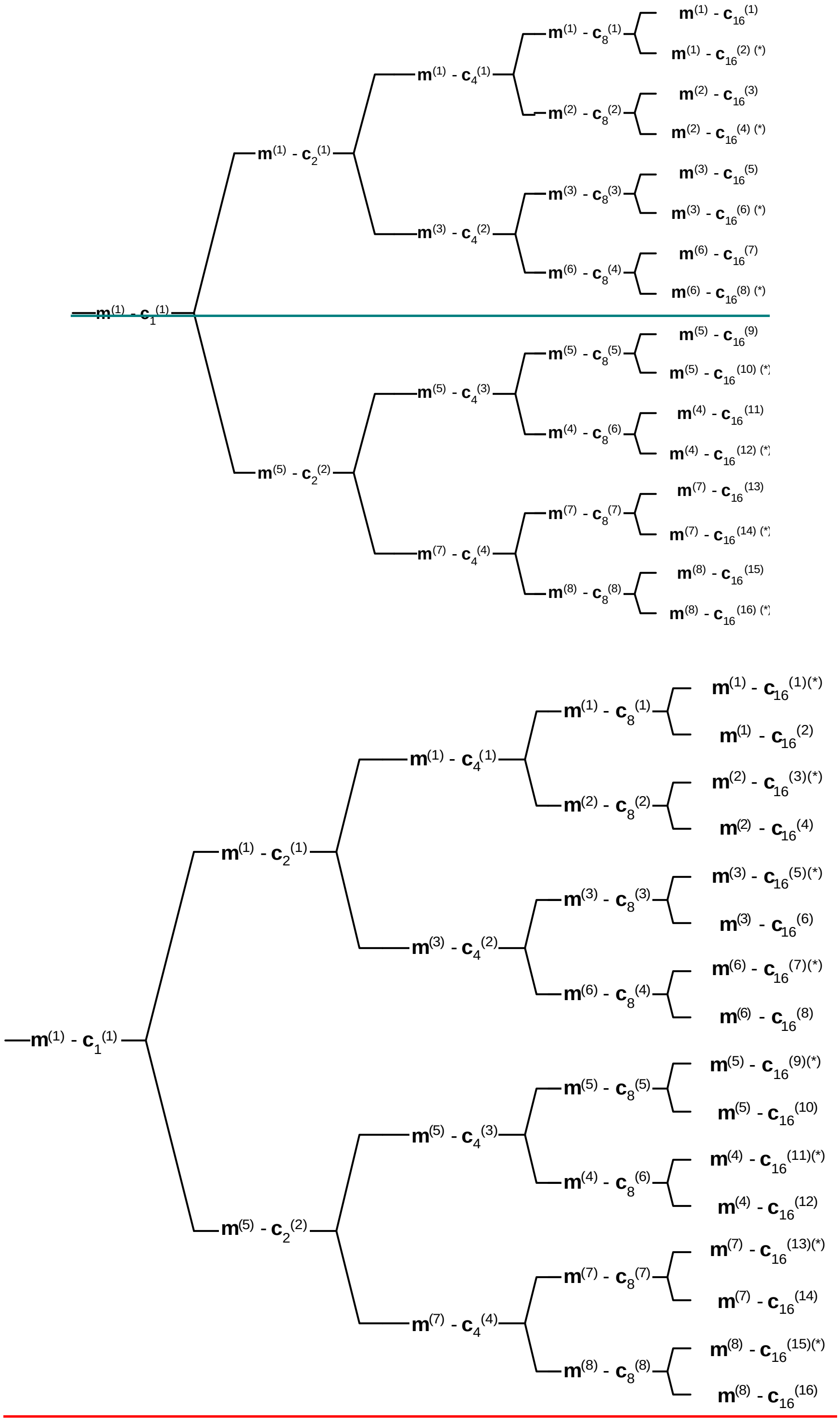

Figure A-2: Association of Midambles to Spreading Codes for Burst Type 1/3 and K=8

