Annex A (informative): Connection Diagrams

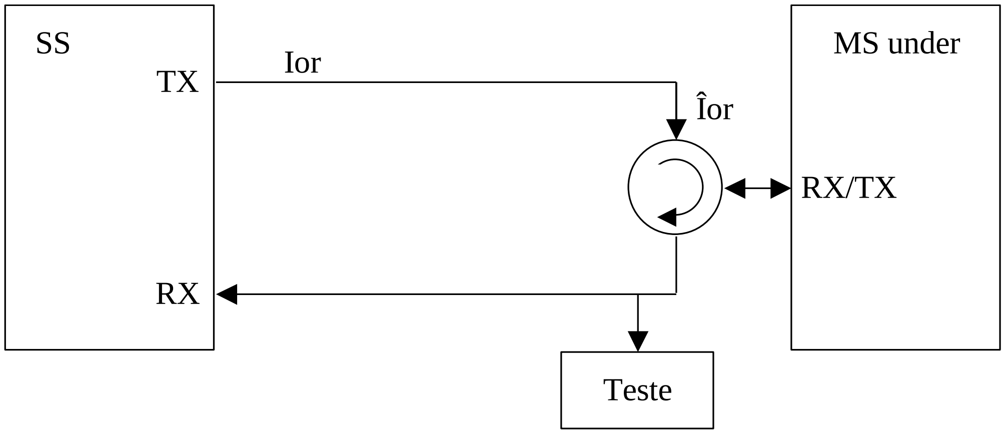


Figure A.1: Connection for Basic TX Test

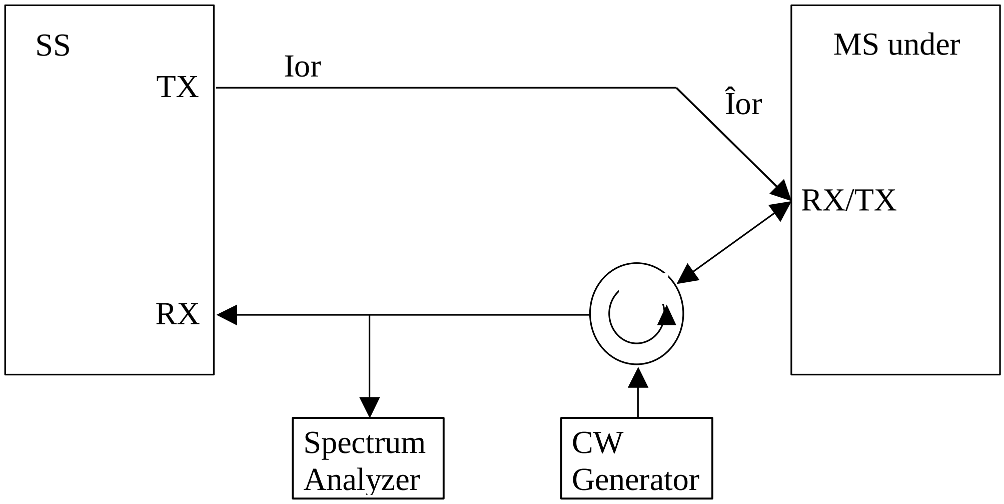


Figure A.2: Connection for TX Intermodulation Test

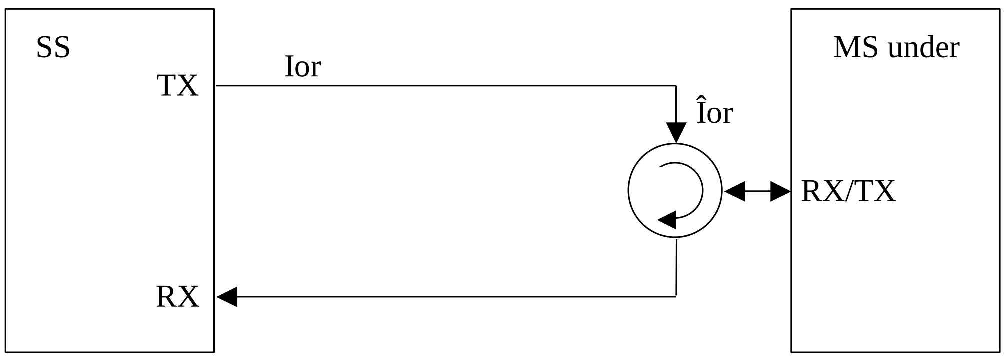


Figure A.3: Connection for Basic RX Test

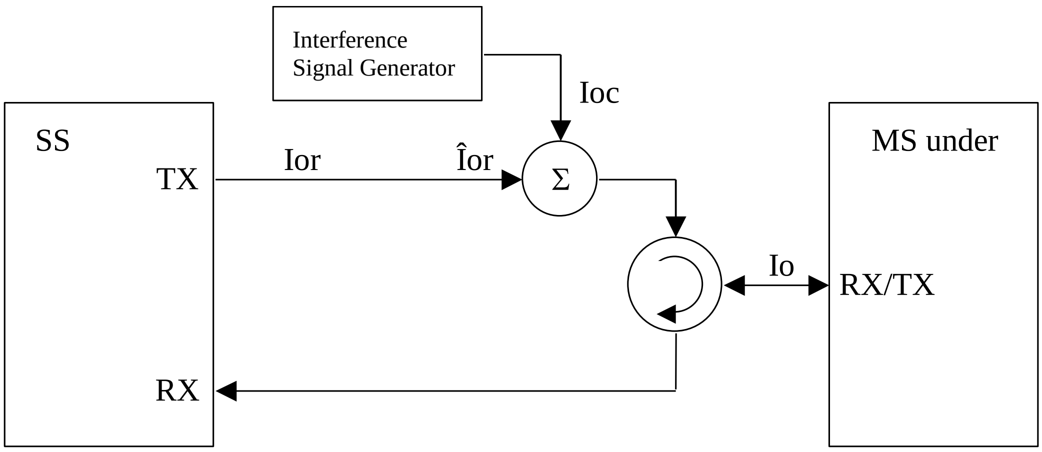


Figure A.4: Connection for RX Test with Interference

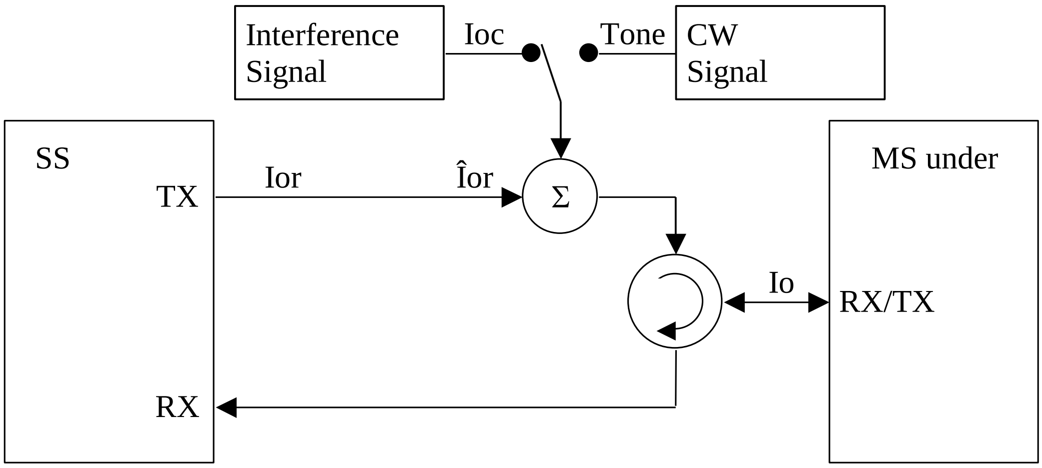


Figure A.5: Connection for RX Test with Interference or additional CW

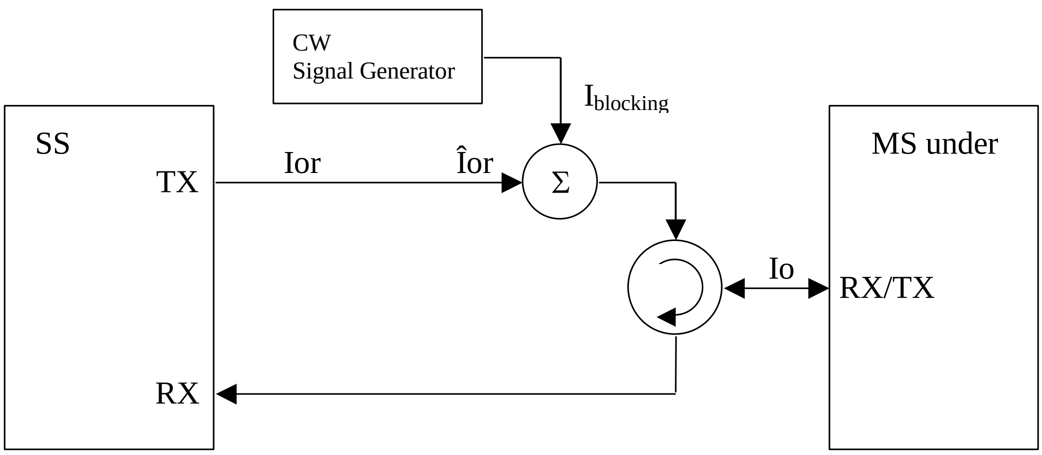


Figure A.6: Connection for RX Test with additional CW

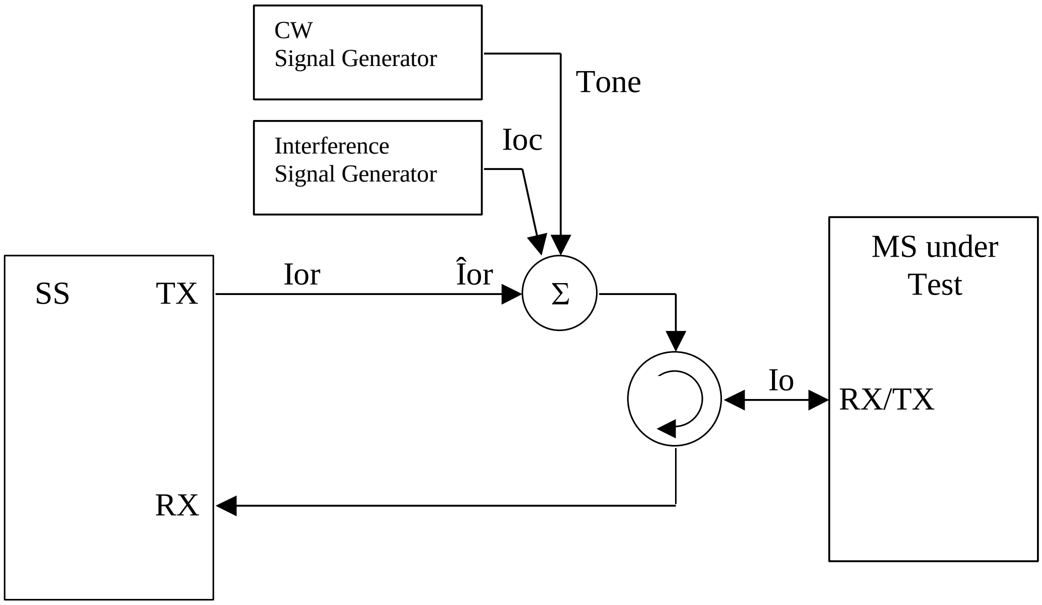


Figure A.7: Connection for RX Test with both Interference and additional CW

Figure A.8: Connection for Spurious Emission Test

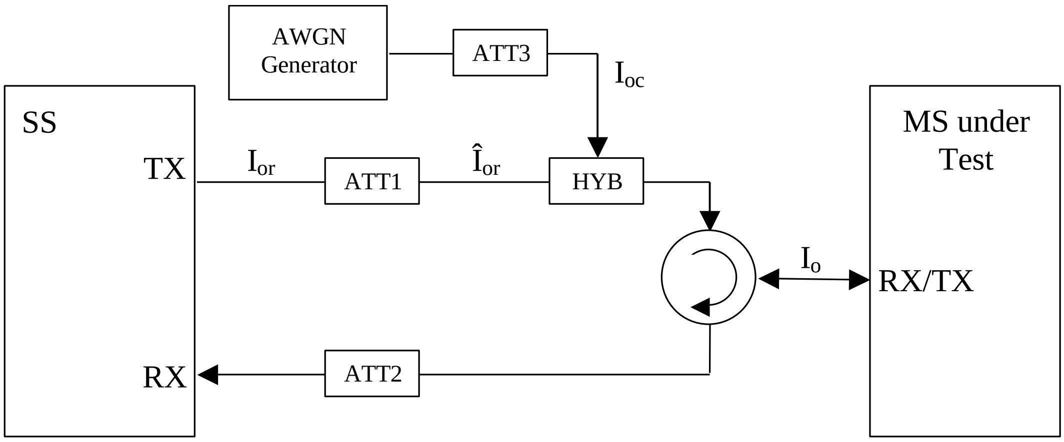


Figure A.9: Connection for Static Channel Test

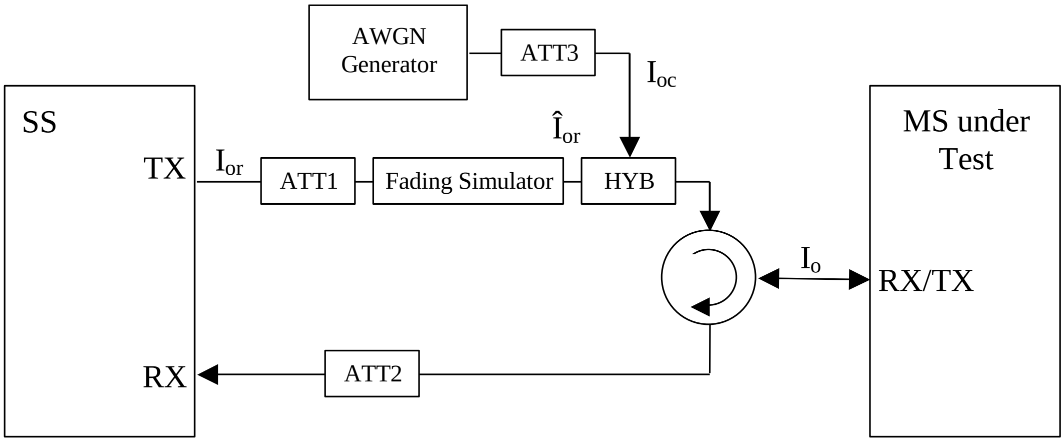


Figure A.10: Connection for Multiple Fading Channel Test

Figure A.11: Void

Figure A.12: Void

Figure A.13: Void

Figure A.14: Void

Figure A.15: Void

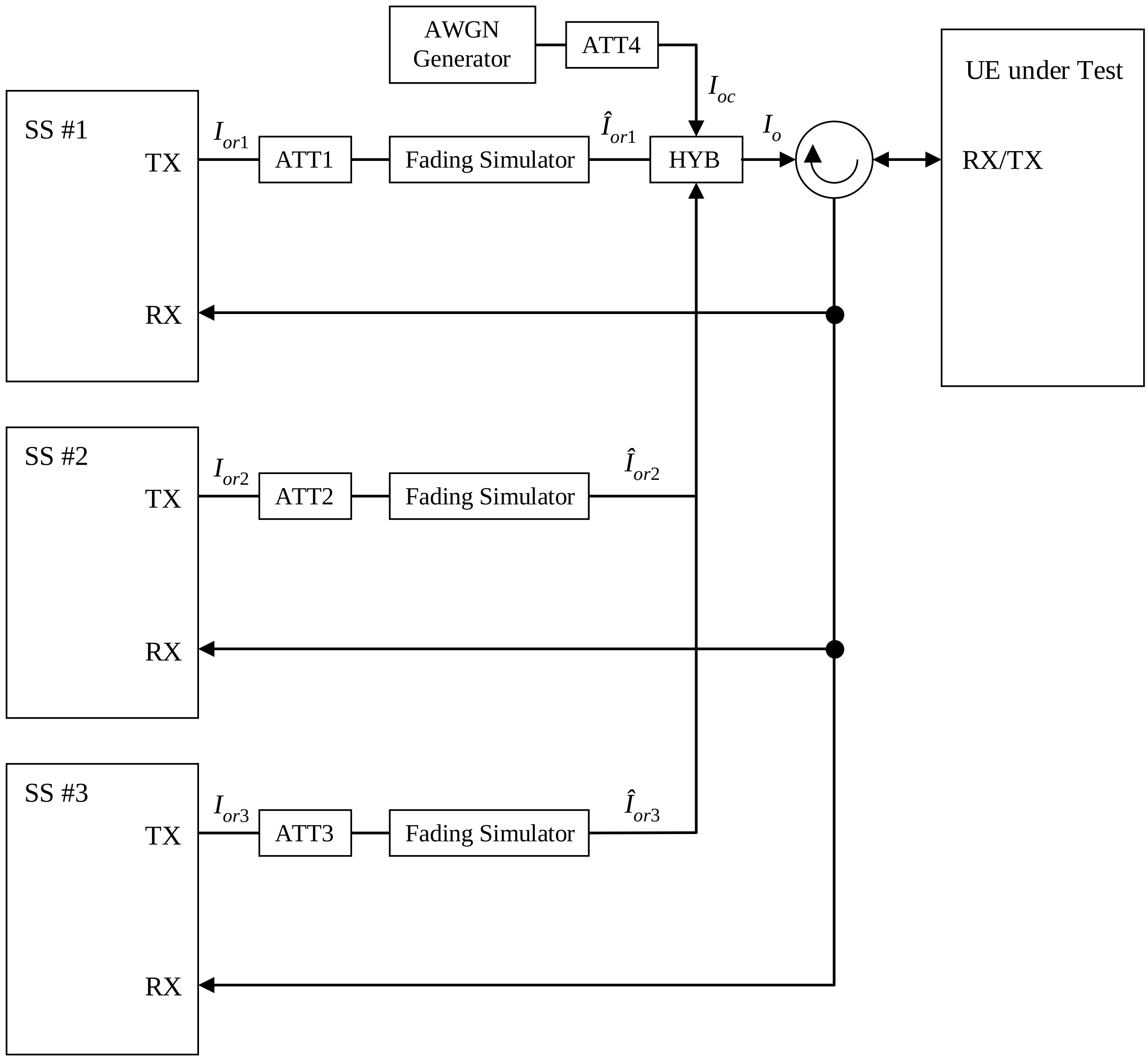


Figure A.16: Connection for three cell tests with Multi-path Fading propagation

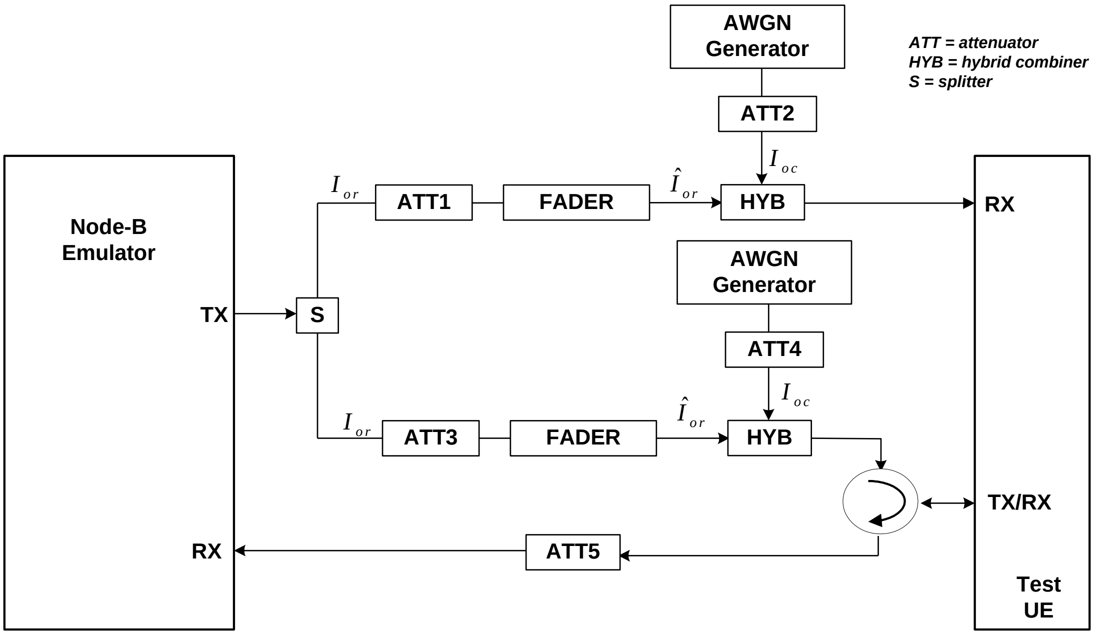


Figure A.17: Connection for single cell tests with Multi-path Fading propagation and UE receive diversity

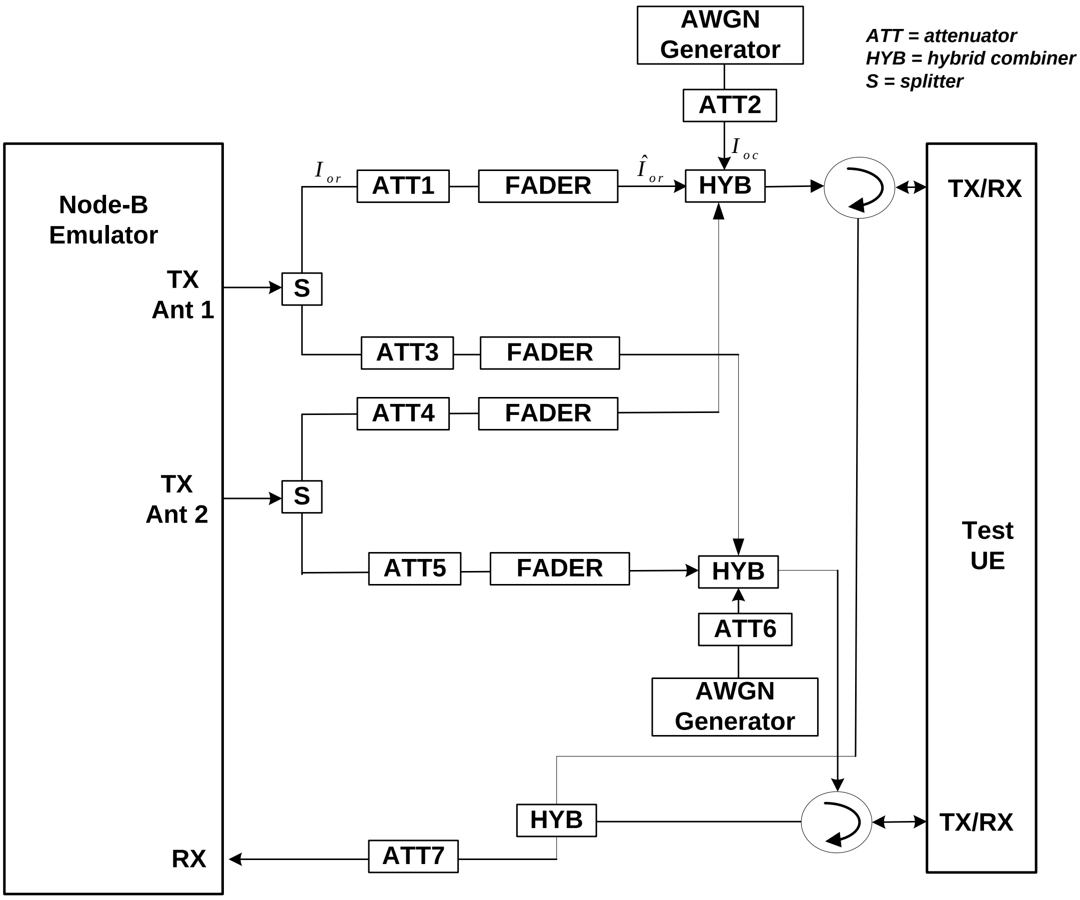


Figure A.18: Connection for MIMO performance Test for MIMO capable UE with Multiple Fading Channel

