TSG-RAN WG 1 meeting No. 14
July 03 – 07, Oulu, Finland

TSGR1-00-0908

Source: Siemens AG

Title: TDD related changes for TR25.944

Document for: Approval

Introduction

In RAN#7, it was endorsed to change TR25.944 to align with "Typical radio parameter sets" from ISG (ISG document). According to the endorsement and the changes, made in the FDD part of the document, this document clarifies the changes in the TDD part of the TR. Error corrections are clarified in this document, also. The detailed revisions are clarified in the CR.

Overview of the changes in the TDD Part of the TR25.944

Section 4.2.1.2 Example for PCH and FACH

- Transport block size, Transport block set size, and coding are changed according to the ISG document.
- Number of TrBks for transport block concatenation is clarified in the figure.
- Errors concerning the number of bits in case of no transport block are corrected.
- Stand-alone mapping of PCH/FACH removed

Section 4.2.1.4.1.1 Example for 3.4 kbps data

- Data rate is changed to 3.4 kbps according to the ISG document.
- Transport block size and Transport block set size are changed according to the ISG document.
- Number of TrBks for transport block concatenation is clarified in the figure.

Section 4.2.1.4.1.2 Example for 12.2 kbps data

- Transport block size and Transport block set size are changed according to the ISG document.
- CRC parity bit attachment for 0 bit transport block is clarified in table 4.
- Numbers for TrCHs are changed from #1, 2, and 3 to #a, b and c. And Numbers after radio frame segmentation are changed from #1a, 1b, 2a, 2b, 3a and 3c to #1a, 2a, 1b, 2b, 1c and 2c in order to align with other figures, i.e. integer numbers after radio frame segmentation show frame number in a TTI.

Section 4.2.1.4.1.3 Example for 28.8/57.6 kbps data

- New section. This example is corresponding to streaming 28.8/57.6 kbps RABs

Section 4.2.1.4.1.4 Example for 64/128/144 kbps packet data, and Section 4.2.1.4.1.5 Example for 384 kbps packet data

- Transport block size, Transport block set size and TTI are changed according to the ISG document.
- Number of TrBks for transport block concatenation is clarified in the figure.
- 144 kbps packet data is added according to the ISG document.
- 384 kbps packet data is moved to the new section 4.2.1.4.1.5 since code block segmentation is applied only to 384 kbps packet data.
- Errors concerning the number of bits in case of no transport block are corrected.

Section 4.2.1.4.2.1 Example for Stand-alone mapping of 3.4 kbps data

- Data rate is changed to 3.4 kbps according to the ISG document.

Section 4.2.1.4.2.2 Example for multiplexing of 12.2 kbps data and 3.4 kbps data

- Data rate is changed to 3.4 kbps according to the ISG document.

Section 4.2.1.4.2.3 Example for multiplexing of 28.8/57.6 kbps data and 3.4 kbps data

- New section. This example is corresponding to multiplexing of streaming 28.8/57.6 kbps RABs and DCCH.

Section 4.2.1.4.2.4 Example for multiplexing of 64/128/144/384 kbps packet data and 3.4 kbps data

- 144 kbps packet data is added according to the ISG document.
- Data rate is changed to 3.4 kbps according to the ISG document.
- TTI for packet is changed from 10 ms to 20 ms according to the ISG document.
- N_{data1} and N_{data2} in the table are corrected.

Section 4.2.1.4.2.4 Example for multiplexing of 64 kbps data and 3.4 kbps data

- Data rate is changed to 3.4 kbps according to the ISG document.

Section 4.2.1.4.2.5 Example for multiplexing of 12.2 kbps data , 64/128/144/384 kbps packet data and 3.4 kbps data

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

Section 4.2.2.1 Example for RACH

- Table for Transport block size, CRC, etc are added according to the ISG document.
- Transport block multiplexing is deleted according to the ISG document.
- Code block segmentation is deleted according to the ISG document.

Section 4.2.2.2.2.1 Example for Stand-alone mapping of 3.4 kbps data

- Data rate is changed to 3.4 kbps according to the ISG document.

Section 4.2.2.2.2.2 Example for multiplexing of 12.2 kbps data and 3.4 kbps data

- Data rate is changed to 3.4 kbps according to the ISG document.

Section 4.2.2.2.2.3 Example for multiplexing of 28.8/57.6 kbps data and 3.4 kbps data

- New section. This example is corresponding to multiplexing of streaming 28.8/57.6 kbps RABs and DCCH.

Section 4.2.2.2.2.4 Example for multiplexing of 64/128/144/384 kbps packet data and 3.4 kbps data

- 144 kbps packet data is added according to the ISG document.
- Data rate is changed to 3.4 kbps according to the ISG document.
- TTI for packet is changed from 10 ms to 20 ms according to the ISG document.

Section 4.2.2.2.2.5 Example for multiplexing of 64 kbps data and 3.4 kbps data

- Data rate is changed to 3.4 kbps according to the ISG document.

3GPP Meeting WG1#14
Oulu, Finland, 04-07 July 2000

***Document* R1-00-908**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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

TR 25.944 **CR** **002r1** Current Version: 3.1.0

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

For submission to: RAN#9 for approval [X] strategic [ ] *(for SMG use only)*
list expected approval meeting # here ↑ for information [ ] non-strategic [ ]

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

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

Source: Siemens AG **Date:** 30.06.2000

Subject: TDD related changes for TR25.944

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	[X]
A	Corresponds to a correction in an earlier release	[ ]
B	Addition of feature	[ ]
C	Functional modification of feature	[ ]
D	Editorial modification	[ ]

Release:

Phase 2	[ ]
Release 96	[ ]
Release 97	[ ]
Release 98	[ ]
Release 99	[X]
Release 00	[ ]

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 the TDD part to align with the document from ISG.

Clauses affected: All TDD sections i.e. 4.2 and all subclauses

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

4.2 TDD mode

4.2.1 Downlink

4.2.1.1 BCH

Table 16: Parameters for BCH

Transport block size	246 bits
CRC	16 bits
Coding	CC, coding rate = 1/2
TTI	20 ms
Midamble	512 chips
Codes and time slots	SF = 16 x 1 x 1 time slot
TFCI	0 bit
TPC	0 bit

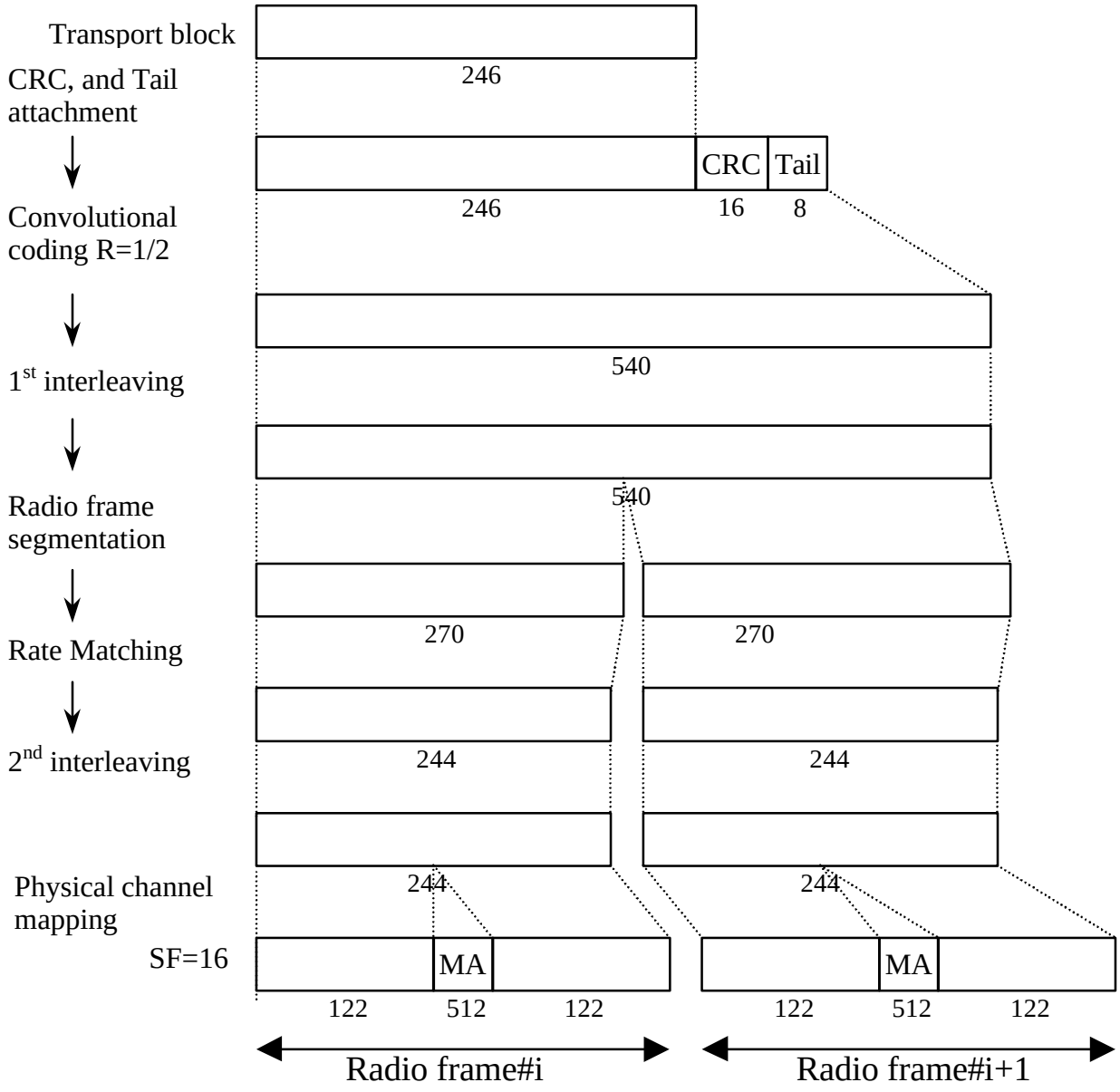
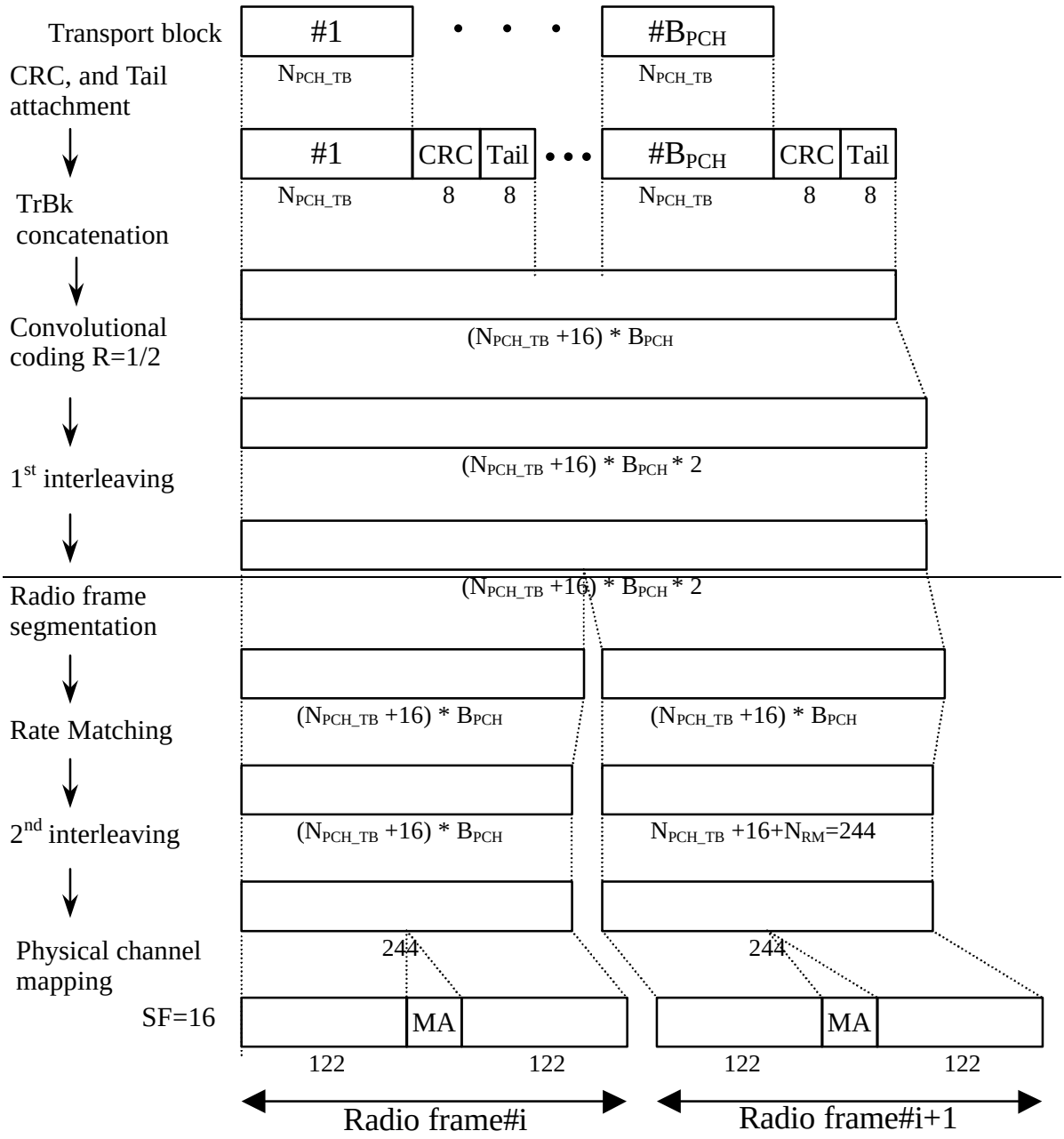


Figure 20: Channel coding for BCH

4.2.1.2 Example for PCH and FACH

Table 17: Parameters 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*B_{PCH} or 240*B_{PCH} bits (B_{PCH}=0,1)
	FACH1	360*B_{FACH1} bits (B_{FACH1}=0,1)
	FACH2	168*B_{FACH2} bits (B_{FACH2}=0,1,2,3)
~~CRC~~		~~8 bits~~
Coding	PCH, FACH2	CC, coding rate = 1/2
	FACH1	TC
TTI		~~20~~ 10 ms
Midamble		512 chips
Codes and time slots		SF = 16 x ~~1~~ 2 x 1 time slot
TFCI		~~0~~ 16 bit
TPC		0 bit


Transport block
#1
#B_PCH
N_PCH_TB
CRC, and Tail attachment
CRC
Tail
8
TrBk concatenation
Convolutional coding R=1/2
(N_PCH_TB +16) * B_PCH
1st interleaving
(N_PCH_TB +16) * B_PCH * 2
Radio frame segmentation
Rate Matching
2nd interleaving
N_PCH_TB +16+N_RM=244
Physical channel mapping
244
SF=16
MA
122
Radio frame#i
Radio frame#i+1

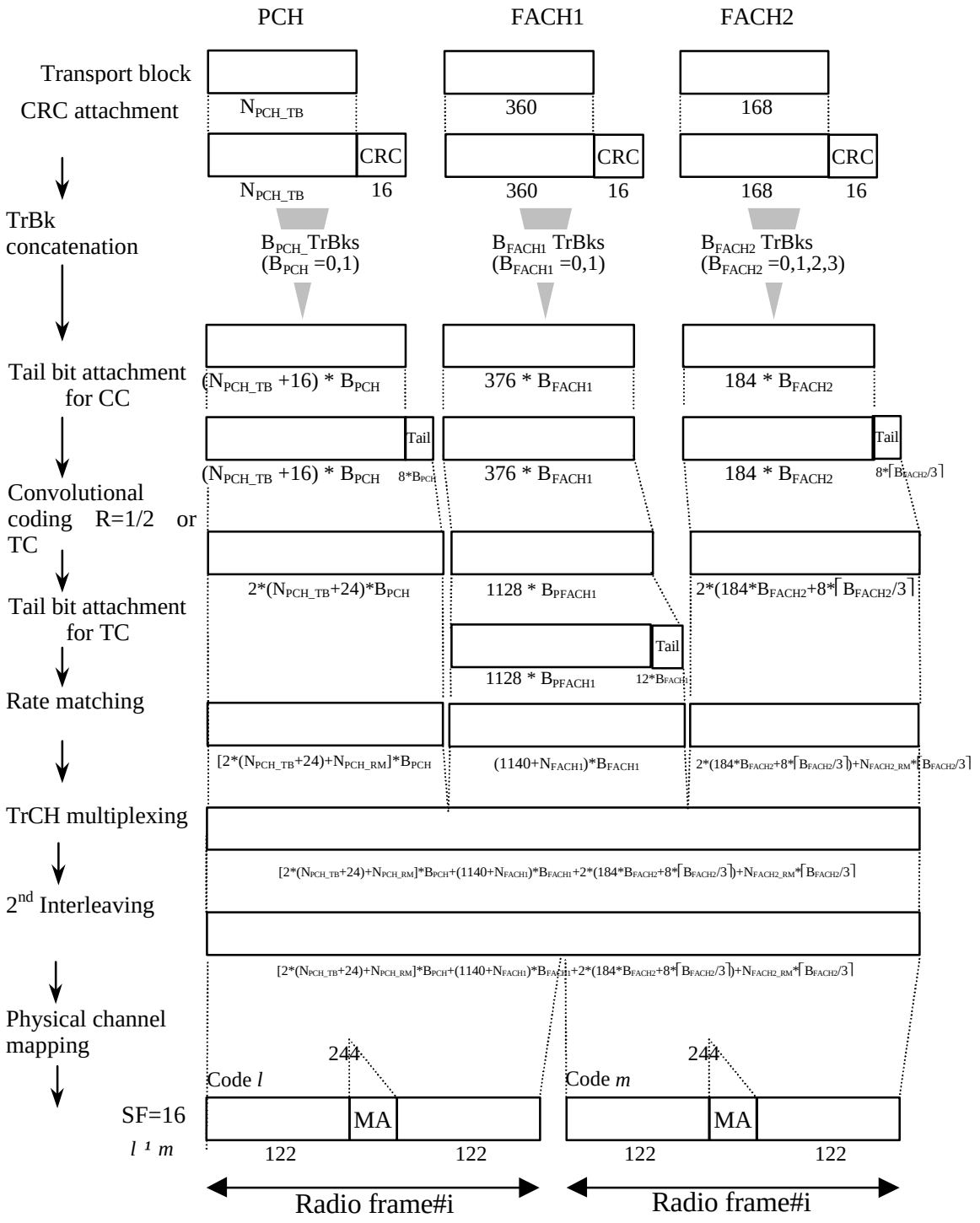


Figure 21: Channel coding and multiplexing example for PCH and FACH

4.2.1.3 Example for FACH

Table 18: Parameters for FACH

CRC	8 bits
Coding	CC, coding rate = 1/2
TTI	20 ms
Midamble	512 chips
Codes and time slots	SF = 16 x 1 x 1 time slot
TFCI	0 bit
TPC	0 bit

