TSG RAN Meeting #28 **RP-050252**
Quebec, Canada, 1 - 3 June 2005

Title **CRs (Rel-6 category F) for corrections of Enhanced uplink in RAN1 specifications**
Source **TSG RAN WG1**
Agenda Item **8.6**

RAN1 Tdoc	Spec	CR	Rev	Rel	Cat	Current Version	Subject	Work item	Remarks
R1-050359	25.211	203	1	Rel-6	F	6.4.0	Correction of text on E-RGCH duration	EDCH-Phys	
R1-050544	25.211	210	1	Rel-6	F	6.4.0	Clarification on EACGH transmission interval	EDCH-Phys	
R1-050546	25.211	212	1	Rel-6	F	6.4.0	Clarification on E-DCH timing	EDCH-Phys	
R1-050540	25.212	204	2	Rel-6	F	6.4.0	E-DCH Corrections	EDCH-Phys	
R1-050541	25.212	205	1	Rel-6	F	6.4.0	Compressed Mode Operation for the Enhanced Uplink	EDCH-Phys	Linked RAN2 CR (CR 216 to 25.321) is packed in separate package.
R1-050329	25.212	206	-	Rel-6	F	6.4.0	E-HICH and E-RGCH serving/non-serving definition clarification	EDCH-Phys	
R1-050429	25.212	215	-	Rel-6	F	6.4.0	Clarification on E-AGCH bit mapping	EDCH-Phys	
R1-050434	25.212	216	-	Rel-6	F	6.4.0	Determination of SF and number of PhCHs considering SF2	EDCH-Phys	
R1-050505	25.212	219	-	Rel-6	F	6.4.0	Re-ordering of the E-DPCCH bit mapping	EDCH-Phys	
R1-050543	25.212	220	-	Rel-6	F	6.4.0	Coding for E-AGCH	EDCH-Phys	
R1-050537	25.213	074	2	Rel-6	F	6.2.0	Power Offset values for E-PDDCH/E-DPCCH	EDCH-Phys	
R1-050549	25.213	075	3	Rel-6	F	6.2.0	Support of different HARQ profiles	EDCH-Phys	
R1-050565	25.214	363	4	Rel-6	F	6.5.0	Power control at the maximum power limit	EDCH-Phys	
R1-050550	25.214	372	4	Rel-6	F	6.5.0	Support of different HARQ profiles	EDCH-Phys	
R1-050346	25.214	373	-	Rel-6	F	6.5.0	Lowest reference E-TFC for the gain factor setting for E-DCH	EDCH-Phys	
R1-050576	25.214	380	3	Rel-6	F	6.5.0	Clarification on E-DCH timing	EDCH-Phys	

RAN1 Tdoc	Spec	CR	Rev	Rel	Cat	Current Version	Subject	Work item	Remarks
R1-050536	25.214	381	1	Rel-6	F	6.5.0	DPCCH gain factor with no DPDCH configured	EDCH-Phys	
R1-050542	25.214	382	2	Rel-6	F	6.5.0	Compressed Mode Operation for the Enhanced Uplink	EDCH-Phys	Linked RAN2 CR (CR 216 to 25.321) is packed in separate package.

3GPP TSG-RAN WG1 Meeting #40bis **Tdoc ⌘R1-050359**
Beijing, China, 04–08 April 2005

CR-Form-v7.1

CHANGE REQUEST

⌘	**25.211**	**CR**	**203**	⌘**rev**	**1**	⌘	Current version:	**6.4.0**	⌘

*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: ⌘	Correction of text on E-RGCH duration			
Source: ⌘	RAN WG1			
Work item code: ⌘	EDCH-Phys		***Date:*** ⌘	06/04/2005
Category: ⌘	**F**		***Release:*** ⌘	Rel-6
	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:* *Ph2 (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)* *Rel-7 (Release 7)*

Reason for change: ⌘	The current text in section 5.3.2.4 and 7.11 defines the duration and timing of RG for serving/non-serving cells, while the intention is that the relation is defined in terms of cells from the serving/non-serving RLS.
Summary of change: ⌘	The RG duration and timing are defined in terms of cells from the serving/non-serving RLS.
Consequences if not approved: ⌘	Ambiguous wording in the specification of the RG length and timing.

Clauses affected: ⌘	5.3.2.4 and 7.11			
	Y	**N**		
Other specs affected: ⌘		X	Other core specifications ⌘	
			Test specifications	
			O&M Specifications	
Other comments: ⌘				

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.3.2.4 E-DCH Relative Grant Channel

The E-DCH Relative Grant Channel (E-RGCH) is a fixed rate (SF=128) dedicated downlink physical channel carrying the uplink E-DCH relative grants. Figure 12A illustrates the structure of the E-RGCH. A relative grant is transmitted using 3, 12 or 15 consecutive slots and in each slot a sequence of 40 ternary values is transmitted. The 3 and 12 slot duration shall be used to controlon an E-RGCH transmitted to UEs for which the cell transmitting the E-RGCH is in the E-DCH serving cell radio link set and for which the E-DCH TTI is respectively 2 and 10 ms. The 15 slot duration shall be used to controlon an E-RGCH transmitted to UEs for which the cell transmitting the E-RGCH is not in the E-DCH serving cellradio link set.

The sequence $b_{i,0}$, $b_{i,1}$, …, $b_{i,39}$ transmitted in slot i in Figure 12A is given by $b_{i,j}$ = a $C_{ss,40,m(i),j}$. In a serving E-DCH radio link set, the relative grant a is set to +1, 0, or -1 and in a non-serving E-DCH radio link set, the relative grant a is set to 0 or -1. The orthogonal signature sequences $C_{ss,40,\ m(i)}$ is given by Table 16A and the index m(i) in slot i is given by Table 16B. The E-RGCH signature sequence index l in Table 16B is given by higher layers.

In case STTD-based open loop transmit diversity is applied for E-RGCH, STTD encoding according to subclause 5.3.1.1.1 is applied to the sequence $b_{i,j}$.

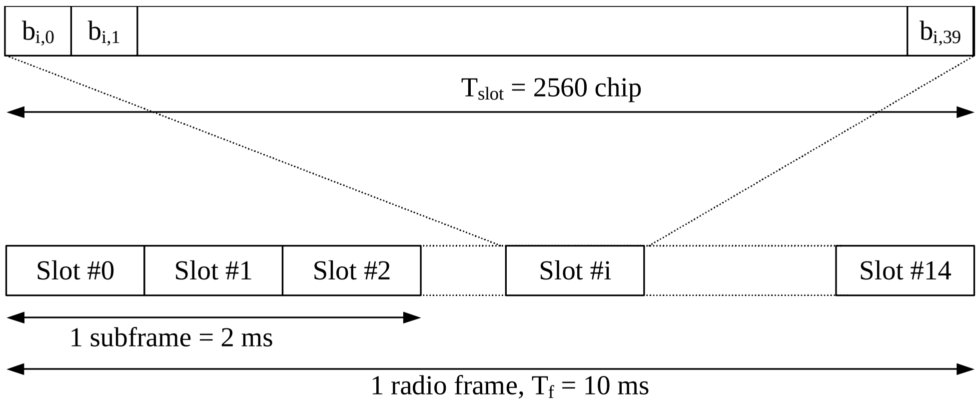

Figure 12A: E-RGCH and E-HICH structure

Table 16A: E-RGCH and E-HICH signature sequences

$C_{ss,40,0}$	-1	-1	-1	1	-1	1	-1	-1	1	1	-1	-1	1	-1	1	1	-1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1	1	-1	-1	1	1	1	1	1	-1	-1	-1
$C_{ss,40,1}$	-1	1	1	-1	-1	1	1	1	1	-1	1	-1	1	1	-1	-1	-1	-1	1	1	1	-1	-1	-1	-1	1	-1	-1	-1	-1	-1	-1	-1	1	1	-1	1	1	-1	-1
$C_{ss,40,2}$	-1	-1	-1	1	-1	1	1	1	1	-1	-1	-1	1	-1	-1	1	1	-1	-1	1	1	-1	1	1	1	-1	-1	1	1	1	-1	1	-1	1	-1	-1	-1	-1	-1	-1
$C_{ss,40,3}$	1	-1	-1	-1	-1	-1	-1	1	1	1	-1	1	-1	1	-1	1	-1	-1	1	1	-1	1	-1	-1	1	1	-1	1	-1	-1	1	1	-1	1	1	-1	-1	-1	-1	-1
$C_{ss,40,4}$	1	1	1	-1	-1	1	-1	1	1	-1	1	1	1	-1	1	1	1	1	1	1	-1	1	1	1	-1	-1	-1	1	1	-1	1	-1	1	1	1	1	-1	1	-1	-1
$C_{ss,40,5}$	-1	1	-1	-1	1	1	1	-1	1	1	-1	1	1	1	-1	1	1	1	-1	-1	1	-1	-1	1	-1	1	-1	1	-1	-1	1	-1	1	1	-1	-1	-1	1	1	-1
$C_{ss,40,6}$	1	1	-1	-1	-1	1	1	-1	1	1	-1	-1	1	-1	-1	-1	-1	1	1	-1	1	1	1	-1	1	-1	1	-1	1	-1	-1	1	1	1	1	-1	-1	1	-1	1
$C_{ss,40,7}$	-1	1	-1	1	1	1	-1	-1	1	-1	-1	1	1	1	1	-1	-1	-1	1	-1	-1	-1	1	-1	1	1	-1	-1	1	1	1	1	-1	1	1	1	-1	1	1	-1
$C_{ss,40,8}$	1	1	-1	1	1	-1	1	1	1	1	-1	-1	-1	-1	1	-1	1	-1	1	1	1	1	-1	1	-1	-1	-1	-1	-1	1	-1	-1	-1	1	1	1	-1	1	1	-1
$C_{ss,40,9}$	-1	1	-1	-1	-1	-1	1	-1	1	-1	-1	1	-1	-1	1	1	1	-1	1	-1	1	-1	-1	1	1	-1	1	1	-1	-1	1	1	-1	1	1	1	1	1	-1	1
$C_{ss,40,10}$	-1	1	1	-1	1	1	-1	1	1	1	1	-1	1	-1	1	1	-1	-1	-1	1	-1	-1	-1	-1	1	-1	1	1	-1	-1	-1	1	-1	1	-1	1	-1	1	1	1
$C_{ss,40,11}$	-1	1	-1	-1	-1	-1	-1	1	1	1	-1	-1	-1	1	1	-1	1	1	-1	1	-1	-1	1	1	1	1	-1	-1	1	-1	-1	1	1	1	-1	1	1	1	-1	-1
$C_{ss,40,12}$	-1	-1	-1	-1	1	-1	1	1	1	-1	-1	-1	-1	1	1	1	-1	1	1	1	1	-1	1	-1	-1	1	1	1	1	-1	-1	-1	1	1	1	1	-1	-1	1	1
$C_{ss,40,13}$	1	1	1	1	-1	-1	1	-1	1	-1	1	-1	-1	1	1	1	-1	1	-1	-1	1	1	-1	-1	1	1	-1	1	-1	1	-1	1	1	1	-1	1	-1	1	-1	-1
$C_{ss,40,14}$	-1	1	1	1	-1	-1	-1	-1	1	1	1	-1	-1	1	-1	1	1	-1	1	-1	-1	-1	1	1	-1	1	1	1	1	1	-1	-1	-1	1	1	-1	-1	1	-1	1
$C_{ss,40,15}$	-1	-1	1	1	-1	1	1	1	1	1	1	1	1	1	1	-1	1	1	1	1	1	-1	-1	1	1	1	1	-1	-1	1	1	1	1	1	1	1	-1	-1	-1	1
$C_{ss,40,16}$	1	-1	-1	-1	-1	1	-1	-1	1	-1	-1	-1	1	1	1	-1	1	-1	-1	-1	-1	1	-1	1	-1	1	1	-1	-1	-1	-1	-1	-1	1	-1	1	-1	-1	-1	1
$C_{ss,40,17}$	1	-1	1	-1	1	1	1	-1	1	1	1	-1	1	1	1	1	1	-1	1	-1	1	1	1	1	1	1	-1	1	1	-1	-1	1	-1	1	1	1	1	-1	1	-1
$C_{ss,40,18}$	1	1	-1	1	-1	1	1	1	1	1	-1	1	1	1	1	1	-1	-1	-1	1	1	1	1	-1	-1	1	1	1	1	1	1	-1	-1	1	-1	1	1	1	-1	1
$C_{ss,40,19}$	1	1	-1	1	1	1	-1	1	1	-1	-1	-1	1	1	-1	1	1	1	1	1	-1	1	-1	1	1	1	1	1	-1	1	-1	1	1	1	1	-1	1	1	1	1
$C_{ss,40,20}$	1	1	1	-1	1	1	-1	1	1	1	-1	1	-1	-1	-1	1	-1	-1	1	-1	1	-1	-1	1	1	1	1	-1	1	1	-1	-1	1	1	-1	1	-1	-1	-1	-1
$C_{ss,40,21}$	-1	1	1	-1	-1	-1	-1	1	1	1	-1	-1	1	-1	-1	1	1	-1	-1	-1	1	1	1	-1	-1	1	-1	-1	-1	1	1	1	1	1	1	1	1	-1	1	1
$C_{ss,40,22}$	-1	-1	-1	1	-1	-1	-1	1	1	1	1	-1	1	1	-1	-1	-1	-1	1	-1	1	1	-1	1	1	-1	-1	1	1	-1	1	-1	1	1	-1	1	-1	1	1	1
$C_{ss,40,23}$	1	-1	-1	-1	-1	1	1	1	1	-1	1	1	-1	-1	-1	-1	1	-1	-1	-1	-1	-1	1	-1	1	1	-1	1	-1	1	-1	-1	1	1	1	1	-1	1	1	1
$C_{ss,40,24}$	-1	-1	-1	1	1	1	-1	-1	1	-1	1	-1	-1	-1	-1	1	1	-1	1	1	1	1	1	-1	1	1	1	-1	-1	-1	1	-1	1	1	-1	1	1	1	-1	-1
$C_{ss,40,25}$	-1	1	-1	-1	1	-1	-1	-1	1	-1	1	1	1	-1	-1	-1	-1	1	1	1	1	1	1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	-1	-1	1
$C_{ss,40,26}$	-1	-1	1	1	1	1	1	1	1	1	-1	1	-1	-1	1	-1	-1	-1	1	-1	-1	1	1	1	-1	1	-1	1	-1	-1	-1	1	1	1	-1	-1	1	1	-1	1
$C_{ss,40,27}$	1	-1	1	-1	-1	1	-1	1	1	-1	-1	-1	-1	1	-1	-1	-1	1	1	-1	1	-1	1	1	-1	-1	1	1	-1	1	1	1	-1	1	-1	1	1	1	1	-1
$C_{ss,40,28}$	1	1	-1	1	1	1	-1	1	1	-1	1	-1	-1	1	1	1	-1	-1	-1	-1	1	-1	1	1	-1	-1	-1	-1	-1	-1	1	1	1	1	1	-1	-1	-1	-1	1
$C_{ss,40,29}$	-1	1	-1	-1	-1	1	-1	-1	1	1	1	1	-1	1	1	-1	-1	-1	-1	1	1	1	1	1	1	-1	1	1	-1	1	-1	-1	1	1	1	-1	1	-1	1	-1
$C_{ss,40,30}$	-1	1	1	-1	1	-1	1	1	1	-1	-1	-1	1	1	1	-1	1	-1	1	-1	-1	1	1	-1	1	-1	1	1	-1	1	1	-1	1	1	-1	-1	-1	-1	-1	-1
$C_{ss,40,31}$	-1	1	-1	-1	-1	1	1	1	1	-1	1	-1	-1	-1	1	1	-1	1	1	-1	-1	1	-1	1	1	1	-1	-1	1	1	1	-1	-1	1	-1	-1	1	-1	1	1
$C_{ss,40,32}$	1	1	1	1	-1	-1	1	-1	1	-1	-1	1	1	1	-1	1	-1	-1	1	1	-1	-1	1	1	1	-1	-1	-1	-1	-1	-1	-1	1	1	-1	1	1	-1	1	1
$C_{ss,40,33}$	-1	-1	-1	-1	1	-1	1	1	1	-1	1	1	1	1	-1	1	-1	-1	-1	-1	-1	1	-1	1	-1	-1	1	-1	1	1	-1	1	1	1	1	1	1	1	-1	-1
$C_{ss,40,34}$	1	-1	-1	-1	1	-1	-1	1	1	1	1	1	1	1	1	1	1	1	1	-1	1	-1	1	-1	1	-1	-1	-1	-1	1	-1	-1	-1	1	-1	-1	1	1	-1	1
$C_{ss,40,35}$	-1	-1	1	1	-1	-1	-1	1	1	-1	-1	1	1	-1	1	1	-1	1	-1	-1	1	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	1	1	-1	-1	1	1	-1
$C_{ss,40,36}$	-1	1	1	1	1	1	-1	1	1	-1	-1	1	-1	1	-1	-1	1	1	-1	-1	1	1	-1	-1	1	-1	-1	1	1	-1	-1	-1	-1	1	1	1	1	-1	-1	1
$C_{ss,40,37}$	1	-1	1	-1	1	-1	-1	-1	1	-1	-1	-1	1	-1	1	-1	-1	-1	-1	1	1	-1	-1	1	1	1	-1	1	1	1	1	-1	1	1	1	-1	1	1	-1	1
$C_{ss,40,38}$	-1	-1	1	-1	1	1	1	-1	1	1	-1	-1	-1	1	-1	1	-1	1	-1	1	-1	1	1	1	1	-1	-1	-1	-1	1	1	-1	-1	1	1	1	-1	1	-1	1
$C_{ss,40,39}$	-1	-1	1	-1	-1	1	-1	-1	1	-1	-1	1	-1	1	1	1	1	-1	1	1	1	1	-1	-1	-1	-1	-1	-1	1	1	-1	1	1	1	-1	-1	-1	1	1	1

The bits are transmitted in order from left to right, i.e., column 2 corresponds to index j=0 and the rightmost column corresponds to index j=39.

Table 16B: E-HICH and E-RGCH signature hopping pattern

Sequence index l	Row index $m(i)$ for slot i		
	$i \bmod 3 = 0$	$i \bmod 3 = 1$	$i \bmod 3 = 2$
1	1	18	18
2	2	8	33
3	3	16	32
4	4	13	10
5	5	3	25
6	6	12	16
7	7	6	1
8	8	19	39
9	9	34	14
10	10	4	5
11	11	17	34
12	12	29	30

13	13	11	23
14	14	24	22
15	15	28	21
16	16	35	19
17	17	21	36
18	18	37	2
19	19	23	11
20	20	39	9
21	21	22	3
22	22	9	15
23	23	36	20
24	24	0	26
25	25	5	24
26	26	7	8
27	27	27	17
28	28	32	29
29	29	15	38
30	30	30	12
31	31	26	7
32	32	20	37
33	33	1	35
34	34	14	0
35	35	33	31
36	36	25	28
37	37	10	27
38	38	31	4
39	39	38	6

---------------------End of change 5.3.2.4---

---------------------Start of change 7.11---

7.11 DL E-RGCH/P-CCPCH/DPCH timing relation

The timing of the DL E-RGCH relative to the P-CCPCH is illustrated in figure 38.

When transmitted to a UE for which the cell transmitting the E-RGCH is in the E-DCH serving ~~cell~~ radio link set, the E-RGCH frame offset shall be as follows:

- if the E-DCH TTI is 10 ms, the E-RGCH frame offset relative to P-CCPCH shall be $\tau_{E\text{-}RGCH,n}$ chips with

$$\tau_{E-RGCH,n} = 5120 + 7680 \times \left\lfloor \frac{(\tau_{DPCH,n}/256) - 70}{30} \right\rfloor$$

- if the E-DCH TTI is 2 ms the E-RGCH frame offset relative to P-CCPCH shall be $\tau_{E\text{-}RGCH,n}$ chips with

$$\tau_{E-RGCH,n} = 5120 + 7680 \times \left\lfloor \frac{(\tau_{DPCH,n}/256) + 50}{30} \right\rfloor$$

When transmitted to a UE for which the cell transmitting the E-RGCH is not in the E-DCH serving ~~cell~~radio link set, the E-RGCH frame offset relative to P-CCPCH shall be $\tau_{E\text{-}RGCH} = 5120$ chips.

