TSG-RAN Meeting #15
Jeju-do, Korea, 5 - 8 March 2002

RP-020231

Title: **Removal of channel coding option “no coding” for FDD**

Source: **Siemens**

Agenda item: **7**

RAN TDoc	Spec	CR	Rev	Phas	Subject	Cat	Version	Version-
RP-020231	25.201	009	2	R99	Removal of channel coding option “no coding” for FDD	F	3.2.0	3.3.0
RP-020231	25.201	010	1	Rel-4	Removal of channel coding option “no coding” for FDD	A	4.1.0	4.2.0
RP-020231	25.212	127	2	R99	Removal of channel coding option “no coding” for FDD	F	3.8.0	3.9.0
RP-020231	25.212	128	2	Rel-4	Removal of channel coding option “no coding” for FDD	A	4.3.0	4.4.0
RP-020231	25.215	110	1	R99	Removal of channel coding option “no coding” for FDD	F	3.9.0	3.10.0
RP-020231	25.215	111	1	Rel-4	Removal of channel coding option “no coding” for FDD	A	4.3.0	4.4.0
RP-020231	25.302	120	2	R99	Removal of channel coding option “no coding” for FDD	C	3.11.0	3.12.0
RP-020231	25.302	121	1	Rel-4	Removal of channel coding option “no coding” for FDD	A	4.3.0	4.4.0
RP-020231	25.331	1295	2	R99	Removal of channel coding option “no coding” for FDD	C	3.9.0	3.10.0
RP-020231	25.331	1296	1	Rel-4	Removal of channel coding option “no coding” for FDD	A	4.3.0	4.4.0
RP-020231	25.423	585	2	R99	Removing of channel coding option "no coding" for FDD	F	3.8.0	3.9.0
RP-020231	25.423	586	2	Rel-4	Removing of channel coding option "no coding" for FDD	A	4.3.0	4.4.0
RP-020231	25.433	627	2	R99	Removing of channel coding option "no coding" for FDD	F	3.8.0	3.9.0
RP-020231	25.433	628	2	Rel-4	Removing of channel coding option "no coding" for FDD	A	4.3.0	4.4.0

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CR-Form-v5

CHANGE REQUEST

⌘ **25.201**	**CR 009**	⌘ **rev 2** ⌘	Current version:	**3.2.0**	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title: ⌘	Removal of channel coding option "no coding" for FDD		
Source: ⌘	TSG RAN WG1		
Work item code: ⌘	TEI	***Date:*** ⌘	March 2002
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:*** ⌘	R99 *Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change: ⌘	At the RAN meeting it has been agreed to remove the channel coding option "no coding" for FDD. For TDD this option is still valid.
Summary of change: ⌘	The channel coding option "no coding" has been removed. **Isolated Impact Analysis** This change affects the channel coding type. It would not affect implementations behaving like indicated in the CR, it would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved: ⌘	An option that is not used by any Radio Bearer would be a mandatory feature for all UEs.

Clauses affected: ⌘			
Other specs affected: ⌘	[X] Other core specifications	⌘	CR010r1 25.201 v4.1.0 CR127r2 25.212 v3.8.0 CR128r2 25.212 v4.3.0 CR110r1 25.215 v3.9.0 CR111r1 25.215 v4.3.0 CR120r2 25.302 v3.11.0 CR121r1 25.302 v4.3.0 CR1295r2 25.331 v3.9.0 CR1296r1 25.331 v4.3.0 CR 585r2 25.423 v3.8.0 CR 586r2 25.423 v4.3.0 CR 627r2 25.433 v3.8.0 CR 628r2 25.433 v4.3.0
	[ ] 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/3G_Specs/CRs.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.

4.2.2 Channel coding and interleaving

For the channel coding in UTRA ~~three~~ two options are supported for FDD and three options are supported for TDD:

- Convolutional coding.
- Turbo coding.
- No coding (TDD only)

Channel coding selection is indicated by higher layers. In order to randomise transmission errors, bit interleaving is performed further.

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CHANGE REQUEST

⌘ **25.201 CR 010** ⌘ **rev 1** ⌘ Current version: **4.1.0** ⌘

For ***HELP*** *on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title: ⌘	Removal of channel coding option "no coding" for FDD
Source: ⌘	TSG RAN WG1
Work item code: ⌘	TEI
Date: ⌘	March 2002
Category: ⌘	A
Release: ⌘	REL-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

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Clauses affected: ⌘	4.2.2		
Other specs affected: ⌘	X	Other core specifications ⌘	CR009r2 25.201 v3.2.0 CR127r2 25.212 v3.8.0 CR128r2 25.212 v4.3.0 CR110r1 25.215 v3.9.0 CR111r1 25.215 v4.3.0 CR120r2 25.302 v3.11.0 CR121r1 25.302 v4.3.0 CR1295r2 25.331 v3.9.0 CR1296r1 25.331 v4.3.0 CR 585r2 25.423 v3.8.0 CR 586r2 25.423 v4.3.0 CR 627r2 25.433 v3.8.0 CR 628r2 25.433 v4.3.0
		Test specifications	
		O&M Specifications	

Other comments:	⌘	

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For the channel coding in UTRA ~~three~~ two options are supported for FDD and three options are supported for TDD:

- Convolutional coding.
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Channel coding selection is indicated by higher layers. In order to randomise transmission errors, bit interleaving is performed further.

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Jeju, Korea, 5 – 8, March, 2002

RP-020231

CR-Form-v5

CHANGE REQUEST

⌘	**25.212**	**CR 127**	⌘ **rev**	**2**	⌘ Current version:	**3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title: ⌘	Removal of channel coding option “no coding” for FDD		
Source: ⌘	TSG RAN WG1		
Work item code: ⌘	TEI	***Date:*** ⌘	March 2002
Category: ⌘	**F**	***Release:*** ⌘	R99
	Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change: ⌘	At the last RAN meeting it has been agreed to remove the channel coding option “no coding” for FDD. For TDD this option is still valid.
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Clauses affected: ⌘	4.2.2, 4.2.3, 4.2.7.1, 4.2.7.2, 4.2.7.3, 4.2.7.4		
Other specs affected: ⌘	[X] Other core specifications	⌘	CR009r2 25.201 v3.2.0 CR010r1 25.201 v4.1.0 CR128r2 25.212 v4.3.0 CR110r1 25.215 v3.9.0 CR111r1 25.215 v4.3.0 CR120r2 25.302 v3.11.0 CR121r1 25.302 v4.3.0 CR1295r2 25.331 v3.9.0 CR1296r1 25.331 v4.3.0 CR 585r2 25.423 v3.8.0 CR 586r2 25.423 v4.3.0 CR 627r2 25.433 v3.8.0 CR 628r2 25.433 v4.3.0
	[ ] Test specifications		
	[ ] 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.

4.2.2 Transport block concatenation and code block segmentation

All transport blocks in a TTI are serially concatenated. If the number of bits in a TTI is larger than Z, the maximum size of a code block in question, then code block segmentation is performed after the concatenation of the transport blocks. The maximum size of the code blocks depends on whether convolutional coding or ~~,~~ turbo coding ~~or no coding~~ is used for the TrCH.

4.2.2.1 Concatenation of transport blocks

The bits input to the transport block concatenation are denoted by $b_{im1}, b_{im2}, b_{im3}, \ldots, b_{imB_i}$ where i is the TrCH number, m is the transport block number, and B_i is the number of bits in each block (including CRC). The number of transport blocks on TrCH i is denoted by M_i. The bits after concatenation are denoted by $x_{i1}, x_{i2}, x_{i3}, \ldots, x_{iX_i}$, where i is the TrCH number and $X_i = M_i B_i$. They are defined by the following relations:

$x_{ik} = b_{i1k}$ $\quad k = 1, 2, \ldots, B_i$

$x_{ik} = b_{i,2,(k-B_i)}$ $\quad k = B_i + 1, B_i + 2, \ldots, 2B_i$

$x_{ik} = b_{i,3,(k-2B_i)}$ $\quad k = 2B_i + 1, 2B_i + 2, \ldots, 3B_i$

$\ldots$

$x_{ik} = b_{i,M_i,(k-(M_i-1)B_i)}$ $\quad k = (M_i - 1)B_i + 1, (M_i - 1)B_i + 2, \ldots, M_iB_i$

4.2.2.2 Code block segmentation

Segmentation of the bit sequence from transport block concatenation is performed if $X_i > Z$. The code blocks after segmentation are of the same size. The number of code blocks on TrCH i is denoted by C_i. If the number of bits input to the segmentation, X_i, is not a multiple of C_i, filler bits are added to the beginning of the first block. If turbo coding is selected and $X_i < 40$, filler bits are added to the beginning of the code block. The filler bits are transmitted and they are always set to 0. The maximum code block sizes are:

- convolutional coding: $Z = 504$;
- turbo coding: $Z = 5114$;
- ~~no channel coding: $Z = unlimited$.~~

The bits output from code block segmentation, for $C_i \neq 0$, are denoted by $o_{ir1}, o_{ir2}, o_{ir3}, \ldots, o_{irK_i}$, where i is the TrCH number, r is the code block number, and K_i is the number of bits per code block.

Number of code blocks:

$$_i = \lceil X_i / Z \rceil$$

$$C_i = \begin{cases} \lceil X_i / Z \rceil & \text{when } Z \neq unlimited \\ 0 & \text{when } Z = unlimited \text{ and } X_i = 0 \\ 1 & \text{when } Z = unlimited \text{ and } X_i \neq 0 \end{cases}$$

Number of bits in each code block (applicable for $C_i \neq 0$ only):

if $X_i < 40$ and Turbo coding is used, then

$K_i = 40$

else

$K_i = \lceil X_i / C_i \rceil$

end if

Number of filler bits: $Y_i = C_i K_i - X_i$

for k = 1 to Y_i -- Insertion of filler bits

$o_{i1k} = 0$

end for

for $k = Y_i+1$ to K_i

$o_{i1k} = x_{i,(k-Y_i)}$

end for

$r = 2$ -- Segmentation

while $r \le C_i$

for k = 1 to K_i

$o_{irk} = x_{i,(k+(r-1)\cdot K_i - Y_i)}$

end for

$r = r+1$

end while

4.2.3 Channel coding

Code blocks are delivered to the channel coding block. They are denoted by $o_{ir1}, o_{ir2}, o_{ir3}, \ldots, o_{irK_i}$, where i is the TrCH number, r is the code block number, and K_i is the number of bits in each code block. The number of code blocks on TrCH i is denoted by C_i. After encoding the bits are denoted by $y_{ir1}, y_{ir2}, y_{ir3}, \ldots, y_{irY_i}$, where Y_i is the number of encoded bits. The relation between o_{irk} and y_{irk} and between K_i and Y_i is dependent on the channel coding scheme.

The following channel coding schemes can be applied to TrCHs:

- convolutional coding;
- turbo coding;
- ~~no coding.~~

Usage of coding scheme and coding rate for the different types of TrCH is shown in table 1.

The values of Y_i in connection with each coding scheme:

- convolutional coding with rate 1/2: $Y_i = 2*K_i + 16$; rate 1/3: $Y_i = 3*K_i + 24$;
- turbo coding with rate 1/3: $Y_i = 3*K_i + 12$;
- ~~no coding: $Y_i = K_i$.~~

Table 1: Usage of channel coding scheme and coding rate

<table>
<tr><th>Type of TrCH</th><th>Coding scheme</th><th>Coding rate</th></tr>
<tr><td>BCH</td><td rowspan="4">Convolutional coding</td><td rowspan="3">1/2</td></tr>
<tr><td>PCH</td></tr>
<tr><td>RACH</td></tr>
<tr><td rowspan="3">CPCH, DCH, DSCH, FACH</td><td>1/3, 1/2</td></tr>
<tr><td>Turbo coding</td><td>1/3</td></tr>
<tr><td colspan="2">~~No coding~~</td></tr>
</table>

4.2.7.1.2 Determination of parameters needed for calculating the rate matching pattern

The number of bits to be repeated or punctured, $\Delta N_{i,j}$, within one radio frame for each TrCH i is calculated with equation 1 for all possible transport format combinations j and selected every radio frame. $N_{data,j}$ is given from subclause 4.2.7.1.1.

In a compressed radio frame, $N_{data,j}$ is replaced by $N_{data,j}^{cm}$ in Equation 1. $N_{data,j}^{cm}$ is given as follows:

In a radio frame compressed by higher layer scheduling, $N_{data,j}^{cm}$ is obtained by executing the algorithm in subclause 4.2.7.1.1 but with the number of bits in one radio frame of one PhCH reduced to $\frac{N_{tr}}{15}$ of the value in normal mode.

N_{tr} is the number of transmitted slots in a compressed radio frame and is defined by the following relation:

$$N_{tr} = \begin{cases} 15 - TGL, \text{ if } N_{first} + TGL \le 15 \\ N_{first}, \text{ in first frame if } N_{first} + TGL > 15 \\ 30 - TGL - N_{first}, \text{ in second frame if } N_{first} + TGL > 15 \end{cases}$$

N_{first} and TGL are defined in subclause 4.4.

In a radio frame compressed by spreading factor reduction, $N_{data,j}^{cm} = 2 \times \left(N_{data,j} - N_{TGL}\right)$, where

$$N_{TGL} = \frac{15 - N_{tr}}{15} \times N_{data,j}$$

If $\Delta N_{i,j} = 0$ then the output data of the rate matching is the same as the input data and the rate matching algorithm of subclause 4.2.7.5 does not need to be executed.

If $\Delta N_{i,j} \neq 0$ the parameters listed in subclauses 4.2.7.1.2.1 and 4.2.7.1.2.2 shall be used for determining e_{ini}, e_{plus}, and e_{minus} (regardless if the radio frame is compressed or not).

