

**TSG-RAN Meeting #8
Düsseldorf, Germany, 21-23 June 2000**

RP-000276

Title: Agreed CRs to TR 25.944

Source: TSG-RAN WG1

Agenda item: 5.1.3

No.	Doc #	Report	CR	Rev	Subject	Cat	Current_v	New_v
1	R1-000784	25.944	001	2	Corrections to align with "Typical radio parameter	F	3.0.0	3.1.0

CHANGE REQUEST				Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.	
TR 25.944		CR	001r2		Current Version: 3.0.0
GSM (AA.BB) or 3G (AA.BBB) specification number ↑			↑ CR number as allocated by MCC support team		
For submission to:	TSG RAN#8	for approval	<input checked="" type="checkbox"/>	strategic	<input type="checkbox"/>
list expected approval meeting # here ↑		for information	<input type="checkbox"/>	non-strategic	<input type="checkbox"/>
				(for SMG use only)	

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

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

Source: TSG RAN WG1 **Date:** 12th May 2000

Subject: Corrections to align with "Typical radio parameter sets" from ISG

Work item: TR 25.944

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

Reason for change: In RAN#7, it was endorsed to change TR25.944 to align with a document "Typical radio parameter sets" from ISG. This CR includes corrections for FDD part to align with the document from ISG. And changes to align with TR25.926 "UE capabilities" are also included.

Clauses affected: Section 4

Other specs affected:	Other 3G core specifications	<input type="checkbox"/>	→ List of CRs:	
	Other GSM core specifications	<input type="checkbox"/>	→ List of CRs:	
	MS test specifications	<input type="checkbox"/>	→ List of CRs:	
	BSS test specifications	<input type="checkbox"/>	→ List of CRs:	
	O&M specifications	<input type="checkbox"/>	→ List of CRs:	

Other comments:

PRACH	Physical Random Access Channel
RACH	Random Access Channel
SF	Spreading Factor
SCCPCH	Secondary Common Control Physical Channel
TDD	Time Division Duplex
TFCI	Transport Format Combination Indicator
TPC	Transmit Power Control
TrBk	Transport Block
TrCh	Transport Channel
TTI	Transmission Time Interval
UL	Uplink

4 Channel coding and multiplexing examples

Following examples of channel coding and multiplexing is according to reference [2] and [7]. If there are any contradictions between following examples and the references, the present document should be corrected according to the references unless it is clear that the contradiction comes from error in the references.

Number and variables in following figures show the number of bits in corresponding fields.

4.1 FDD mode

4.1.1 Downlink

4.1.1.1 BCH

Table 1: Parameters for BCH

Transport block size	246
CRC	16 bits
Coding	CC, coding rate = 1/2
TTI	20 ms
The number of codes	1
SF	256

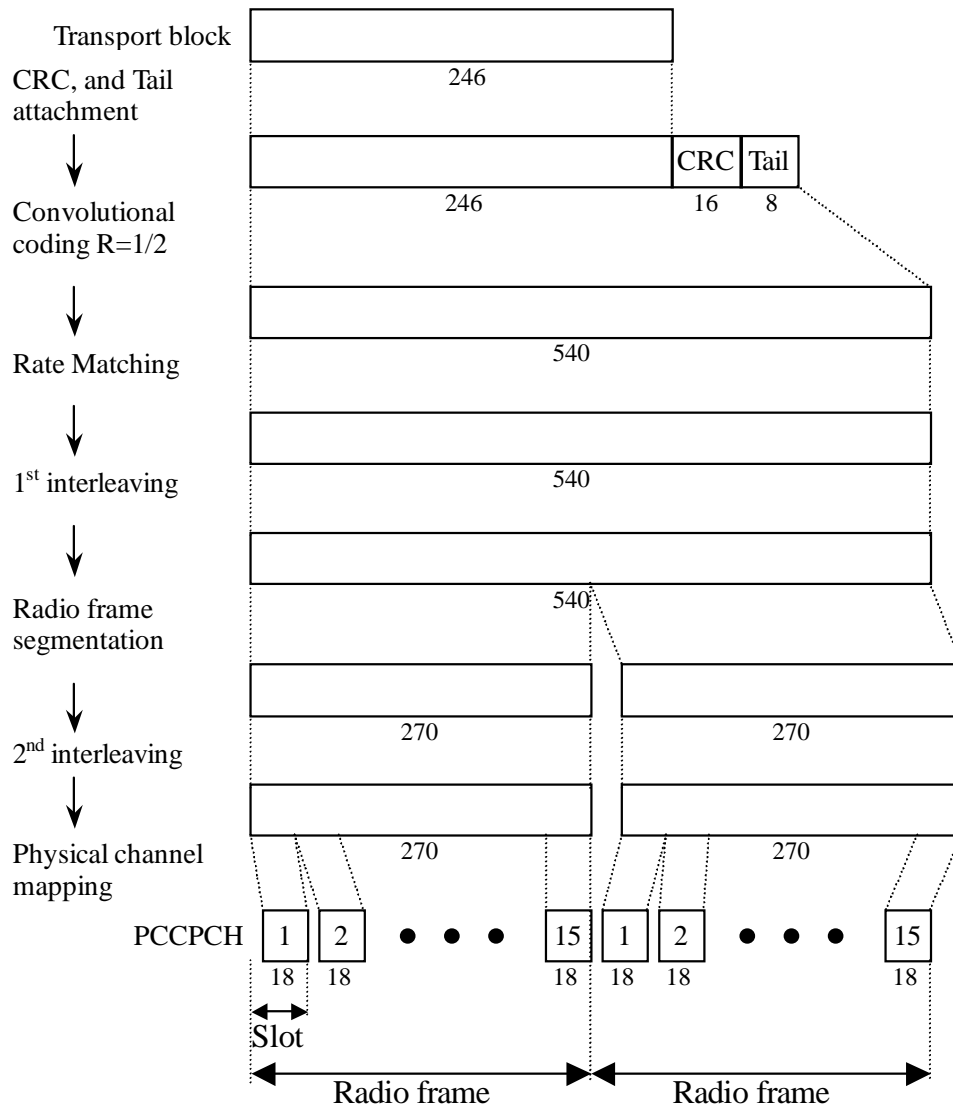
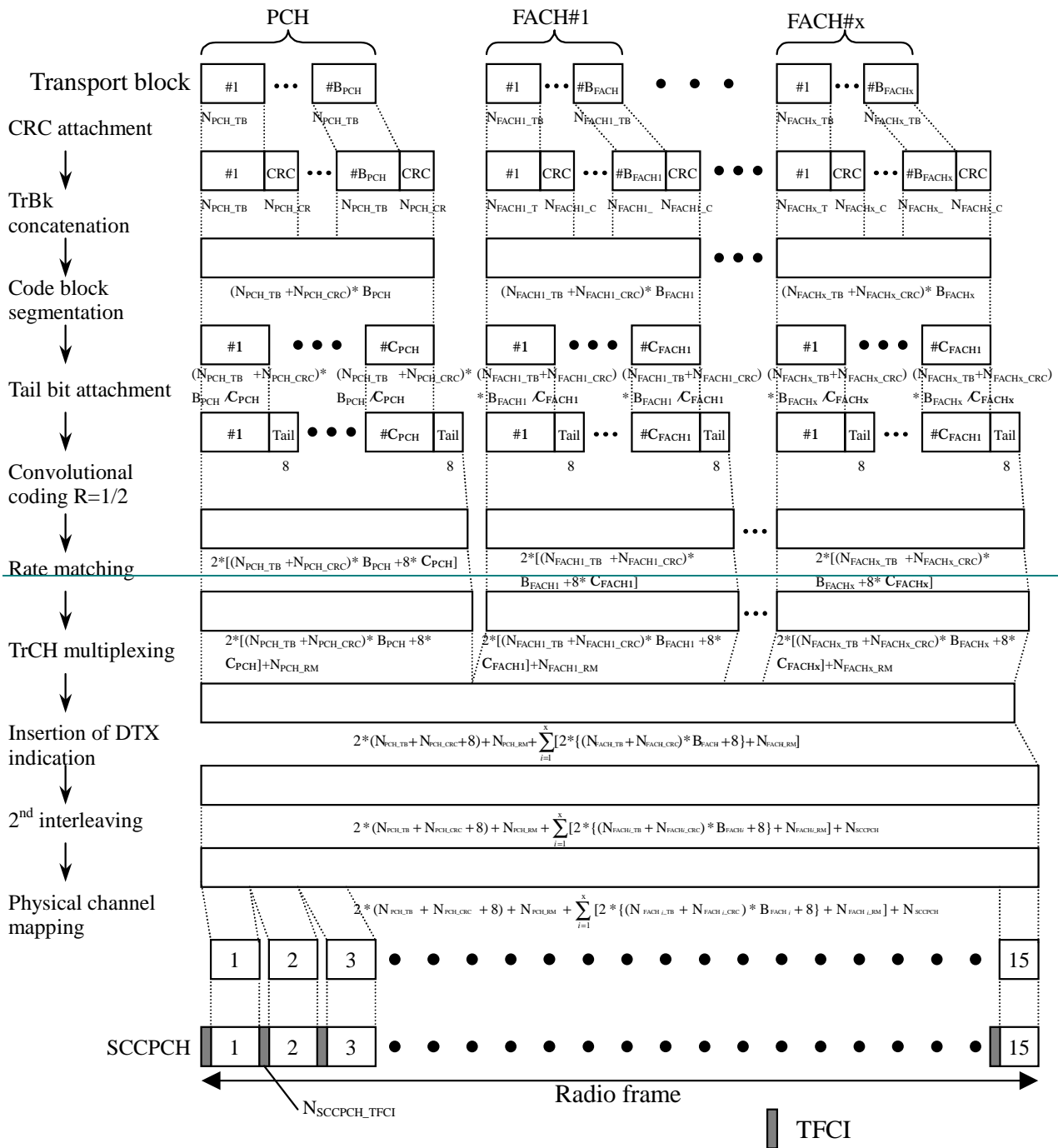


Figure 1: Channel coding for BCH

4.1.1.2 Example for PCH and FACH

Table 2: Parameter examples for PCH and FACH

Transport block size	PCH	$N_{PCH}=64$ or 240 bits
	FACH1	360 bits
	FACH2	168 bits
Transport block set size	PCH	$64 \cdot B_{PCH}$ or $240 \cdot B_{PCH}$ bits ($B_{PCH}=0, 1$)
	FACH1	$360 \cdot B_{FACH1}$ bits ($B_{FACH1}=0, 1$)
	FACH2	$168 \cdot B_{FACH2}$ bits ($B_{FACH2}=0, 1, 2, 3$)
Coding	PCH, FACH2	CC, coding rate = 1/2
	FACH1	TC
TTI		10 ms
The numbers of codes		1
SE		64