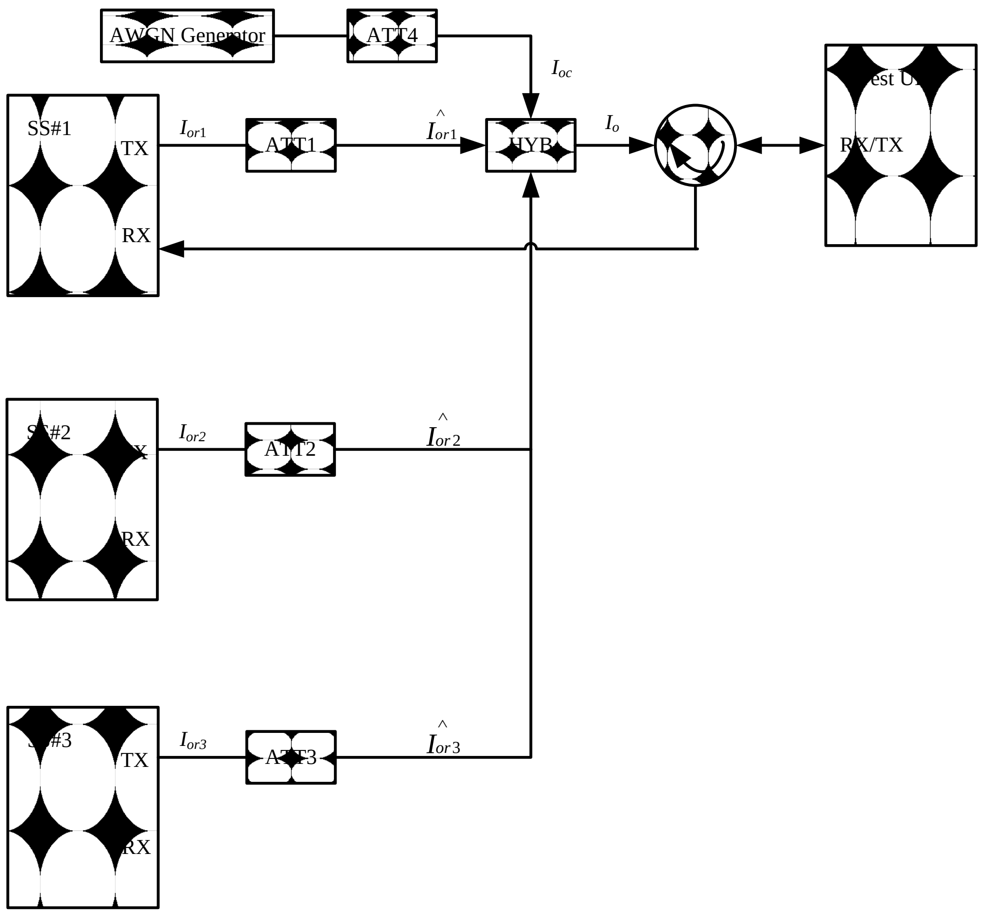


Figure A.19: Connection for performance test under multiple-cell scenario with static propagation

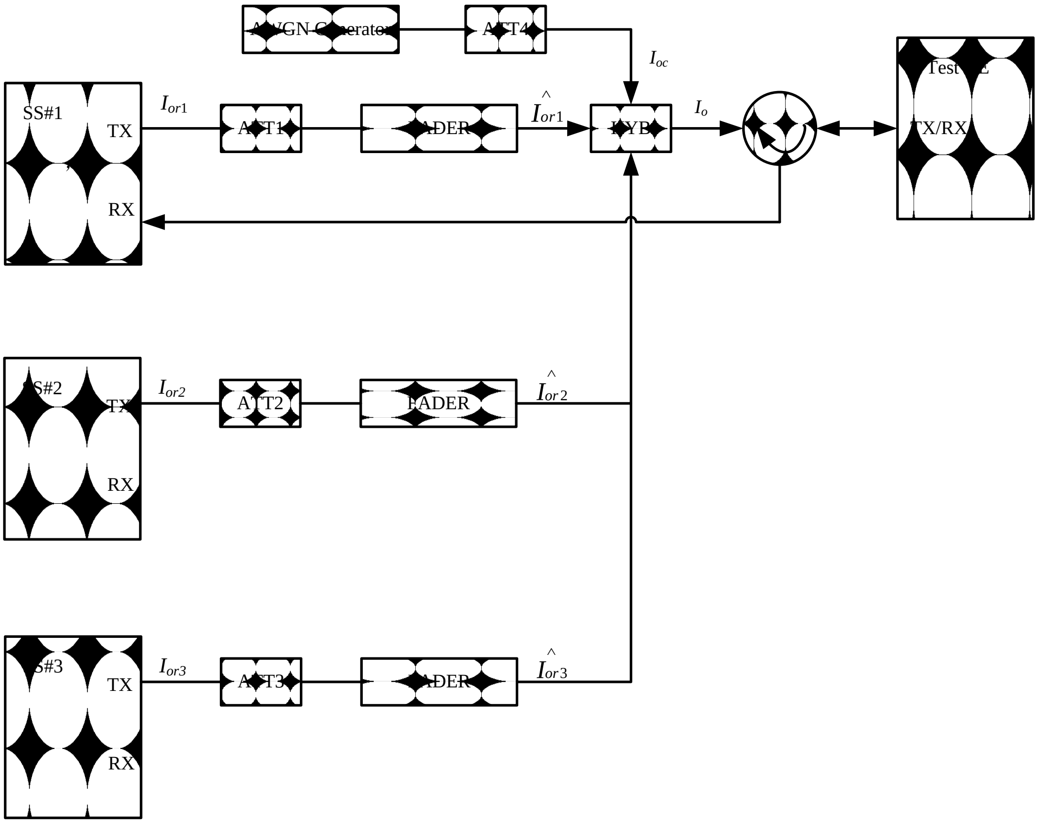


Figure A.20: Connection for performance test under multiple-cell scenario with Multi-path Fading propagation

Annex B (normative): Global In-Channel TX-Test

B.1 General

The global in-channel Tx test enables the measurement of all relevant parameters that describe the in-channel quality of the output signal of the Tx under test in a single measurement process.

The parameters describing the in-channel quality of a transmitter, however, are not necessarily independent. The algorithm chosen for description inside this annex places particular emphasis on the exclusion of all interdependencies among the parameters. Any other algorithm (e.g. having better computational efficiency) may be applied, as long as the results are the same within the accuracy limits.

All notes referred in the various clauses of B.2 are put together in B.3.

B.2 Definition of the process

B.2.1 Basic principle

The process is based on the comparison of the actual **output signal of the TX under test**, received by an ideal receiver, with a **reference signal**, that is generated by the measuring equipment and represents an ideal error free received signal. The reference signal shall be composed of the same number of codes at the correct spreading factors as contained in the test signal. Note, for simplification, the notation below assumes only codes of one spreading factor although the algorithm is valid for signals containing multiple spreading factors.

All signals are represented as equivalent (generally complex) baseband signals.

B.2.2 Output signal of the TX under test

The output signal of the TX under test is acquired by the measuring equipment, filtered by a matched filter (RRC 0.22, correct in shape and in position on the frequency axis) and stored for further processing.

The following form represents the physical signal in the entire measurement interval:

one vector **Z**, containing N = ns x sf + ma complex samples;

with

ns: number of symbols in the measurement interval;

sf: number of chips per symbol. (sf: spreading factor) (see Note: Symbol length)

ma: number of midamble chips

B.2.3 Reference signal

The reference signal is constructed by the measuring equipment according to the relevant TX specifications.

It is filtered by the same matched filter, mentioned in B.2.2., and stored at the Inter-Symbol-Interference free instants. The following form represents the reference signal in the entire measurement interval:

one vector **R**, containing N = ns x sf + ma complex samples;

ns, sf, ma: see B.2.2

B.2.4 void

B.2.5 Classification of measurement results

The measurement results achieved by the global in-channel TX test can be classified into two types:

Results of type "deviation", where the error-free parameter has a non-zero magnitude. (These are the parameters that quantify the integral physical characteristic of the signal).These parameters are:

- RF Frequency
- Power (in case of single code)
- Code Domain Power (in case of multi code)
- Timing

(Additional parameters: see Note: Deviation)

Results of type "residual", where the error-free parameter has value zero. (These are the parameters that quantify the error values of the measured signal, whose ideal magnitude is zero). These parameters are:

- Error Vector Magnitude (EVM);
- Peak Code Domain Error (PCDE).

(Additional parameters: see Note residual).

B.2.6 Process definition to achieve results of type "deviation"

The reference signal (**R**; see clause B.2.3) and the signal under Test (Z; see subclause B.2.2) are varied with respect to the parameters mentioned in clause B.2.5 under "results of type deviation" in order to achieve best fit. Best fit is achieved when the RMS difference value between the varied signal under test and the varied reference signal is an absolute minimum.

Overview:

$$FCT[\ Z(\tilde{f},\tilde{t},\tilde{\varphi},g_1,g_2,...,g_{synch}) - R(f,t,\varphi,\tilde{g}_1,\tilde{g}_2,...,\tilde{g}_{synch})\ ] = Minimum!$$

Z : Signal under test.

R: Reference signal,

with frequency f, the timing t, the phase φ, gain of code1 (g_1), gain of code2 (g_2) etc, and the gain of the synch channel g_{synch}

The parameters marked with a tilde in Z and R are varied in order to achieve a best fit.

Detailed formula: see Note: Formula for the minimum process

The varied reference signal, after the best fit process, will be called **R'.**

The varied signal under test, after the best fit process, will be called **Z'.**

The varying parameters, leading to **R' and Z'** represent directly the wanted results of type "deviation". These measurement parameters are expressed as deviation from the reference value with units same as the reference value.

In case of multi code, the type-"deviation"-parameters (frequency, timing and (RF-phase)) are varied commonly for all codes such that the process returns one frequency-deviation, one timing deviation, (one RF-phase –deviation).

(These parameters are not varied on the individual codes signals such that the process would return kr frequency errors... . (kr: number of codes in the reference signal)).

The only type-"deviation"-parameters varied individually are the code domain gain factors (g1, g2, …).

E.2.5.1 Decision Point Power

The mean-square value of the signal-under-test, sampled at the best estimate of the of Intersymbol-Interference-free points using the process defined in subclause 2.5, is referred to the *Decision Point Power* (DPP):

E.2.5.2 Code-Domain Power

The samples, Z', are separated into symbol intervals to create ns time-sequential vectors **z** with sf complex samples comprising one symbol interval. The *Code Domain Power* is calculated according to the following steps:

1) Take the vectors **z** defined above.

2) To achieve meaningful results it is necessary to descramble **z,** leading to **z'**

3) Take the orthogonal vectors of the channelization code set **C** (all codes belonging to one spreading factor) as defined in TS 25.213 and TS 25.223 (range +1, -1), and normalize by the norm of the vectors to produce **C**norm=**C**/sqrt(sf). (see Note: Symbol length)

4) Calculate the inner product of **z'** with **C**norm**.**. Do this for all symbols of the measurement interval and for all codes in the code space.
This gives an array of format k x ns, each value representing a specific symbol and a specific code, which can be exploited in a variety of ways.

k: total number of codes in the code space

ns: number of symbols in the measurement interval

5) Calculate k mean-square values, each mean-square value unifying ns symbols within one code.
(These values can be called "*Absolute CodeDomainPower* (CDP)" [$Volt^2$].) The sum of the k values of CDP is equal to DPP.

6) Normalize by the decision point power to obtain

$$Relative\ CodeDomain\ Power = \frac{Absolute\ CodeDomainPower}{DecisionPointPower}$$

B.2.7 Process definition to achieve results of type "residual"

The difference between the varied reference signal (**R'**; see clauseB.2.6.) and the varied TX signal under test (**Z'**; see clause B.2.6) is the error vector **E** versus time:

$$\mathbf{E} = \mathbf{Z'} - \mathbf{R'}.$$

Depending on the parameter to be evaluated, it is appropriate to represent **E** in one of the following two different forms:

Form EVM (representing the physical error signal in the entire measurement interval)

One vector **E**, containing N = ns x sf + ma complex samples;

ns, sf, ma: see B.2.2

Form PCDE (derived from Form EVM by separating the samples into symbol intervals)

ns time-sequential vectors **e** with sf complex samples comprising one symbol interval.

E gives results of type "residual" applying the two algorithms defined in clauses B 2.7.1 and B 2.7.2.

B.2.7.1 Error Vector Magnitude (EVM)

The Error Vector Magnitude EVM is calculated according to the following steps:

1) Take the error vector **E** defined in clause B.2.7 (Form EVM) and calculate the RMS value of **E**; the result will be called RMS(**E**).

2) Take the varied reference vector **R'** defined in clause B.2.6 and calculate the RMS value of **R'**; the result will be called RMS(**R'**).

3) Calculate EVM according to:

$$EVM = \frac{RMS(E)}{RMS(R')} \text{ x } 100\%$$ (here, EVM is relative and expressed in %)

(see note TDD)

(see note: Formula for EVM)

B.2.7.2 Peak Code Domain Error (PCDE)

The Peak Code Domain Error is calculated according to the following steps:

1) Take the error vectors **e** defined in clause B.2.7 (Form PCDE).

2) Take the orthogonal vectors of the channelisation - code set **C** (all codes belonging to one spreading factor) as defined in TS 25.213 and TS 25.223 (range +1, -1). (see Note: Symbol length) and normalize by the norm of the vectors to produce **C**norm= **C**/sqrt(sf). (see Note: Symbol length).

3) To achieve meaningful results it is necessary to descramble **e,** leading to **e'**.

4) Calculate the inner product of **e'** with **C**norm. Do this for all symbols of the measurement interval and for all codes in the code space.
   This gives an array of format k x ns, each value representing an error-vector representing a specific symbol and a specific code, which can be exploited in a variety of ways.

   k: total number of codes in the code space

   ns: number of symbols in the measurement interval

5) Calculate k RMS values, each RMS value unifying ns symbols within one code.
   (These values can be called "*Absolute CodeEVMs*" [Volt].)

6) Find the peak value among the k "*Absolute CodeEVMs*".
   (This value can be called "*Absolute PeakCodeEVM*" [Volt].)

7) Calculate PCDE according to:

$$10*\lg \frac{(\text{"}\textit{Absolute PeakCodeEVM}\text{"})^2}{(RMS(\mathbf{R'}))^2} \text{ dB}$$ (a relative value in dB).

(see Note: Scrambling code)

(see Note TDD)

B.3 Notes

Note: Symbol length)

A general code multiplexed signal is multicode and multirate. In order to avoid unnecessary complexity, the measurement applications use a unique symbol-length, corresponding to a spreading factor, regardless of the really intended spreading factor. Nevertheless the complexity with a multicode / multirate signal can be mastered by introducing appropriate definitions.

Note: Deviation)

It is conceivable to regard more parameters as type „deviation" e.g. Chip frequency and RF-phase.

As chip-frequency and RF-frequency are linked together by a statement in the core specifications [1] it is sufficient to process RF frequency only.

A parameter RF-phase must be varied within the best fit process (B 2.6.). Although necessary, this parameter-variation doesn't describe any error, as the modulation schemes used in the system don't depend on an absolute RF-phase.

Note: Residual)

It is conceivable to regard more parameters as type „residual" e.g. IQ origin offset. As it is not the intention of the test to separate for different error sources, but to quantify the quality of the signal, all such parameters are not extracted by the best fit process, instead remain part of EVM and PCDE.

Note Scrambling Code)

To interpret the measurement results in practice it should be kept in mind that erroneous code power on unused codes is generally de-scrambled differently under test conditions and under real life conditions, whereas erroneous code power on used codes is generally de-scrambled equally under test conditions and under real life conditions. It might be indicated if a used or unused code hits PCDE.

Note TDD)

EVM covers the midamble part as well as the data part; however PCDE disregards the midamble part.

NOTE: Fomula for the minimum process

$$L(\Delta\tilde{f},\Delta\tilde{t},\Delta\tilde{\varphi},\Delta\tilde{g}_c,...,\Delta\tilde{g}_{mid}) = \sum_{\nu=0}^{N-1}\left|Z(\nu)-R(\nu)\right|^2$$

Legend:

L: the function to be minimised

The parameters to be varied in order to minimize are:

$\Delta\tilde{f}$: the RF frequency offset

$\Delta\tilde{t}$: the timing offset

$\Delta\tilde{\varphi}$: the phase offset

$\Delta\tilde{g}_c$ ... code power offsets (one offset for each code)

$\Delta\tilde{g}_{mid}$: the power offset of the midamble

Z(ν): Samples of the signal under Test

R(ν): Samples of the reference signal

$\sum_{\nu=0}^{N-1}$: counting index ν starting at the beginning of the measurement interval and ending at its end.

N = No of chips during the measurement interval.

Z(ν): Samples of the signal under Test. It is modelled as a sequence of complex baseband samples Z(γ) with a time-shift Δt, a frequency offset Δf, a phase offset Δφ, the latter three with respect to the reference signal.

$$Z(\nu) = Z(\nu - \Delta\tilde{t}) * e^{-j2\pi\Delta\tilde{f}\nu} * e^{-j\Delta\tilde{\varphi}}$$

R(ν): Samples of the reference signal:

$$R(\nu) = \sum_{c=1}^{\substack{No.of\\codes}} (g_c + \Delta\tilde{g}_c) * Chip_c(\nu) + (g_{mid} + \Delta\tilde{g}_{mid}) * Chip_{mid}(\nu)$$

g : nominal gain of the code channel or midamble

$\Delta\tilde{g}$: The gain offset to be varied in the minimum process

Chip(ν) is the chipsequence of the code channel or midamble

Indices at g, Δg and Chip:

The index indicates the code channel: c = 1,2,... No of code channels

Range for $Chip_c$: +1,-1

NOTE: Formula for EVM

$$EVM = \sqrt{\frac{\sum_{\nu=0}^{N-1} \left| Z'(\gamma) - R'(\gamma) \right|^2}{\sum_{\nu=0}^{N-1} \left| R'(\gamma) \right|^2}} * 100\%$$

Z'(γ), R'(γ) are the varied measured and reference signals.

Annex C (normative): Measurement channels

C.1 General

Void.

C.2 UL Reference measurement channels

C.2.1 UL reference measurement channel (12,2 kbps)

C.2.1.1 3,84 TDD Option

Table C.2.1.1: UL reference measurement channel physical parameters (12,2 kbps)

Parameter	
Information data rate	12,2 kbps
RU´s allocated	2 RU
Midamble	512 chips
Interleaving	20 ms
Power control	2 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate 1/3 : DCH of the DTCH / DCH of the DCCH	10% / 0%

Table C.2.1.2: UL reference measurement channel using RLC-TM for DTCH, transport channel parameters (12.2 kbps)

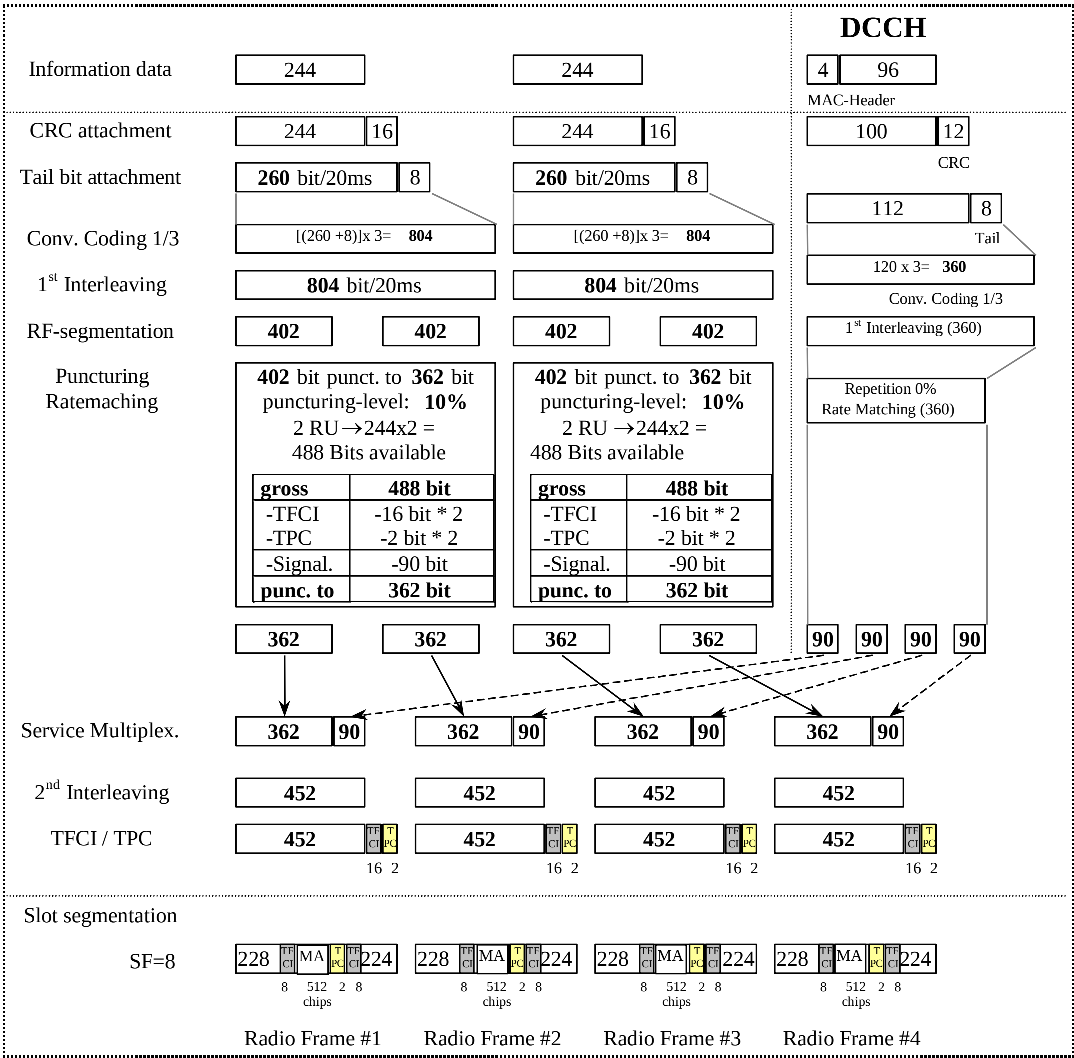
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		244	88/80
	Max data rate, bps		12200	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		244	100
	TFS	TF0, bits	0*244	0*100
		TF1, bits	1*244	1*100
	TTI, ms		20	40
	Coding type		Convolution Coding	Convolution Coding
	Coding Rate		1/3	1/3
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		804	360
	Uplink: Max number of bits/radio frame before rate matching		402	90
	RM attribute		220	242

Table C.2.1.3: UL reference measurement channel, TFCS (12.2 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.2.1.4: UL reference measurement channel, puncturing limit (12.2 kbps)

DPCH Downlink	Puncturing limit	0.88



C.2.1.2 UL reference measurement channel (12,2 kbps) for 1,28 Mcps TDD Option

Parameter	
Information data rate	12,2 kbps
RU's allocated	1TS (1*SF8) = 2RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
Synchronisation Shift (SS)	4 Bit/user/10ms
Inband signalling DCCH	2 kbps
Puncturing level at Code rate 1/3: DCH of the DTCH / DCH of the DCCH	33% / 33%

C.2.1.3 7,68 TDD Option

Parameter	Value
Information data rate	12.2 kbps
RU´s allocated	2 RU
Midamble	1024 chips
Interleaving	20 ms
Power control	2 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate 1/3 : DCH of the DTCH / DCH of the DCCH	10% / 0%

Table C.2.1.2: UL reference measurement channel using RLC-TM for DTCH, transport channel parameters (12.2 kbps)