A.3.3 Association for Burst Type 1/3 and K=4 Midambles

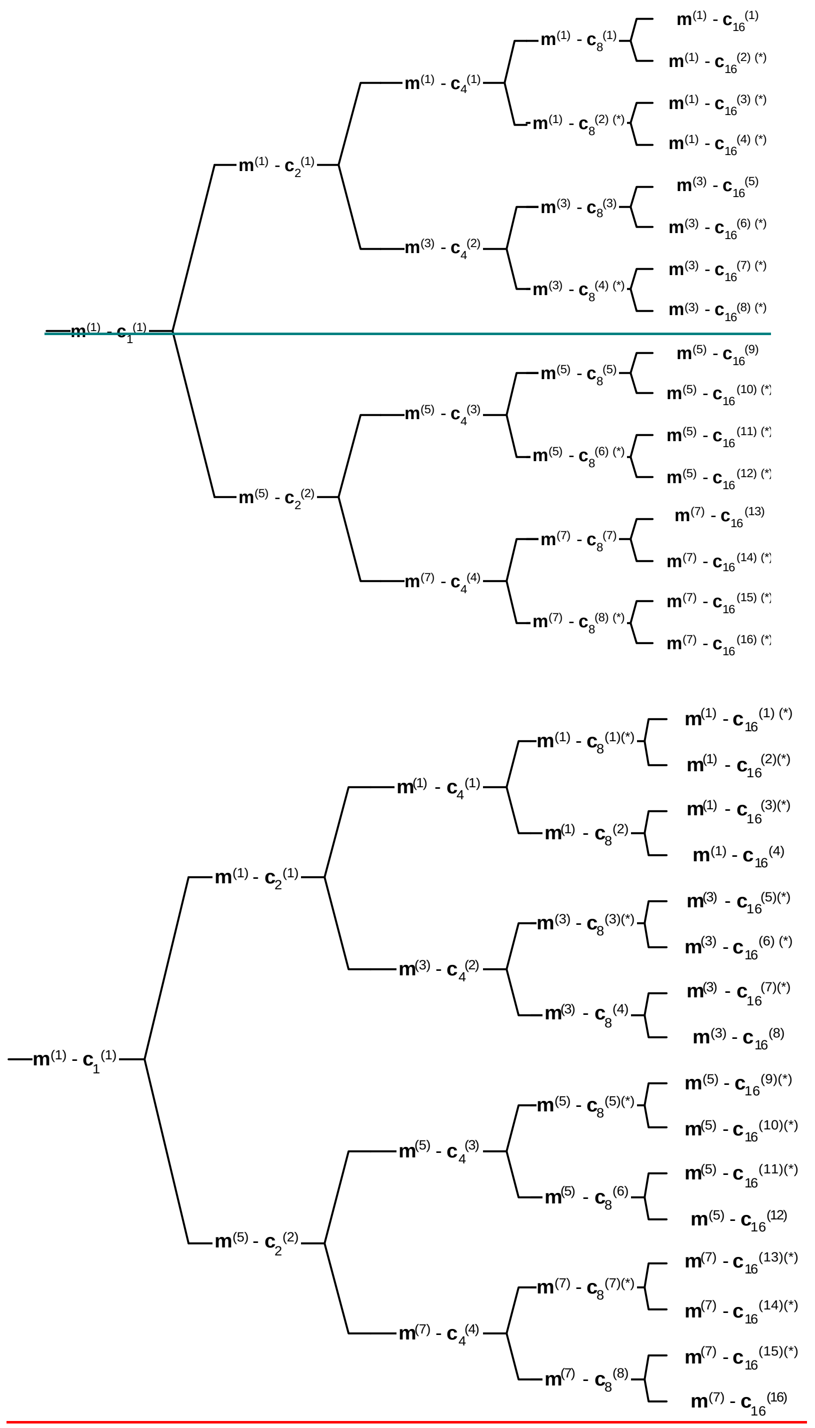

Figure A-3: Association of Midambles to Spreading Codes for Burst Type 1/3 and K=4