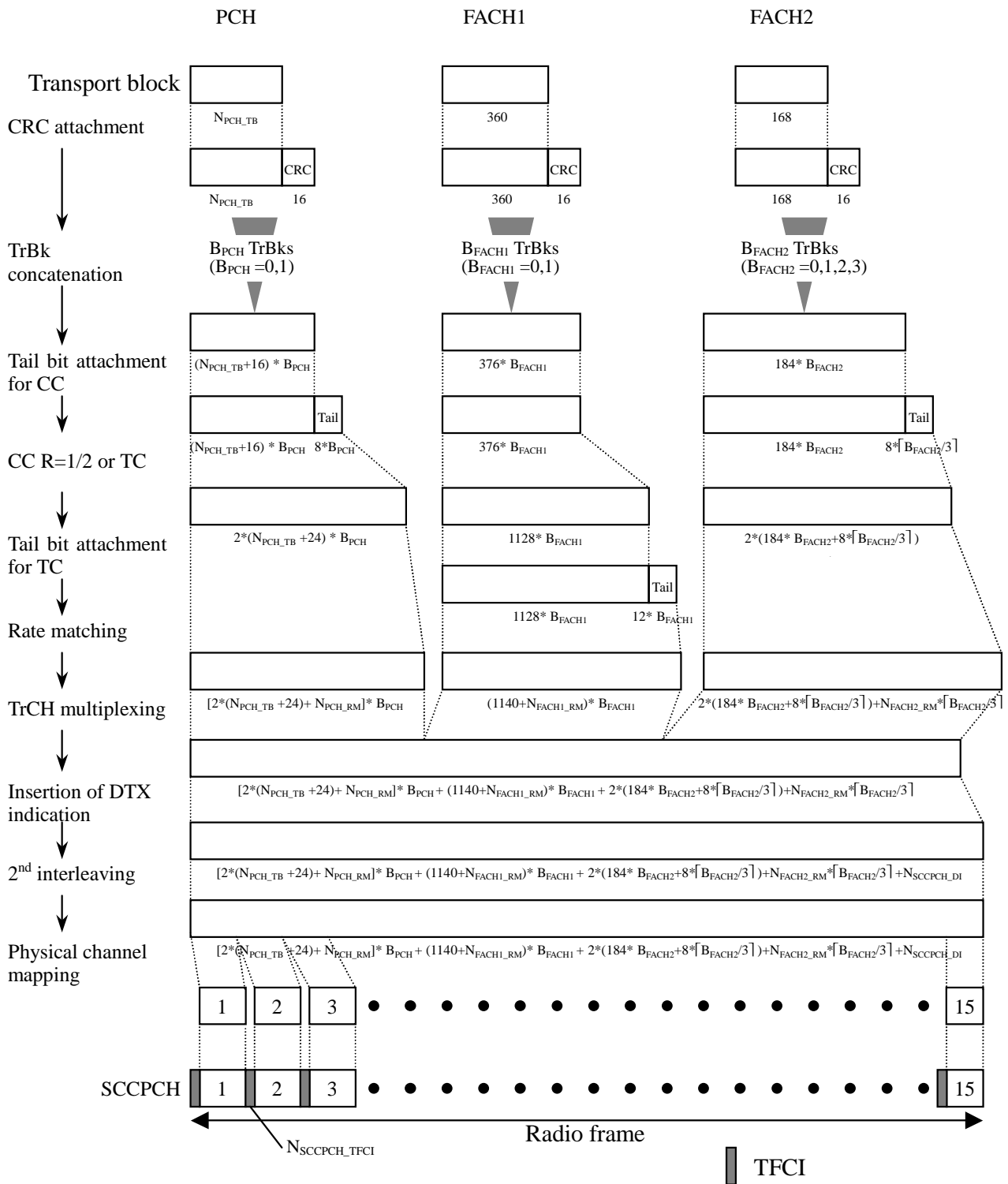


Figure 2: Channel coding and multiplexing example for PCH and FACH

4.1.1.3 Example for DCH

4.1.1.3.1 DCH-> Radio frame segmentation

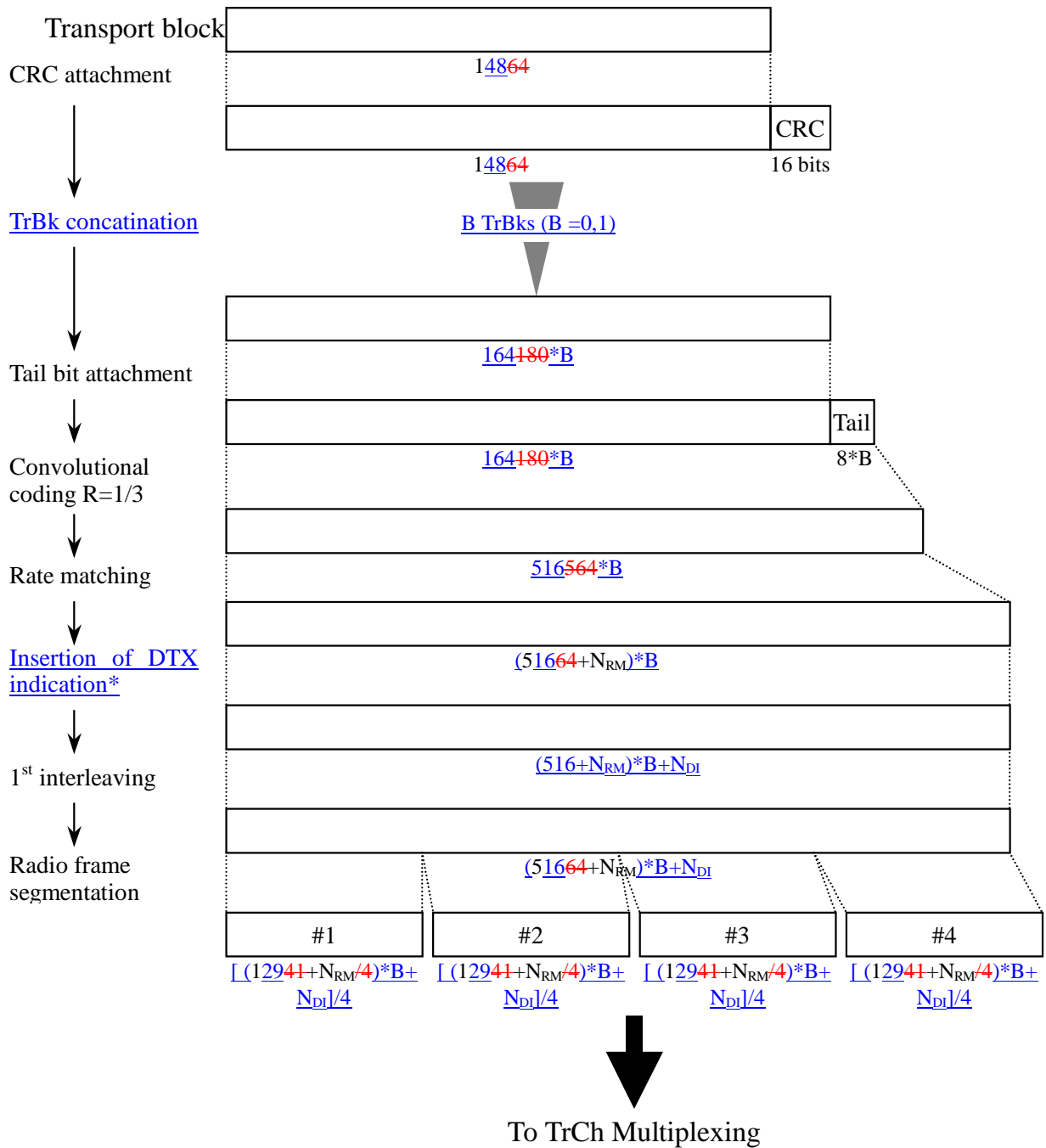
4.1.1.3.1.1 Example for 3.44.1 kbps data

NOTE: This example can be applied to DCCH.

NOTE: In this example, it is assumed that maximum data rate of RLC payload is 3.4 kbps, and that MAC and RLC overhead in a transport block is 12 bits.

Table 3: Parameter examples for 4.13.4 kbps data

Transport block size	148164 bits
Transport block set size	148*B+64 bits (B=0,1)
CRC	16 bits
Coding	CC, coding rate = 1/3
TTI	40 ms



* Insertion of DTX indication is used only if the position of the TrCHs in the radio frame is fixed.

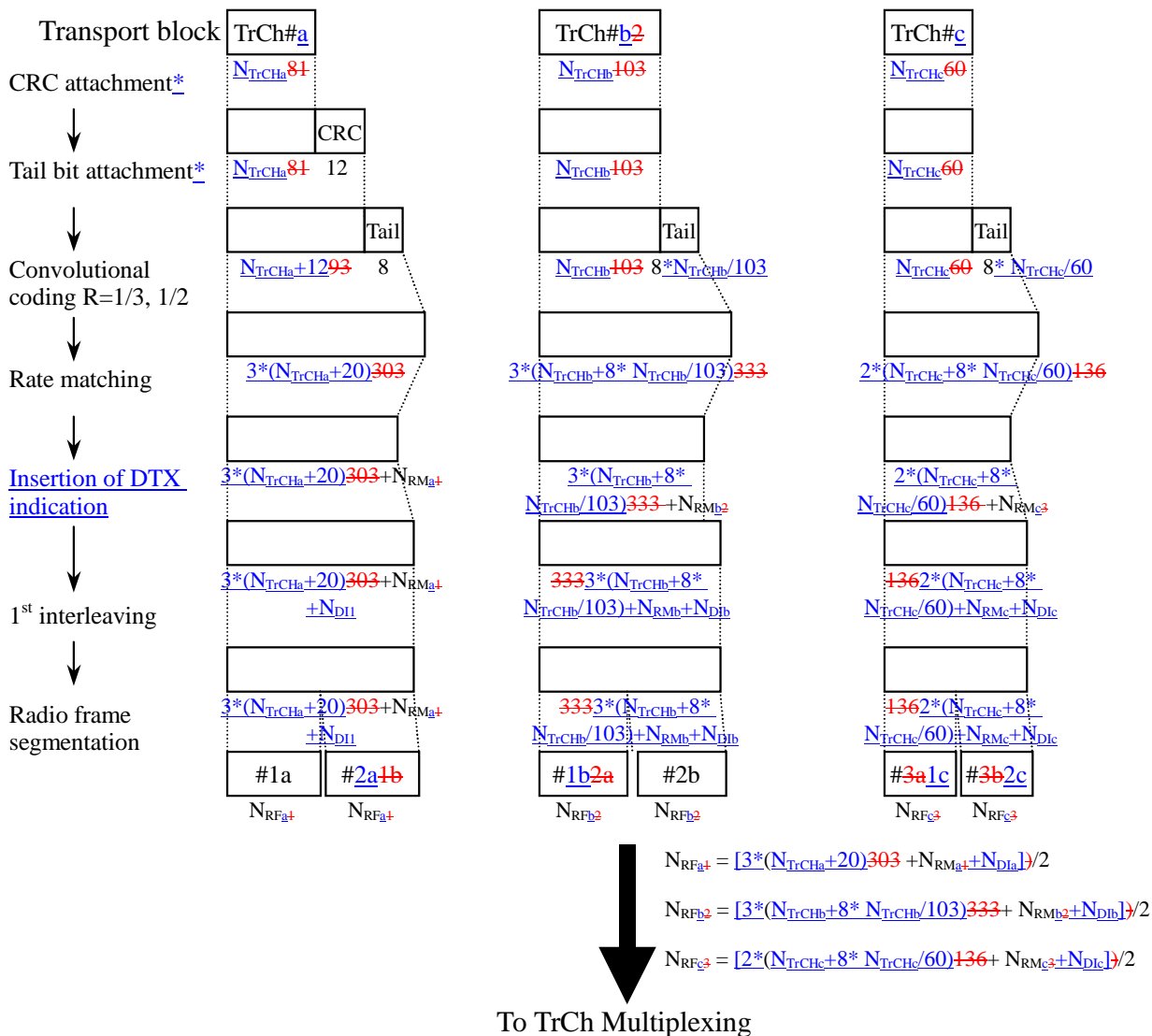
Figure 3: Channel coding and multiplexing example for 4.13.4 kbps data

4.1.1.3.1.2 Example for 12.2 kbps data

NOTE: This example can be applied to AMR speech.

Table 4: Parameter examples for 12.2 kbps data

The number of TrChs	3	
Transport block size	TrCH#a	$N_{TrCHa}=0, 39$ or $81, 103, \text{ and } 60$ bits
	TrCH#b	$N_{TrCHb}=0$ or 103 bits
	TrCH#c	$N_{TrCHc}=0$ or 60 bits
TFCS	#1	$N_{TrCHa}=81, N_{TrCHb}=103, N_{TrCHc}=60$ bits
	#2	$N_{TrCHa}=39, N_{TrCHb}=0, N_{TrCHc}=0$ bits
	#3	$N_{TrCHa}=0, N_{TrCHb}=0, N_{TrCHc}=0$ bits
CRC	12 bits (attached only to TrCh#a4)	
CRC parity bit attachment for 0 bit transport block	Applied only to TrCH#a	
Coding	CC, coding rate = 1/3 for TrCh#a4, b2 coding rate = 1/2 for TrCh#c3	
TTI	20 ms	



* CRC and tail bits for TrCH#a is attached even if $N_{TrCHa}=0$ bits since CRC parity bit attachment for 0 bit transport block is applied.

Figure 4: Channel coding and multiplexing example for 12.2 kbps data

4.1.1.3.1.3 Example for 28.8/57.6 kbps data

NOTE: This example can be applied to Modem or FAX.

Table 5: Parameters for 28.8/57.6 kbps data

The number of TrChs	1	
Transport block size	576 bits	
Transport block	28.8 kbps	576*B bits (B = 0, 1, 2)
Set size	57.6 kbps	576*B bits (B = 0, 1, 2, 3, 4)
CRC	16 bits	
Coding	Turbo coding, coding rate = 1/3	
TTI	40 ms	

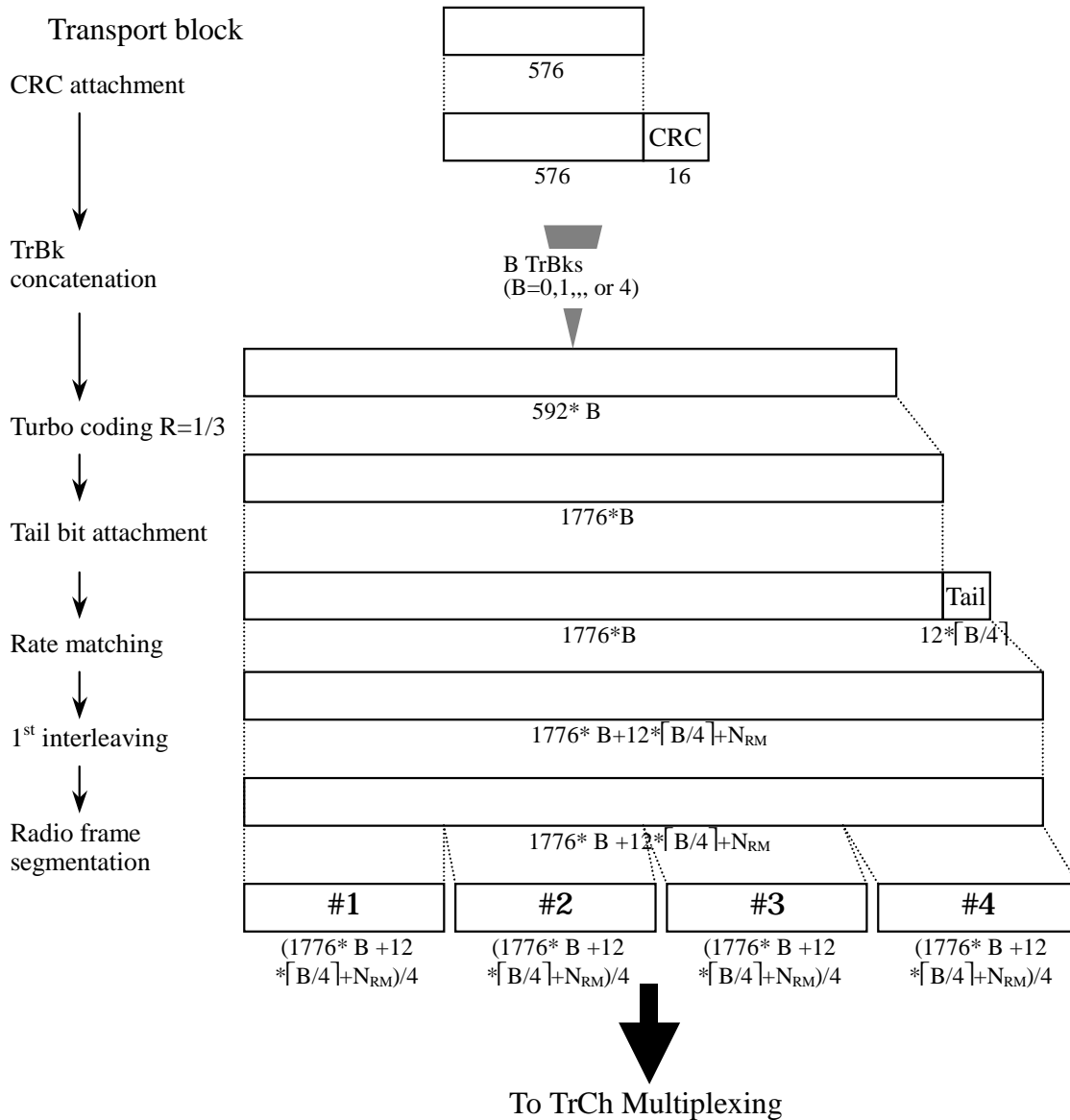


Figure 5: Channel coding and multiplexing example for 28.8/57.6 kbps data

4.1.1.3.1.43 Example for 64/128/144/384 kbps packet data

NOTE: In this example, it is assumed that maximum data rate of RLC payload is 64/128/144 kbps, and MAC and RLC overhead in a transport block is 16 bits.

Table 6: Parameters for 64/128/144/384 kbps packet data

The number of TrChs	1	
Transport block size	336640 bits	
Transport block size	64 kbps	336640*B bits (B = 0, 1, 2, 4)
	128 kbps	336640*B bits (B = 0, 1, 2, 4, 8)
	144 kbps	336*B bits (B = 0, 1, 2, 4, 8, 9)
	384 kbps	640*B bits (B = 0, 1, 2, ..., 6)
CRC	16 bits	
Coding	Turbo coding, coding rate = 1/3	
TTI	2040 ms	

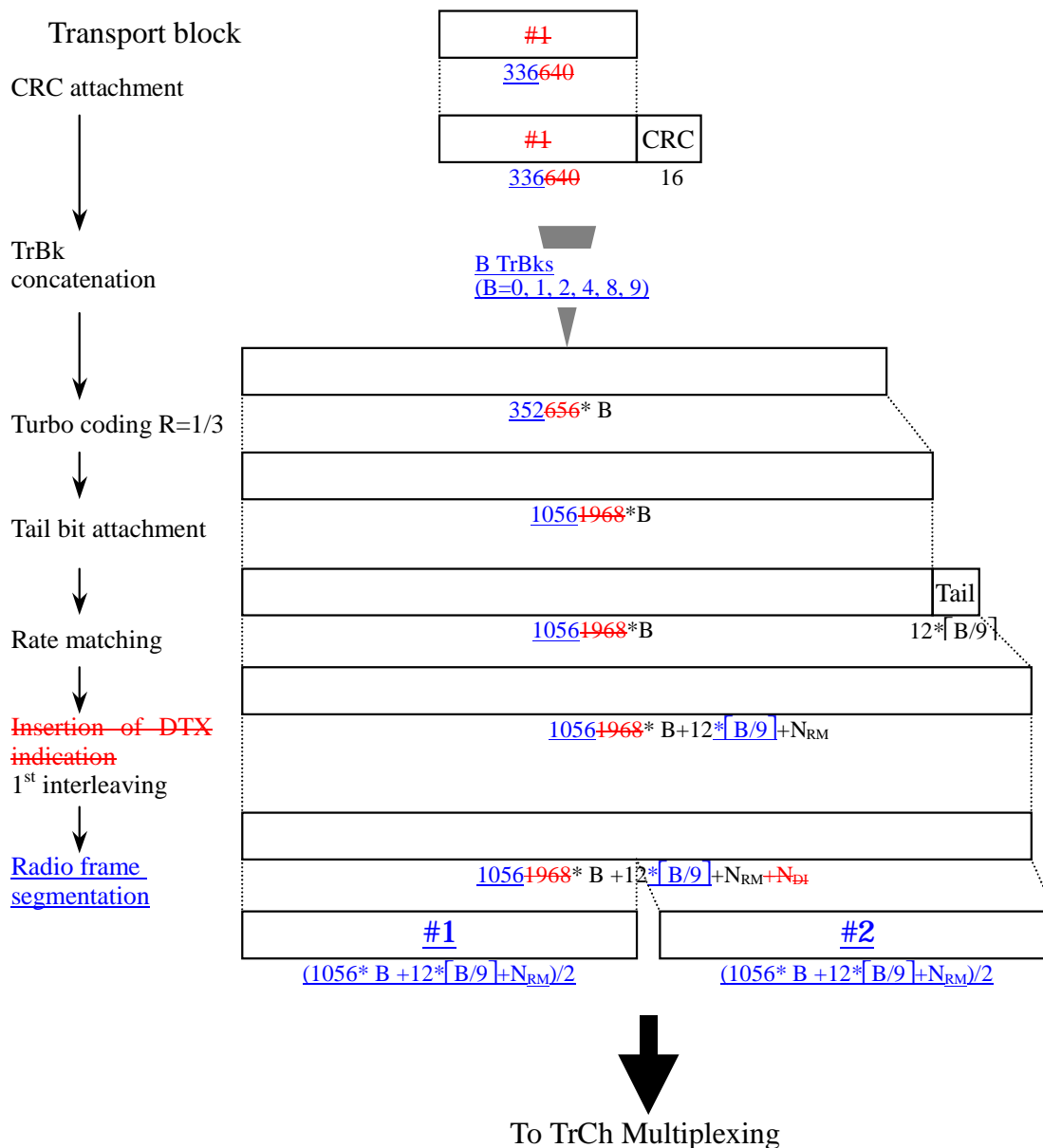


Figure 65: Channel coding and multiplexing example for 64/128/144/384 kbps packet data

4.1.1.3.1.5 Example for 384 kbps packet data

NOTE: In this example, it is assumed that maximum data rate of RLC payload is 384kbps, and MAC and RLC overhead in a transport block is 16 bits.