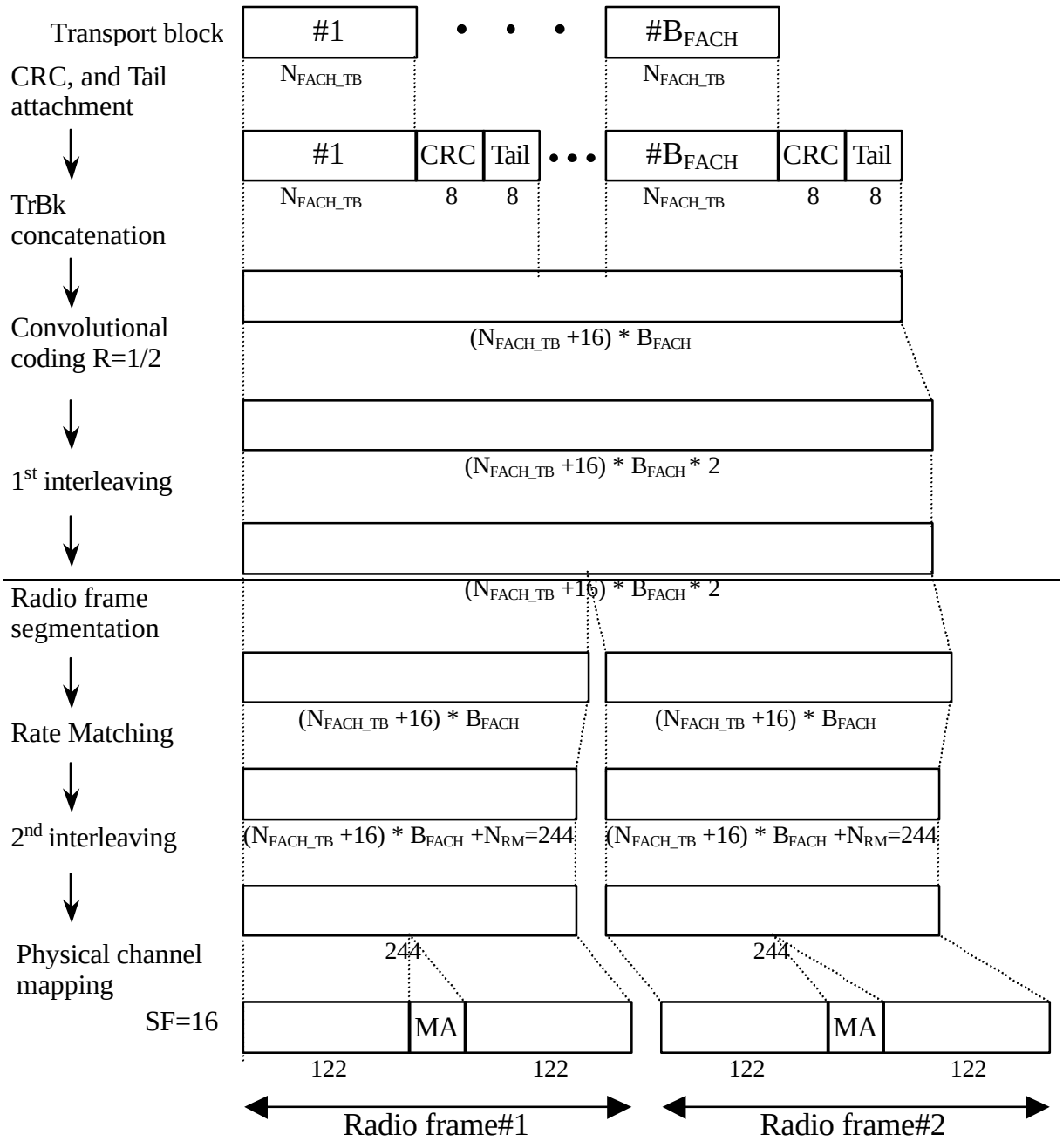


Figure 22: Channel coding and multiplexing example for FACH

4.2.1.4 Example for DCH

4.2.1.4.1 DCH-> Radio frame segmentation

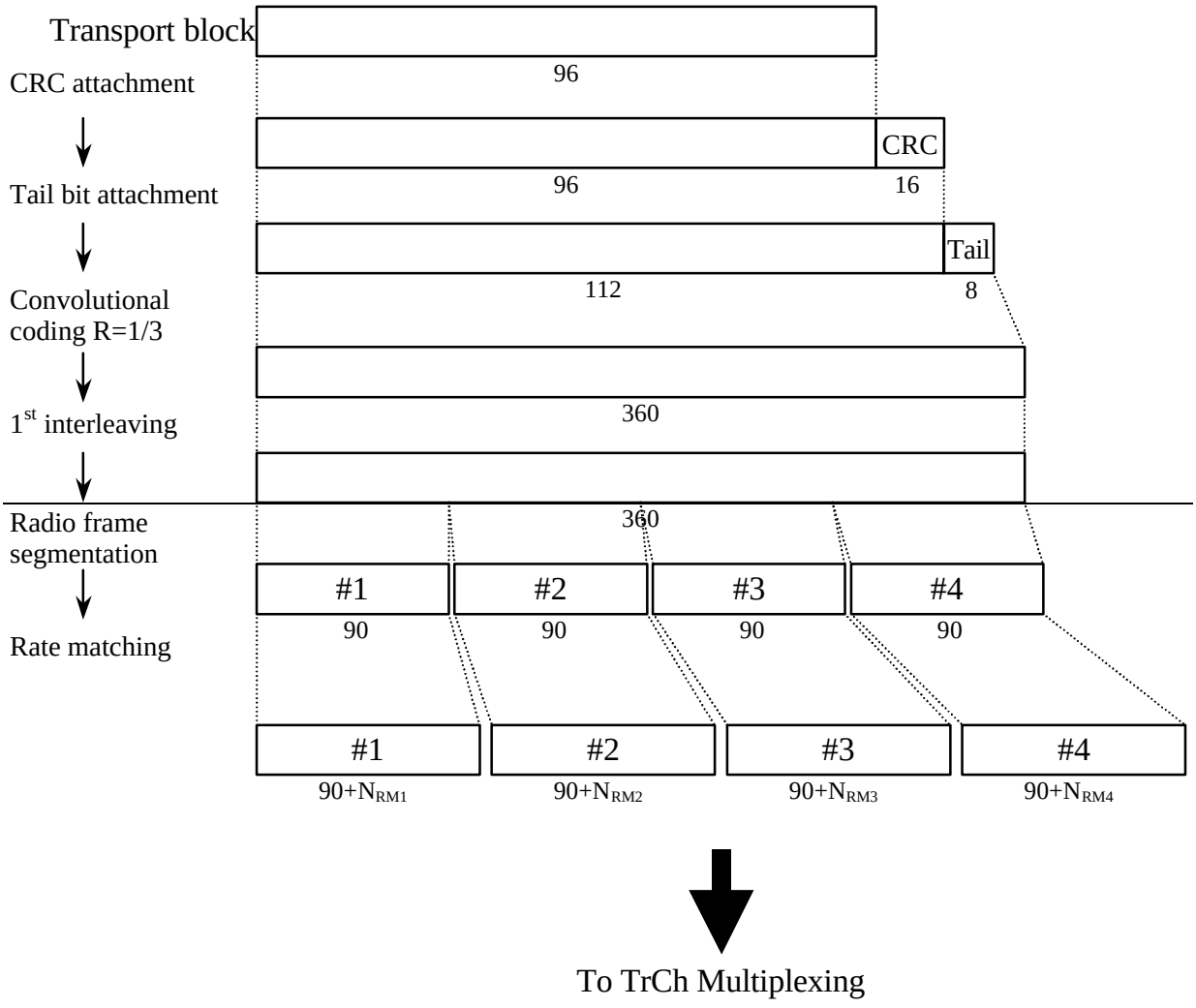
4.2.1.4.1.1 Example for ~~2~~3.4 kbps data

NOTE: This example can be applied to DCCH.

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

Table 19: Parameter examples for ~~2~~3.4 kbps data

Transport block size	~~96~~ 148 bits
Transport block set size	~~96~~ 148*B bits (B=0,1)
CRC	16 bits
Coding	CC, coding rate = 1/3
TTI	40 ms



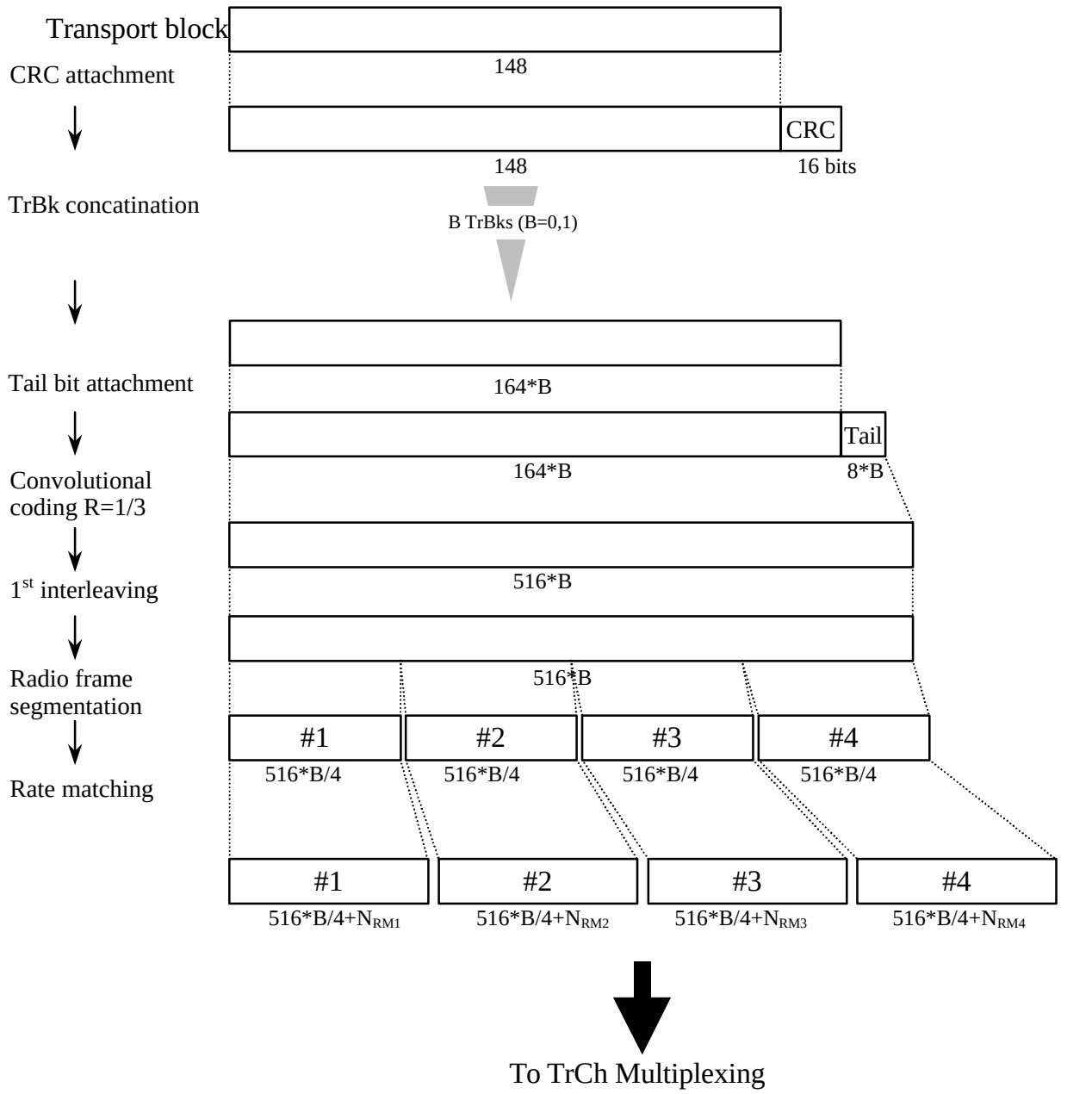


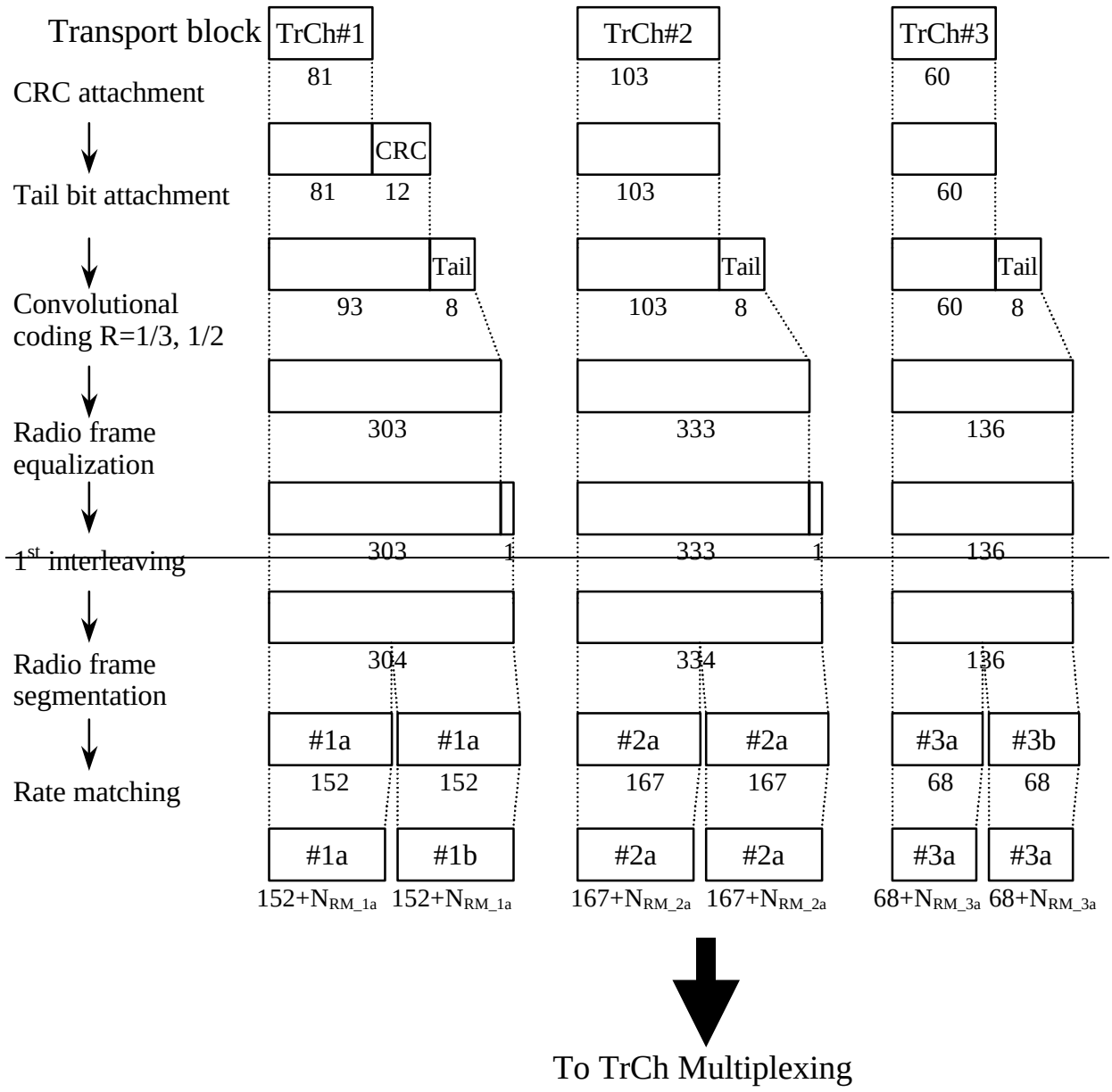
Figure 23: Channel coding and multiplexing example for ~~2~~3.4 kbps data

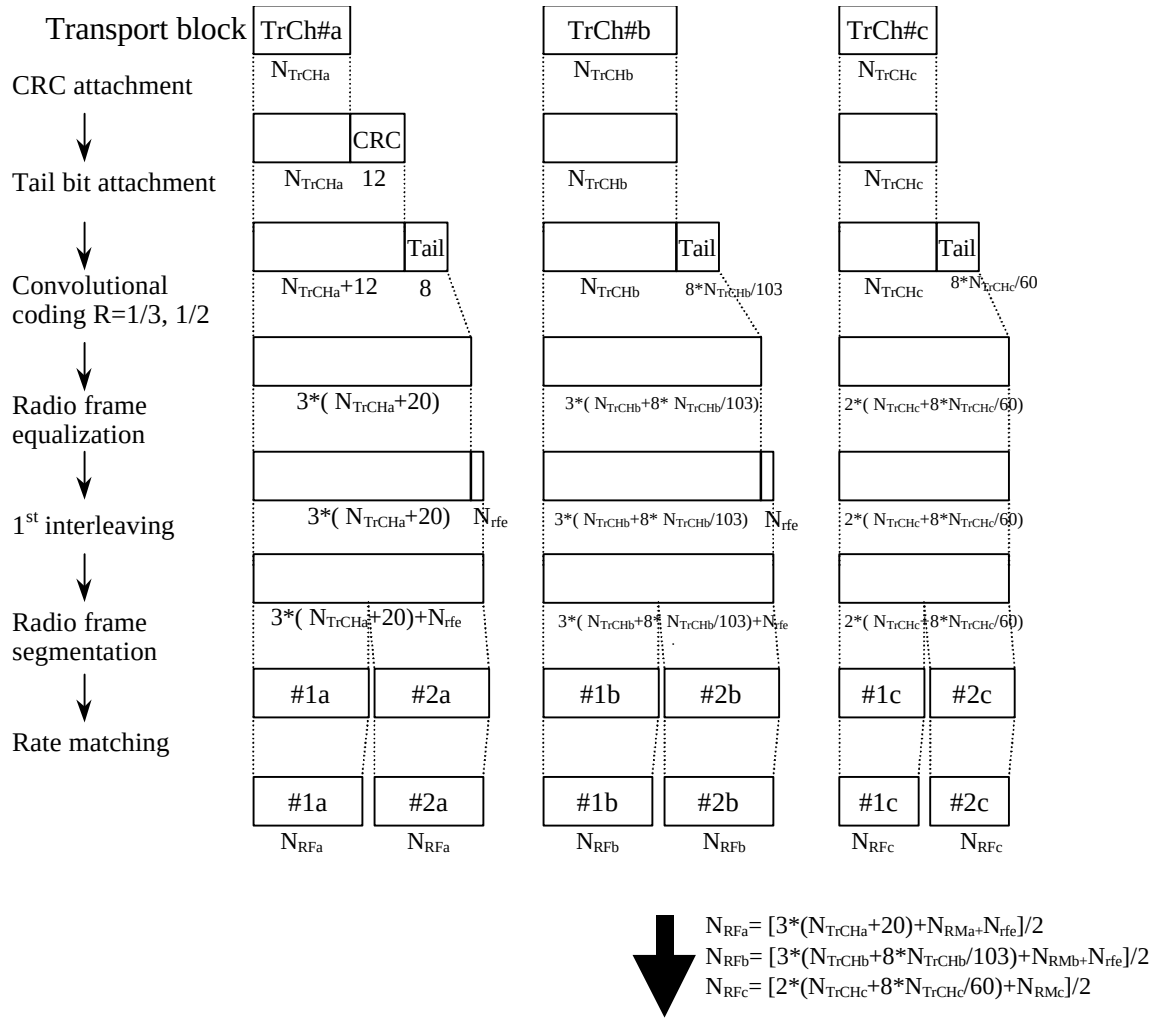
4.2.1.4.1.2 Example for 12.2 kbps data

NOTE: This example can be applied to AMR speech.

