CHANGE REQUEST

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25.221	CR	**035**	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: (U)SIM ☐   ME ☐   UTRAN / Radio **X**   Core Network ☐
(at least one should be marked with an X)

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

Subject:	Clarifications on Midamble Associations

Work item:	

Category: F   Correction   **X**   **Release:**

(only one category shall be marked with an X)

F	Correction	**X**		Phase 2	☐
A	Corresponds to a correction in an earlier release	☐		Release 96	☐
B	Addition of feature	☐		Release 97	☐
C	Functional modification of feature	☐		Release 98	☐
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

The burst type 2 can be used for uplink and downlink. 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.

5.2.3.1 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.
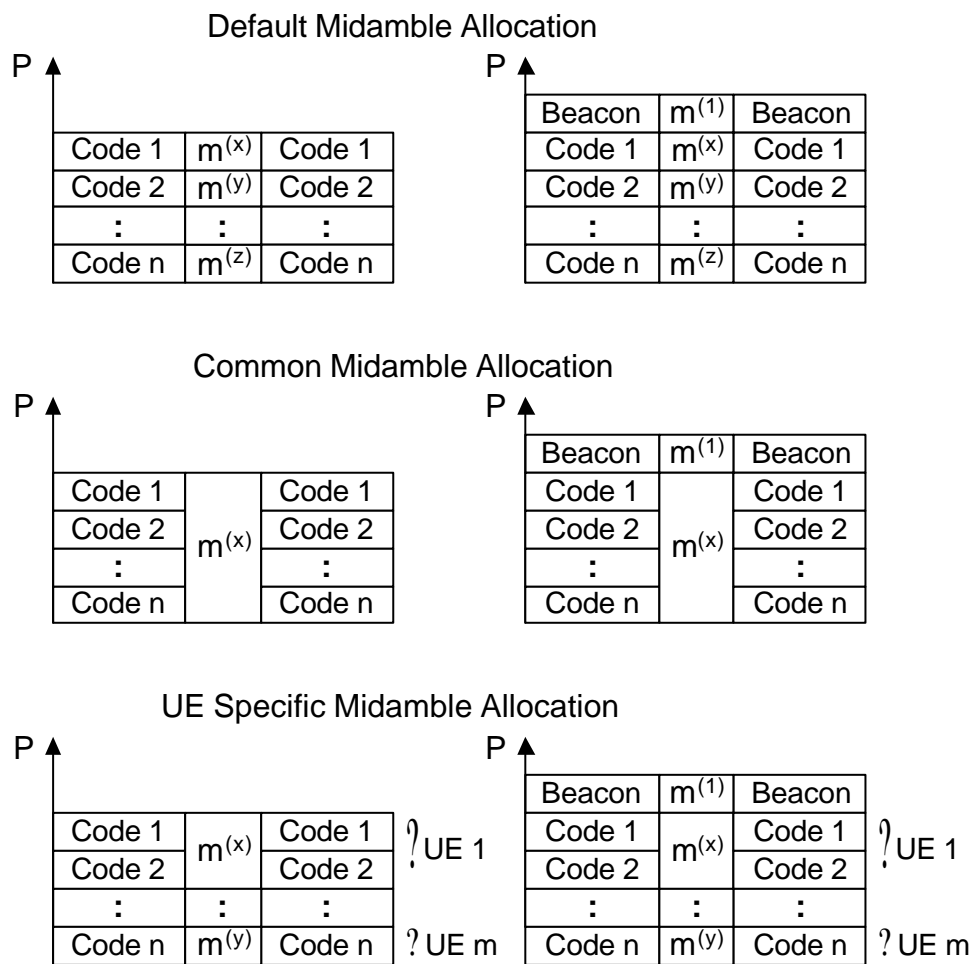
Figure 18: Midamble powers for the different midamble allocation schemes
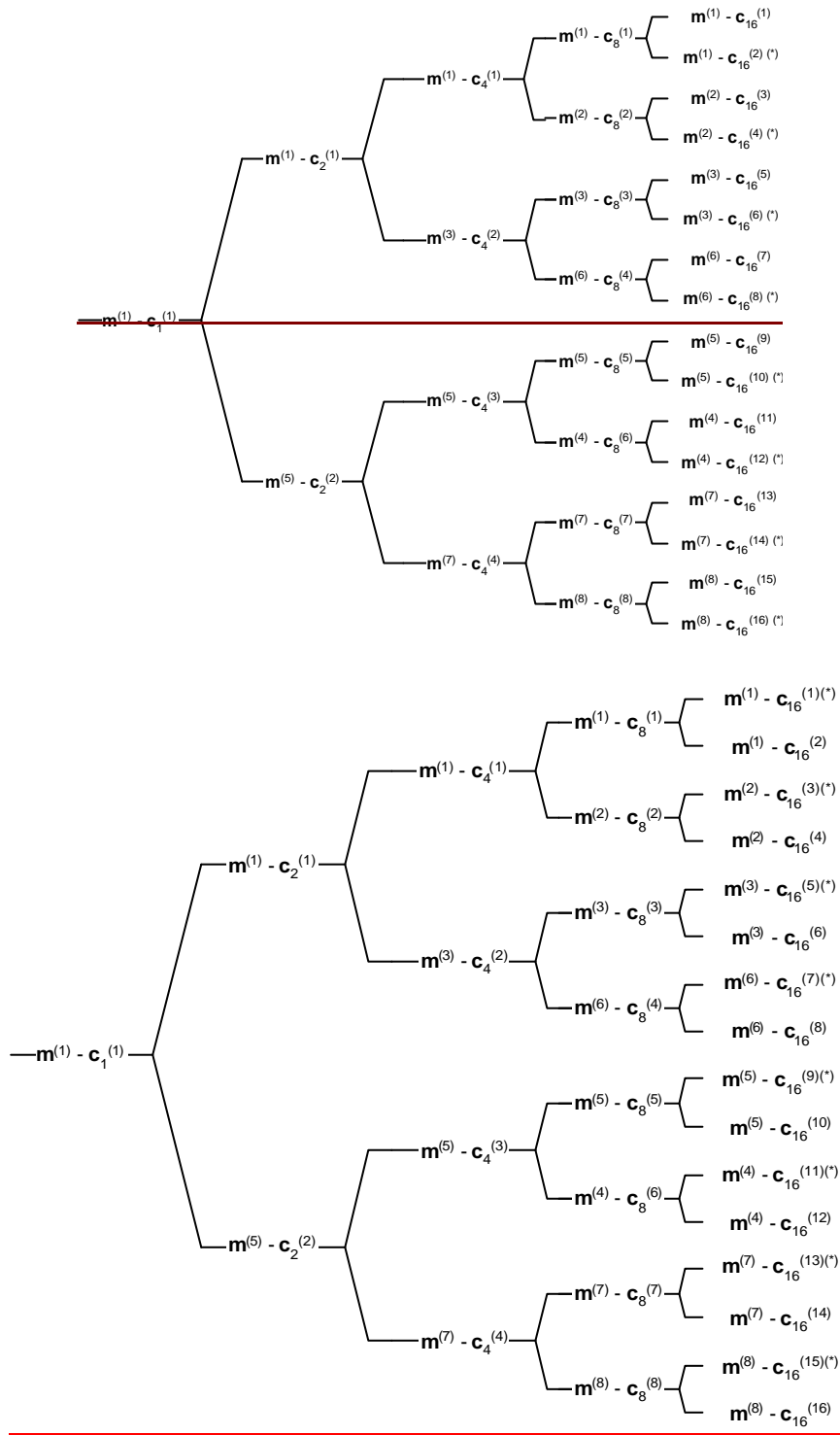
A.3.2 Association for Burst Type 1/3 and K=8 Midambles