Table 7: Parameters for 384 kbps packet data

The number of TrChs	1
Transport block size	336 bits
Transport block Set size	336*B bits (B = 0, 1, 2, 4, 8, 12 for TTI=10 ms, B = 0, 1, 2, 4, 8, 12, 24 for TTI=20 ms)
CRC	16 bits
Coding	Turbo coding, coding rate = 1/3
TTI	10 or 20 ms

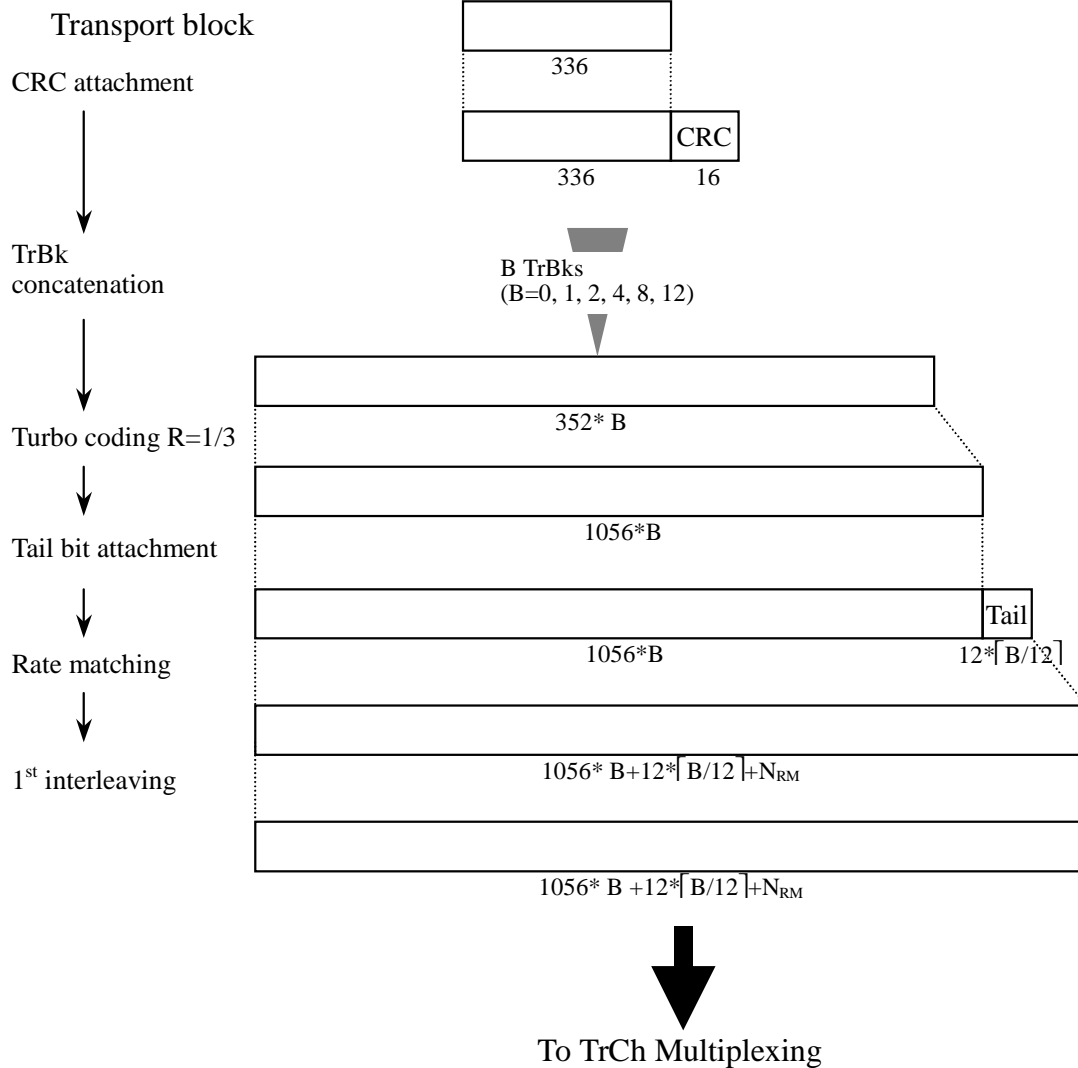


Figure 7: Channel coding and multiplexing example for 384 kbps packet data in case of TTI=10 ms

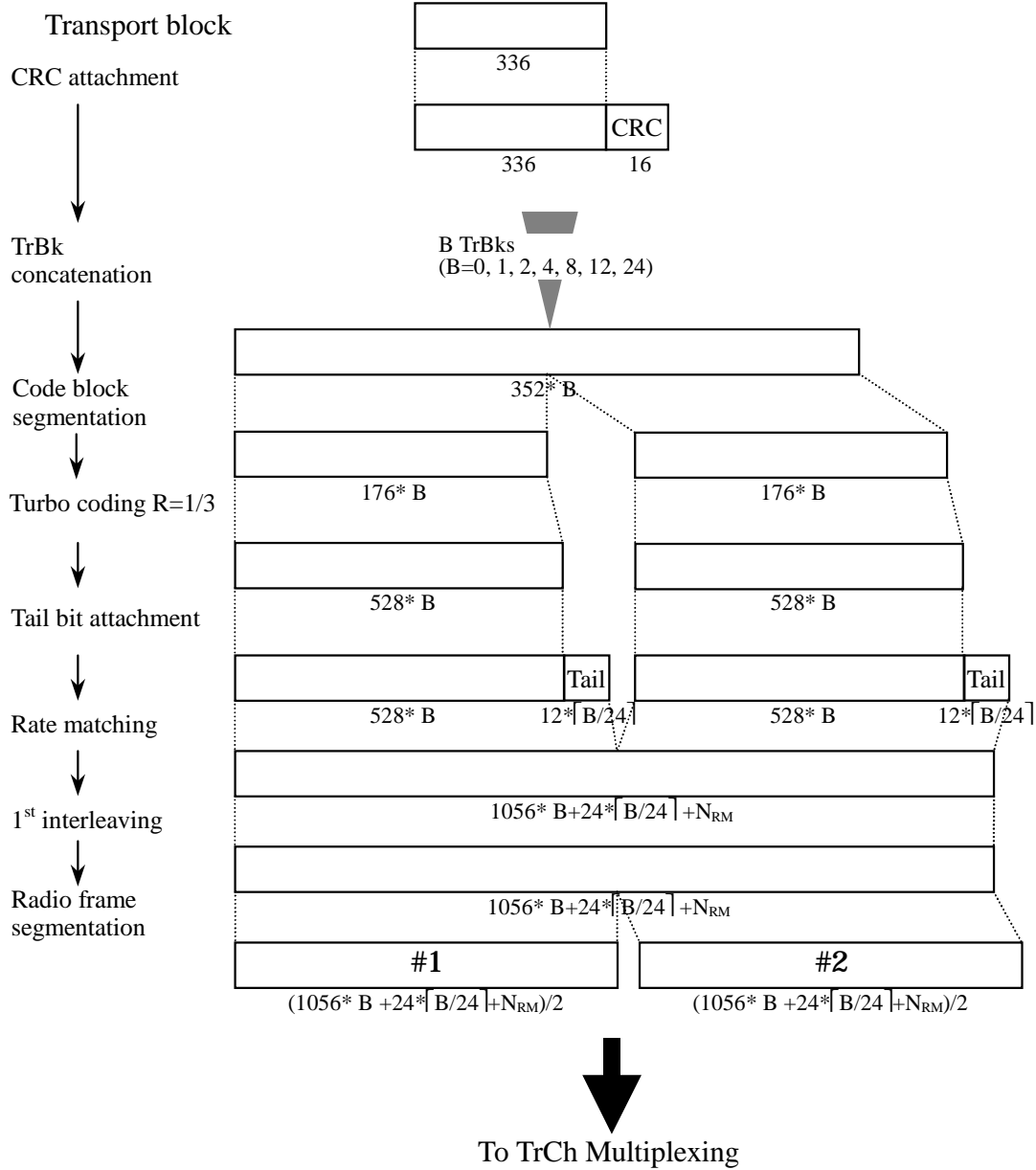


Figure 8: Channel coding and multiplexing example for 384 kbps packet data in case of TTI=20 ms

4.1.1.3.1.64 Example for 64 kbps data

NOTE: This example can be applied to ISDN service.

Table 8: Parameters for 64 kbps data

The number of TrChs	1
Transport block size	640 bits
Transport block set size	4*640 bits
CRC	16 bits
Coding	Turbo coding, coding rate = 1/3
TTI	40 ms

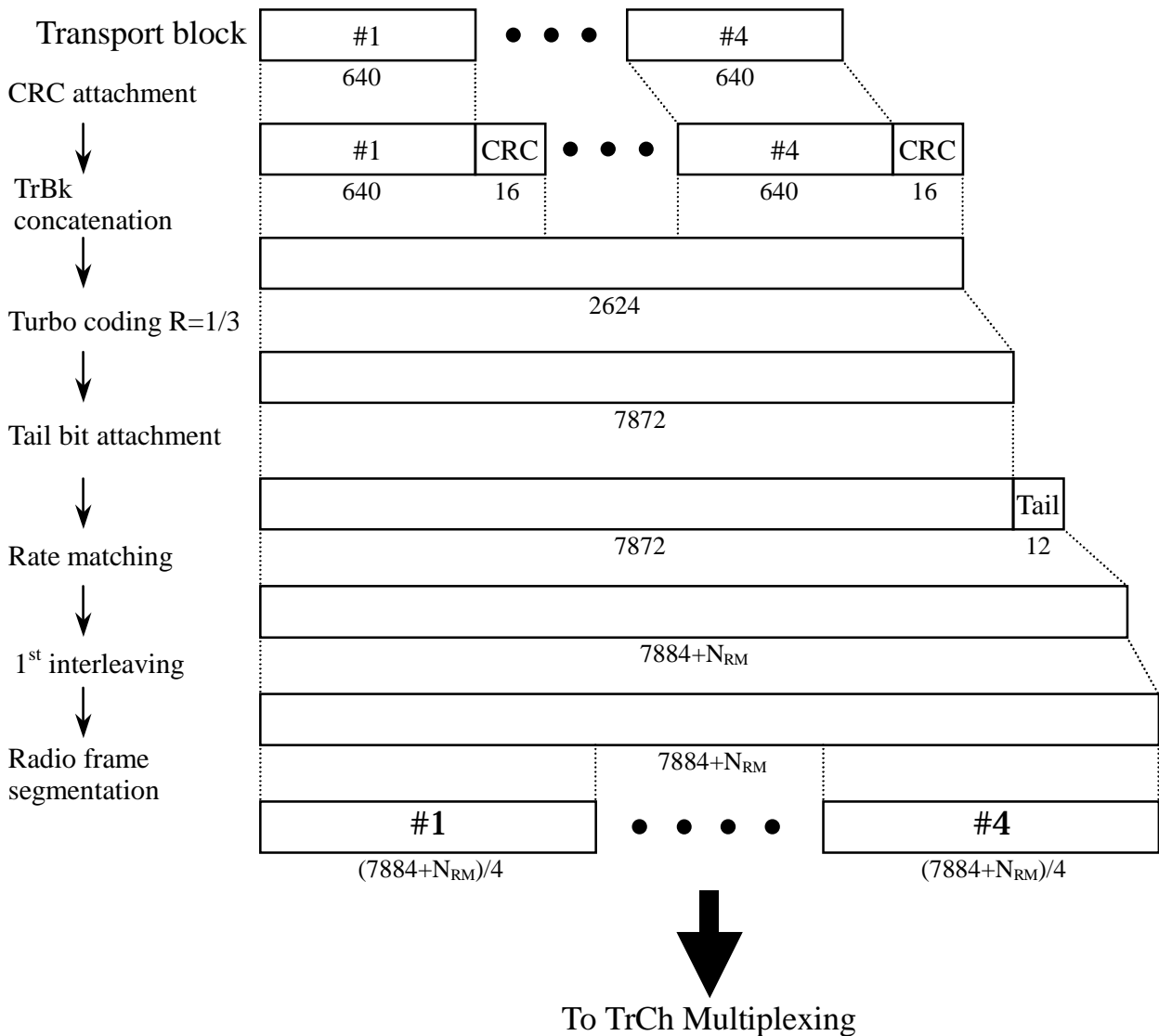


Figure 96: Channel coding and multiplexing example for 64 kbps data

4.1.1.3.2 TrCh multiplexing -> Physical channel mapping

4.1.1.3.2.1 Example for Stand-alone mapping of 4.13.4 kbps data

NOTE: This example can be applied to Stand-alone mapping of DCCH.

Table 97 shows example of physical channel parameters for stand-alone mapping of 4.13.4 kbps data.