Table 20: Parameter examples for 12.2 kbps data

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


Transport block
TrCh#1
TrCh#2
TrCh#3
81
103
60
CRC attachment
CRC
81
12
103
60
Tail bit attachment
Tail
Tail
Tail
93
8
103
8
60
8
Convolutional coding R=1/3, 1/2
303
333
136
Radio frame equalization
303
1
333
1
136
1st interleaving
304
334
136
Radio frame segmentation
#1a
#1a
#2a
#2a
#3a
#3b
152
152
167
167
68
68
Rate matching
#1a
#1b
#2a
#2a
#3a
#3a
152+NRM_1a
152+NRM_1a
167+NRM_2a
167+NRM_2a
68+NRM_3a
68+NRM_3a
To TrCh Multiplexing



$N_{RFa}= [3*(N_{TrCHa}+20)+N_{RMa+}N_{rfe}]/2$
$N_{RFb}= [3*(N_{TrCHb}+8*N_{TrCHb}/103)+N_{RMb+}N_{rfe}]/2$
$N_{RFc}= [2*(N_{TrCHc}+8*N_{TrCHc}/60)+N_{RMc}]/2$

*** 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 24: Channel coding and multiplexing example for 12.2 kbps data

4.2.1.4.1.3 Example of 28.8/57.6 kbps data

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

Table XX: Parameters for 28.8/57.6 kbps data

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

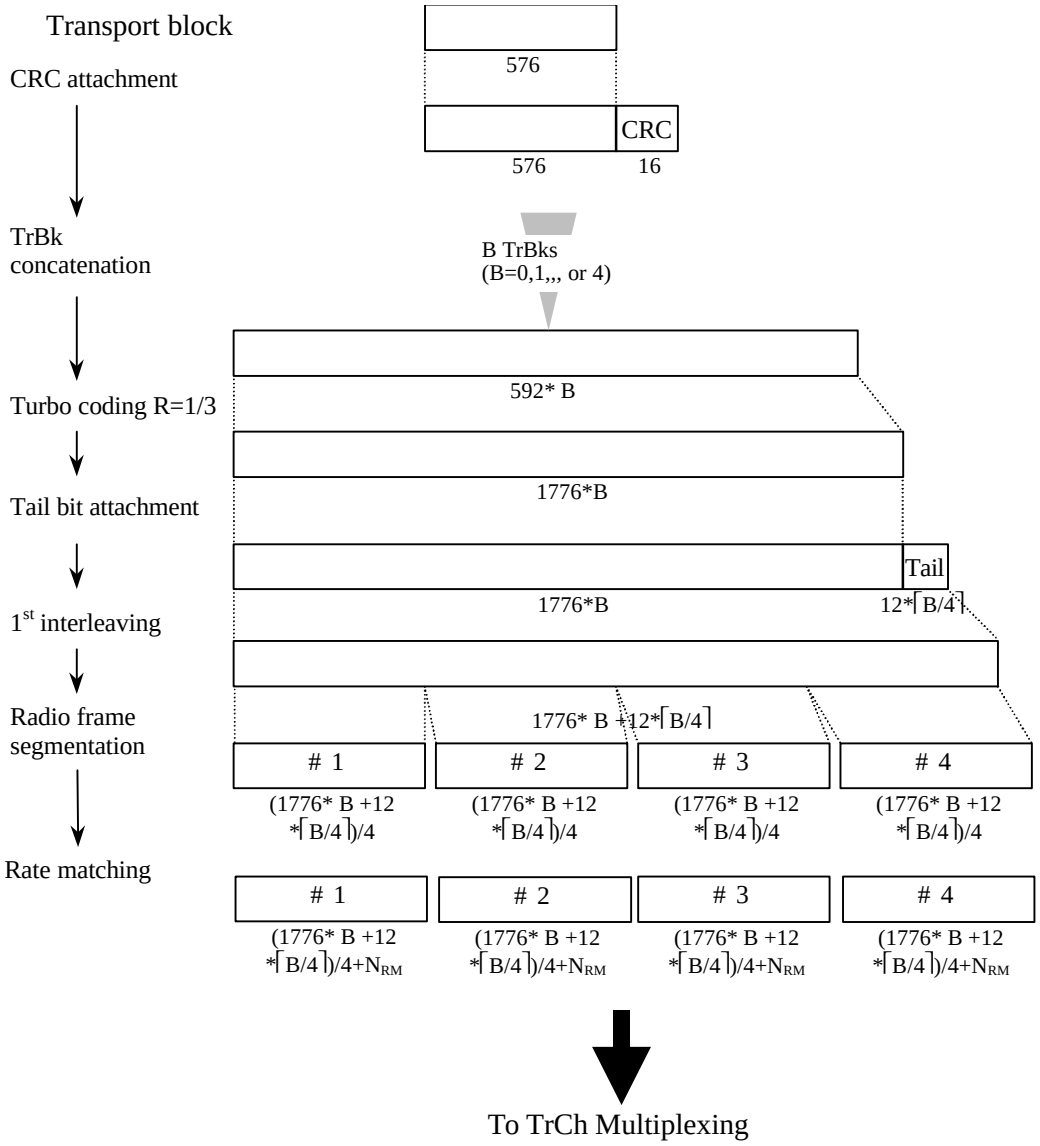


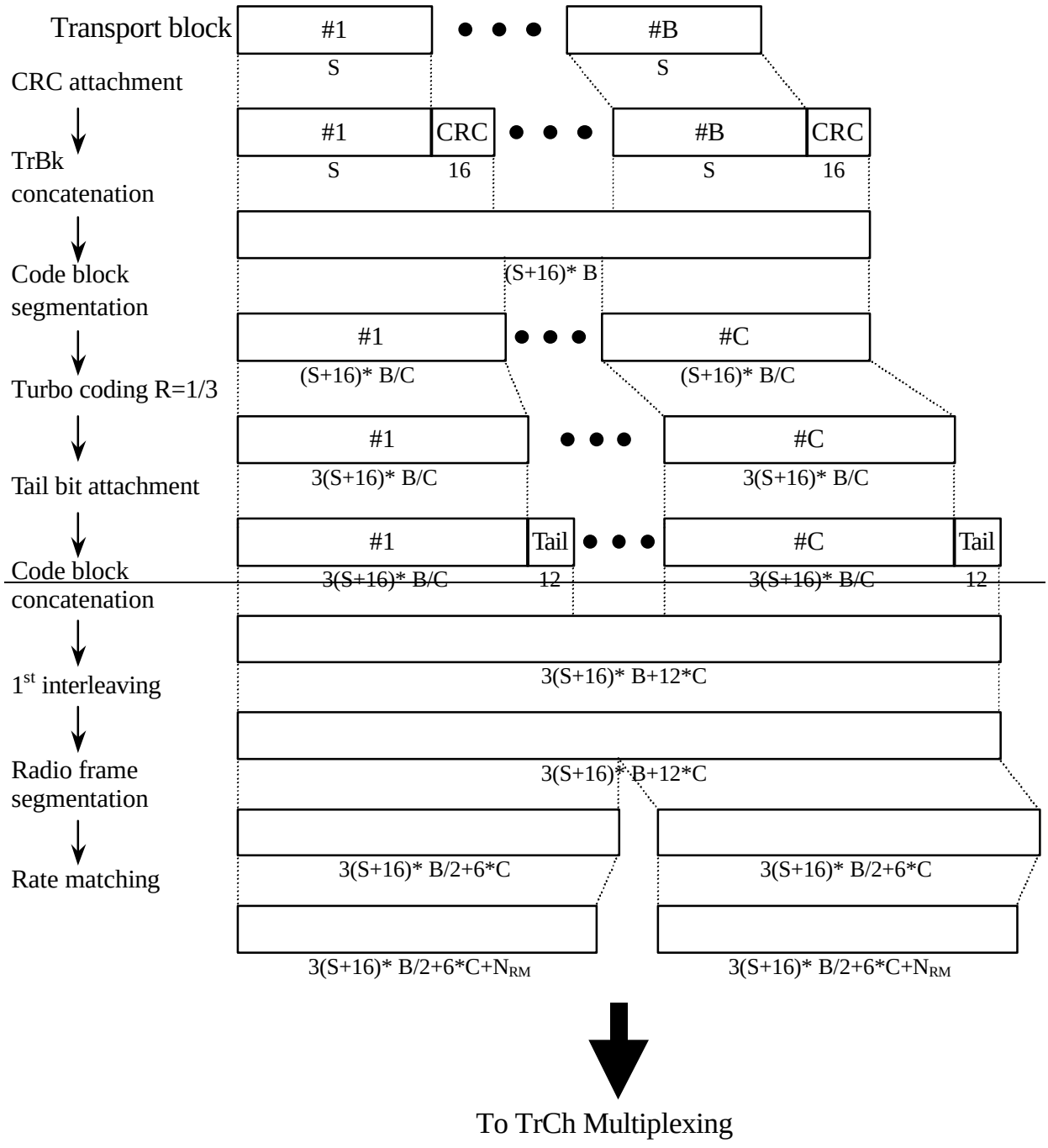
Figure XX: Channel coding and multiplexing example for 28.8/57.6 kbps data

4.2.1.4.1.~~3~~4 Example of 64/128/~~384~~ 144 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 21: Parameters for 64/128/144~~384~~ kbps packet data

The number of TrChs		1
Transport block size		336 bits
~~Transport block~~	~~64 kbps~~	~~1280 bits~~
~~Size: S~~	~~128 kbps~~	~~2560 bits~~
	~~384 kbps~~	~~3840 bits~~
Transport block set size	64 kbps	~~1280~~336*B bits (B = 0, 1, 2, 4)
	128 kbps	~~2560~~336*B bits (B = 0, 1, 2, 4, 8)
	~~384~~ 144 kbps	~~3840~~336*B bits (B = 0, 1, 2, 4, 8, 9)
~~Code block~~	~~64 kbps~~	~~1~~
~~Segmentation: C~~	~~128 kbps~~	~~1~~
	~~384 kbps~~	~~1 (B = 0, 1) or 2 (B = 2)~~
CRC		16 bits
Coding		Turbo coding, coding rate = 1/3
TTI		20 ms


Transport block
#1
#B
S
S
CRC attachment
#1
CRC
#B
CRC
S
16
S
16
TrBk concatenation
(S+16)* B
Code block segmentation
#1
#C
(S+16)* B/C
(S+16)* B/C
Turbo coding R=1/3
#1
#C
3(S+16)* B/C
3(S+16)* B/C
Tail bit attachment
#1
Tail
#C
Tail
3(S+16)* B/C
12
3(S+16)* B/C
12
Code block concatenation
3(S+16)* B+12*C
1st interleaving
3(S+16)* B+12*C
Radio frame segmentation
3(S+16)* B/2+6*C
3(S+16)* B/2+6*C
Rate matching
3(S+16)* B/2+6*C+NRM
3(S+16)* B/2+6*C+NRM
To TrCh Multiplexing

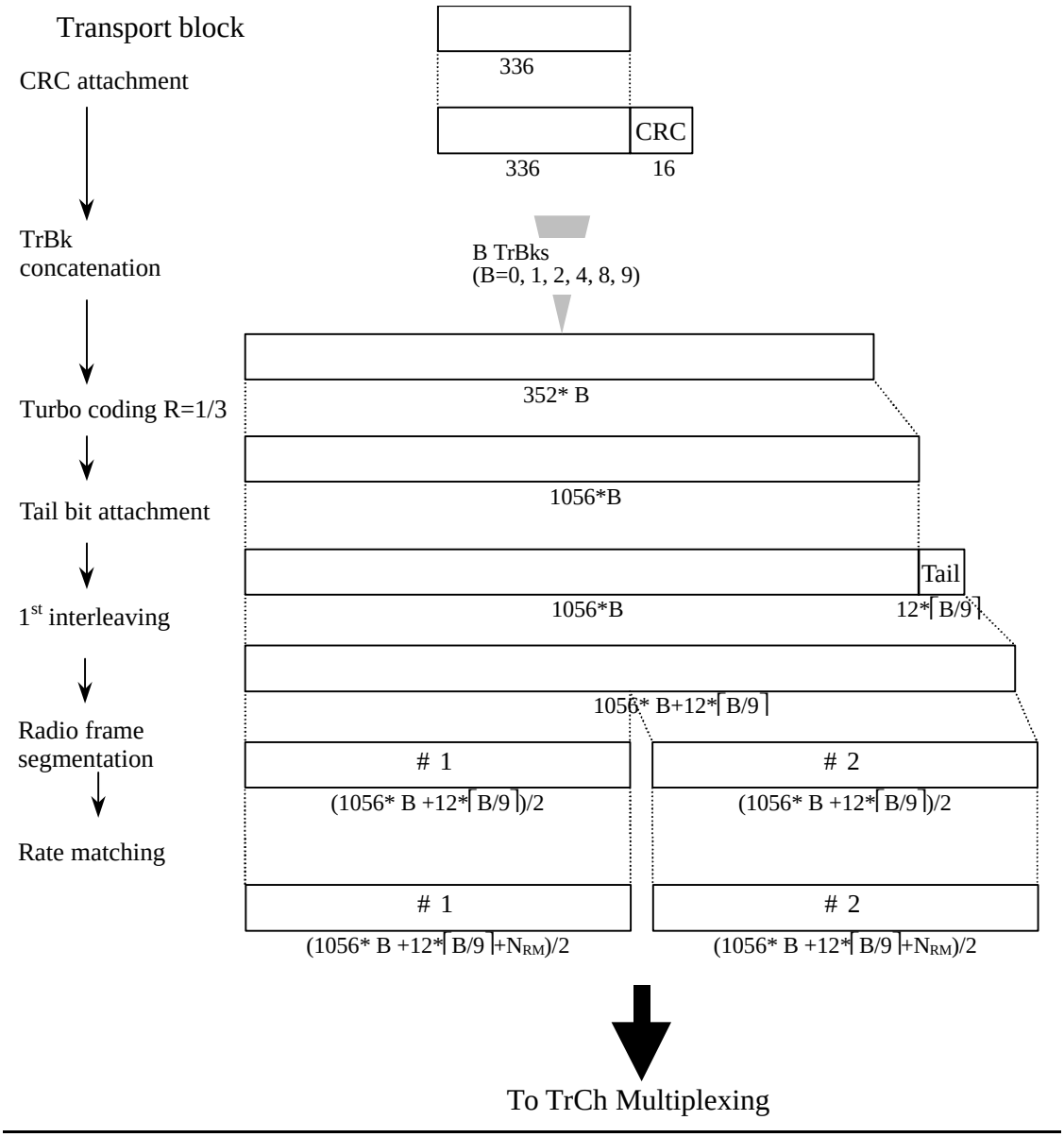


Figure 25: Channel coding and multiplexing example for 64/128/~~384~~ 144 kbps packet data

4.2.1.4.1.4 Example of 384 kbps packet data

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

Table 21: 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=10ms, B=0,1,2,4,8,12,24 for TTI=20ms)
CRC	16 bits
Coding	Turbo coding, coding rate = 1/3
TTI	10 or 20 ms