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

$m^{(1)} - c_1^{(1)}$

$m^{(1)} - c_2^{(1)}$

$m^{(1)} - c_4^{(1)}$

$m^{(1)} - c_8^{(1)}$
- $m^{(1)} - c_{16}^{(1)}$
- $m^{(1)} - c_{16}^{(2)}$ (*)

$m^{(1)} - c_8^{(2)}$ (*)
- $m^{(1)} - c_{16}^{(3)}$ (*)
- $m^{(1)} - c_{16}^{(4)}$ (*)

$m^{(3)} - c_4^{(2)}$

$m^{(3)} - c_8^{(3)}$
- $m^{(3)} - c_{16}^{(5)}$
- $m^{(3)} - c_{16}^{(6)}$ (*)

$m^{(3)} - c_8^{(4)}$ (*)
- $m^{(3)} - c_{16}^{(7)}$ (*)
- $m^{(3)} - c_{16}^{(8)}$ (*)

$m^{(5)} - c_2^{(2)}$

$m^{(5)} - c_4^{(3)}$

$m^{(5)} - c_8^{(5)}$
- $m^{(5)} - c_{16}^{(9)}$
- $m^{(5)} - c_{16}^{(10)}$ (*)

$m^{(5)} - c_8^{(6)}$ (*)
- $m^{(5)} - c_{16}^{(11)}$ (*)
- $m^{(5)} - c_{16}^{(12)}$ (*)

$m^{(7)} - c_4^{(4)}$

$m^{(7)} - c_8^{(7)}$
- $m^{(7)} - c_{16}^{(13)}$
- $m^{(7)} - c_{16}^{(14)}$ (*)

$m^{(7)} - c_8^{(8)}$ (*)
- $m^{(7)} - c_{16}^{(15)}$ (*)
- $m^{(7)} - c_{16}^{(16)}$ (*)

$m^{(1)} - c_1^{(1)}$

$m^{(1)} - c_2^{(1)}$

$m^{(1)} - c_4^{(1)}$

$m^{(1)} - c_8^{(1)}$ (*)
- $m^{(1)} - c_{16}^{(1)}$ (*)
- $m^{(1)} - c_{16}^{(2)}$ (*)

$m^{(1)} - c_8^{(2)}$
- $m^{(1)} - c_{16}^{(3)}$ (*)
- $m^{(1)} - c_{16}^{(4)}$

$m^{(3)} - c_4^{(2)}$

$m^{(3)} - c_8^{(3)}$ (*)
- $m^{(3)} - c_{16}^{(5)}$ (*)
- $m^{(3)} - c_{16}^{(6)}$ (*)

$m^{(3)} - c_8^{(4)}$
- $m^{(3)} - c_{16}^{(7)}$ (*)
- $m^{(3)} - c_{16}^{(8)}$

$m^{(5)} - c_2^{(2)}$

$m^{(5)} - c_4^{(3)}$

$m^{(5)} - c_8^{(5)}$ (*)
- $m^{(5)} - c_{16}^{(9)}$ (*)
- $m^{(5)} - c_{16}^{(10)}$ (*)

$m^{(5)} - c_8^{(6)}$
- $m^{(5)} - c_{16}^{(11)}$ (*)
- $m^{(5)} - c_{16}^{(12)}$

$m^{(7)} - c_4^{(4)}$

$m^{(7)} - c_8^{(7)}$ (*)
- $m^{(7)} - c_{16}^{(13)}$ (*)
- $m^{(7)} - c_{16}^{(14)}$ (*)