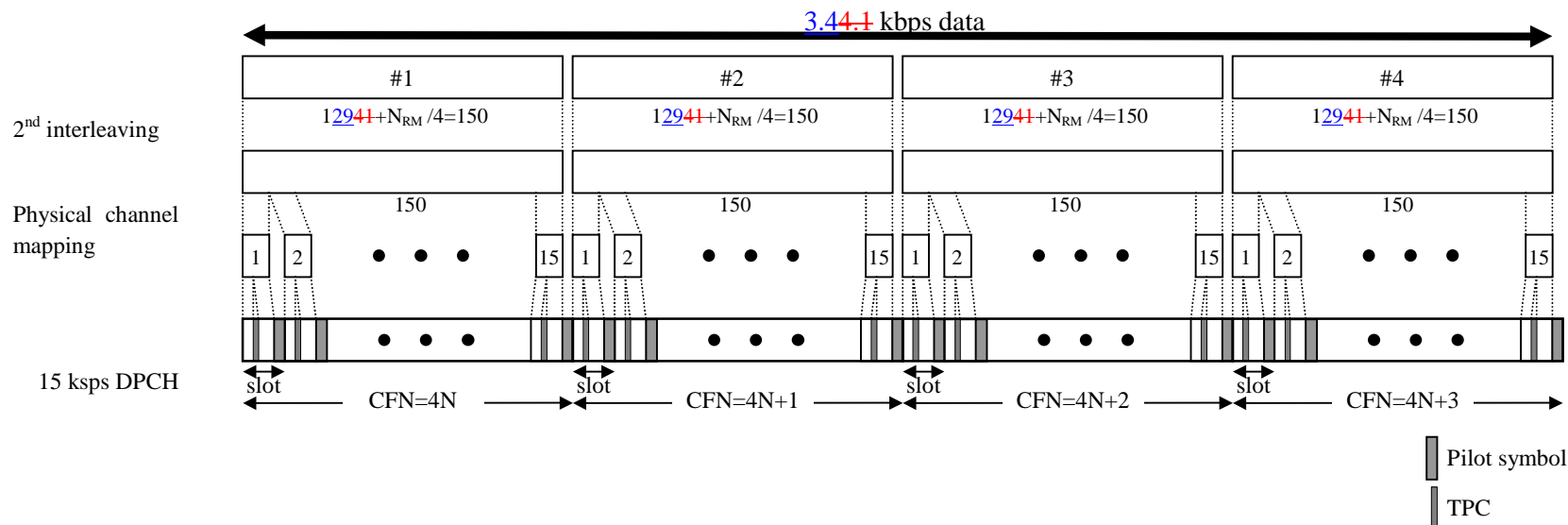


Figure 107: Channel coding and multiplexing example for stand-alone mapping of 4.13.4 kbps data

Table 7

Table 9: Physical channel parameters for stand-alone mapping of 4.13.4 kbps data

Symbol rate (kps)	N _{pilot} (bits)	N _{TFCI} (bits)	N _{TPC} (bits)	N _{data1} (bits)	N _{data2} (bits)
15	8	0	2	2	8

4.1.1.3.2.2 Example for multiplexing of 12.2 kbps data and 4.13.4 kbps data

NOTE: This example can be applied to multiplexing AMR speech and DCCH.

Table 10 shows example of physical channel parameters for multiplexing of 12.2 kbps data and 4.13.4 kbps data.

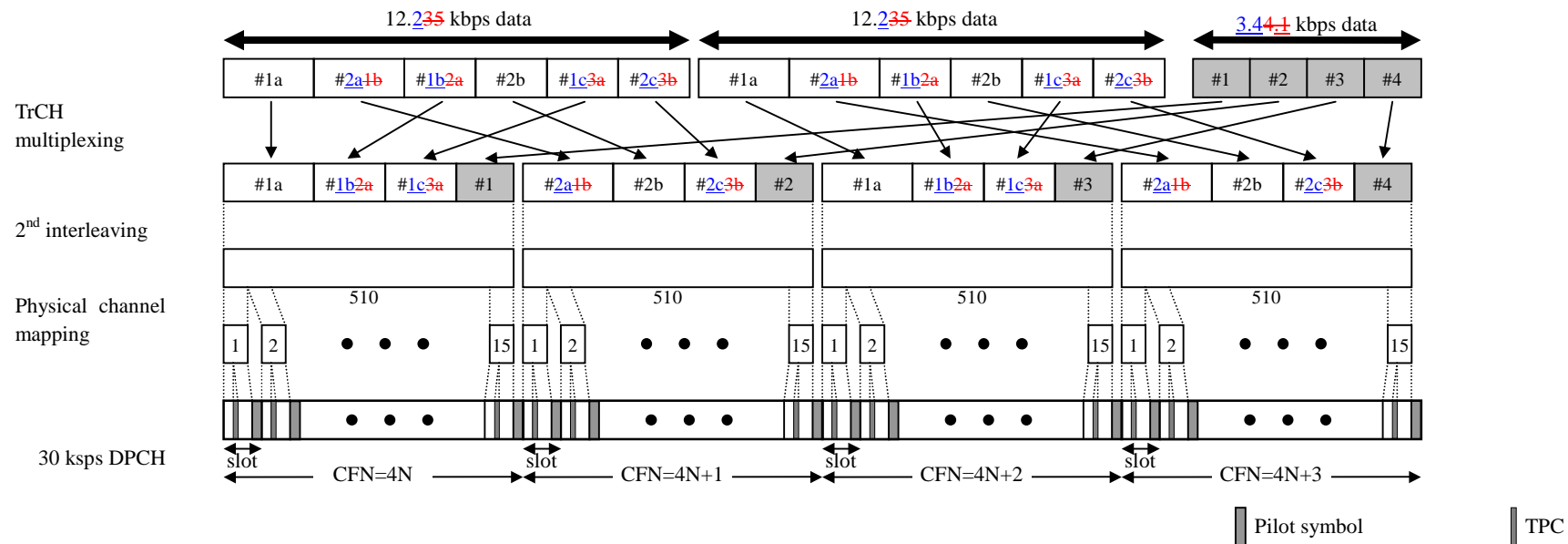


Figure 118: Channel coding and multiplexing example for multiplexing of 12.2 kbps data and 4.13.4 kbps data

Table 10: Physical channel parameters for multiplexing of 12.2 kbps data and 4.13.4 kbps data

Symbol rate (kps)	N _{pilot} (bits)	N _{TFCI} (bits)	N _{TPC} (bits)	N _{data1} (bits)	N _{data2} (bits)
30	4	0	2	6	28

4.1.1.3.2.3 Example for multiplexing of 28.8/57.6 kbps data and 3.4 kbps data

NOTE: This example can be applied to multiplexing of Modem/FAX and DCCH.

Table 11 shows example of physical channel parameters for multiplexing of 28.8/57.6 kbps data and 3.4 kbps data.

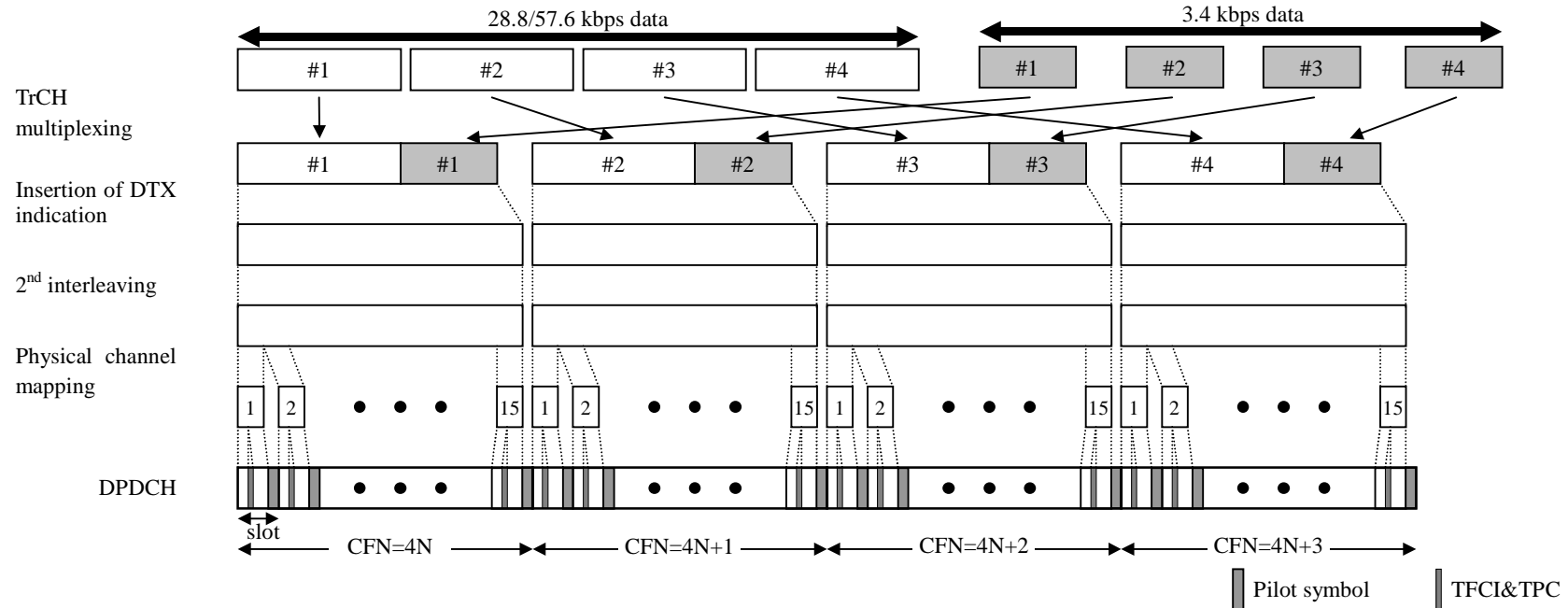


Figure 12: Channel coding and multiplexing example for multiplexing of 28.8/57.6 kbps data and 3.4 kbps data

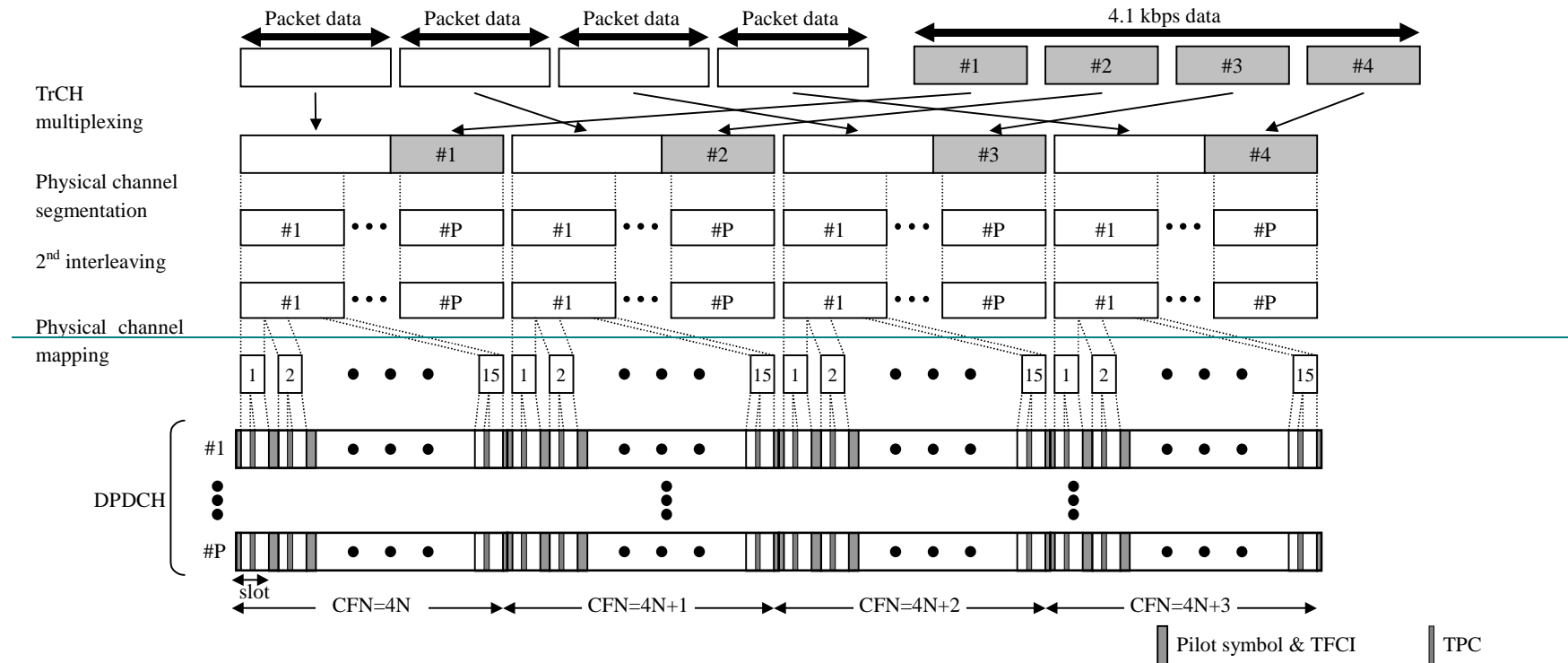
Table 11: Physical channel parameters for multiplexing of 28.8/57.6 kbps data and 3.4 kbps data

Data rate (kbps)	Symbol rate (ksps)	No. of physical channel: P	N _{pilot} (bits)	N _{TFCI} (bits)	N _{TPC} (bits)	N _{data1} (bits)	N _{data2} (bits)
28.8	60	1	8	8	4	12	48
57.6	120	1	8	8	4	28	112

4.1.1.3.2.43 Example for multiplexing of 64/128/144/384 kbps packet data and 3.44.4 kbps data

NOTE: This example can be applied to multiplexing 64/128/144/384 kbps packet data and DCCH.

Table 129 shows example of physical channel parameters for multiplexing of 64/128/144/384 kbps packet data and 4+3.4 kbps data.