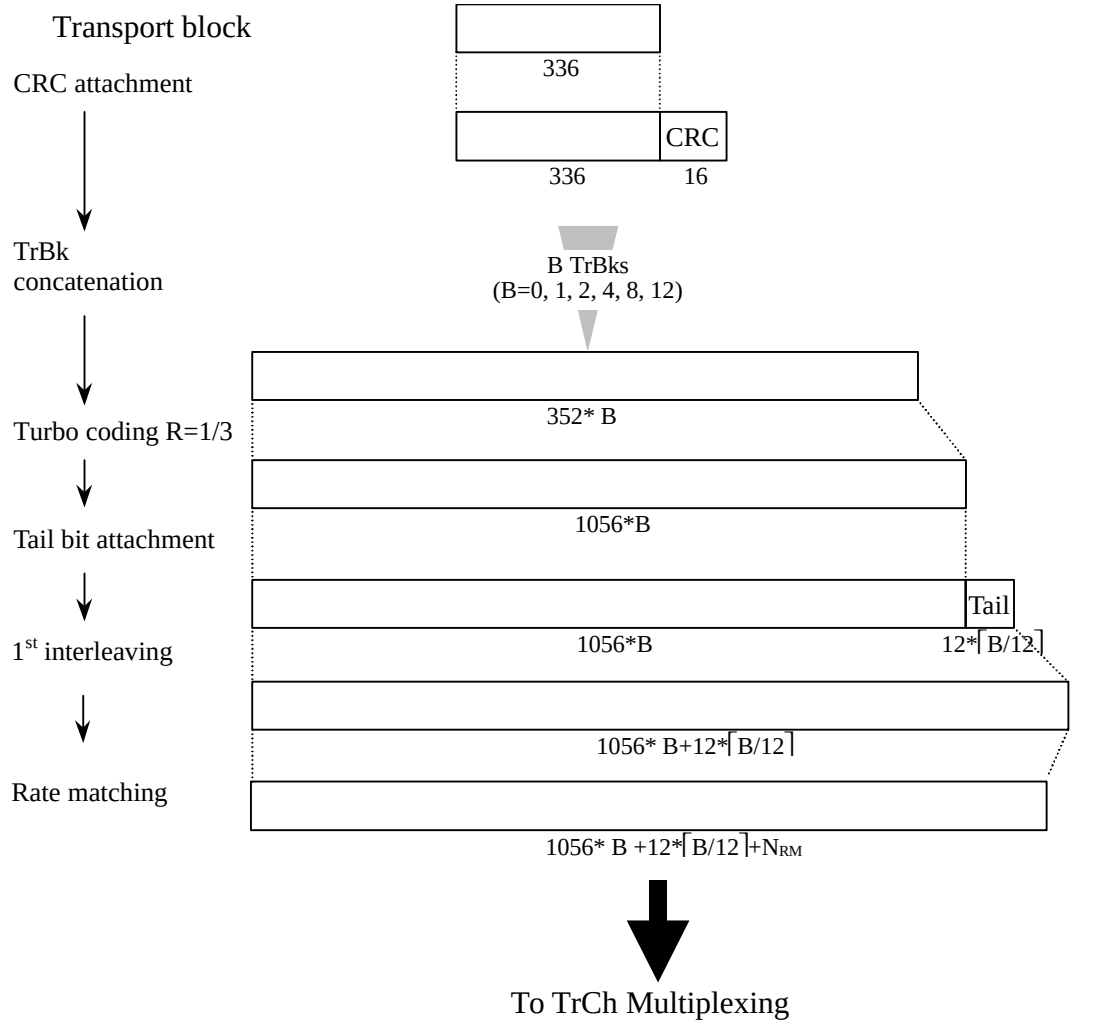


Figure 25: Channel coding and multiplexing example for 384 kbps packet data in case of TTI=10ms

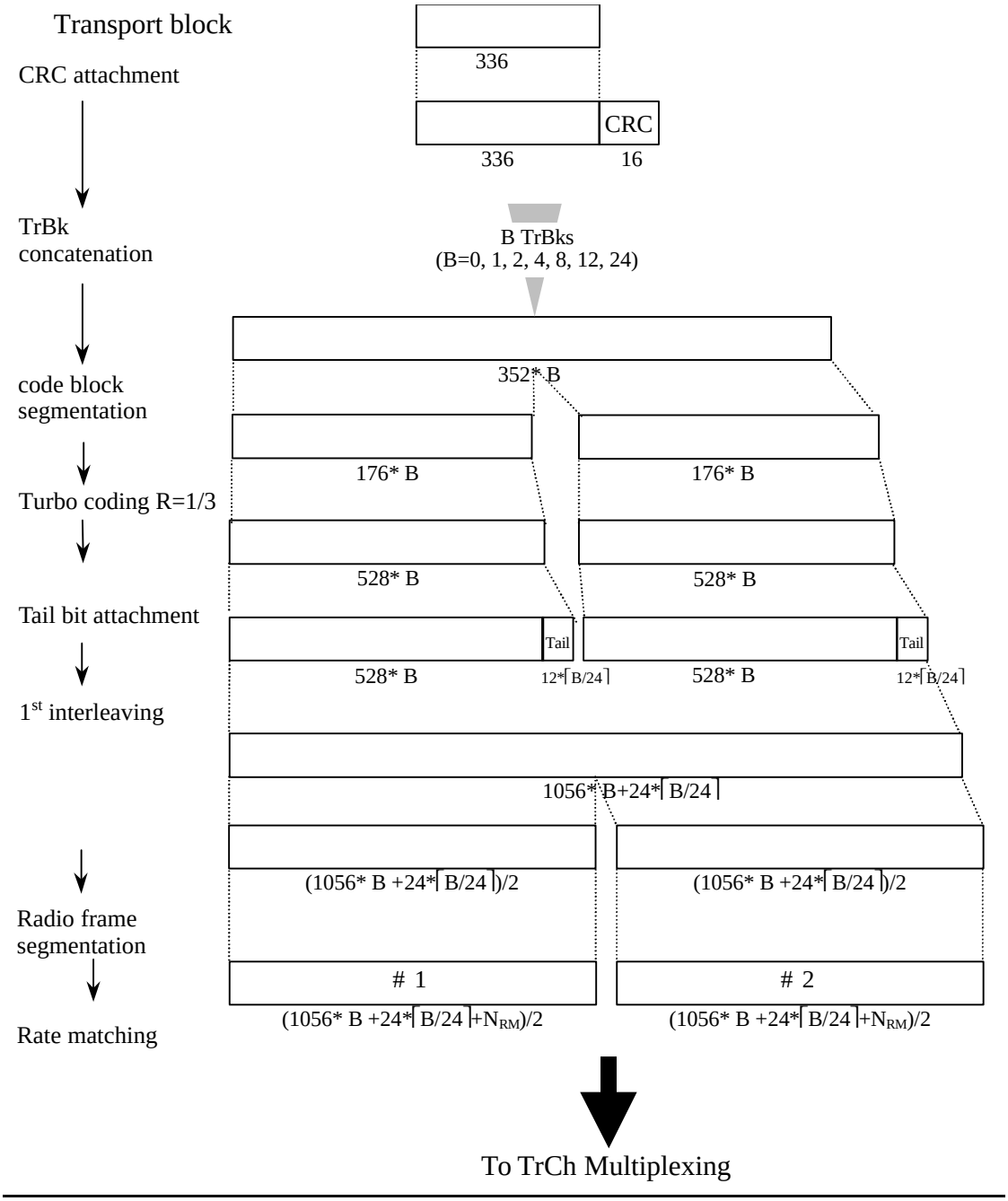


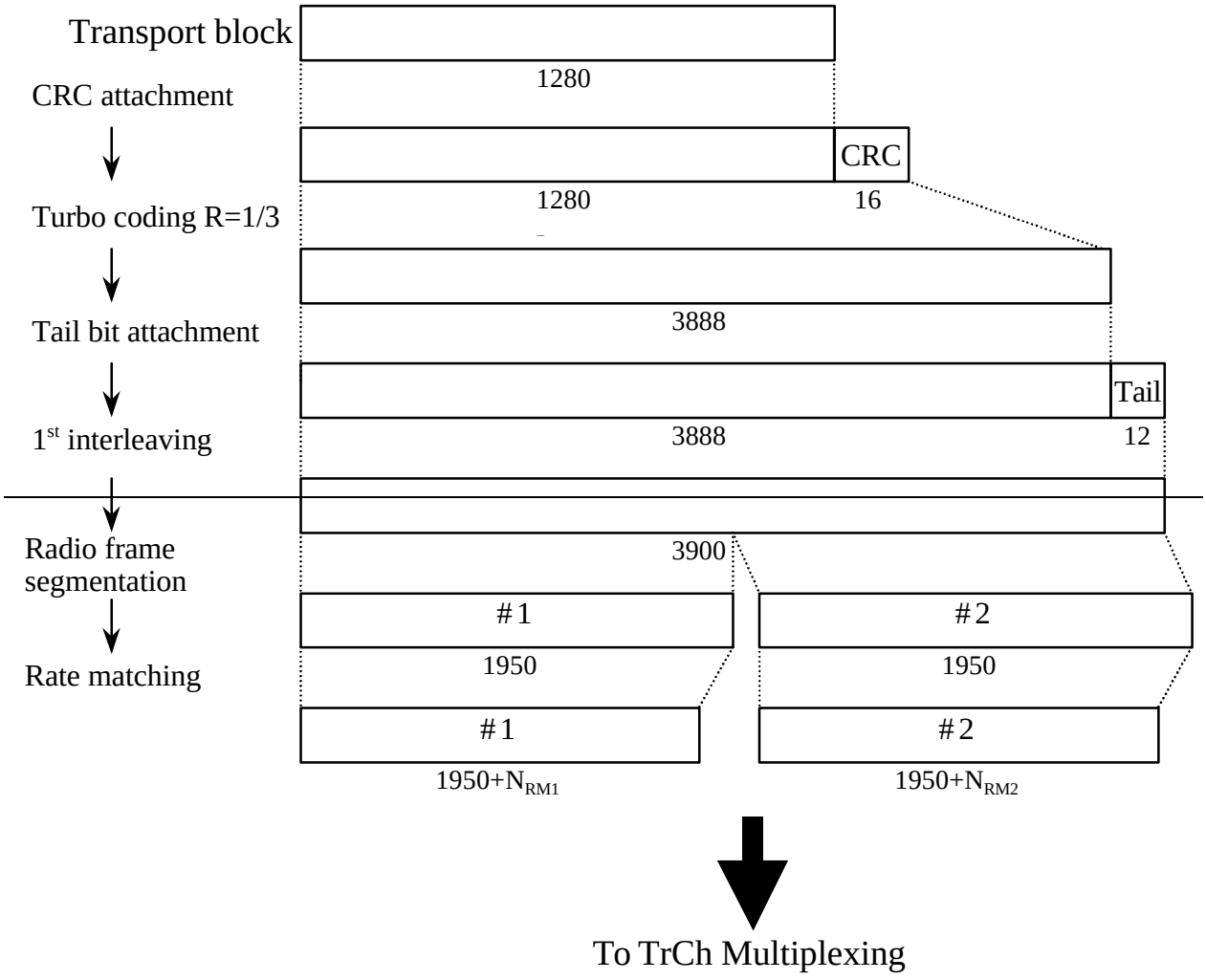
Figure 25: Channel coding and multiplexing example for 384 kbps packet data in case of TTI=20ms

4.2.1.4.1.4 Example for 64 kbps data

NOTE: This example can be applied to ISDN service.

Table 22: Parameters for 64 kbps data

The number of TrChs	1
Transport block size	~~1280~~ 640 bits
Transport block set size	~~1280~~ 4*640 bits
CRC	16 bits
Coding	Turbo coding, coding rate = 1/3
TTI	~~20~~ 40 ms


Transport block
1280
CRC attachment
CRC
1280
16
Turbo coding R=1/3
3888
Tail bit attachment
Tail
3888
12
1st interleaving
3900
Radio frame segmentation
#1
#2
1950
1950
Rate matching
#1
#2
1950+N_RM1
1950+N_RM2
To TrCh Multiplexing

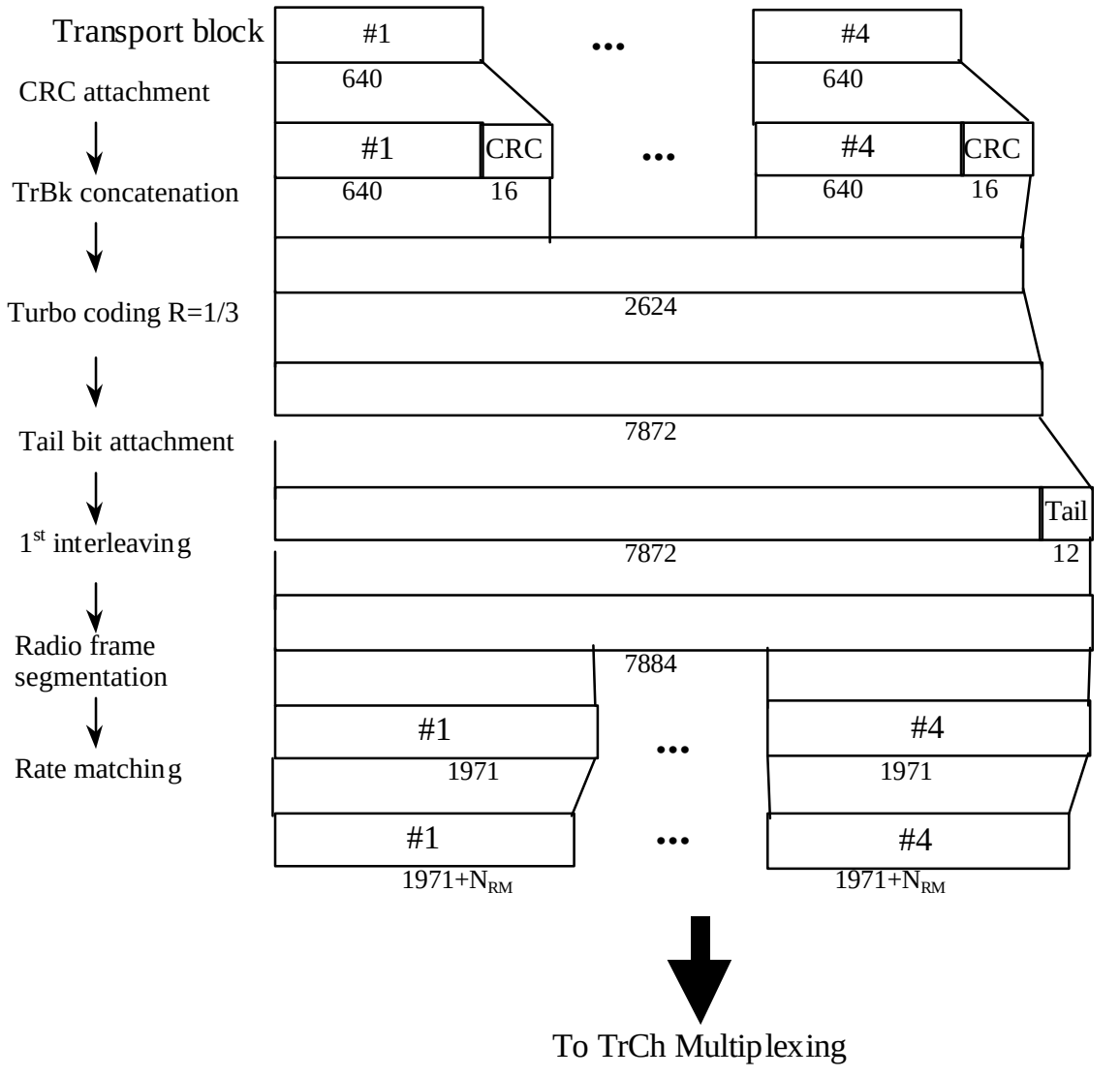


Figure 26: Channel coding and multiplexing example for 64 kbps data

4.2.1.4.2 TrCH multiplexing -> Physical channel mapping

4.2.1.4.2.1 Example for Stand-alone mapping of ~~2~~3.4 kbps data

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

Table 23 shows example of physical channel parameters for Stand-alone mapping of ~~2~~3.4 kbps data.