$m^{(7)} - c_8^{(8)}$
- $m^{(7)} - c_{16}^{(15)}$ (*)
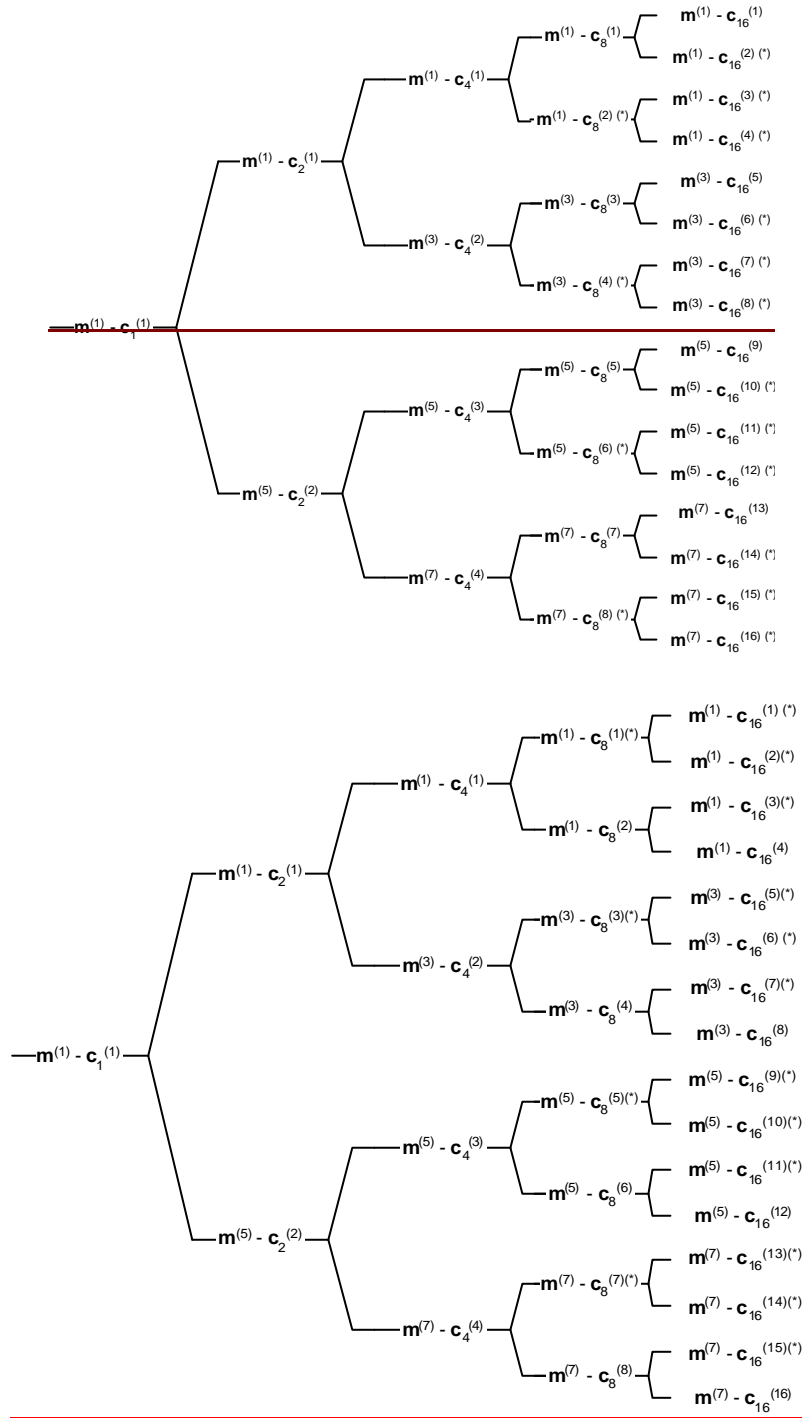- $m^{(7)} - c_{16}^{(16)}$