A.3.4 Association for Burst Type 2 and K=6 Midambles

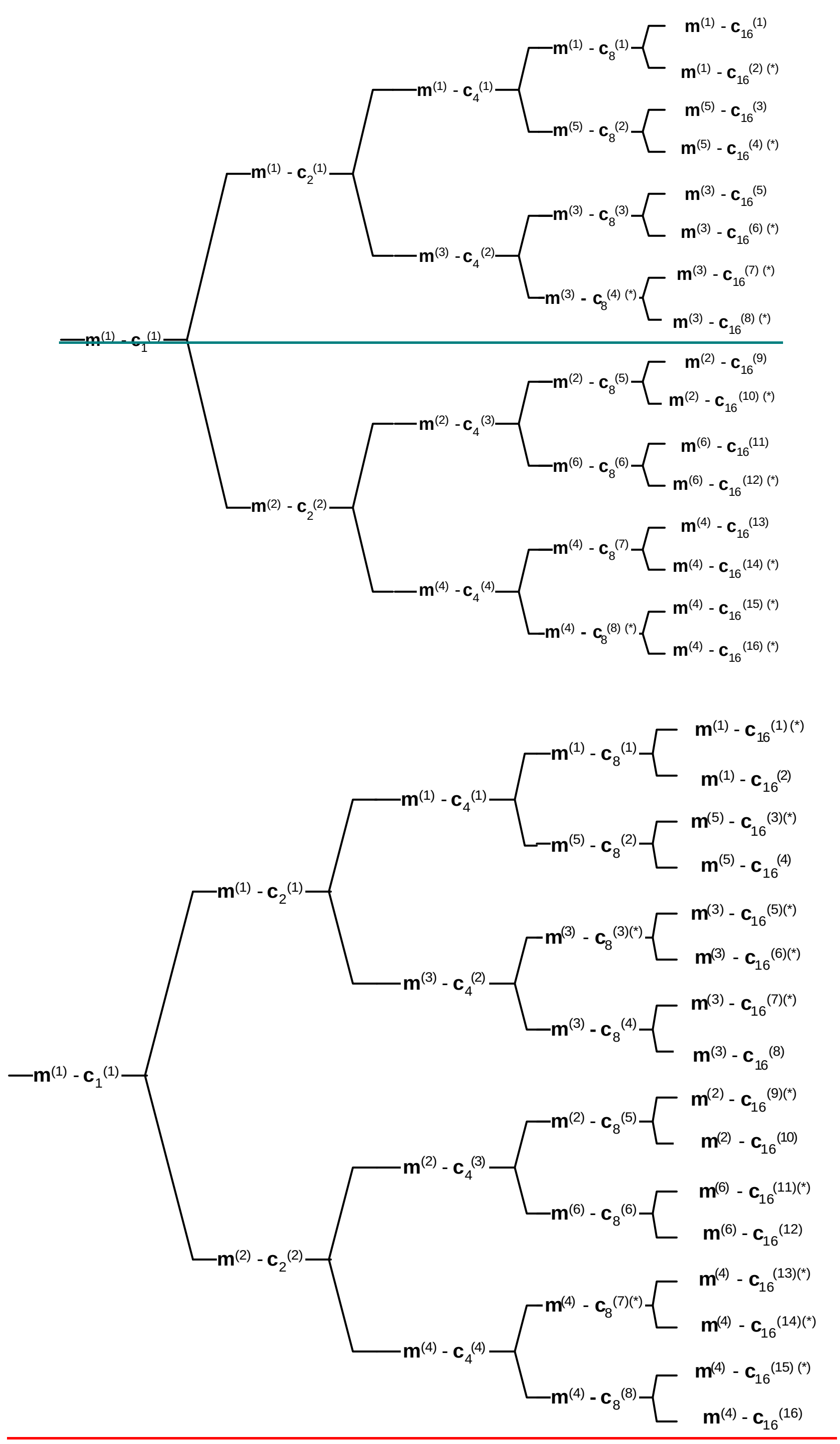

Figure A-4: Association of Midambles to Spreading Codes for Burst Type 2 and K=6

A.3.5 Association for Burst Type 2 and K=3 Midambles

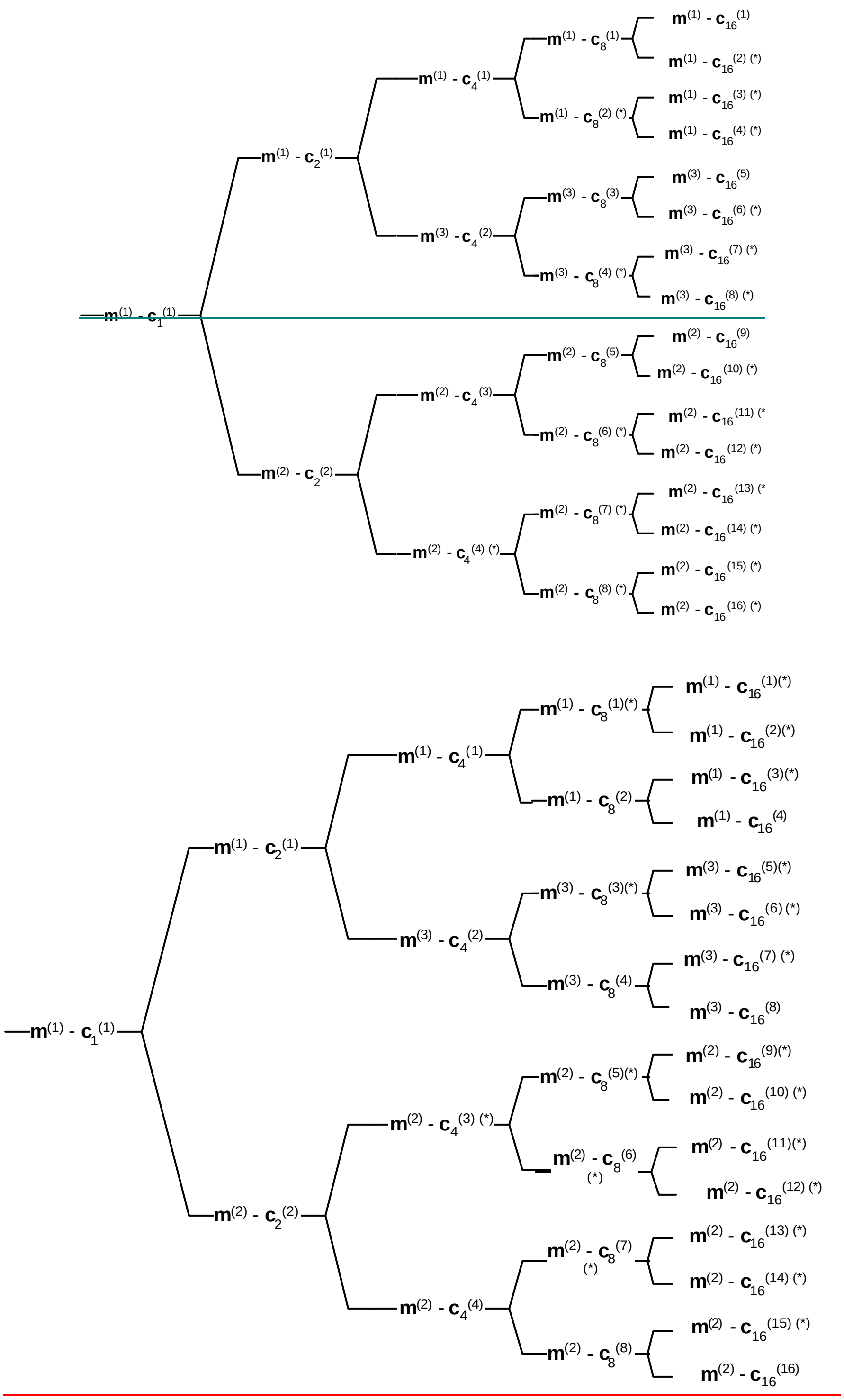

Figure A-5: Association of Midambles to Spreading Codes for Burst Type 2 and K=3

Annex B (normative) Signalling of the number of channelisation codes for the DL common midamble case

The following mapping schemes shall apply for the association between the number of channelisation codes employed in a timeslot and the use of a particular midamble shift in the DL common midamble case. In the following tables the presence of a particular midamble shift is indicated by '1'. Midamble shifts marked with '0' are left unused. Mapping schemes B.3 and B.4 are not applicable to beacon timeslots where a P-CCPCH is present, because the default midamble allocation scheme is applied to these timeslots. Note that in mapping schemes B.3 and B.4, the fixed and pre-allocated channelisation code for the beacon channel is included into the number of indicated channelisation codes.

B.1 Mapping scheme for Burst Type 1 and K=16 Midambles.

m1	m2	m3	m4	m5	m6	m7	M8	m9	m10	m11	m12	m13	m14	m15	m16	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 code
0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 codes
0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	3 codes
0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	4 codes
0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	5 codes
0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	6 codes
0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	7 codes
0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	8 codes
0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	9 codes
0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	10 codes
0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0	11 codes
0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	12 codes
0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	13 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	14 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	15 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	16 codes

B.2 Mapping scheme for Burst Type 1 and K=8 Midambles.