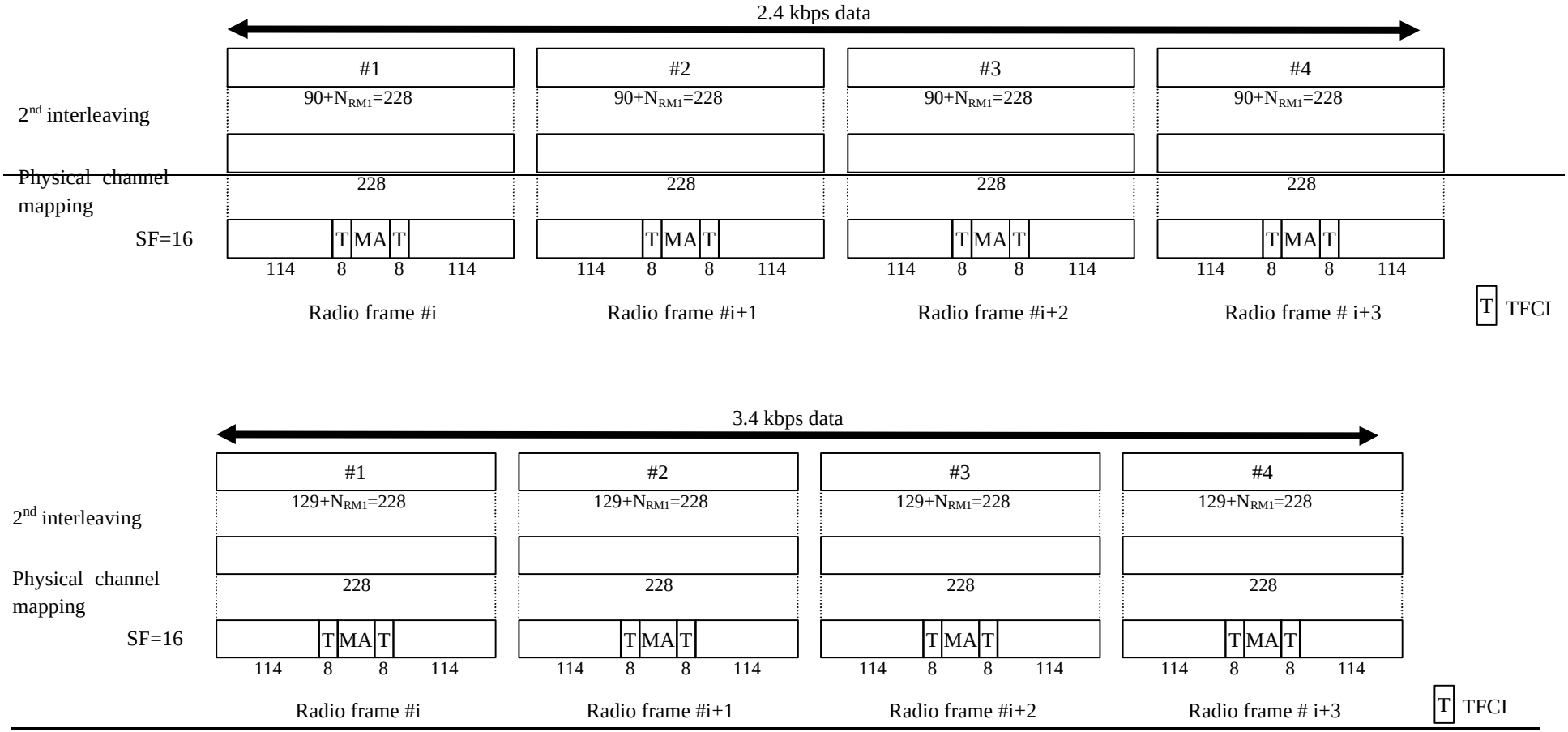


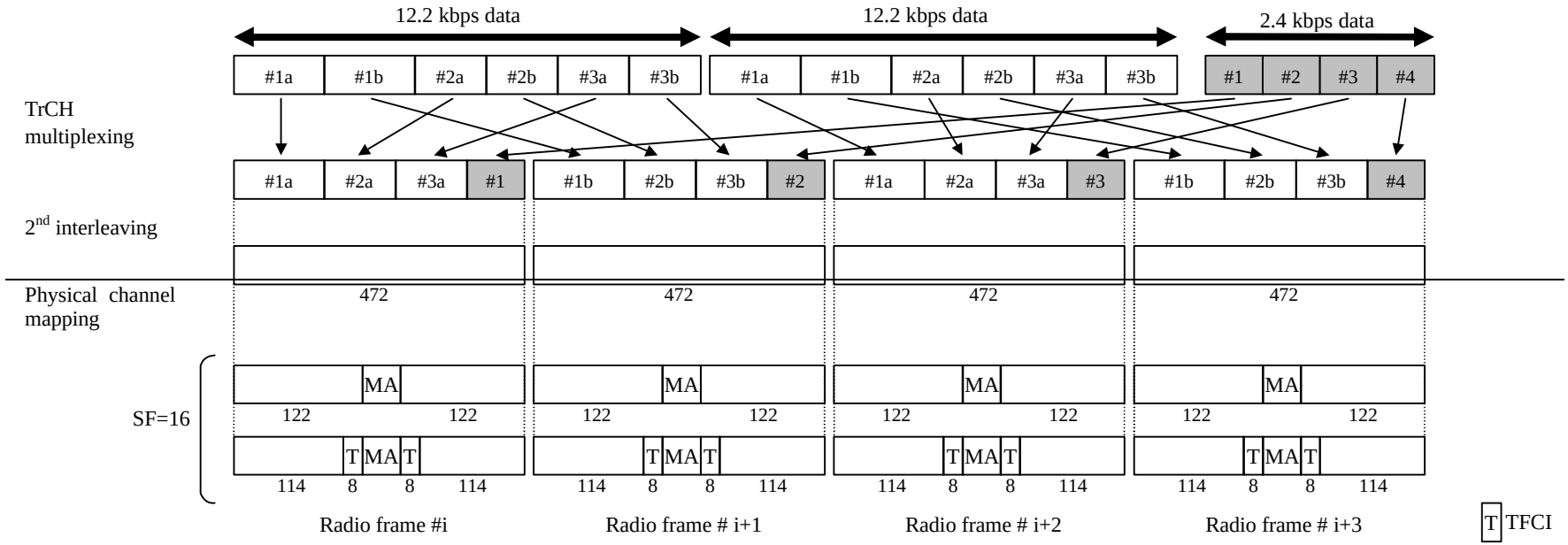
Figure 27: Channel coding and multiplexing example for Stand-alone mapping of ~~2~~3.4 kbps data

Table 23: Physical channel parameters for Stand-alone mapping of ~~2~~3.4 kbps data

Midamble	512 chips
Codes and time slots	SF16 x 1 code x 1 time slot
TFCI	16 bits per user
TPC	0 bit

4.2.1.4.2.2 Example for multiplexing of 12.2 kbps data and ~~2~~3.4 kbps data

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


12.2 kbps data
12.2 kbps data
2.4 kbps data
#1a
#1b
#2a
#2b
#3a
#3b
#1
#2
#3
#4
TrCH multiplexing
2nd interleaving
Physical channel mapping
472
SF=16
MA
122
T
114
8
Radio frame #i
Radio frame # i+1
Radio frame # i+2
Radio frame # i+3
T TFCI

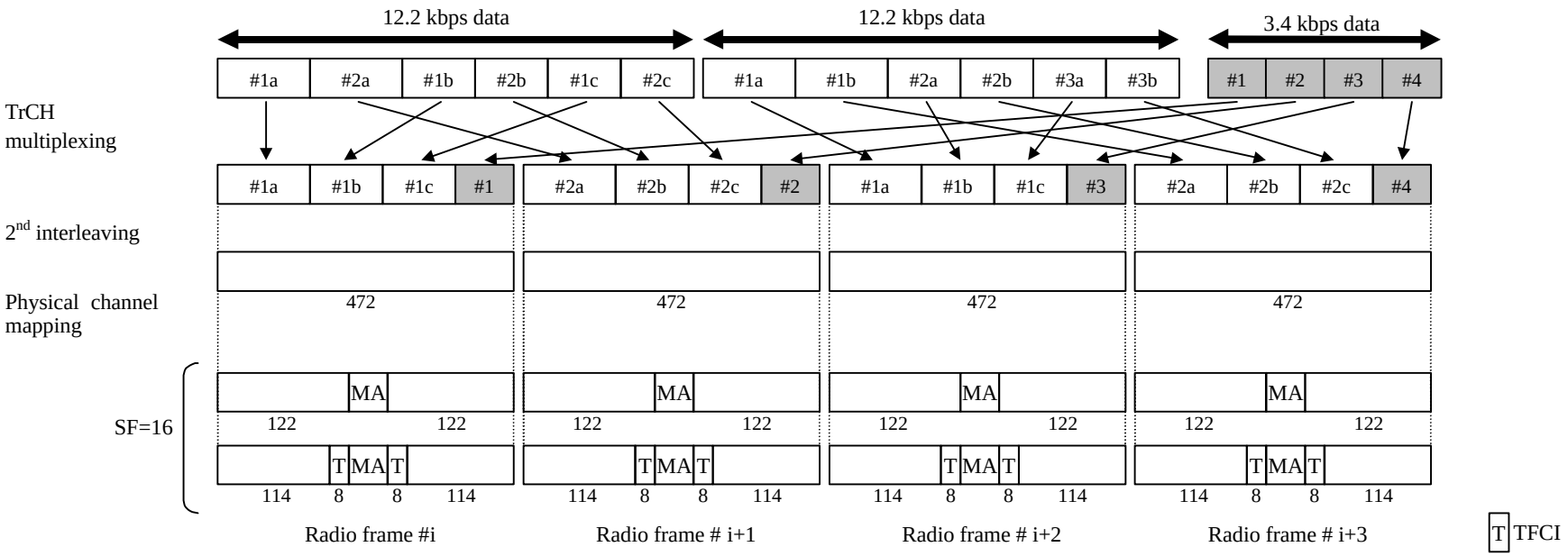


Figure 28: Channel coding and multiplexing example for multiplexing of 12.2 kbps data and ~~2~~3.4 kbps data

Table 24: Physical channel parameters for multiplexing of 12.2 kbps data and ~~2~~3.4 kbps data

Midamble	512 chips
Codes and time slots	SF16 x 2 code x 1 time slot
TFCI	16 bits per user
TPC	0 bit

4.2.1.4.2.3 Example for multiplexing of 28.8/57.6 kbps data 3.4 kbps data

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

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

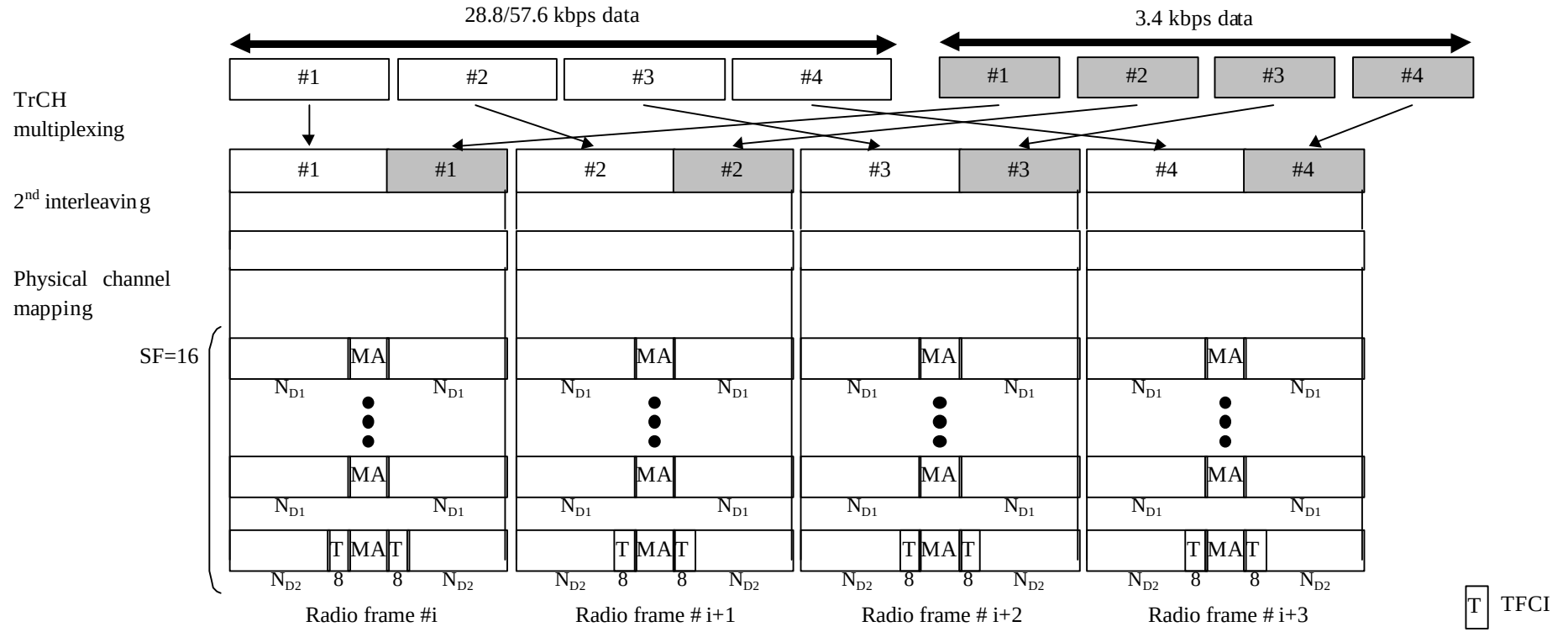


Figure 29: Channel coding and multiplexing example for multiplexing 28.8/57.6 kbps data and 3.4 kbps data

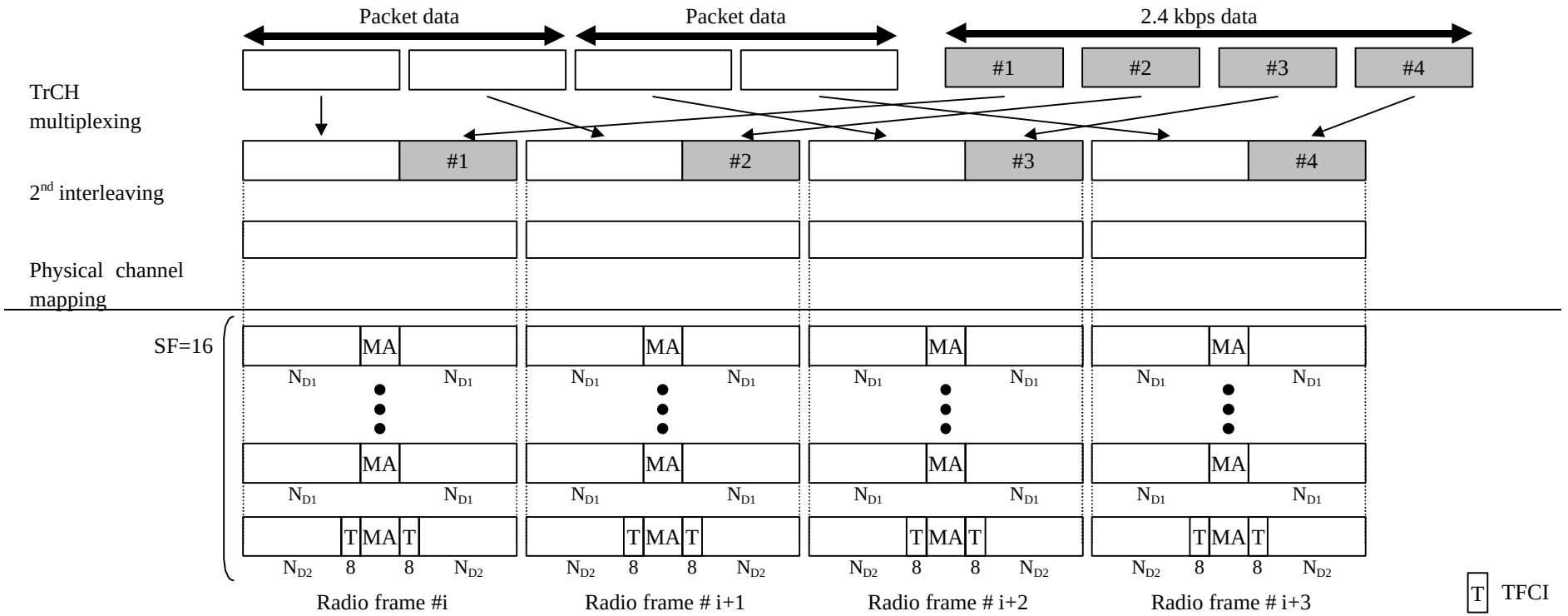
Table XX: Physical channel parameters for multiplexing of 28.8/57.6 kbps packet data and 3.4 kbps data

Midamble	28.8/57.6 kbps	512 chips
N_{D1}, N_{D2}	28.8/57.6 kbps	122 bits, 114 bits
Code & time	28.8 kbps	SF16 x 2 codes x 1 time slot
slots	57.6 kbps	SF16 x 4 codes x 1 time slot
TFCI		16 bits per user
TPC		0 bit

4.2.1.4.2.3 Example for multiplexing of 64/128/144/384 kbps packet data and 32.4 kbps data

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

Table 25 shows example of physical channel parameters for multiplexing of 64/128/144/384 kbps packet data and 23.4 kbps data.


Packet data
Packet data
2.4 kbps data
#1
#2
#3
#4
TrCH multiplexing
2nd interleaving
Physical channel mapping
SF=16
MA
T
N_{D1}
N_{D2}
8
Radio frame #i
Radio frame # i+1
Radio frame # i+2
Radio frame # i+3
T TFCI

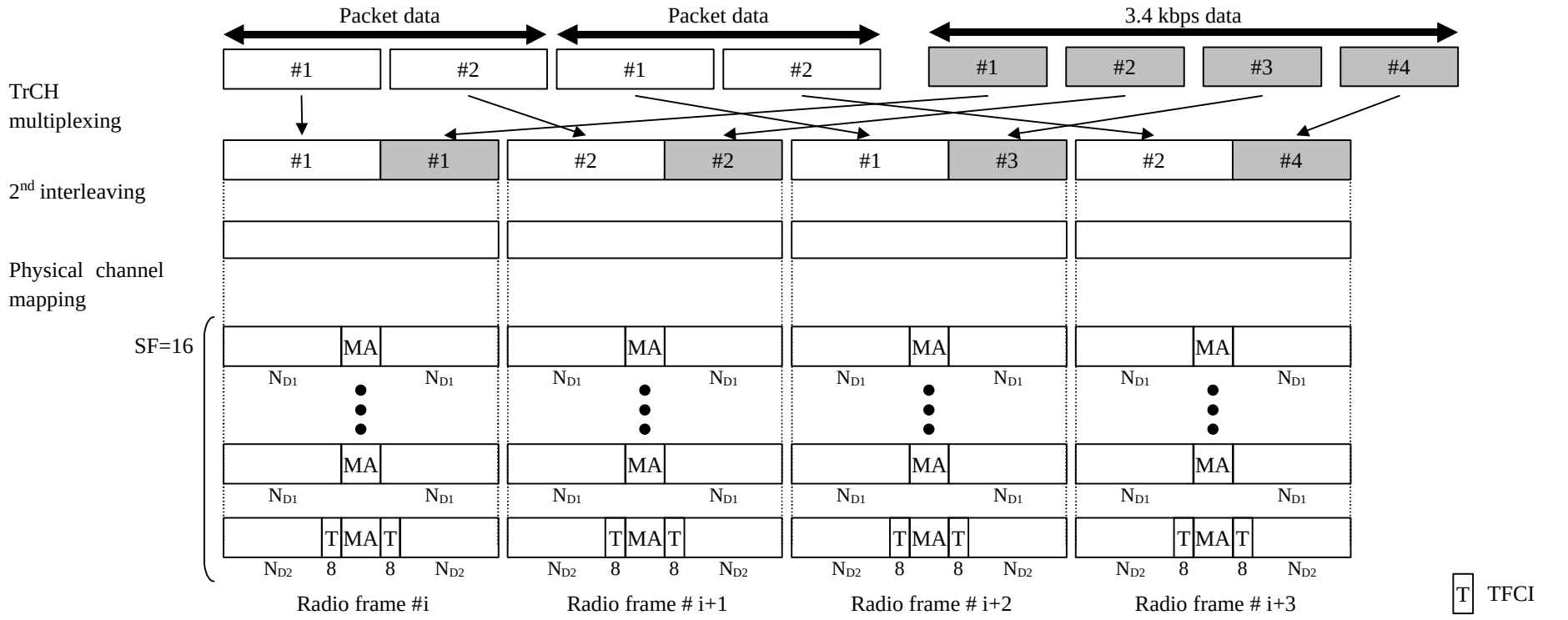


Figure 29: Channel coding and multiplexing example for multiplexing of 64/128/144/384 kbps packet data and ~~2~~3.4 kbps data