4.2.7.1.2.1 ~~Uncoded and c~~Convolutionally encoded TrCHs

$R = \Delta N_{i,j} \bmod N_{i,j}$ -- note: in this context $\Delta N_{i,j} \bmod N_{i,j}$ is in the range of 0 to N_{ij}-1 i.e. -1 mod 10 = 9.

if $R \neq 0$ and $2 \times R \le N_{ij}$

then q = $\lceil N_{i,j} / R \rceil$

else

q = $\lceil N_{i,j} / (R - N_{i,j}) \rceil$

endif

-- note: q is a signed quantity.

if q is even

then q' = q + gcd($|q|$, F_i)/ F_i -- where gcd ($|q|$, F_i) means greatest common divisor of $|q|$ and F_i

-- note that q' is not an integer, but a multiple of 1/8

else

q' = q

endif

for x = 0 to F_i - 1

$S[\lceil \lfloor x \times q' \rfloor \rceil \bmod F_i] = (\lceil \lfloor x \times q' \rfloor \rceil \text{ div } F_i)$

end for

$\Delta N_i = \Delta N_{i,j}$

a = 2

For each radio frame, the rate-matching pattern is calculated with the algorithm in subclause 4.2.7.5, where :

$X_i = N_{i,j}$., and

$e_{ini} = (a \times S[P1_{Fi}(n_i)] \times |\Delta N_i| + 1) \bmod (a \cdot N_{ij})$.

$e_{plus} = a \times N_{i,j}$

$e_{minus} = a \times |\Delta N_i|$

puncturing for ΔN <0, repetition otherwise.

4.2.7.2.1.3 Determination of rate matching parameters for ~~uncoded and~~ convolutionally encoded TrCHs

$$\Delta N_i = \Delta N_{i,max}$$

For compressed mode by puncturing, ΔN_i is defined as: $\Delta N_i = \Delta N_{i,\max}^{TTI,cm,m}$, instead of the previous relation.

a=2

$$N_{max} = \max_{l \in TFS(i)} N_{il}^{TTI}$$

For each transmission time interval of TrCH *i* with TF *l*, the rate-matching pattern is calculated with the algorithm in subclause 4.2.7.5. The following parameters are used as input:

$$X_i = N_{il}^{TTI}$$

$$e_{ini} = 1$$

$$e_{plus} = a \times N_{max}$$

$$e_{\min us} = a \times |\Delta N_i|$$

Puncturing if $\Delta N_i < 0$, repetition otherwise. The values of $\Delta N_{i,l}^{TTI}$ may be computed by counting repetitions or puncturing when the algorithm of subclause 4.2.7.5 is run. The resulting values of $\Delta N_{i,l}^{TTI}$ can be represented with following expression.

$$\Delta N_{i,l}^{TTI} = \left\lceil \frac{|\Delta N_i| \times X_i}{N_{max}} \right\rceil \times \mathrm{sgn}(\Delta N_i)$$

For compressed mode by puncturing, the above formula produces $\Delta N_{i,l}^{TTI,m}$ instead of $\Delta N_{i,l}^{TTI}$.

4.2.7.2.1.4 Determination of rate matching parameters for Turbo encoded TrCHs

If repetition is to be performed on turbo encoded TrCHs, i.e. $\Delta N_{i,max} > 0$, the parameters in subclause 4.2.7.2.1.3 are used.

If puncturing is to be performed, the parameters below shall be used. Index *b* is used to indicate systematic (*b*=1), 1st parity (*b*=2), and 2nd parity bit (*b*=3).

$a=2$ when b=2

$a=1$ when b=3

The bits indicated by *b*=1 shall not be punctured.

$$\Delta N_i^b = \begin{cases} \lfloor \Delta N_{i,max}/2 \rfloor, & \text{for } b = 2 \\ \lceil \Delta N_{i,max}/2 \rceil, & \text{for } b = 3 \end{cases}$$

In Compressed Mode by puncturing, the following relations are used instead of the previous ones:

$$\Delta N_i^b = \lfloor \Delta N_{i,\max}^{TTI,cm,m}/2 \rfloor, \text{ for } b=2$$

$$\Delta N_{i\ I}^{b} = \lceil \Delta N_{i,\max}^{TTI,cm,m}/2 \rceil, \text{ for } b=3$$

$$N_{max} = \max_{l \in TFS(i)} (N_{il}^{TTI} / 3)$$

For each transmission time interval of TrCH *i* with TF *l*, the rate-matching pattern is calculated with the algorithm in subcaluse 4.2.7.5. The following parameters are used as input:

$$X_i = N_{il}^{TTI} / 3$$

$$e_{ini} = N_{max}$$

$$e_{plus} = a \times N_{max}$$

$$e_{\min us} = a \times \left| \Delta N_i^b \right|$$

The values of $\Delta N_{i,l}^{TTI}$ may be computed by counting puncturing when the algorithm of subclause 4.2.7.5 is run. The resulting values of $\Delta N_{i,l}^{TTI}$ can be represented with following expression.

$$\Delta N_{i,l}^{TTI} = -\left\lfloor \frac{\left| \Delta N_i^2 \right| \times X_i}{N_{max}} + 0.5 \right\rfloor - \left\lfloor \frac{\left| \Delta N_i^3 \right| \times X_i}{N_{max}} \right\rfloor$$

In the above equation, the first term of the right hand side represents the amount of puncturing for *b*=2 and the second term represents the amount of puncturing for *b*=3.

For compressed mode by puncturing, the above formula produces $\Delta N_{i,l}^{TTI,m}$ instead of $\Delta N_{i,l}^{TTI}$.

4.2.7.2.2.2 Determination of rate matching parameters for ~~uncoded and~~ convolutionally encoded TrCHs

$\Delta N_i = \Delta N_{il}^{TTI}$

a=2

For each transmission time interval of TrCH *i* with TF *l*, the rate-matching pattern is calculated with the algorithm in subclause 4.2.7.5. The following parameters are used as input:

$X_i = N_{il}^{TTI}$

$e_{ini} = 1$

$e_{plus} = a \times N_{il}^{TTI}$

$e_{minus} = a \times |\Delta N_i|$

puncturing for $\Delta N_i < 0$, repetition otherwise.

4.2.7.3 Bit separation and collection in uplink

The systematic bits of turbo encoded TrCHs shall not be punctured, the other bits may be punctured. The systematic bits, first parity bits, and second parity bits in the bit sequence input to the rate matching block are therefore separated into three sequences.

The first sequence contains:

- All of the systematic bits that are from turbo encoded TrCHs.
- From 0 to 2 first and/or second parity bits that are from turbo encoded TrCHs. These bits come into the first sequence when the total number of bits in a block after radio frame segmentation is not a multiple of three.
- Some of the systematic, first parity and second parity bits that are for trellis termination.

The second sequence contains:

- All of the first parity bits that are from turbo encoded TrCHs, except those that go into the first sequence when the total number of bits is not a multiple of three.
- Some of the systematic, first parity and second parity bits that are for trellis termination.

The third sequence contains:

- All of the second parity bits that are from turbo encoded TrCHs, except those that go into the first sequence when the total number of bits is not a multiple of three.
- Some of the systematic, first parity and second parity bits that are for trellis termination.

The second and third sequences shall be of equal length, whereas the first sequence can contain from 0 to 2 more bits. Puncturing is applied only to the second and third sequences.The bit separation function is transparent for ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and for turbo encoded TrCHs with repetition. The bit separation and bit collection are illustrated in figures 5 and 6.

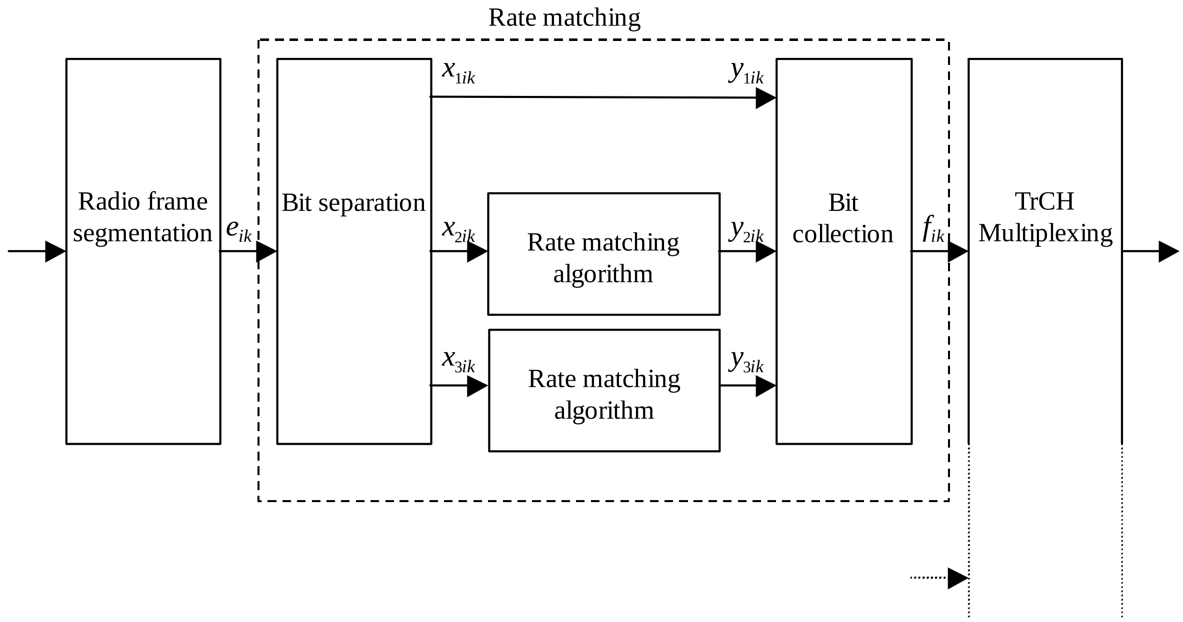

Figure 5: Puncturing of turbo encoded TrCHs in uplink

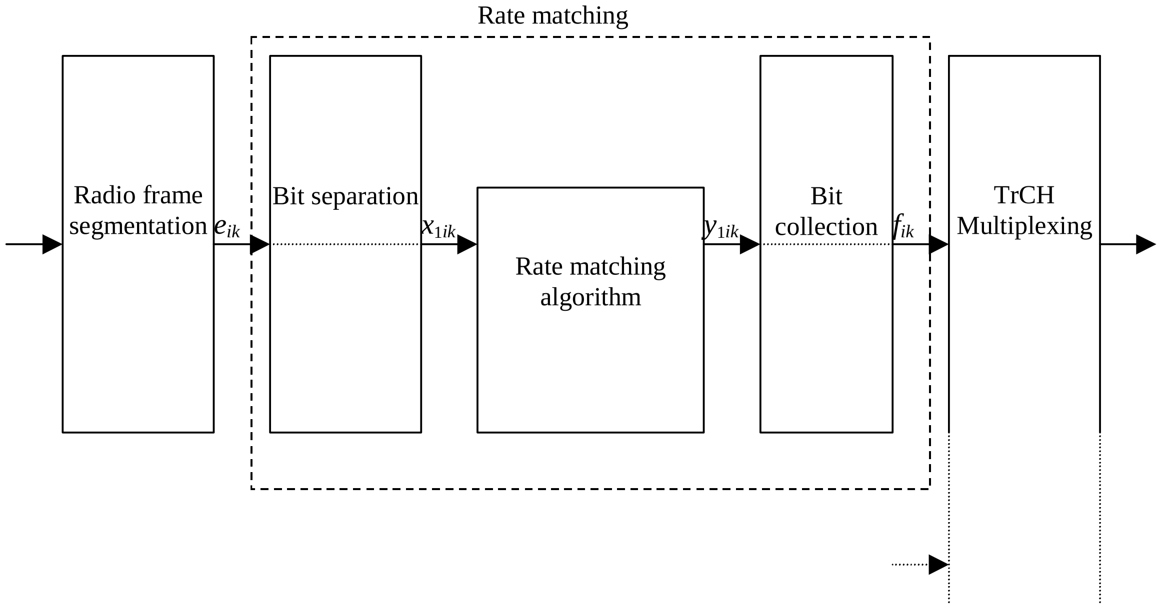

Figure 6: Rate matching for ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and for turbo encoded TrCHs with repetition in uplink

The bit separation is dependent on the 1st interleaving and offsets are used to define the separation for different TTIs. b indicates the three sequences defined in this section, with b=1 indicating the first sequence, b = 2 the second one, and b = 3 the third one. The offsets α_b for these sequences are listed in table 5.

Table 5: TTI dependent offset needed for bit separation

TTI (ms)	α_1	α_2	α_3
10, 40	0	1	2
20, 80	0	2	1

The bit separation is different for different radio frames in the TTI. A second offset is therefore needed. The radio frame number for TrCH i is denoted by n_i. and the offset by β_{n_i} .

Table 6: Radio frame dependent offset needed for bit separation

TTI (ms)	β_0	β_1	β_2	β_3	β_4	β_5	β_6	β_7
10	0	NA	NA	NA	NA	NA	NA	NA
20	0	1	NA	NA	NA	NA	NA	NA
40	0	1	2	0	NA	NA	NA	NA
80	0	1	2	0	1	2	0	1

4.2.7.3.1 Bit separation

The bits input to the rate matching are denoted by $e_{i1}, e_{i2}, e_{i3}, \ldots, e_{iN_i}$, where i is the TrCH number and N_i is the number of bits input to the rate matching block. Note that the transport format combination number j for simplicity has been left out in the bit numbering, i.e. N_i=N_{ij}. The bits after separation are denoted by $x_{bi1}, x_{bi2}, x_{bi3}, \ldots, x_{biX_i}$. For turbo encoded TrCHs with puncturing, b indicates the three sequences defined in section 4.2.7.3, with b=1 indicating the first sequence, and so forth. For all other cases b is defined to be 1. X_i is the number of bits in each separated bit sequence. The relation between e_{ik} and x_{bik} is given below.

For turbo encoded TrCHs with puncturing:

$$x_{1,i,k} = e_{i,3(k-1)+1+(\alpha_1+\beta_{n_i}) \bmod 3} \qquad k = 1, 2, 3, \ldots, X_i \qquad X_i = \lfloor N_i / 3 \rfloor$$

$x_{1,i,\lfloor N_i/3 \rfloor+k} = e_{i,3\lfloor N_i/3 \rfloor+k}$ k = 1, …, N_i mod 3 Note: When (N_i mod 3) = 0 this row is not needed.