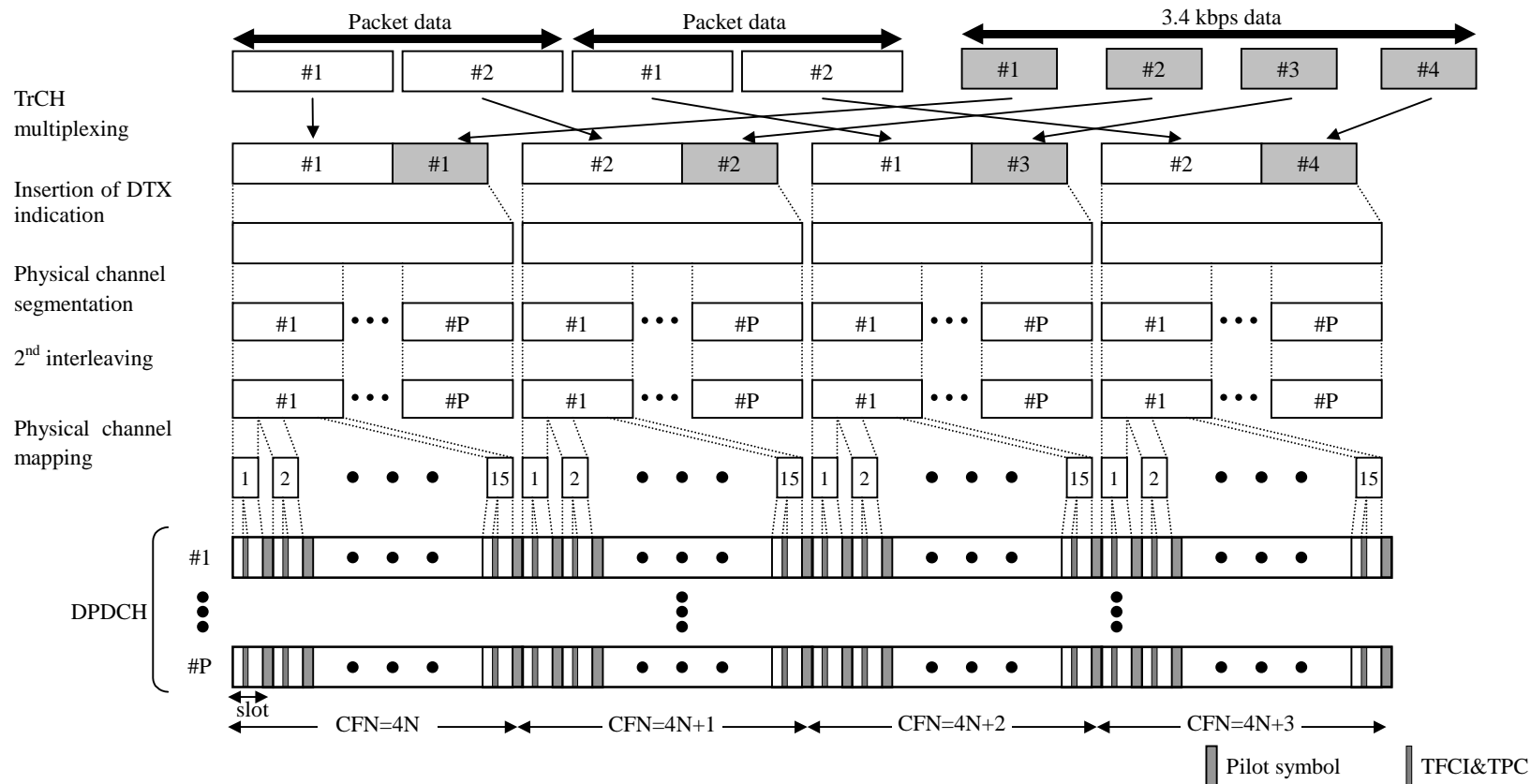


Figure 13-9: Channel coding and multiplexing example for multiplexing of 64/128/144/384 kbps packet data and 4-13.4 kbps data

Table 12: Physical channel parameters for multiplexing of 64/128/144/384 kbps packet data and 4-13.4 kbps data

Data rate (kbps)	Symbol rate (ksps)	No. of physical channel: P	N_{pilot} (bits)	N_{TFCI} (bits)	N_{TPC} (bits)	N_{data1} (bits)	N_{data2} (bits)
64	120	1	8	8	4	284	11256
128	240	1	16	8	8	5648	232240
144	240	1	16	8	8	56	232
384	240	3	16	8	8	5648	232240
	480	1	16	8	8	120	488

4.1.1.3.2.54 Example for multiplexing of 64 kbps data and ~~4.43.4~~ kbps data

NOTE: This example can be applied to multiplexing ISDNs data and DCCH.

Table ~~130~~ shows example of physical channel parameters for multiplexing of 64 kbps data and ~~4.43.4~~ kbps data.

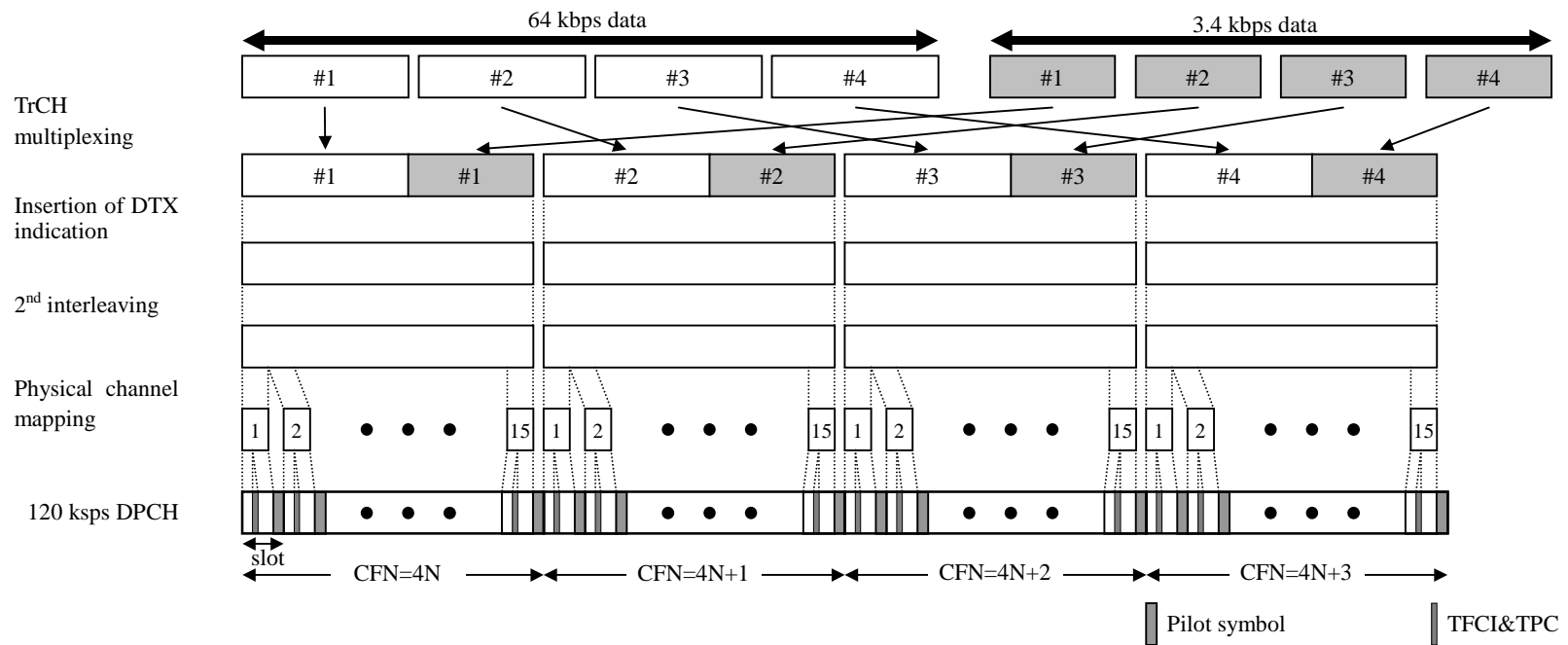
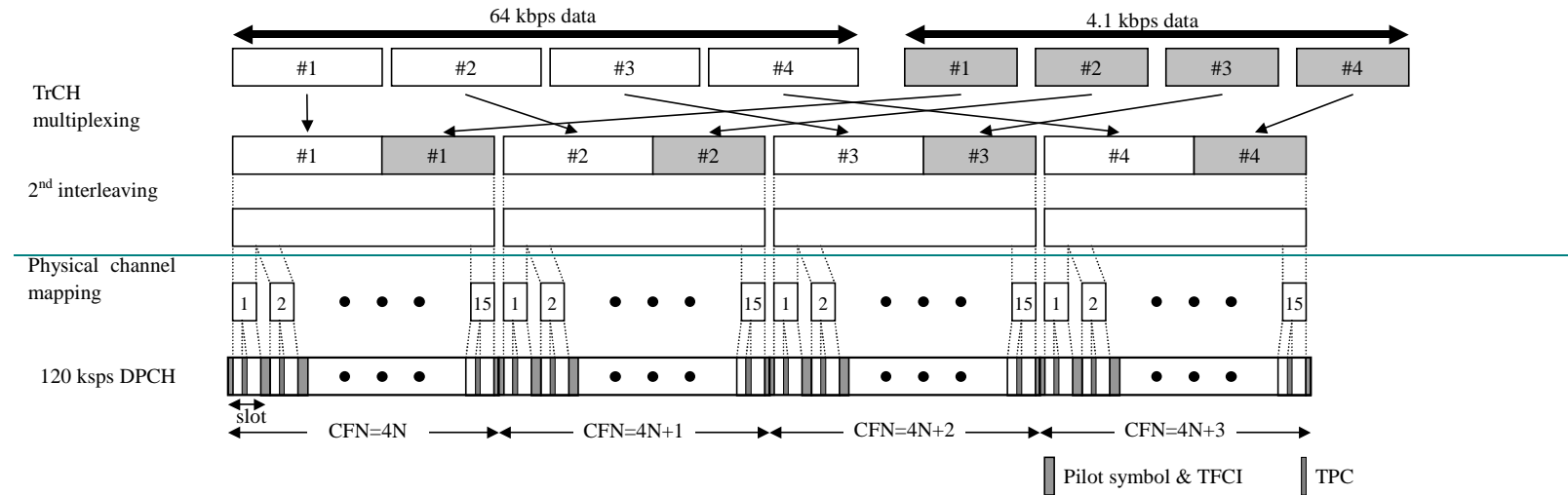


Figure 140: Channel coding and multiplexing example for multiplexing of 64 kbps data and 4.43.4 kbps data

Table 13: Physical channel parameters for multiplexing of 64 kbps data and 4.43.4 kbps data

Symbol rate (ksps)	No. of physical channel	N _{pilot} (bits)	N _{TFC1} (bits)	N _{TPC} (bits)	N _{data1} (bits)	N _{data2} (bits)
120	1	8	8*	4	280	11220

4.1.1.3.2.6 Example for multiplexing of 12.2 kbps data, 64/128/144/384 kbps packet data and 3.4 kbps data

NOTE: This example is corresponding to multiplexing of AMR speech, 64/128/144/384 kbps packet and DCCH.

Table 14 shows example of physical channel parameters for multiplexing of 12.2 kbps data, 64/128/144/384 kbps packet data and 3.4 kbps data.

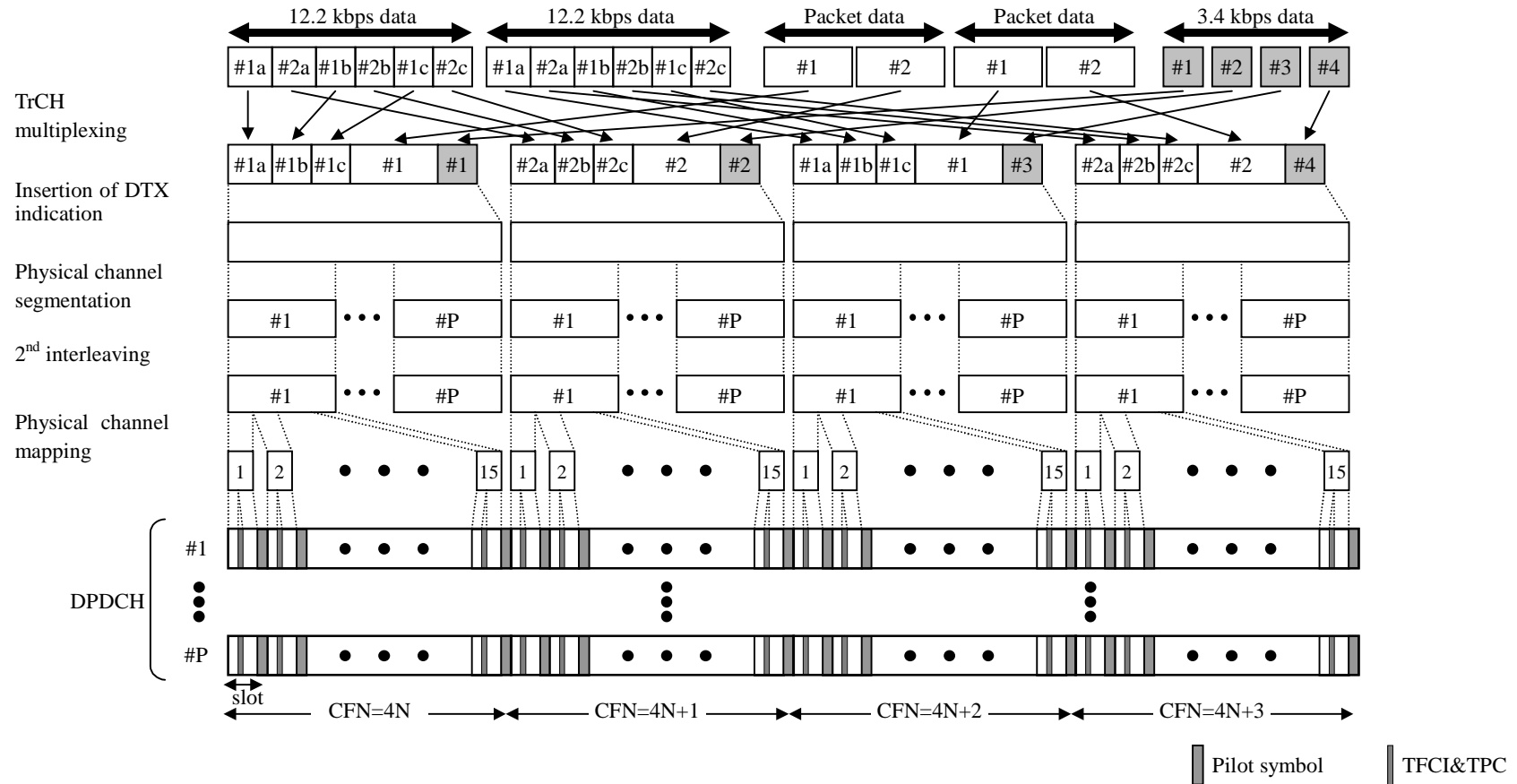


Figure 15: Channel coding and multiplexing example for multiplexing of 12.2 kbps data, 64/128/144/384 kbps packet data and 3.4 kbps data

Table 14: Physical channel parameters for multiplexing of 12.2 kbps data, 64/128/144/384 kbps packet data and 3.4 kbps data

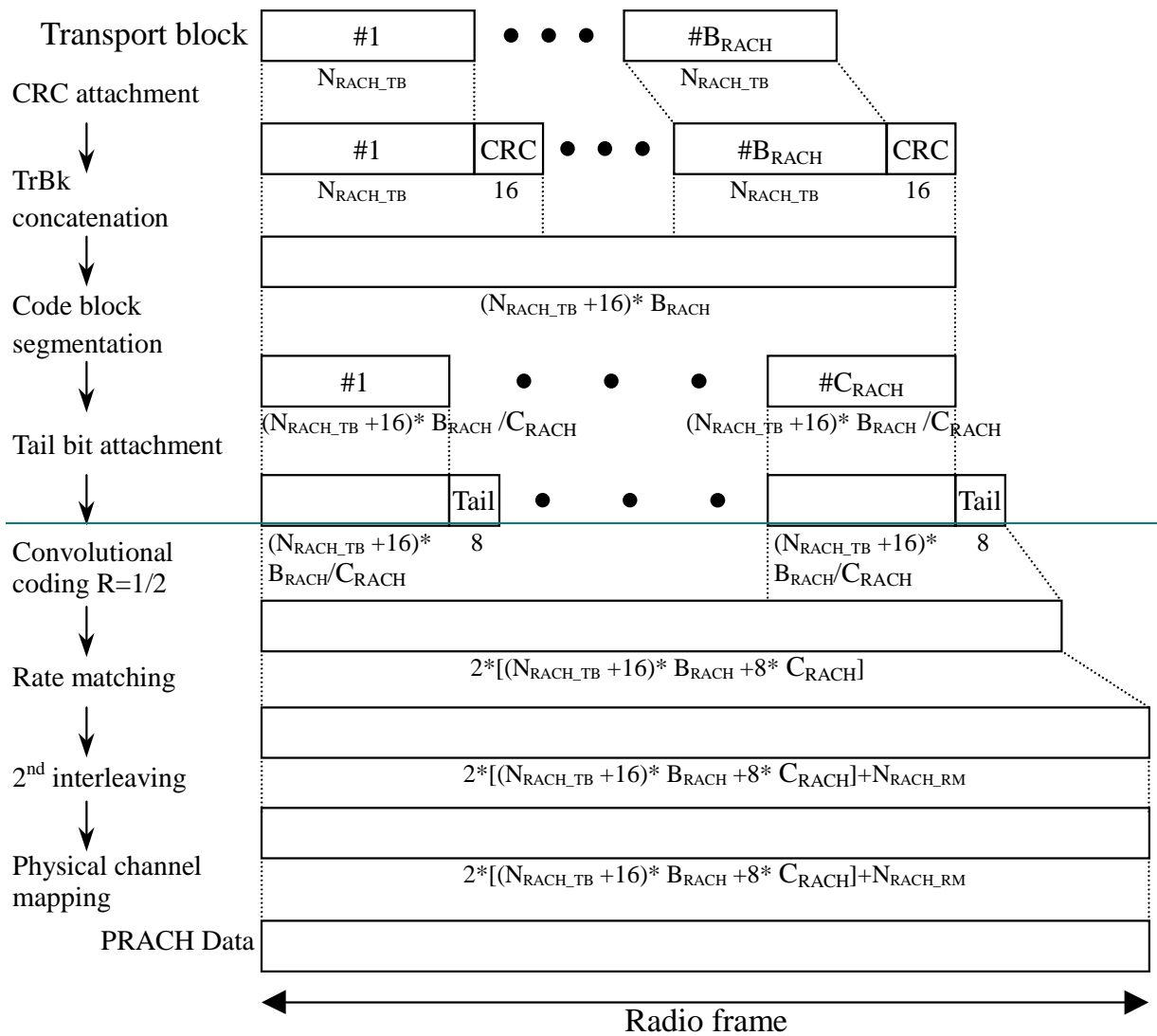
Data rate (kbps)	Symbol rate (ksps)	No. of physical channel: P	N_{pilot} (bits)	N_{TFCI} (bits)	N_{TPC} (bits)	N_{data1} (bits)	N_{data2} (bits)
64	120	1	8	8	4	28	112
128	240	1	16	8	8	56	232
144	240	1	16	8	8	56	232
384	240	3	16	8	8	56	232
	480	1	16	8	8	120	488