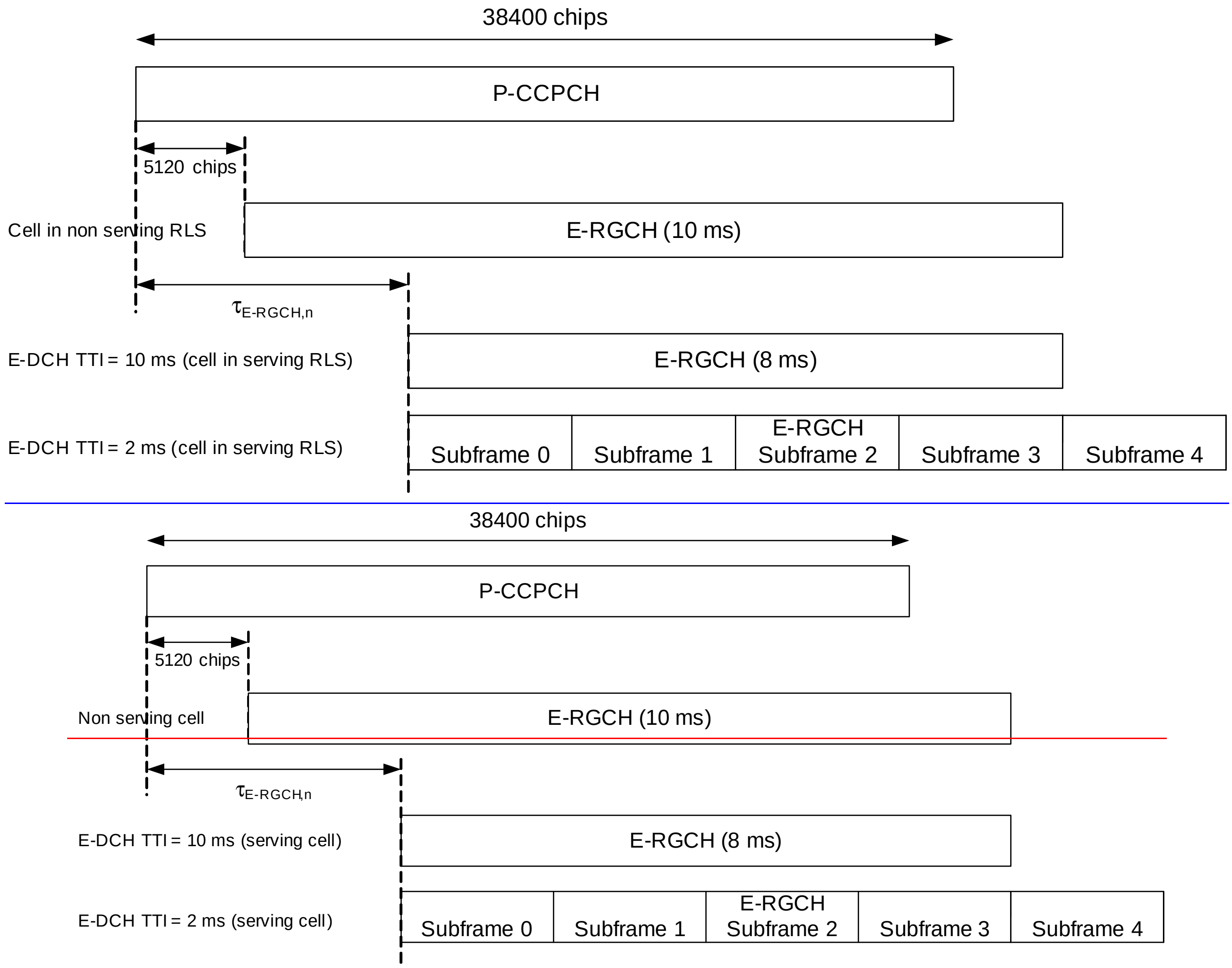

Figure 38: E-RGCH timing

3GPP TSG-RAN WG1 #41
Athen, Greece, May 10-14, 2005

Tdoc ⌘R1-050544

CR-Form-v7.1

CHANGE REQUEST

⌘	**25.211**	**CR**	**210**	⌘**rev**	**1**	⌘	Current version:	**6.4.0**	⌘

*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:	⌘	Clarification on E-AGCH transmission interval		
Source:	⌘	RAN WG1		
Work item code:	⌘	EDCH-Phys	***Date:*** ⌘	10/05/2005
Category:	⌘	**F**	***Release:*** ⌘	Rel-6
		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:* *Ph2 (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)* *Rel-7 (Release 7)*

Reason for change:	⌘	Transmission interval for E-AGCH is not specified
Summary of change:	⌘	Specification of the transmission interval for E-AGCH
Consequences if not approved:	⌘	Can not implement the E-DCH feature

Clauses affected:	⌘					
		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:

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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

~~5.3.3.14~~5.3.3.14 E–DCH Absolute Grant Channel (E-AGCH)

The E-DCH Absolute Grant Channel (E-AGCH) is a fixed rate (30 kbps, SF=256) downlink physical channel carrying the uplink E-DCH absolute grant. Figure 26C illustrates the frame and sub-frame structure of the E-AGCH.

An E-DCH absolute grant shall be transmitted over one E-AGCH sub-frame or one E-AGCH frame. The transmission over one E-AGCH sub-frame and over one E-AGCH frame shall be used for UEs for which E-DCH TTI is set to respectively 2 ms and 10 ms.

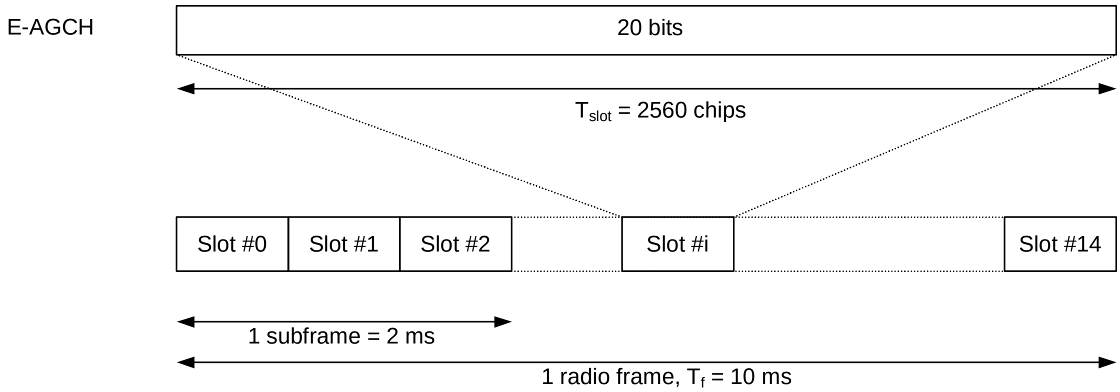

Figure 26C: Sub-frame structure for the E-AGCH

3GPP TSG-RAN WG1 #41 **Tdoc ⌘R1-050546**
Athen, Greece, May 10-14, 2005

CR-Form-v7.1

CHANGE REQUEST

⌘	**25.211**	**CR**	**212**	⌘**rev**	**1**	⌘	Current version:	**6.4.0** ⌘

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: ⌘	Clarification on E-DCH timing		
Source: ⌘	RAN WG1		
Work item code: ⌘	EDCH-Phys	***Date:*** ⌘	10/05/2005
Category: ⌘	**F**	***Release:*** ⌘	Rel-6
	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:* *Ph2 (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)* *Rel-7 (Release 7)*

Reason for change: ⌘	Inconsistencies: • Uplink E-DPxCH timing described under downlink timing figure. • No reference to the DL E-DCH control channel timing in the downlink timing descritpion.
Summary of change: ⌘	Correcting these inconsistencies
Consequences if not approved: ⌘	Structure of the E-DCH timing specification is inconsistent with principles followed for earlier channels.

Clauses affected: ⌘	7			
	Y	**N**		
Other specs affected: ⌘		X	Other core specifications ⌘	
		X	Test specifications	
		X	O&M Specifications	
Other comments: ⌘				

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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.

7 Timing relationship between physical channels

7.1 General

The P-CCPCH, on which the cell SFN is transmitted, is used as timing reference for all the physical channels, directly for downlink and indirectly for uplink.

Figure 29 below describes the frame timing of some of the downlink physical channels; the timing of the remaining downlink physical channels and of the uplink physical channels is specified in the remaining subclauses. For the AICH the access slot timing is included. Transmission timing for uplink physical channels is given by the received timing of downlink physical channels, as described in the following subclauses.

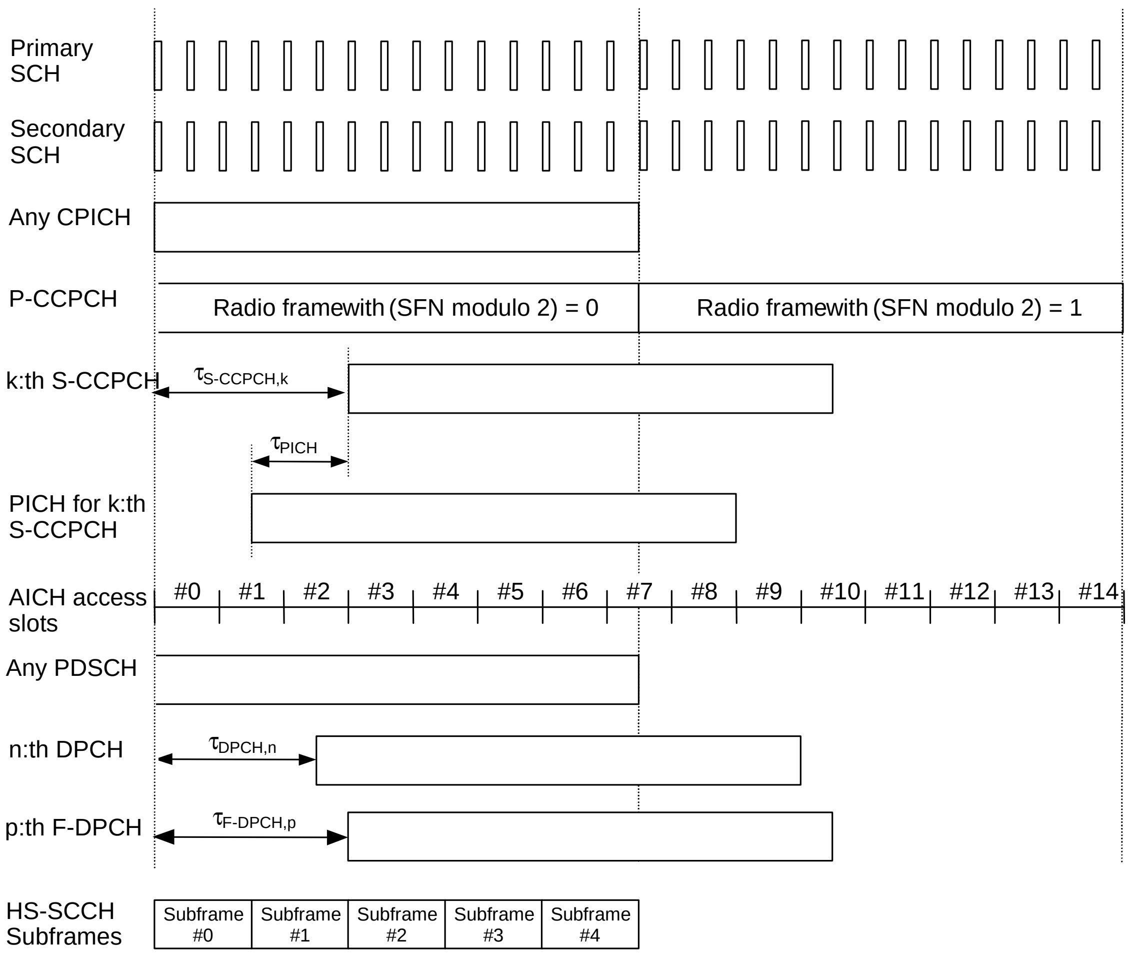

Figure 29: Radio frame timing and access slot timing of downlink physical channels

The following applies:

- SCH (primary and secondary), CPICH (primary and secondary), P-CCPCH, and PDSCH have identical frame timings.
- The S-CCPCH timing may be different for different S-CCPCHs, but the offset from the P-CCPCH frame timing is a multiple of 256 chips, i.e. $\tau_{S\text{-}CCPCH,k} = T_k \times 256$ chip, $T_k \in \{0, 1, \ldots, 149\}$.

- The PICH timing is τ_{PICH} = 7680 chips prior to its corresponding S-CCPCH frame timing, i.e. the timing of the S-CCPCH carrying the PCH transport channel with the corresponding paging information, see also subclause 7.2.
- AICH access slots #0 starts the same time as P-CCPCH frames with (SFN modulo 2) = 0. The AICH/PRACH and AICH/PCPCH timing is described in subclauses 7.3 and 7.4 respectively.
- The relative timing of associated PDSCH and DPCH is described in subclause 7.5.
- The DPCH timing may be different for different DPCHs, but the offset from the P-CCPCH frame timing is a multiple of 256 chips, i.e. $\tau_{DPCH,n} = T_n \times 256$ chip, $T_n \in \{0, 1, \ldots, 149\}$. The DPCH (DPCCH/DPDCH) timing relation with uplink DPCCH/DPDCHs is described in subclause 7.6.
- The F-DPCH timing may be different for different F-DPCHs, but the offset from the P-CCPCH frame timing is a multiple of 256 chips, i.e. $\tau_{F\text{-}DPCH,p} = T_p \times 256$ chip, $T_p \in \{0, 1, \ldots, 149\}$. The F-DPCH timing relation with uplink DPCCH/DPDCHs is described in subclause 7.6.
- The start of HS-SCCH subframe #0 is aligned with the start of the P-CCPCH frames. The relative timing between a HS-PDSCH and the corresponding HS-SCCH is described in subclause 7.8.
- The E-HICH, E-RGCH and E-AGCH downlink timing are respectively specified in subclause 7.10, 7.11 and 7.12. The E-DPCCH and E-DPDCH uplink timing are specified in subclause 7.13.
- ~~The E-DPCCH and all E-DPDCHs transmitted from one UE have the same frame timing as the DPCCH.~~

7.2 PICH/S-CCPCH timing relation

Figure 30 illustrates the timing between a PICH frame and its associated single S-CCPCH frame, i.e. the S-CCPCH frame that carries the paging information related to the paging indicators in the PICH frame. A paging indicator set in a PICH frame means that the paging message is transmitted on the PCH in the S-CCPCH frame starting τ_{PICH} chips after the transmitted PICH frame. τ_{PICH} is defined in subclause 7.1.

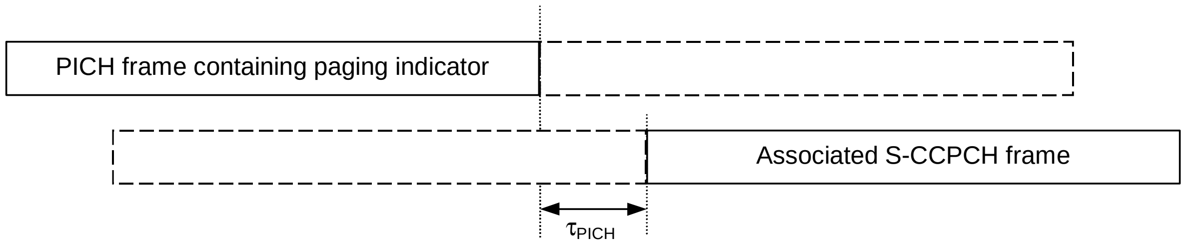

Figure 30: Timing relation between PICH frame and associated S-CCPCH frame

7.3 PRACH/AICH timing relation

The downlink AICH is divided into downlink access slots, each access slot is of length 5120 chips. The downlink access slots are time aligned with the P-CCPCH as described in subclause 7.1.

The uplink PRACH is divided into uplink access slots, each access slot is of length 5120 chips. Uplink access slot number *n* is transmitted from the UE $\tau_{p\text{-}a}$ chips prior to the reception of downlink access slot number *n*, *n* = 0, 1, …, 14.

Transmission of downlink acquisition indicators may only start at the beginning of a downlink access slot. Similarly, transmission of uplink RACH preambles and RACH message parts may only start at the beginning of an uplink access slot.

The PRACH/AICH timing relation is shown in figure 31.

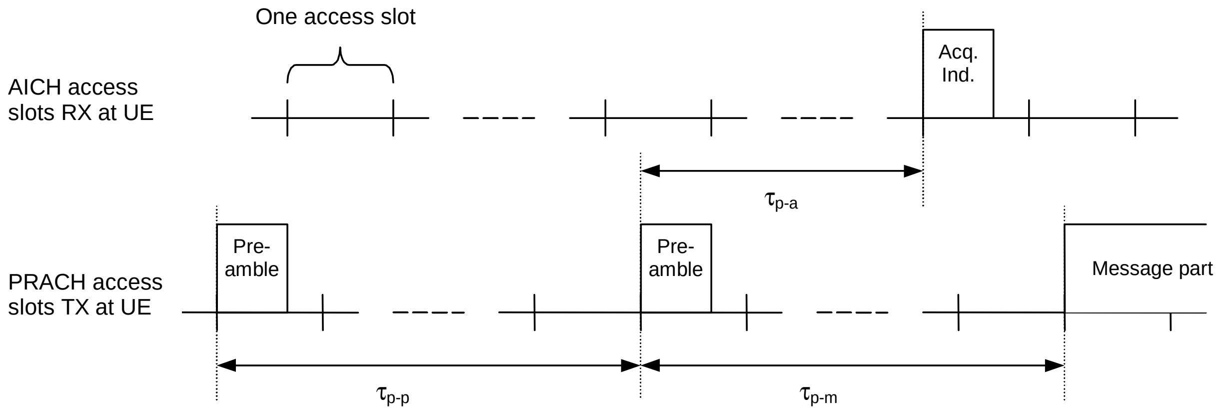

Figure 31: Timing relation between PRACH and AICH as seen at the UE

The preamble-to-preamble distance $\tau_{p\text{-}p}$ shall be larger than or equal to the minimum preamble-to-preamble distance $\tau_{p\text{-}p,min}$, i.e. $\tau_{p\text{-}p} \geq \tau_{p\text{-}p,min}$.

In addition to $\tau_{p\text{-}p,min}$, the preamble-to-AI distance $\tau_{p\text{-}a}$ and preamble-to-message distance $\tau_{p\text{-}m}$ are defined as follows:

- when AICH_Transmission_Timing is set to 0, then

  $\tau_{p\text{-}p,min}$ = 15360 chips (3 access slots)

  $\tau_{p\text{-}a}$ = 7680 chips

  $\tau_{p\text{-}m}$ = 15360 chips (3 access slots)

- when AICH_Transmission_Timing is set to 1, then

  $\tau_{p\text{-}p,min}$ = 20480 chips (4 access slots)

  $\tau_{p\text{-}a}$ = 12800 chips

  $\tau_{p\text{-}m}$ = 20480 chips (4 access slots)

The parameter AICH_Transmission_Timing is signalled by higher layers.

7.4 PCPCH/AICH timing relation

The uplink PCPCH is divided into uplink access slots, each access slot is of length 5120 chips. Uplink access slot number n is transmitted from the UE $\tau_{p\text{-}a1}$ chips prior to the reception of downlink access slot number n, n =0, 1, …,14.

The timing relationship between preambles, AICH, and the message is the same as PRACH/AICH. Note that the collision resolution preambles follow the access preambles in PCPCH/AICH. However, the timing relationships between CD-Preamble and CD/CA-ICH is identical to RACH Preamble and AICH. The timing relationship between CD/CA-ICH and the Power Control Preamble in CPCH is identical to AICH to message in RACH. The T_{cpch} timing parameter is identical to the PRACH/AICH transmission timing parameter. When T_{cpch} is set to zero or one, the following PCPCH/AICH timing values apply.

Note that a1 corresponds to AP-AICH and a2 corresponds to CD/CA-ICH.

$\tau_{p\text{-}p}$ = Time to next available access slot, between Access Preambles.

Minimum time = 15360 chips + 5120 chips X Tcpch

Maximum time = 5120 chips X 12 = 61440 chips

Actual time is time to next slot (which meets minimum time criterion) in allocated access slot subchannel group.

$\tau_{p\text{-}a1}$ = Time between Access Preamble and AP-AICH has two alternative values: 7680 chips or 12800 chips, depending on T_{cpch}

$\tau_{a1\text{-}cdp}$ = Time between receipt of AP-AICH and transmission of the CD Preamble $\tau_{a1\text{-}cdp}$ has a minimum value of $\tau_{a1\text{-}cdp,\ min}$ =7680 chips.

$\tau_{p\text{-}cdp}$ = Time between the last AP and CD Preamble. $\tau_{p\text{-}cdp}$ has a minimum value of $\tau_{p\text{-}cdp\text{-}min}$ which is either 3 or 4 access slots, depending on T_{cpch}

$\tau_{cdp\text{-}a2}$ = Time between the CD Preamble and the CD/CA-ICH has two alternative values: 7680 chips or 12800 chips, depending on T_{cpch}

$\tau_{cdp\text{-}pcp}$ = Time between CD Preamble and the start of the Power Control Preamble is either 3 or 4 access slots, depending on $T_{cpch.}$

The time between the start of the reception of DL-DPCCH slot at UE and the Power Control Preamble is T_0 chips, where T_0 is as in subclause 7.6.3.

The message transmission shall start 0 or 8 slots after the start of the power control preamble depending on the length of the power control preamble.

Figure 32 illustrates the PCPCH/AICH timing relationship whenT_{cpch} is set to 0 and all access slot subchannels are available for PCPCH.

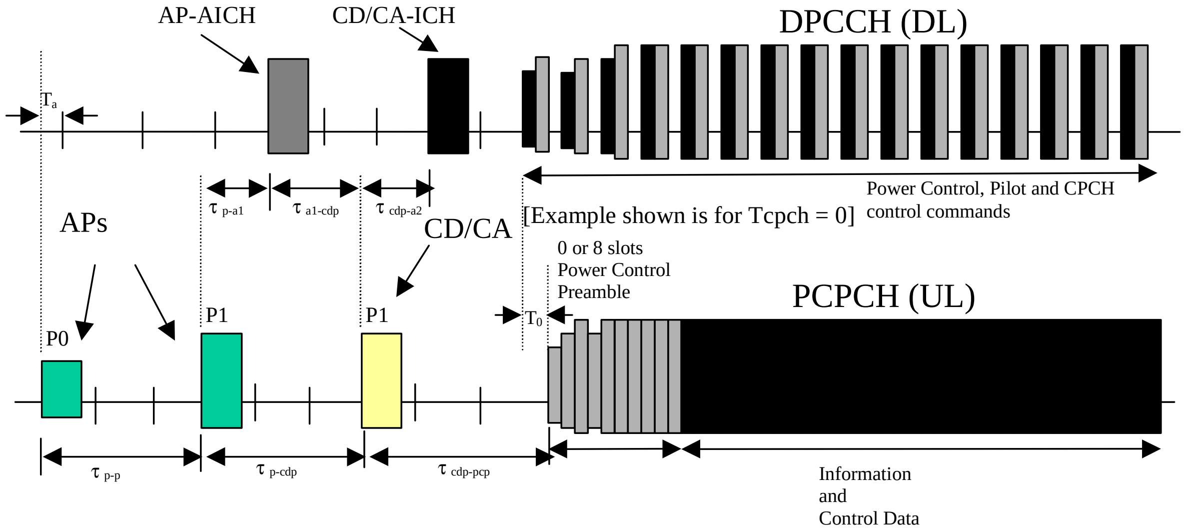

Figure 32: Timing of PCPCH and AICH transmission as seen by the UE, with T_{cpch}= 0

7.5 DPCH/PDSCH timing

The relative timing between a DPCH frame and the associated PDSCH frame is shown in figure 33.