$x_{2,i,k} = e_{i,3(k-1)+1+(\alpha_2+\beta_{n_i}) \bmod 3}$ k = 1, 2, 3, …, X_i $X_i = \lfloor N_i/3 \rfloor$

$x_{3,i,k} = e_{i,3(k-1)+1+(\alpha_3+\beta_{n_i}) \bmod 3}$ k = 1, 2, 3, …, X_i $X_i = \lfloor N_i/3 \rfloor$

For ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and turbo encoded TrCHs with repetition:

$x_{1,i,k} = e_{i,k}$ k = 1, 2, 3, …, X_i $X_i = N_i$

4.2.7.3.2 Bit collection

The bits x_{bik} are input to the rate matching algorithm described in subclause 4.2.7.5. The bits output from the rate matching algorithm are denoted $y_{bi1}, y_{bi2}, y_{bi3}, \ldots, y_{biY_i}$.

Bit collection is the inverse function of the separation. The bits after collection are denoted by $z_{bi1}, z_{bi2}, z_{bi3}, \ldots, z_{biY_i}$. After bit collection, the bits indicated as punctured are removed and the bits are then denoted by $f_{i1}, f_{i2}, f_{i3}, \ldots, f_{iV_i}$, where i is the TrCH number and $V_i = N_{ij} + \Delta N_{ij}$. The relations between y_{bik}, z_{bik}, and f_{ik} are given below.

For turbo encoded TrCHs with puncturing (Y_i=X_i):

$z_{i,3(k-1)+1+(\alpha_1+\beta_{n_i}) \bmod 3} = y_{1,i,k}$ k = 1, 2, 3, …, Y_i

$z_{i,3\lfloor N_i/3 \rfloor+k} = y_{1,i,\lfloor N_i/3 \rfloor+k}$ k = 1, …, N_i mod 3 Note: When (N_i mod 3) = 0 this row is not needed.

$z_{i,3(k-1)+1+(\alpha_2+\beta_{n_i}) \bmod 3} = y_{2,i,k}$ k = 1, 2, 3, …, Y_i

$z_{i,3(k-1)+1+(\alpha_3+\beta_{n_i}) \bmod 3} = y_{3,i,k}$ k = 1, 2, 3, …, Y_i

After the bit collection, bits $z_{i,k}$ with value δ, where $\delta \notin \{0, 1\}$, are removed from the bit sequence. Bit $f_{i,1}$ corresponds to the bit $z_{i,k}$ with smallest index k after puncturing, bit $f_{i,2}$ corresponds to the bit $z_{i,k}$ with second smallest index k after puncturing, and so on.

For ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and turbo encoded TrCHs with repetition:

$z_{i,k} = y_{1,i,k}$ k = 1, 2, 3, …, Y_i

When repetition is used, $f_{i,k}$=$z_{i,k}$ and Y_i=V_i.

When puncturing is used, Y_i=X_i and bits $z_{i,k}$ with value δ, where $\delta \notin \{0, 1\}$, are removed from the bit sequence. Bit $f_{i,1}$ corresponds to the bit $z_{i,k}$ with smallest index k after puncturing, bit $f_{i,2}$ corresponds to the bit $z_{i,k}$ with second smallest index k after puncturing, and so on.

4.2.7.4 Bit separation and collection in downlink

The systematic bits of turbo encoded TrCHs shall not be punctured, the other bits may be punctured.

The systematic bits, first parity bits and second parity bits in the bit sequence input to the rate matching block are therefore separated into three sequences of equal lengths.

The first sequence contains :

- All of the systematic bits that are from turbo encoded TrCHs.
- Some of the systematic, first parity and second parity bits that are for trellis termination.

The second sequence contains:

- All of the first parity bits that are from turbo encoded TrCHs.
- Some of the systematic, first parity and second parity bits that are for trellis termination.

The third sequence contains:

- All of the second parity bits that are from turbo encoded TrCHs.
- Some of the systematic, first parity and second parity bits that are for trellis termination.

Puncturing is applied only to the second and third sequences.

The bit separation function is transparent for ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and for turbo encoded TrCHs with repetition. The bit separation and bit collection are illustrated in figures 7 and 8.

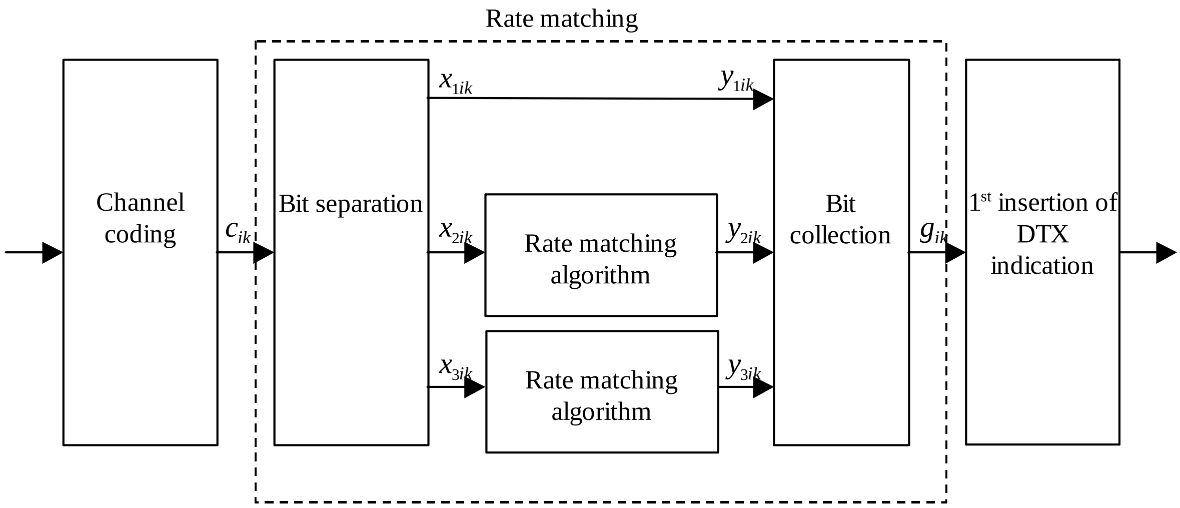

Figure 7: Puncturing of turbo encoded TrCHs in downlink

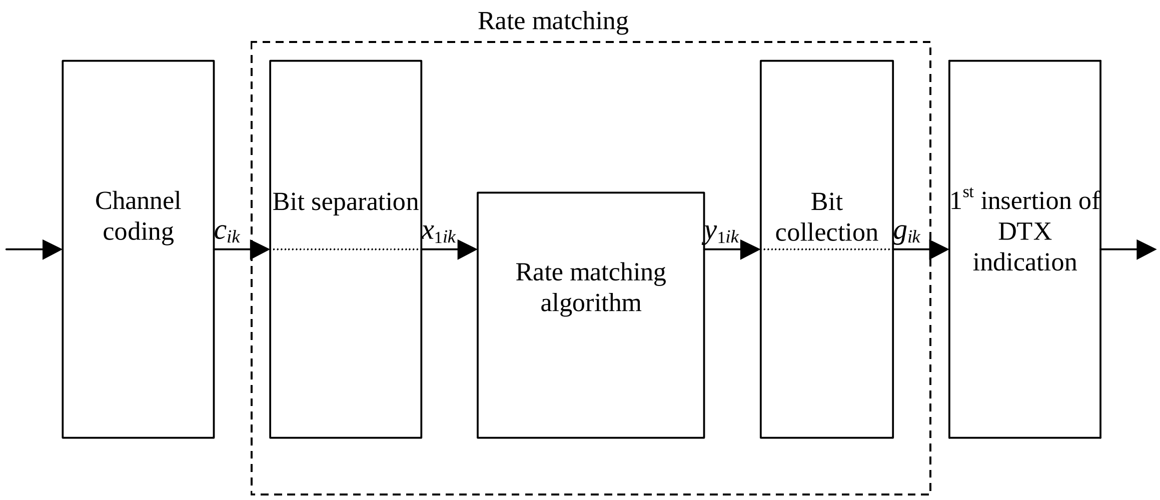

Figure 8: Rate matching for ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and for turbo encoded TrCHs with repetition in downlink

4.2.7.4.1 Bit separation

The bits input to the rate matching are denoted by $c_{i1}, c_{i2}, c_{i3}, \ldots, c_{iE_i}$, where i is the TrCH number and E_i is the number of bits input to the rate matching block. Note that E_i is a multiple of 3 for turbo encoded TrCHs and that the transport format l for simplicity has been left out in the bit numbering, i.e. $E_i = N_{il}^{TTI}$. The bits after separation are denoted by $x_{bi1}, x_{bi2}, x_{bi3}, \ldots, x_{biX_i}$. For turbo encoded TrCHs with puncturing, *b* indicates the three sequences defined in section 4.2.7.4, with b=1 indicating the first sequence, and so forth. For all other cases *b* is defined to be 1. X_i is the number of bits in each separated bit sequence. The relation between c_{ik} and x_{bik} is given below.

For turbo encoded TrCHs with puncturing:

$x_{1,i,k} = c_{i,3(k-1)+1}$ k = 1, 2, 3, …, X_i $X_i = E_i /3$

$x_{2,i,k} = c_{i,3(k-1)+2}$ k = 1, 2, 3, …, X_i $X_i = E_i /3$

$x_{3,i,k} = c_{i,3(k-1)+3}$ k = 1, 2, 3, …, X_i $X_i = E_i /3$

For ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and turbo encoded TrCHs with repetition:

$x_{1,i,k} = c_{i,k}$ k = 1, 2, 3, …, X_i $X_i = E_i$

4.2.7.4.2 Bit collection

The bits x_{bik} are input to the rate matching algorithm described in subclause 4.2.7.5. The bits output from the rate matching algorithm are denoted $y_{bi1}, y_{bi2}, y_{bi3}, \ldots, y_{biY_i}$.

Bit collection is the inverse function of the separation. The bits after collection are denoted by $z_{bi1}, z_{bi2}, z_{bi3}, \ldots, z_{biY_i}$. After bit collection, the bits indicated as punctured are removed and the bits are then denoted by $g_{i1}, g_{i2}, g_{i3}, \ldots, g_{iG_i}$, where *i* is the TrCH number and $G_i = N_{il}^{TTI} + \Delta N_{il}^{TTI}$. The relations between y_{bik}, z_{bik}, and g_{ik} are given below.

For turbo encoded TrCHs with puncturing ($Y_i=X_i$):

$z_{i,3(k-1)+1} = y_{1,i,k}$ k = 1, 2, 3, …, Y_i

$z_{i,3(k-1)+2} = y_{2,i,k}$ k = 1, 2, 3, …, Y_i

$z_{i,3(k-1)+3} = y_{3,i,k}$ k = 1, 2, 3, …, Y_i

After the bit collection, bits $z_{i,k}$ with value δ, where $\delta \notin \{0, 1\}$, are removed from the bit sequence. Bit $g_{i,1}$ corresponds to the bit $z_{i,k}$ with smallest index *k* after puncturing, bit $g_{i,2}$ corresponds to the bit $z_{i,k}$ with second smallest index *k* after puncturing, and so on.

For ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and turbo encoded TrCHs with repetition:

$z_{i,k} = y_{1,i,k}$ k = 1, 2, 3, …, Y_i

When repetition is used, $g_{i,k}=z_{i,k}$ and $Y_i=G_i$.

When puncturing is used, $Y_i=X_i$ and bits $z_{i,k}$ with value δ, where $\delta \notin \{0, 1\}$, are removed from the bit sequence. Bit $g_{i,1}$ corresponds to the bit $z_{i,k}$ with smallest index *k* after puncturing, bit $g_{i,2}$ corresponds to the bit $z_{i,k}$ with second smallest index *k* after puncturing, and so on.

3GPP TSG RAN Meeting #15
Jeju, Korea, 5 – 8, March, 2002

RP-020231

CR-Form-v5

CHANGE REQUEST

⌘	**25.212**	**CR**	**128**	⌘ **rev**	**2**	⌘	Current version:	**4.3.0**	⌘

For ***HELP*** *on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Removal of channel coding option “no coding” for FDD
Source:	⌘	TSG RAN WG1
Work item code:	⌘	TEI
Date:	⌘	March2002
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
- ***F*** *(correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(addition of feature),*
- ***C*** *(functional modification of feature)*
- ***D*** *(editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
- *2 (GSM Phase 2)*
- *R96 (Release 1996)*
- *R97 (Release 1997)*
- *R98 (Release 1998)*
- *R99 (Release 1999)*
- *REL-4 (Release 4)*
- *REL-5 (Release 5)*

Reason for change:	⌘	At the RAN meeting it has been agreed to remove the channel coding option “no coding” for FDD. For TDD this option is still valid.
Summary of change:	⌘	The channel coding option “no coding” has been removed. **Isolated Impact Analysis** This change affects the channel coding type. It would not affect implementations behaving like indicated in the CR, it would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved:	⌘	An option that is not used by any Radio Bearer would be a mandatory feature for all UEs.

Clauses affected:	⌘	4.2.2, 4.2.3, 4.2.7.1, 4.2.7.2, 4.2.7.3, 4.2.7.4			
Other specs affected:	⌘	X	Other core specifications	⌘	CR009r2 25.201 v3.2.0 CR010r1 25.201 v4.1.0 CR127r2 25.212 v3.8.0 CR110r1 25.215 v3.9.0 CR111r1 25.215 v4.3.0 CR120r2 25.302 v3.11.0 CR121r1 25.302 v4.3.0 CR1295r2 25.331 v3.9.0 CR1296r1 25.331 v4.3.0 CR 585r2 25.423 v3.8.0 CR 586r2 25.423 v4.3.0 CR 627r2 25.433 v3.8.0 CR 628r2 25.433 v4.3.0
			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/3G_Specs/CRs.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.

4.2.2 Transport block concatenation and code block segmentation

All transport blocks in a TTI are serially concatenated. If the number of bits in a TTI is larger than *Z*, the maximum size of a code block in question, then code block segmentation is performed after the concatenation of the transport blocks. The maximum size of the code blocks depends on whether convolutional coding or ~~,~~ turbo coding ~~or no coding~~ is used for the TrCH.

