3GPP TSG RAN WG1#11
San Diego USA, Feb. 29th – March 3rd, 2000

Document R1-00-0237
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.222	**CR**	**025**	Current Version:	V3.1.1

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

For submission to:	TSG RAN #7	for approval	X	strategic		(for SMG
list expected approval meeting # here ↑		for information		non-strategic		use only)

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

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

Source: LGIC **Date:** 2000-2-29

Subject: Change of TFCI basis for TDD

Work item:

Category:
(only one category Shall be marked With an X)

F	Correction	X	**Release:**	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: For the most commonality between FDD and TDD TFCI basis, this CR is proposed.

Clauses affected: 4.3.1.1, 4.3.1.2.2

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:

4.3 Coding for layer 1 control

4.3.1 Coding of transport format combination indicator (TFCI)

Encoding of the TFCI bits depends on the number of them. If there are 6-10 bits of TFCI the channel encoding is done as described in section 4.3.1.1. Also specific coding of less than 6 bits is possible as explained in section 4.3.1.2.

4.3.1.1 Coding of long TFCI lengths

The TFCI bits are encoded using a (32, 10) sub-code of the second order Reed-Muller code. The coding procedure is as shown in figure 4.3.3.1-1.

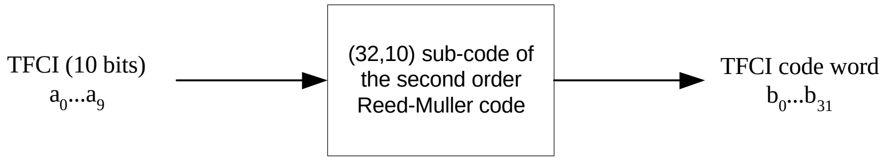

Figure 4.3.3.1-1: Channel coding of TFCI bits

TFCI is encoded by the (32,10) sub-code of second order Reed-Muller code. The code words of the (32,10) sub-code of second order Reed-Muller code are linear combination of some among 10 basis sequences. The basis sequences are as follows in table 4.3.1-1.

Table 4.3.1-1: Basis sequences for (32,10) TFCI code

I	$M_{i,0}$	$M_{i,1}$	$M_{i,2}$	$M_{i,3}$	$M_{I,4}$	$M_{i,5}$	$M_{i,6}$	$M_{i,7}$	$M_{i,8}$	$M_{i,9}$
0	1~~1~~	0~~1~~	0~~0~~	0~~0~~	0~~0~~	1~~0~~	0	0	0	0
1	0~~1~~	1~~0~~	0~~1~~	0~~0~~	0~~0~~	1~~0~~	1	0	0	0
2	1~~1~~	1~~1~~	0~~1~~	0~~0~~	0~~0~~	1~~0~~	0	0	0	1
3	0~~1~~	0~~0~~	1~~0~~	0~~1~~	0~~0~~	1~~0~~	1	0	1	1
4	1~~1~~	0~~1~~	1~~0~~	0~~1~~	0~~0~~	1~~0~~	0	0	0	1
5	0~~1~~	1~~0~~	1~~1~~	0~~1~~	0~~0~~	1~~0~~	0	0	1	0
6	1~~1~~	1~~1~~	1~~1~~	0~~1~~	0~~0~~	1~~0~~	0	1	0	0
7	0~~1~~	0~~0~~	0~~0~~	1~~0~~	0~~1~~	1~~0~~	0	1	1	0
8	1~~1~~	0~~1~~	0~~0~~	1~~0~~	0~~1~~	1~~0~~	1	1	1	0
9	0~~1~~	1~~0~~	0~~1~~	1~~0~~	0~~1~~	1~~0~~	1	0	1	1
10	1~~1~~	1~~1~~	0~~1~~	1~~0~~	0~~1~~	1~~0~~	0	0	1	1
11	0~~1~~	0~~0~~	1~~0~~	1~~1~~	0~~1~~	1~~0~~	0	1	1	0
12	1~~1~~	0~~1~~	1~~0~~	1~~1~~	0~~1~~	1~~0~~	0	1	0	1
13	0~~1~~	1~~0~~	1~~1~~	1~~1~~	0~~1~~	1~~0~~	1	0	0	1
14	1~~1~~	1~~1~~	1~~1~~	1~~1~~	0~~1~~	1~~0~~	1	1	1	1
15	1~~1~~	0~~1~~	0~~0~~	0~~0~~	1~~0~~	1~~1~~	1	1	0	0
16	0~~1~~	1~~0~~	0~~1~~	0~~0~~	1~~0~~	1~~1~~	1	1	0	1
17	1~~1~~	1~~1~~	0~~1~~	0~~0~~	1~~0~~	1~~1~~	1	0	1	0
18	0~~1~~	0~~0~~	1~~0~~	0~~1~~	1~~0~~	1~~1~~	0	1	1	1
19	1~~1~~	0~~1~~	1~~0~~	0~~1~~	1~~0~~	1~~1~~	0	1	0	1
20	0~~1~~	1~~0~~	1~~1~~	0~~1~~	1~~0~~	1~~1~~	0	0	1	1
21	1~~1~~	1~~1~~	1~~1~~	0~~1~~	1~~0~~	1~~1~~	0	1	1	1
22	0~~1~~	0~~0~~	0~~0~~	1~~0~~	1~~1~~	1~~1~~	0	1	0	0
23	1~~1~~	0~~1~~	0~~0~~	1~~0~~	1~~1~~	1~~1~~	1	1	0	1
24	0~~1~~	1~~0~~	0~~1~~	1~~0~~	1~~1~~	1~~1~~	1	0	1	0
25	1~~1~~	1~~1~~	0~~1~~	1~~0~~	1~~1~~	1~~1~~	1	0	0	1
26	0~~1~~	0~~0~~	1~~0~~	1~~1~~	1~~1~~	1~~1~~	0	0	1	0
27	1~~1~~	0~~1~~	1~~0~~	1~~1~~	1~~1~~	1~~1~~	1	1	0	0
28	0~~1~~	1~~0~~	1~~1~~	1~~1~~	1~~1~~	1~~1~~	1	1	1	0
29	1~~1~~	1~~1~~	1~~1~~	1~~1~~	1~~1~~	1~~1~~	1	1	1	1
30	0~~1~~	0~~0~~	0~~0~~	0~~0~~	0~~0~~	1~~0~~	0	0	0	0
31	0~~1~~	0~~0~~	0~~0~~	0~~0~~	1~~0~~	1~~1~~	1	0	0	0