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

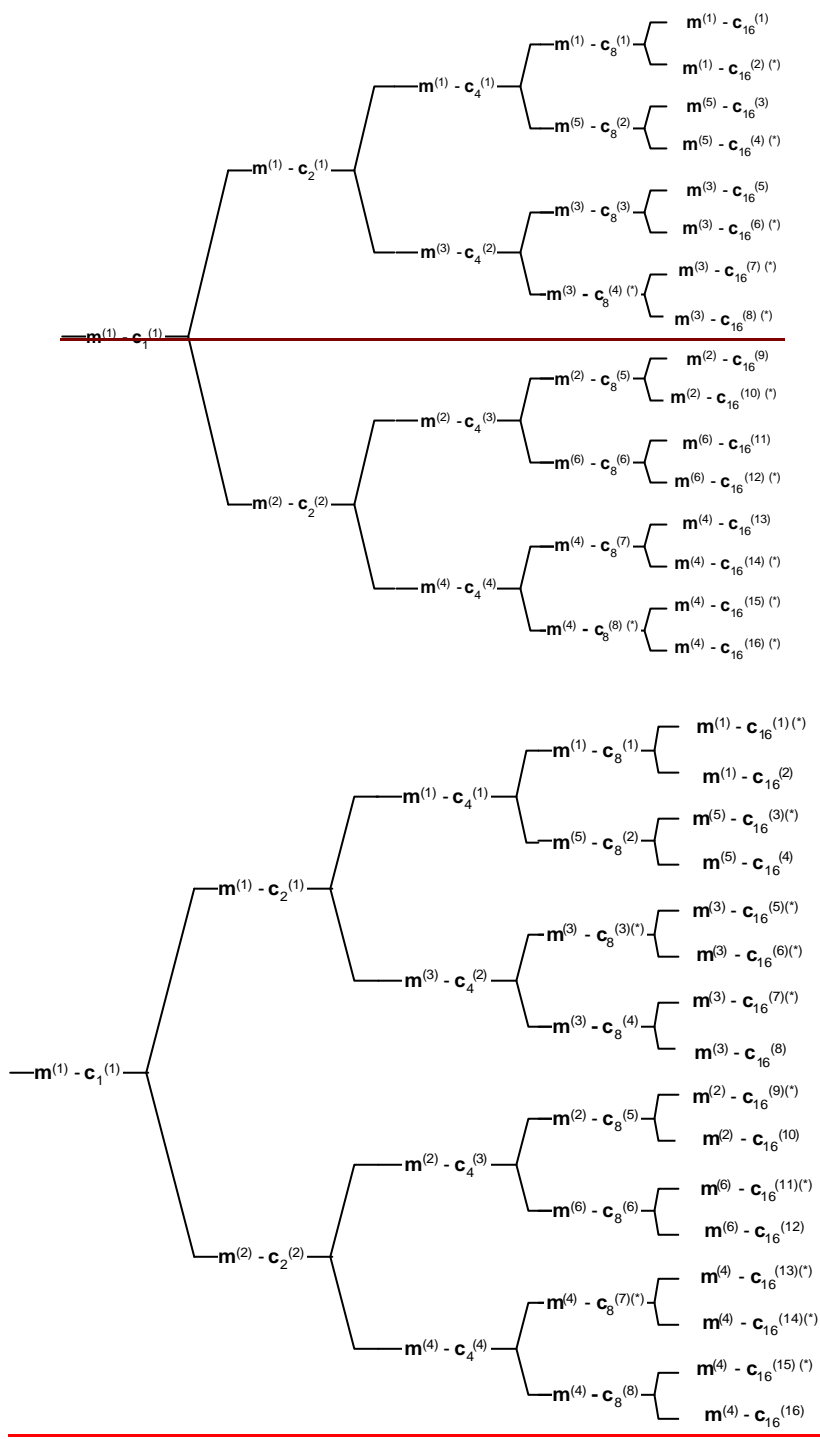## A.3.4 Association for Burst Type 2 and K=6 Midambles