M1	m2	m3	m4	m5	m6	m7	m8	
1	0	0	0	0	0	0	0	1 code or 9 codes
0	**1**	0	0	0	0	0	0	2 codes or 10 codes
0	0	**1**	0	0	0	0	0	3 codes or 11 codes
0	0	0	**1**	0	0	0	0	4 codes or 12 codes
0	0	0	0	**1**	0	0	0	5 codes or 13 codes
0	0	0	0	0	**1**	0	0	6 codes or 14 codes
0	0	0	0	0	0	**1**	0	7 codes or 15 codes
0	0	0	0	0	0	0	**1**	8 codes or 16 codes

B.3 Mapping scheme for Burst Type 1 and K=4 Midambles.

m1	m3	m5	m7	
1	0	0	0	1 or 5 or 9 or 13 codes
0	**1**	0	0	2 or 6 or 10 or 14 codes
0	0	**1**	0	3 or 7 or 11 or 15 codes
0	0	0	**1**	4 or 8 or 12 or 16 codes

B.4~~3~~ Mapping scheme for beacon timeslots and K=16 Midambles.

m1	m2	m3	M4	m5	m6	m7	M8	m9	m10	m11	M12	m13	m14	m15	m16	
1	$x^{(*)}$	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1 codes or 13 codes
1	$x^{(*)}$	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2 codes or 14 codes
1	$x^{(*)}$	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3 codes or 15 codes
1	$x^{(*)}$	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4 codes or 16 codes
1	$x^{(*)}$	0	0	0	0	1	0	0	0	0	0	0	0	0	0	5 codes
1	$x^{(*)}$	0	0	0	0	0	1	0	0	0	0	0	0	0	0	6 codes
1	$x^{(*)}$	0	0	0	0	0	0	0	0	1	0	0	0	0	0	7 codes
1	$x^{(*)}$	0	0	0	0	0	0	0	0	0	1	0	0	0	0	8 codes
1	$x^{(*)}$	0	0	0	0	0	0	0	0	0	0	1	0	0	0	9 codes
1	$x^{(*)}$	0	0	0	0	0	0	0	0	0	0	0	1	0	0	10 codes
1	$x^{(*)}$	0	0	0	0	0	0	0	0	0	0	0	0	1	0	11 codes
1	$x^{(*)}$	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12 codes

(*) In case of Block-STTD encoding for the P-CCPCH, midamble shift 2 is used by the diversity antenna

B.5~~4~~ Mapping scheme for beacon timeslots and K=8 Midambles.

m1	m2	m3	m4	m5	m6	m7	M8	
1	$x^{(*)}$	1	0	0	0	0	0	1 or 7 or 13 codes
1	$x^{(*)}$	0	1	0	0	0	0	2 or 8 or 14 codes
1	$x^{(*)}$	0	0	1	0	0	0	3 or 9 or 15 codes
1	$x^{(*)}$	0	0	0	1	0	0	4 or 10 or 16 codes
1	$x^{(*)}$	0	0	0	0	1	0	5 codes or 11 codes
1	$x^{(*)}$	0	0	0	0	0	1	6 codes or 12 codes

(*) In case of Block-STTD encoding for the P-CCPCH, midamble shift 2 is used by the diversity antenna

B.6 Mapping scheme for beacon timeslots and K=4 Midambles.

m1	m3	m5	m7	
1	1	0	0	1 or 4 or 7 or 10 or 13 or 16 codes
1	0	1	0	2 or 5 or 8 or 11 or 14 codes
1	0	0	1	3 or 6 or 9 or 12 or 15 codes

B.7~~5~~ Mapping scheme for Burst Type 2 and K=6 Midambles.

m1	m2	m3	m4	m5	m6	
1	0	0	0	0	0	1 or 7 or 13 codes
0	1	0	0	0	0	2 or 8 or 14 codes
0	0	1	0	0	0	3 or 9 or 15 codes
0	0	0	1	0	0	4 or 10 or 16 codes
0	0	0	0	1	0	5 or 11 codes
0	0	0	0	0	1	6 or 12 codes

B.8~~6~~ Mapping scheme for Burst Type 2 and K=3 Midambles.

m1	m2	m3	
1	0	0	1 or 4 or 7 or 10 or 13 or 16 codes
0	**1**	0	2 or 5 or 8 or 11 or 14 codes
0	0	**1**	3 or 6 or 9 or 12 or 15 codes