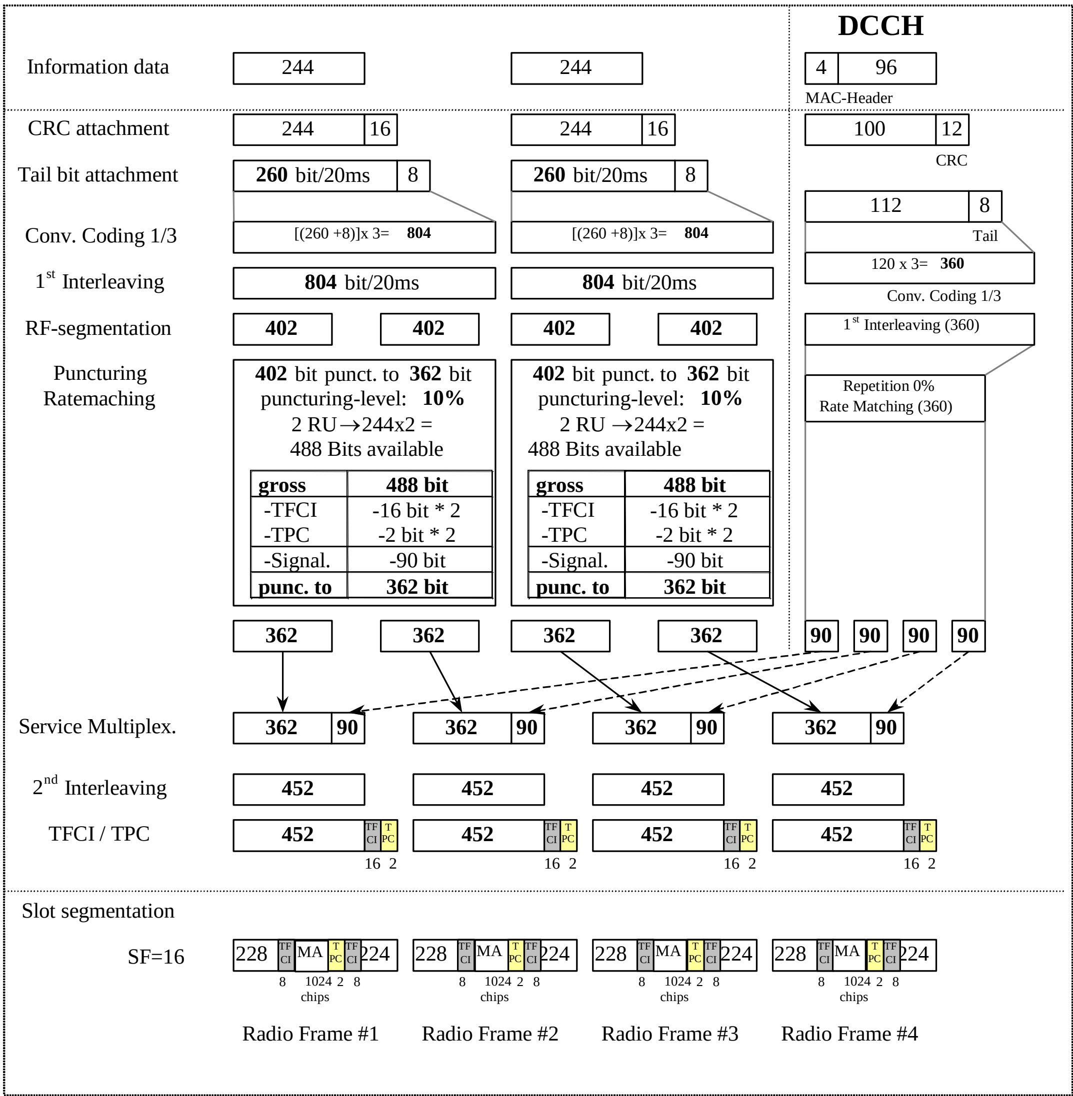
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		244	88/80
	Max data rate, bps		12200	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		244	100
	TFS	TF0, bits	0*244	0*100
		TF1, bits	1*244	1*100
	TTI, ms		20	40
	Coding type		Convolution Coding	Convolution Coding
	Coding Rate		1/3	1/3
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		804	360
	Uplink: Max number of bits/radio frame before rate matching		402	90
	RM attribute		220	242

Table C.2.1.3: UL reference measurement channel, TFCS (12.2 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.2.1.4: UL reference measurement channel, puncturing limit (12.2 kbps)

DPCH Downlink	Puncturing limit	0.88



C.2.2 UL multi code reference measurement channel (12,2 kbps)

C.2.2.1 3,84 Mcps TDD Option

Table C.2.2.1: UL reference measurement channel physical parameters (12,2 kbps, multi code)

Parameter	
Information data rate	12,2 kbps
RU´s allocated	2 RU
Midamble	512 chips
Interleaving	20 ms
Power control	2 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate 1/3 : DCH of the DTCH / DCH of the DCCH	5% / 0 %

Table C.2.2.2: UL reference measurement channel using RLC-TM for DTCH, transport channel parameters (12.2 kbps, multicode)

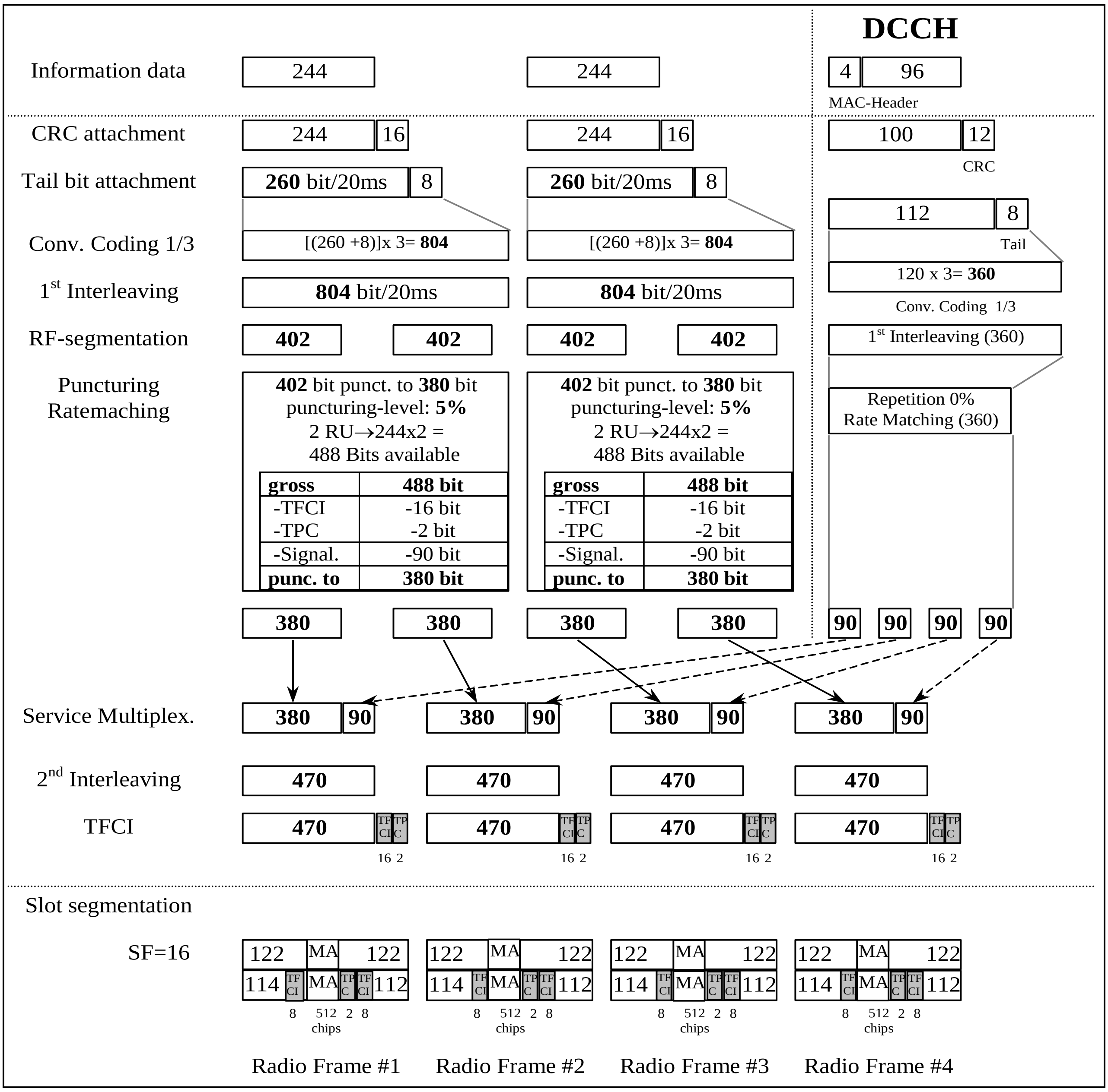
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		244	88/80
	Max data rate, bps		12200	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		244	100
	TFS	TF0, bits	0*244	0*100
		TF1, bits	1*244	1*100
	TTI, ms		20	40
	Coding type		Convolution Coding	Convolution Coding
	Coding Rate		1/3	1/3
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		804	360
	Uplink: Max number of bits/radio frame before rate matching		402	90
	RM attribute		220	232

Table C.2.2.3: UL reference measurement channel, TFCS (12.2 kbps, multicode)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.2.2.4: UL reference measurement channel, puncturing limit (12.2 kbps, mulitcode)

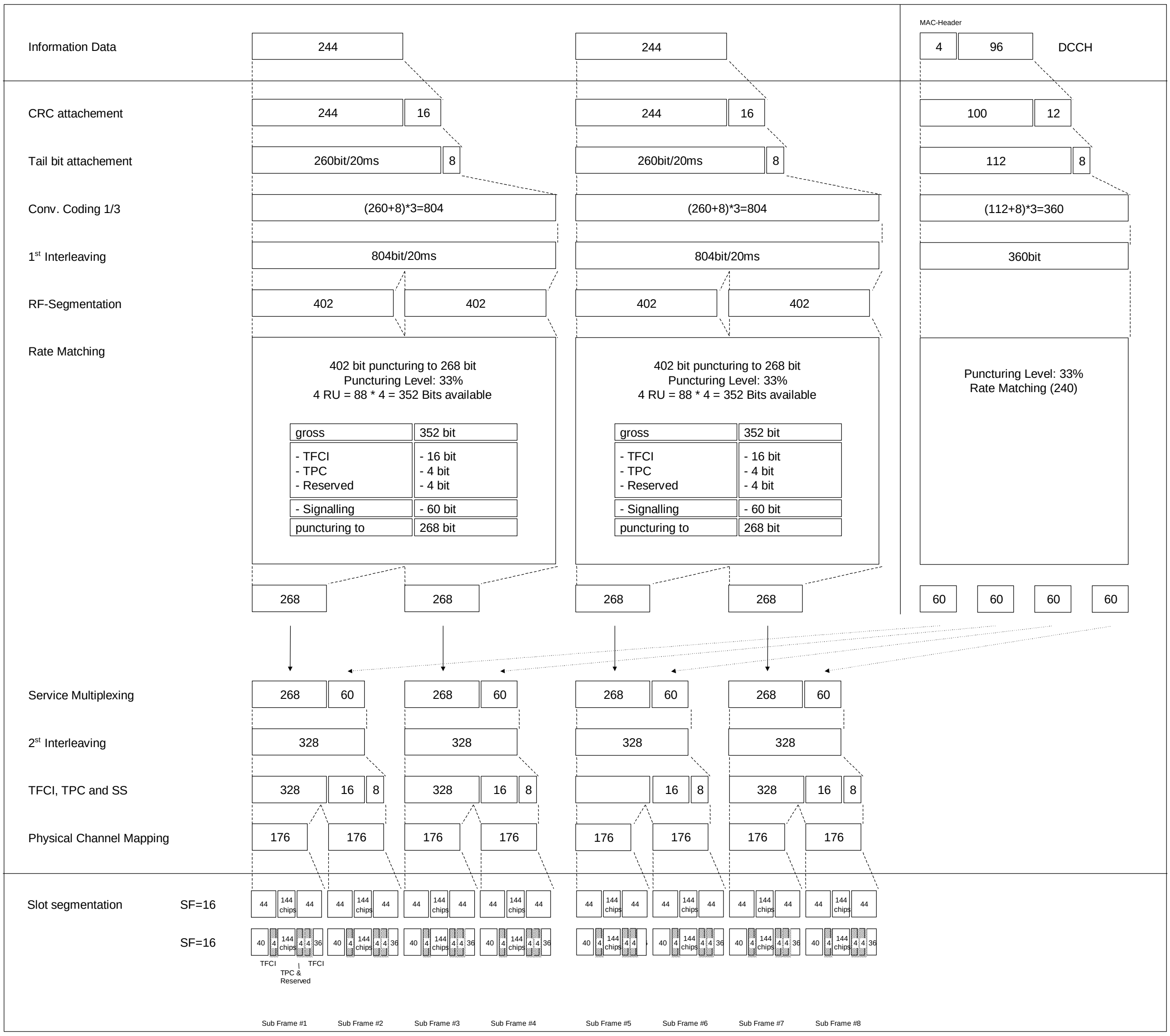
DPCH Downlink	Puncturing limit	0.92



C.2.2.2 UL multi code reference measurement channel (12,2 kbps) for 1,28 Mcps TDD Option

Table C.2.2.2

Parameter	Value
Information data rate	12,2 kbps
RU's allocated	1TS (2*SF16) = 2RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
4 Bit reserved for future use (place of SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate 1/3: DCH of the DTCH / DCH of the DCCH	33% / 33%



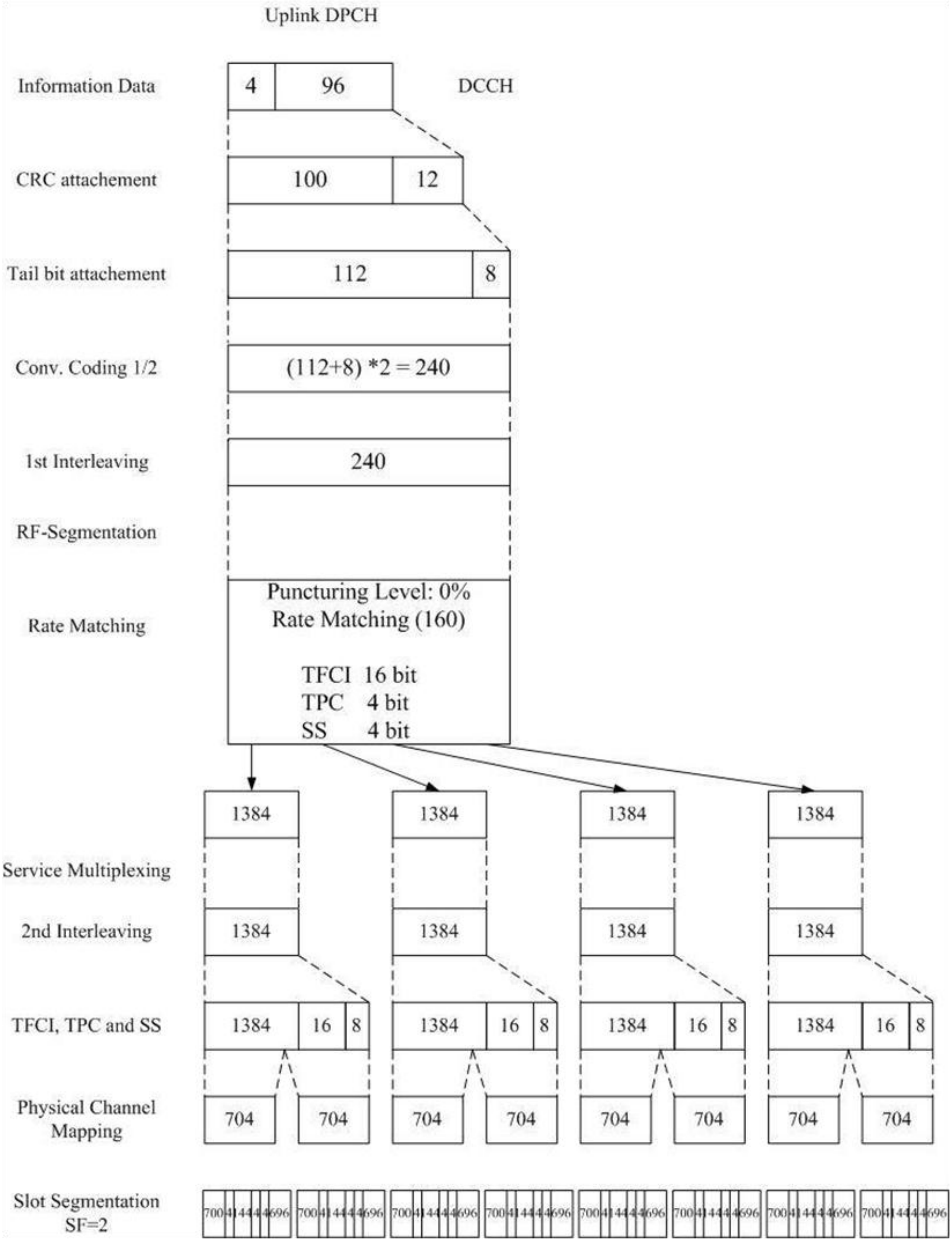
C.2.2.2a UL multi code(HS-SICH and DPCH) reference measurement channel for 1,28 Mcps TDD Option

Table C.2.2.2a: HS-SICH reference measurement channel

Parameter	Value
Information data rate	1.6kbps
RU's allocated	1TS (1*SF16) = 1RU/5ms
Midamble	144
Midamble Allocation	default
Scrambling code	0
Power control (TPC)	2 Bits/user/5ms
TFCI	0 Bits/user/5ms
Synchronisation Shift (SS)	2 Bits/user/5ms

Table C.2.2.2b: DPCH reference measurement channel

Parameter	Value
Information data rate	2.4kbps
RU's allocated	1TS (SF2) =8RU/5ms
Midamble	144
Midamble Allocation	default
Scrambling code	0
Power control (TPC)	2Bits/user/5ms
TFCI	8 Bits/user/5ms
Synchronisation Shift (SS)	2Bits/user/5ms


Uplink DPCH
Information Data
4
96
DCCH
CRC attachement
100
12
Tail bit attachement
112
8
Conv. Coding 1/2
(112+8) *2 = 240
1st Interleaving
240
RF-Segmentation
Rate Matching
Puncturing Level: 0%
Rate Matching (160)
TFCI 16 bit
TPC 4 bit
SS 4 bit
1384
Service Multiplexing
2nd Interleaving
1384
TFCI, TPC and SS
1384
16
8
Physical Channel Mapping
704
Slot Segmentation SF=2

C.2.2.3 7,68 Mcps TDD Option

Parameter	Value
Information data rate	12.2 kbps
RU´s allocated	2 RU
Midamble	1024 chips
Interleaving	20 ms
Power control	2 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate 1/3 : DCH of the DTCH / DCH of the DCCH	5% / 0 %

Table C.2.2.5: UL reference measurement channel using RLC-TM for DTCH, transport channel parameters (12.2 kbps, multicode)

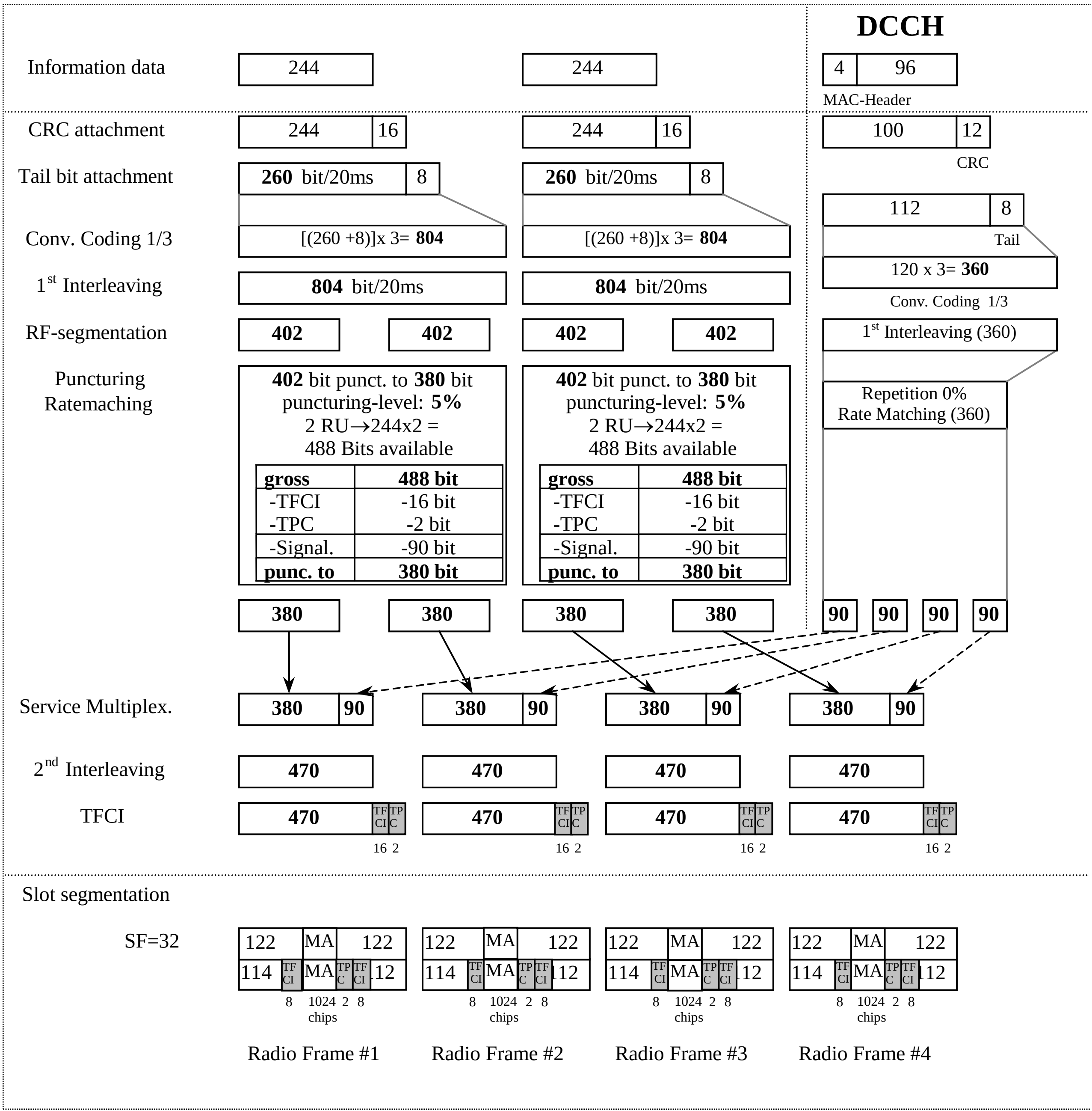
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		244	88/80
	Max data rate, bps		12200	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		244	100
	TFS	TF0, bits	0*244	0*100
		TF1, bits	1*244	1*100
	TTI, ms		20	40
	Coding type		Convolution Coding	Convolution Coding
	Coding Rate		1/3	1/3
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		804	360
	Uplink: Max number of bits/radio frame before rate matching		402	90
	RM attribute		220	232

Table C.2.2.6: UL reference measurement channel, TFCS (12.2 kbps, multicode)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.2.2.7: UL reference measurement channel, puncturing limit (12.2 kbps, mulitcode)

DPCH Downlink	Puncturing limit	0.92



C.2.3 UL reference measurement channel (64 kbps)

C.2.3.1 3.84 Mcps TDD Option

Table C.2.3.1: UL reference measurement channel physical parameters (64kbps)

Parameter	Value
Information data rate	64 kbps
RU´s allocated	1 SF4 + 1 SF16 = 5RU
Midamble	512 chips
Interleaving	20 ms
Power control	2 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate : 1/3 DCH of the DTCH / ½ DCH of the DCCH	43.8% / 13.3%

Table C.2.3.2: UL reference measurement channel using RLC-TM for DTCH, transport channel parameters (64 kbps)