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

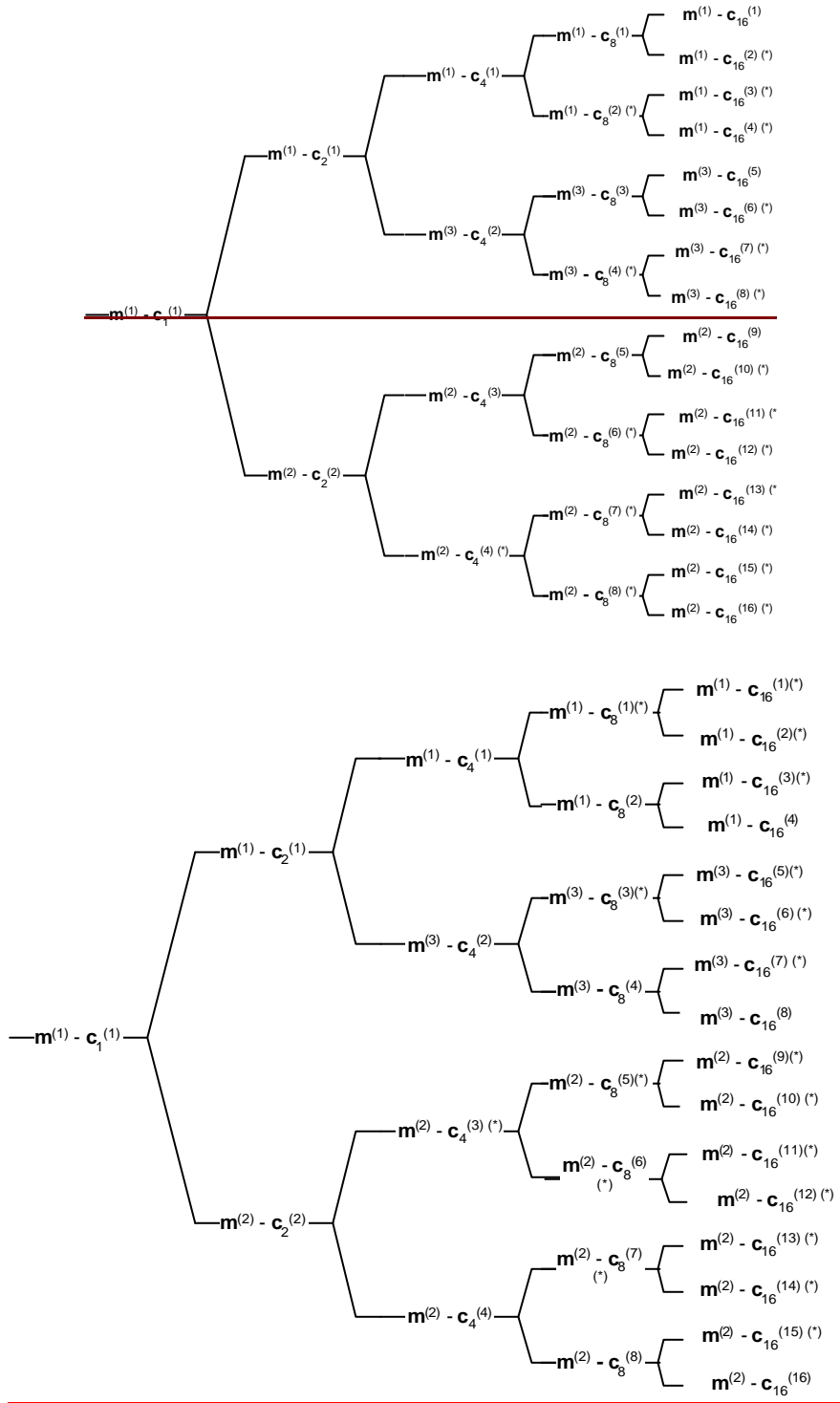## A.3.5 Association for Burst Type 2 and K=3 Midambles

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.43 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.54 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.75 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