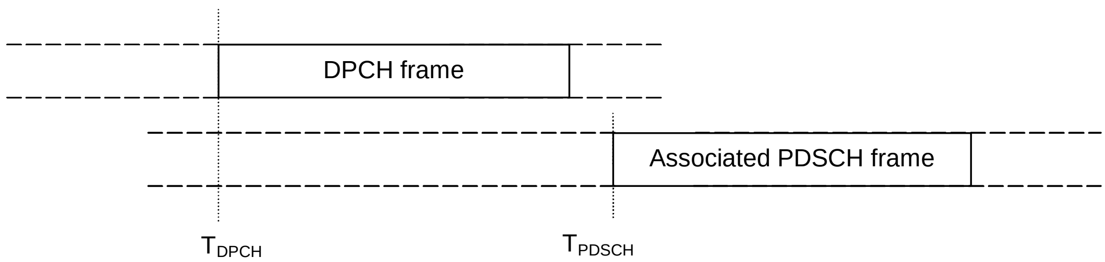

Figure 33: Timing relation between DPCH frame and associated PDSCH frame

The start of a DPCH frame is denoted T_{DPCH} and the start of the associated PDSCH frame is denoted T_{PDSCH}. Any DPCH frame is associated to one PDSCH frame through the relation 46080 chips $\leq T_{PDSCH} - T_{DPCH} < 84480$ chips, i.e., the associated PDSCH frame starts between three slots after the end of the DPCH frame and 18 slots after the end of the DPCH frame, as described in subclause 7.1.

7.6 DPCCH/DPDCH timing relations

7.6.1 Uplink

In uplink the DPCCH and all the DPDCHs transmitted from one UE have the same frame timing.

7.6.2 Downlink

In downlink, the DPCCH and all the DPDCHs carrying CCTrCHs of dedicated type to one UE have the same frame timing.

Note: support of multiple CCTrChs of dedicated type is not part of the current release.

7.6.3 Uplink/downlink timing at UE

At the UE, the uplink DPCCH/DPDCH frame transmission takes place approximately T_0 chips after the reception of the first detected path (in time) of the corresponding downlink DPCCH/DPDCH or F-DPCH frame. T_0 is a constant defined to be 1024 chips. The first detected path (in time) is defined implicitly by the relevant tests in [14]. More information about the uplink/downlink timing relation and meaning of T_0 can be found in [5].

7.7 Uplink DPCCH/HS-DPCCH/HS-PDSCH timing at the UE

Figure 34 shows the timing offset between the uplink DPCH, the HS-PDSCH and the HS-DPCCH at the UE. An HS-DPCCH sub-frame starts $m \times 256$ chips after the start of an uplink DPCH frame that corresponds to the DL DPCH or F-DPCH frame from the HS-DSCH serving cell containing the beginning of the related HS-PDSCH subframe with *m* calculated as

$m = (T_{TX\_diff} /256) + 101$

where T_{TX_diff} is the difference in chips (T_{TX_diff} =0, 256, ..., 38144), between

- the transmit timing of the start of the related HS-PDSCH subframe (see sub-clauses 7.8 and 7.1)

and

- the transmit timing of the start of the downlink DPCH or F-DPCH frame from the HS-DSCH serving cell that contains the beginning of the HS-PDSCH subframe (see sub-clause 7.1).

At any one time, *m* therefore takes one of a set of five possible values according to the transmission timing of HS-DSCH sub-frame timings relative to the DPCH or F-DPCH frame boundary. The UE and Node B shall only update the set of values of *m* in connection to UTRAN reconfiguration of downlink timing.

More information about uplink timing adjustments can be found in [5].

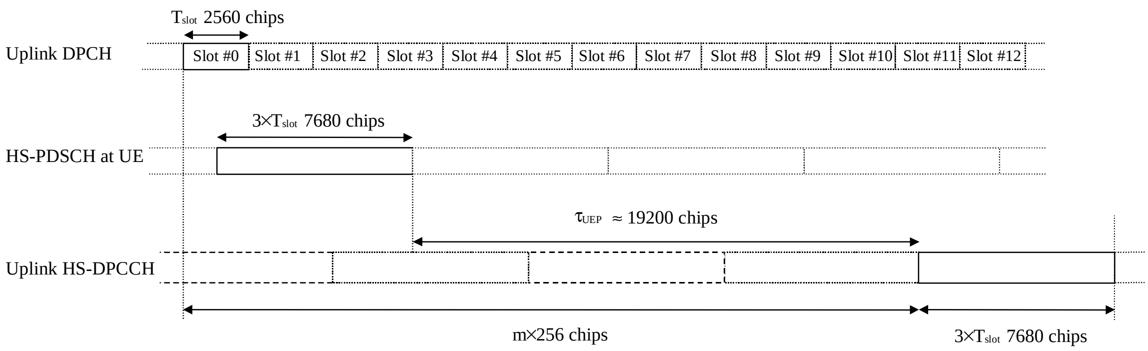

Figure 34: Timing structure at the UE for HS-DPCCH control signalling

7.8 HS-SCCH/HS-PDSCH timing

Figure 35 shows the relative timing between the HS-SCCH and the associated HS-PDSCH for one HS-DSCH sub-frame. The HS-PDSCH starts $\tau_{HS\text{-}PDSCH} = 2 \times T_{slot}$ = 5120 chips after the start of the HS-SCCH.

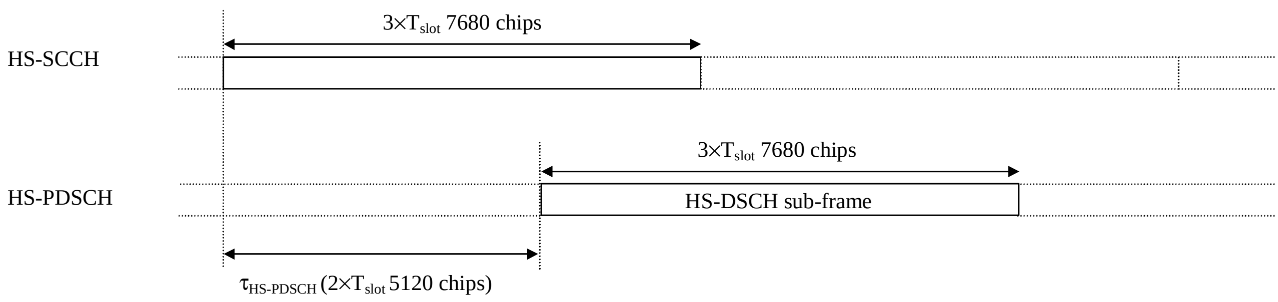

Figure 35: Timing relation between the HS-SCCH and the associated HS-PDSCH.

7.9 MICH/S-CCPCH timing relation

Figure 36 illustrates the timing between the MICH frame boundaries and the frame boundaries of the associated S-CCPCH, i.e. the S-CCPCH that carries the MBMS control information related to the notification indicators in the MICH frame. The MICH transmission timing shall be such that the end of radio frame boundary occurs τ_{MICH} chips before the associated S-CCPCH start of radio frame boundary. τ_{MICH} is equal to 7680 chips.

The MICH frames during which the Node B shall set specific notification indicators and the S-CCPCH frames during which the Node B shall transmit the corresponding MBMS control data is defined by higher layers.

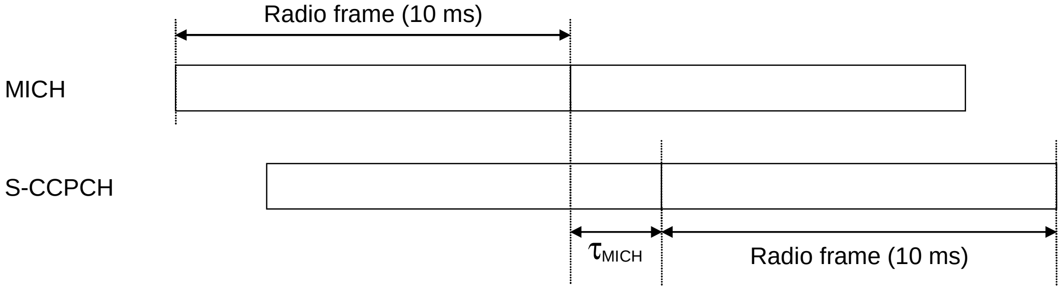

Figure 36: Timing relation between MICH frame and associated S-CCPCH frame

7.10 ~~DL~~ E-HICH/P-CCPCH/DPCH timing relation

The timing of the ~~DL~~ E-HICH relative to the P-CCPCH is illustrated in figure 37.

When the E-DCH TTI is 10 ms the E-HICH frame offset relative to P-CCPCH shall be $\tau_{E\text{-}HICH,n}$ chips with

$$\tau_{E-HICH,n} = 5120 + 7680 \times \left\lfloor \frac{(\tau_{DPCH,n}/256) - 70}{30} \right\rfloor$$

When the E-DCH TTI is 2 ms the E-HICH frame offset relative to P-CCPCH shall be $\tau_{E\text{-}HICH,n}$ chips with

$$\tau_{E-HICH,n} = 5120 + 7680 \times \left\lfloor \frac{(\tau_{DPCH,n}/256) + 50}{30} \right\rfloor$$

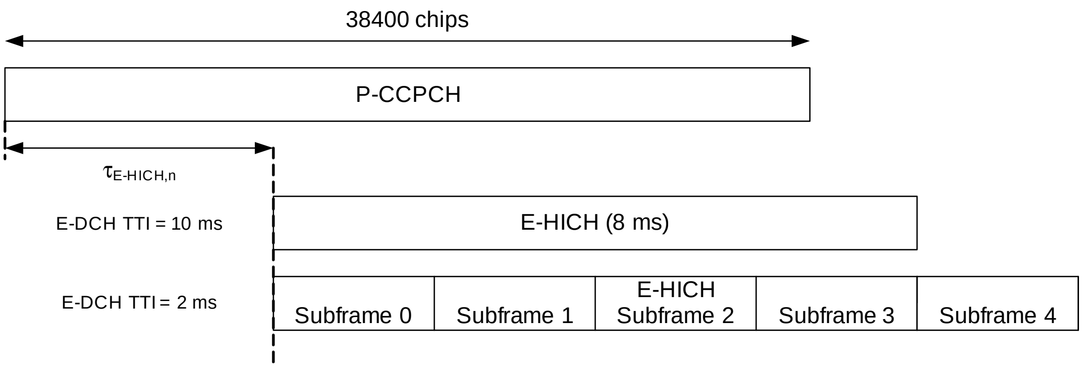

Figure 37: E-HICH timing

7.11 ~~DL~~ E-RGCH/P-CCPCH/DPCH timing relation

The timing of the ~~DL~~ E-RGCH relative to the P-CCPCH is illustrated in figure 38.

When transmitted to a UE for which the cell is the E-DCH serving cell the E-RGCH frame offset shall be as follows:

- if the E-DCH TTI is 10 ms, the E-RGCH frame offset relative to P-CCPCH shall be $\tau_{E\text{-}RGCH,n}$ chips with

$$\tau_{E-RGCH,n} = 5120 + 7680 \times \left\lfloor \frac{(\tau_{DPCH,n}/256) - 70}{30} \right\rfloor$$

- if the E-DCH TTI is 2 ms the E-RGCH frame offset relative to P-CCPCH shall be $\tau_{E\text{-}RGCH,n}$ chips with

$$\tau_{E-RGCH,n} = 5120 + 7680 \times \left\lfloor \frac{(\tau_{DPCH,n}/256) + 50}{30} \right\rfloor$$

When transmitted to a UE for which the cell is not the E-DCH serving cell, the E-RGCH frame offset relative to P-CCPCH shall be $\tau_{E\text{-}RGCH}$ = 5120 chips.

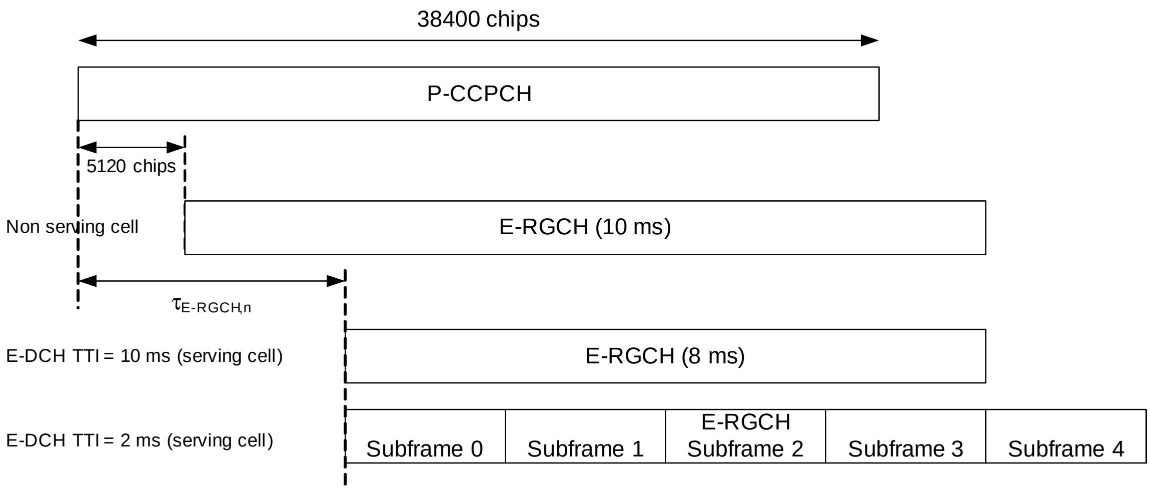

Figure 38: E-RGCH timing

7.12 E-AGCH/P-CCPCH timing relation

The E-AGCH frame offset relative to P-CCPCH shall be $\tau_{E\text{-}AGCH}$ = 5120 chips as illustrated in figure 39.

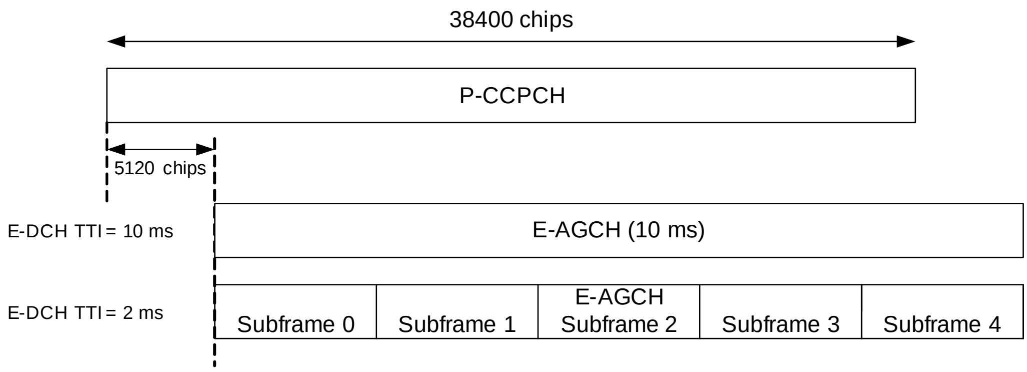

Figure 39: E-AGCH timing

7.13 E-DPDCH/E-DPCCH/DPCCH timing relation

The frame timing of the E-DPCCH and all E-DPDCHs transmitted from one UE shall be the same as the uplink DPCCH frame timing.

3GPP TSG-RAN 1 Meeting #41
Athens, Greece, 9 - 13 May, 2005

R1-050540

CR-Form-v7.1

CHANGE REQUEST

⌘	**25.212**	**CR**	**204**	⌘ **rev**	**2**	⌘	Current version:	**6.4.0**	⌘

*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:	⌘	E-DCH Corrections
Source:	⌘	RAN WG1
Work item code:	⌘	EDCH-Phys — ***Date:*** ⌘ 12/05/2005
Category:	⌘	**F** — ***Release:*** ⌘ Rel-6

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:
Ph2 (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)
Rel-7 (Release 7)

Reason for change:	⌘	The CR covers some E-DCH corrections
Summary of change:	⌘	Clarification of HARQ bit separation in 4.8.4.2, correction of delta bits removal in 4.8.4.3 and 4.8.4.4, clarification of bit collection in 4.8.4.4, correction of HARQ rate matching parameters in 4.8.4.3, refinement of 4.9, definition of used coding rate in 4.9.2.2, new section 4.9.2.3 that the E-DPCCH bit $x_{h,1}$ is set based on the value of the MAC happy bit, added the word "happy" bit in 4.9.3, replace *k* by *i* in 4.9.5 (wrong index reference),
Consequences if not approved:	⌘	If not approved the E-DCH description remains unclear or even incorrect here and there.

Clauses affected:	⌘	4.8.4.2, 4.8.4.3, 4.8.4.4, 4.9, 4.9.2.2, 4.9.2.3, 4.9.3, 4.9.5			
		Y	**N**		
Other specs affected:	⌘		**X**	Other core specifications	⌘
				Test specifications	
				O&M Specifications	
Other comments:	⌘				

How to create CRs using this form:
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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.

4.8 Coding for E-DCH

Figure 21 shows the processing structure for the E-DCH transport channel mapped onto a separate CCTrCH. Data arrives to the coding unit in form of a maximum of one transport block once every transmission time interval (TTI). The following coding steps can be identified:

- Add CRC to the transport block
- Code block segmentation
- Channel coding
- Physical layer hybrid ARQ and rate matching
- Physical channel segmentation
- Interleaving
- Physical channel mapping

The coding steps for E-DCH transport channel are shown in the figure below.

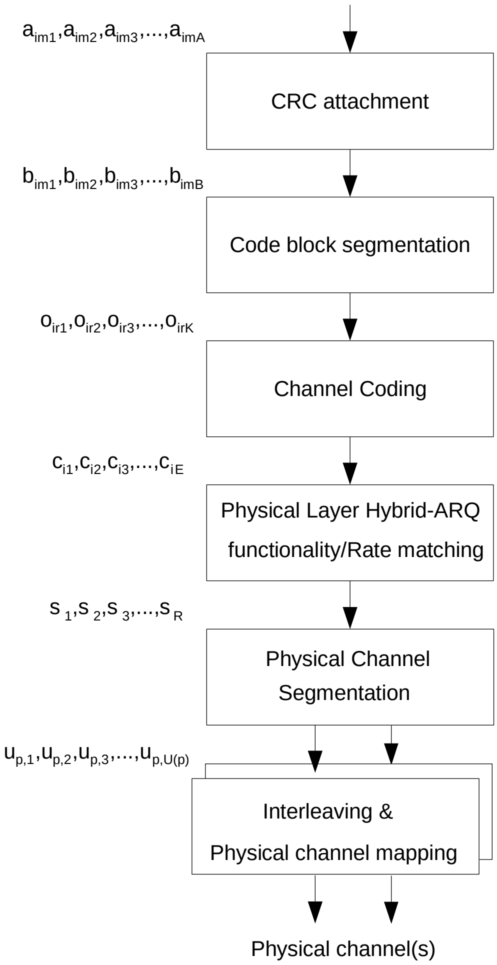

Figure 21: Transport channel processing for E-DCH

In the following the number of transport blocks per TTI and the number of transport channels is always one i.e. m=1 and i=1. When referencing non E-DCH formulae which are used in correspondence with E-DCH formulae the convention is used that transport block subscripts may be omitted (e.g. X_1 may be written X).

4.8.1 CRC attachment for E-DCH

CRC attachment for the E-DCH transport channel shall be performed according to the general method described in 4.2.1 above with the following specific parameters.

The CRC length shall always be L_1=24 bits.

4.8.2 Code block segmentation for E-DCH

Code block segmentation for the E-DCH transport channel shall be performed according to the general method described in 4.2.2.2 with the following specific parameters.

There is a maximum of one transport block. The bits $b_{im1}, b_{im2}, b_{im3}, \ldots, b_{imB_i}$ input to the block are mapped to the bits $x_{i1}, x_{i2}, x_{i3}, \ldots, x_{iX_i}$ directly. It follows that $X_i = B_i$. Note that the bits x referenced here refer only to the internals of the code block segmentation function. The output bits from the code block segmentation function are o_{ir1}, o_{ir2}, o_{ir3}, …, o_{irK}.

The value of Z = 5114 for turbo coding shall be used.

4.8.3 Channel coding for E-DCH

Channel coding for the E-DCH transport channel shall be performed according to the general method described in section 4.2.3 above with the following specific parameters.

There is a maximum of one transport block, i=1. The rate 1/3 turbo coding shall be used.

4.8.4 Physical layer HARQ functionality and rate matching for E-DCH

The hybrid ARQ functionality matches the number of bits at the output of the channel coder to the total number of bits of the E-DPDCH set to which the E-DCH transport channel is mapped. The hybrid ARQ functionality is controlled by the redundancy version (RV) parameters.

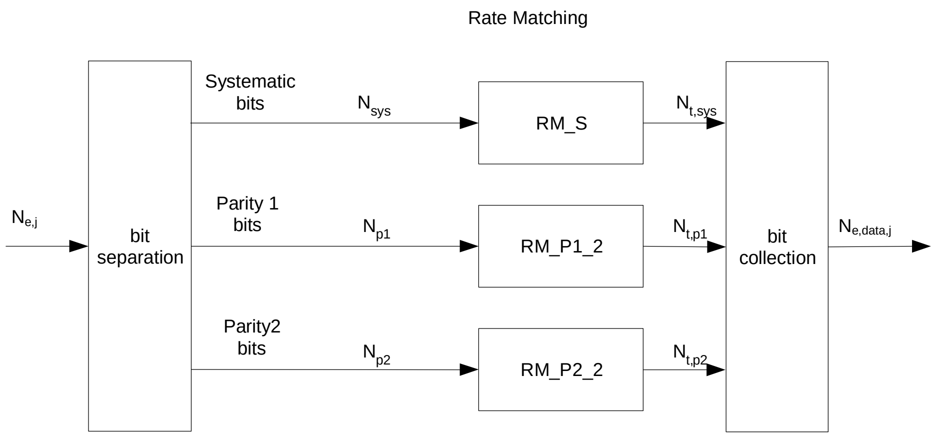

Figure 22: E-DCH hybrid ARQ functionality

4.8.4.1 Determination of SF and number of PhCHs needed

The maximum amount of puncturing that can be applied is

- 1-$PL_{non\text{-}max}$ if the number of code channels is less than the maximum allowed by the UE capability and restrictions imposed by UTRAN.
- 1-PL_{max} if the number of code channels equals to the maximum allowed by the UE capability and restrictions imposed by UTRAN.