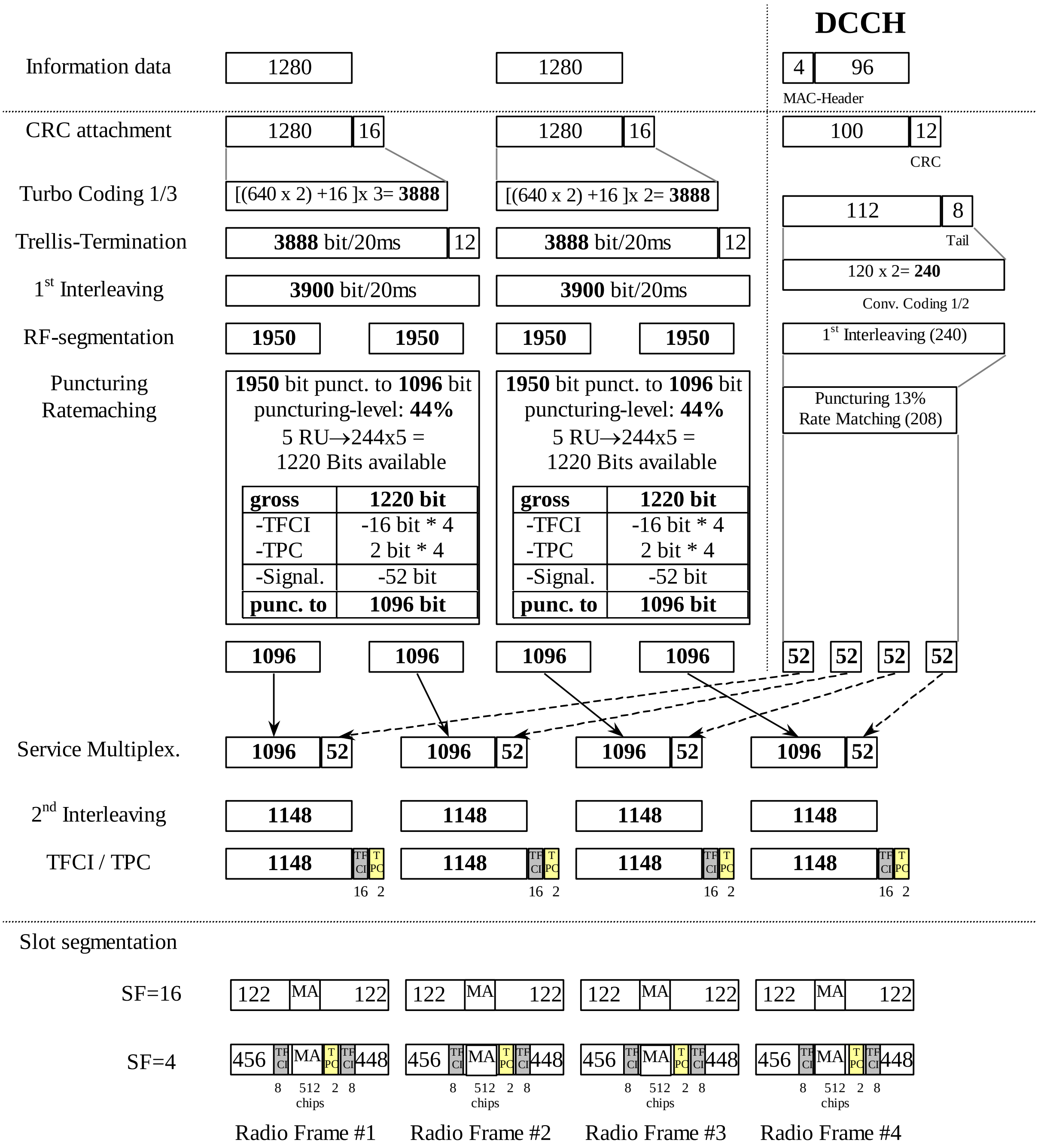
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		1280	88/80
	Max data rate, bps		64000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		1280	100
	TFS	TF0, bits	0*1280	0*100
		TF1, bits	1*1280	1*100
	TTI, ms		20	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		N/A	1/2
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		3900	240
	Uplink: Max number of bits/radio frame before rate matching		1950	60
	RM attribute		158	240

Table C.2.3.3: UL reference measurement channel, TFCS (64 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.2.3.4: UL reference measurement channel, puncturing limit (64 kbps)

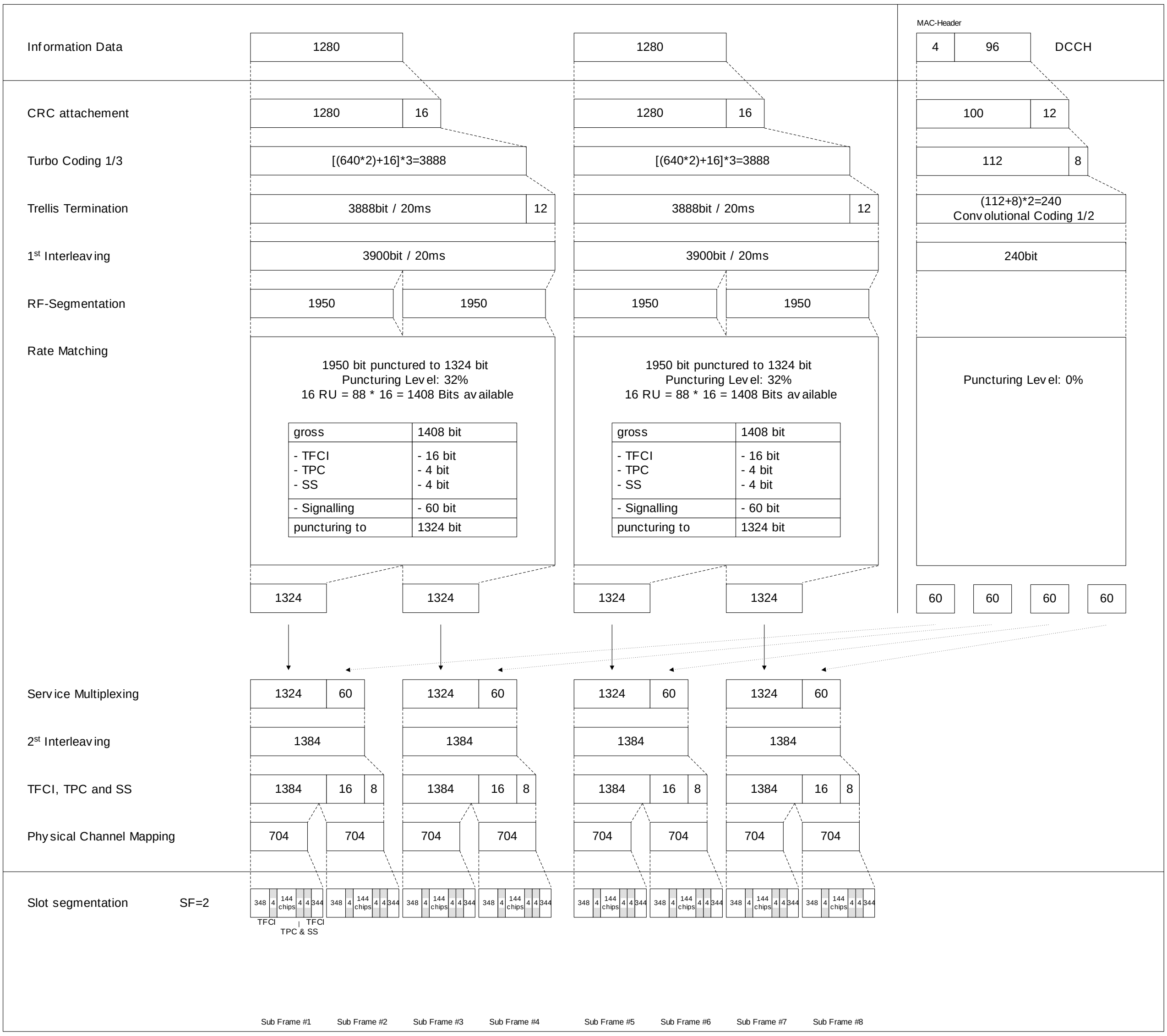
DPCH Downlink	Puncturing limit	0.56



C.2.3.2 1.28 Mcps TDD Option

Table C.2.3.2

Parameter	Value
Information data rate	64 kbps
RU's allocated	1TS (1*SF2) = 8RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
Synchronisation Shift (SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH of the DTCH / ½ DCH of the DCCH	32% / 0



C.2.3.3 7.68 Mcps TDD Option

Table C.2.3.5: UL reference measurement channel physical parameters (64kbps)

Parameter	Value
Information data rate	64 kbps
RU´s allocated	1 SF8 + 1 SF32 = 5RU
Midamble	1024 chips
Interleaving	20 ms
Power control	2 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate : 1/3 DCH of the DTCH / ½ DCH of the DCCH	43.8% / 13.3%

Table C.2.3.6: UL reference measurement channel using RLC-TM for DTCH, transport channel parameters (64 kbps)

Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		1280	88/80
	Max data rate, bps		64000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		1280	100
	TFS	TF0, bits	0*1280	0*100
		TF1, bits	1*1280	1*100
	TTI, ms		20	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		N/A	1/2
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		3900	240
	Uplink: Max number of bits/radio frame before rate matching		1950	60
	RM attribute		158	240

Table C.2.3.7: UL reference measurement channel, TFCS (64 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.2.3.8: UL reference measurement channel, puncturing limit (64 kbps)

DPCH Downlink	Puncturing limit	0.56

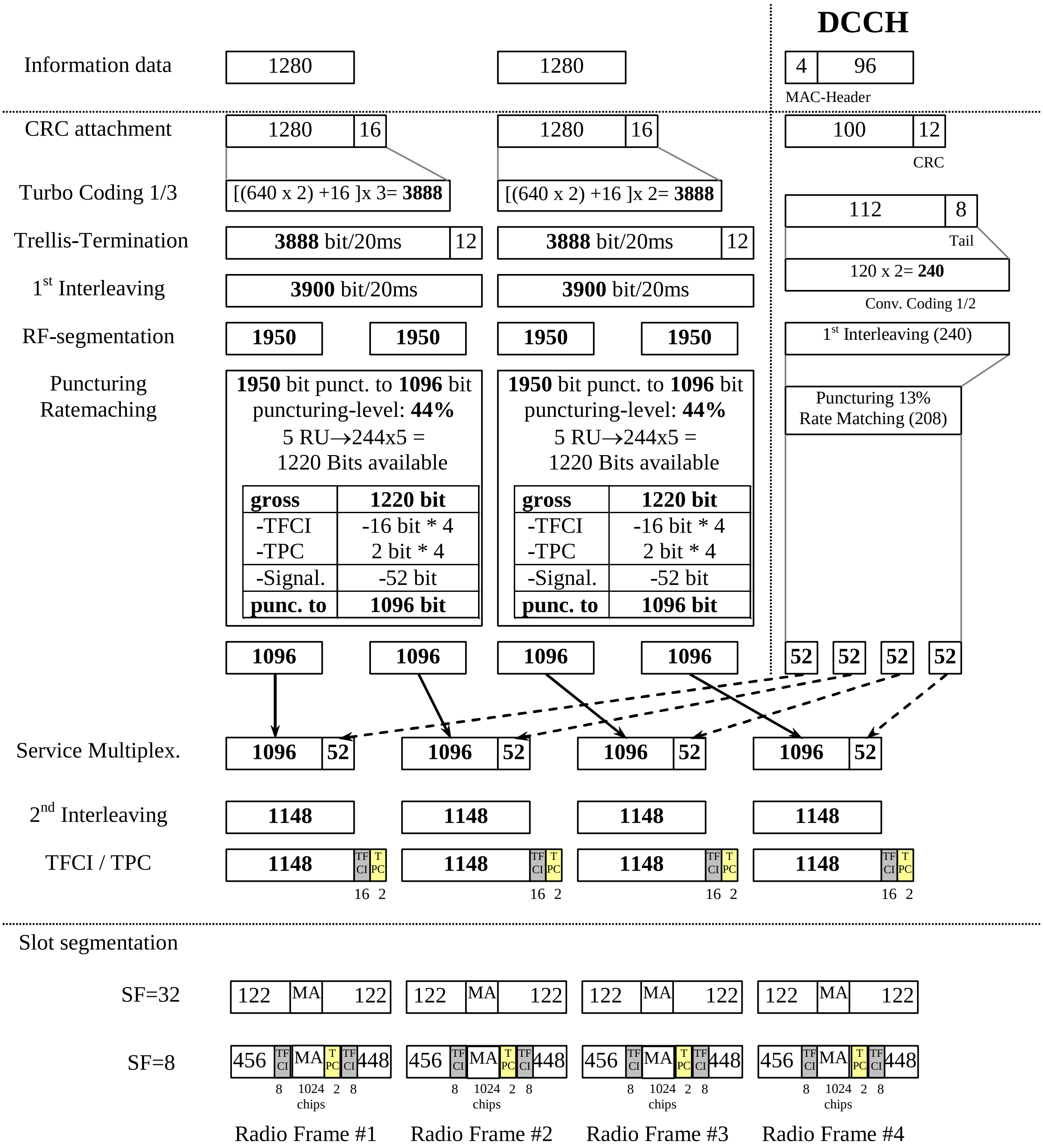

DCCH
Information data
1280
1280
4
96
MAC-Header
CRC attachment
1280
16
1280
16
100
12
CRC
Turbo Coding 1/3
[(640 x 2) +16]x 3= 3888
[(640 x 2) +16]x 2= 3888
112
8
Tail
Trellis-Termination
3888 bit/20ms
12
3888 bit/20ms
12
120 x 2= 240
Conv. Coding 1/2
1st Interleaving
3900 bit/20ms
3900 bit/20ms
1st Interleaving (240)
RF-segmentation
1950
1950
1950
1950
Puncturing
Ratemaching
1950 bit punct. to 1096 bit
puncturing-level: 44%
5 RU→244x5 =
1220 Bits available
gross 1220 bit
-TFCI -16 bit * 4
-TPC 2 bit * 4
-Signal. -52 bit
punc. to 1096 bit
1950 bit punct. to 1096 bit
puncturing-level: 44%
5 RU→244x5 =
1220 Bits available
gross 1220 bit
-TFCI -16 bit * 4
-TPC 2 bit * 4
-Signal. -52 bit
punc. to 1096 bit
Puncturing 13%
Rate Matching (208)
1096
1096
1096
1096
52
52
52
52
Service Multiplex.
1096 52
1096 52
1096 52
1096 52
2nd Interleaving
1148
1148
1148
1148
TFCI / TPC
1148 TFCI TPC
16 2
1148 TFCI TPC
16 2
1148 TFCI TPC
16 2
1148 TFCI TPC
16 2
Slot segmentation
SF=32
122 MA 122
122 MA 122
122 MA 122
122 MA 122
SF=8
456 TFCI MA TPC TFCI 448
8 1024 2 8
chips
456 TFCI MA TPC TFCI 448
8 1024 2 8
chips
456 TFCI MA TPC TFCI 448
8 1024 2 8
chips
456 TFCI MA TPC TFCI 448
8 1024 2 8
chips
Radio Frame #1
Radio Frame #2
Radio Frame #3
Radio Frame #4

Figure A.2B

C.2.4 UL reference measurement channel (144 kbps)

C.2.4.1 3.84 Mcps TDD Option

Table C.2.4.1: UL reference measurement channel physical parameters (144kbps)

Parameter	Value
Information data rate	144 kbps
RU´s allocated	1 SF2 + 1 SF16 = 9RU
Midamble	256 chips
Interleaving	20 ms
Pow er control	2 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate : 1/3 DCH of the DTCH / ½ DCH of the DCCH	47.3% / 20%

Table C.2.4.2: UL reference measurement channel using RLC-TM for DTCH, transport channel parameters (144 kbps)

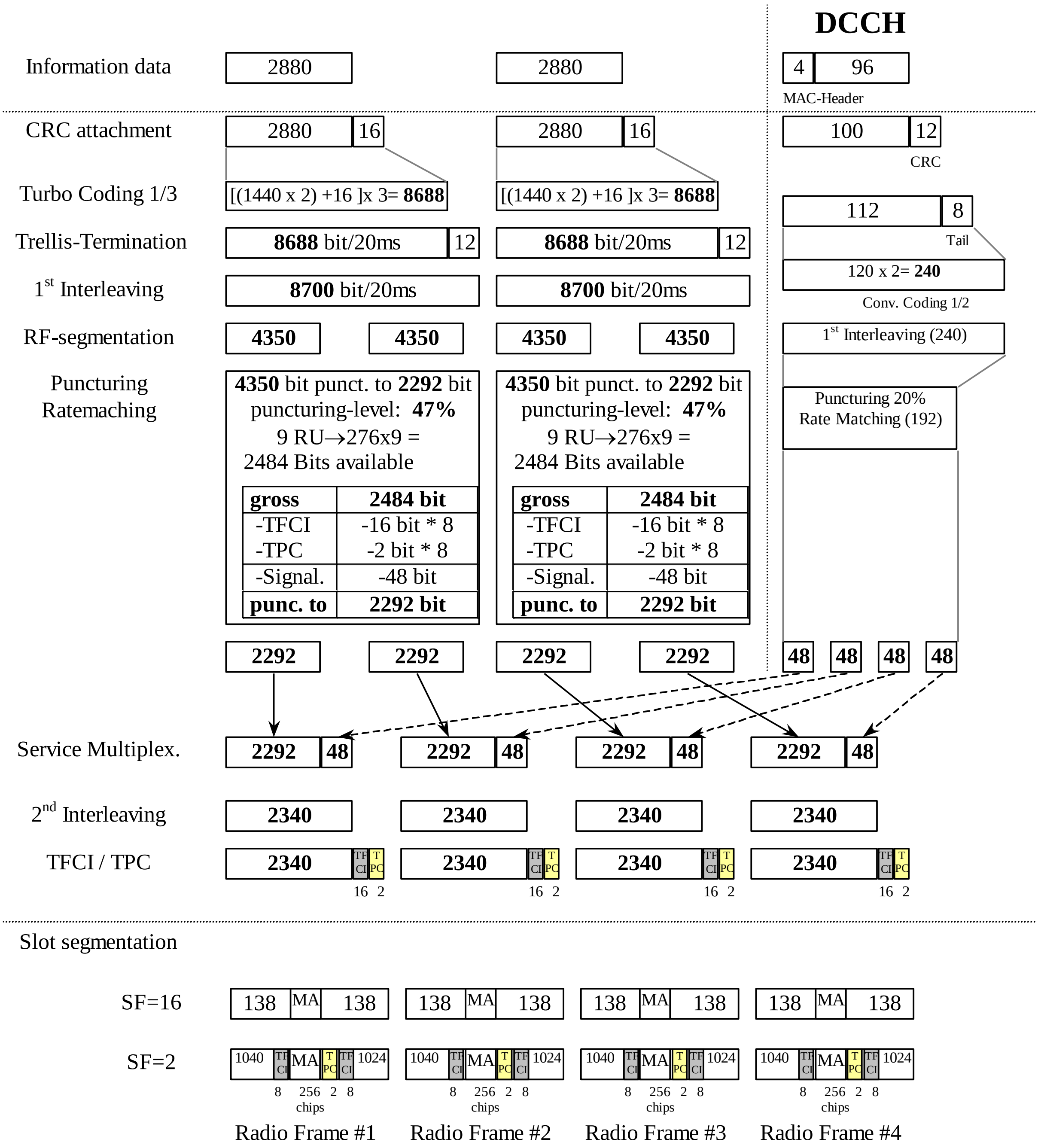
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		2880	88/80
	Max data rate, bps		144000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		2880	100
	TFS	TF0, bits	0*2880	0*100
		TF1, bits	1*2880	1*100
	TTI, ms		20	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		N/A	1/2
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		8700	240
	Uplink: Max number of bits/radio frame before rate matching		4350	60
	RM attribute		160	240

Table C.2.4.3: UL reference measurement channel, TFCS (144 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.2.4.4: UL reference measurement channel, puncturing limit (144 kbps)

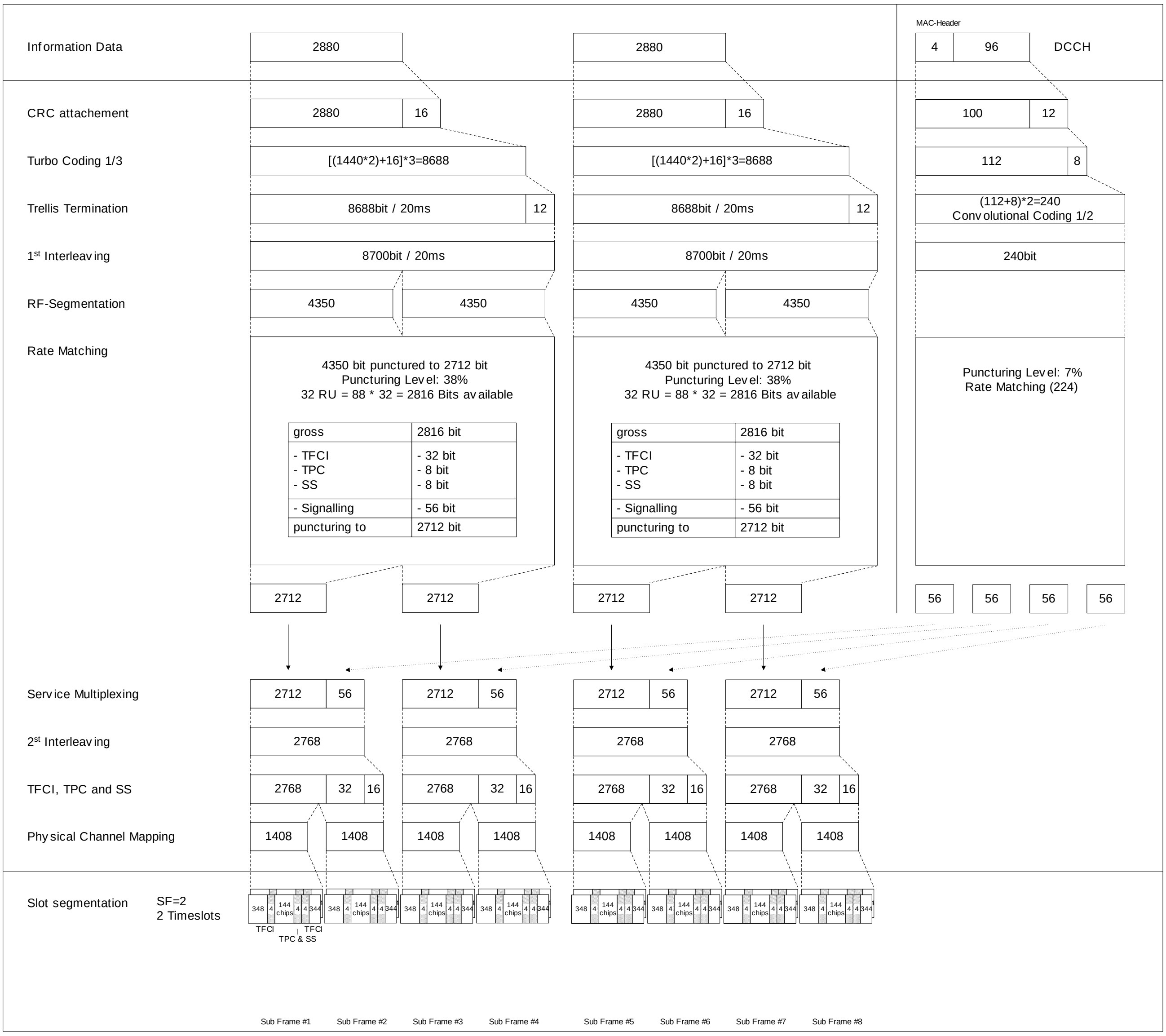
DPCH Downlink	Puncturing limit	0.52



C.2.4.2 1.28 Mcps TDD Option

Table C.2.4.2

Parameter	Value
Information data rate	144 kbps
RU's allocated	2TS (1*SF2) = 16RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	8 Bit/user/10ms
TFCI	32 Bit/user/10ms
Synchronisation Shift (SS)	8 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH of the DTCH / ½ DCH of the DCCH	38% / 7%



C.2.4.3 7.68 Mcps TDD Option

Table C.2.4.5: UL reference measurement channel physical parameters (144kbps)

Parameter	Value
Information data rate	144 kbps
RU´s allocated	1 SF4 + 1 SF32 = 9RU
Midamble	512 chips
Interleaving	20 ms
Power control	2 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate : 1/3 DCH of the DTCH / ½ DCH of the DCCH	47.3% / 20%

Table C.2.4.6: UL reference measurement channel using RLC-TM for DTCH, transport channel parameters (144 kbps)