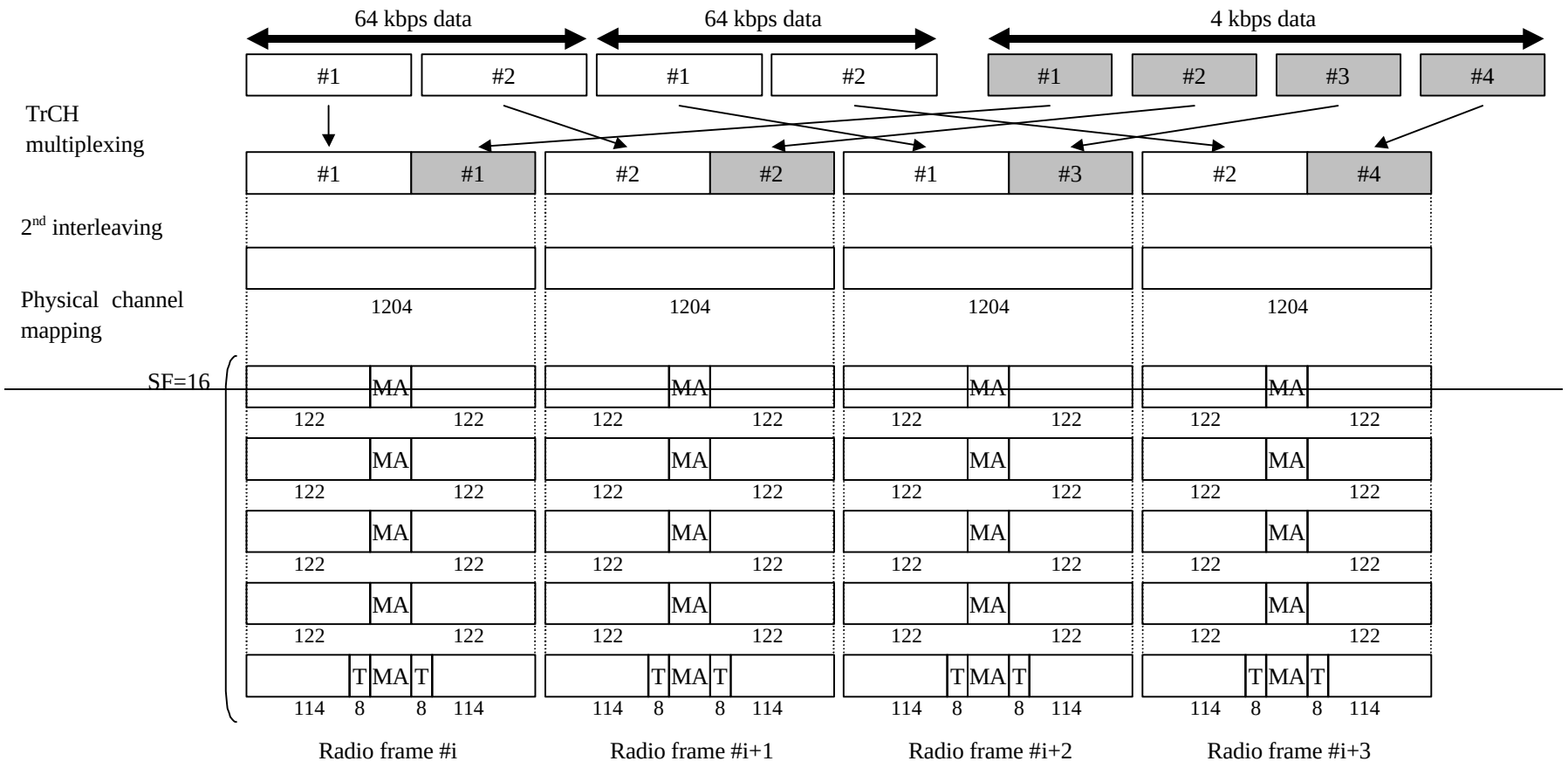
Table 25: Physical channel parameters for multiplexing of 64/128/144/384 kbps packet data and ~~2~~3.4 kbps data

Midamble	64 kbps	512 chips
	128 & 144 & 384 kbps	256 chips
N_{D1}, N_{D2}	64 kbps	122 bits, 114 bits
	128 & 144 & 384 kbps	138 bits, 130 bits
Code & time slots	64 kbps	SF16 x 5 codes x 1 time slot
	128 kbps	SF16 x ~~9~~8 codes x 1 time slot
	144 kbps	SF16 x 9 codes x 1 time slot
	384 kbps	SF16 x 8 codes x 3 time slots
TFCI		16 bits per user
TPC		0 bit

4.2.1.4.2.4 Example for multiplexing of 64 kbps data and ~~2~~3.4 kbps data

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

Table 26 shows example of physical channel parameters for multiplexing of 64~~/128/384~~ kbps ~~packet~~ data and 3~~2~~.4 kbps data.


64 kbps data
64 kbps data
4 kbps data
#1
#2
#1
#2
#1
#2
#3
#4
TrCH multiplexing
#1
#1
#2
#2
#1
#3
#2
#4
2nd interleaving
Physical channel mapping
1204
1204
1204
1204
SF=16
MA
122
T
8
114
Radio frame #i
Radio frame #i+1
Radio frame #i+2
Radio frame #i+3

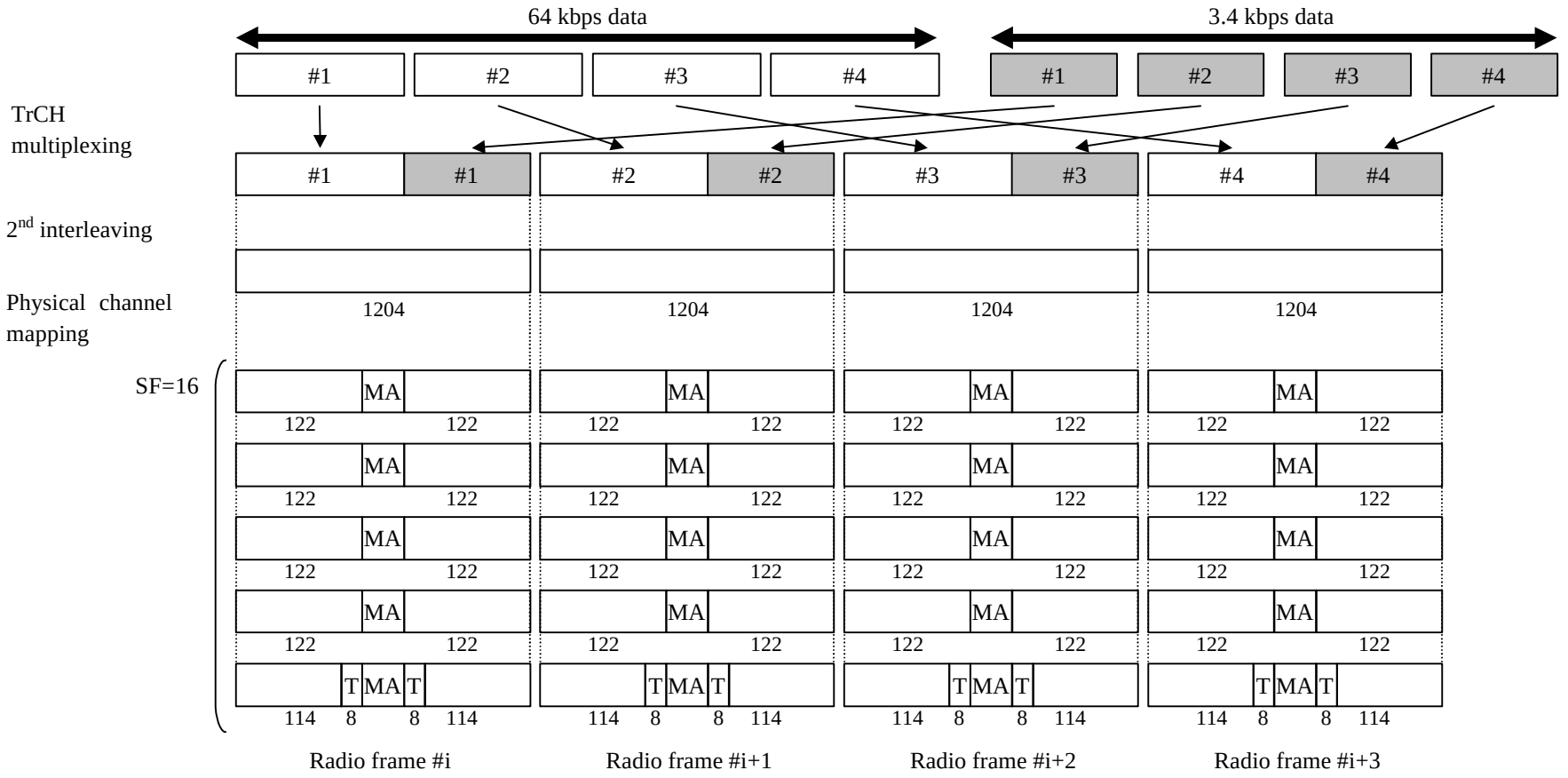


Figure 30: Channel coding and multiplexing example for multiplexing of 64~~/128/384~~ kbps ~~packet~~ data and 3~~2~~.4 kbps data

Table 26: Physical channel parameters for multiplexing of 64~~/128/384~~ kbps packet data and ~~2~~3.4 kbps data

Midamble	512 chips
Code & time slots	SF16 x 5 codes x 1 time slot
TFCI	16 bits per user
TPC	0 bit

4.2.1.4.2.4 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 26 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.

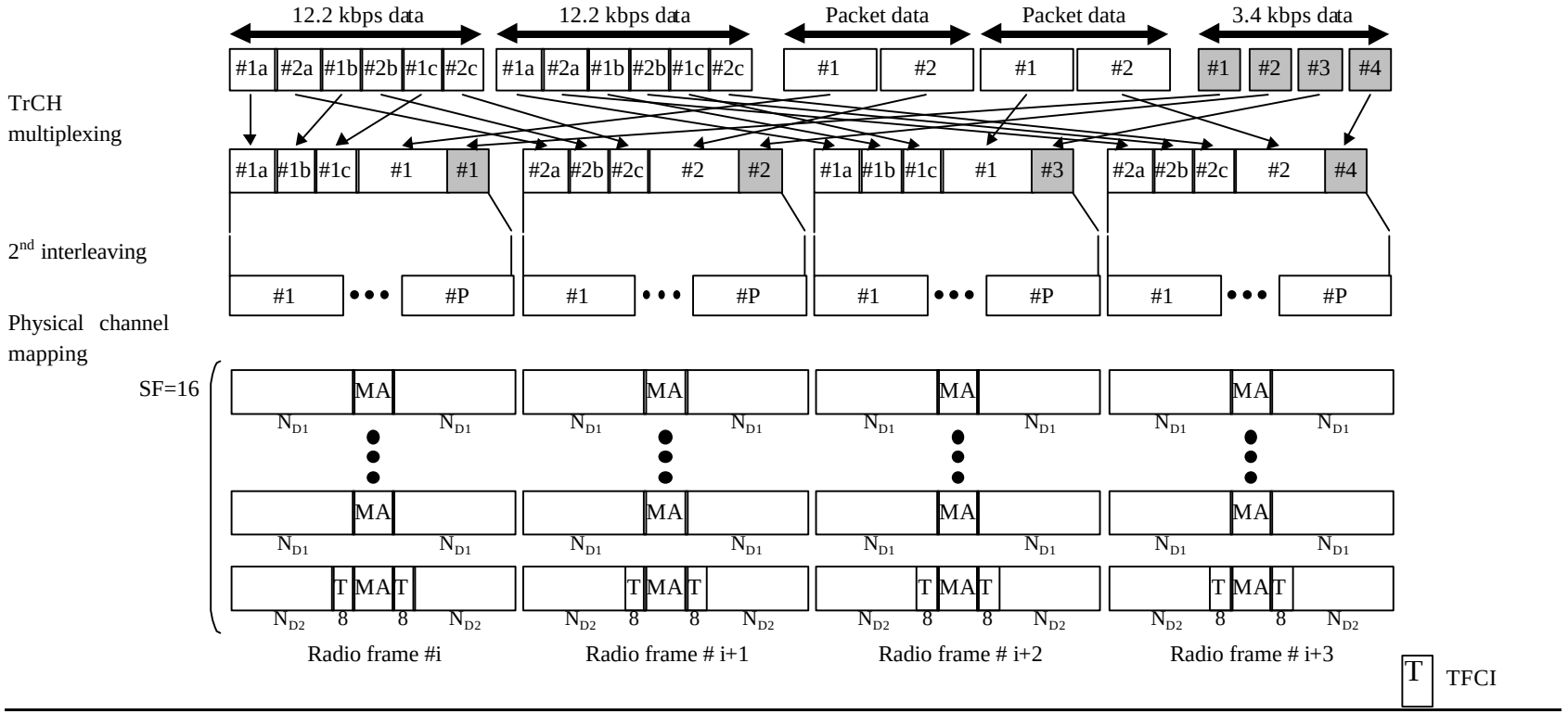


Figure 30: Channel coding and multiplexing example for multiplexing of 12.2 kbps data, 64/128/144/384 kbps packet data and 3.4 kbps data

Table 26: 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)	No. of timeslots	No. of physical channels with SF16 per used TS	Midamble length	N_{TFCI}	N_{TPC}

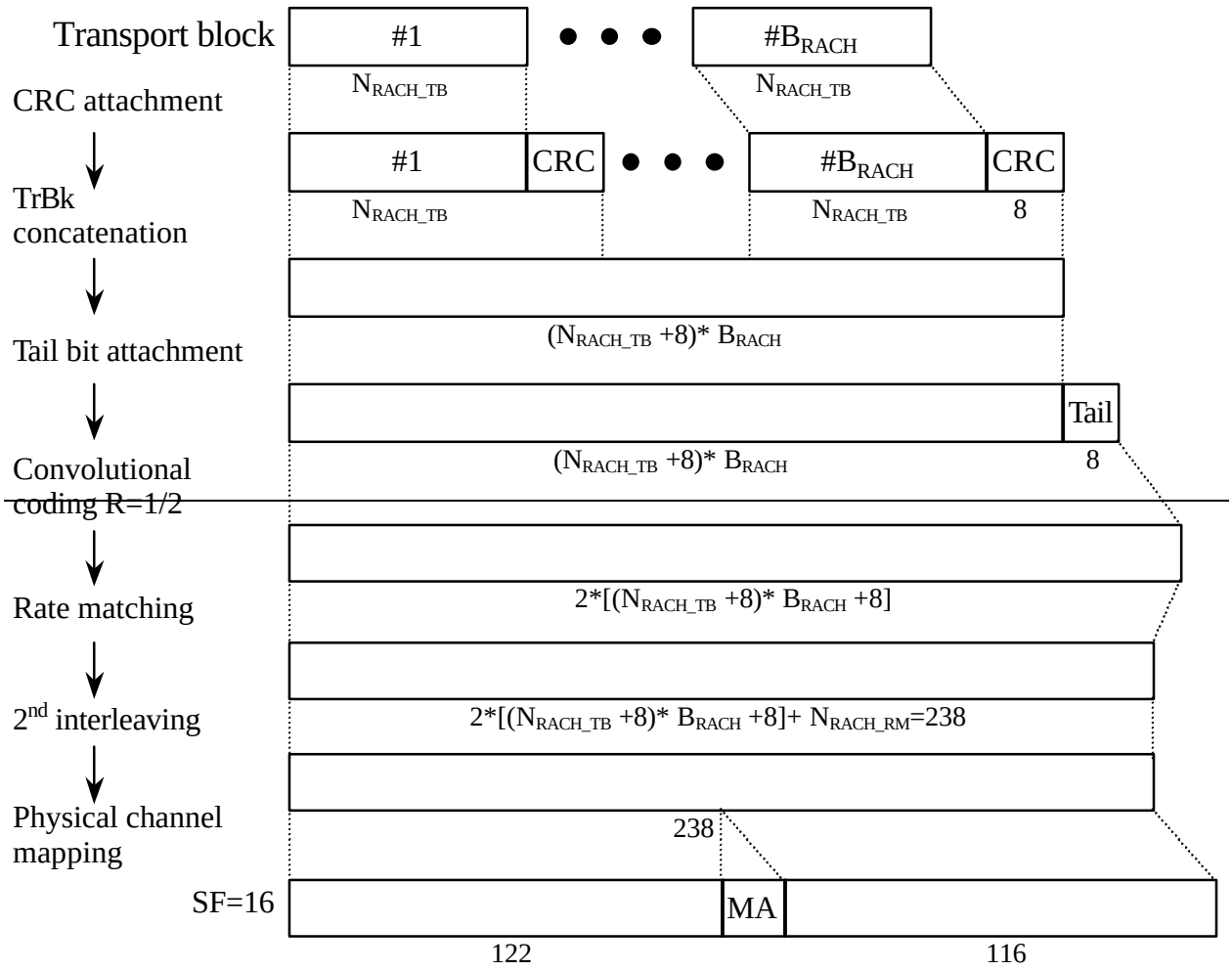
64	1	5	512 chips	16	0
128	1	8	256 chips	16	0
144	1	9	256 chips	16	0
384	3	8	256 chips	16	0

4.2.2 Uplink

4.2.2.1 RACH

Table 27: Parameters for RACH

Transport block size	N_{RACH}=168 or 360 bits
CRC	~~8~~ 16 bits
Coding	CC, coding rate = 1/2
TTI	10 ms
Midamble	512 chips
Codes and time slots	SF = 16 x 1 x 1 time slot or SF = 8 x 1 x 1 time slot
TFCI	0 bit
TPC	0 bit