4.2.2.1 Concatenation of transport blocks

The bits input to the transport block concatenation are denoted by $b_{im1}, b_{im2}, b_{im3}, \ldots, b_{imB_i}$ where *i* is the TrCH number, *m* is the transport block number, and B_i is the number of bits in each block (including CRC). The number of transport blocks on TrCH *i* is denoted by M_i. The bits after concatenation are denoted by $x_{i1}, x_{i2}, x_{i3}, \ldots, x_{iX_i}$, where *i* is the TrCH number and $X_i=M_iB_i$. They are defined by the following relations:

$x_{ik} = b_{i1k}$ $k = 1, 2, \ldots, B_i$

$x_{ik} = b_{i,2,(k-B_i)}$ $k = B_i + 1, B_i + 2, \ldots, 2B_i$

$x_{ik} = b_{i,3,(k-2B_i)}$ $k = 2B_i + 1, 2B_i + 2, \ldots, 3B_i$

$\ldots$

$x_{ik} = b_{i,M_i,(k-(M_i-1)B_i)}$ $k = (M_i - 1)B_i + 1, (M_i - 1)B_i + 2, \ldots, M_iB_i$

4.2.2.2 Code block segmentation

Segmentation of the bit sequence from transport block concatenation is performed if $X_i>Z$. The code blocks after segmentation are of the same size. The number of code blocks on TrCH *i* is denoted by C_i. If the number of bits input to the segmentation, X_i, is not a multiple of C_i, filler bits are added to the beginning of the first block. If turbo coding is selected and $X_i < 40$, filler bits are added to the beginning of the code block. The filler bits are transmitted and they are always set to 0. The maximum code block sizes are:

- convolutional coding: $Z = 504$;
- turbo coding: $Z = 5114$;
- ~~no channel coding: *Z = unlimited*.~~

The bits output from code block segmentation, for $C_i \neq 0$, are denoted by $o_{ir1}, o_{ir2}, o_{ir3}, \ldots, o_{irK_i}$, where *i* is the TrCH number, *r* is the code block number, and K_i is the number of bits per code block.

Number of code blocks:

$${}_i = \lceil X_i / Z \rceil$$

~~$$C_i = \begin{cases} \lceil X_i / Z \rceil & \text{when } Z \neq \textit{unlimited} \\ 0 & \text{when } Z = \textit{unlimited} \text{ and } X_i = 0 \\ 1 & \text{when } Z = \textit{unlimited} \text{ and } X_i \neq 0 \end{cases}$$~~

Number of bits in each code block (applicable for $C_i \neq 0$ only):

if $X_i < 40$ and Turbo coding is used, then

$K_i = 40$

else

$K_i = \lceil X_i / C_i \rceil$

end if

Number of filler bits: $Y_i = C_i K_i - X_i$

for k = 1 to Y_i -- Insertion of filler bits

$o_{i1k} = 0$

end for

for $k = Y_i+1$ to K_i

$o_{i1k} = x_{i,(k-Y_i)}$

end for

$r = 2$ -- Segmentation

while $r \le C_i$

for k = 1 to K_i

$o_{irk} = x_{i,(k+(r-1)\cdot K_i - Y_i)}$

end for

$r = r+1$

end while

4.2.3 Channel coding

Code blocks are delivered to the channel coding block. They are denoted by $o_{ir1}, o_{ir2}, o_{ir3}, \ldots, o_{irK_i}$, where i is the TrCH number, r is the code block number, and K_i is the number of bits in each code block. The number of code blocks on TrCH i is denoted by C_i. After encoding the bits are denoted by $y_{ir1}, y_{ir2}, y_{ir3}, \ldots, y_{irY_i}$, where Y_i is the number of encoded bits. The relation between o_{irk} and y_{irk} and between K_i and Y_i is dependent on the channel coding scheme.

The following channel coding schemes can be applied to TrCHs:

- convolutional coding;
- turbo coding;
- ~~no coding.~~

Usage of coding scheme and coding rate for the different types of TrCH is shown in table 1.

The values of Y_i in connection with each coding scheme:

- convolutional coding with rate 1/2: $Y_i = 2*K_i + 16$; rate 1/3: $Y_i = 3*K_i + 24$;
- turbo coding with rate 1/3: $Y_i = 3*K_i + 12$;
- ~~no coding: $Y_i = K_i$.~~

Table 1: Usage of channel coding scheme and coding rate

<table>
<tr><th>Type of TrCH</th><th>Coding scheme</th><th>Coding rate</th></tr>
<tr><td>BCH</td><td rowspan="4">Convolutional coding</td><td rowspan="3">1/2</td></tr>
<tr><td>PCH</td></tr>
<tr><td>RACH</td></tr>
<tr><td rowspan="3">CPCH, DCH, DSCH, FACH</td><td>1/3, 1/2</td></tr>
<tr><td>Turbo coding</td><td>1/3</td></tr>
<tr><td colspan="2">~~No coding~~</td></tr>
</table>

4.2.7.1.2 Determination of parameters needed for calculating the rate matching pattern

The number of bits to be repeated or punctured, $\Delta N_{i,j}$, within one radio frame for each TrCH *i* is calculated with equation 1 for all possible transport format combinations *j* and selected every radio frame. $N_{data,j}$ is given from subclause 4.2.7.1.1.

In a compressed radio frame, $N_{data,j}$ is replaced by $N_{data,j}^{cm}$ in Equation 1. $N_{data,j}^{cm}$ is given as follows:

In a radio frame compressed by higher layer scheduling, $N_{data,j}^{cm}$ is obtained by executing the algorithm in subclause 4.2.7.1.1 but with the number of bits in one radio frame of one PhCH reduced to $\frac{N_{tr}}{15}$ of the value in normal mode.

N_{tr} is the number of transmitted slots in a compressed radio frame and is defined by the following relation:

$$N_{tr} = \begin{cases} 15 - TGL\text{, if } N_{first} + TGL \le 15 \\ N_{first}\text{, in first frame if } N_{first} + TGL > 15 \\ 30 - TGL - N_{first}\text{, in second frame if } N_{first} + TGL > 15 \end{cases}$$

N_{first} and *TGL* are defined in subclause 4.4.

In a radio frame compressed by spreading factor reduction, $N_{data,j}^{cm} = 2 \times \left(N_{data,j} - N_{TGL}\right)$, where

$$N_{TGL} = \frac{15 - N_{tr}}{15} \times N_{data,j}$$

If $\Delta N_{i,j} = 0$ then the output data of the rate matching is the same as the input data and the rate matching algorithm of subclause 4.2.7.5 does not need to be executed.

If $\Delta N_{i,j} \neq 0$ the parameters listed in subclauses 4.2.7.1.2.1 and 4.2.7.1.2.2 shall be used for determining e_{ini}, e_{plus}, and e_{minus} (regardless if the radio frame is compressed or not).

4.2.7.1.2.1 ~~Uncoded and c~~Convolutionally encoded TrCHs

$R = \Delta N_{i,j} \bmod N_{i,j}$ -- note: in this context $\Delta N_{i,j} \bmod N_{i,j}$ is in the range of 0 to N_{ij}-1 i.e. -1 mod 10 = 9.

if $R \neq 0$ and $2 \times R \le N_{ij}$

then q = $\lceil N_{i,j} / R \rceil$

else

q = $\lceil N_{i,j} / (R - N_{i,j}) \rceil$

endif

-- note: q is a signed quantity.

if q is even

then q' = q + gcd(|q|, F_i)/ F_i -- where gcd (|q|, F_i) means greatest common divisor of |q| and F_i

-- note that q' is not an integer, but a multiple of 1/8

else

q' = q

endif

for x = 0 to F_i - 1

$S[\lceil \lfloor x \times q' \rfloor \rceil \bmod F_i] = (\lceil \lfloor x \times q' \rfloor \rceil \text{ div } F_i)$

end for

$\Delta N_i = \Delta N_{i,j}$

a = 2

For each radio frame, the rate-matching pattern is calculated with the algorithm in subclause 4.2.7.5, where :

$X_i = N_{i,j}$., and

$e_{ini} = (a \times S[P1_{Fi}(n_i)] \times |\Delta N_i| + 1) \bmod (a \cdot N_{ij})$.

$e_{\mathrm{plus}} = a \times N_{i,j}$

$e_{\mathrm{minus}} = a \times |\Delta N_i|$

puncturing for $\Delta N < 0$, repetition otherwise.

4.2.7.2.1.3 Determination of rate matching parameters for ~~uncoded and~~ convolutionally encoded TrCHs

$$\Delta N_i = \Delta N_{i,max}$$

For compressed mode by puncturing, ΔN_i is defined as: ΔN_i = $\Delta N_{i,\max}^{TTI,cm,m}$, instead of the previous relation.

a=2

$$N_{max} = \max_{l \in TFS(i)} N_{il}^{TTI}$$

For each transmission time interval of TrCH *i* with TF *l*, the rate-matching pattern is calculated with the algorithm in subclause 4.2.7.5. The following parameters are used as input:

$$X_i = N_{il}^{TTI}$$

$$e_{ini} = 1$$

$$e_{plus} = a \times N_{max}$$

$$e_{\min us} = a \times \left|\Delta N_i\right|$$

Puncturing if $\Delta N_i < 0$, repetition otherwise. The values of $\Delta N_{i,l}^{TTI}$ may be computed by counting repetitions or puncturing when the algorithm of subclause 4.2.7.5 is run. The resulting values of $\Delta N_{i,l}^{TTI}$ can be represented with following expression.

$$\Delta N_{i,l}^{TTI} = \left\lceil \frac{\left|\Delta N_i\right| \times X_i}{N_{max}} \right\rceil \times \mathrm{sgn}(\Delta N_i)$$

For compressed mode by puncturing, the above formula produces $\Delta N_{i,l}^{TTI,m}$ instead of $\Delta N_{i,l}^{TTI}$.

4.2.7.2.2.2 Determination of rate matching parameters for ~~uncoded and~~ convolutionally encoded TrCHs

$$\Delta N_i = \Delta N_{il}^{TTI}$$

a=2

For each transmission time interval of TrCH *i* with TF *l*, the rate-matching pattern is calculated with the algorithm in subclause 4.2.7.5. The following parameters are used as input:

$$X_i = N_{il}^{TTI}$$

$$e_{ini} = 1$$

$$e_{plus} = a \times N_{il}^{TTI}$$

$$e_{minus} = a \times |\Delta N_i|$$

puncturing for $\Delta N_i < 0$, repetition otherwise.

4.2.7.3 Bit separation and collection in uplink

The systematic bits of turbo encoded TrCHs shall not be punctured, the other bits may be punctured. The systematic bits, first parity bits, and second parity bits in the bit sequence input to the rate matching block are therefore separated into three sequences.

The first sequence contains:

- All of the systematic bits that are from turbo encoded TrCHs.
- From 0 to 2 first and/or second parity bits that are from turbo encoded TrCHs. These bits come into the first sequence when the total number of bits in a block after radio frame segmentation is not a multiple of three.
- Some of the systematic, first parity and second parity bits that are for trellis termination.

The second sequence contains:

- All of the first parity bits that are from turbo encoded TrCHs, except those that go into the first sequence when the total number of bits is not a multiple of three.
- Some of the systematic, first parity and second parity bits that are for trellis termination.

The third sequence contains:

- All of the second parity bits that are from turbo encoded TrCHs, except those that go into the first sequence when the total number of bits is not a multiple of three.
- Some of the systematic, first parity and second parity bits that are for trellis termination.

The second and third sequences shall be of equal length, whereas the first sequence can contain from 0 to 2 more bits. Puncturing is applied only to the second and third sequences.The bit separation function is transparent for ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and for turbo encoded TrCHs with repetition. The bit separation and bit collection are illustrated in figures 5 and 6.