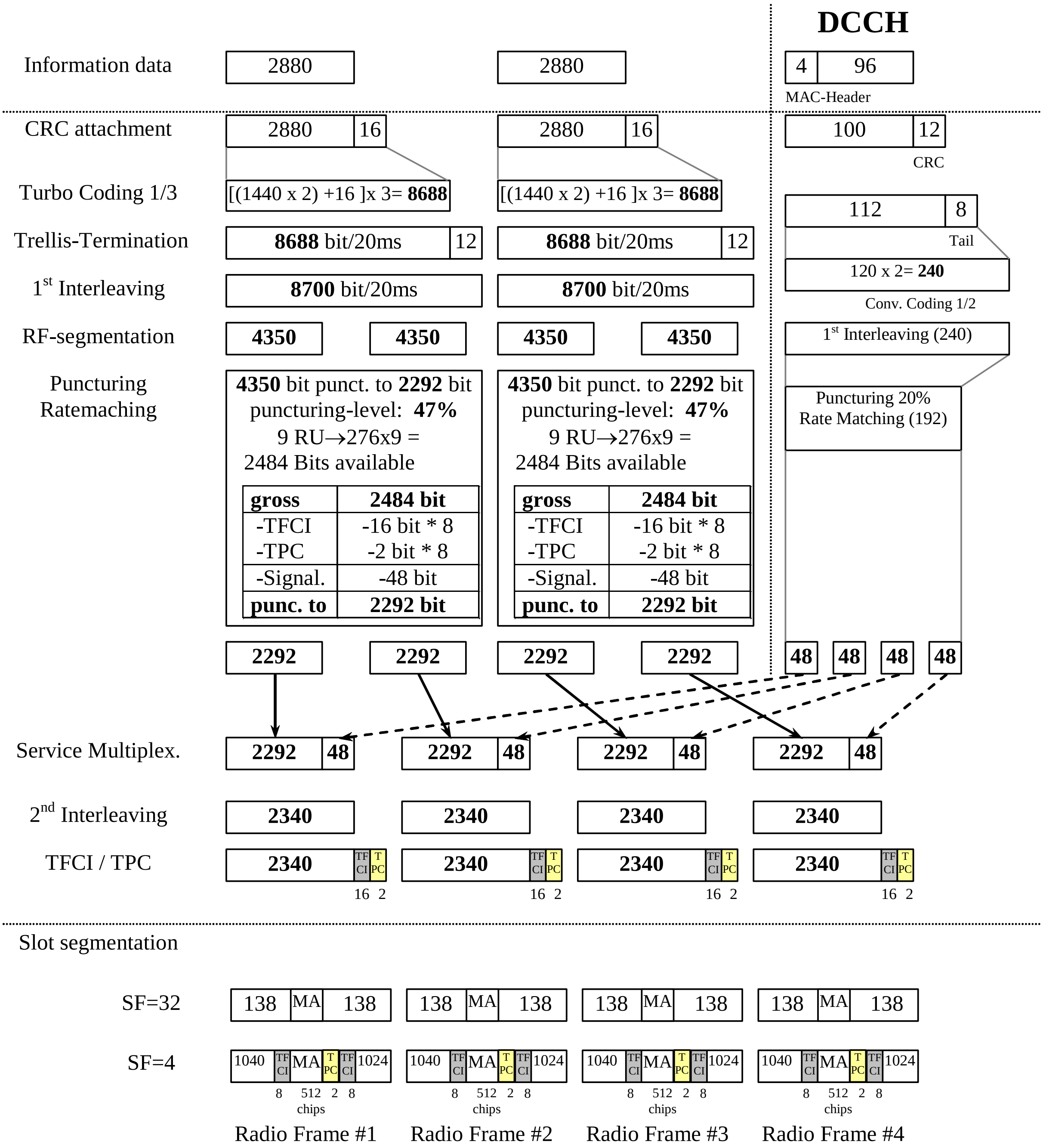
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		2880	88/80
	Max data rate, bps		144000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		2880	100
	TFS	TF0, bits	0*2880	0*100
		TF1, bits	1*2880	1*100
	TTI, ms		20	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		N/A	1/2
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		8700	240
	Uplink: Max number of bits/radio frame before rate matching		4350	60
	RM attribute		160	240

Table C.2.4.7: UL reference measurement channel, TFCS (144 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.2.4.8: UL reference measurement channel, puncturing limit (144 kbps)

DPCH Downlink	Puncturing limit	0.52


DCCH
Information data
2880
2880
4
96
MAC-Header
CRC attachment
2880
16
2880
16
100
12
CRC
Turbo Coding 1/3
[(1440 x 2) +16]x 3= 8688
[(1440 x 2) +16]x 3= 8688
112
8
Tail
Trellis-Termination
8688 bit/20ms
12
8688 bit/20ms
12
120 x 2= 240
Conv. Coding 1/2
1st Interleaving
8700 bit/20ms
8700 bit/20ms
1st Interleaving (240)
RF-segmentation
4350
4350
4350
4350
Puncturing
Ratemaching
4350 bit punct. to 2292 bit
puncturing-level: 47%
9 RU→276x9 =
2484 Bits available
gross 2484 bit
-TFCI -16 bit * 8
-TPC -2 bit * 8
-Signal. -48 bit
punc. to 2292 bit
Puncturing 20%
Rate Matching (192)
2292
2292
2292
2292
48
48
48
48
Service Multiplex.
2292 48
2292 48
2292 48
2292 48
2nd Interleaving
2340
2340
2340
2340
TFCI / TPC
2340
TF CI
T PC
16 2
Slot segmentation
SF=32
138 MA 138
SF=4
1040 TF CI MA T PC TF CI 1024
8 512 2 8
chips
Radio Frame #1
Radio Frame #2
Radio Frame #3
Radio Frame #4

C.2.5 UL reference measurement channel (384 kbps)

C.2.5.1 3.84 Mcps TDD Option

Table C.2.5.1: UL reference measurement channel physical parameters (384kbps)

Parameter	
Information data rate	384 kbps
RU´s allocated	8*3TS = 24RU
Midamble	256 chips
Interleaving	20 ms
Power control	2 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate : 1/3 DCH of the DTCH / ½ DCH of the DCCH	43.4% / 15.3%

Table C.2.5.2: UL reference measurement channel using RLC-TM for DTCH, transport channel parameters (384 kbps)

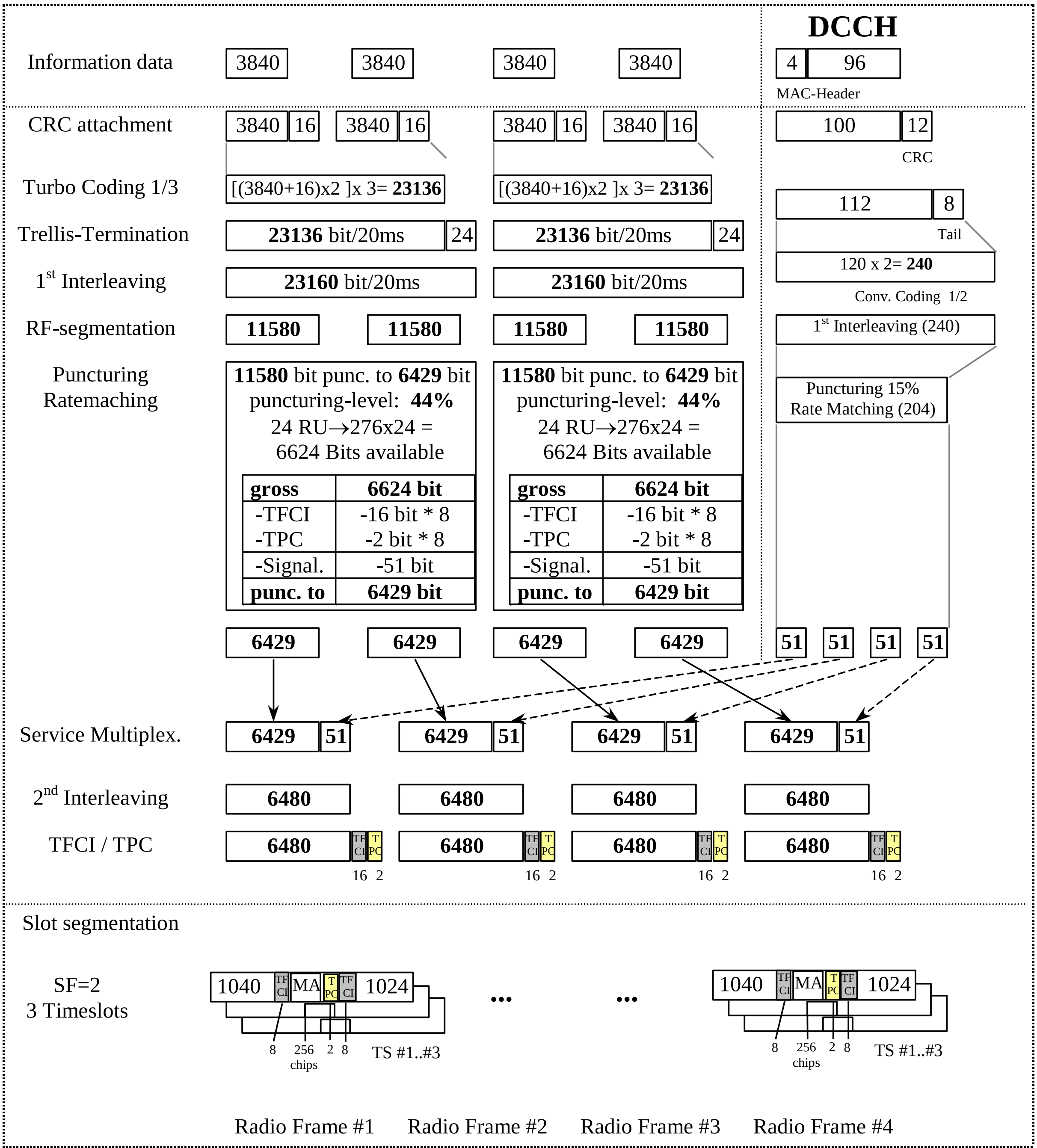
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		3840	88/80
	Max data rate, bps		384000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		2880	100
	TFS	TF0, bits	0*3840	0*100
		TF1, bits	2*3840	1*100
	TTI, ms		20	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		N/A	1/2
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		23160	240
	Uplink: Max number of bits/radio frame before rate matching		11580	60
	RM attribute		158	240

Table C.2.5.3: UL reference measurement channel, TFCS (384 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.2.5.4: UL reference measurement channel, puncturing limit (384 kbps)

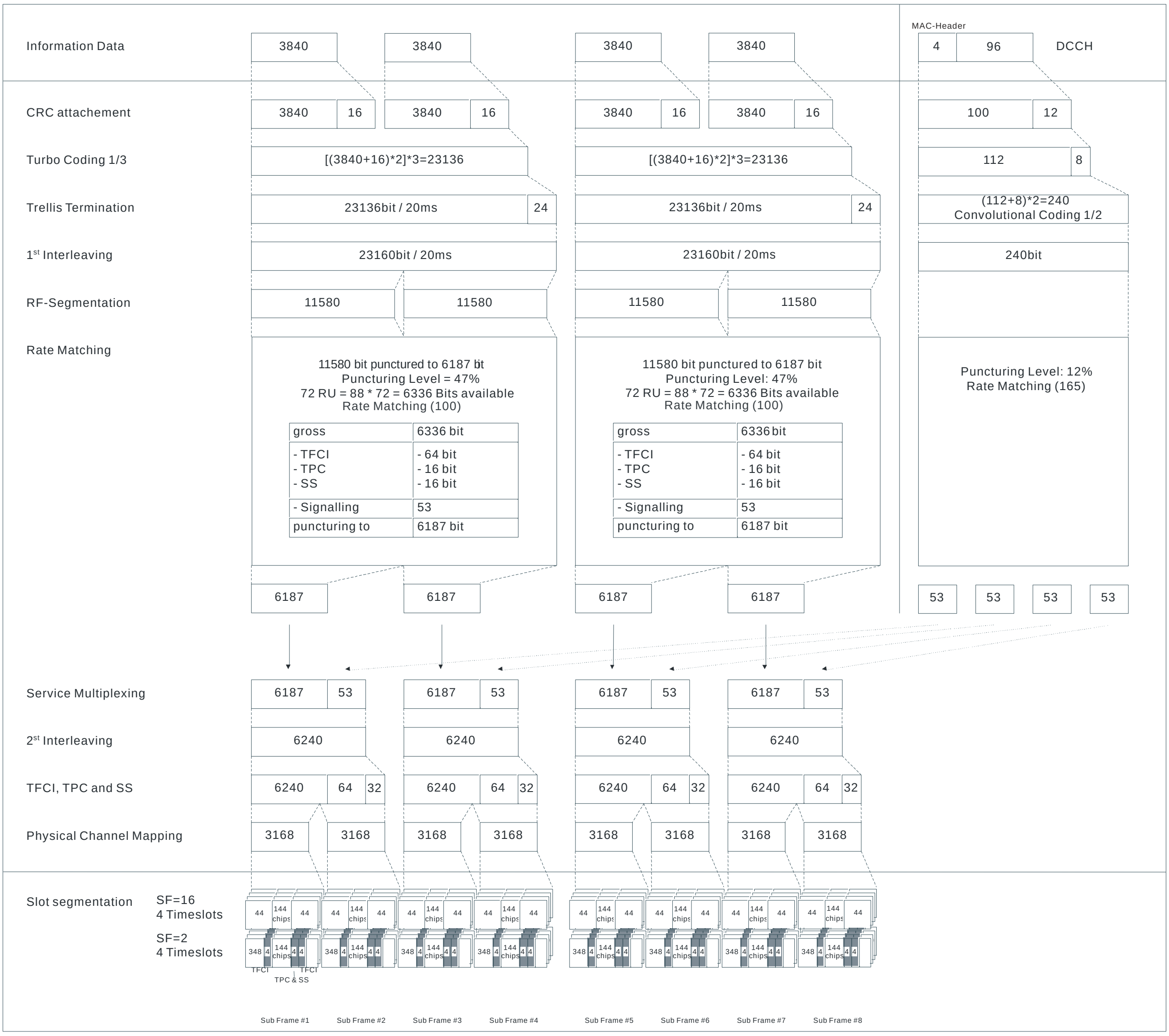
DPCH Downlink	Puncturing limit	0.52


DCCH
Information data
3840
3840
3840
3840
4
96
MAC-Header
CRC attachment
3840 16
3840 16
3840 16
3840 16
100 12
CRC
Turbo Coding 1/3
[(3840+16)x2]x 3= 23136
[(3840+16)x2]x 3= 23136
112 8
Tail
Trellis-Termination
23136 bit/20ms 24
23136 bit/20ms 24
120 x 2= 240
Conv. Coding 1/2
1st Interleaving
23160 bit/20ms
23160 bit/20ms
RF-segmentation
11580
11580
11580
11580
1st Interleaving (240)
Puncturing Ratemaching
11580 bit punc. to 6429 bit
puncturing-level: 44%
24 RU→276x24 =
6624 Bits available
gross 6624 bit
-TFCI -16 bit * 8
-TPC -2 bit * 8
-Signal. -51 bit
punc. to 6429 bit
Puncturing 15%
Rate Matching (204)
6429
6429
6429
6429
51
51
51
51
Service Multiplex.
6429 51
6429 51
6429 51
6429 51
2nd Interleaving
6480
6480
6480
6480
TFCI / TPC
6480
6480
6480
6480
16 2
Slot segmentation
SF=2
3 Timeslots
1040
1024
8
256 chips
2
8
TS #1..#3
Radio Frame #1
Radio Frame #2
Radio Frame #3
Radio Frame #4

C.2.5.2 1.28 Mcps TDD Option

Table C.2.5.2

Parameter	Value
Information data rate	384 kbps
RU's allocated	4TS (1*SF2 + 1*SF16) = 36RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	16 Bit/user/10ms
TFCI	64 Bit/user/10ms
Synchronisation Shift (SS)	16 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH of the DTCH / ½ DCH of the DCCH	47% / 12%



C.2.5.3 7.68 Mcps TDD Option

Table C.2.5.3: UL reference measurement channel physical parameters (384kbps)

Parameter	Value
Information data rate	384 kbps
RU´s allocated	8*3TS = 24RU
Midamble	512 chips
Interleaving	20 ms
Power control	2 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate : 1/3 DCH of the DTCH / ½ DCH of the DCCH	43.4% / 15.3%

Table C.2.5.4: UL reference measurement channel using RLC-TM for DTCH, transport channel parameters (384 kbps)

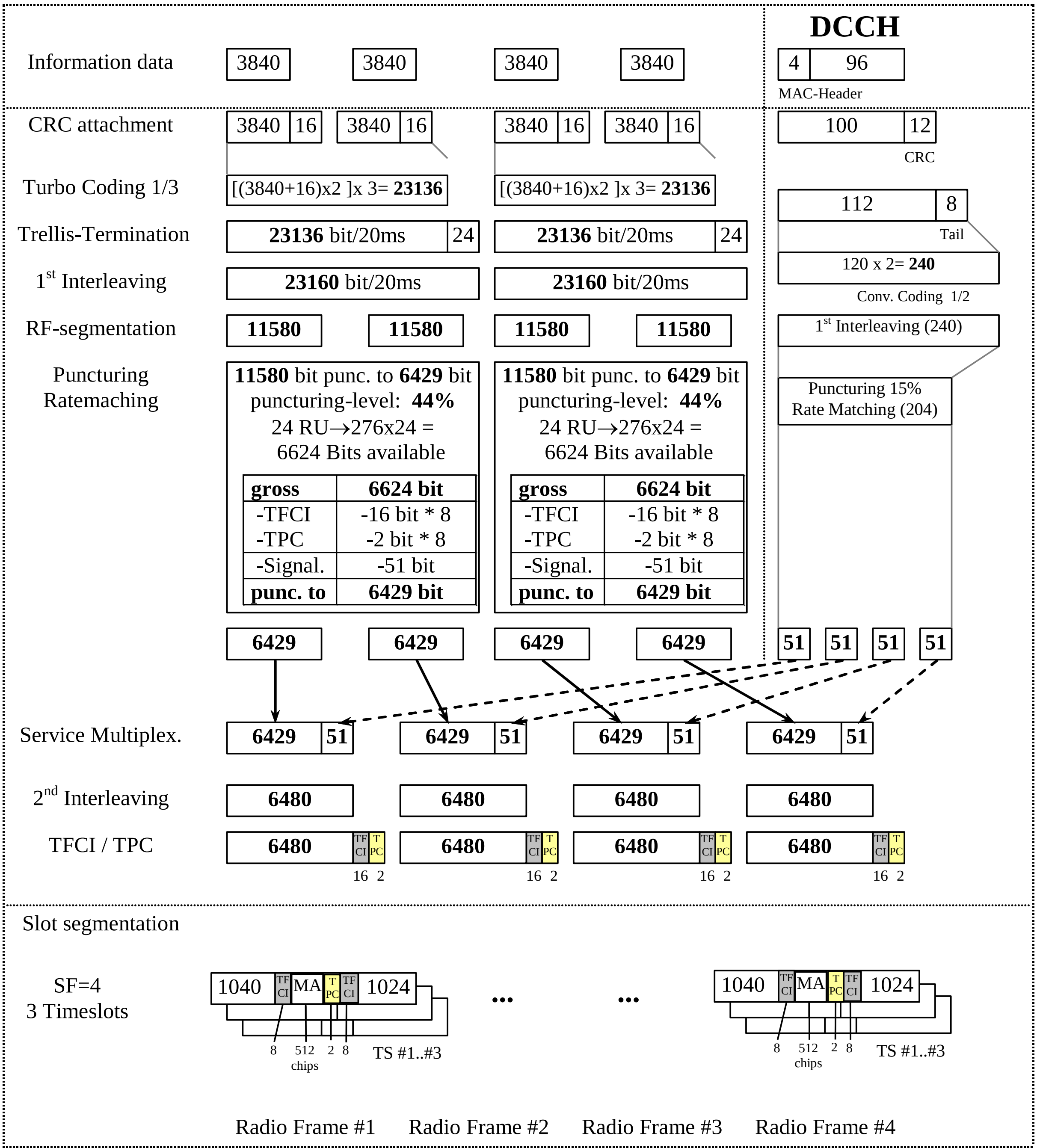
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		3840	88/80
	Max data rate, bps		384000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		2880	100
	TFS	TF0, bits	0*3840	0*100
		TF1, bits	2*3840	1*100
	TTI, ms		20	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		N/A	1/2
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		23160	240
	Uplink: Max number of bits/radio frame before rate matching		11580	60
	RM attribute		158	240

Table C.2.5.5: UL reference measurement channel, TFCS (384 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.2.5.6: UL reference measurement channel, puncturing limit (384 kbps)

DPCH Downlink	Puncturing limit	0.52



DCCH
Information data
3840
3840
3840
3840
4
96
MAC-Header
CRC attachment
3840 16
3840 16
3840 16
3840 16
100
12
CRC
Turbo Coding 1/3
[(3840+16)x2]x 3= 23136
[(3840+16)x2]x 3= 23136
112
8
Tail
Trellis-Termination
23136 bit/20ms 24
23136 bit/20ms 24
120 x 2= 240
Conv. Coding 1/2
1st Interleaving
23160 bit/20ms
23160 bit/20ms
1st Interleaving (240)
RF-segmentation
11580
11580
11580
11580
Puncturing Ratemaching
11580 bit punc. to 6429 bit
puncturing-level: 44%
24 RU→276x24 =
6624 Bits available
gross 6624 bit
-TFCI -16 bit * 8
-TPC -2 bit * 8
-Signal. -51 bit
punc. to 6429 bit
Puncturing 15%
Rate Matching (204)
6429
6429
6429
6429
51
51
51
51
Service Multiplex.
6429 51
6429 51
6429 51
6429 51
2nd Interleaving
6480
6480
6480
6480
TFCI / TPC
6480
TFCI TPC
16 2
Slot segmentation
SF=4
3 Timeslots
1040
TFCI
MA
TPC
TFCI
1024
8
512 chips
2
8
TS #1..#3
...
Radio Frame #1
Radio Frame #2
Radio Frame #3
Radio Frame #4

C.3 DL Reference measurement channels

C.3.1 DL reference measurement channel (12,2 kbps)

C.3.1.1 3,84 Mcps TDD Option

Table C.3.1.1: DL reference measurement channel physical parameters (12.2kbps)

Parameter	
Information data rate	12,2 kbps
RU´s allocated	2 RU
Midamble	512 chips
Interleaving	20 ms
Power control	0 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate 1/3 : DCH of the DTCH / DCH of the DCCH	5% / 0 %

Table C.3.1.2: DL reference measurement channel using RLC-TM for DTCH, transport channel parameters (12.2 kbps)

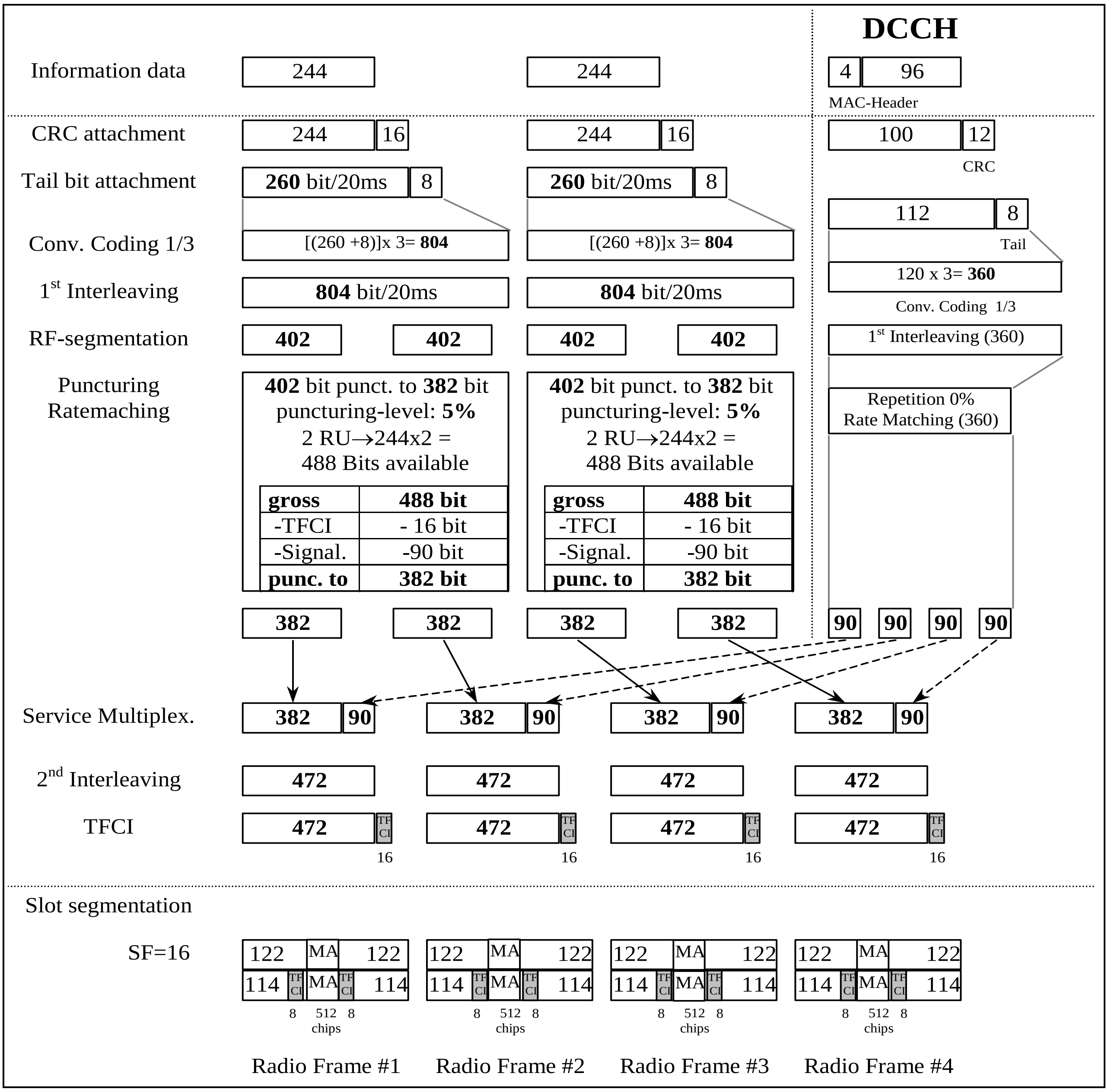
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		244	88/80
	Max data rate, bps		12200	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		6	10
	TB sizes, bit		244	100
	TFS	TF0, bits	0*244	0*100
		TF1, bits	1*244	1*100
	TTI, ms		20	40
	Coding type		Convolution Coding	Convolution Coding
	Coding Rate		1/3	1/3
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		804	360
	Downlink: Max number of bits/radio frame before rate matching		402	90
	RM attribute		228	240