4.1.2 Uplink

4.1.2.1 Example for RACH

Table 15: Parameter examples for RACH

Transport block size	$N_{RACH} = 168$ or 360 bits
CRC	16 bits
Coding	CC, coding rate = $1/2$
TTI	10 ms
Minimum spreading factor	32



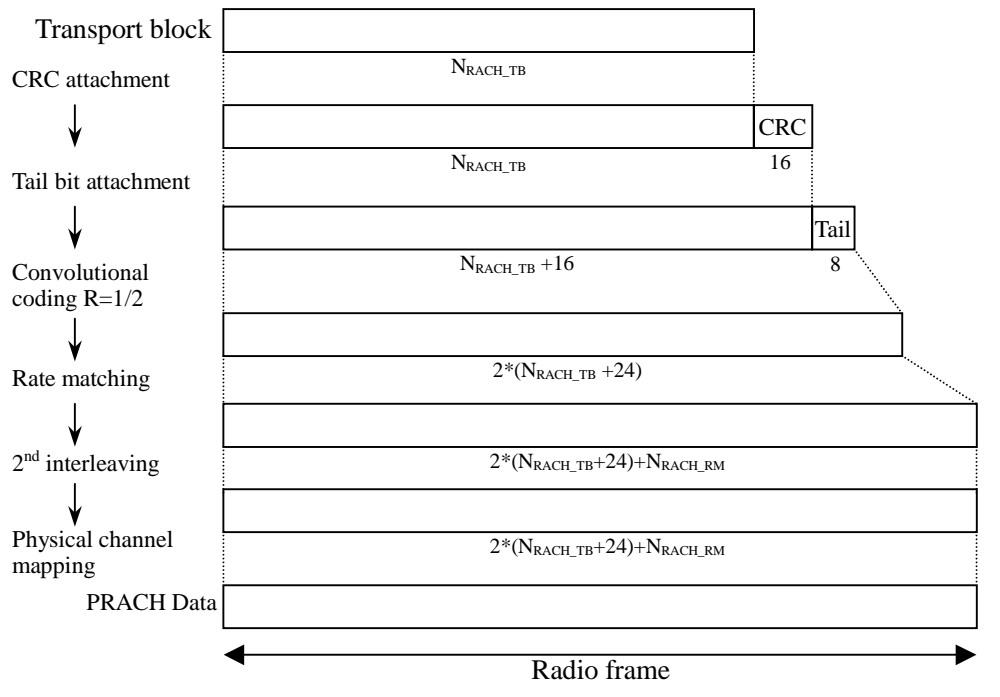


Figure 164: Channel coding and multiplexing example for PRACH

4.1.2.2 Example for DCH

4.1.2.2.1 DCH -> Radio frame segmentation

4.1.2.2.1.1 Example for 4.13.4 kbps data

NOTE: This example can be applied to DCCH.

NOTE: In this example, it is assumed that maximum data rate of RLC payload is 3.4 kbps, and that MAC and RLC overhead in a transport block is 12 bits.

Table 16: Parameter examples for 4.13.4 kbps data

Transport block size	14864 bits
Transport block set size	0..14864 bits
CRC	16 bits
Coding	CC, coding rate = 1/3
TTI	40 ms

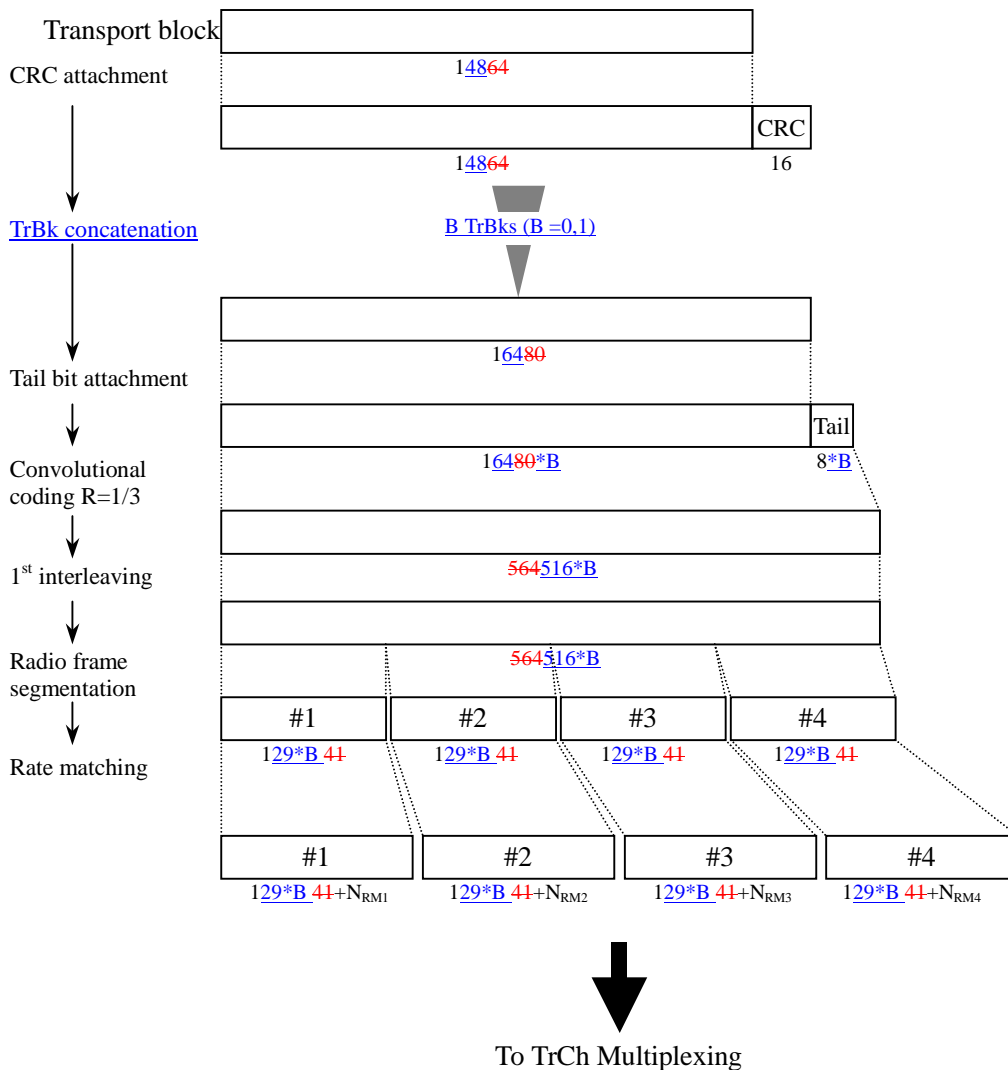


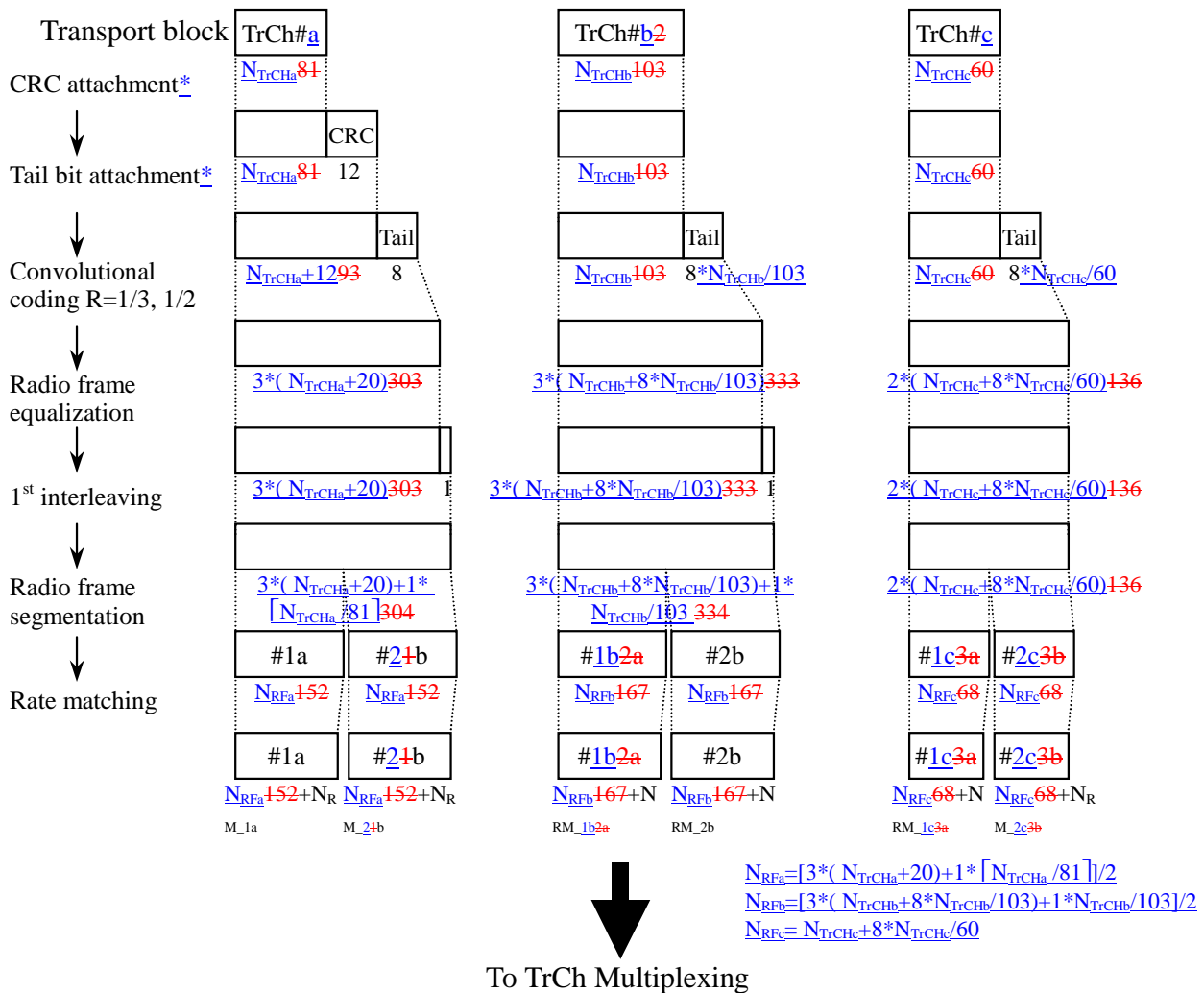
Figure 172: Channel coding and multiplexing example for 4.13.4 kbps data

4.1.2.2.1.2 Example for 12.2 kbps data

NOTE: This example can be applied to AMR speech.

Table 17: Parameter examples for 12.2 kbps data

The number of TrChs	3	
Transport block size	TrCH#a	$N_{TrCHa}=0, 39 \text{ or } 81, 103, 60, \text{ and } \text{bits}$
	TrCH#b	$N_{TrCHb}=0 \text{ or } 103 \text{ bits}$
	TrCH#c	$N_{TrCHc}=0 \text{ or } 60 \text{ bits}$
TFCS	#1	$N_{TrCHa}=81, N_{TrCHb}=103, N_{TrCHc}=60 \text{ bits}$
	#2	$N_{TrCHa}=39, N_{TrCHb}=0, N_{TrCHc}=0 \text{ bits}$
	#3	$N_{TrCHa}=0, N_{TrCHb}=0, N_{TrCHc}=0 \text{ bits}$
CRC	12 bits (attached only to TrCh#a)	
CRC parity bit attachment for 0 bit transport block	Applied only to TrCH#a	
Coding	CC, coding rate = 1/3 for TrCh#a, b coding rate = 1/2 for TrCh#c	
TTI	20 ms	



* CRC and tail bits for TrCH#a is attached even if $N_{TrCHa}=0$ bits since CRC parity bit attachment for 0 bit transport block is applied.

Figure 183: Channel coding and multiplexing example for 12.2 kbps data

4.1.2.2.1.3 Example for 28.8/57.6 kbps data

NOTE: This example can be applied to Modem or FAX.