The number of available bits per TTI of one E-DPDCH for all possible spreading factors is denoted by N_{64}, N_{32}, N_{16}, N_8, N_4 and N_2, where the index refers to the spreading factor.

The possible number of bits available to the CCTrCH of E-DCH type on all PhCHs, $N_{e,data}$, then are {N_{64}, N_{32}, N_{16}, N_8, N_4, $2\times N_4$, $2\times N_2$, $2\times N_2+2\times N_4$}.

SET0 denotes the set of $N_{e,data}$ values allowed by the UTRAN and supported by the UE, as part of the UE's capability. SET0 can be a subset of {N_{64}, N_{32}, N_{16}, N_8, N_4, $2\times N_4$, $2\times N_2$, $2\times N_2+2\times N_4$}.

The total number of bits in a TTI before rate matching with transport format j is $N_{e,j}$. The total number of bits available for the E-DCH transmission per TTI with transport format j, $N_{e,data,j}$, is determined by executing the following algorithm, where $PL_{non\text{-}max}$ is signalled from higher layers and PL_{max} is equal to 0.44 for all E-DCH UE categories defined in [15] except the highest E-DCH UE category, for which PL_{max} is equal to 0.33:

SET1 = { $N_{e,data}$ in SET0 such that $N_{e,data} - N_{e,j}$ is non negative }

If SET1 is not empty and the smallest element of SET1 requires just one E-DPDCH then

$N_{e,data,j}$ = min SET1

Else

SET2 = { $N_{e,data}$ in SET0 such that $N_{e,data} - PL_{non\text{-}max} \times N_{e,j}$ is non negative }

If SET2 is not empty then

Sort SET2 in ascending order

$N_{e,data}$ = min SET2

While $N_{e,data}$ is not the max of SET2 and the follower of $N_{e,data}$ requires no additional E-DPDCH do

$N_{e,data}$ = follower of $N_{e,data}$ in SET2

End while

$N_{e,data,j} = N_{,e,data}$

Else

$N_{e,data,j}$ = max SET0 provided that $N_{e,data,j} - PL_{max} \times N_{e,j}$ is non negative

End if

End if-

4.8.4.2 HARQ bit separation

The HARQ bit separation function shall be performed in the same way as bit separation for turbo encoded TrCHs with puncturing in 4.2.7.4.1 above.

4.8.4.3 HARQ Rate Matching Stage

The hybrid ARQ rate matching for the E-DCH transport channel shall be done with the general method described in 4.2.7.5 with the following specific parameters. ~~Bits selected for puncturing which appear as δ in the algorithm in 4.2.7.5 shall be discarded and are not counted in the streams towards the bit collection.~~

The parameters of the rate matching stage depend on the value of the RV parameters *s* and *r*. The *s* and *r* combinations corresponding to each RV allowed for the E-DCH are listed in the table below.

Table 15: RV for E-DCH

E-DCH RV Index	*s*	*r*
0	1	0
1	0	0
2	1	1
3	0	1

The parameter e_{plus}, e_{minus} and e_{ini} are calculated with the general method for QPSK as described in 4.5.4.3 above. The following parameters are used as input:

– $N_{sys} = N_{p1} = N_{p2} = N_{e,j}/3$

– $N_{data} = N_{e,data,j}$

– $r_{max} = 2$

4.8.4.4 HARQ bit collection

The HARQ bit collection shall be performed according to the general method for bit collection for turbo encoded TrCHs with puncturing as specified in 4.2.7.4.2 including the removal of the bits with value δ.

4.8.5 Physical channel segmentation for E-DCH

When more than one E-DPDCH is used, physical channel segmentation distributes the bits among the different physical channels. The bits input to the physical channel segmentation are denoted by $s_1, s_2, s_3, \ldots, s_R$, where R is the number of bits input to the physical channel segmentation block. The number of PhCHs is denoted by P.

The bits after physical channel segmentation are denoted $u_{p,k}$ where p is the PhCH number. $U(p)$ is the number of physical channel bits in one E-DCH TTI for the p[th] E-DPDCH. The relation between s_k and $u_{p,k}$ is given below.

Bits on first PhCH after physical channel segmentation:

$$u_{1,k} = s_k \qquad k = 1, 2, \ldots, U(1)$$

Bits on p[th] PhCH after physical channel segmentation:

$$u_{p,k} = s_{k+\sum_{q=1}^{p-1} U(q)} \qquad k = 1, 2, \ldots, U(p)$$

4.8.6 Interleaving for E-DCH

Interleaving for the E-DCH transport channel shall be done according to the general method described in section 4.2.11 with the specific parameter $U=U(p)$.

4.8.7 Physical channel mapping for E-DCH

The E-DCH structure is described in [2]. The bits input to the physical channel mapping are denoted $v_{p,1}, v_{p,2}, \ldots, v_{p,U(p)}$. The bits $v_{p,k}$ are mapped to the PhCHs such that the bits for each PhCH are transmitted over the air in ascending order with respect to k.

4.9 Coding for E-DPCCH

The following information is transmitted by means of the E-DPCCH:

- Retransmission sequence number (RSN): $x_{rsn,1}, x_{rsn,2}$

- E-TFCI information: $x_{tfci,1}, x_{tfci,2}, \ldots, x_{tfci,7}$

- "Happy" bit: $x_{h,1}$

4.9.1 Overview

The figure below illustrates the overall coding chain for E-DPCCH.

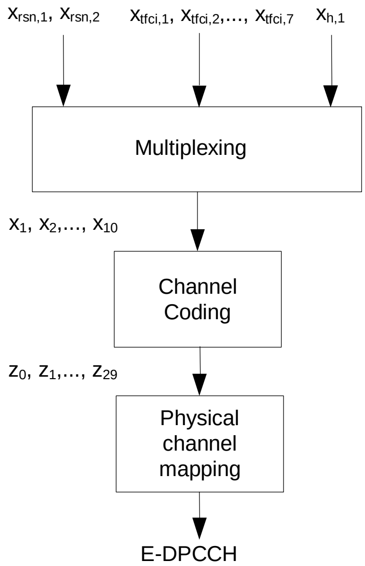

Figure 23: Coding chain for E-DPCCH

4.9.2 E-DPCCH information field mapping

4.9.2.1 Information field mapping of E-TFCI

The E-TFCI is mapped such that $x_{tfci,1}$ corresponds to the MSB.

4.9.2.2 Information field mapping of retransmission sequence number

To indicate the redundancy version (RV) of each HARQ transmission and to assist the Node B soft buffer management a two bit retransmission sequence number (RSN) is signalled from the UE to the Node B. The Node B can avoid soft buffer corruption by flushing the soft buffer associated to one HARQ process in case more than 3 consecutive E-DPCCH transmissions on that HARQ process can not be decoded or the last received RSN is incompatible with the current one.

The RSN value for each initial transmission of an E-DCH transport block is 0. For the first retransmission the RSN value is 1, for the second retransmission the RSN value is 2 and for each further retransmission the RSN value is 3. The RSN is mapped such that $x_{rsn,1}$ corresponds to the MSB.

The applied E-DCH RV index specifying the used RV (*s* and *r* parameter) depends on the RSN, on ~~the used coding rate~~ $N_{sys} / N_{e,data,j}$, and if RSN=3 also on ~~from~~ the TTIN (TTI number). For 10 ms TTI the TTI number is equal to the CFN, for 2 ms TTI

$$TTIN = 5*CFN + subframe\ number$$

where the subframe number counts the five TTIs which are within a given CFN, starting from 0 for the first TTI to 4 for the last TTI. N_{ARQ} is the number of Hybrid ARQ processes.

Table 16: Relation between RSN value and E-DCH RV Index

RSN Value	~~Coding Rate~~N_{sys} / $N_{e,data,j}$ <1/2	1/2 ≤ N_{sys} / $N_{e,data,j}$ ~~Coding Rate~~
	E-DCH RV Index	E-DCH RV Index
0	0	0
1	2	3
2	0	2
3	$\lceil \lfloor TTIN/N_{ARQ} \rfloor$ **mod** $2 \rceil \times 2$	$\lfloor TTIN/N_{ARQ} \rfloor$ **mod** 4

The UE shall use either

- an RV index as indicated in Table 16 and according to the RSN
- or, if signalled by higher layers only E-DCH RV index 0 independently of the RSN.

4.9.2.3 Information field mapping of the "Happy" bit

The UE shall set $x_{h,1}$ as specified in Table 16A.

Table 16A: Mapping of "Happy" bit

"Happy" bit	$x_{h,1}$
Happy	1
Not happy	0

4.9.3 Multiplexing of E-DPCCH information

The E-TFCI information $x_{tfci,1}$, $x_{tfci,2}$, …, $x_{tfci,7}$, the retransmission sequence number $x_{rsn,1}$, $x_{rsn,2}$ and the "happy" bit $x_{h,1}$ are multiplexed together. This gives a sequence of bits x_1, x_2, …, x_{10} where

$x_k = x_{rsn,k}$ $k=1,2$

$x_k = x_{tfci,k-2}$ $k=3,4,\ldots,9$

$x_k = x_{h,1}$ $k=10$

4.9.4 Channel coding for E-DPCCH

Channel coding of the E-DPCCH is done using a sub-code of the second order Reed-Muller code. Coding is applied to the output x_1, x_2, ..., x_{10} from the E-DPCCH multiplexing, resulting in:

$$z_i = \sum_{n=0}^{9} (x_{n+1} \times M_{i,n}) \bmod 2 \qquad i=0, 1, ..., 29$$

The basis sequences are as described in 4.3.3 for i=0, 1, ..., 29.

4.9.5 Physical channel mapping for E-DPCCH

The E-DPCCH is described in [2]. The sequence of bits z_0, z_1, ..., z_{29} output from the E-DPCCH channel coding is mapped to the corresponding E-DPCCH sub frame. The bits are mapped so that they are transmitted over the air in ascending order with respect to i~~k~~. If the E-DCH TTI is equal to 10 ms the sequence of bits is transmitted in all the E-DPCCH sub frames of the E-DPCCH radio frame.

3GPP TSG-RAN1 Meeting #41 **R1-050541**
Athens, Greece, 9th - 13th May 2005

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.212 CR 205** ⌘ **rev 1** ⌘ Current version: **6.4.0** ⌘

*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: ⌘	Compressed mode operation for the Enhanced Uplink		
Source: ⌘	RAN WG1		
Work item code: ⌘	EDCH-Phys	***Date:*** ⌘	12/05/2005
Category: ⌘	**F**	***Release:*** ⌘	Rel-6
	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:* *Ph2 (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)* *Rel-7 (Release 7)*

Reason for change: ⌘	Currently compressed mode operation is not specified for the Enhanced Uplink. This CR introduces changes necessary for implementing correctly E-DCH compressed mode.
Summary of change: ⌘	For the 10 ms TTI the transmission gap position in case of compressed mode for E-DCH in case of initial and retransmission is specified. Further it is specified that the selection of spreading factor and rate matching are done considering the actual number of slots available for transmission. A correction of the E-DCH bit collection ensures, that it works properly also in case of compressed mode.
Consequences if not approved: ⌘	Compressed mode behaviour for E-DCH will not be properly specified.

Clauses affected: ⌘	4.4.5, 4.4.5.1, 4.4.5.2, 4.4.5.3, 4.8.4.1, 4.8.4.3, 4.8.7,4.9.5				
	Y	**N**			
Other specs affected: ⌘	X		Other core specifications	⌘	25.214(CR382r2), 25.321(CR216)
		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.

4.4.5 Transmission gap position for E-DCH

In the following, the transmission gap position for E-DCH during compressed frames is specified for the case when E-DCH TTI length is 10 ms. Slots that are not idle due to uplink compressed mode are termed "available".

The parameter n_{first} and n_{last} are used to determine the transmission gap position due to uplink compressed mode in the current radio frame. If the start of the transmission gap is allocated in the current frame $n_{first}=N_{first}$ else $n_{first}=0$. If the end of a transmission gap is allocated in the current frame $n_{last}=N_{last}$ else $n_{last}=14$.

4.4.5.1 E-DPDCH Transmission Gap Position during Initial Transmissions

If an initial transmission overlaps with a compressed frame the starting slot of the consecutive E-DPDCH idle slots within the E-DCH TTI is n_{first}, and n_{last} is the final idle slot within the 10 ms E-DCH TTI. The number of transmitted slots n_{tx1} is given by $n_{tx1}=14+n_{first}-n_{last}$.

If the initial transmission occurs in a non-compressed uplink frame, $n_{tx1}=15$.

4.4.5.2 E-DPDCH Transmission Gap Position during Retransmissions

If the current retransmission occurs in a compressed frame the maximum number of slots available for the retransmission is given by $n_{max}=14+n_{first}-n_{last}$. Else the maximum number of slots available for the retransmission n_{max} is 15.

If the initial transmission was compressed and in the retransmission more than n_{tx1} slots are available for transmission ($n_{max}>n_{tx1}$), the last $n_{dtx}=n_{max}-n_{tx1}$ available slots of the E-DPDCH frame are E-DPDCH idle slots. The parameter n_{tx1} refers to the number of transmitted slots calculated as defined in 4.4.5.1 for the corresponding initial transmission.

The E-DPDCH transmission gap in case a retransmission occurs in a compressed frame or a retransmission occurs in a non-compressed frame and the initial transmission was compressed is defined as follows:

If $n_{max} \le n_{tx1}$

  E-DPDCH idle slots are slots n_{first}, $n_{first}+1$, .., n_{last}

Else

  If $n_{first} < n_{tx1}$

    E-DPDCH idle slots are the slots n_{first}, $n_{first}+1$, .., n_{last} and $15-n_{dtx}$, $15-n_{dtx}+1$, ..,14

  Else

    E-DPDCH idle slots are the slots n_{tx1}, $n_{tx1}+1$, ..,14

4.4.5.3 E-DPCCH Transmission Gap Position

If a transmission overlaps with an uplink compressed frame the starting slot of the compressed mode gap within the E-DCH TTI is n_{first}, and n_{last} is the final E-DPCCH idle slot within the 10 ms E-DCH TTI.

4.8.4.1 Determination of SF and number of PhCHs needed

The maximum amount of puncturing that can be applied is

- $1\text{-}PL_{non\text{-}max}$ if the number of code channels is less than the maximum allowed by the UE capability and restrictions imposed by UTRAN.
- $1\text{-}PL_{max}$ if the number of code channels equals to the maximum allowed by the UE capability and restrictions imposed by UTRAN.

The number of available bits per TTI of one E-DPDCH for all possible spreading factors is denoted by N_{64}, N_{32}, N_{16}, N_8, N_4 and N_2, where the index refers to the spreading factor.

The possible number of bits available to the CCTrCH of E-DCH type on all PhCHs, $N_{e,data}$, then are $\{N_{64}, N_{32}, N_{16}, N_8, N_4, 2\times N_4, 2\times N_2, 2\times N_2+2\times N_4\}$.

SET0 denotes the set of $N_{e,data}$ values allowed by the UTRAN and supported by the UE, as part of the UE's capability. SET0 can be a subset of $\{N_{64}, N_{32}, N_{16}, N_8, N_4, 2\times N_4, 2\times N_2, 2\times N_2+2\times N_4\}$.

The total number of bits in a TTI before rate matching with transport format j is $N_{e,j}$. The total number of bits available for the E-DCH transmission per TTI with transport format j, $N_{e,data,j}$, is determined by executing the following algorithm, where $PL_{non\text{-}max}$ is signalled from higher layers and PL_{max} is equal to 0.44 for all E-DCH UE categories defined in [15] except the highest E-DCH UE category, for which PL_{max} is equal to 0.33:

SET1 = { $N_{e,data}$ in SET0 such that $N_{e,data} - N_{e,j}$ is non negative }

If SET1 is not empty and the smallest element of SET1 requires just one E-DPDCH then

$N_{e,data,j}$ = min SET1

Else

SET2 = { $N_{e,data}$ in SET0 such that $N_{e,data} - PL_{non\text{-}max} \times N_{e,j}$ is non negative }

If SET2 is not empty then

Sort SET2 in ascending order

$N_{e,data}$ = min SET2

While $N_{e,data}$ is not the max of SET2 and the follower of $N_{e,data}$ requires no additional E-DPDCH do

$N_{e,data}$ = follower of $N_{e,data}$ in SET2

End while

$N_{e,data,j} = N_{e,data}$

Else

$N_{e,data,j}$ = max SET0 provided that $N_{e,data,j} - PL_{max} \times N_{e,j}$ is non negative

End if

End if

While E-DCH TTI length is 10 ms, if an initial transmission occurs in a compressed frame, a retransmission occurs in a compressed frame or a retransmission occurs in a non-compressed frame and the initial transmission was compressed, the number of available bits per TTI of one E-DPDCH for all posible spreading factors denoted by N_{64}, N_{32}, N_{16}, N_8, N_4 and N_2 used in the algorithm above is replaced by $k\times N_{64}$, $k\times N_{32}$, $k\times N_{16}$, $k\times N_8$, $k\times N_4$ and $k\times N_2$. The parameter k is equal to $n_{tx1}/15$ and n_{tx1} is defined in 4.4.5.1.

4.8.4.2 HARQ bit separation

The HARQ bit separation function shall be performed in the same way as bit separation for turbo encoded TrCHs in 4.2.7.4.1 above.

4.8.4.3 HARQ Rate Matching Stage

The hybrid ARQ rate matching for the E-DCH transport channel shall be done with the general method described in 4.2.7.5 with the following specific parameters. Bits selected for puncturing which appear as δ in the algorithm in 4.2.7.5 shall be discarded and are not counted in the streams towards the bit collection.

The parameters of the rate matching stage depend on the value of the RV parameters *s* and *r*. The *s* and *r* combinations corresponding to each RV allowed for the E-DCH are listed in the table below.

Table 15: RV for E-DCH

E-DCH RV Index	s	r
0	1	0
1	0	0
2	1	1
3	0	1

The parameter e_{plus}, e_{minus} and e_{ini} are calculated with the general method for QPSK as described in 4.5.4.3 above. The following parameters are used as input:

- $N_{sys} = N_{p1} = N_{p2} = N_{e,j}/3$

- $N_{data} = N_{e,data,j}$

- $r_{max} = 2$

During uplink compressed frames while E-DCH TTI length is 10 ms and if $N_{data} > N_{e,j}$:

- If N_{data} mod 3 = 1, one δ bit is added to the $N_{t,sys}$ bits as the last systematic bit and another δ bit is added to the $P_{t,p1}$ bits as the last $P_{t,p1}$ bit.
- If N_{data} mod 3 = 2, one δ bit is added to the $N_{t,sys}$ bits as the last systematic bit.

4.8.4.4 HARQ bit collection

The HARQ bit collection shall be performed according to the general method for bit collection as specified in 4.2.7.4.2.

4.8.5 Physical channel segmentation for E-DCH

When more than one E-DPDCH is used, physical channel segmentation distributes the bits among the different physical channels. The bits input to the physical channel segmentation are denoted by $s_1, s_2, s_3, \ldots, s_R$, where R is the number of bits input to the physical channel segmentation block. The number of PhCHs is denoted by P.

The bits after physical channel segmentation are denoted $u_{p,k}$ where p is the PhCH number. $U(p)$ is the number of physical channel bits in one E-DCH TTI for the p^{th} E-DPDCH. The relation between s_k and $u_{p,k}$ is given below.

Bits on first PhCH after physical channel segmentation:

$$u_{1,k} = s_k \qquad k = 1, 2, \ldots, U(1)$$

Bits on p^{th} PhCH after physical channel segmentation:

$$u_{p,k} = s_{k+\sum_{q=1}^{p-1} U(q)} \qquad k = 1, 2, \ldots, U(p)$$

4.8.6 Interleaving for E-DCH

Interleaving for the E-DCH transport channel shall be done according to the general method described in section 4.2.11 with the specific parameter $U = U(p)$.

4.8.7 Physical channel mapping for E-DCH

The E-DCH structure is described in [2]. The bits input to the physical channel mapping are denoted $v_{p,1}, v_{p,2}, ..., v_{p,U(p)}$. The bits $v_{p,k}$ are mapped to the PhCHs such that the bits for each PhCH are transmitted over the air in ascending order with respect to k.

During compressed frames in the uplink and when E-DCH TTI is 10 ms:

- For the initial transmission the bits shall be consecutively mapped to the non-idle slots. The UE shall not map any bit to the E-DPDCH idle slots specified in 4.4.5.1.
- In case a retransmission occurs in a compressed frame or a retransmission occurs in a non-compressed frame if the initial transmission was compressed:
  - If $n_{tx1}>n_{max}$: The bits shall be consecutively mapped to the n_{max} available slots. The remaining bits are not transmitted.
  - If $n_{tx1}\leq n_{max}$: The bits shall be consecutively mapped to the n_{tx1} non-idle slots, whilst no bits are mapped to the idle slots.
  - The transmission gap position and the parameters n_{tx1} and n_{max} are specified in 4.4.5.2.

4.9 Coding for E-DPCCH

The following information is transmitted by means of the E-DPCCH:

- Retransmission sequence number (RSN)

- E-TFCI information

4.9.1 Overview

The figure below illustrates the overall coding chain for E-DPCCH.