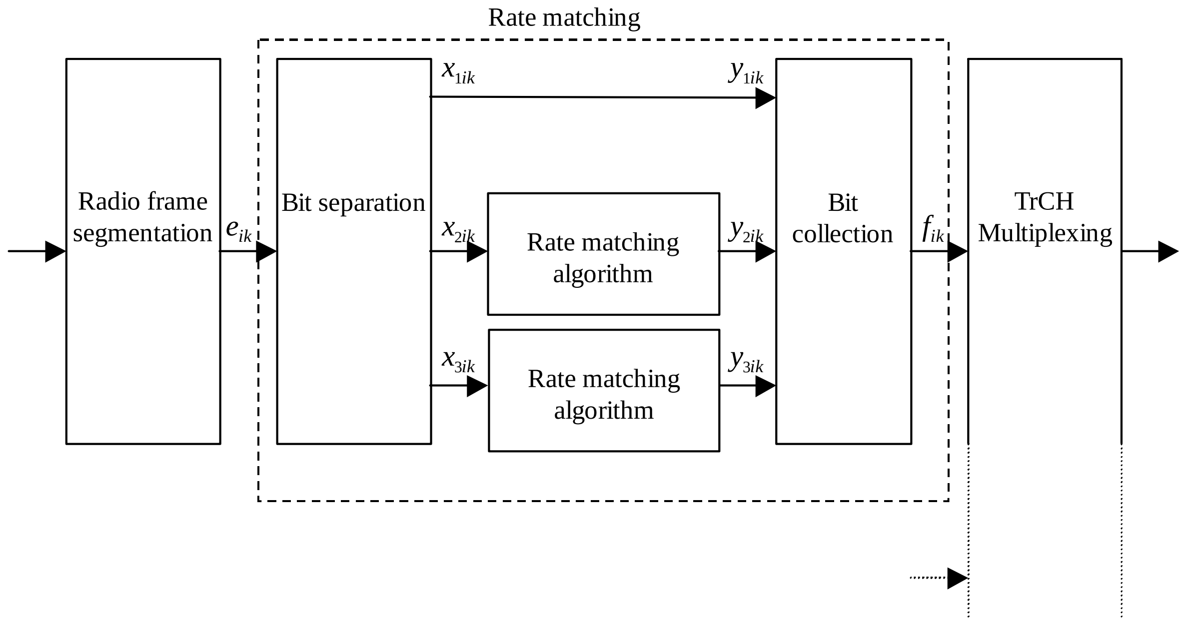

Figure 5: Puncturing of turbo encoded TrCHs in uplink

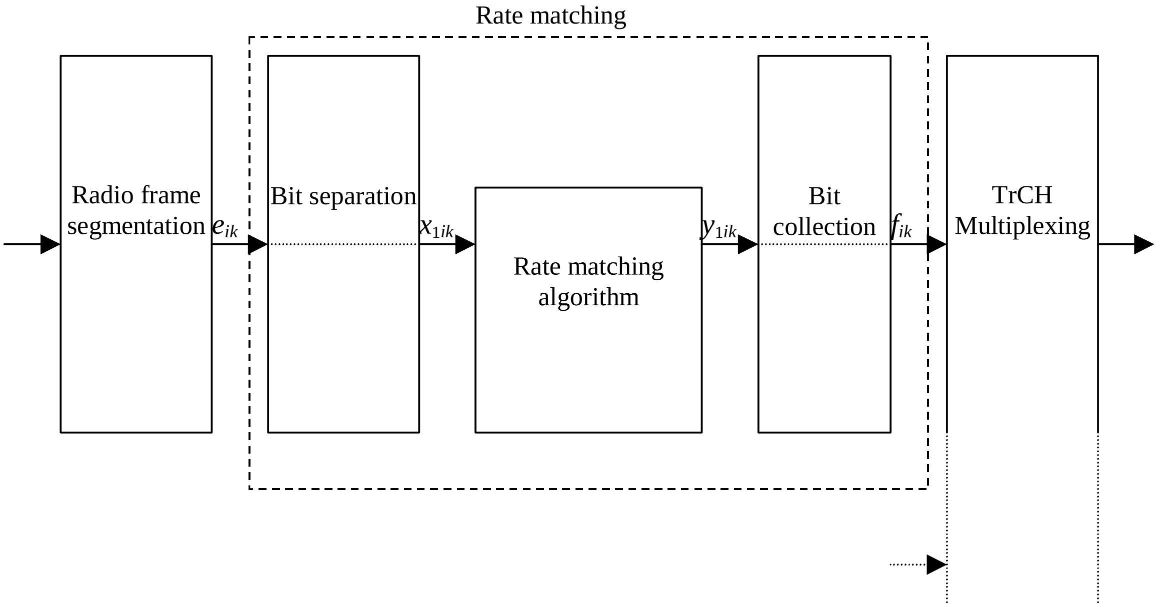

Figure 6: Rate matching for ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and for turbo encoded TrCHs with repetition in uplink

The bit separation is dependent on the 1st interleaving and offsets are used to define the separation for different TTIs. *b* indicates the three sequences defined in this section, with *b*=1 indicating the first sequence, *b* = 2 the second one, and *b* = 3 the third one. The offsets α_b for these sequences are listed in table 5.

Table 5: TTI dependent offset needed for bit separation

TTI (ms)	α_1	α_2	α_3
10, 40	0	1	2
20, 80	0	2	1

The bit separation is different for different radio frames in the TTI. A second offset is therefore needed. The radio frame number for TrCH *i* is denoted by n_i. and the offset by β_{n_i} .

Table 6: Radio frame dependent offset needed for bit separation

TTI (ms)	β_0	β_1	β_2	β_3	β_4	β_5	β_6	β_7
10	0	NA	NA	NA	NA	NA	NA	NA
20	0	1	NA	NA	NA	NA	NA	NA
40	0	1	2	0	NA	NA	NA	NA
80	0	1	2	0	1	2	0	1

4.2.7.3.1 Bit separation

The bits input to the rate matching are denoted by $e_{i1}, e_{i2}, e_{i3}, \ldots, e_{iN_i}$, where *i* is the TrCH number and N_i is the number of bits input to the rate matching block. Note that the transport format combination number *j* for simplicity has been left out in the bit numbering, i.e. $N_i=N_{ij}$. The bits after separation are denoted by $x_{bi1}, x_{bi2}, x_{bi3}, \ldots, x_{biX_i}$. For turbo encoded TrCHs with puncturing, *b* indicates the three sequences defined in section 4.2.7.3, with *b*=1 indicating the first sequence, and so forth. For all other cases *b* is defined to be 1. X_i is the number of bits in each separated bit sequence. The relation between e_{ik} and x_{bik} is given below.

For turbo encoded TrCHs with puncturing:

$$x_{1,i,k} = e_{i,3(k-1)+1+(\alpha_1+\beta_{n_i}) \bmod 3} \qquad k = 1, 2, 3, \ldots, X_i \qquad X_i = \lfloor N_i / 3 \rfloor$$

$x_{1,i,\lfloor N_i/3 \rfloor + k} = e_{i,3\lfloor N_i/3 \rfloor + k}$ $k = 1, \ldots, N_i \bmod 3$ Note: When (N_i mod 3) = 0 this row is not needed.

$x_{2,i,k} = e_{i,3(k-1)+1+(\alpha_2+\beta_{n_i}) \bmod 3}$ $k = 1, 2, 3, \ldots, X_i$ $X_i = \lfloor N_i /3 \rfloor$

$x_{3,i,k} = e_{i,3(k-1)+1+(\alpha_3+\beta_{n_i}) \bmod 3}$ $k = 1, 2, 3, \ldots, X_i$ $X_i = \lfloor N_i /3 \rfloor$

For ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and turbo encoded TrCHs with repetition:

$x_{1,i,k} = e_{i,k}$ $k = 1, 2, 3, \ldots, X_i$ $X_i = N_i$

4.2.7.3.2 Bit collection

The bits x_{bik} are input to the rate matching algorithm described in subclause 4.2.7.5. The bits output from the rate matching algorithm are denoted $y_{bi1}, y_{bi2}, y_{bi3}, \ldots, y_{biY_i}$.

Bit collection is the inverse function of the separation. The bits after collection are denoted by $z_{bi1}, z_{bi2}, z_{bi3}, \ldots, z_{biY_i}$. After bit collection, the bits indicated as punctured are removed and the bits are then denoted by $f_{i1}, f_{i2}, f_{i3}, \ldots, f_{iV_i}$, where i is the TrCH number and $V_i = N_{ij} + \Delta N_{ij}$. The relations between y_{bik}, z_{bik}, and f_{ik} are given below.

For turbo encoded TrCHs with puncturing ($Y_i = X_i$):

$z_{i,3(k-1)+1+(\alpha_1+\beta_{n_i}) \bmod 3} = y_{1,i,k}$ $k = 1, 2, 3, \ldots, Y_i$

$z_{i,3\lfloor N_i/3 \rfloor + k} = y_{1,i,\lfloor N_i/3 \rfloor + k}$ $k = 1, \ldots, N_i \bmod 3$ Note: When (N_i mod 3) = 0 this row is not needed.

$z_{i,3(k-1)+1+(\alpha_2+\beta_{n_i}) \bmod 3} = y_{2,i,k}$ $k = 1, 2, 3, \ldots, Y_i$

$z_{i,3(k-1)+1+(\alpha_3+\beta_{n_i}) \bmod 3} = y_{3,i,k}$ $k = 1, 2, 3, \ldots, Y_i$

After the bit collection, bits $z_{i,k}$ with value δ, where $\delta \notin \{0, 1\}$, are removed from the bit sequence. Bit $f_{i,1}$ corresponds to the bit $z_{i,k}$ with smallest index k after puncturing, bit $f_{i,2}$ corresponds to the bit $z_{i,k}$ with second smallest index k after puncturing, and so on.

For ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and turbo encoded TrCHs with repetition:

$z_{i,k} = y_{1,i,k}$ $k = 1, 2, 3, \ldots, Y_i$

When repetition is used, $f_{i,k} = z_{i,k}$ and $Y_i = V_i$.

When puncturing is used, $Y_i = X_i$ and bits $z_{i,k}$ with value δ, where $\delta \notin \{0, 1\}$, are removed from the bit sequence. Bit $f_{i,1}$ corresponds to the bit $z_{i,k}$ with smallest index k after puncturing, bit $f_{i,2}$ corresponds to the bit $z_{i,k}$ with second smallest index k after puncturing, and so on.

4.2.7.4 Bit separation and collection in downlink

The systematic bits of turbo encoded TrCHs shall not be punctured, the other bits may be punctured.

The systematic bits, first parity bits and second parity bits in the bit sequence input to the rate matching block are therefore separated into three sequences of equal lengths.

The first sequence contains :

- All of the systematic bits that are from turbo encoded TrCHs.
- Some of the systematic, first parity and second parity bits that are for trellis termination.

The second sequence contains:

- All of the first parity bits that are from turbo encoded TrCHs.
- Some of the systematic, first parity and second parity bits that are for trellis termination.

The third sequence contains:

- All of the second parity bits that are from turbo encoded TrCHs.
- Some of the systematic, first parity and second parity bits that are for trellis termination.

Puncturing is applied only to the second and third sequences.

The bit separation function is transparent for ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and for turbo encoded TrCHs with repetition. The bit separation and bit collection are illustrated in figures 7 and 8.

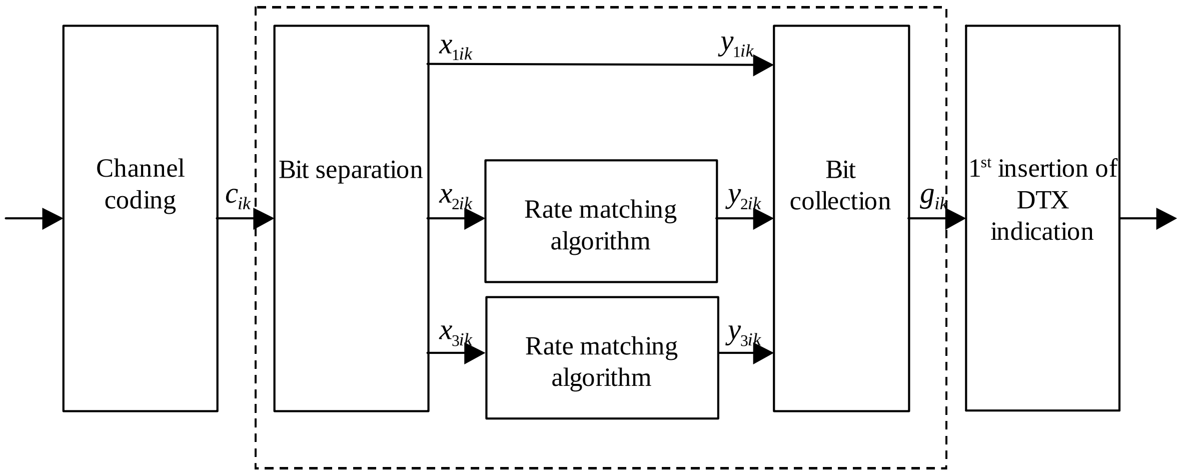

Figure 7: Puncturing of turbo encoded TrCHs in downlink

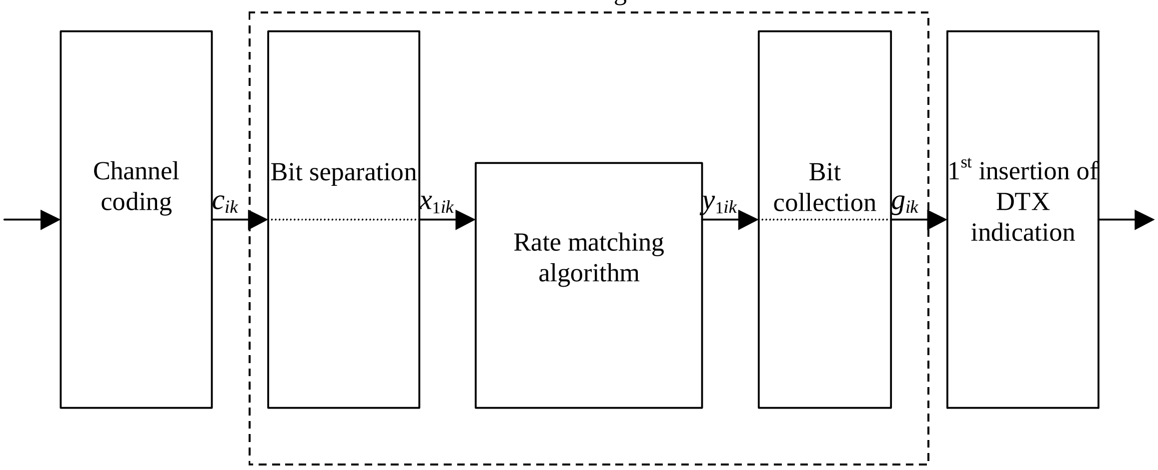

Figure 8: Rate matching for ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and for turbo encoded TrCHs with repetition in downlink

4.2.7.4.1 Bit separation

The bits input to the rate matching are denoted by $c_{i1}, c_{i2}, c_{i3}, \ldots, c_{iE_i}$, where i is the TrCH number and E_i is the number of bits input to the rate matching block. Note that E_i is a multiple of 3 for turbo encoded TrCHs and that the transport format l for simplicity has been left out in the bit numbering, i.e. $E_i = N_{il}^{TTI}$. The bits after separation are denoted by $x_{bi1}, x_{bi2}, x_{bi3}, \ldots, x_{biX_i}$. For turbo encoded TrCHs with puncturing, *b* indicates the three sequences defined in section 4.2.7.4, with b=1 indicating the first sequence, and so forth. For all other cases *b* is defined to be 1. X_i is the number of bits in each separated bit sequence. The relation between c_{ik} and x_{bik} is given below.