Table 18: Parameters for 28.8/57.6 kbps packet data

The number of TrChs		1
Transport block size		576 bits
Transport block	28.8 kbps	$576 \cdot B$ bits ($B = 0, 1, 2$)
	57.6 kbps	$576 \cdot B$ bits ($B = 0, 1, 2, 3, 4$)
CRC		16 bits
Coding		Turbo coding, coding rate = 1/3
TTI		40 ms

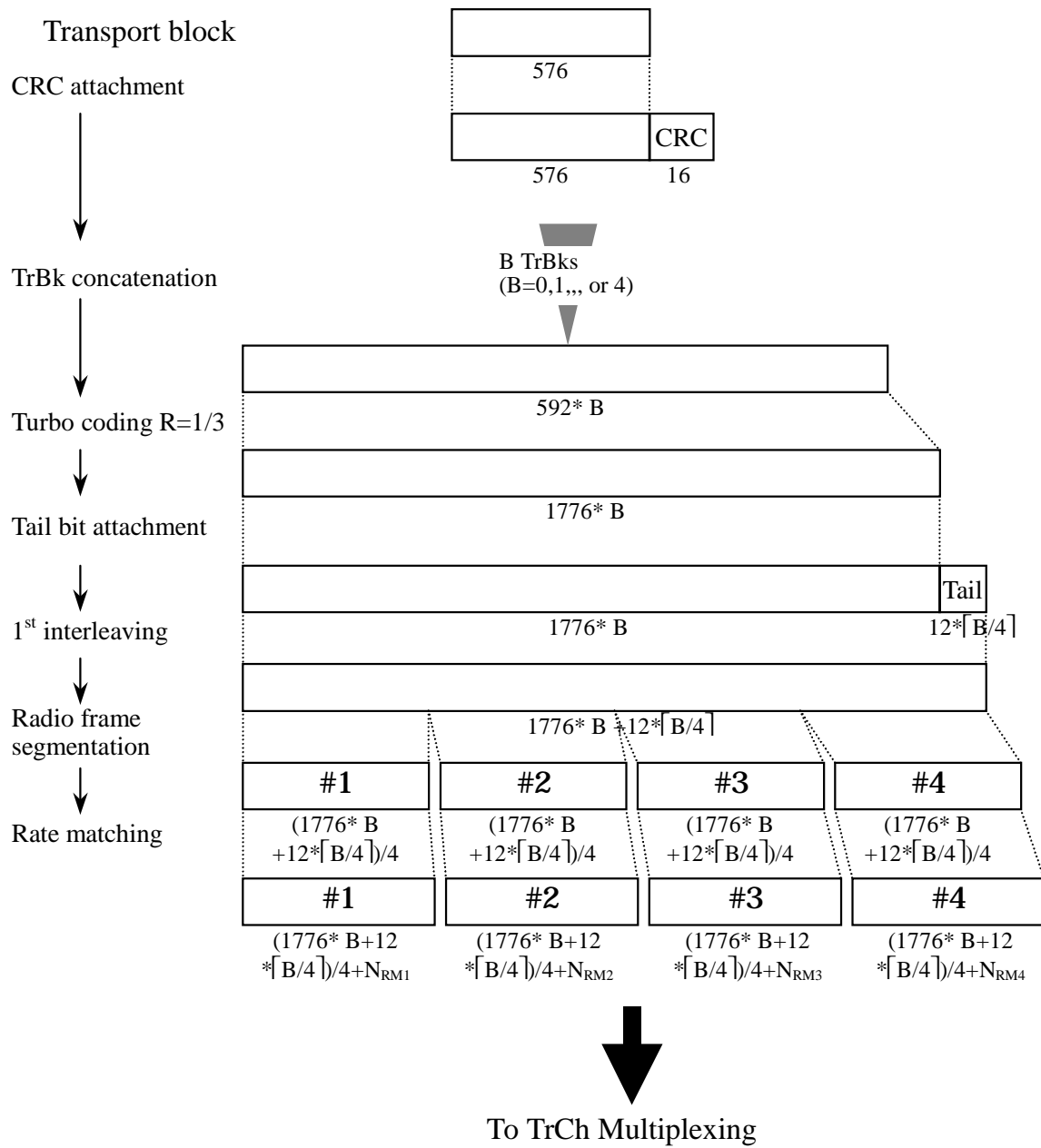


Figure 19: Channel coding and multiplexing example for 64/128/144 kbps packet data

4.1.2.2.1.43 Example for 64/128/144384 kbps packet data

NOTE: In this example, it is assumed that maximum data rate of RLC payload is 64/128/144 kbps, and MAC and RLC overhead in a transport block is 16 bits.

Table 19: Parameters for 64/128/144384 kbps packet data

The number of TrChs	1	
Transport block size	336640 bits	
Transport block size	64 kbps	336640*B bits (B = 0, 1, 2, 4)
	128 kbps	336640*B bits (B = 0, 1, 2, 4, 8)
	144384 kbps	336640*B bits (B = 0, 1, 2, 4, 8, ..., 96)
CRC	16 bits	
Coding	Turbo coding, coding rate = 1/3	
TTI	420 ms	

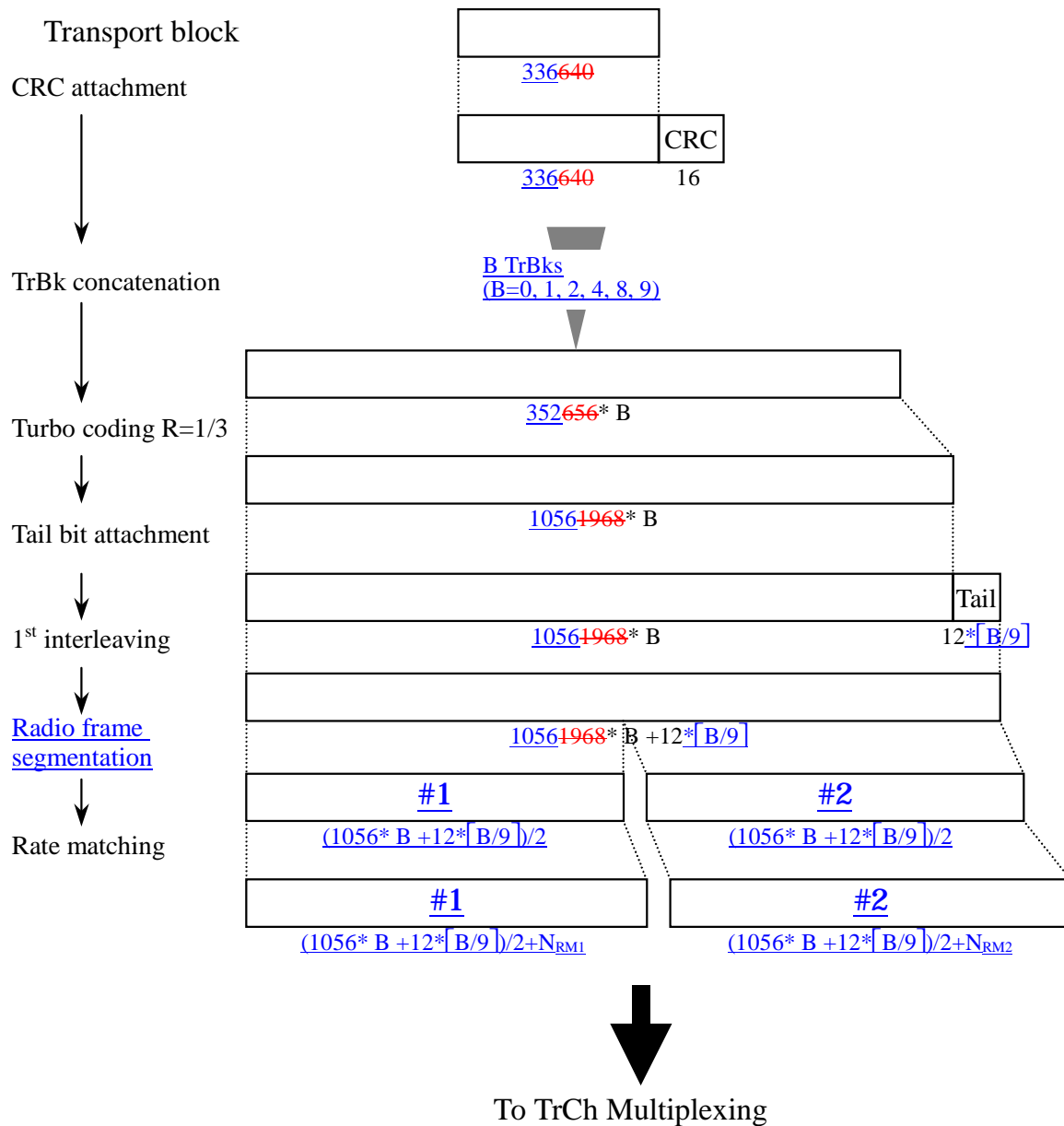


Figure 2044: Channel coding and multiplexing example for 64/128/144384 kbps packet data

4.1.2.2.1.4 Example for 384 kbps packet data

NOTE: In this example, it is assumed that maximum data rate of RLC payload is 384kbps, and MAC and RLC overhead in a transport block is 16 bits.

Table 20: Parameters for 384 kbps packet data

The number of TrChs	1
Transport block size	336 bits
Transport block Set size	384 kbps
CRC	16 bits
Coding	Turbo coding, coding rate = 1/3
TTI	20 ms

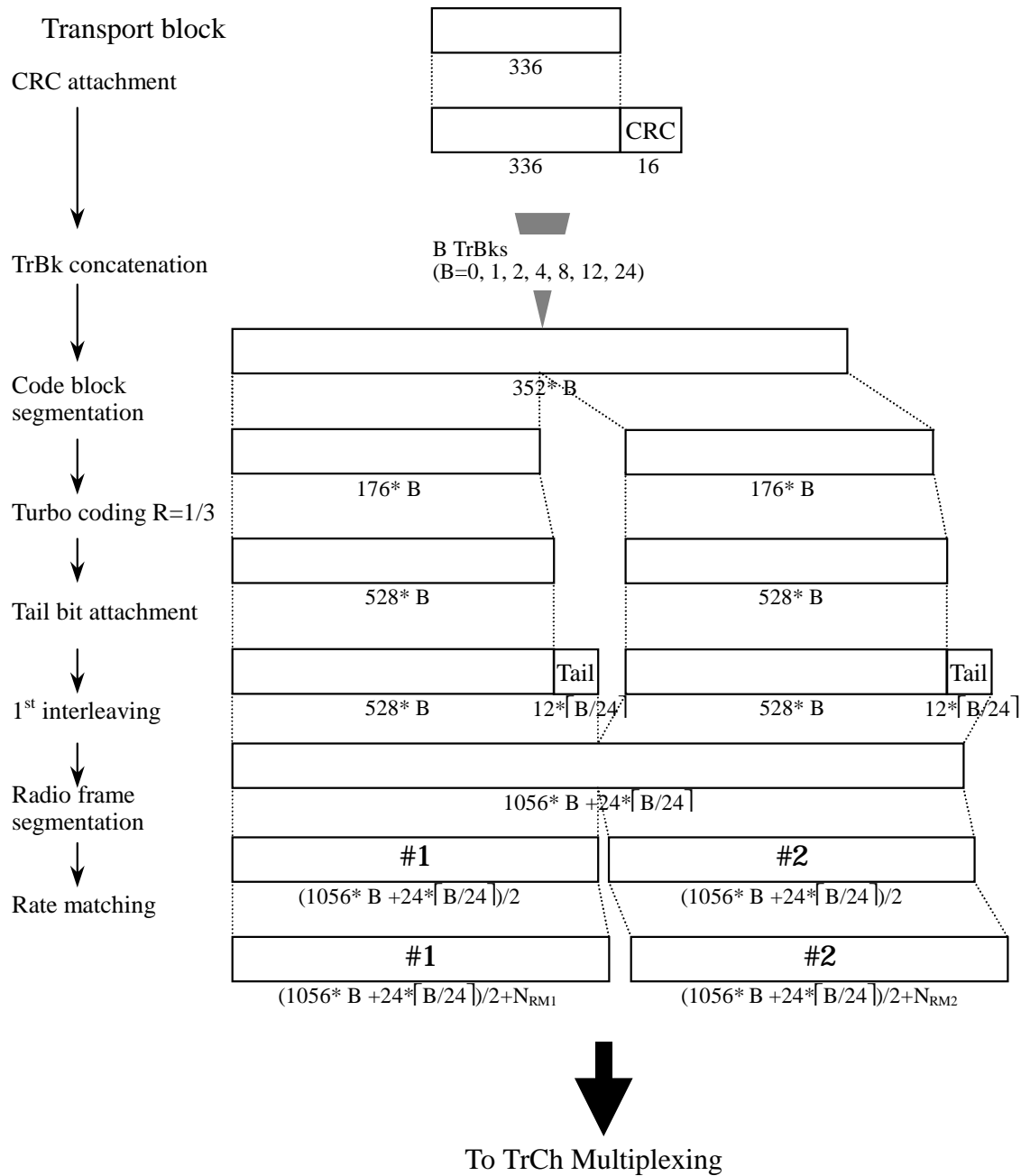


Figure 21: Channel coding and multiplexing example for 384 kbps packet data

4.1.2.2.1.54 Example for 64 kbps data

NOTE: This example can be applied to ISDN service.

Table 21: Parameters for 64 kbps data

The number of TrChs	1
Transport block size	640 bits
Transport block set size	4*640 bits
CRC	16 bits
Coding	Turbo coding, coding rate = 1/3
TTI	40 ms

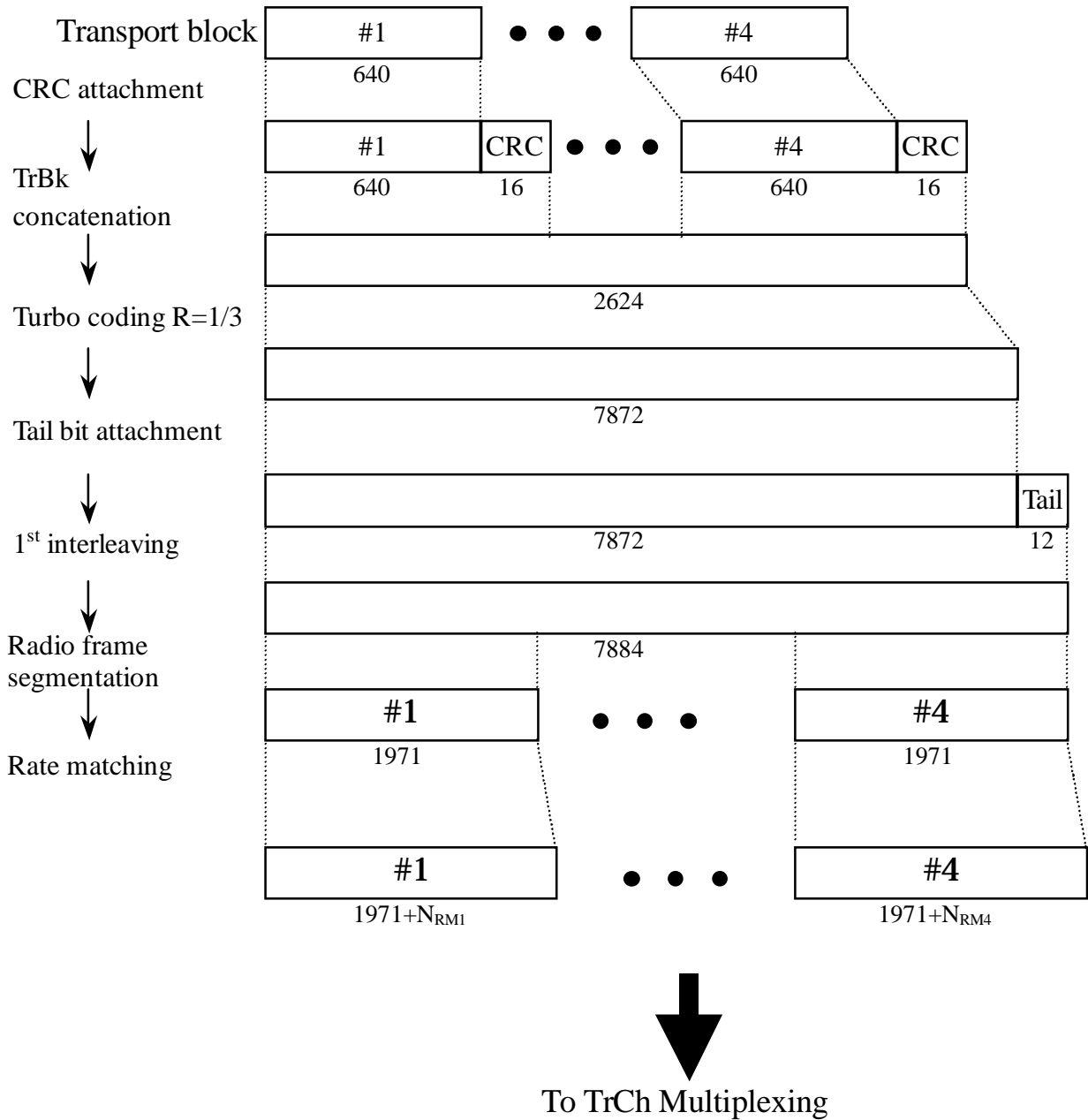


Figure 2245: Channel coding and multiplexing example for 64 kbps data

4.1.2.2.2 TrCH multiplexing -> Physical channel mapping

4.1.2.2.2.1 Example for Stand-alone mapping of 4.13.4 kbps data

NOTE: This example can be applied to Stand-alone mapping of DCCH.