Transport block
#1
#B_RACH
N_RACH_TB
CRC attachment
CRC
8
TrBk concatenation
(N_RACH_TB +8)* B_RACH
Tail bit attachment
Tail
Convolutional coding R=1/2
2*[(N_RACH_TB +8)* B_RACH +8]
Rate matching
2nd interleaving
2*[(N_RACH_TB +8)* B_RACH +8]+ N_RACH_RM=238
Physical channel mapping
238
SF=16
MA
122
116

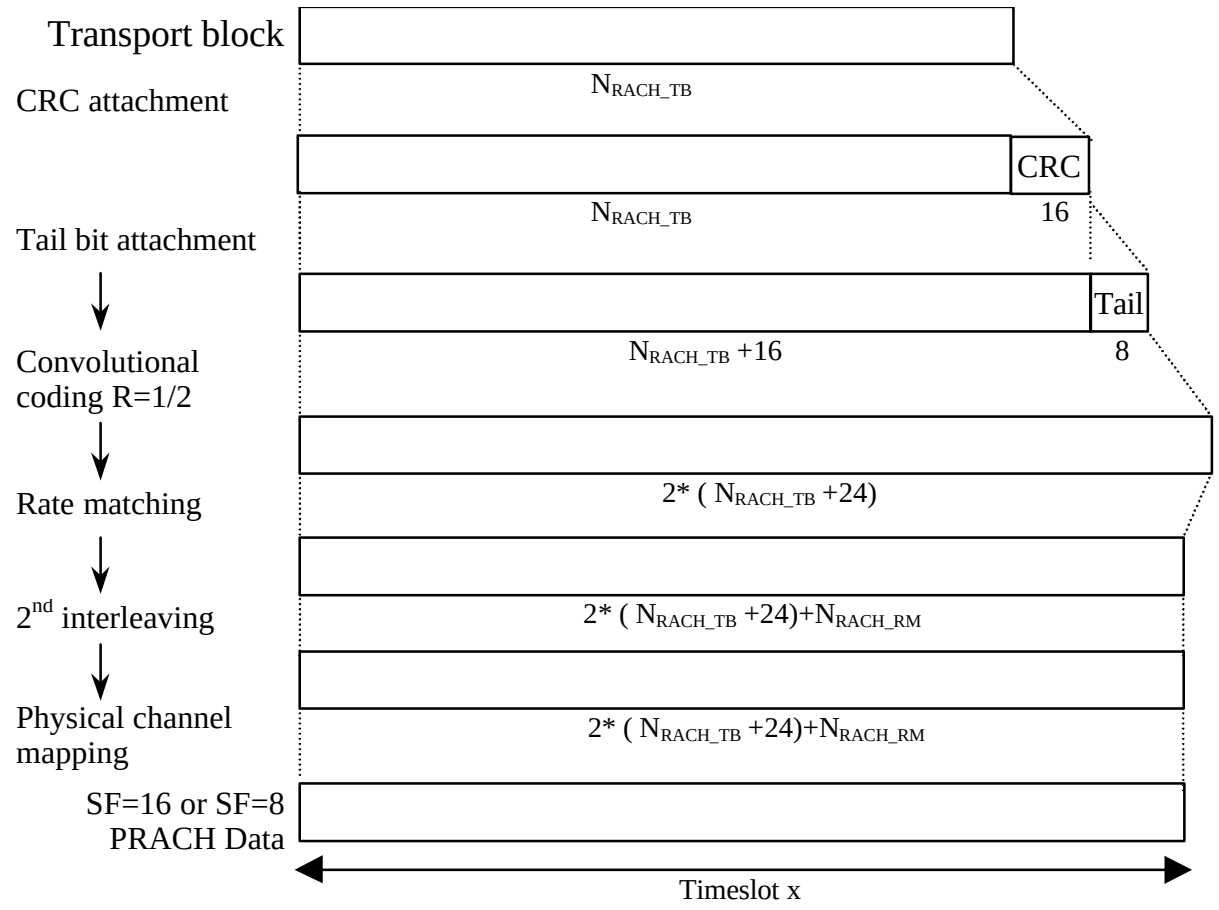


Figure 31: Channel coding and multiplexing example for _

4.2.2.2 Example for DCH

4.2.2.2.1 DCH-> Radio frame segmentation

See 4.2.1.4.2.

4.2.2.2.2 TrCH multiplexing -> Physical channel mapping

4.2.2.2.2.1 Example for Stand-alone mapping of ~~2~~3.4 kbps data

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

~~Table 28 shows example of physical channel parameters for Stand-alone mapping of 2.4 kbps data.~~

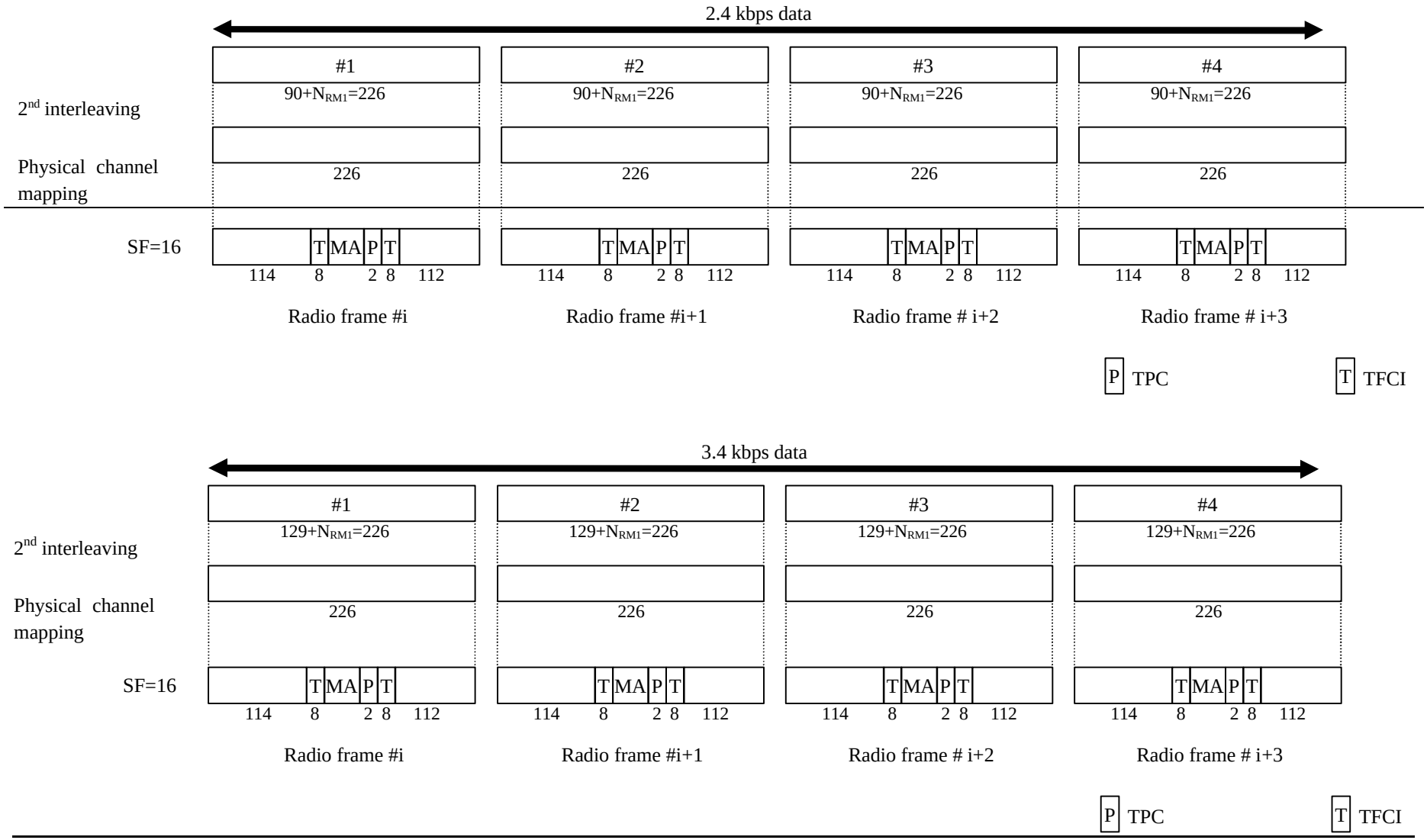


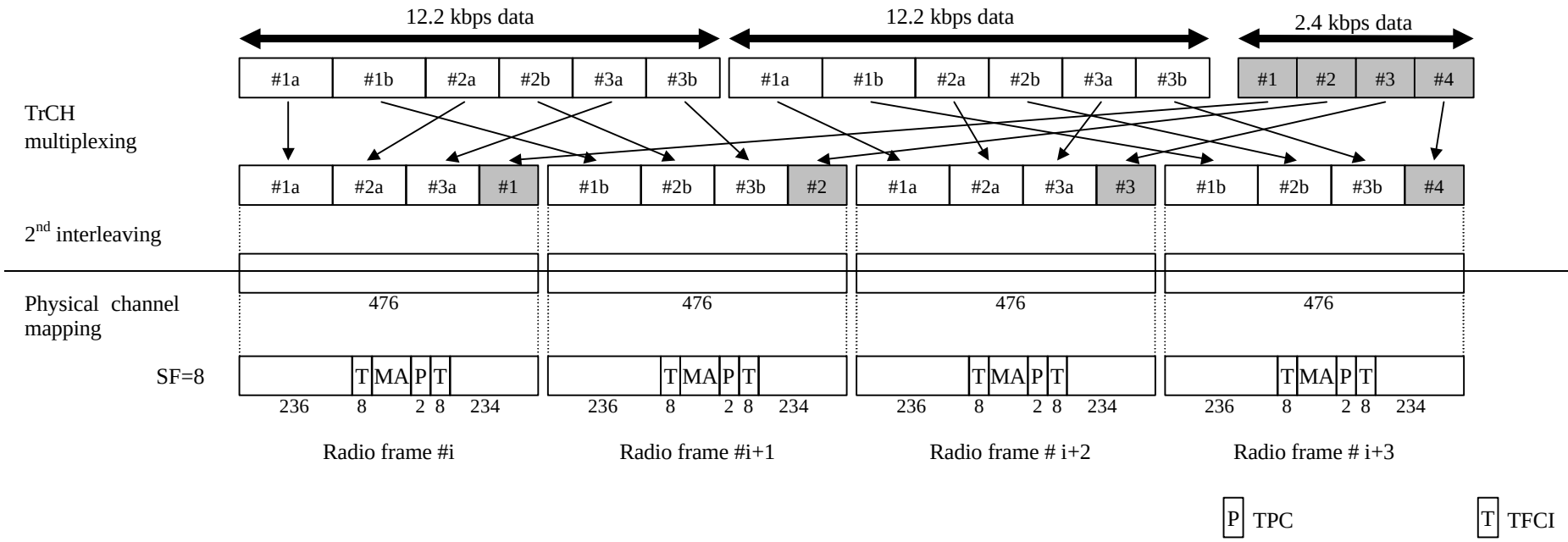
Figure 32: Channel coding and multiplexing example for Stand-alone mapping of ~~2~~3.4 kbps data

~~Table 28: Physical channel parameters for Stand-alone mapping of 2.4 kbps data~~

~~Midamble~~	~~512 chips~~
~~Codes and time slots~~	~~SF16 x 1 code x 1 time slot~~
~~TFCI~~	~~16 bits per user~~
~~TPC~~	~~2 bit~~

Example for multiplexing of 12.2 kbps data and ~~2~~ .4 kbps data

NOTE:


12.2 kbps data
12.2 kbps data
2.4 kbps data
#1a
#1b
#2a
#2b
#3a
#3b
#1
#2
#3
#4
TrCH multiplexing
2nd interleaving
Physical channel mapping
476
SF=8
T
MA
P
236
8
2
234
Radio frame #i
Radio frame #i+1
Radio frame # i+2
Radio frame # i+3
TPC
TFCI

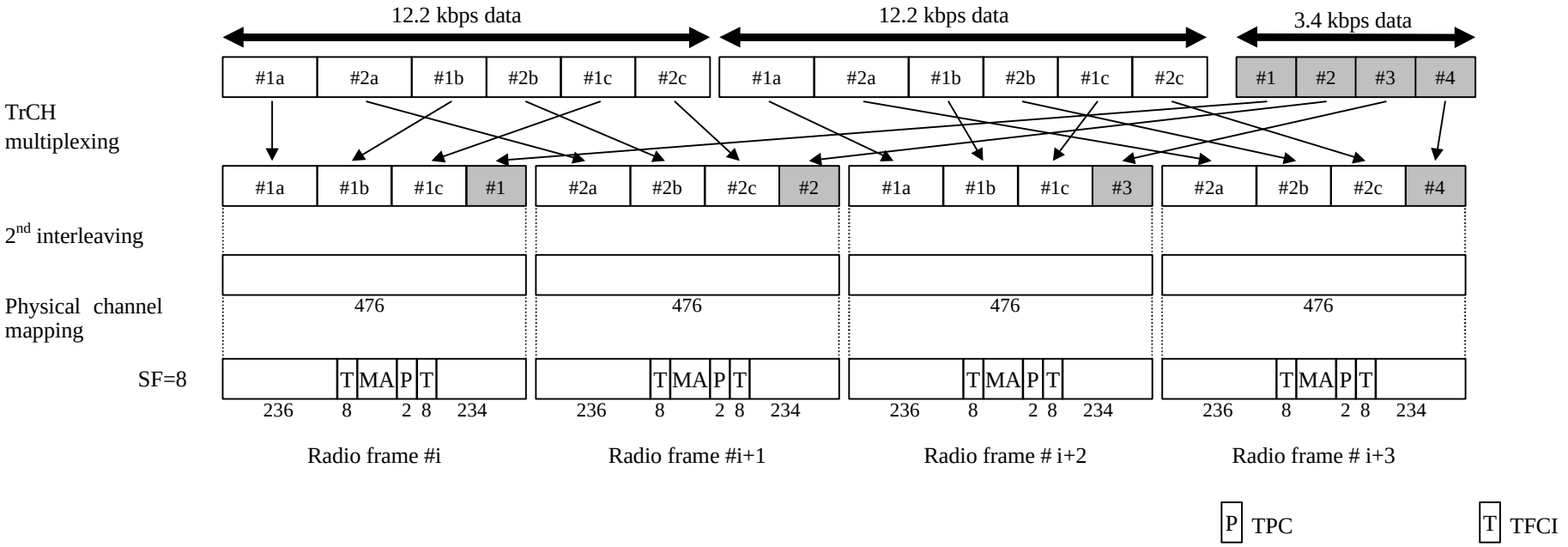


Figure 33: Channel coding and multiplexing example for multiplexing of 12.2 kbps data and ~~2~~3.4 kbps data

Table 29: Physical channel parameters for multiplexing of 12.2 kbps data and ~~2~~3.4 kbps data

Midamble	512 chips
Codes and time slots	SF8 x 1 code x 1 time slot
TFCI	16 bits per user
TPC	2 bit

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

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

Table 30 shows example of physical channel parameters for multiplexing of 28.8/57.6 kbps data and 3.4 kbps data.

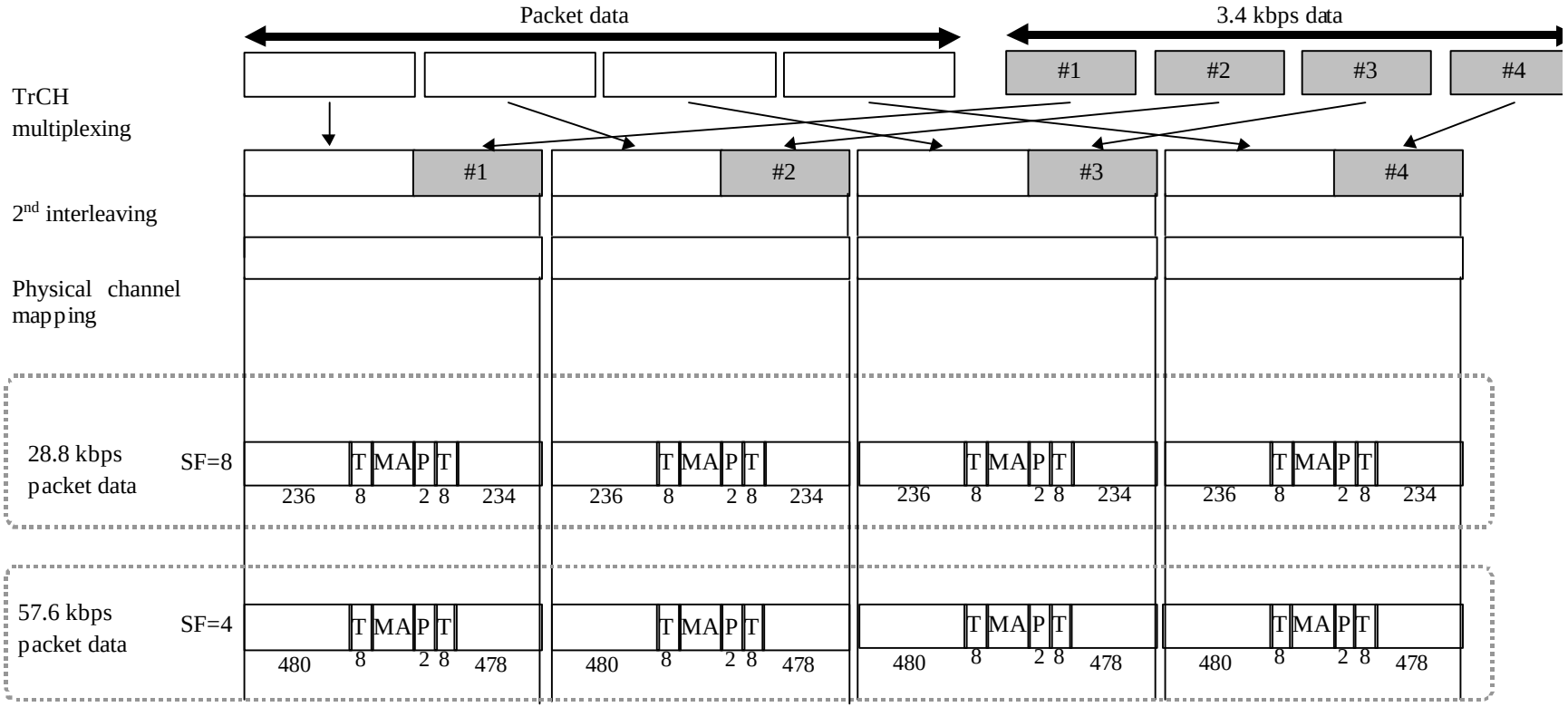


Figure 34: Channel coding and multiplexing example for multiplexing of 28.8/57.6 kbps data and 3.4 kbps data