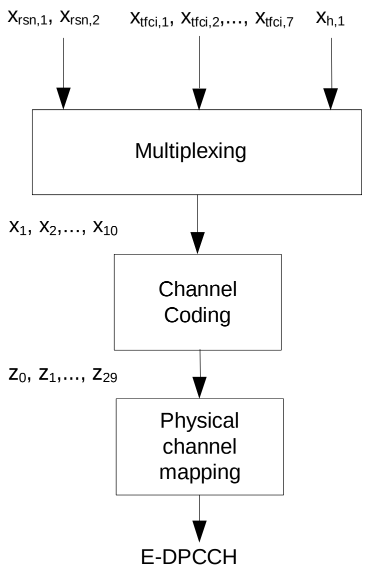

Figure 23: Coding chain for E-DPCCH

4.9.2 E-DPCCH information field mapping

4.9.2.1 Information field mapping of E-TFCI

The E-TFCI is mapped such that $x_{tfci,1}$ corresponds to the MSB.

4.9.2.2 Information field mapping of retransmission sequence number

To indicate the redundancy version (RV) of each HARQ transmission and to assist the Node B soft buffer management a two bit retransmission sequence number (RSN) is signalled from the UE to the Node B. The Node B can avoid soft buffer corruption by flushing the soft buffer associated to one HARQ process in case more than 3 consecutive E-DPCCH transmissions on that HARQ process can not be decoded or the last received RSN is incompatible with the current one.

The RSN value for each initial transmission of an E-DCH transport block is 0. For the first retransmission the RSN value is 1, for the second retransmission the RSN value is 2 and for each further retransmission the RSN value is 3. The RSN is mapped such that $x_{rsn,1}$ corresponds to the MSB.

The applied E-DCH RV index specifying the used RV (*s* and *r* parameter) depends on the RSN, the used coding rate and if RSN=3 also from the TTIN (TTI number). For 10 ms TTI the TTI number is equal to the CFN, for 2 ms TTI

$$TTIN = 5*CFN + subframe\ number$$

where the subframe number counts the five TTIs which are within a given CFN, starting from 0 for the first TTI to 4 for the last TTI. N_{ARQ} is the number of Hybrid ARQ processes.

Table 16: Relation between RSN value and E-DCH RV Index

RSN Value	**Coding Rate <1/2**	**1/2 ≤ Coding Rate**
	E-DCH RV Index	**E-DCH RV Index**
0	0	0
1	2	3
2	0	2
3	$[\lfloor TTIN/N_{ARQ} \rfloor \mathbf{mod}\ 2] \times 2$	$\lfloor TTIN/N_{ARQ} \rfloor \mathbf{mod}\ 4$

The UE shall use either

- an RV index as indicated in Table 16 and according to the RSN
- or, if signalled by higher layers only E-DCH RV index 0 independently of the RSN.

4.9.3 Multiplexing of E-DPCCH information

The E-TFCI information $x_{tfci,1}$, $x_{tfci,2}$, …, $x_{tfci,7}$, the retransmission sequence number $x_{rsn,1}$, $x_{rsn,2}$ and $x_{h,1}$ are multiplexed together. This gives a sequence of bits x_1, x_2, …, x_{10} where

$x_k = x_{rsn,k}$ $\quad$ *k=1,2*

$x_k = x_{tfci,k-2}$ $\quad$ *k=3,4,…,9*

$x_k = x_{h,1}$ $\quad$ *k=10*

4.9.4 Channel coding for E-DPCCH

Channel coding of the E-DPCCH is done using a sub-code of the second order Reed-Muller code. Coding is applied to the output x_1, x_2, ..., x_{10} from the E-DPCCH multiplexing, resulting in:

$$z_i = \sum_{n=0}^{9} (x_{n+1} \times M_{i,n}) \bmod 2 \qquad i=0, 1, ..., 29$$

The basis sequences are as described in 4.3.3 for *i*=0, 1, ..., 29.

4.9.5 Physical channel mapping for E-DPCCH

The E-DPCCH is described in [2]. The sequence of bits z_0, z_1, ..., z_{29} output from the E-DPCCH channel coding is mapped to the corresponding E-DPCCH sub frame. The bits are mapped so that they are transmitted over the air in ascending order with respect to *k*. If the E-DCH TTI is equal to 10 ms the sequence of bits is transmitted in all the E-DPCCH sub frames of the E-DPCCH radio frame.

For compressed frames in the uplink and the case when E-DCH TTI length is 10 ms, the bits mapped to the E-DPCCH idle slots specified in 4.4.5.3 shall not be transmitted.

CR-Form-v7.1

CHANGE REQUEST

⌘	**25.212**	**CR** **206**	⌘**rev**	**-**	⌘ Current version:	**6.4.0** ⌘

*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:	⌘	E-HICH and E-RGCH servng/non-serving definition clarification	
Source:	⌘	RAN WG1	
Work item code:	⌘	EDCH-Phys	***Date:*** ⌘ 30/03/2005
Category:	⌘	**F**	***Release:*** ⌘ Rel-6
		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:* *Ph2 (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)* *Rel-7 (Release 7)*

Reason for change:	⌘	The definition of serving/non-serving affecting the mappings of E-HICH and E-RGCH are undefined
Summary of change:	⌘	The serving/non serving for E-HICH means RLSs containing/not containing the serving E-DCH cell. For E-RGCH they mean serving/non-serving E-DCH RLS.
Consequences if not approved:	⌘	Ambiguously defined E-HICH and E-RGCH mappings in the specifications.

Clauses affected:	⌘	4.11.2 and 4.12.2				
		Y	**N**			
Other specs affected:	⌘		**X**	Other core specifications	⌘	
				Test specifications		
				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.

4.11 Mapping for E-RGCH Relative Grant

4.11.1 Overview

The relative grant is transmitted on the E-RGCH as described in [2].

4.11.2 Relative Grant mapping

The relative grant (RG) command is mapped to the relative grant value as described in the table below.

Table 17: Mapping of RG value

Command	RG Value (serving E-DCH RLS)	RG Value (non serving E-DCH RLS)
UP	+1	not allowed
HOLD	0	0
DOWN	-1	-1

4.12 Mapping for E-HICH ACK/NACK

4.12.1 Overview

The ACK/NACK is transmitted on the E-HICH as described in [2].

4.12.2 ACK/NACK mapping

The ACK/NACK command is mapped to the HARQ acknowledgement indicator as described in the table below.

Table 18: Mapping of HARQ Acknowledgement

Command	HARQ acknowledgement indicator
ACK	+1
NACK (RLSs not containing the serving E-DCH cell~~non serving~~)	0
NACK (RLS containing the serving E-DCH cell~~serving~~)	-1

3GPP TSG-RAN WG1 #41
Athen, Greece, May 10-14, 2005

Tdoc ⌘R1-050429

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CHANGE REQUEST

⌘	**25.212 CR 215**	⌘ **rev**	**-**	⌘ Current version:	**6.4.0** ⌘

*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: ⌘	Clarification on E-AGCH bit mapping			
Source: ⌘	RAN WG1			
Work item code: ⌘	EDCH-Phys		***Date:*** ⌘	28/04/2005
Category: ⌘	**F**		***Release:*** ⌘	Rel-6
	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:* *Ph2 (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)* *Rel-7 (Release 7)*

Reason for change: ⌘	Bit mapping is not clearly specified (initial text was left ambiguous as no final decision had been made on the E-AGCH TTI)
Summary of change: ⌘	Clarification on the E-AGCH bit mapping as a function of the E-DCH TTI
Consequences if not approved: ⌘	Not possible to implement the E-DCH feature without ambiguity.

Clauses affected: ⌘	4.10.5			
	Y	**N**		
Other specs affected: ⌘		X	Other core specifications	⌘
		X	Test specifications	
		X	O&M Specifications	
Other comments: ⌘				

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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.

4.10.5 Physical channel mapping for E-AGCH

The E-AGCH sub frame is described in [2]. The sequence of bits $r_1, r_2, \ldots, r_{60}$ is mapped to the corresponding E-AGCH sub frame. The bits r_k are mapped so that they are transmitted over the air in ascending order with respect to k. If the E-DCH TTI is equal to 10 ms the same sequence of bits is transmitted in ~~only one or in~~ all the E-AGCH sub frames of the E-AGCH radio frame.

3GPP TSG-RAN WG1 Meeting #41 **Tdoc R1-050434**
Athens, Greece, 9-13 May 2005

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CHANGE REQUEST

⌘ 25.212	CR 216	⌘ rev -	⌘ Current version: 6.4.0 ⌘

*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:	⌘	Determination of SF and number of PhCHs considering SF2
Source:	⌘	RAN WG1
Work item code:	⌘	EDCH-Phys — ***Date:*** ⌘ 02/05/2005
Category:	⌘	**F** — ***Release:*** ⌘ Rel-6

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:
- *Ph2 (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)*
- *Rel-7 (Release 7)*

Reason for change: ⌘ Since the number of E-DPDCHs for $2\times N_4$ and $2\times N_2$ are same, if SET2 includes $2\times N_2$ as well as $2\times N_4$, the current algorithm in TS 25.212 section 4.8.4.1 will always choose $2\times N_2$ even though there is no puncturing with $2\times N_4$. This results in unnecessary repetition. An example is shown below.

Assume 2ms TTI, $PL_{non\text{-}max}$=0.6, and SET0 is {N_{64}, N_{32}, N_{16}, N_8, N_4, $2\times N_4$, $2\times N_2$, $2\times N_2+2\times N_4$} = {120, 240, 480, 960, 1920, 3840, 7680, 11520}. If UE will transmit $N_{e,i}$ = 3702, $2\times N_2$ will be selected according to the current algorithm. The amount of repetition in case of $2\times N_4$ and $2\times N_2$ is as follows:
- With $2\times N_4$, $N_{e,data}$ - $N_{e,i}$ = 3840 – 3702 = 138 bits are repeated.
- With $2\times N_2$, $N_{e,data}$ - $N_{e,j}$ = 7680 – 3702 = 3978 bits are repeated.

Summary of change: ⌘ To avoid unnecessary repetition, when the algorithm executes the search in SET2, if $N_{e,data} – N_{e,j}$ becomes non-negative, then the "while" loop is stopped and $N_{e,data,j}$ is set to $N_{e,data}$.

Consequences if not approved: ⌘ Current algorithm may cause unnecessary repetition.

Clauses affected: ⌘ 4.8.4.1

	Y	N		
Other specs affected: ⌘		X	Other core specifications	⌘
			Test specifications	
			O&M Specifications	

Other comments: ⌘

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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.

4.8.4.1 Determination of SF and number of PhCHs needed

The maximum amount of puncturing that can be applied is

- 1-$PL_{non\text{-}max}$ if the number of code channels is less than the maximum allowed by the UE capability and restrictions imposed by UTRAN.
- 1-PL_{max} if the number of code channels equals to the maximum allowed by the UE capability and restrictions imposed by UTRAN.

The number of available bits per TTI of one E-DPDCH for all possible spreading factors is denoted by N_{64}, N_{32}, N_{16}, N_8, N_4 and N_2, where the index refers to the spreading factor.

The possible number of bits available to the CCTrCH of E-DCH type on all PhCHs, $N_{e,data}$, then are {N_{64}, N_{32}, N_{16}, N_8, N_4, $2\times N_4$, $2\times N_2$, $2\times N_2+2\times N_4$}.

SET0 denotes the set of $N_{e,data}$ values allowed by the UTRAN and supported by the UE, as part of the UE's capability. SET0 can be a subset of {N_{64}, N_{32}, N_{16}, N_8, N_4, $2\times N_4$, $2\times N_2$, $2\times N_2+2\times N_4$}.

The total number of bits in a TTI before rate matching with transport format j is $N_{e,j}$. The total number of bits available for the E-DCH transmission per TTI with transport format j, $N_{e,data,j}$, is determined by executing the following algorithm, where $PL_{non\text{-}max}$ is signalled from higher layers and PL_{max} is equal to 0.44:

SET1 = { $N_{e,data}$ in SET0 such that $N_{e,data} - N_{e,j}$ is non negative }

If SET1 is not empty and the smallest element of SET1 requires just one E-DPDCH then

$N_{e,data,j}$ = min SET1

Else

SET2 = { $N_{e,data}$ in SET0 such that $N_{e,data} - PL_{non\text{-}max} \times N_{e,j}$ is non negative }

If SET2 is not empty then

Sort SET2 in ascending order

$N_{e,data}$ = min SET2

While $N_{e,data} - N_{e,j}$ is negative and $N_{e,data}$ is not the max of SET2 and the follower of $N_{e,data}$ requires no additional E-DPDCH do

$N_{e,data}$ = follower of $N_{e,data}$ in SET2

End while

$N_{e,data,j} = N_{,e,data}$

Else

$N_{e,data,j}$ = max SET0 provided that $N_{e,data,j} - PL_{max} \times N_{e,j}$ is non negative

End if

End if

3GPP TSG-RAN WG1 #41
Athen, Greece, May 10-14, 2005

Tdoc ⌘R1-050505

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CHANGE REQUEST

⌘	**25.212**	**CR**	**219**	⌘ **rev**	**-**	⌘	Current version:	**6.4.0**	⌘

*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:	⌘	Re-ordering of the E-DPCCH bit mapping		
Source:	⌘	RAN WG1		
Work item code:	⌘	EDCH-Phys	***Date:*** ⌘	02/05/2005
Category:	⌘	**F**	***Release:*** ⌘	Rel-6
		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:* *Ph2 (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)* *Rel-7 (Release 7)*

Reason for change:	⌘	Simplification of the decoder design in the NodeB.
Summary of change:	⌘	The E-DPCCH bit mapping is re-ordered such that the decoder in the NodeB is simplified, employing a maximum search over fewer index regions, cf. R1-050349.
Consequences if not approved:	⌘	The E-DPCCH decoder design in the NodeB would be more complicated while there are no performance benefits.

Clauses affected:	⌘	4.9.1, 4.9.3				
		Y	**N**			
Other specs affected:	⌘		X	Other core specifications	⌘	
			X	Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

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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.

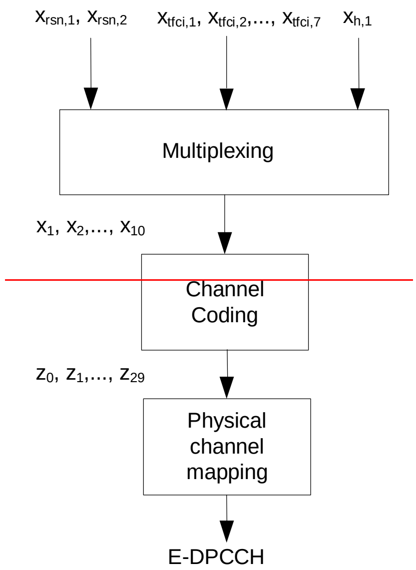
4.9 Coding for E-DPCCH

The following information is transmitted by means of the E-DPCCH:

- Retransmission sequence number (RSN)
- E-TFCI information

4.9.1 Overview

The figure below illustrates the overall coding chain for E-DPCCH.



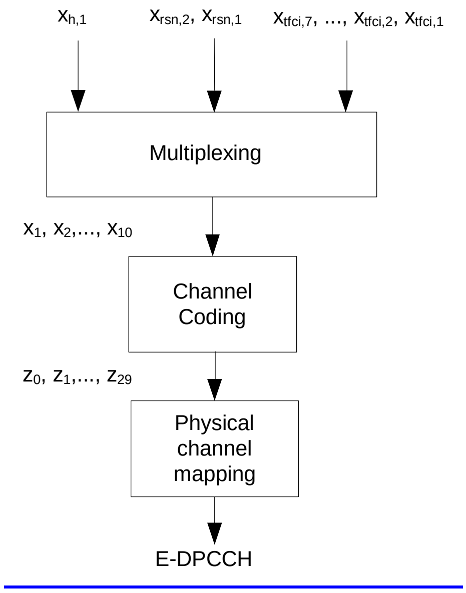


Figure 23: Coding chain for E-DPCCH

4.9.2 E-DPCCH information field mapping

4.9.2.1 Information field mapping of E-TFCI

The E-TFCI is mapped such that $x_{tfci,1}$ corresponds to the MSB.

4.9.2.2 Information field mapping of retransmission sequence number

To indicate the redundancy version (RV) of each HARQ transmission and to assist the Node B soft buffer management a two bit retransmission sequence number (RSN) is signalled from the UE to the Node B. The Node B can avoid soft buffer corruption by flushing the soft buffer associated to one HARQ process in case more than 3 consecutive E-DPCCH transmissions on that HARQ process can not be decoded or the last received RSN is incompatible with the current one.

The RSN value for each initial transmission of an E-DCH transport block is 0. For the first retransmission the RSN value is 1, for the second retransmission the RSN value is 2 and for each further retransmission the RSN value is 3. The RSN is mapped such that $x_{rsn,1}$ corresponds to the MSB.

The applied E-DCH RV index specifying the used RV (*s* and *r* parameter) depends on the RSN, the used coding rate and if RSN=3 also from the TTIN (TTI number). For 10 ms TTI the TTI number is equal to the CFN, for 2 ms TTI

TTIN = 5*CFN + subframe number

where the subframe number counts the five TTIs which are within a given CFN, starting from 0 for the first TTI to 4 for the last TTI. N_{ARQ} is the number of Hybrid ARQ processes.

Table 16: Relation between RSN value and E-DCH RV Index

RSN Value	Coding Rate <1/2	1/2 ≤ Coding Rate
	E-DCH RV Index	E-DCH RV Index
0	0	0
1	2	3
2	0	2
3	$[\lfloor TTIN/N_{ARQ} \rfloor \textbf{ mod } 2] \times 2$	$\lfloor TTIN/N_{ARQ} \rfloor \textbf{ mod } 4$

The UE shall use either

- an RV index as indicated in Table 16 and according to the RSN
- or, if signalled by higher layers only E-DCH RV index 0 independently of the RSN.

4.9.3 Multiplexing of E-DPCCH information

The E-TFCI information $x_{tfci,1}, x_{tfci,2}, \ldots, x_{tfci,7}$, the retransmission sequence number $x_{rsn,1}, x_{rsn,2}$ and $x_{h,1}$ are multiplexed together. This gives a sequence of bits $x_1, x_2, \ldots, x_{10}$ where

~~$x_k = x_{rsn,k}$ $k=1,2$~~

~~$x_k = x_{tfci,k-2}$ $k=3,4,\ldots,9$~~

~~$x_k = x_{h,1}$ $k=10$~~

$x_k = x_{h,1}$ $k=1$

$x_k = x_{rsn,4-k}$ $k=2,3$

$x_k = x_{tfci,11-k}$ $k=4,5,\ldots,10$

4.9.4 Channel coding for E-DPCCH

Channel coding of the E-DPCCH is done using a sub-code of the second order Reed-Muller code. Coding is applied to the output $x_1, x_2, \ldots, x_{10}$ from the E-DPCCH multiplexing, resulting in:

$$z_i = \sum_{n=0}^{9} (x_{n+1} \times M_{i,n}) \bmod 2 \qquad i=0, 1, \ldots, 29$$

The basis sequences are as described in 4.3.3 for i=0, 1, ..., 29.

4.9.5 Physical channel mapping for E-DPCCH

The E-DPCCH is described in [2]. The sequence of bits $z_0, z_1, \ldots, z_{29}$ output from the E-DPCCH channel coding is mapped to the corresponding E-DPCCH sub frame. The bits are mapped so that they are transmitted over the air in ascending order with respect to *k*. If the E-DCH TTI is equal to 10 ms the sequence of bits is transmitted in all the E-DPCCH sub frames of the E-DPCCH radio frame.

3GPP TSG-RAN WG1 Meeting #41
Athens, Greece, 9 – 13 May, 2005

R1-050543

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.212**	**CR 220**	⌘ **rev**	**-**	⌘	Current version:	**6.4.0**	⌘

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

Title:	⌘	Coding for E-AGCH
Source:	⌘	RAN WG1
Work item code:	⌘	EDCH-Phys
Date:	⌘	21/03/2005
Category:	⌘	F
Release:	⌘	Rel-6

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:
Ph2 (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)
Rel-7 (Release 7)

Reason for change:	⌘	In section 4.10 the length of absolute grant is not fixed yet. Consequently, CRC attachment, channel coding, and rate matching is not fixed yet. Furthermore in section 4.10.4, it is decribed that the rate matching is applied to obtain the output sequence $r_1, r_2, \ldots, r_{60}$. from the input sequence $z_1, z_2, \ldots, z_{3x(w+24)}$.. However, it is not yet completely defined how to obtain the output sequence.
Summary of change:	⌘	The length of absolute grant is fixed as 6. Accordingly CRC attachment, channel coding, and rate matching is fixed.
Consequences if not approved:	⌘	Coding for E-AGCH can not be performed in a proper manner.

Clauses affected:	⌘	4.10, 4.10.1, 4.10.2, 4.10.3, 4.10.4

		Y	N			
Other specs affected:	⌘		X	Other core specifications	⌘	
				Test specifications		
				O&M Specifications		
Other comments:	⌘					

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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.

The UE shall use either

- an RV index as indicated in Table 16 and according to the RSN
- or, if signalled by higher layers only E-DCH RV index 0 independently of the RSN.

4.9.3 Multiplexing of E-DPCCH information

The E-TFCI information $x_{tfci,1}$, $x_{tfci,2}$, …, $x_{tfci,7}$, the retransmission sequence number $x_{rsn,1}$, $x_{rsn,2}$ and $x_{h,1}$ are multiplexed together. This gives a sequence of bits x_1, x_2, …, x_{10} where

$x_k = x_{rsn,k}$ $\quad$ $k=1,2$

$x_k = x_{tfci,k-2}$ $\quad$ $k=3,4,\ldots,9$

$x_k = x_{h,1}$ $\quad$ $k=10$

4.9.4 Channel coding for E-DPCCH

Channel coding of the E-DPCCH is done using a sub-code of the second order Reed-Muller code. Coding is applied to the output x_1, x_2, ..., x_{10} from the E-DPCCH multiplexing, resulting in:

$$z_i = \sum_{n=0}^{9} (x_{n+1} \times M_{i,n}) \bmod 2 \qquad i=0, 1, ..., 29$$

The basis sequences are as described in 4.3.3 for i=0, 1, ..., 29.