For turbo encoded TrCHs with puncturing:

$x_{1,i,k} = c_{i,3(k-1)+1}$ k = 1, 2, 3, …, X_i $X_i = E_i /3$

$x_{2,i,k} = c_{i,3(k-1)+2}$ k = 1, 2, 3, …, X_i $X_i = E_i /3$

$x_{3,i,k} = c_{i,3(k-1)+3}$ k = 1, 2, 3, …, X_i $X_i = E_i /3$

For ~~uncoded TrCHs,~~ convolutionally encoded TrCHs~~,~~ and turbo encoded TrCHs with repetition:

$x_{1,i,k} = c_{i,k}$ k = 1, 2, 3, …, X_i $X_i = E_i$

4.2.7.4.2 Bit collection

The bits x_{bik} are input to the rate matching algorithm described in subclause 4.2.7.5. The bits output from the rate matching algorithm are denoted $y_{bi1}, y_{bi2}, y_{bi3}, \ldots, y_{biY_i}$.

Bit collection is the inverse function of the separation. The bits after collection are denoted by $z_{bi1}, z_{bi2}, z_{bi3}, \ldots, z_{biY_i}$. After bit collection, the bits indicated as punctured are removed and the bits are then denoted by $g_{i1}, g_{i2}, g_{i3}, \ldots, g_{iG_i}$, where *i* is the TrCH number and $G_i = N_{il}^{TTI} + \Delta N_{il}^{TTI}$. The relations between y_{bik}, z_{bik}, and g_{ik} are given below.

For turbo encoded TrCHs with puncturing (Y_i=X_i):

$z_{i,3(k-1)+1} = y_{1,i,k}$ k = 1, 2, 3, …, Y_i

$z_{i,3(k-1)+2} = y_{2,i,k}$ k = 1, 2, 3, …, Y_i

$z_{i,3(k-1)+3} = y_{3,i,k}$ k = 1, 2, 3, …, Y_i

After the bit collection, bits $z_{i,k}$ with value δ, where $\delta \not\in \{0, 1\}$, are removed from the bit sequence. Bit $g_{i,1}$ corresponds to the bit $z_{i,k}$ with smallest index *k* after puncturing, bit $g_{i,2}$ corresponds to the bit $z_{i,k}$ with second smallest index *k* after puncturing, and so on.

For ~~uncoded TrCHs,~~ convolutionally encoded TrCHs, and turbo encoded TrCHs with repetition:

$z_{i,k} = y_{1,i,k}$ k = 1, 2, 3, …, Y_i

When repetition is used, $g_{i,k}$=$z_{i,k}$ and Y_i=G_i.

When puncturing is used, Y_i=X_i and bits $z_{i,k}$ with value δ, where $\delta \not\in \{0, 1\}$, are removed from the bit sequence. Bit $g_{i,1}$ corresponds to the bit $z_{i,k}$ with smallest index *k* after puncturing, bit $g_{i,2}$ corresponds to the bit $z_{i,k}$ with second smallest index *k* after puncturing, and so on.

3GPP TSG RAN Meeting #15
Jeju, Korea, 5 – 8, March, 2002

RP-020231

CR-Form-v5

CHANGE REQUEST

⌘ 25.215 CR 110	⌘ rev 1 ⌘	Current version: 3.9.0 ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title: ⌘	Removal of channel coding option "no coding" for FDD		
Source: ⌘	TSG RAN WG1		
Work item code: ⌘	TEI	***Date:*** ⌘	March 2002
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:*** ⌘	R99 *Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change: ⌘	At the RAN meeting it has been agreed to remove the channel coding option "no coding" for FDD. For TDD this option is still valid.
Summary of change: ⌘	The channel coding option "no coding" has been removed. **Isolated Impact Analysis** This change affects the channel coding type. It would not affect implementations behaving like indicated in the CR, it would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved: ⌘	An option that is not used by any Radio Bearer would be a mandatory feature for all UEs.

Clauses affected: ⌘	5.2.6		
Other specs affected: ⌘	[X] Other core specifications	⌘	CR009r2 25.201 v3.2.0 CR010r1 25.201 v4.1.0 CR127r2 25.212 v3.8.0 CR128r2 25.212 v4.3.0 CR111r1 25.215 v4.3.0 CR120r2 25.302 v3.11.0 CR121r1 25.302 v4.3.0 CR1295r2 25.331 v3.9.0 CR1296r1 25.331 v4.3.0 CR 585r2 25.423 v3.8.0 CR 586r2 25.423 v4.3.0 CR 627r2 25.433 v3.8.0 CR 628r2 25.433 v4.3.0
	[ ] 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/3G_Specs/CRs.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.

5.2.6 Transport channel BER

Definition	The transport channel BER is an estimation of the average bit error rate (BER) of the DPDCH data of a Radio Link Set. The transport channel (TrCH) BER is measured from the data considering only non-punctured bits at the input of the channel decoder in Node B. It shall be possible to report an estimate of the transport channel BER for a TrCH after the end of each TTI of the TrCH. The reported TrCH BER shall be an estimate of the BER during the latest TTI for that TrCH. ~~Transport channel BER is only required to be reported for TrCHs that are channel coded.~~

3GPP TSG RAN Meeting #15
Jeju, Korea, 5 – 8, March, 2002

RP-020231

CR-Form-v5

CHANGE REQUEST

⌘	25.215	CR	111	⌘ rev	1	⌘	Current version:	4.3.0	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title: ⌘	Removal of channel coding option "no coding" for FDD			
Source: ⌘	TSG RAN WG1			
Work item code: ⌘	TEI		***Date:*** ⌘	March 2002
Category: ⌘	A		***Release:*** ⌘	REL-4
	Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.			*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change: ⌘	At the RAN meeting it has been agreed to remove the channel coding option "no coding" for FDD. For TDD this option is still valid.
Summary of change: ⌘	The channel coding option "no coding" has been removed. **Isolated Impact Analysis** This change affects the channel coding type. It would not affect implementations behaving like indicated in the CR, it would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved: ⌘	An option that is not used by any Radio Bearer would be a mandatory feature for all UEs.

Clauses affected: ⌘	5.2.6		
Other specs affected: ⌘	X	Other core specifications ⌘	CR009r2 25.201 v3.2.0 CR010r1 25.201 v4.1.0 CR127r2 25.212 v3.8.0 CR128r2 25.212 v4.3.0 CR110r1 25.215 v3.9.0 CR120r2 25.302 v3.11.0 CR121r1 25.302 v4.3.0 CR1295r2 25.331 v3.9.0 CR1296r1 25.331 v4.3.0 CR 585r2 25.423 v3.8.0 CR 586r2 25.423 v4.3.0 CR 627r2 25.433 v3.8.0 CR 628r2 25.433 v4.3.0
		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/3G_Specs/CRs.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.

5.2.6 Transport channel BER

Definition	The transport channel BER is an estimation of the average bit error rate (BER) of the DPDCH data of a Radio Link Set. The transport channel (TrCH) BER is measured from the data considering only non-punctured bits at the input of the channel decoder in Node B. It shall be possible to report an estimate of the transport channel BER for a TrCH after the end of each TTI of the TrCH. The reported TrCH BER shall be an estimate of the BER during the latest TTI for that TrCH. ~~Transport channel BER is only required to be reported for TrCHs that are channel coded.~~

3GPP TSG-RAN Meeting #15
Cheju, Korea, 5th – 8th March 2002

Tdoc RP-020231

CR-Form-v5

CHANGE REQUEST

⌘	**25.302**	**CR**	**120**	⌘ **rev**	**2**	⌘	Current version:	**3.11.0**	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Removal of channel coding option "no coding" for FDD		
Source:	⌘	Siemens		
Work item code:	⌘	TEI	***Date:*** ⌘	March 2002
Category:	⌘	**C**	***Release:*** ⌘	R99
		Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change:	⌘	In the RAN#15 meeting it has been agreed to remove the channel coding option "no coding" for FDD. For TDD this option is still valid.
Summary of change:	⌘	The channel coding option "no coding" has been removed for FDD. **Isolated Impact Analysis** This change affects the channel coding type. It would not affect implementations behaving like indicated in the CR, it would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved:	⌘	"no coding" option is possible

Clauses affected:	⌘	7.1.6, Annex A, Annex B			
Other specs affected:	⌘	[ ] Other core specifications	⌘	CR009r2 CR010r1 CR127r2 CR128r2 CR110r1 CR111r1 CR121r1 CR1295r2 CR1296r1 CR 585r2 CR 586r2 CR 627r2 CR 628r2	25.201 v3.2.0 25.201 v4.1.0 25.212 v3.8.0 25.212 v4.3.0 25.215 v3.9.0 25.215 v4.3.0 25.302 v4.3.0 25.331 v3.9.0 25.331 v4.3.0 25.423 v3.8.0 25.423 v4.3.0 25.433 v3.8.0 25.433 v4.3.0
		[ ] 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/3G_Specs/CRs.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.

7.1.6 Transport Format

This is defined as a format offered by L1 to MAC (and vice versa) for the delivery of a Transport Block Set during a Transmission Time Interval on a Transport Channel. The Transport Format constitutes of two parts – one *dynamic* part and one *semi-static* part.

Attributes of the dynamic part are:

- Transport Block Size;
- Transport Block Set Size;
- Transmission Time Interval (optional dynamic attribute for TDD only);

Attributes of the semi-static part are:

- Transmission Time Interval (mandatory for FDD, optional for the dynamic part of TDD NRT bearers);
- error protection scheme to apply:
  - type of error protection, turbo code, convolutional code or no channel coding (TDD only);
  - coding rate;
  - static rate matching parameter;
- size of CRC.

Table A.1: Characterisation of Transport Format

		Attribute values	BCH	PCH	FACH	RACH
Dynamic part	Transport Block Size	0 to 5 000 1 bit granularity	246	1 to 5000 1 bit granularity	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity
	Transport Block Set Size	0 to 200 000 1 bit granularity	246	1 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity
	Transmission Time Interval (option for TDD only)	10, 20 ms, 40 and 80 ms				
Semi-static part	Transmission Time Interval (FDD, option for TDD NRT bearers)	10, 20 ms, 40 and 80 ms	20 ms	10ms for FDD, 20ms for TDD	10, 20 ms, 40 and 80 ms	10 ms and 20 ms for FDD, 10 ms for TDD
	Type of channel coding	No Coding (TDD only) Turbo coding Convolutional coding	Convolutional coding	Convolutional coding	No coding (TDD only) Turbo coding Convolutional coding	Convolutional coding
	code rates	1/2, 1/3	1/2	1/2	1/2, 1/3	1/2
	CRC size	0, 8, 12, 16, 24	16	0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24
	Resulting ratio after static rate matching	0,5 to 4				

		Attribute values	CPCH	DCH	DSCH	USCH
Dynamic part	Transport Block Size	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity
	Transport Block Set Size	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity
	Transmission Time Interval (option for TDD only)	10, 20 ms, 40 and 80 ms		10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms
Semi-static part	Transmission Time Interval (FDD, option for TDD NRT bearers)	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms
	Type of channel coding	No coding (TDD only) Turbo coding Convolutional coding	No coding (TDD only) Turbo coding Convolutional coding	No coding (TDD only) Turbo coding Convolutional coding	No coding (TDD only) Turbo coding Convolutional coding	No coding (TDD only) Turbo coding Convolutional coding
	code rates (in case of convolutional coding)	1/2, 1/3	1/2, 1/3	1/2, 1/3	1/2, 1/3	1/2, 1/3
	CRC size	0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24
	Resulting ratio after static rate matching	0,5 to 4				

Table B.1

	Attribute	Value		
		Class A	Class B	Class C
Dynamic part	Transport Block Size	81 65 75 61 58 55 49 42 39	103 99 84 87 76 63 54 53 0	60 40 0 0 0 0 0 0 0
	Transport Block Set Size	Same as the transport block sizes		
Semi-static part	Transmission Time Interval	20 ms		
	Type of channel coding	Convolutional coding		
	code rates	1/2, 1/3 + class-specific rate matching	None (TDD only), 1/2, 1/3 + class-specific rate matching	None (TDD only), 1/2 , 1/3 + class-specific rate matching
	CRC size	8	0	0
	Resulting ratio after static rate matching	0.5 to 4(with no coding the rate matching ratio needs to be >1)		

CR-Form-v5

CHANGE REQUEST

⌘ **25.302 CR 121** ⌘ **rev 1** ⌘ Current version: **4.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Removal of channel coding option "no coding" for FDD
Source:	⌘	Siemens
Work item code:	⌘	TEI
Date:	⌘	March 2002
Category:	⌘	**C**
Release:	⌘	REL-4

Use one of the following categories:
- ***F*** *(correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(addition of feature),*
- ***C*** *(functional modification of feature)*
- ***D*** *(editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
- *2 (GSM Phase 2)*
- *R96 (Release 1996)*
- *R97 (Release 1997)*
- *R98 (Release 1998)*
- *R99 (Release 1999)*
- *REL-4 (Release 4)*
- *REL-5 (Release 5)*

Reason for change:	⌘	In the RAN#15 meeting it has been agreed to remove the channel coding option "no coding" for FDD. For TDD this option is still valid.
Summary of change:	⌘	The channel coding option "no coding" has been removed for FDD. **Isolated Impact Analysis** This change affects the channel coding type. It would not affect implementations behaving like indicated in the CR, it would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved:	⌘	"no coding" option is possible

Clauses affected:	⌘	7.1.6, Annex A, Annex B

Other specs affected: ⌘

- [ ] Other core specifications ⌘
- [ ] Test specifications
- [ ] O&M Specifications

CR009r2	25.201 v3.2.0
CR010r1	25.201 v4.1.0
CR127r2	25.212 v3.8.0
CR128r2	25.212 v4.3.0
CR110r1	25.215 v3.9.0
CR111r1	25.215 v4.3.0
CR120r2	25.302 v3.11.0
CR1295r2	25.331 v3.9.0
CR1296r1	25.331 v4.3.0
CR 585r2	25.423 v3.8.0
CR 586r2	25.423 v4.3.0
CR 627r2	25.433 v3.8.0
CR 628r2	25.433 v4.3.0

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/3G_Specs/CRs.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.

7.1.6 Transport Format

This is defined as a format offered by L1 to MAC (and vice versa) for the delivery of a Transport Block Set during a Transmission Time Interval on a Transport Channel. The Transport Format constitutes of two parts – one *dynamic* part and one *semi-static* part.