Table C.3.1.3: DL reference measurement channel, TFCS (12.2 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.3.1.4: DL reference measurement channel, puncturing limit (12.2 kbps)

DPCH Downlink	Puncturing limit	0.92



C.3.1.2 DL reference measurement channel (12,2 kbps) for 1,28 Mcps TDD Option

Table C.3.1.2

Parameter	Value
Information data rate	12,2 kbps
RU's allocated	1TS (2*SF16) = 2RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
Synchronisation Shift (SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate 1/3 : DCH of the DTCH / DCH of the DCCH	33% / 33%

C.3.1.3 7,68 Mcps TDD Option

Table C.3.1.5: DL reference measurement channel physical parameters (12.2kbps)

Parameter	Value
Information data rate	12.2 kbps
RU´s allocated	2 RU
Midamble	1024 chips
Interleaving	20 ms
Power control	0 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate 1/3 : DCH of the DTCH / DCH of the DCCH	5% / 0 %

Table C.3.1.6: DL reference measurement channel using RLC-TM for DTCH, transport channel parameters (12.2 kbps)

Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		244	88/80
	Max data rate, bps		12200	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		6	10
	TB sizes, bit		244	100
	TFS	TF0, bits	0*244	0*100
		TF1, bits	1*244	1*100
	TTI, ms		20	40
	Coding type		Convolution Coding	Convolution Coding
	Coding Rate		1/3	1/3
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		804	360
	Downlink: Max number of bits/radio frame before rate matching		402	90
	RM attribute		228	240

Table C.3.1.7: DL reference measurement channel, TFCS (12.2 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.3.1.8: DL reference measurement channel, puncturing limit (12.2 kbps)

DPCH Downlink	Puncturing limit	0.92

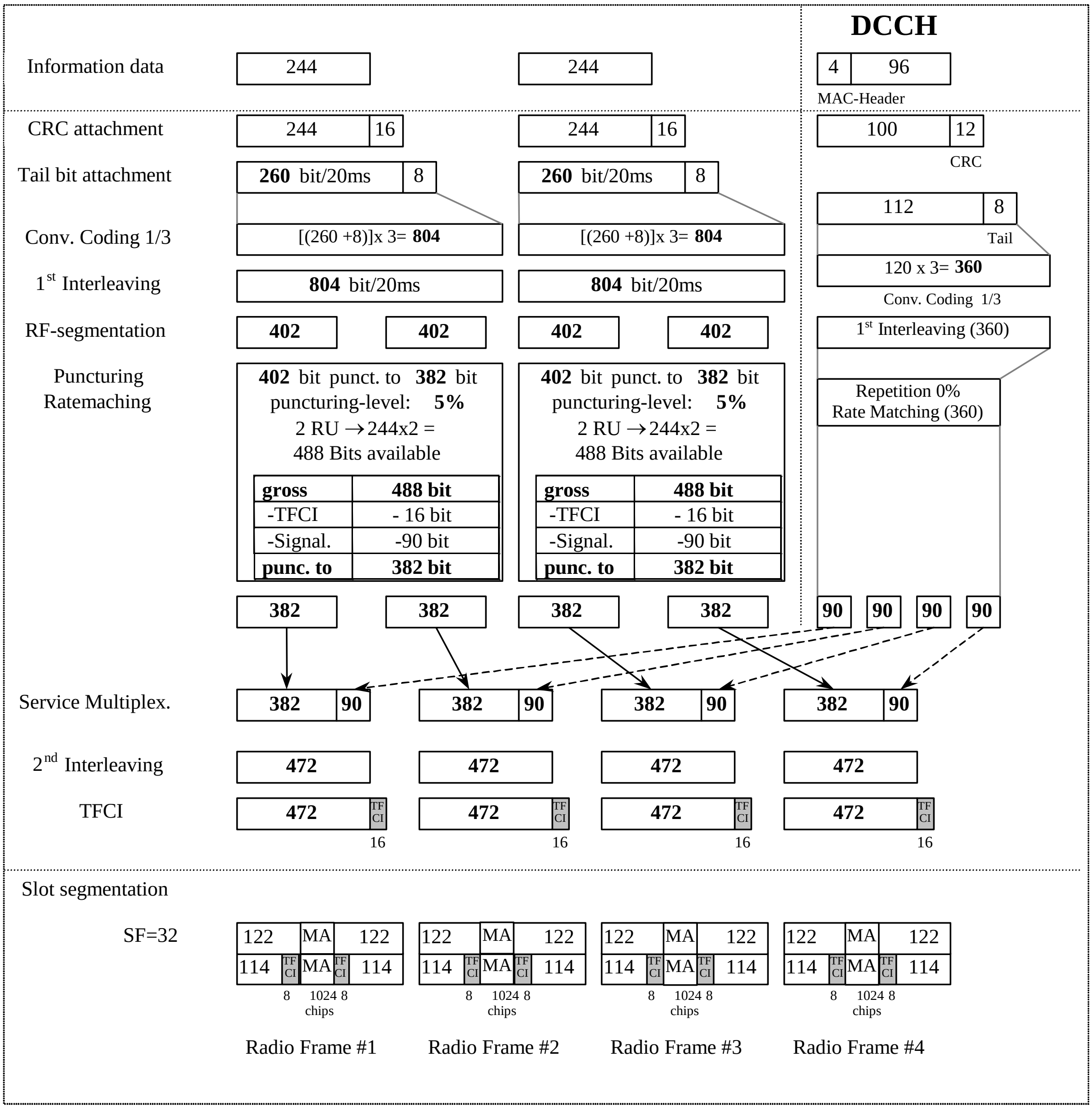


Figure A.2B

C.3.2 DL reference measurement channel (64 kbps)

C.3.2.1 3,84 Mcps TDD Option

Table C.3.2.1: DL reference measurement channel physical parameters (64kbps)

Parameter	
Information data rate	64 kbps
RU´s allocated	5 codes SF16 = 5RU
Midamble	512 chips
Interleaving	20 ms
Power control	0 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate : 1/3 DCH of the DTCH / ½ DCH of the DCCH	41.1% / 10%

Table C.3.2.2: DL reference measurement channel using RLC-TM for DTCH, transport channel parameters (64 kbps)

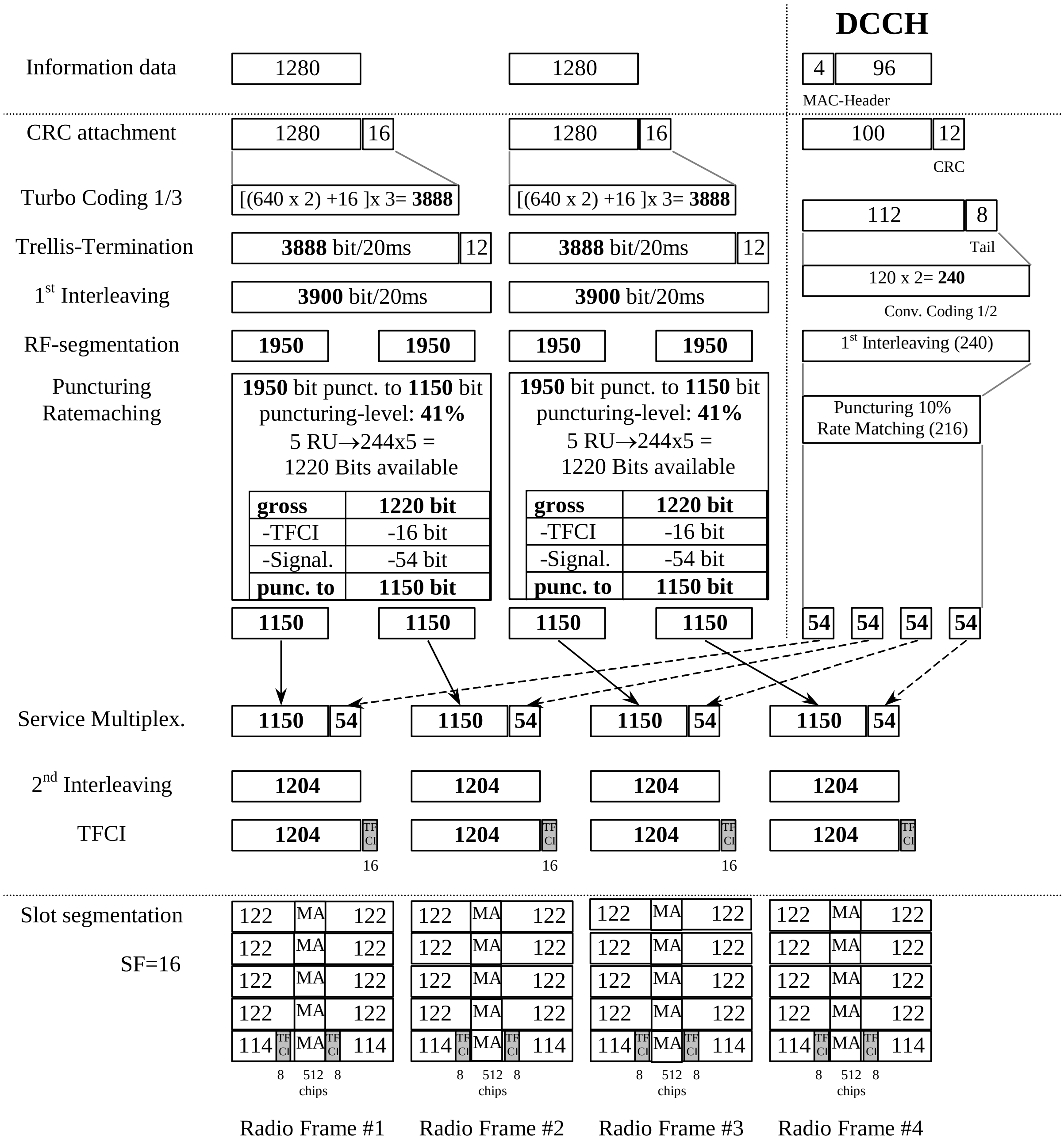
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		1280	88/80
	Max data rate, bps		64000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		6	10
	TB sizes, bit		1280	100
	TFS	TF0, bits	0*1280	0*100
		TF1, bits	1*1280	1*100
	TTI, ms		20	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		1/3	1/2
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		3900	240
	Downlink: Max number of bits/radio frame before rate matching		1950	60
	RM attribute		160	240

Table C.3.2.3: DL reference measurement channel, TFCS (64 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.3.2.4: DL reference measurement channel, puncturing limit (64 kbps)

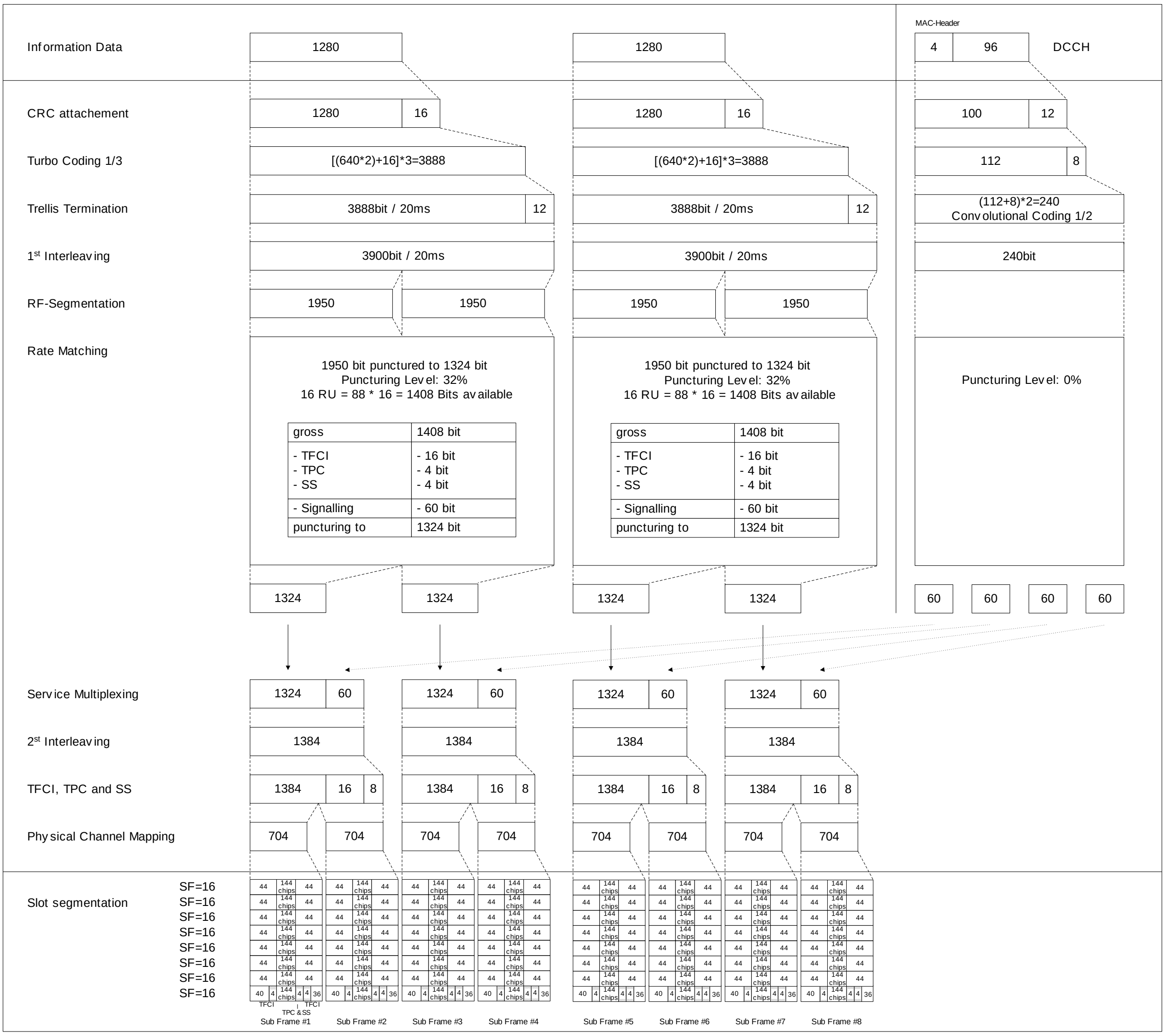
DPCH Downlink	Puncturing limit	0.56



C.3.2.2 DL reference measurement channel (64 kbps) for 1,28 Mcps TDD Option

Table C.3.2.2

Parameter	Value
Information data rate	64 kbps
RU's allocated	1TS (8*SF16) = 8RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	4 Bit/user/10ms
TFCI	16 Bit/user/10ms
Synchronisation Shift (SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH of the DTCH/ ½ DCH of the DCCH	32% / 0



C.3.2.3 7,68 Mcps TDD Option

Table C.3.2.5: DL reference measurement channel physical parameters (64kbps)

Parameter	Value
Information data rate	64 kbps
RU´s allocated	5 codes SF32 = 5RU
Midamble	1024 chips
Interleaving	20 ms
Power control	0 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate : 1/3 DCH of the DTCH / ½ DCH of the DCCH	41.1% / 10%

Table C.3.2.6: DL reference measurement channel using RLC-TM for DTCH, transport channel parameters (64 kbps)

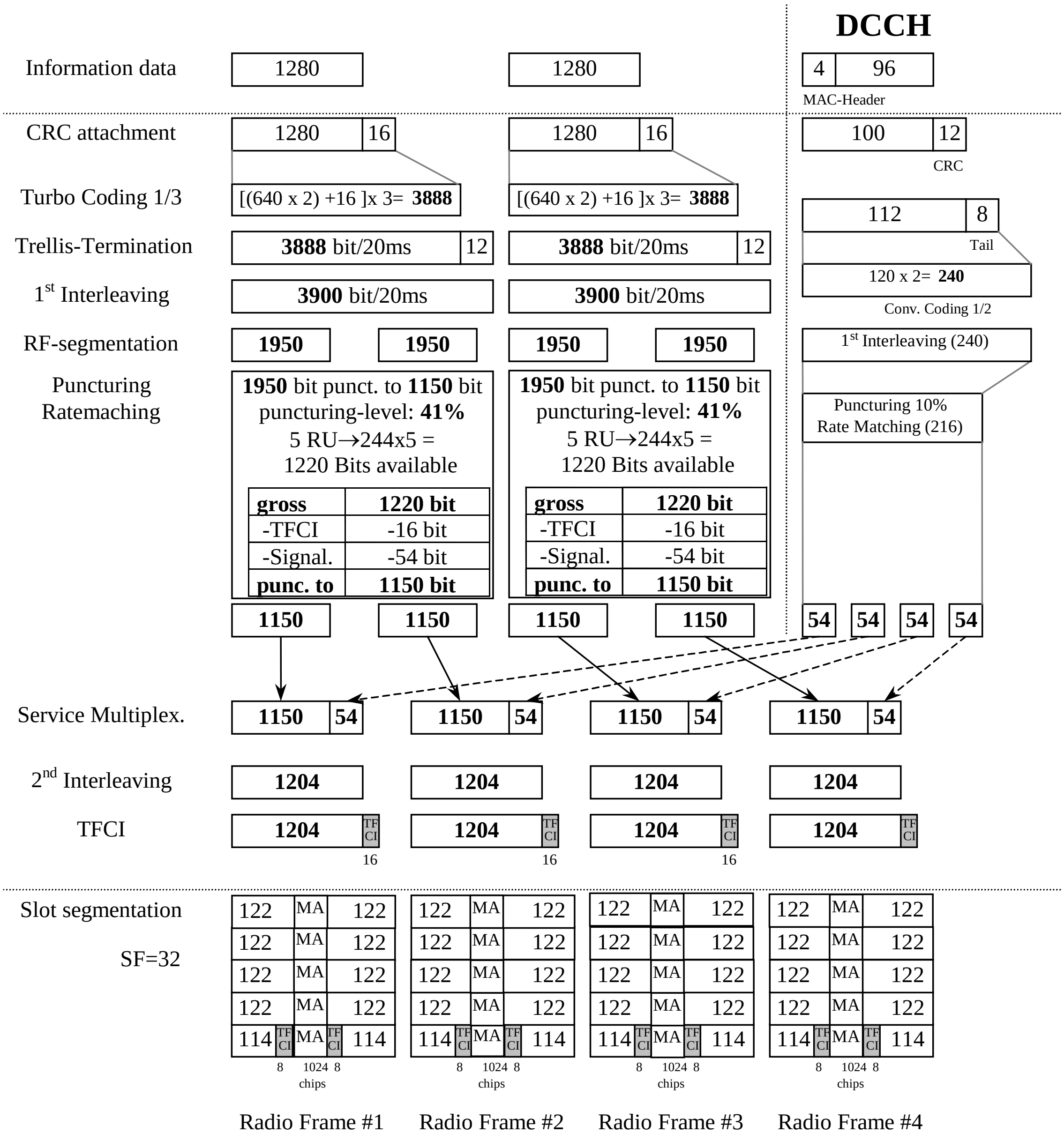
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		1280	88/80
	Max data rate, bps		64000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		6	10
	TB sizes, bit		1280	100
	TFS	TF0, bits	0*1280	0*100
		TF1, bits	1*1280	1*100
	TTI, ms		20	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		1/3	1/2
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		3900	240
	Downlink: Max number of bits/radio frame before rate matching		1950	60
	RM attribute		160	240

Table C.3.2.7: DL reference measurement channel, TFCS (64 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.3.2.8: DL reference measurement channel, puncturing limit (64 kbps)

DPCH Downlink	Puncturing limit	0.56



C.3.3 DL reference measurement channel (144 kbps)

C.3.3.1 3,84 Mcps TDD Option

Table C.3.3.1: DL reference measurement channel physical parameters (144kbps)

Parameter	
Information data rate	144 kbps
RU´s allocated	9 codes SF16 = 9RU
Midamble	256 chips
Interleaving	20 ms
Power control	0 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate: 1/3 DCH of the DTCH / ½ DCH of the DCCH	44.5% / 16.6%

Table C.3.3.2: DL reference measurement channel using RLC-TM for DTCH, transport channel parameters (144 kbps)

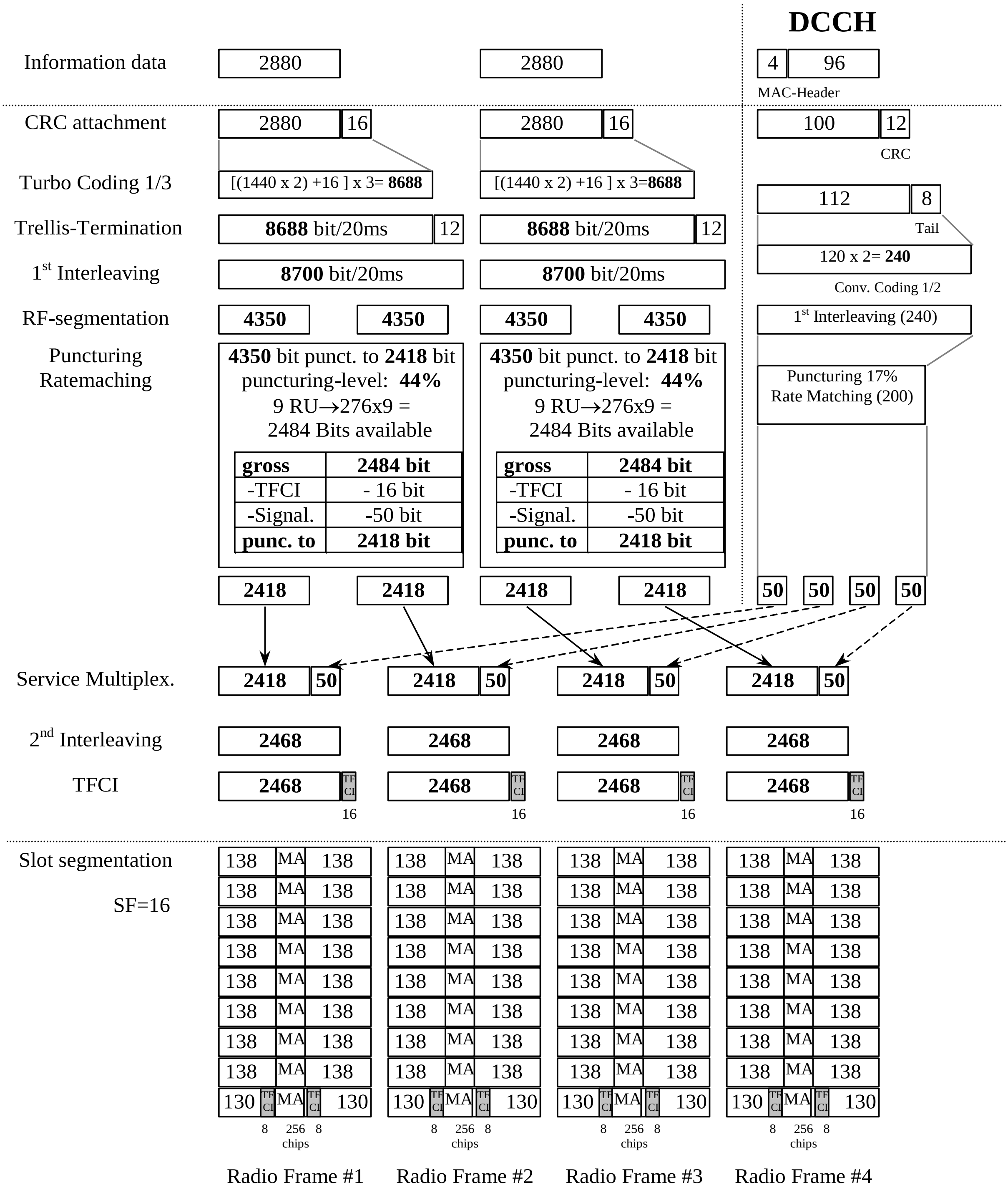
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		2880	88/80
	Max data rate, bps		144000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		6	10
	TB sizes, bit		2880	100
	TFS	TF0, bits	0*2880	0*100
		TF1, bits	1*2880	1*100
	TTI, ms		20	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		1/3	1/2
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		8700	240
	Downlink: Max number of bits/radio frame before rate matching		4350	60
	RM attribute		162	240