4.9.5 Physical channel mapping for E-DPCCH

The E-DPCCH is described in [2]. The sequence of bits z_0, z_1, ..., z_{29} output from the E-DPCCH channel coding is mapped to the corresponding E-DPCCH sub frame. The bits are mapped so that they are transmitted over the air in ascending order with respect to k. If the E-DCH TTI is equal to 10 ms the sequence of bits is transmitted in all the E-DPCCH sub frames of the E-DPCCH radio frame.

4.10 Coding for E-AGCH

The absolute grant $x_{ag,1}$, $x_{ag,2}$, ..., $x_{ag,}$~~w~~$\underline{6}$ is transmitted by means of the absolute grant channel (E-AGCH).

4.10.1 Overview

Figure 24 below illustrates the overall coding chain for the E-AGCH.

Figure 24: Coding for E-AGCH

4.10.2 CRC attachment for E-AGCH

The E-RNTI is the E-DCH Radio Network Identifier defined in [13]. It is mapped such that $x_{id,1}$ corresponds to the MSB.

From the sequence of bits $x_{ag,1}$, $x_{ag,2}$, ..., $x_{ag,w6}$ a 16 bit CRC is calculated according to section 4.2.1.1. That gives the sequence of bits c_1, c_2, ..., c_{16} where

$$c_k = p_{im(17-k)} \qquad k=1,2,\ldots,16$$

This sequence of bits is then masked with $x_{id,1}$, $x_{id,2}$, ..., $x_{id,16}$ and appended to the sequence of bits $x_{ag,1}$, $x_{ag,2}$, ..., $x_{ag,w6}$ to form the sequence of bits y_1, y_2, ..., y_{w+1622} where

$y_i = x_{ag,i} \qquad i=1,2, \ldots, w6$

$y_i = (c_{i-w6} + x_{id,i-w6}) \bmod 2 \qquad i=$ ~~$w+1, \ldots, w+16$~~ $7, \ldots, 22$

4.10.3 Channel coding for E-AGCH

Rate 1/3 convolutional coding, as described in Section 4.2.3.1 is applied to the sequence of bits $y_1, y_2, \ldots, y_{w+1622}$, resulting in the sequence of bits $z_1, z_2, \ldots, z_{3x(w+24)90}$.

4.10.4 Rate matching for E-AGCH

~~Rate matching is applied to obtain the output sequence $r_1, r_2, \ldots, r_{60}$. from the input sequence $z_1, z_2, \ldots, z_{3x(w+24)}$.~~ From the input sequence $z_1, z_2, \ldots, z_{90}$ the bits $z_1, z_2, z_5, z_6, z_7, z_{11}, z_{12}, z_{14}, z_{15}, z_{17}, z_{23}, z_{24}, z_{31}, z_{37}, z_{44}, z_{47}, z_{61}, z_{63}, z_{64}, z_{71}, z_{72}, z_{75}, z_{77}, z_{80}, z_{83}, z_{84}, z_{85}, z_{87}, z_{88}, z_{90}$ are punctured to obtain the output sequence $r_1, r_2, \ldots, r_{60}$.

4.10.5 Physical channel mapping for E-AGCH

The E-AGCH sub frame is described in [2]. The sequence of bits $r_1, r_2, \ldots, r_{60}$ is mapped to the corresponding E-AGCH sub frame. The bits r_k are mapped so that they are transmitted over the air in ascending order with respect to k. If the E-DCH TTI is equal to 10 ms the sequence of bits is transmitted in only one or in all the E-AGCH sub frames of the E-AGCH radio frame.

4.11 Mapping for E-RGCH Relative Grant

4.11.1 Overview

The relative grant is transmitted on the E-RGCH as described in [2].

4.11.2 Relative Grant mapping

The relative grant (RG) command is mapped to the relative grant value as described in the table below.

Table 17: Mapping of RG value

Command	RG Value (serving)	RG Value (non serving)
UP	+1	not allowed
HOLD	0	0
DOWN	-1	-1

4.12 Mapping for E-HICH ACK/NACK

4.12.1 Overview

The ACK/NACK is transmitted on the E-HICH as described in [2].

4.12.2 ACK/NACK mapping

The ACK/NACK command is mapped to the HARQ acknowledgement indicator as described in the table below.

Table 18: Mapping of HARQ Acknowledgement

Command	HARQ acknowledgement indicator
ACK	+1
NACK (non serving)	0
NACK (serving)	-1

CR-Form-v7.1

CHANGE REQUEST

⌘ 25.213	CR 074	⌘ rev 2	⌘ Current version: 6.2.0 ⌘

*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:	⌘	Power offset values for E-DPDCH/E-DPCCH
Source:	⌘	RAN WG1
Work item code:	⌘	EDCH-Phys — ***Date:*** ⌘ 13/05/2005
Category:	⌘	**F** — ***Release:*** ⌘ Rel-6

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:
Ph2 (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)
Rel-7 (Release 7)

Reason for change:	⌘	E-DPDCH/E-DPCCH power offset quantization is not yet defined.
Summary of change:	⌘	Define the quantization tables for E-DPDCH/E-DPCCH.
Consequences if not approved:	⌘	It is not possible to determine the power offset for E-DPDCH/E-DPCCH with signaling value.

Clauses affected:	⌘	4.2.1.3			
		Y	**N**		
Other specs affected:	⌘		X	Other core specifications	⌘
				Test specifications	
				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.

4.2.1.3 E-DPDCH/E-DPCCH

Figure 1c illustrates the spreading operation for the E-DPDCHs and the E-DPCCH.

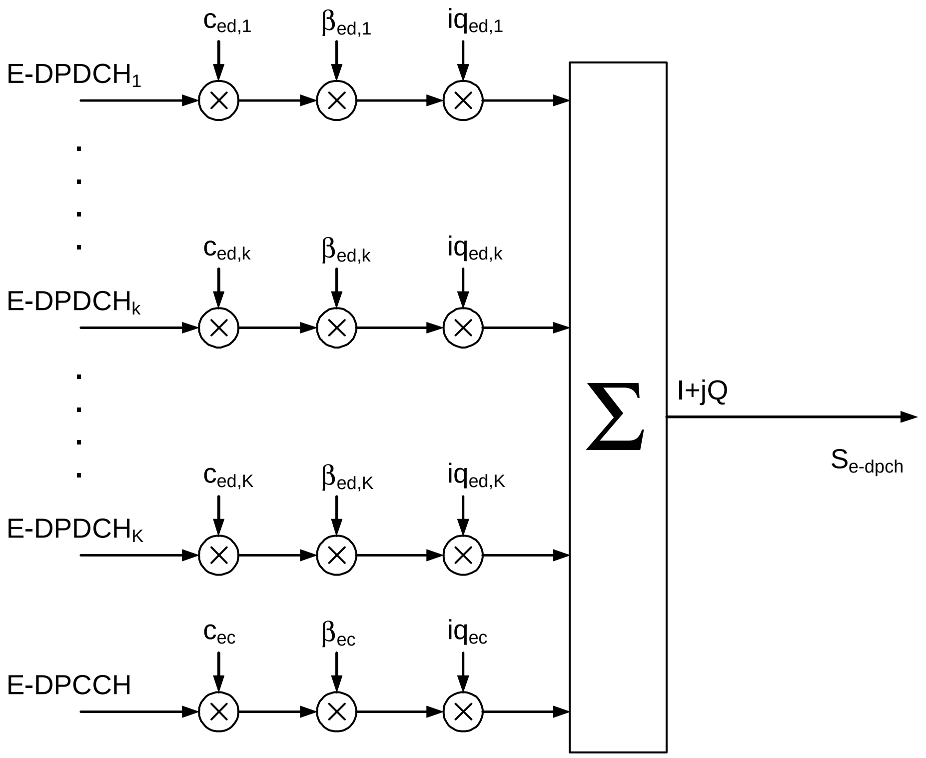

Figure 1c: Spreading for E-DPDCH/E-DPCCH

The E-DPCCH shall be spread to the chip rate by the channelisation code c_{ec}. The *k*:th E-DPDCH, denominated $E\text{-}DPDCH_k$, shall be spread to the chip rate using channelisation code $c_{ed,k}$.

After channelisation, the real-valued spread E-DPCCH and $E\text{-}DPDCH_k$ signals shall respectively be weighted by gain factor β_{ec} and $\beta_{ed,k}$.

The value of β_{ec} shall be derived as specified in [6] based on the power offset $\Delta_{E\text{-}DPCCH}$ signalled by higher layers. The relative power offsets $\Delta_{E\text{-}DPCCH}$ are quantized into amplitude ratios as specified in Table 1B.

Table 1B: Quantization for $\Delta_{E\text{-}DPCCH}$

Signalling values for $\Delta_{E\text{-}DPCCH}$	Quantized amplitude ratios for $10^{\left(\frac{\Delta_{E-DPCCH}}{20}\right)}$
~~blank~~	~~blank~~
8	30/15
7	24/15
6	19/15
5	15/15
4	12/15
3	9/15
2	8/15
1	6/15
0	5/15

The value of β_{ed} shall be computed based on the reference gain factors as specified in [6].

The reference gain factors are derived from the power offsets $\Delta_{E\text{-}DPDCH}$ signalled by higher layers. The relative power offsets $\Delta_{E\text{-}DPDCH}$ are quantized into amplitude ratios as specified in Table1B.1.

Table 1B.1: Quantization for $\Delta_{E\text{-}DPDCH}$

Signalling values for $\Delta_{E\text{-}DPDCH}$	Quantized amplitude ratios for $10^{\left(\frac{\Delta_{E-DPDCH}}{20}\right)}$
~~Blank~~	~~Blank~~
29	168/15
28	150/15
27	134/15
26	119/15
25	106/15
24	95/15
23	84/15
22	75/15
21	67/15
20	60/15
19	53/15
18	47/15
17	42/15
16	38/15
15	34/15
14	30/15
13	27/15
12	24/15
11	21/15
10	19/15
9	17/15
8	15/15
7	13/15
6	12/15
5	11/15
4	9/15
3	8/15
2	7/15
1	6/15
0	5/15

The value for $\beta_{ed,k}$ shall be set to $\sqrt{2}\times\beta_{ed}$ if the spreading factor for E-DPDCH$_k$ is 2 and to β_{ed} otherwise.

After weighting, the real-valued spread signals shall be mapped to the I branch or the Q branch according to the iq_{ec} value for the E-DPCCH and to $iq_{ed,k}$ for E-DPDCH$_k$ and summed together.

The E-DPCCH shall always be mapped to the I branch, i.e. $iq_{ec} = 1$.

The IQ branch mapping for the E-DPDCHs depends on $N_{max\text{-}dpdch}$ and on whether an HS-DSCH is configured for the UE; the IQ branch mapping shall be as specified in table 1C.

Table 1C: IQ branch mapping for E-DPDCH

$N_{max\text{-}dpdch}$	HS-DSCH configured	E-DPDCH$_k$	$iq_{ed,k}$
0	No/Yes	E-DPDCH$_1$	1
		E-DPDCH$_2$	j
		E-DPDCH$_3$	1
		E-DPDCH$_4$	j
1	No	E-DPDCH$_1$	j
		E-DPDCH$_2$	1
1	Yes	E-DPDCH$_1$	1
		E-DPDCH$_2$	j

NOTE: In case the UE transmits more than 2 E-DPDCHs, the UE then always transmits E-DPDCH$_3$ and E-DPDCH$_4$ simultaneously

4.2.2 PRACH

3GPP TSG RAN WG1 Meeting #41 R1-050549
Athens, Greece, 9 – 13 May 2005

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CHANGE REQUEST

⌘	**25.213**	**CR 075**	⌘ **rev**	**3**	⌘ Current version:	**6.2.0** ⌘

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:	⌘ Support of different HARQ profiles		
Source:	⌘ RAN WG1		
Work item code:	⌘ EDCH-Phys	***Date:*** ⌘	13/05/2005
Category:	⌘ **F** *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.	***Release:*** ⌘	Rel-6 *Use one of the following releases:* *Ph2 (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)* *Rel-7 (Release 7)*

Reason for change: ⌘	It is not yet described how to support different HARQ profiles.
Summary of change: ⌘	Define a set of additional power offset values needed to support different HARQ profiles.
Consequences if not approved: ⌘	It is not possible to support different HARQ profiles for a E-TFC.

Clauses affected: ⌘	4.2.1.3			
	Y	**N**		
Other specs affected: ⌘		X	Other core specifications	⌘
			Test specifications	
			O&M Specifications	
Other comments: ⌘				

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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.

4.2.1.3 E-DPDCH/E-DPCCH

Figure 1c illustrates the spreading operation for the E-DPDCHs and the E-DPCCH.

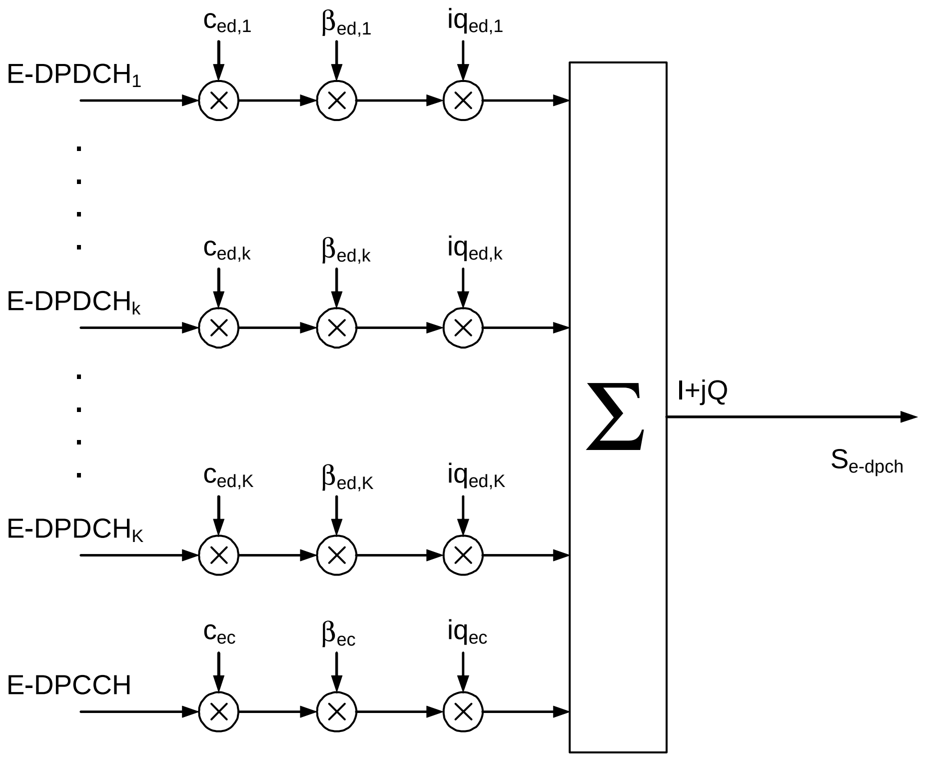

Figure 1c: Spreading for E-DPDCH/E-DPCCH

The E-DPCCH shall be spread to the chip rate by the channelisation code c_{ec}. The *k*:th E-DPDCH, denominated E-DPDCH_k, shall be spread to the chip rate using channelisation code $c_{ed,k}$.

After channelisation, the real-valued spread E-DPCCH and E-DPDCH_k signals shall respectively be weighted by gain factor β_{ec} and $\beta_{ed,k}$.

The value of β_{ec} shall be derived as specified in [6] based on the power offset $\Delta_{\text{E-DPCCH}}$ signalled by higher layers. The relative power offsets $\Delta_{\text{E-DPCCH}}$ are quantized into amplitude ratios as specified in Table 1B.

Table 1B: Quantization for $\Delta_{\text{E-DPCCH}}$

Signalling values for $\Delta_{\text{E-DPCCH}}$	Quantized amplitude ratios for $10^{\left(\frac{\Delta_{E-DPCCH}}{20}\right)}$
Blank	Blank

The value of $\beta_{ed,k}$ shall be computed as specified in [6] subclause 5.1.2.5B.2, based on the reference gain factors, the spreading factor for E-DPDCH_k, the HARQ offsets, and the quantization of the ratio $\beta_{ed,k}/\beta_c$ into amplitude ratios specified in Table 1B.2 ~~as specified in [6]~~.

The reference gain factors are derived from the power offsets $\Delta_{\text{E-DPDCH}}$ signalled by higher layers. The relative power offsets $\Delta_{\text{E-DPDCH}}$ are quantized into amplitude ratios as specified in Table 1B.1.

Table 1B.1: Quantization for $\Delta_{E\text{-}DPDCH}$

Signalling values for $\Delta_{E\text{-}DPDCH}$	Quantized amplitude ratios for $10^{\left(\frac{\Delta_{E-DPDCH}}{20}\right)}$
Blank	Blank

Table 1B.2: Quantization for $\beta_{ed,k}/\beta_c$

Quantized amplitude ratios for $\beta_{ed,k}/\beta_c$
168/15
150/15
134/15
119/15
106/15
95/15
84/15
75/15
67/15
60/15
53/15
47/15
42/15
38/15
34/15
30/15
27/15
24/15
21/15
19/15
17/15
15/15
13/15
12/15
11/15
9/15
8/15
7/15
6/15
5/15

The HARQ offsets Δ_{harq} to be used for support of different HARQ profile are configured by higher layers as specified in Table 1B.3.

Table 1B.3: HARQ offset Δ_{harq}

Signalling values for Δ_{harq}	Power offset values Δ_{harq} [dB]
6	6
5	5
4	4
3	3
2	2
1	1
0	0

~~The value for $\beta_{ed,k}$ shall be set to $\sqrt{2}\times\beta_{ed}$ if the spreading factor for E-DPDCH$_k$ is 2 and to β_{ed} otherwise.~~

After weighting, the real-valued spread signals shall be mapped to the I branch or the Q branch according to the iq_{ec} value for the E-DPCCH and to $iq_{ed,k}$ for E-DPDCH$_k$ and summed together.

The E-DPCCH shall always be mapped to the I branch, i.e. $iq_{ec} = 1$.

The IQ branch mapping for the E-DPDCHs depends on $N_{max\text{-}dpdch}$ and on whether an HS-DSCH is configured for the UE; the IQ branch mapping shall be as specified in table 1C.

Table 1C: IQ branch mapping for E-DPDCH

$N_{max\text{-}dpdch}$	HS-DSCH configured	E-DPDCH$_k$	$iq_{ed,k}$
0	No/Yes	E-DPDCH$_1$	1
		E-DPDCH$_2$	J
		E-DPDCH$_3$	1
		E-DPDCH$_4$	j
1	No	E-DPDCH$_1$	j
		E-DPDCH$_2$	1
1	Yes	E-DPDCH$_1$	1
		E-DPDCH$_2$	j

NOTE: In case the UE transmits more than 2 E-DPDCHs, the UE then always transmits E-DPDCH$_3$ and E-DPDCH$_4$ simultaneously

4.2.2 PRACH

3GPP TSG RAN WG1 Meeting #41 **R1-050565**
Athens, Greece, 9 – 13 May 2005

CR-Form-v7.1

CHANGE REQUEST

⌘ 25.214	CR 363	⌘ rev 4 ⌘	Current version: 6.5.0 ⌘

*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: ⌘	Power control at the maximum power limit		
Source: ⌘	RAN WG1		
Work item code: ⌘	EDCH-Phys	***Date:*** ⌘	13/05/2005
Category: ⌘	**F**	***Release:*** ⌘	Rel-6
	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:* *Ph2 (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)* *Rel-7 (Release 7)*

Reason for change: ⌘	It is not yet clearly described how to adjust the transmit power of uplink physical channels at the maximum power limit when E-DCH is configured. The power scaling should be defined such that the DCH performance is guaranteed because DCH has higher priority than E-DCH. On the other hand, the minimum set transmission on E-DPDCH also should be guaranteed without increasing complexity when no DPDCH is configured.
Summary of change: ⌘	For each slot, if the UE faces the power limited situation, the UE shall compress only the E-DPDCH power down to DTX when at least one DPDCH is configured or down to a predefined value when no DPDCH is configured.
Consequences if not approved: ⌘	E-DPDCH may degrade the DCH performance in the power limited situation.

Clauses affected: ⌘	5.1.2.6			
	Y	**N**		
Other specs affected: ⌘		X	Other core specifications	⌘
			Test specifications	
			O&M Specifications	
Other comments: ⌘				

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.1.2.6 Maximum and minimum power limits

When E-DCH is not configured, in the case that the total UE transmit power (after applying DPCCH power adjustments and gain factors) would exceed the maximum allowed value, the UE shall apply additional scaling to the total transmit power so that it is equal to the maximum allowed power. This additional scaling shall be such that the power ratio between DPCCH and DPDCH and also DPCCH and HS-DPCCH remains as required by sub-clause 5.1.2.5 and 5.1.2.5A.

When E-DCH is configured, if the total UE transmit power (after applying DPCCH power adjustments and gain factors) would exceed the maximum allowed value, the UE shall firstly reduce all the E-DPDCH gain factors $\beta_{ed,k}$ by an equal scaling factor to respective values $\beta_{ed,k,reduced}$ so that the total transmit power would be equal to the maximum allowed power. After calculating the reduced E-DPDCH gain factors, quantization according to table 1B.2 in [3] subclause 4.2.1.3 may be applied, where each $\beta_{ed,k,reduced}$ is quantized such that $\beta_{ed,k}/\beta_c$ is the largest quantised value for which the condition $\beta_{ed,k} \leq \beta_{ed,k,reduced}$ holds.

In case at least one DPDCH is configured, if any $\beta_{ed,k,reduced}/\beta_c$ is less than the smallest quantized value of Table 1B.2 in [3] subclause 4.2.1.3, DTX may be used on that E-DPDCH.