Attributes of the dynamic part are:

- Transport Block Size;
- Transport Block Set Size;
- Transmission Time Interval (optional dynamic attribute for TDD only);

Attributes of the semi-static part are:

- Transmission Time Interval (mandatory for FDD, optional for the dynamic part of TDD NRT bearers);
- error protection scheme to apply:
  - type of error protection, turbo code, convolutional code or no channel coding (TDD only);
  - coding rate;
  - static rate matching parameter;
- size of CRC.

Table A.1: Characterisation of Transport Format

		Attribute values	BCH	PCH	FACH	RACH
Dynamic part	Transport Block Size	0 to 5 000 1 bit granularity	246	1 to 5000 1 bit granularity	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity
	Transport Block Set Size	0 to 200 000 1 bit granularity	246	1 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity
	Transmission Time Interval (option for TDD only)	10, 20 ms, 40 and 80 ms				
Semi-static part	Transmission Time Interval (FDD, option for TDD NRT bearers)	10, 20 ms, 40 and 80 ms	20 ms	10ms for FDD, 20ms for TDD	10, 20 ms, 40 and 80 ms	10 ms and 20 ms for FDD, 10 ms for TDD
	Type of channel coding	No Coding (TDD only) Turbo coding Convolutional coding	Convolutional coding	Convolutional coding	No coding (TDD only) Turbo coding Convolutional coding	Convolutional coding
	code rates	1/2, 1/3	1/2	1/2	½, 1/3	1/2
	CRC size	0, 8, 12, 16, 24	16	0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24
	Resulting ratio after static rate matching	0,5 to 4				

		Attribute values	CPCH	DCH	DSCH	USCH
Dynamic part	Transport Block Size	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity	0 to 5 000 1 bit granularity
	Transport Block Set Size	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity	0 to 200 000 1 bit granularity
	Transmission Time Interval (option for TDD only)	10, 20 ms, 40 and 80 ms		10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms
Semi-static part	Transmission Time Interval (FDD, option for TDD NRT bearers)	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms
	Type of channel coding	No coding (TDD only) Turbo coding Convolutional coding	No coding (TDD only) Turbo coding Convolutional coding	No coding (TDD only) Turbo coding Convolutional coding	No coding (TDD only) Turbo coding Convolutional coding	No coding (TDD only) Turbo coding Convolutional coding
	code rates (in case of convolutional coding)	1/2, 1/3	1/2, 1/3	1/2, 1/3	1/2, 1/3	1/2, 1/3
	CRC size	0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24
	Resulting ratio after static rate matching	0,5 to 4				

Table B.1

	Attribute	Value		
		Class A	Class B	Class C
Dynamic part	Transport Block Size	81 65 75 61 58 55 49 42 39	103 99 84 87 76 63 54 53 0	60 40 0 0 0 0 0 0 0
	Transport Block Set Size	Same as the transport block sizes		
Semi-static part	Transmission Time Interval	20 ms		
	Type of channel coding	Convolutional coding		
	code rates	1/2, 1/3 + class-specific rate matching	None (TDD only), 1/2, 1/3 + class-specific rate matching	None (TDD only), 1/2 , 1/3 + class-specific rate matching
	CRC size	8	0	0
	Resulting ratio after static rate matching	0.5 to 4(with no coding the rate matching ratio needs to be >1)		

CR-Form-v5

CHANGE REQUEST

⌘	25.331	CR	1295	⌘ rev	2	⌘	Current version:	3.9.0	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘	(U)SIM		ME/UE	X	Radio Access Network	X	Core Network

Title: ⌘	Removal of channel coding option "no coding" for FDD		
Source: ⌘	Siemens		
Work item code: ⌘	TEI	***Date:*** ⌘	March 2002
Category: ⌘	**C**	***Release:*** ⌘	R99
	Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change: ⌘	In the RAN#15 meeting it has been agreed to remove the channel coding option "no coding" for FDD. For TDD this option is still valid.
Summary of change: ⌘	The channel coding option "no coding" has been removed for FDD. **Isolated Impact Analysis** This change affects the channel coding type. It would not affect implementations behaving like indicated in the CR, it would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved: ⌘	"no coding" option is possible

Clauses affected: ⌘	10.3.5.11			
Other specs ⌘		Other core specifications	⌘	CR009r2 25.201 v3.2.0 CR010r1 25.201 v4.1.0 CR127r2 25.212 v3.8.0 CR128r2 25.212 v4.3.0 CR110r1 25.215 v3.9.0 CR111r1 25.215 v4.3.0 CR120r2 25.302 v3.11.0 CR121r1 25.302 v4.3.0 CR1296r1 25.331 v4.3.0 CR 585r2 25.423 v3.8.0 CR 586r2 25.423 v4.3.0 CR 627r2 25.433 v3.8.0 CR 628r2 25.433 v4.3.0
affected:		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/3G_Specs/CRs.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.

10.3.5.11 Semi-static Transport Format Information

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Transmission time interval	MP		Integer(10, 20, 40, 80, dynamic)	In ms. The value dynamic is only used in TDD mode
Type of channel coding	MP		Enumerated(No coding, Convolutional, Turbo)	The option "No coding" is only valid for TDD.
Coding Rate	CV-*Coding*		Enumerated(1/2, 1/3)	
Rate matching attribute	MP		Integer(1..hiRM)	
CRC size	MP		Integer(0, 8, 12, 16, 24)	in bits

```
ChannelCodingType ::=               CHOICE {
-- the option 'noCoding' is only used for TDD in this version of the specification, otherwise it should be ignored
    noCoding                            NULL,
    convolutional                       CodingRate,
    turbo                               NULL
}
```

3GPP TSG-RAN Meeting #15
Cheju, Korea, 5th – 8th March 2002

Tdoc R2-020231

CR-Form-v5

CHANGE REQUEST

⌘	**25.331**	**CR**	**1296**	⌘ **rev**	**1**	⌘ Current version:	**4.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Removal of channel coding option "no coding" for FDD		
Source:	⌘	Siemens		
Work item code:	⌘	TEI	***Date:*** ⌘	March 2002
Category:	⌘	**A** *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-4 *Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change:	⌘	In the RAN#15 meeting it has been agreed to remove the channel coding option "no coding" for FDD. For TDD this option is still valid.
Summary of change:	⌘	The channel coding option "no coding" has been removed for FDD. **Isolated Impact Analysis** This change affects the channel coding type. It would not affect implementations behaving like indicated in the CR, it would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved:	⌘	"no coding" option is possible

Clauses affected:	⌘	10.3.5.11			
Other specs	⌘	[ ] Other core specifications	⌘	CR009r2 CR010r1 CR127r2 CR128r2 CR110r1 CR111r1 CR120r2 CR121r1 CR1295r2 CR 585r2 CR 586r2 CR 627r2 CR 628r2	25.201 v3.2.0 25.201 v4.1.0 25.212 v3.8.0 25.212 v4.3.0 25.215 v3.9.0 25.215 v4.3.0 25.302 v3.11.0 25.302 v4.3.0 25.331 v3.9.0 25.423 v3.8.0 25.423 v4.3.0 25.433 v3.8.0 25.433 v4.3.0
Affected:		[ ] 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/3G_Specs/CRs.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.

10.3.5.11 Semi-static Transport Format Information

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Transmission time interval	MP		Integer(10, 20, 40, 80, dynamic)	In ms. The value dynamic is only used in TDD mode
Type of channel coding	MP		Enumerated(No coding, Convolutional, Turbo)	The option "No coding" is only valid for TDD.
Coding Rate	CV-*Coding*		Enumerated(1/2, 1/3)	
Rate matching attribute	MP		Integer(1..hiRM)	
CRC size	MP		Integer(0, 8, 12, 16, 24)	in bits

```
ChannelCodingType ::=               CHOICE {
    -- the option 'noCoding' is only used for TDD in this version of the specification, otherwise it
should be ignored
    noCoding                            NULL,
    convolutional                       CodingRate,
    turbo                               NULL
}
```

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Cheju, Korea, March 05-08, 2002

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CHANGE REQUEST

⌘ **25.423**	**CR 585**	⌘ **rev**	**2** ⌘	Current version:	**3.8.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [ ]

Title: ⌘	Removing of channel coding option "no coding" for FDD		
Source: ⌘	Siemens AG		
Work item code: ⌘	TEI	***Date:*** ⌘	March 2002
Category: ⌘	F	***Release:*** ⌘	R99
	Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change: ⌘	In the TSG RAN plenary meeting (March 5th-8th 2002) it has been agreed to remove the channel coding option "no coding" for FDD from Rel.99 & REL-4 since 'this feature was not used by anyone'. For TDD this option is still valid.
Summary of change: ⌘	The type of channel coding "no coding" is removed in the tabular format and in the ASN.1 code and replaced by "no codingTDD" Revision 1: CR cover page and semantic description modified Revision 2: According to TSG RAN agreement to retain "no coding" for 3.84Mcps TDD **Isolated impact analysis**: Impact assessment towards the previous version of the specification (same release): This CR has no impact with the previous version of the specification (same release) because the removed type of channel coding wasn't used at all.
Consequences if not approved: ⌘	"no coding" option would still be possible for FDD.

Clauses affected: ⌘	9.2.1.64, 9.3.4		
Other specs ⌘	[X] Other core specifications	⌘ CR009r2 CR010r1 CR127r2 CR128r2 CR110r1 CR111r1 CR120r2 CR121r1 CR1295r2	25.201 v3.2.0 25.201 v4.1.0 25.212 v3.8.0 25.212 v4.3.0 25.215 v3.9.0 25.215 v4.3.0 25.302 v3.11.0 25.302 v4.3.0 25.331 v3.9.0

			CR1296r1 25.331 v4.3.0 CR 586r2 25.423 v4.3.0 CR 627r2 25.433 v3.8.0 CR 628r2 25.433 v4.3.0
affected:		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/3G_Specs/CRs.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.

9.2.1.64 Transport Format Set

The Transport Format Set is defined as the set of Transport Formats associated to a Transport Channel, e.g. DCH.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Dynamic Transport Format Information		1..<maxTFcount>		The first instance of the parameter corresponds to TFI zero, the second to 1 and so on.
>Number of Transport Blocks	M		INTEGER (0..512)	
>Transport Block Size	C – Blocks		INTEGER (0..5000)	Bits
>CHOICE *Mode*	M			
>>TDD				
>>>**Transmission Time Interval Information**	C-TTIdynamic	1..<maxTTIcount>		
>>>>Transmission Time Interval	M		ENUMERATED(10, 20, 40, 80,…)	msec
Semi-static Transport Format Information		1		
>Transmission Time Interval	M		ENUMERATED (10, 20, 40, 80, dynamic, …)	msec Value “dynamic” for TDD only
>Type of Channel Coding	M		ENUMERATED (No codingTDD, Convolutional, Turbo,…)	[FDD - The value ‘No codingTDD’ shall be treated as logical error if received]
>Coding Rate	C – Coding		ENUMERATED (1/2, 1/3,…)	
>Rate Matching Attribute	M		INTEGER (1..maxRM)	
>CRC size	M		ENUMERATED (0, 8, 12, 16, 24,…)	
>CHOICE *Mode*	M			
>>TDD				
>>>2nd Interleaving Mode	M		ENUMERATED(Frame related, Timeslot related,…)	

Condition	Explanation
Blocks	The IE shall be present if the *Number of Transport Blocks* IE is set to a value greater than 0.
Coding	The IE shall be present if the *Type of Channel Coding* IE is set to "Convolutional" or "Turbo".
TTIdynamic	The IE shall be present if the *Transmission Time Interval* IE of the *Semi-static Transport Format Information* IE is set to “dynamic”.

Range bound	Explanation
MaxTFcount	The maximum number of different transport formats that can be included in the Transport format set for one transport channel.
MaxRM	The maximum number that could be set as rate matching attribute for a transport channel.
MaxTTIcount	The amount of different TTI that are possible for that transport format is.

9.3.4 Information Element Definitions

```
-- **************************************************************
--
-- Information Element Definitions
--
-- **************************************************************
```

TEXT OMITTED

```
CGI-ExtIEs RNSAP-PROTOCOL-EXTENSION ::= {
    ...
}

ChannelCodingType ::= ENUMERATED {
    no-codingTDD,
    convolutional-coding,
    turbo-coding,
    ...
}

ChipOffset              ::= INTEGER (0..38399)
```

TEXT OMITTED

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CHANGE REQUEST

⌘	25.423	CR	586	⌘ rev	2	⌘	Current version:	4.3.0	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [ ]

Title:	⌘	Removing of channel coding option "no coding" for FDD		
Source:	⌘	Siemens AG		
Work item code:	⌘	TEI	***Date:*** ⌘	March 2002
Category:	⌘	**A**	***Release:*** ⌘	REL-4
		Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change:	⌘	In the TSG RAN plenary meeting (March 5th-8th 2002) it has been agreed to remove the channel coding option "no coding" for FDD from Rel.99 & REL-4 since 'this feature was not used by anyone'. For TDD this option is still valid.
Summary of change:	⌘	The type of channel coding "no coding" is removed in the tabular format and in the ASN.1 code and replaced by "no coding TDD" Revision 1: CR cover page and semantic description modified. Revision 2: According to TSG RAN agreement to retain "no coding" for 3.84Mcps TDD **Isolated impact analysis**: Impact assessment towards the previous version of the specification (same release): This CR has no impact with the previous version of the specification (same release) because the removed type of channel coding wasn't used at all
Consequences if not approved:	⌘	"no coding" option would still be possible for FDD.

Clauses affected:	⌘	9.2.1.64, 9.3.4			
Other specs	⌘	X	Other core specifications	⌘	CR009r2 25.201 v3.2.0 CR010r1 25.201 v4.1.0 CR127r2 25.212 v3.8.0 CR128r2 25.212 v4.3.0 CR110r1 25.215 v3.9.0

			CR111r1 25.215 v4.3.0 CR120r2 25.302 v3.11.0 CR121r1 25.302 v4.3.0 CR1295r2 25.331 v3.9.0 CR1296r1 25.331 v4.3.0 CR 585r2 25.423 v3.8.0 CR 627r2 25.433 v3.8.0 CR 628r2 25.433 v4.3.0
affected:		Test specifications	
		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.