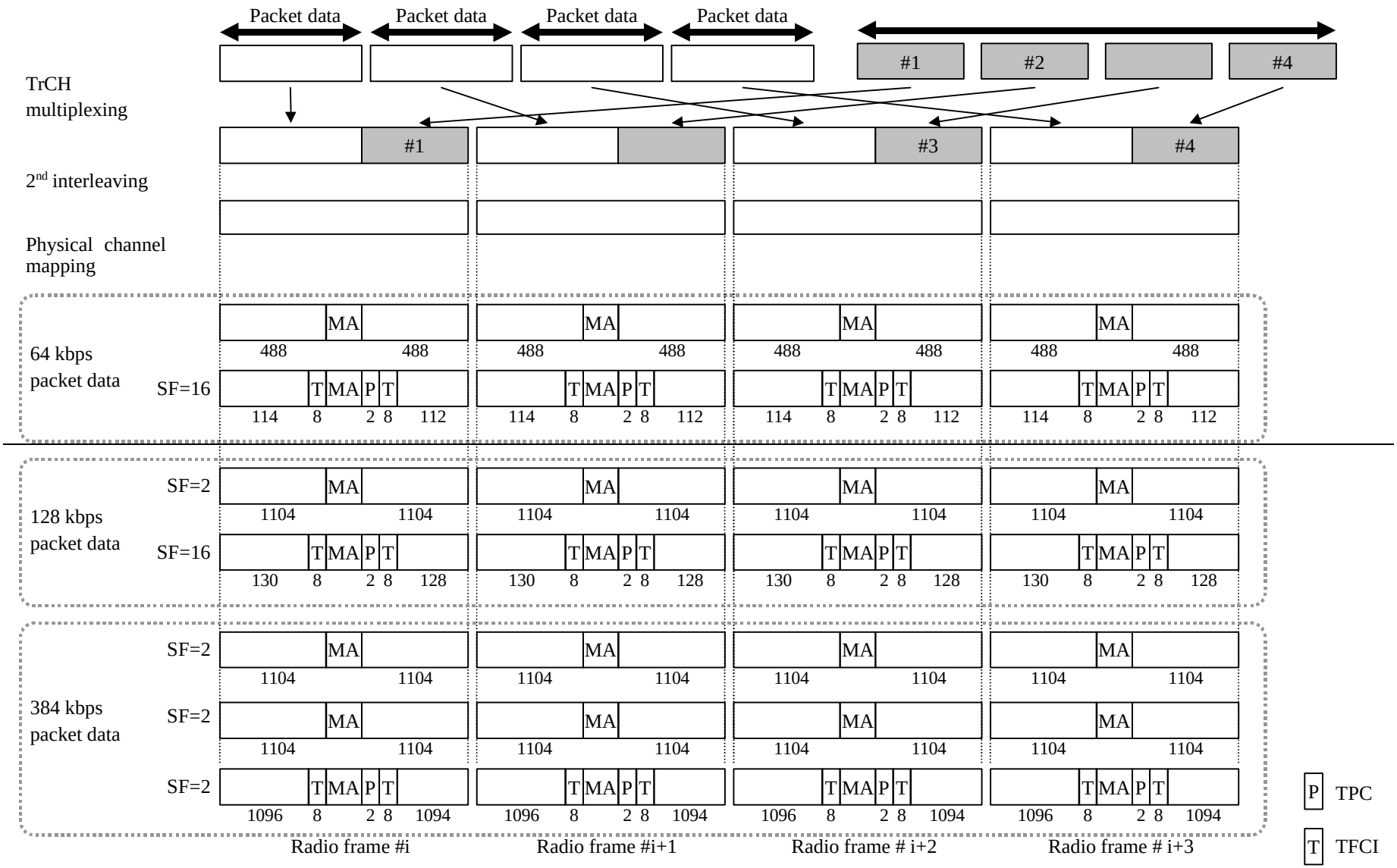
Table 30: Physical channel parameters for multiplexing of 28.8/57.6 kbps data and 3.4 kbps data

Midamble	28.8/57.6 kbps	512 chips
Codes & time slots	28.8 kbps	(SF4 x 1 code) x 1 time slot
	57.6 kbps	(SF2 x 1 code) x 1 time slot
TFCI		16 bits per user
TPC		2 bit

4.2.2.2.2.3 Example for multiplexing of 64/128/144/384 kbps packet data and ~~2~~3.4 kbps data

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

Table 30 shows example of physical channel parameters for multiplexing of 64/128/144/384 kbps packet data and ~~2~~3.4 kbps data.


Packet data
Packet data
Packet data
Packet data
#1
#2
#4
TrCH multiplexing
#1
#3
#4
2nd interleaving
Physical channel mapping
64 kbps packet data
SF=16
MA
488
T
P
114
8
2
112
128 kbps packet data
SF=2
SF=16
1104
130
128
384 kbps packet data
SF=2
SF=2
1096
1094
Radio frame #i
Radio frame #i+1
Radio frame # i+2
Radio frame # i+3
P TPC
T TFCI

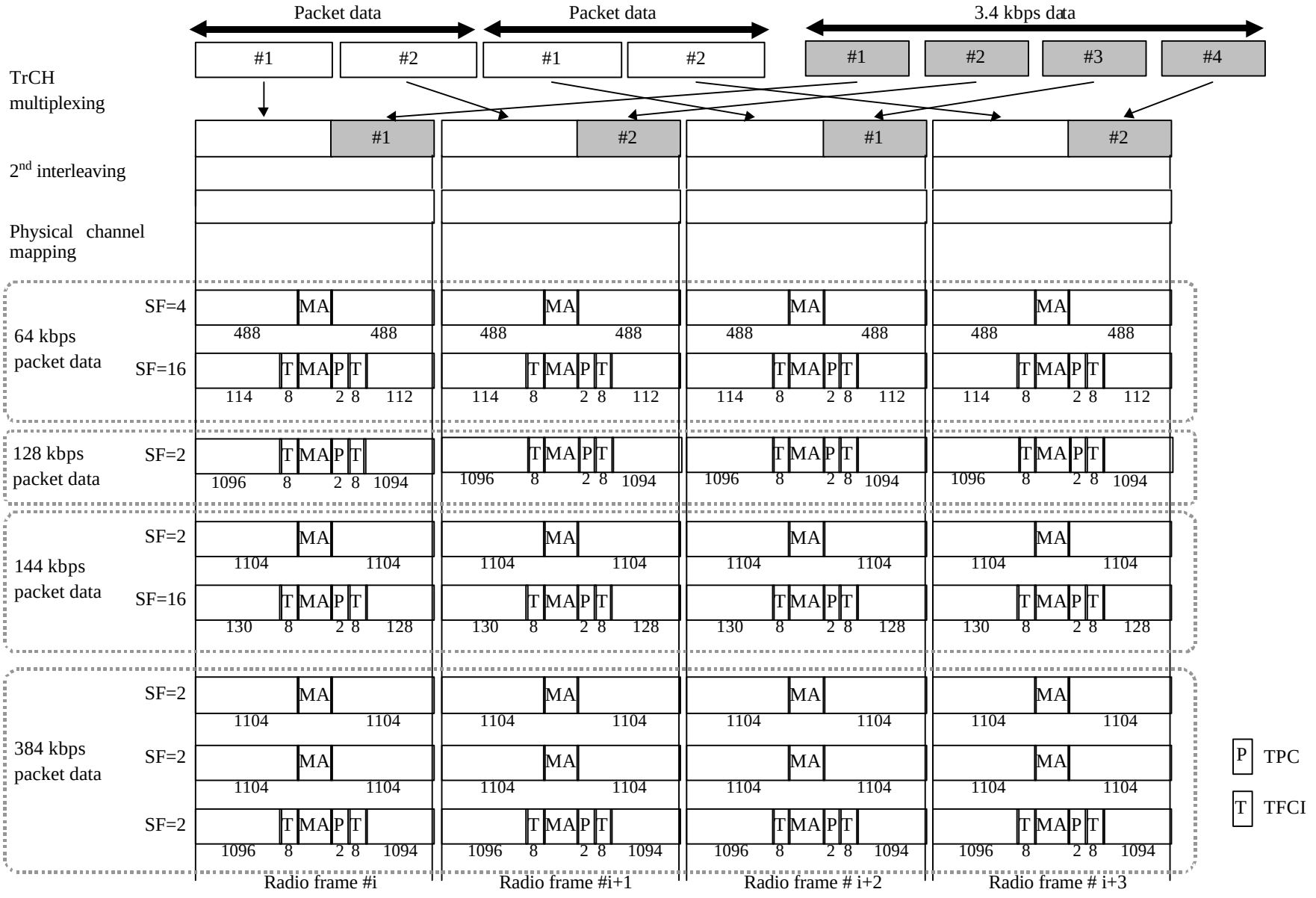

Packet data
Packet data
3.4 kbps data
#1
#2
#3
#4
TrCH multiplexing
2nd interleaving
Physical channel mapping
64 kbps packet data
128 kbps packet data
144 kbps packet data
384 kbps packet data
SF=4
SF=16
SF=2
MA
T
P
488
114
8
2
112
1096
1094
1104
130
128
TPC
TFCI
Radio frame #i
Radio frame #i+1
Radio frame # i+2
Radio frame # i+3

Figure 34 144/384 kbps packet data and –3.4 kbps data

: Physical channel parameters for multiplexing of 64/128/144/ 23

Midamble	64 kbps	
	128 & 144 & 384 kbps	256 chips
Codes & time	64 kbps	{(SF16 x 1 code) + (SF4 x 1 code)} x 1 time slot
slots	128 kbps	{(SF16 x 1 code) + (SF2 x 1 code)} x 1 time slot
	144 kbps	{(SF16 x 1 code) + (SF2 x 1 code)} x 1 time slot
	384 kbps	SF2 x 1 code x 3 time slot
TFCI		16 bits per user
TPC		2 bit

NOTE: As an additional example, physical channels can also be mapped without using multicode per timeslot, e.g.:

for 64kbps: (SF16 x 1 code x 1 timeslot) + (SF4x 1 code x 1 timeslot)

for 64kbps: (SF2 x 1 code x 1 timeslot)

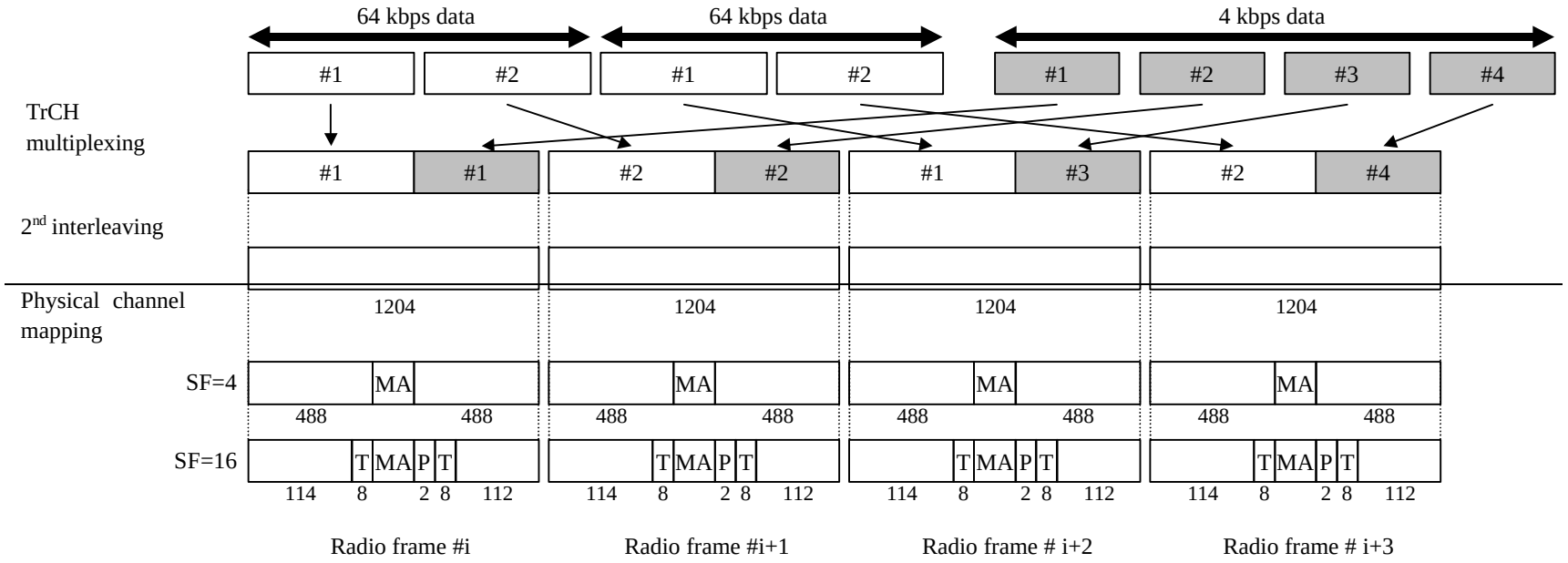
for 128kbps144kbps: (SF16 x 1 code x 1 timeslot) + (SF2x 1 code x 1 timeslot)

for 128kbps144kbps: (SF1 x 1 code x 1 timeslot)

4.2.2.2.2.4 ~~2~~3

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

shows example of physical channel parameters for multiplexing of 64~~/128/384~~ ~~packet~~ data and ~~–~~3.4 kbps data.


64 kbps data
64 kbps data
4 kbps data
#1
#2
#1
#2
#1
#2
#3
#4
TrCH multiplexing
#1
#1
#2
#2
#1
#3
#2
#4
2nd interleaving
Physical channel mapping
1204
1204
1204
1204
SF=4
MA
MA
MA
MA
488
488
488
488
488
488
488
488
SF=16
T
MA
P
T
114
8
2
8
112
Radio frame #i
Radio frame #i+1
Radio frame # i+2
Radio frame # i+3

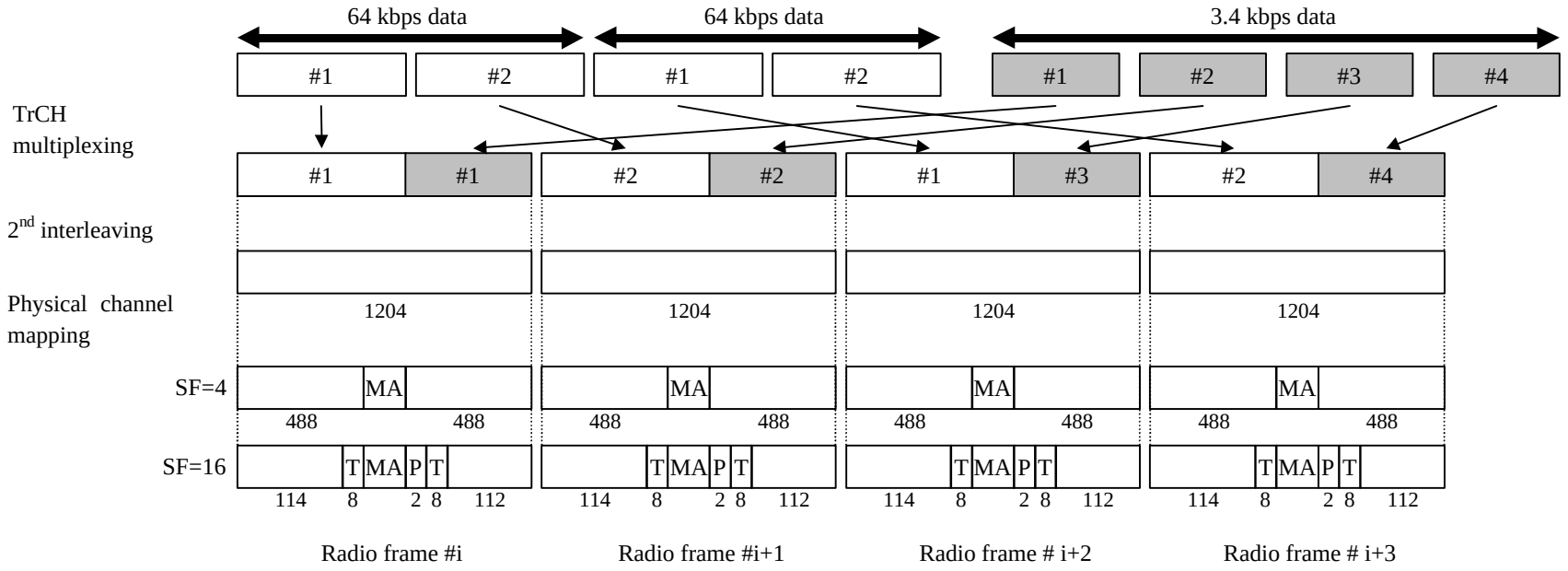


Figure 35: Channel coding and multiplexing example for multiplexing of 64 kbps packet data and ~~2~~3.4 kbps data

Table 31: Physical channel parameters for multiplexing of 64 kbps packet data and ~~2~~3.4 kbps data

Midamble	512 chips
Codes & time slots	{(SF16 x 1 code) + (SF4 x 1 code)} x 1 time slot
TFCI	16 bits per user
TPC	2 bit

NOTE: As an additional example, physical channels can also be mapped without using multicode per timeslot, e.g.

for 64kbps: (SF16 x 1 code x 1 timeslot) + (SF4 x 1 code x 1 timeslot)

for 64kbps: (SF2 x 1 code x 1 timeslot)