For TFCI bits a_0, a_1, a_2, a_3, a_4, a_5, a_6, a_7, a_8, a_9 (a_0 is LSB and a_9 is MSB), the output code word bits b_i are given by:

$$b_i = \sum_{n=0}^{9} (a_n \times M_{i,n}) \bmod 2$$

where i=0…31. N_{TFCI}=32.

4.3.1.2 Coding of short TFCI lengths

4.3.1.2.1 Coding very short TFCIs by repetition

If the number of TFCI bits is 1 or 2, then repetition will be used for coding. In this case each bit is repeated to a total of 4 times giving 4-bit transmission (N_{TFCI}=4) for a single TFCI bit and 8-bit transmission (N_{TFCI}=8) for 2 TFCI bits. In the case of two TFCI bits denoted b_0 and b_1 the TFCI word shall be { b_0, b_1, b_0, b_1, b_0, b_1, b_0, b_1 }.

4.3.1.2.2 Coding short TFCIs using bi-orthogonal codes

If the number of TFCI bits is in the range 3 to 5 the TFCI bits are encoded using a (16, 5) bi-orthogonal (or first order Reed-Muller) code. The coding procedure is as shown in figure 4-8.

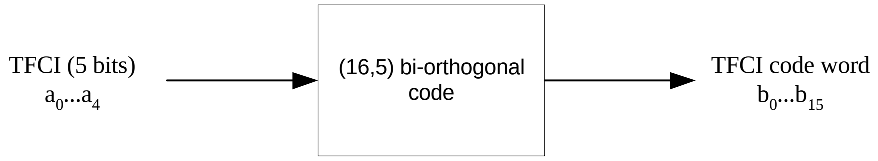

Figure 4-8: Channel coding of short length TFCI bits

The code words of the (16,5) bi-orthogonal code are linear combinations of 5 basis sequences as defined in table 4.3.1-2 below.

Table 4.3.1-2: Basis sequences for (16,5) TFCI code

i	$M_{i,0}$	$M_{i,1}$	$M_{i,2}$	$M_{i,3}$	$M_{i,4}$
0	1~~1~~	0~~1~~	0~~0~~	0~~0~~	1~~0~~
1	0~~1~~	1~~0~~	0~~1~~	0~~0~~	1~~0~~
2	1~~1~~	1~~1~~	0~~1~~	0~~0~~	1~~0~~
3	0~~1~~	0~~0~~	1~~0~~	0~~1~~	1~~0~~
4	1~~1~~	0~~1~~	1~~0~~	0~~1~~	1~~0~~
5	0~~1~~	1~~0~~	1~~1~~	0~~1~~	1~~0~~
6	1~~1~~	1~~1~~	1~~1~~	0~~1~~	1~~0~~
7	0~~1~~	0~~0~~	0~~0~~	1~~0~~	1~~1~~
8	1~~1~~	0~~1~~	0~~0~~	1~~0~~	1~~1~~
9	0~~1~~	1~~0~~	0~~1~~	1~~0~~	1~~1~~
10	1~~1~~	1~~1~~	0~~1~~	1~~0~~	1~~1~~
11	0~~1~~	0~~0~~	1~~0~~	1~~1~~	1~~1~~
12	1~~1~~	0~~1~~	1~~0~~	1~~1~~	1~~1~~
13	0~~1~~	1~~0~~	1~~1~~	1~~1~~	1~~1~~
14	1~~1~~	1~~1~~	1~~1~~	1~~1~~	1~~1~~
15	0~~1~~	0~~0~~	0~~0~~	0~~0~~	1~~0~~

For TFCI information bits a_0, a_1, a_2, a_3, a_4 (a_0 is LSB and a_4 is MSB), the), the output code word bits b_j are given by:

$$b_i = \sum_{n=0}^{4} (a_n \times M_{i,n}) \bmod 2$$

where i=0…15. N_{TFCI}=16.