9.2.1.64 Transport Format Set

The Transport Format Set is defined as the set of Transport Formats associated to a Transport Channel, e.g. DCH.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Dynamic Transport Format Information		1..<maxTFcount>		The first instance of the parameter corresponds to TFI zero, the second to 1 and so on.
>Number of Transport Blocks	M		INTEGER (0..512)	
>Transport Block Size	C – Blocks		INTEGER (0..5000)	Bits
>CHOICE *Mode*	M			
>>*TDD*				
>>>**Transmission Time Interval Information**	C-TTIdynamic	1..<maxTTIcount>		
>>>>Transmission Time Interval	M		ENUMERATED(10, 20, 40, 80,…)	msec
Semi-static Transport Format Information		1		
>Transmission Time Interval	M		ENUMERATED (10, 20, 40, 80, dynamic, …)	msec Value "dynamic" for TDD only
>Type of Channel Coding	M		ENUMERATED (No codingTDD, Convolutional, Turbo,…)	[FDD - The value 'No codingTDD' shall be treated as logical error if received]
>Coding Rate	C – Coding		ENUMERATED (1/2, 1/3,…)	
>Rate Matching Attribute	M		INTEGER (1..maxRM)	
>CRC size	M		ENUMERATED (0, 8, 12, 16, 24,…)	
>CHOICE *Mode*	M			
>>*TDD*				
>>>2nd Interleaving Mode	M		ENUMERATED(Frame related, Timeslot related,…)	

Condition	Explanation
Blocks	The IE shall be present if the *Number of Transport Blocks* IE is set to a value greater than 0.
Coding	Th IE present if *Transmission Time Interval* IE is set to "Convolutional" or "Turbo".
TTIdynamic	The IE shall be present if the *Transmission Time Interval* IE in the *Semi-static Transport Format Information* IE is set to “dynamic”.

Range bound	Explanation
MaxTFcount	The maximum number of different transport formats that can be included in the Transport format set for one transport channel.
MaxRM	The maximum number that could be set as rate matching attribute for a transport channel.
MaxTTIcount	The amount of different TTI that are possible for that transport format is.

9.3.4 Information Element Definitions

```
-- **************************************************************
--
-- Information Element Definitions
--
-- **************************************************************
```

TEXT OMITTED

```
CGI-ExtIEs RNSAP-PROTOCOL-EXTENSION ::= {
    ...
}

ChannelCodingType ::= ENUMERATED {
    no-codingTDD,
    convolutional-coding,
    turbo-coding,
    ...
}

ChipOffset              ::= INTEGER (0..38399)
```

TEXT OMITTED

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Cheju, Korea, March 05-08, 2002

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CHANGE REQUEST

⌘ **25.433**	**CR**	**627**	⌘ **rev**	**2**	⌘ Current version:	**3.8.0**	⌘

For ***HELP*** *on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [ ]

Title:	⌘	Removing of channel coding option "no coding" for FDD
Source:	⌘	Siemens AG
Work item code:	⌘	TEI
Date:	⌘	March 2002
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
- ***F*** *(correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(addition of feature),*
- ***C*** *(functional modification of feature)*
- ***D*** *(editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
- *2 (GSM Phase 2)*
- *R96 (Release 1996)*
- *R97 (Release 1997)*
- *R98 (Release 1998)*
- *R99 (Release 1999)*
- *REL-4 (Release 4)*
- *REL-5 (Release 5)*

Reason for change:	⌘	In the TSG RAN plenary meeting (March 5th-8th 2002) it has been agreed to remove the channel coding option “no coding” for FDD from Rel.99 & REL-4 since 'this feature was not used by anyone'. For TDD this option is still valid.
Summary of change:	⌘	The type of channel coding "no coding" is removed in the tabular format and in the ASN.1 code and replaced by "no coding TDD" Revision 1: CR cover page and semantic description modified Revision 2: According to TSG RAN agreement to retain “no coding” for 3.84Mcps TDD **Isolated impact analysis**: Impact assessment towards the previous version of the specification (same release): This CR has no impact with the previous version of the specification (same release) because the removed type of channel coding wasn't used at all.
Consequences if not approved:	⌘	"no coding" option would still be possible for FDD

Clauses affected:	⌘	9.2.1.59, 9.3.4		
Other specs	⌘ [X]	Other core specifications	⌘ CR009r2	25.201 v3.2.0
			CR010r1	25.201 v4.1.0
			CR127r2	25.212 v3.8.0
			CR128r2	25.212 v4.3.0
			CR110r1	25.215 v3.9.0
			CR111r1	25.215 v4.3.0
			CR120r2	25.302 v3.11.0
			CR121r1	25.302 v4.3.0
			CR1295r2	25.331 v3.9.0

			CR1296r1 25.331 v4.3.0 CR 585r2 25.423 v3.8.0 CR 586r2 25.423 v4.3.0 CR 628r2 25.433 v4.3.0
affected:		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/3G_Specs/CRs.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.

9.2.1.59 Transport Format Set

The Transport Format Set is defined as the set of Transport Formats associated to a Transport Channel, e.g. DCH.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Dynamic Transport Format Information		1 to <maxTFcount>		The first instance of the parameter corresponds to TFI zero, the second to 1 and so on.
>Number of Transport blocks	M		INTEGER (0..512)	
>Transport Block Size	C – Blocks		INTEGER (0..5000)	Bits
>CHOICE *Mode*	M			
>>TDD				
>>>**Transmission Time interval Information**	C-TTIdynamic	1 to <maxTTIcount>		
>>>>Transmission time interval	M		Enumerated(10, 20, 40, 80,…)	ms
Semi-static Transport Format Information		1		
>Transmission time interval	M		ENUMERATED (10, 20, 40, 80, dynamic,…)	ms Value “dynamic” for TDD only
>Type of channel coding	M		ENUMERATED (No codingTDD, Convolutional, Turbo,…)	[FDD - The value ‘No codingTDD’ shall be treated as logical error if received]
>Coding Rate	C – Coding		ENUMERATED (1/2, 1/3,…)	
>Rate matching attribute	M		INTEGER (1..maxRM)	
>CRC size	M		ENUMERATED (0, 8, 12, 16, 24,…)	
>CHOICE *Mode*	M			
>>TDD				
>>>2nd interleaving mode	M		Enumerated(Frame related, Timeslot related,…)	

Condition	Explanation
Blocks	The IE shall be present if the *Number of Transport Blocks* IE is set to a value greater than 0.
Coding	The IE shall be present if the *Type of channel coding* IE is set to "Convolutional" or "Turbo".
TTIdynamic	The IE shall be present if the *Transmission Time Interval* IE in the *Semi-static Transport Format Information* IE is set to “dynamic”.

Range bound	Explanation
MaxTFcount	Maximum number of different transport formats that can be included in the Transport format set for one transport channel.
MaxRM	Maximum number that could be set as rate matching attribute for a transport channel.
MaxTTIcount	The amount of different TTI that are possible for that transport format.

9.3.4 Information Elements Definitions

```
--**************************************************************************
--
-- Information Element Definitions
--
--**************************************************************************
```

TEXT OMITTED

```
TransportFormatSet-Semi-staticPart ::= SEQUENCE {
    transmissionTimeInterval            TransportFormatSet-TransmissionTimeIntervalSemiStatic,
    channelCoding                   TransportFormatSet-ChannelCodingType,
    codingRate                      TransportFormatSet-CodingRate               OPTIONAL,
    -- This IE shall be present if the Type of channel coding IE is set to 'convolutional' or
'turbo'
    rateMatcingAttribute            TransportFormatSet-RateMatchingAttribute,
    cRC-Size                        TransportFormatSet-CRC-Size,
    mode                            TransportFormatSet-ModeSSP  ,
    iE-Extensions                   ProtocolExtensionContainer { { TransportFormatSet-Semi-
staticPart-ExtIEs} }        OPTIONAL,
    ...
}

TransportFormatSet-Semi-staticPart-ExtIEs NBAP-PROTOCOL-EXTENSION ::= {
    ...
}

TransportFormatSet-ChannelCodingType ::= ENUMERATED {
    no-codingTDD,
    convolutional-coding,
    turbo-coding,
    ...
}

TransportFormatSet-CodingRate ::= ENUMERATED {
    half,
    third,
    ...
}

TransportFormatSet-CRC-Size ::= ENUMERATED {
    v0,
    v8,
    v12,
    v16,
    v24,
    ...
}
```

TEXT OMITTED

3GPP TSG-RAN Meeting #15
Cheju, Korea, March 05-08, 2002

RP-020231

CR-Form-v5

CHANGE REQUEST

⌘	**25.433**	**CR**	**628**	⌘ **rev**	**2**	⌘	Current version:	**4.3.0**	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [ ]

Title:	⌘	Removing of channel coding option "no coding" for FDD
Source:	⌘	Siemens AG
Work item code:	⌘	TEI
Date:	⌘	March 2002
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
- ***F*** *(correction)*
- ***A*** *(corresponds to a correction in an earlier release)*
- ***B*** *(addition of feature),*
- ***C*** *(functional modification of feature)*
- ***D*** *(editorial modification)*

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
- *2 (GSM Phase 2)*
- *R96 (Release 1996)*
- *R97 (Release 1997)*
- *R98 (Release 1998)*
- *R99 (Release 1999)*
- *REL-4 (Release 4)*
- *REL-5 (Release 5)*

Reason for change: ⌘ In the TSG RAN plenary meeting (March 5th-8th 2002) it has been agreed to remove the channel coding option “no coding” for FDD from Rel.99 & REL-4 since 'this feature was not used by anyone'. For TDD this option is still valid.

Summary of change: ⌘ The type of channel coding "no coding" is removed in the tabular format and in the ASN.1 code and replaced by "no coding TDD"

Revision 1: CR cover page and semantic description modified.

Revision 2: According to TSG RAN agreement to retain “no coding” for 3.84Mcps TDD

Isolated impact analysis:

Impact assessment towards the previous version of the specification (same release):

This CR has no impact with the previous version of the specification (same release) because the removed type of channel coding wasn't used at all.

Consequences if not approved: ⌘ "no coding" option would still be possible for FDD

Clauses affected: ⌘ 9.2.1.59, 9.3.4

Other specs ⌘ [X] Other core specifications ⌘

CR009r2	25.201 v3.2.0
CR010r1	25.201 v4.1.0
CR127r2	25.212 v3.8.0
CR128r2	25.212 v4.3.0
CR110r1	25.215 v3.9.0
CR111r1	25.215 v4.3.0
CR120r2	25.302 v3.11.0
CR121r1	25.302 v4.3.0
CR1295r2	25.331 v3.9.0

			CR1296r1 25.331 v4.3.0 CR 585r2 25.423 v3.8.0 CR 586r2 25.423 v4.3.0 CR 627r2 25.433 v3.8.0
affected:		Test specifications	
		O&M Specifications	
Other comments: ⌘			

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>Transport Block Size	C – Blocks		INTEGER (0..5000)	Bits
>CHOICE *Mode*	M			
>>*TDD*				
>>>**Transmission Time interval Information**	C-TTIdynamic	1 to <maxTTIcount>		
>>>>Transmission time interval	M		Enumerated(10, 20, 40, 80,…)	ms
Semi-static Transport Format Information		1		
>Transmission time interval	M		ENUMERATED (10, 20, 40, 80, dynamic,…,5)	ms; Value "dynamic" for TDD only; Value "5" for LCR TDD only
>Type of channel coding	M		ENUMERATED (No codingTDD, Convolutional, Turbo,…)	[FDD - The value 'No codingTDD' shall be treated as logical error if received]
>Coding Rate	C – Coding		ENUMERATED (1/2, 1/3,…)	
>Rate matching attribute	M		INTEGER (1..maxRM)	
>CRC size	M		ENUMERATED (0, 8, 12, 16, 24,…)	
>CHOICE *Mode*	M			
>>*TDD*				
>>>2nd interleaving mode	M		Enumerated(Frame related, Timeslot related,…)	

Condition	Explanation
Blocks	The IE shall be present if the *Number of Transport Blocks* IE is set to a value greater than 0.
Coding	The IE shall be present if the *Type of channel coding* IE is set to "Convolutional" or "Turbo".
TTIdynamic	The IE shall be present if the *Transmission Time Interval* IE in the *Semi-static Transport Format Information* IE is set to "dynamic".

Range bound	Explanation
MaxTFcount	Maximum number of different transport formats that can be included in the Transport format set for one transport channel.
MaxRM	Maximum number that could be set as rate matching attribute for a transport channel.
MaxTTIcount	The amount of different TTI that are possible for that transport format.

9.3.4 Information Elements Definitions

```
--**************************************************************************
--
-- Information Element Definitions
--
--**************************************************************************
```

TEXT OMITTED

```
TransportFormatSet-Semi-staticPart ::= SEQUENCE {
    transmissionTimeInterval            TransportFormatSet-TransmissionTimeIntervalSemiStatic,
    channelCoding                   TransportFormatSet-ChannelCodingType,
    codingRate                      TransportFormatSet-CodingRate               OPTIONAL,
    -- This IE shall be present if the Type of channel coding IE is set to 'convolutional' or
'turbo'
    rateMatcingAttribute            TransportFormatSet-RateMatchingAttribute,
    cRC-Size                        TransportFormatSet-CRC-Size,
    mode                            TransportFormatSet-ModeSSP  ,
    iE-Extensions                   ProtocolExtensionContainer { { TransportFormatSet-Semi-
staticPart-ExtIEs} }        OPTIONAL,
    ...
}

TransportFormatSet-Semi-staticPart-ExtIEs NBAP-PROTOCOL-EXTENSION ::= {
    ...
}

TransportFormatSet-ChannelCodingType ::= ENUMERATED {
    no-codingTDD,
    convolutional-coding,
    turbo-coding,
    ...
}

TransportFormatSet-CodingRate ::= ENUMERATED {
    half,
    third,
    ...
}

TransportFormatSet-CRC-Size ::= ENUMERATED {
    v0,
    v8,
    v12,
    v16,
    v24,
    ...
}
```

TEXT OMITTED