In case no DPDCH is configured, if any $\beta_{ed,k,reduced}/\beta_c$ is less than $[\beta_{coffee}]/\beta_c$, that $\beta_{ed,k}$ shall be set to $\beta_{ed,k,min}$ such that $\beta_{ed,k,min}/\beta_c = \min([\beta_{coffee}]/\beta_c, \beta_{ed,k,original}/\beta_c)$, where $\beta_{ed,k,original}$ denotes the E-DPDCH gain factor before reduction.

In the following cases, the UE shall then apply additional scaling to the total transmit power so that it is equal to the maximum allowed power:

- if at least one DPDCH is configured and the total UE transmit power would still exceed the maximum allowed value even though DTX is used on all E-DPDCHs;
- if no DPDCH is configured and the total UE transmit power would still exceed the maximum allowed value even though $\beta_{ed,k}$ is equal to $\beta_{ed,k,min}$ for all k.

Any additional scaling of the total transmit power as described above shall be such that the power ratio between DPCCH and DPDCH, between DPCCH and HS-DPCCH, and between DPCCH and E-DPCCH, remains as required by sub-clauses 5.1.2.5, 5.1.2.5A and 5.1.2.5B.1, and such that the power ratio between each E-DPDCH and DPCCH remains as required by $\beta_{ed,k,min}/\beta_c$ if DTX is not used on E-DPDCH.

Any scaling, and any reduction in the E-DPDCH gain factor as described above, shall only be applied or changed at a DPCCH slot boundary. In order that the total UE transmit power does not exceed the maximum allowed value the scaling or E-DPDCH gain factor reduction shall be computed using the maximum HS-DPCCH power transmitted in the next DPCCH slot. In the case that either an ACK or a NACK transmission will start during the next DPCCH slot, the maximum HS-DPCCH power shall be computed using one of the following:

(a) whichever of Δ_{ACK} and Δ_{NACK} will be used according to whether the transmission will be ACK or NACK, *or*

(b) whichever of Δ_{ACK} and Δ_{NACK} is the largest.

When transmitting on a DPCH the UE is not required to be capable of reducing its total transmit power below the minimum level required in [7]. However, it may do so, provided that the power ratio between DPCCH and DPDCH and also between DPCCH and HS-DPCCH remains as specified in sub clause 5.1.2.5 and 5.1.2.5A. Some further regulations also apply as follows: In the case that the total UE transmit power (after applying DPCCH power adjustments and gain factors) would be at or below the total transmit power in the previously transmitted slot and also at or below the required minimum power specified in [7], the UE may apply additional scaling to the total transmit power, subject to the following restrictions:

- The total transmit power after applying any additional scaling shall not exceed the required minimum power, nor the total transmit power in the previously transmitted slot;
- The magnitude of any reduction in total transmit power between slots after applying any additional scaling shall not exceed the magnitude of the calculated power reduction before the additional scaling.

In the case that the total UE transmit power in the previously transmitted slot is at or below the required minimum power specfied in [7] and the DPCCH power adjustment and gain factors for the current slot would result in an increase in total power, then no additional scaling shall be used (i.e. power control shall operate as normal).

If the UE applies any additional scaling to the total transmit power as described above, this scaling shall be included in the computation of any DPCCH power adjustments to be applied in the next transmitted slot.

3GPP TSG RAN WG1 Meeting #41 **R1-050550**
Athens, Greece, 9 – 13 May 2005

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.214**	**CR 372**	⌘ **rev 4** ⌘	Current version: **6.5.0** ⌘

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:	⌘	Support of different HARQ profiles
Source:	⌘	RAN WG1
Work item code:	⌘	EDCH-Phys — ***Date:*** ⌘ 13/05/2005
Category:	⌘	**F** — ***Release:*** ⌘ Rel-6

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:
Ph2 (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)
Rel-7 (Release 7)

Reason for change:	⌘	It is not yet described how to support different HARQ profiles.
Summary of change:	⌘	Revise the equation for calculating the gain factor to incorporate the additional power offset needed to support different HARQ profiles.
Consequences if not approved:	⌘	It is not possible to support different HARQ profiles for a E-TFC.

Clauses affected:	⌘	5.1.2.5B.2			
		Y	**N**		
Other specs affected:	⌘		X	Other core specifications	⌘
				Test specifications	
				O&M Specifications	
Other comments:	⌘				

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downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.1.2.5B.2 DPCCH/ E-DPDCH

5.1.2.5B.2.1 General

The E-DPDCH gain factor, β_{ed}, which is defined in [3] subclause 4.2.1.3, may take a different value for each E-TFC and HARQ offset. ~~Generally, t~~The gain factors for different E-TFCs and HARQ offsets are computed as described in subclause 5.1.2.5B.2.3 ~~and only the~~based on reference gain factor(s) $\beta_{ed,ref}$ of E-TFC(s) ~~used~~ signalled as reference E-TFC(s). The $\beta_{ed,ref}$ are ~~is~~ computed~~nfigured~~ as described in subclause 5.1.2.5B.2.2. At least the lowest E-TFC of the set of E-TFCs configured by the network shall be signalled as a reference E-TFC.

The gain factors may vary on radio frame basis or sub-frame basis depending on the E-DCH TTI used. Further, the setting of gain factors is independent of the inner loop power control.

5.1.2.5B.2.2 ~~Signalled~~ Computation of reference gain factors

For each reference E-TFC, a reference~~The~~ gain factor $\beta_{ed,ref}$ is calculated according to

$$\sout{\beta_{ed} = \beta_c \cdot 10^{\left(\frac{\Delta_{E-DPDCH}}{20}\right)}} \quad \beta_{ed,ref} = \beta_c \cdot 10^{\left(\frac{\Delta_{E-DPDCH}}{20}\right)}$$

where β_c value is signalled by higher-layer or calculated as described in subclause 5.1.2.5.2 or 5.1.2.5.3 and $\Delta_{E\text{-}DPDCH}$ is defined in [3] subcaluse 4.2.1.3.

5.1.2.5B.2.3 Computation of~~ed~~ gain factors

The gain factor β_{ed} of an E-TFC is computed based on the signalled settings for its corresponding reference E-TFC.

Let $E\text{-}TFCI_{ref,m}$ denote the E-TFCI of the m:th reference E-TFC, where m=1,2,…,M and M is the number of signalled reference E-TFCs and $E\text{-}TFCI_{ref,1} < E\text{-}TFCI_{ref,2} < \ldots < E\text{-}TFCI_{ref,M}$. Let $E\text{-}TFCI_j$ denote the E-TFCI of the j:th E-TFC. For the j:th E-TFC:

if $E\text{-}TFCI_j \geq E\text{-}TFCI_{ref,M}$, the reference E-TFC is the M:th reference E-TFC.

if $E\text{-}TFCI_{ref,1} \leq E\text{-}TFCI_j < E\text{-}TFCI_{ref,M}$, the reference E-TFC is the m:th reference E-TFC such that $E\text{-}TFCI_{ref,m} \leq E\text{-}TFCI_j < E\text{-}TFCI_{ref,m+1}$.

~~Let~~ $\beta_{ed,ref}$ denotes the reference gain factor of the reference E-TFC. ~~Also l~~Let $L_{e,ref}$ denote the number of E-DPDCHs used for the reference E-TFC and $L_{e,j}$ denote the number of E-DPDCHs used for the j:th E-TFC. If SF2 is used, $L_{e,ref}$ and $L_{e,j}$ are the equivalent number of physical channels assuming SF4. Let $K_{e,ref}$ denote the number of data bits of the reference E-TFC and $K_{e,j}$ denote the number of data bits of the j:th E-TFC.

For the j:th E-TFC, the temporary ~~gain factor~~variable $\beta_{ed,j,harq}$ is then computed as:

$$\sout{\beta_{ed,j} = \beta_{ed,ref}\sqrt{\frac{L_{e,ref}}{L_{e,j}}}\sqrt{\frac{K_{e,j}}{K_{e,ref}}}}$$

$$\beta_{ed,j,harq} = \beta_{ed,ref}\sqrt{\frac{L_{e,ref}}{L_{e,j}}}\sqrt{\frac{K_{e,j}}{K_{e,ref}}} \cdot 10^{\left(\frac{\Delta_{harq}}{20}\right)}$$

where the HARQ offset Δ_{harq} is defined in [3] subclause 4.2.1.3.

For the j:th E-TFC, the unquantized gain factor $\beta_{ed,k,j,uq}$ for the k:th E-DPDCH (denoted E-DPDCH$_k$ in [3] subclause 4.2.1.3) shall be set to $\sqrt{2} \times \beta_{ed,j,harq}$ if the spreading factor for E-DPDCH$_k$ is 2 and to $\beta_{ed,j,harq}$ otherwise.

If $\beta_{ed,k,j,uq}/\beta_c$ is less than the smallest quantized value of Table 1B.2 in [3] subclause 4.2.1.3, then the gain factor of E-DPDCH$_k$, $\beta_{ed,k}$ is set such that $\beta_{ed,k}/\beta_c$ is the smallest quantized value of Table 1B.2 in [3] subclause 4.2.1.3. Otherwise,

$\beta_{ed,k}$ is set such that $\beta_{ed,k}/\beta_c$ is the largest quantized value of Table 1B.2 in [3] subclause 4.2.1.3, for which the condition $\beta_{ed,k} \leq \beta_{ed,k,j,uq}$ holds.

5.1.2.6 Maximum and minimum power limits

3GPP TSG RAN WG1 Meeting #40bis **R1-050346**
Beijing, China, 4 – 8 April, 2005

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.214**	**CR 373**	⌘ **rev**	**-**	⌘ Current version:	**6.5.0** ⌘

*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:	⌘	Lowest reference E-TFC for the gain factor setting for E-DCH
Source:	⌘	RAN WG1
Work item code:	⌘	EDCH-Phys
Date:	⌘	4/4/2005
Category:	⌘	**F**
Release:	⌘	Rel-6

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:
- *Ph2 (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)*
- *Rel-7 (Release 7)*

Reason for change:	⌘	With the current specification, it is mandated to signal the gain factor for the lowest E-TFC. This restriction may not be necessarily needed.
Summary of change:	⌘	The change removes the phrase which mandates the gain factor of the lowest E-TFC to be signalled, and for the lowest set of E-TFCs it designates the lowest E-TFC with which the gain factor was signalled to be the reference E-TFC.
Consequences if not approved:	⌘	Having a single reference E-TFC which is not the lowest E-TFC, e.g. setting the highest E-TFC as the only reference E-TFC, is not allowed.

Clauses affected:	⌘	5.1.2.5B			
		Y	**N**		
Other specs affected:	⌘		X	Other core specifications	⌘
				Test specifications	
				O&M Specifications	
Other comments:	⌘				

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2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.1.2.5B Setting of the uplink DPCCH/E-DPCCH and E-DPDCH power difference

5.1.2.5B.1 DPCCH/ E-DPCCH

The E-DPCCH gain factor, β_{ec}, which is defined in [3] subclause 4.2.1.3, is calculated according to

$$\beta_{ec} = \beta_c \cdot 10^{\left(\frac{\Delta_{E-DPCCH}}{20}\right)}$$

where β_c value is signalled by higher-layer or calculated as described in subclause 5.1.2.5.2 or 5.1.2.5.3 and $\Delta_{\text{E-DPCCH}}$ is defined in [3] subcaluse 4.2.1.3.

5.1.2.5B.2 DPCCH/ E-DPDCH

5.1.2.5B.2.1 General

The E-DPDCH gain factor, β_{ed}, which is defined in [3] subclause 4.2.1.3, may take a different value for each E-TFC. Generally, the gain factors for different E-TFCs are computed as described in subclause 5.1.2.5B.2.3 and only the gain factor of E-TFC(s) used as reference E-TFC(s) is configured as described in subclause 5.1.2.5B.2.2. At least ~~the lowest~~one E-TFC of the set of E-TFCs configured by the network shall be signalled as a reference E-TFC.

The gain factors may vary on radio frame basis or sub-frame basis depending on the E-DCH TTI used. Further, the setting of gain factors is independent of the inner loop power control.

5.1.2.5B.2.2 Signalled gain factors

The gain factor β_{ed} is calculated according to

$$\beta_{ed} = \beta_c \cdot 10^{\left(\frac{\Delta_{E-DPDCH}}{20}\right)}$$

where β_c value is signalled by higher-layer or calculated as described in subclause 5.1.2.5.2 or 5.1.2.5.3 and $\Delta_{\text{E-DPDCH}}$ is defined in [3] subcaluse 4.2.1.3.

5.1.2.5B.2.3 Computed gain factors

The gain factor β_{ed} of an E-TFC is computed based on the signalled settings for its corresponding reference E-TFC.

Let $E\text{-}TFCI_{ref,m}$ denote the E-TFCI of the m:th reference E-TFC, where m=1,2,…,M and M is the number of signalled reference E-TFCs and $E\text{-}TFCI_{ref,1} < E\text{-}TFCI_{ref,2} < \ldots < E\text{-}TFCI_{ref,M}$. Let $E\text{-}TFCI_j$ denote the E-TFCI of the j:th E-TFC. For the j:th E-TFC:

if $E\text{-}TFCI_j \geq E\text{-}TFCI_{ref,M}$, the reference E-TFC is the M:th reference E-TFC.

if $E\text{-}TFCI_j < E\text{-}TFCI_{ref,1}$, the reference E-TFC is the 1st reference E-TFC.

if $E\text{-}TFCI_{ref,1} \leq E\text{-}TFCI_j < E\text{-}TFCI_{ref,M}$, the reference E-TFC is the m:th reference E-TFC such that $E\text{-}TFCI_{ref,m} \leq E\text{-}TFCI_j < E\text{-}TFCI_{ref,m+1}$.

Let $\beta_{ed,ref}$ denote the gain factor of the reference E-TFC. Also let $L_{e,ref}$ denote the number of E-DPDCHs used for the reference E-TFC and $L_{e,j}$ denote the number of E-DPDCHs used for the j:th E-TFC. If SF2 is used, $L_{e,ref}$ and $L_{e,j}$ are the equivalent number of physical channels assuming SF4. Let $K_{e,ref}$ denote the number of data bits of the reference E-TFC and $K_{e,j}$ denote the number of data bits of the j:th E-TFC.

For the j:th E-TFC, the gain factor $\beta_{ed,j}$ is then computed as:

$$\beta_{ed,j} = \beta_{ed,ref} \sqrt{\frac{L_{e,ref}}{L_{e,j}}} \sqrt{\frac{K_{e,j}}{K_{e,ref}}}$$

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CHANGE REQUEST

⌘	**25.214**	**CR**	**380**	⌘ **rev**	**3**	⌘ Current version: **6.5.0** ⌘

*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: ⌘	Clarification on E-DCH timing		
Source: ⌘	RAN WG1		
Work item code: ⌘	EDCH-PHYS	***Date:*** ⌘	27/05/2005
Category: ⌘	**F**	***Release:*** ⌘	Rel-6
	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:* *Ph2 (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)* *Rel-7 (Release 7)*

Reason for change: ⌘	• Incorrect terminology • Reference to a mode which has been removed • Ambiguity on UE behaviour on application time of E-DCH control information not in line with WG2 assumptions • Error in the E-AGCH timing formula for 10 ms EDCH TTI
Summary of change: ⌘	• Wording update such that consistent terminology is used • Removal of non RG mode relatde text • Clarification on application time of control data received on E-AGCH and E-RGCH from cells which don't belong to the E-DCH serving RLS. • Correction in the E-AGCH timing formula
Consequences if not approved: ⌘	Ambiguity possibly leading to non interopable implementaion of the E-DCH feature. In some cases, impossible to handle the E-AGCH in the UE within the allocated time for 10 ms E-DCH TTI.

Clauses affected: ⌘	6B.3			
	Y	**N**		
Other specs affected: ⌘		X	Other core specifications	⌘
		X	Test specifications	
		X	O&M Specifications	
Other comments: ⌘				

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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.

6B.3 E-DCH control timing

In sub-clauses 6B.3.1 and 6B.3.2 the word "first" refers to the earliest point in time.

6B.3.1 10 ms E-DCH TTI

For each cell in the E-DCH active set, the UE shall associate the control data received in the E-HICH frame associated with SFN *i* to the data transmitted in the E-DPDCH frame associated with SFN *i-3*.

For each cell which belongs to the serving E-DCH radio link set, ~~T~~the UE shall ~~apply~~ first take into account E-DCH ~~the~~ control data received in the ~~serving cell~~ E-RGCH frame associated with SFN *i* in the higher layer procedures which correspond to E-DCH transmission in ~~to~~ the E--DPDCH frame associated with SFN *i+1*.

~~The UE shall start using any control data received in any E-RGCH frame from a non serving cell as early as possible, but no later than 12 ms after the control data has been received.~~

For each cell which does not belong to the serving E-DCH radio link set the UE shall first take into account E-DCH control data received in the E-RGCH frame associated with SFN *i* in the higher layer procedures which correspond to E-DCH transmission in the E-DPDCH frame associated with SFN *i+1+s* where:

$$s = \left\lceil \frac{160 - \left(\tau_{DPCH,n}/256\right)}{150} \right\rceil$$

~~The UE shall start using any control data received in any E-AGCH frame as early as possible but no later than 12 ms after the control data has been received.~~

The UE shall first take into account E-DCH control data received in the E-AGCH frame associated with SFN *i* in the higher layer procedures which correspond to E-DCH transmission in the E-DPDCH frame associated with SFN *i+1+s* where:

$$s = \left\lceil \frac{100 - \left(\tau_{DPCH,n}/256\right)}{150} \right\rceil$$

6B.3.2 2 ms E-DCH TTI

For each cell in the E-DCH active set, the UE shall associate the E-DCH control data received in sub-frame *j* of the E--HICH frame associated with SFN *i* to sub-frame *t* of the E-DPDCH frame associated with SFN *i-s* where:

$$s = 1 - \lfloor j/3 \rfloor, \text{ and } \; t = (j+2) \bmod 5$$

For each cell which belongs to the serving E-DCH radio link set, t~~T~~he UE shall ~~apply~~ first take into account E-DCH ~~the~~ control data received ~~from the serving cell~~ in ~~E-RGCH~~ sub-frame *j* of the E-RGCH frame associated with SFN *i* ~~to~~ in the higher layer procedures which correspond to E-DCH transmission in sub-frame *j* of the E-DPDCH frame associated with SFN *i+1*.

For each cell which does not belong to the serving E-DCH radio link set the UE shall first take into account E-DCH control data received in the E-RGCH frame associated with SFN *i* in the higher layer procedures which correspond to E-DCH transmission in sub-frame *t* of the E-DPDCH frame associated with SFN *i+1+s* where:

$$s = \left\lfloor \frac{\left\lceil \frac{160 - \left(\tau_{DPCH,n}/256\right)}{30} \right\rceil}{5} \right\rfloor, \text{ and } \; t = \left\lceil \frac{160 - \left(\tau_{DPCH,n}/256\right) - 150s}{30} \right\rceil$$

The UE shall first take into account apply the E-DCH control data received from the serving cell inin E-AGCH sub-frame j of the E-AGCH frame associated with SFN i in the higher layer procedures which correspond to E-DCH transmission in to sub-frame t of the E-DPDCH frame associated with SFN $i+s$ where:

$$s = \left\lfloor \frac{\left\lceil \frac{30j + 100 - (\tau_{DPCH,n}/256)}{30} \right\rceil}{5} \right\rfloor, \text{ and } \quad t = \left\lceil \frac{30j + 100 - (\tau_{DPCH,n}/256) - 150s}{30} \right\rceil$$

In non RG mode, the UE shall start using any control data received in any E-AGCH frame as early as possible but no later than 4 ms after the control data has been received.

The UE shall start using any control data received in any E-RGCH frame from a non serving cell as early as possible but no later than 4 ms after the control data has been received.

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.214 CR 381** ⌘ **rev 1** ⌘ Current version: **6.5.0** ⌘

*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:	⌘	DPCCH gain factor with no DPDCH configured
Source:	⌘	RAN WG1
Work item code:	⌘	EDCH-Phys
Date:	⌘	10/05/2005
Category:	⌘	**F**
Release:	⌘	Rel-6

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:
Ph2 (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)
Rel-7 (Release 7)

Reason for change:	⌘	DPCCH gain factor β_c can be defined by higher layer signalling or being computed with a proper calculation for each TFC. However, in case that no DPDCH is configured (stand-alone E-DCH), there is no way to define β_c. In order to avoid the possible misunderstanding, it is required to define β_c even in case that there is no DPDCH configured.
Summary of change:	⌘	β_c is set to 1 in the case that no DPDCH is configured.
Consequences if not approved:	⌘	β_c has no value if DPDCH is not configured. Then gain factor for each uplink physical channel cannot be defined clearly.

Clauses affected:	⌘	5.1.2.5, 5.1.2.5A, 5.1.2.5B, 5.1.2.5C			
		Y	**N**		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.1.2.5 Setting of the uplink DPCCH/DPDCH power difference

5.1.2.5.1 General

The uplink DPCCH and DPDCH(s) are transmitted on different codes as defined in subclause 4.2.1 of [3]. In the case that at least one DPDCH is configured, tThe gain factors β_c and β_d may vary for each TFC. There are two ways of controlling the gain factors of the DPCCH code and the DPDCH codes for different TFCs in normal (non-compressed) frames:

- β_c and β_d are signalled for the TFC, or
- β_c and β_d is computed for the TFC, based on the signalled settings for a reference TFC.

Combinations of the two above methods may be used to associate β_c and β_d values to all TFCs in the TFCS. The two methods are described in subclauses 5.1.2.5.2 and 5.1.2.5.3 respectively. Several reference TFCs may be signalled from higher layers.

The gain factors may vary on radio frame basis depending on the current TFC used. Further, the setting of gain factors is independent of the inner loop power control.

After applying the gain factors, the UE shall scale the total transmit power of the DPCCH and DPDCH(s), such that the DPCCH output power follows the changes required by the power control procedure with power adjustments of Δ_{DPCCH} dB, subject to the provisions of sub-clause 5.1.2.6.

The gain factors during compressed frames are based on the nominal power relation defined in normal frames, as specified in subclause 5.1.2.5.4.