Table C.3.3.3: DL reference measurement channel, TFCS (144 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.3.3.4: DL reference measurement channel, puncturing limit (144 kbps)

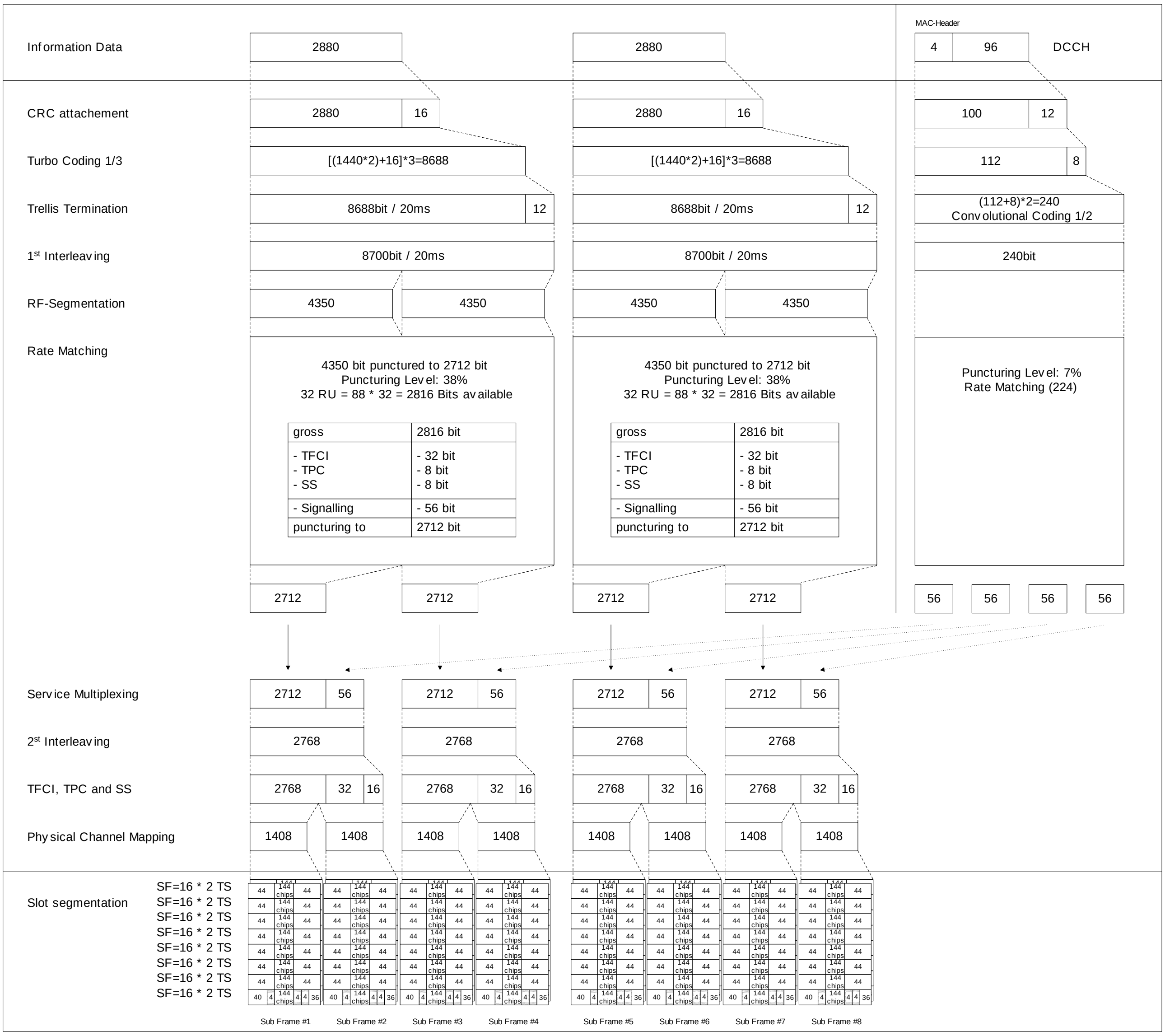
DPCH Downlink	Puncturing limit	0.52


DCCH
Information data
2880
2880
4
96
MAC-Header
CRC attachment
2880
16
2880
16
100
12
CRC
Turbo Coding 1/3
[(1440 x 2) +16] x 3= 8688
[(1440 x 2) +16] x 3=8688
112
8
Tail
Trellis-Termination
8688 bit/20ms
12
8688 bit/20ms
12
120 x 2= 240
Conv. Coding 1/2
1st Interleaving
8700 bit/20ms
8700 bit/20ms
RF-segmentation
4350
4350
4350
4350
1st Interleaving (240)
Puncturing
Ratemaching
4350 bit punct. to 2418 bit
puncturing-level: 44%
9 RU→276x9 =
2484 Bits available
gross 2484 bit
-TFCI - 16 bit
-Signal. -50 bit
punc. to 2418 bit
Puncturing 17%
Rate Matching (200)
2418
2418
2418
2418
50
50
50
50
Service Multiplex.
2418
50
2nd Interleaving
2468
TFCI
2468
TFCI
16
Slot segmentation
SF=16
138
MA
138
130
TFCI
MA
TFCI
130
8
256
8
chips
Radio Frame #1
Radio Frame #2
Radio Frame #3
Radio Frame #4

C.3.3.2 DL reference measurement channel (144 kbps) for 1,28 Mcps TDD Option

Table C.3.3.2

Parameter	Value
Information data rate	144 kbps
RU's allocated	2TS (8*SF16) = 16RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	8 Bit/user/10ms
TFCI	32 Bit/user/10ms
Synchronisation Shift (SS)	8 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH of the DTCH/ ½ DCH of the DCCH	38% / 7%



C.3.3.3 7,68 Mcps TDD Option

Table C.3.3.5: DL reference measurement channel physical parameters (144kbps)

Parameter	Value
Information data rate	144 kbps
RU´s allocated	9 codes SF32 = 9RU
Midamble	512 chips
Interleaving	20 ms
Power control	0 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate: 1/3 DCH of the DTCH / ½ DCH of the DCCH	44.5% / 16.6%

Table C.3.3.6: DL reference measurement channel using RLC-TM for DTCH, transport channel parameters (144 kbps)

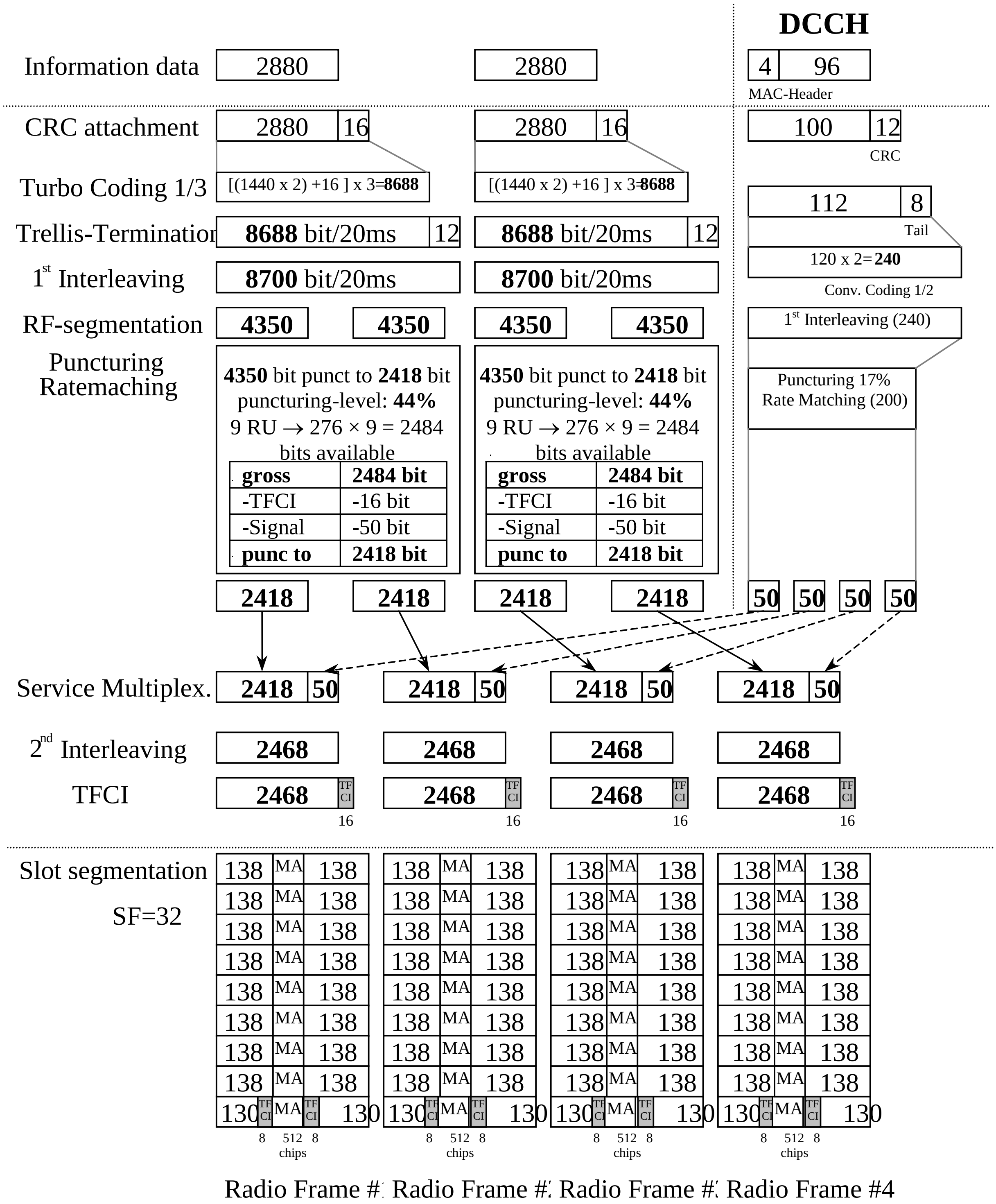
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		2880	88/80
	Max data rate, bps		144000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		6	10
	TB sizes, bit		2880	100
	TFS	TF0, bits	0*2880	0*100
		TF1, bits	1*2880	1*100
	TTI, ms		20	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		1/3	1/2
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		8700	240
	Downlink: Max number of bits/radio frame before rate matching		4350	60
	RM attribute		162	240

Table C.3.3.7: DL reference measurement channel, TFCS (144 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.3.3.8: DL reference measurement channel, puncturing limit (144 kbps)

DPCH Downlink	Puncturing limit	0.52


DCCH
Information data
2880
2880
4
96
MAC-Header
CRC attachment
2880
16
2880
16
100
12
CRC
Turbo Coding 1/3
[(1440 x 2) +16] x 3=8688
[(1440 x 2) +16] x 3=8688
112
8
Tail
Trellis-Termination
8688 bit/20ms
12
8688 bit/20ms
12
120 x 2=240
Conv. Coding 1/2
1st Interleaving
8700 bit/20ms
8700 bit/20ms
1st Interleaving (240)
RF-segmentation
4350
4350
4350
4350
Puncturing Ratemaching
4350 bit punct to 2418 bit
puncturing-level: 44%
9 RU → 276 × 9 = 2484
bits available
gross 2484 bit
-TFCI -16 bit
-Signal -50 bit
punc to 2418 bit
Puncturing 17%
Rate Matching (200)
2418
2418
2418
2418
50
50
50
50
Service Multiplex.
2418 50
2418 50
2418 50
2418 50
2nd Interleaving
2468
2468
2468
2468
TFCI
2468
2468
2468
2468
TFCI
16
Slot segmentation
SF=32
138 MA 138
130 TFCI MA TFCI 130
8 512 8
chips
Radio Frame #1 Radio Frame #2 Radio Frame #3 Radio Frame #4

C.3.4 DL reference measurement channel (384 kbps)

C.3.4.1 3,84 Mcps TDD Option

Table C.3.4.1: DL reference measurement channel physical parameters (384kbps)

Parameter	
Information data rate	384 kbps
RU´s allocated	8*3TS = 24RU
Midamble	256 chips
Interleaving	20 ms
Power control	0 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate : 1/3 DCH of the DTCH / ½ DCH of the DCCH	43.4% / 15.3%

Table C.3.4.2: DL reference measurement channel using RLC-TM for DTCH, transport channel parameters (384 kbps)

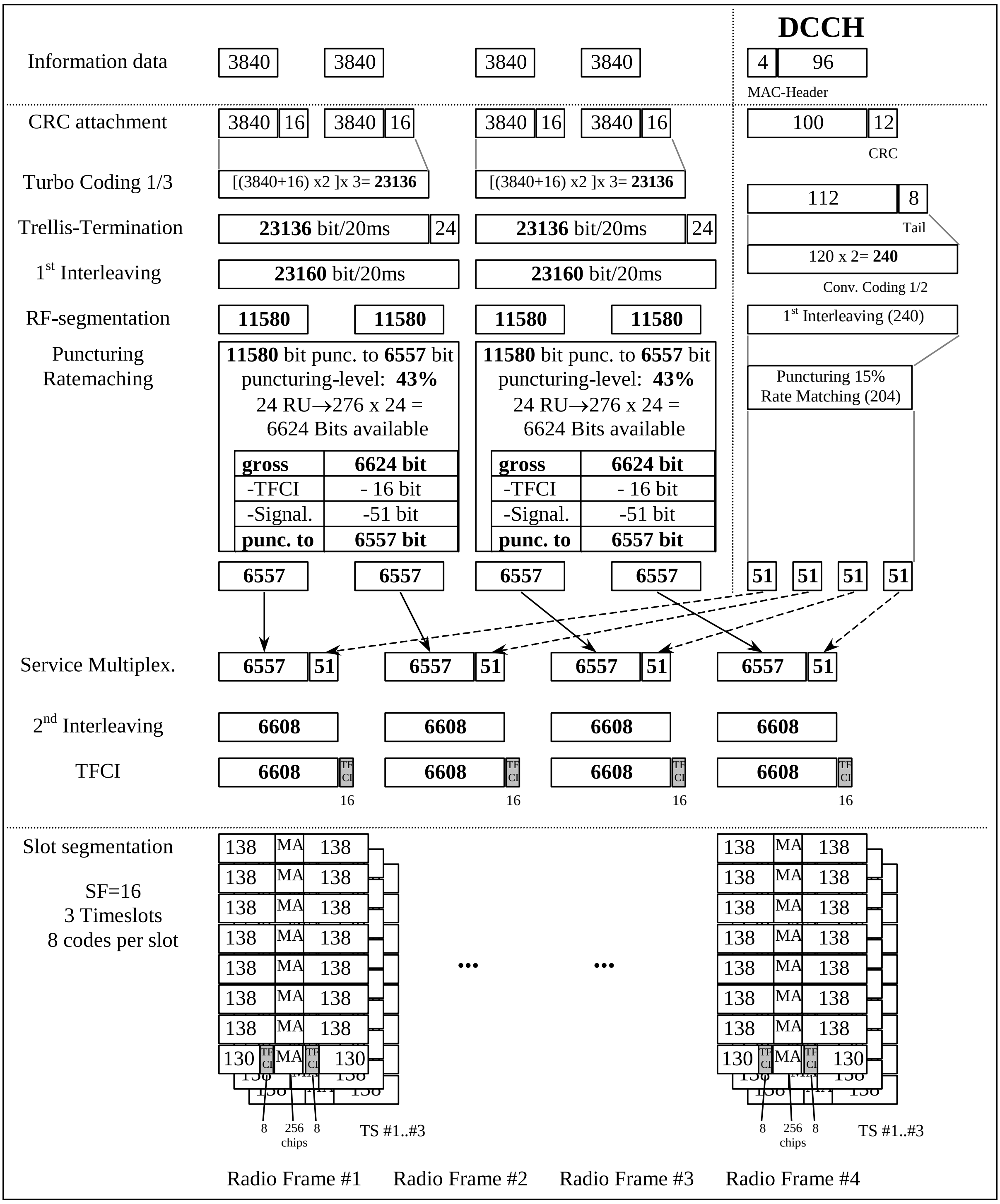
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		3840	88/80
	Max data rate, bps		384000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		3840	100
	TFS	TF0, bits	0*3840	0*100
		TF1, bits	2*3840	1*100
	TTI, ms		20	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		N/A	1/2
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		23160	240
	Uplink: Max number of bits/radio frame before rate matching		11580	60
	RM attribute		162	240

Table C.3.4.3: DL reference measurement channel, TFCS (384 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.3.4.4: DL reference measurement channel, puncturing limit (384 kbps)

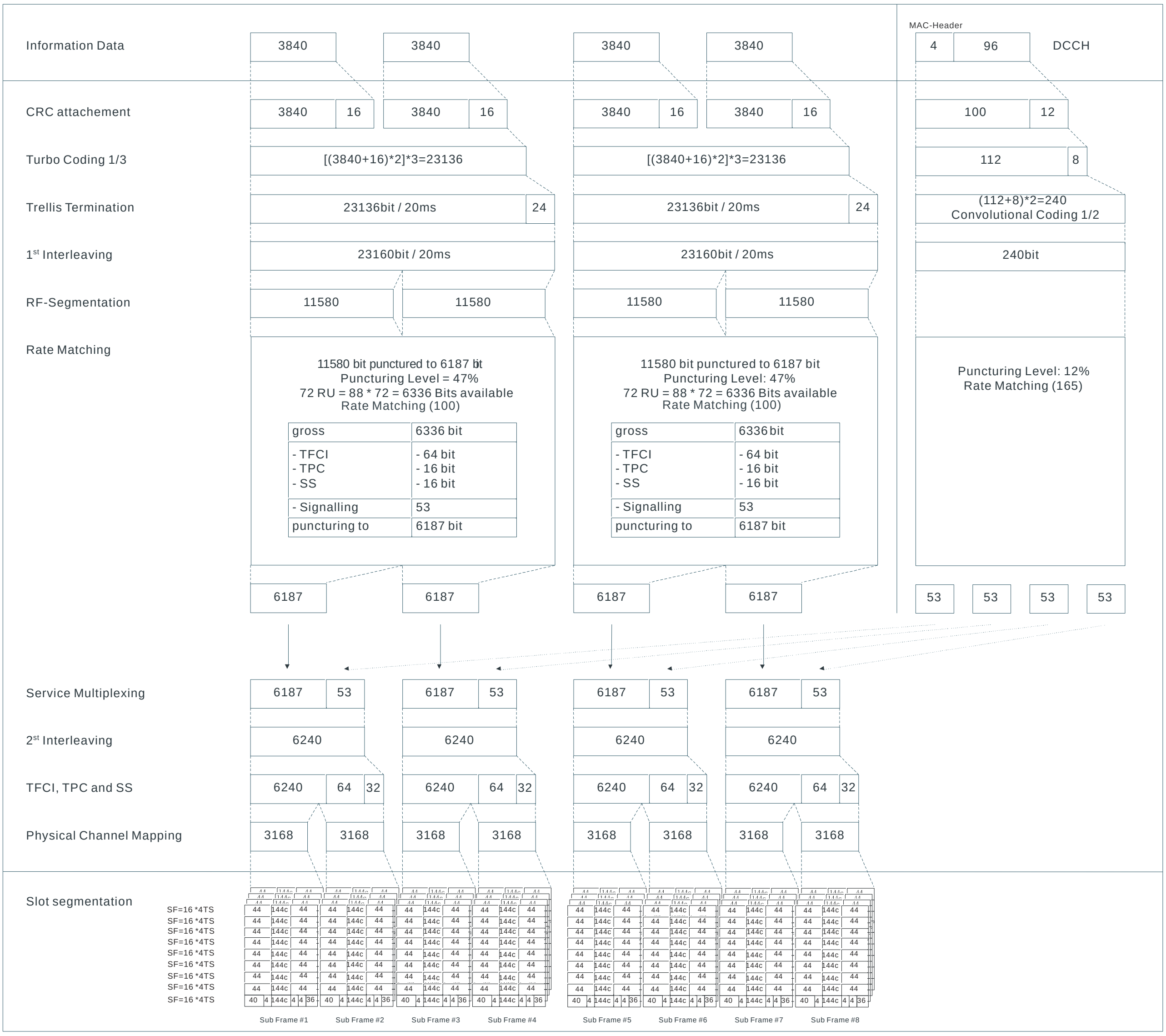
DPCH Downlink	Puncturing limit	0.56


DCCH
Information data
3840
3840
3840
3840
4
96
MAC-Header
CRC attachment
3840 16
3840 16
3840 16
3840 16
100
12
CRC
Turbo Coding 1/3
[(3840+16) x2]x 3= 23136
[(3840+16) x2]x 3= 23136
112
8
Tail
Trellis-Termination
23136 bit/20ms
24
23136 bit/20ms
24
120 x 2= 240
Conv. Coding 1/2
1st Interleaving
23160 bit/20ms
23160 bit/20ms
RF-segmentation
11580
11580
11580
11580
1st Interleaving (240)
Puncturing
Ratemaching
11580 bit punc. to 6557 bit
puncturing-level: 43%
24 RU→276 x 24 =
6624 Bits available
gross 6624 bit
-TFCI - 16 bit
-Signal. -51 bit
punc. to 6557 bit
Puncturing 15%
Rate Matching (204)
6557
51
Service Multiplex.
6557
51
2nd Interleaving
6608
TFCI
6608
16
Slot segmentation
SF=16
3 Timeslots
8 codes per slot
138
MA
130
TF CI
8
256
chips
TS #1..#3
Radio Frame #1
Radio Frame #2
Radio Frame #3
Radio Frame #4

C.3.4.2 DL reference measurement channel (384 kbps) for 1,28 Mcps TDD Option

Table C.3.4.2

Parameter	Value
Information data rate	384 kbps
RU's allocated	4TS (9*SF16) = 36RU/5ms
Midamble	144
Interleaving	20 ms
Power control (TPC)	16 Bit/user/10ms
TFCI	64 Bit/user/10ms
Synchronisation Shift (SS)	16 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH of the DTCH/ ½ DCH of the DCCH	47% / 12%



C.3.4.3 7,68 Mcps TDD Option

Table C.3.4.5: DL reference measurement channel physical parameters (384kbps)

Parameter	Value
Information data rate	384 kbps
RU´s allocated	8*3TS = 24RU
Midamble	512 chips
Interleaving	20 ms
Power control	0 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate : 1/3 DCH of the DTCH / ½ DCH of the DCCH	43.4% / 15.3%

Table C.3.4.6: DL reference measurement channel using RLC-TM for DTCH, transport channel parameters (384 kbps)