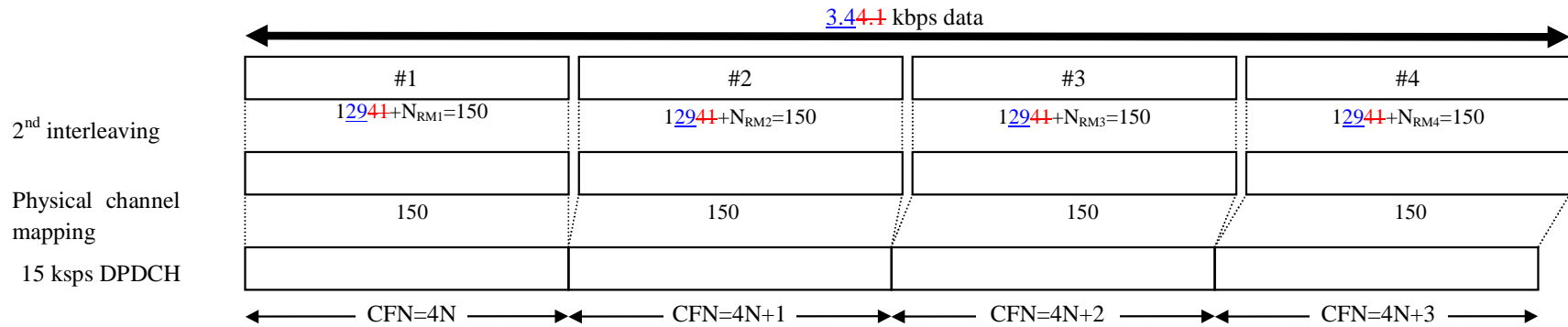


Figure 2316: Channel coding and multiplexing example for stand-alone mapping of 4.13.4 kbps data

4.1.2.2.2 Example for multiplexing of 12.2 kbps data and 4.4 kbps data

NOTE: This example can be applied to multiplexing AMR speech and DCCH.

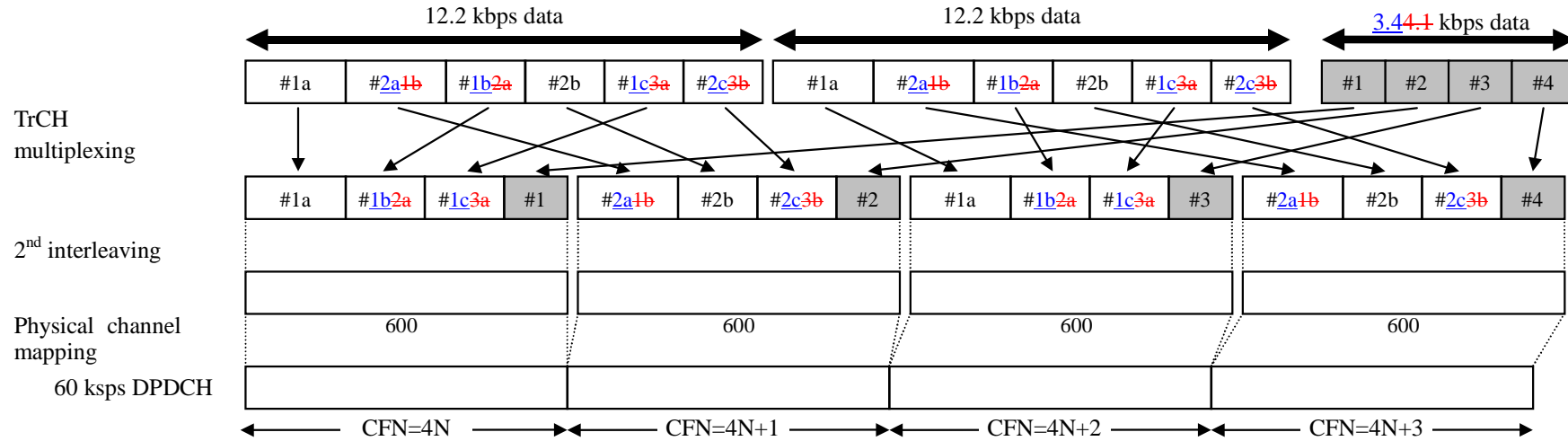


Figure 2417: Channel coding and multiplexing example for multiplexing of 12.2 kbps data and 4.4 kbps data

4.1.2.2.2.3 Example for multiplexing of 28.8/57.6 kbps data and 3.4 kbps data

NOTE: This example can be applied to multiplexing Modem/FAX and DCCH.

Table 22 shows example of physical channel parameters for multiplexing of 28.8/57.6 kbps data and 3.4 kbps data.

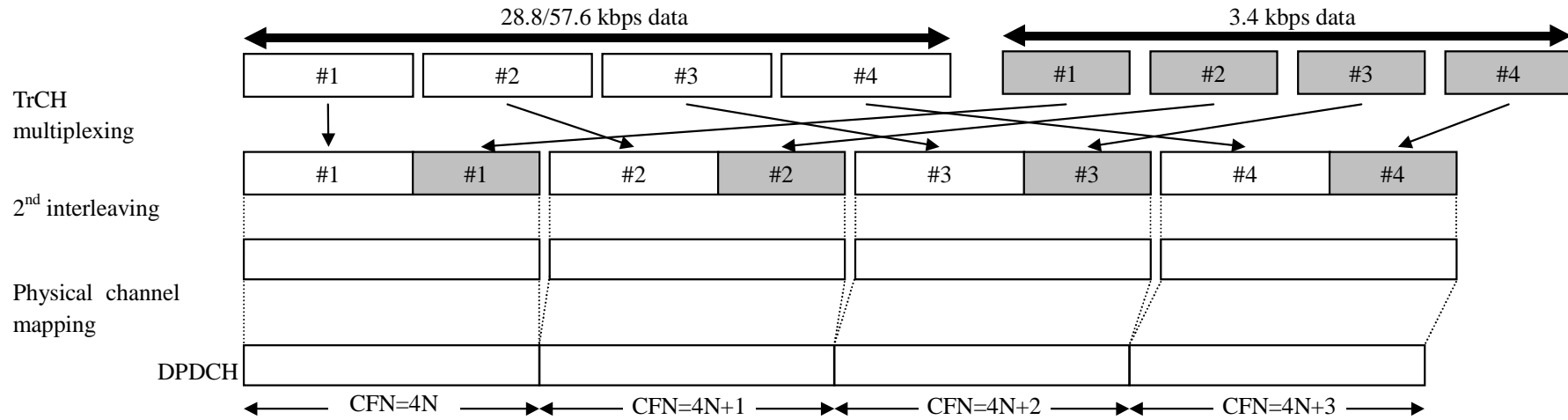


Figure 25: Channel coding and multiplexing example for multiplexing of 28.8/57.6 kbps packet data and 3.4 kbps data

Table 22: Physical channel parameters for multiplexing of 28.8/57.6 kbps packet data and 3.4 kbps data

Data rate (kbps)	Maximum symbol rate (ksps)	No. of physical channel
28.8	120	1
57.6	240	1

4.1.2.2.2.43 Example for multiplexing of 64/128/144/384 kbps packet data and 3.44.4 kbps data

NOTE: This example can be applied to multiplexing 64/128/144/384 kbps packet data and DCCH.

Table 23+5 shows example of physical channel parameters for multiplexing of 64/128/144/384 kbps packet data and 4.13.4 kbps data.

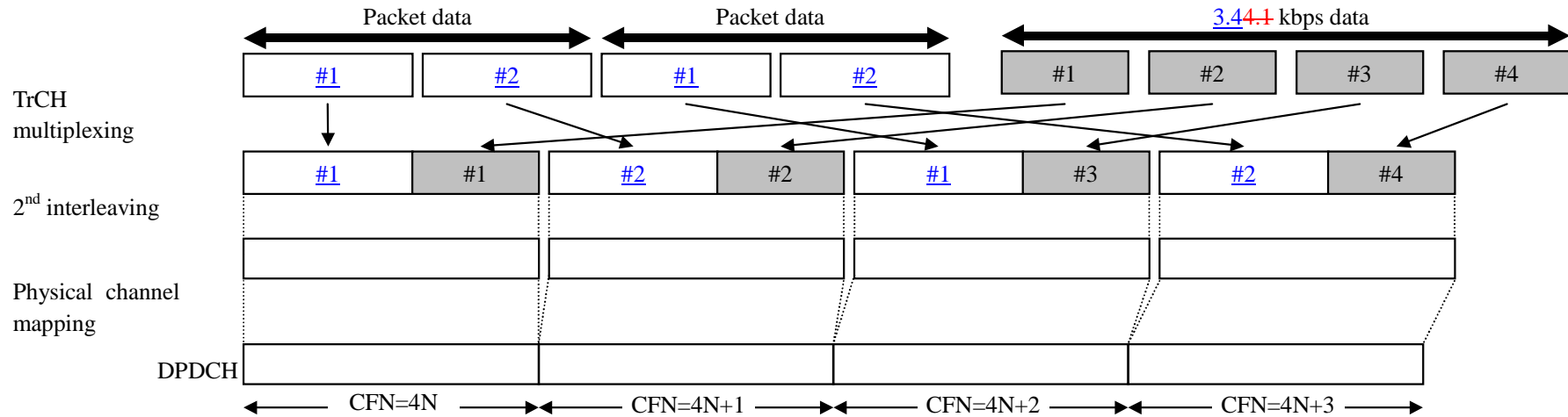


Figure 2618: Channel coding and multiplexing example for multiplexing of 64/128/144/384 kbps packet data and 4.13.4 kbps data

Table 23: Physical channel parameters for multiplexing of 64/128/144/384 kbps packet data and 4.13.4 kbps data

Data rate (kbps)	Maximum Symbol rate (ksps)	No. of physical channel
64	240	1
128	480	1
144	480	1
384	960	1

4.1.2.2.2.54 Example for multiplexing of 64 kbps data and 4.13.4 kbps data

NOTE: This example can be applied to multiplexing ISDNs data and DCCH.

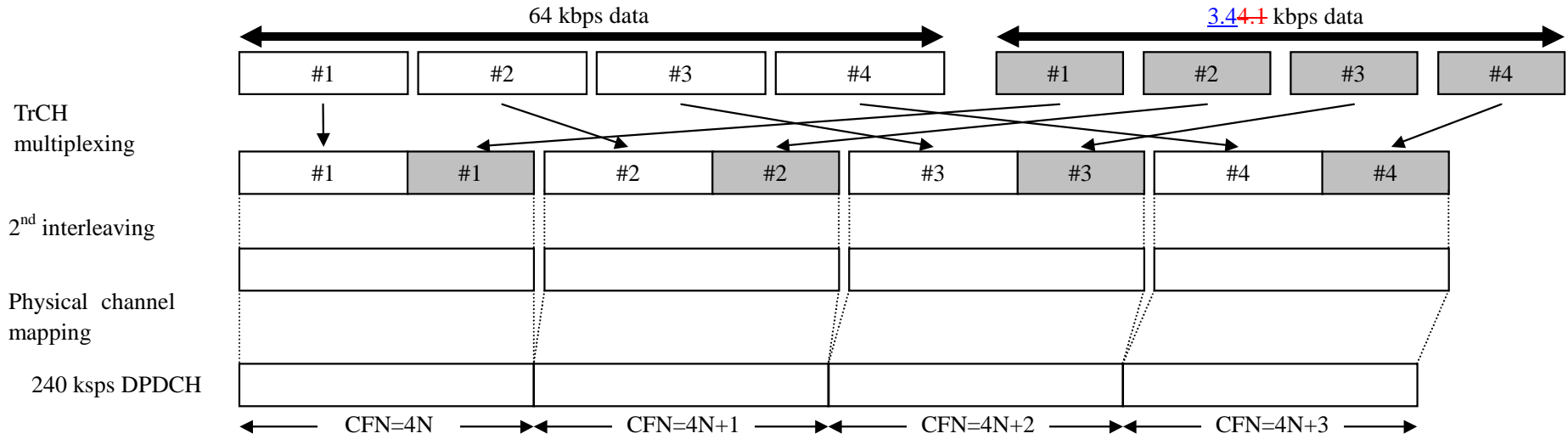


Figure 2749: Channel coding and multiplexing example for multiplexing of 64 kbps data and 4.13.4 kbps data

4.1.2.2.2.6 Example for multiplexing of 12.2 kbps data, 64/128/144/384 kbps packet data and 3.4 kbps data

NOTE: This example is corresponding to multiplexing of AMR speech, 64/128/144/384 kbps packet and DCCH.

Table 24 shows example of physical channel parameters for multiplexing of 12.2 kbps data, 64/128/144/384 kbps packet data and 3.4 kbps data.

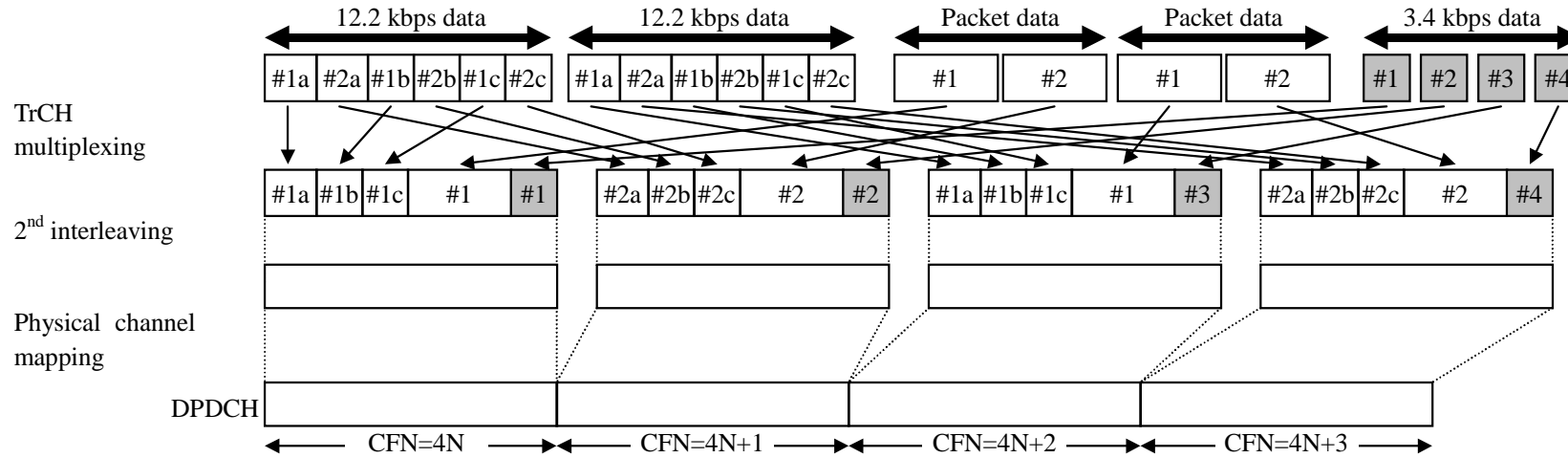


Figure 28: Channel coding and multiplexing example for multiplexing of 12.2 kbps data, 64/128/144/384 kbps packet data and 3.4 kbps data

Table 24: Physical channel parameters for multiplexing of 12.2 kbps data, 64/128/144/384 kbps packet data and 3.4 kbps data

Data rate (kbps)	Maximum symbol rate (ksps)	No. of physical channel
64	240	1
128	480	1
144	480	1
384	960	1