5.1.2.5.2 Signalled gain factors

When the gain factors β_c and β_d are signalled by higher layers for a certain TFC, the signalled values are used directly for weighting of DPCCH and DPDCH(s). The variable A_j, called the nominal power relation is then computed as:

$$A_j = \frac{\beta_d}{\beta_c}.$$

5.1.2.5.3 Computed gain factors

The gain factors β_c and β_d may also be computed for certain TFCs, based on the signalled settings for a reference TFC.

Let $\beta_{c,ref}$ and $\beta_{d,ref}$ denote the signalled gain factors for the reference TFC. Further, let $\beta_{c,j}$ and $\beta_{d,j}$ denote the gain factors used for the j:th TFC. Also let L_{ref} denote the number of DPDCHs used for the reference TFC and $L_{,j}$ denote the number of DPDCHs used for the j:th TFC.

Define the variable

$$K_{ref} = \sum_i RM_i \cdot N_i \ ;$$

where RM_i is the semi-static rate matching attribute for transport channel i (defined in [2] subclause 4.2.7), N_i is the number of bits output from the radio frame segmentation block for transport channel i (defined in [2] subclause 4.2.6.1), and the sum is taken over all the transport channels i in the reference TFC.

Similarly, define the variable

$$K_j = \sum_i RM_i \cdot N_i \ ;$$

where the sum is taken over all the transport channels i in the j:th TFC.

The variable A_j, called the nominal power relation is then computed as:

$$A_j = \frac{\beta_{d,ref}}{\beta_{c,ref}} \cdot \sqrt{\frac{L_{ref}}{L_j}} \sqrt{\frac{K_j}{K_{ref}}} .$$

The gain factors for the *j*:th TFC are then computed as follows:

- If $A_j > 1$, then $\beta_{d,j} = 1.0$ and $\beta_{c,j}$ is the largest quantized β -value, for which the condition $\beta_{c,j} \leq 1 / A_j$ holds. Since $\beta_{c,j}$ may not be set to zero, if the above rounding results in a zero value, $\beta_{c,j}$ shall be set to the lowest quantized amplitude ratio of 1/15 as specified in [3].
- If $A_j \leq 1$, then $\beta_{d,j}$ is the smallest quantized β -value, for which the condition $\beta_{d,j} \geq A_j$ holds and $\beta_{c,j} = 1.0$.

The quantized β-values are defined in [3] subclause 4.2.1, table 1.

5.1.2.5.4 Setting of the uplink DPCCH/DPDCH power difference in compressed mode

The gain factors used during a compressed frame for a certain TFC are calculated from the nominal power relation used in normal (non-compressed) frames for that TFC. Let A_j denote the nominal power relation for the *j*:th TFC in a normal frame. Further, let $\beta_{c,C,j}$ and $\beta_{d,C,j}$ denote the gain factors used for the *j*:th TFC when the frame is compressed. The variable $A_{C,j}$ is computed as:

$$A_{C,j} = A_j \cdot \sqrt{\frac{15 \cdot N_{pilot,C}}{N_{slots,C} \cdot N_{pilot,N}}} ;$$

where $N_{pilot,C}$ is the number of pilot bits per slot when in compressed mode, and $N_{pilot,N}$ is the number of pilot bits per slot in normal mode. $N_{slots,C}$ is the number of slots in the compressed frame used for transmitting the data.

The gain factors for the *j*:th TFC in a compressed frame are computed as follows:

If $A_{C,j} > 1$, then $\beta_{d,C,j} = 1.0$ and $\beta_{c,C,j}$ is the largest quantized β -value, for which the condition $\beta_{c,C,j} \leq 1 / A_{C,j}$ holds. Since $\beta_{c,C,j}$ may not be set to zero, if the above rounding results in a zero value, $\beta_{c,C,j}$ shall be set to the lowest quantized amplitude ratio of 1/15 as specified in [3].

If $A_{C,j} \leq 1$, then $\beta_{d,C,j}$ is the smallest quantized β -value, for which the condition $\beta_{d,C,j} \geq A_{C,j}$ holds and $\beta_{c,C,j} = 1.0$.

The quantized β-values are defined in [3] subclause 4.2.1, table 1.

5.1.2.5A Setting of the uplink DPCCH/HS-DPCCH power difference

When an HS-DPCCH is active, the power offset $\Delta_{HS\text{-}DPCCH}$ for each HS-DPCCH slot shall be set as follows.

For HS-DPCCH slots carrying HARQ Acknowledgement :

$\Delta_{HS\text{-}DPCCH} = \Delta_{ACK}$ if the corresponding HARQ-ACK message is ACK

$\Delta_{HS\text{-}DPCCH} = \Delta_{NACK}$ if the corresponding HARQ-ACK message is NACK

$\Delta_{HS\text{-}DPCCH}$ is the greatest of Δ_{ACK} and Δ_{NACK} if the corresponding HARQ-ACK message is PRE or POST.

For HS-DPCCH slots carrying CQI :

$\Delta_{HS\text{-}DPCCH} = \Delta_{CQI}$

The values for Δ_{ACK}, Δ_{NACK} and Δ_{CQI} are set by higher layers.

Then, in non-compressed frames β_{hs}, which is the gain factor defined in [3] subclause 4.2.1, is calculated according to

$$\beta_{hs} = \beta_c \cdot 10^{\left(\frac{\Delta_{HS-DPCCH}}{20}\right)},$$

where β_c –value is signalled by higher-layer or calculated as described in subclause 5.1.2.5.2 or 5.1.2.5.3 if at least one DPDCH is configured. In case no DPDCH is configured, β_c value is set as described in subclause 5.1.2.5C.

With the exception of the start and end of compressed frames, any DPCCH power change shall not modify the power ratio between the DPCCH and the HS-DPCCH. The power ratio between the DPCCH and the HS-DPCCH during compressed DPCCH frames is described below.

During the period between the start and end of a compressed DPCCH frame, when HS-DPCCH is transmitted, β_{hs} is calculated according to

$$\beta_{hs} = \beta_{c,C,j} \cdot 10^{\left(\frac{\Delta_{HS-DPCCH}}{20}\right)} \cdot \sqrt{\frac{N_{pilot,C}}{N_{pilot,N}}},$$

where $\beta_{c,C,j}$ is calculated as described in subclause 5.1.2.5.4 if at least one DPDCH is configured. In case no DPDCH is configured, $\beta_{c,C,j}$ value is set as described in subclause 5.1.2.5C., $N_{pilot,C}$ is the number of pilot bits per slot on the DPCCH in compressed frames, and $N_{pilot,N}$ is the number of pilot bits per slot in non-compressed frames.

Thus the gain factor β_{hs} varies depending on the current power offset $\Delta_{HS-DPCCH}$ and on whether the UL DPCCH is currently in a compressed frame.

5.1.2.5B Setting of the uplink DPCCH/E-DPCCH and E-DPDCH power difference

5.1.2.5B.1 DPCCH/ E-DPCCH

The E-DPCCH gain factor, β_{ec}, which is defined in [3] subclause 4.2.1.3, is calculated according to

$$\beta_{ec} = \beta_c \cdot 10^{\left(\frac{\Delta_{E-DPCCH}}{20}\right)}$$

where β_c value is signalled by higher-layer or calculated as described in subclause 5.1.2.5.2 or 5.1.2.5.3 if at least one DPDCH is configured. In case no DPDCH is configured, β_c value is set as described in subclause 5.1.2.5C. and $\Delta_{E-DPCCH}$ is defined in [3] subcaluse 4.2.1.3.

5.1.2.5B.2 DPCCH/ E-DPDCH

5.1.2.5B.2.1 General

The E-DPDCH gain factor, β_{ed}, which is defined in [3] subclause 4.2.1.3, may take a different value for each E-TFC. Generally, the gain factors for different E-TFCs are computed as described in subclause 5.1.2.5B.2.3 and only the gain factor of E-TFC(s) used as reference E-TFC(s) is configured as described in subclause 5.1.2.5B.2.2. At least the lowest E-TFC of the set of E-TFCs configured by the network shall be signalled as a reference E-TFC.

The gain factors may vary on radio frame basis or sub-frame basis depending on the E-DCH TTI used. Further, the setting of gain factors is independent of the inner loop power control.

5.1.2.5B.2.2 Signalled gain factors

The gain factor β_{ed} is calculated according to

$$\beta_{ed} = \beta_c \cdot 10^{\left(\frac{\Delta_{E-DPDCH}}{20}\right)}$$

where β_c value is signalled by higher-layer or calculated as described in subclause 5.1.2.5.2 or 5.1.2.5.3 if at least one DPDCH is configured. In case no DPDCH is configured, β_c value is set as described in subclause 5.1.2.5C. ~~and~~ $\Delta_{E\text{-}DPDCH}$ is defined in [3] subcaluse 4.2.1.3.

5.1.2.5B.2.3 Computed gain factors

The gain factor β_{ed} of an E-TFC is computed based on the signalled settings for its corresponding reference E-TFC.

Let $E\text{-}TFCI_{ref,m}$ denote the E-TFCI of the m:th reference E-TFC, where m=1,2,…,M and M is the number of signalled reference E-TFCs and $E\text{-}TFCI_{ref,1} < E\text{-}TFCI_{ref,2} < \ldots < E\text{-}TFCI_{ref,M}$. Let $E\text{-}TFCI_j$ denote the E-TFCI of the j:th E-TFC. For the j:th E-TFC:

if $E\text{-}TFCI_j \geq E\text{-}TFCI_{ref,M}$, the reference E-TFC is the M:th reference E-TFC.

if $E\text{-}TFCI_{ref,1} \leq E\text{-}TFCI_j < E\text{-}TFCI_{ref,M}$, the reference E-TFC is the m:th reference E-TFC such that $E\text{-}TFCI_{ref,m} \leq E\text{-}TFCI_j < E\text{-}TFCI_{ref,m+1}$.

Let $\beta_{ed,ref}$ denote the gain factor of the reference E-TFC. Also let $L_{e,ref}$ denote the number of E-DPDCHs used for the reference E-TFC and $L_{e,j}$ denote the number of E-DPDCHs used for the j:th E-TFC. If SF2 is used, $L_{e,ref}$ and $L_{e,j}$ are the equivalent number of physical channels assuming SF4. Let $K_{e,ref}$ denote the number of data bits of the reference E-TFC and $K_{e,j}$ denote the number of data bits of the j:th E-TFC.

For the j:th E-TFC, the gain factor $\beta_{ed,j}$ is then computed as:

$$\beta_{ed,j} = \beta_{ed,ref} \sqrt{\frac{L_{e,ref}}{L_{e,j}}} \sqrt{\frac{K_{e,j}}{K_{e,ref}}}$$

5.1.2.5C Setting of the uplink DPCCH gain factor when no DPDCH is configured

In the case that no DPDCH is configured, the gain factor β_c is equal to 1. During a compressed frame, the gain factor $\beta_{c,C,j}$ is also equal to 1.

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CR-Form-v7.1

CHANGE REQUEST

⌘	**25.214**	**CR 382**	⌘ **rev**	**2**	⌘ Current version:	**6.5.0** ⌘

*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:	⌘	Compressed mode operation for the Enhanced Uplink
Source:	⌘	RAN WG1
Work item code:	⌘	EDCH-Phys — ***Date:*** ⌘ 12/05/2005
Category:	⌘	**F** — ***Release:*** ⌘ Rel-6

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:

Ph2	*(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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	Currently compressed mode operation is not specified for the Enhanced Uplink. This CR introduces changes in the UL power setting procedures necessary for implementing correctly E-DCH compressed mode
Summary of change:	⌘	For the 10msec TTI, beta_ec is increased according to the amount of slots remaining in a compressed frame in order to maintain the missed detection & error performance. Beta_ed is also increased according to the number of remaining slots (Note: The TFC selection will, however select a lower TFC incompressed frames). For both the 2 and 10msec TTIs, beta_ec and beta_d are further adjusted according to any scaling on the DPCCH in order to avoid scaling of DPCCH changing the EcNo on either E-DCH channel.
Consequences if not approved:	⌘	Compressed mode behaviour for E-DCH will not be properly specified

Clauses affected:	⌘	5.1.2.5B.1, New Section 5.1.2.5B.2.4, new section 6B.4

Other specs affected:		**Y**	**N**			
	⌘	**X**		Other core specifications	⌘	25.212(CR205r1), 25.321(CR216)
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request

5.1.2.5B.1 DPCCH/ E-DPCCH

In non compressed frames, tThe E-DPCCH gain factor, β_{ec}, which is defined in [3] subclause 4.2.1.3, is calculated according to

$$\beta_{ec} = \beta_c \cdot 10^{\left(\frac{\Delta_{E-DPCCH}}{20}\right)}$$

where β_c value is signalled by higher-layer or calculated as described in subclause 5.1.2.5.2 or 5.1.2.5.3 and $\Delta_{E\text{-}DPCCH}$ is defined in [3] subcaluse 4.2.1.3.

During compressed frames where the E-DCH TTI is 2msec, the E-DPCCH gain factor, β_{ec}, which is defined in [3] subclause 4.2.1.3, is calculated according to:

$$\beta_{ec} = \beta_{c,C,j} \cdot 10^{\left(\frac{\Delta_{E-DPCCH}}{20}\right)} \cdot \sqrt{\frac{N_{pilot,C}}{N_{pilot,N}}}$$

where $\beta_{c,C,j}$ is calculated as described in subclause 5.1.2.5.4 if at least one DPDCH is configured. In case no DPDCH is configured, the $\beta_{c,C,j}$ value is set as described in subclause 5.1.2.5C. $N_{pilot,C}$ is the number of pilot bits per slot on the DPCCH in compressed frames, and $N_{pilot,N}$ is the number of pilot bits per slot in non-compressed frames. $N_{slots,C}$ is the number of non DTX slots in the compressed frame

During compressed frames and where the E-DCH TTI is 10msec, the E-DPCCH gain factor, β_{ec}, which is defined in [3] subclause 4.2.1.3, is calculated according to:

$$\beta_{ec} = \beta_{c,C,j} \cdot 10^{\left(\frac{\Delta_{E-DPCCH}}{20}\right)} \cdot \sqrt{\frac{15 \cdot N_{pilot,C}}{N_{slots,C} \cdot N_{pilot,N}}}$$

where , $N_{slots,C}$ is the number of non DTX slots in the compressed frame.

5.1.2.5B.2.4 DPCCH/ E-DPDCH adjustments relating to compressed mode

The gain factor applied to E-DPDCH is adjusted as a result of compressed mode operation in the following cases:

- E-DCH transmissions that overlap a compressed frame
- For 10msec E-DCH TTI case, retransmissions that do not themselves overlap a compressed frame, but for which the corresponding initial transmission overlapped a compressed frame.

The gain factors used during a compressed frame for a certain E-TFC are calculated from the nominal power relation used in normal (non-compressed) frames for that E-TFC. Let $\beta_{ed,C,j}$ denote the gain factor used for the *j*:th E-TFC when the frame is compressed.

When the E-DCH TTI is 2msec, $\beta_{ed,C,j}$ is computed as:

$$\beta_{ed,C,j} = \beta_{c,C,j} \cdot 10^{\left(\frac{\Delta_{E-DPDCH}}{20}\right)} \cdot \sqrt{\frac{L_{e,ref}}{L_{e,j}}} \cdot \sqrt{\frac{K_{e,j}}{K_{e,ref}}} \cdot 10^{\left(\frac{\Delta_{harq}}{20}\right)} \cdot \sqrt{\frac{N_{pilot,C}}{N_{pilot,N}}},$$

where $\beta_{c,C,j}$ is calculated as described in subclause 5.1.2.5.4 if at least one DPDCH is configured. In case no DPDCH is configured, the $\beta_{c,C,j}$ value is set as described in subclause 5.1.2.5C. $\Delta_{E\text{-}DPDCH}$ is as defined in [3] subcalause 4.2.1.3, $L_{e,ref}$, $L_{e,j}$, $K_{e,ref}$ and $K_{e,j}$ are as defined in subclause 5.1.2.5B.2.3, Δ_{harq} is as defined in [3] subclause 4.2.1.3, $N_{pilot,C}$ is the number of pilot bits per slot on the DPCCH in compressed frames, and $N_{pilot,N}$ is the number of pilot bits per slot in non-compressed frames.

When the E-DCH TTI is 10msec and the current frame is compressed, $\beta_{ed,C,j}$ shall be calculated and applied as follows:

$$\beta_{ed,C,j} = \beta_{c,C,j} \cdot 10^{\left(\frac{\Delta_{E-DPDCH}}{20}\right)} \cdot \sqrt{\frac{L_{e,ref}}{L_{e,j}}} \cdot \sqrt{\frac{K_{e,j}}{K_{e,ref}}} \cdot 10^{\left(\frac{\Delta_{harq}}{20}\right)} \cdot \sqrt{\frac{15 \cdot N_{pilot,C}}{N_{slots,I} \cdot N_{pilot,N}}},$$

where $N_{slots,I}$ is the number of non DTX slots in the first frame used for transmitting the data.

When the E-DCH TTI is 10msec and the current frame is not compressed, but is a retransmission for which the corresponding first transmission was compressed, $\beta_{ed,R,j}$ represents the gain factor that shall be applied to the jth TFC and shall be calculated as follows:

$$\beta_{ed,R,j} = \beta_{ed,j} \cdot \sqrt{\frac{15}{N_{slots,I}}}$$

where $\beta_{ed,j}$ is the gain factor used for the jth TFC in non compressed frames.

6B E-DCH related procedures

The following physical layer parameters are signalled to the UE from higher layers:

1) E-HICH set to be monitored

2) E-RGCH set to be monitored

6B.1 ACK/NACK detection

The physical layer in the UE shall detect ACK or NACK within the E-HICH set that is monitored by the UE in the subframes where ACK/NACK is transmitted by the UTRAN and deliver the ACK/NACK to the higher layers as follows:

- When a UE is not in soft handover, an ACK shall be delivered to the higher layers if a reliable ACK is detected by the physical layer in the UE, else a NACK shall be delivered to the higher layers.

- When a UE is in soft handover, multiple ACK/NACKs may be received in an E-DCH TTI from different cells in the active set. In some cases, the UE has the knowledge that some of the transmitted ACK/NACKs are the same. This is the case when the radio links are in the same radio link set. For these cases, ACK/NACKs from the same radio link set shall be soft combined into one ACK/NACK information and delivered to higher layers. If a radio link set contains only one radio link, the detection shall be done as specified above for the case where the UE is not in soft handover. For each radio link set containing multiple radio links, an ACK shall be delivered to the higher layers if a reliable ACK is detected by the physical layer in the UE after soft combining, else a NACK shall be delivered to the higher layers.

6B.2 Relative grants detection

The physical layer in the UE shall detect relative grants within the E-RGCH set that is monitored by the UE and deliver the relative grants to the higher layers as follows:

- When a UE is not in soft handover, an UP shall be delivered to the higher layers if a reliable UP is detected by the physical layer in the UE, else a DOWN shall be delivered to the higher layers if a reliable DOWN is detected by the UE, else a HOLD shall be delivered to the higher layers.

- When a UE is in soft handover, multiple relative grants may be received in an E-DCH TTI from different cells in the E-DCH active set. In some cases, the UE has the knowledge that some of the transmitted relative grants are the same. This is the case when the radio links are in the same E-DCH Radio Link Set (serving or non serving). For these cases, relative grants from the same E-DCH Radio Link Set (serving or non serving) shall be soft combined into one relative grant information and delivered to higher layers. If a radio link set contains only one radio link, the detection shall be done as specified above for the case where the UE is not in soft handover. For each E-DCH radio link set containing multiple radio links, an UP shall be delivered to the higher layers if a reliable UP is detected by the physical layer in the UE after soft combining, else a DOWN shall be delivered to the higher layers if a reliable DOWN is detected by the UE after soft combining, else a HOLD shall be delivered to the higher layers.

6B.3 E-DCH control timing

6B.3.1 10 ms E-DCH TTI

For each cell in the E-DCH active set, the UE shall associate the control data received in the E-HICH frame associated with SFN i to the data transmitted in the E-DCH frame associated with SFN $i-3$.

The UE shall apply the control data received in the serving cell E-RGCH frame associated with SFN i to the E-DCH frame associated with SFN $i+1$.

The UE shall start using any control data received in any E-RGCH frame from a non serving cell as early as possible, but no later than 12 ms after the control data has been received.

The UE shall start using any control data received in any E-AGCH frame as early as possible but no later than 12 ms after the control data has been received.

6B.3.2 2 ms E-DCH TTI

For each cell in the E-DCH active set, the UE shall associate the control data received in sub-frame *j* of the E-HICH frame associated with SFN *i* to sub-frame *t* of the E-DCH frame associated with SFN *i-s* where:

$s = 1 - \lfloor j/3 \rfloor$, and $t = (j+2) \bmod 5$

The UE shall apply the control data received from the serving cell in E-RGCH sub-frame *j* of the frame associated with SFN *i* to sub-frame *j* of the E-DCH frame associated with SFN *i+1*.

The UE shall apply the control data received from the serving cell in E-AGCH sub-frame *j* of the frame associated with SFN *i* to sub-frame *t* of the E-DCH frame associated with SFN *i+s* where:

$$s = \left\lfloor \frac{\left\lceil \frac{30j + 100 - (\tau_{DPCH,n}/256)}{30} \right\rceil}{5} \right\rfloor, \text{ and } t = \left\lceil \frac{30j + 100 - (\tau_{DPCH,n}/256) - 150s}{30} \right\rceil$$

In non RG mode, the UE shall start using any control data received in any E-AGCH frame as early as possible but no later than 4 ms after the control data has been received.

The UE shall start using any control data received in any E-RGCH frame from a non serving cell as early as possible but no later than 4 ms after the control data has been received.

6B.4 Operation during compressed mode

6B.4.1 Uplink compressed mode

When E-DCH TTI length is 2 ms, the UE shall not transmit E-DCH data in a TTI which fully or partly overlaps with an uplink transmission gap.

Handling of uplink compressed mode when the E-DCH TTI is 10msec is described in [2].