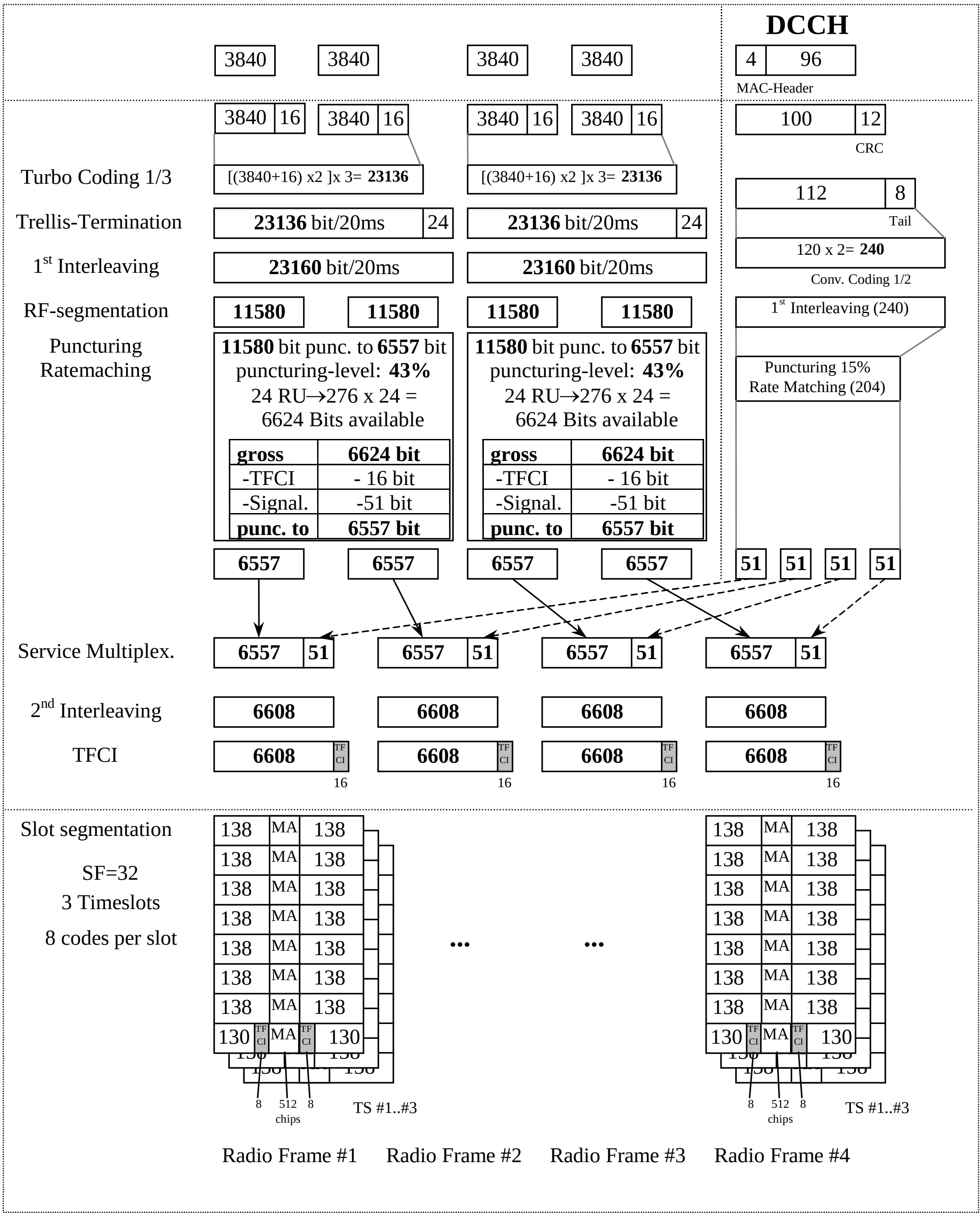
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		3840	88/80
	Max data rate, bps		384000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		3840	100
	TFS	TF0, bits	0*3840	0*100
		TF1, bits	2*3840	1*100
	TTI, ms		20	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		N/A	1/2
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		23160	240
	Uplink: Max number of bits/radio frame before rate matching		11580	60
	RM attribute		162	240

Table C.3.4.7: DL reference measurement channel, TFCS (384 kbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.3.4.8: DL reference measurement channel, puncturing limit (384 kbps)

DPCH Downlink	Puncturing limit	0.56

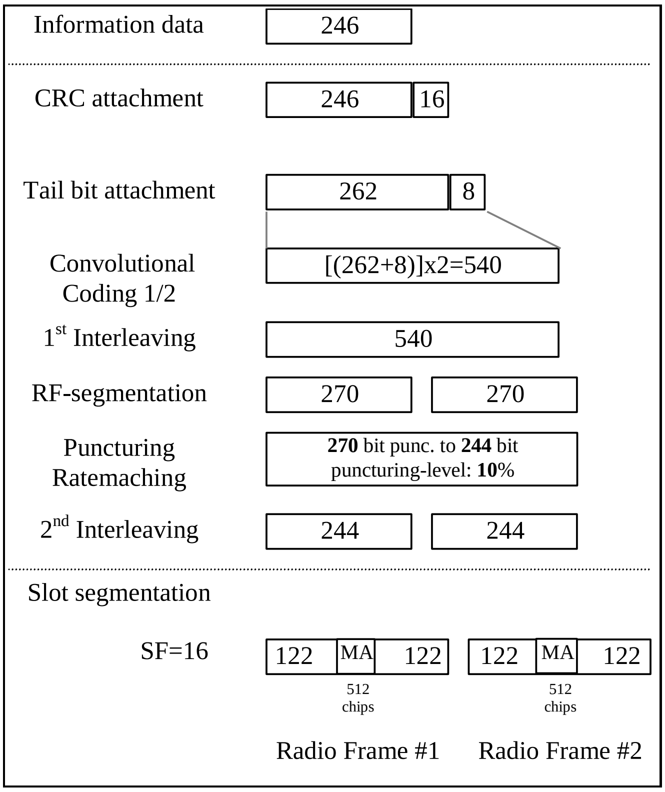

DCCH
3840
3840
3840
3840
4
96
MAC-Header
3840 16
3840 16
3840 16
3840 16
100
12
CRC
Turbo Coding 1/3
[(3840+16) x2]x 3= 23136
[(3840+16) x2]x 3= 23136
112
8
Tail
Trellis-Termination
23136 bit/20ms 24
23136 bit/20ms 24
120 x 2= 240
Conv. Coding 1/2
1st Interleaving
23160 bit/20ms
23160 bit/20ms
RF-segmentation
11580
11580
11580
11580
1st Interleaving (240)
Puncturing
Ratemaching
11580 bit punc. to 6557 bit
puncturing-level: 43%
24 RU→276 x 24 =
6624 Bits available
gross 6624 bit
-TFCI - 16 bit
-Signal. -51 bit
punc. to 6557 bit
Puncturing 15%
Rate Matching (204)
6557
51
Service Multiplex.
6557 51
2nd Interleaving
6608
TFCI
6608
16
Slot segmentation
SF=32
3 Timeslots
8 codes per slot
138
MA
130
TFCI
8
512
chips
TS #1..#3
Radio Frame #1
Radio Frame #2
Radio Frame #3
Radio Frame #4

C.3.5 BCH reference measurement channel

C.3.5.1 3,84 Mcps TDD Option

[mapped to 1 code SF16]

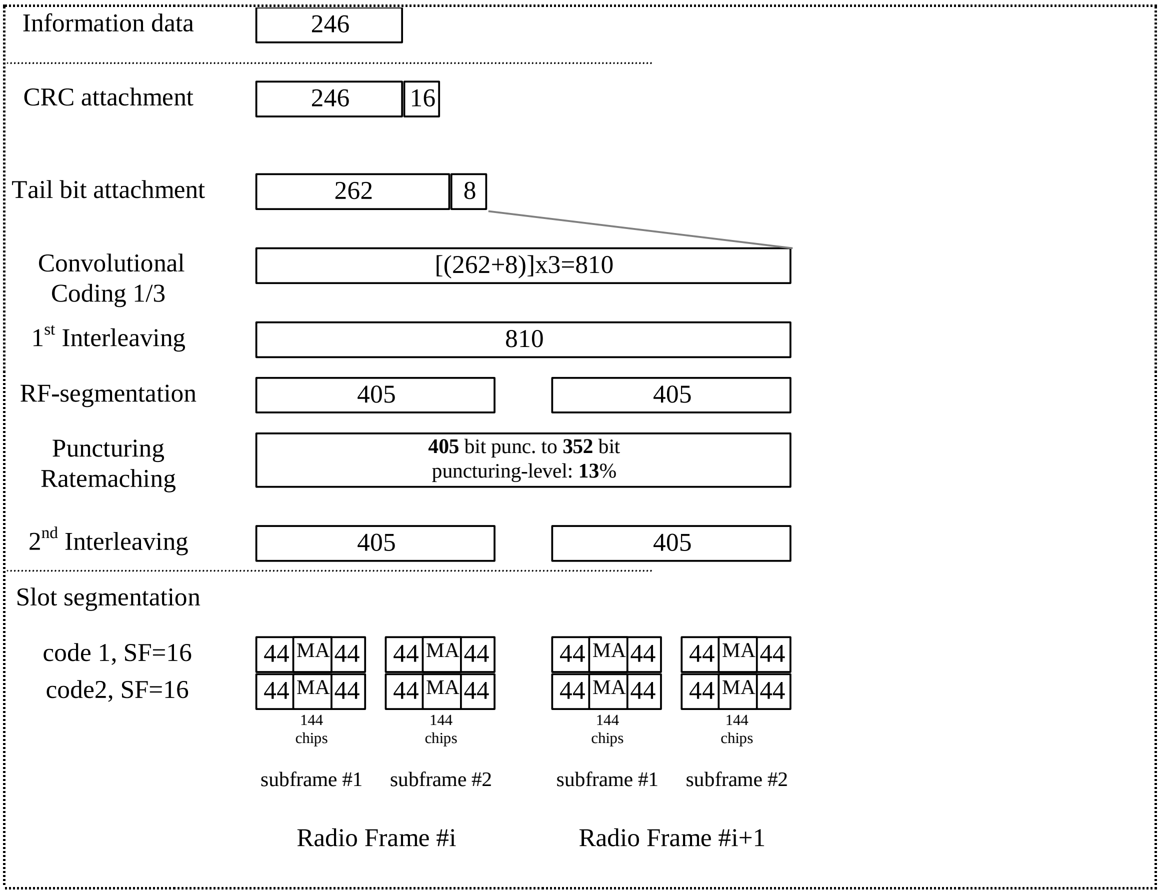
Parameter	
Information data rate:	12.3 kbps
RU´s allocated	1 RU
Midamble	**512** chips
Interleaving	20 ms
Power control	0 bit
TFCI	0 bit
Puncturing level	10%



C.3.5.2 BCH reference measurement channel (12.3 kbps) for 1,28 Mcps TDD Option

Table C.3.5.2

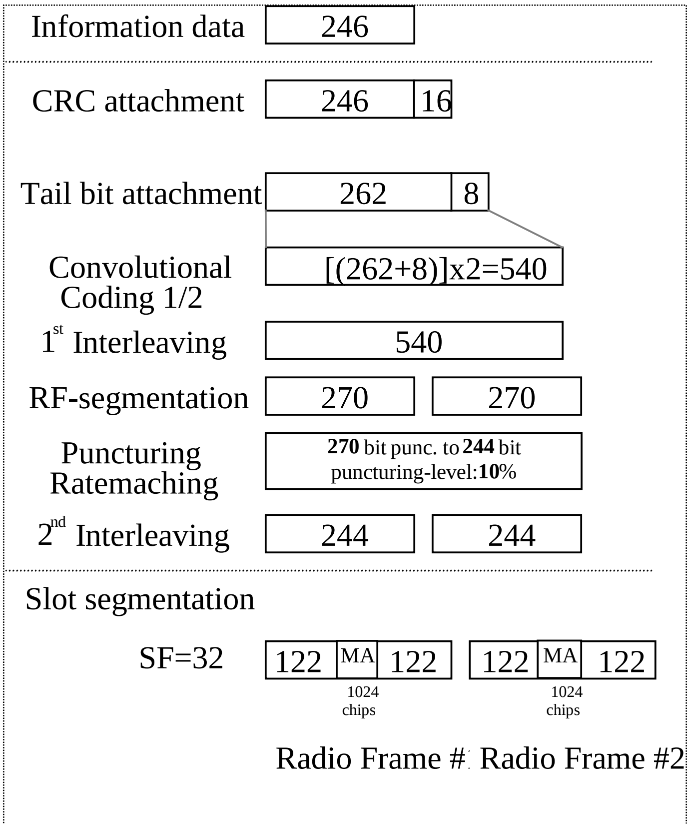
Parameter	Value
Information data rate:	12.3 kbps
RU´s allocated	2 RU
Midamble	144 chips
Interleaving	20 ms
Power control	0 bit
TFCI	0 bit
Puncturing level	13%



C.3.5.3 7,68 Mcps TDD Option

Table C.3.5.3

Parameter	Value
Information data rate:	12.3 kbps
RU´s allocated	1 RU
Midamble	1024 chips
Interleaving	20 ms
Power control	0 bit
TFCI	0 bit
Puncturing level	10%



C.3.6 DL reference measurement channel (2 Mbps) for 3,84 Mcps TDD Option

Table C.3.6.1: DL reference measurement channel physical parameters (2 Mbps)

Parameter	Value
Information data rate	*2048 kbps*
RU´s allocated	*16*12TS = 192RU*
Midamble	**256** chips
Interleaving	10 ms
Power control	0 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate 1/3 : DCH of the DTCH/ DCH of the DCCH	13.9% / 0%

Table C.3.6.2: DL reference measurement channel using RLC-TM for DTCH, transport channel parameters (2 Mbps)

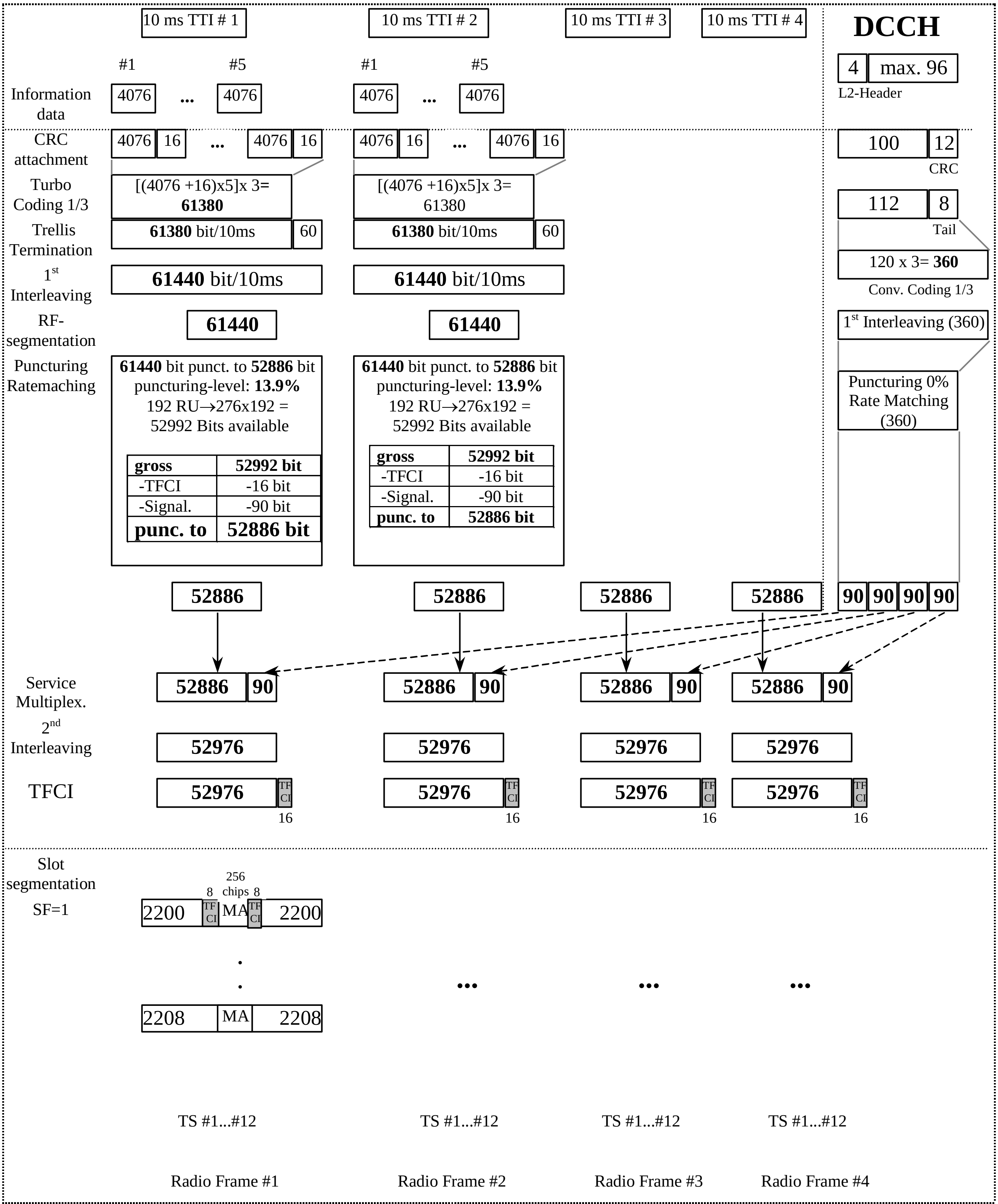
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		4076	88/80
	Max data rate, bps		2038000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		4076	100
	TFS	TF0, bits	0*4076	0*100
		TF1, bits	5*4076	1*100
	TTI, ms		10	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		N/A	1/3
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		61440	360
	Uplink: Max number of bits/radio frame before rate matching		61440	90
	RM attribute		207	240

Table C.3.6.3: DL reference measurement channel, TFCS (2 Mbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.3.6.4: DL reference measurement channel, puncturing limit (2 Mbps)

DPCH Downlink	Puncturing limit	0.84



C.3.7 DL reference measurement channel (2 Mbps) for 7,68 Mcps TDD Option

Table C.3.7.1: DL reference measurement channel physical parameters (2 Mbps)

Parameter	Value
Information data rate	2048 kbps

RU´s allocated	16*12TS = 192RU
Midamble	512 chips
Interleaving	10 ms
Power control	0 Bit/user
TFCI	16 Bit/user
Inband signalling DCCH	2 kbps
Puncturing level at Code rate 1/3 : DCH of the DTCH / DCH of the DCCH	13.9% / 0%

Table C.3.7.2: DL reference measurement channel using RLC-TM for DTCH, transport channel parameters (2 Mbps)

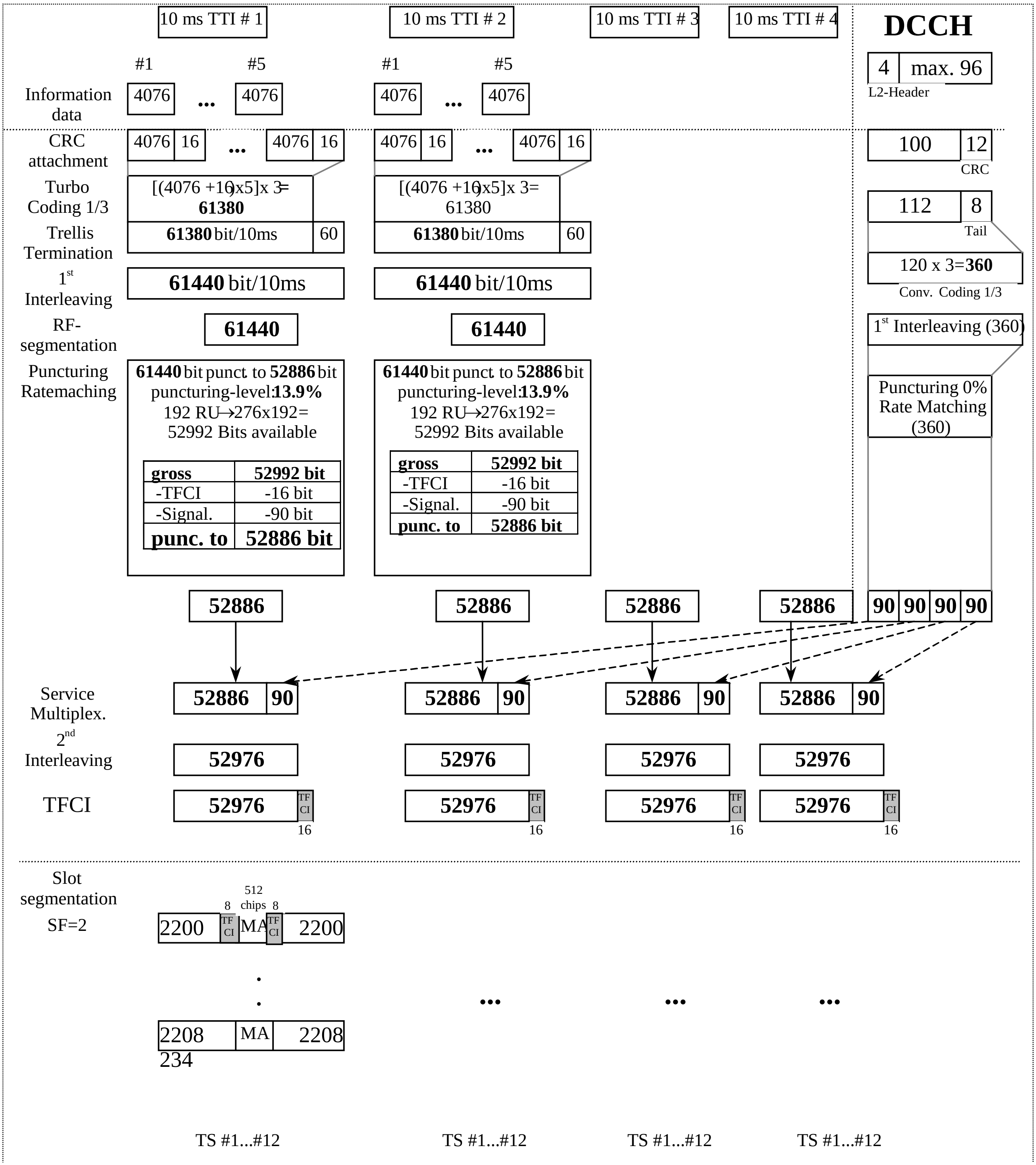
Higher Layer	RAB/Signalling RB		RAB	SRB
RLC	Logical channel type		DTCH	DCCH
	RLC mode		TM	UM/AM
	Payload sizes, bit		4076	88/80
	Max data rate, bps		2038000	2200/2000
	PDU header, bit		N/A	8/16
	TrD PDU header, bit		0	N/A
MAC	MAC header, bit		0	4
	MAC multiplexing		N/A	Yes
Layer 1	TrCH type		DCH	DCH
	Transport Channel Identity		1	5
	TB sizes, bit		4076	100
	TFS	TF0, bits	0*4076	0*100
		TF1, bits	5*4076	1*100
	TTI, ms		10	40
	Coding type		Turbo Coding	Convolution Coding
	Coding Rate		N/A	1/3
	CRC, bit		16	12
	Max number of bits/TTI after channel coding		61440	360
	Uplink: Max number of bits/radio frame before rate matching		61440	90
	RM attribute		207	240

Table C.3.7.3: DL reference measurement channel, TFCS (2 Mbps)

TFCS size	4
TFCS	(DTCH, DCCH)= (TF0, TF0), (TF1, TF0), (TF0, TF1), (TF1, TF1)

Table C.3.7.4: DL reference measurement channel, puncturing limit (2 Mbps)

DPCH Downlink	Puncturing limit	0.84


10 ms TTI # 1
10 ms TTI # 2
10 ms TTI # 3
10 ms TTI # 4
DCCH
Information data
4076 ... 4076
4 max. 96
L2-Header
CRC attachment
4076 16 ... 4076 16
100 12
CRC
Turbo Coding 1/3
[(4076 +16)x5]x 3=
61380
112 8
Tail
Trellis Termination
61380 bit/10ms 60
120 x 3=360
Conv. Coding 1/3
1st Interleaving
61440 bit/10ms
RF-segmentation
61440
1st Interleaving (360)
Puncturing Ratematching
61440 bit punct. to 52886 bit
puncturing-level:13.9%
192 RU→276x192=
52992 Bits available
gross 52992 bit
-TFCI -16 bit
-Signal. -90 bit
punc. to 52886 bit
Puncturing 0%
Rate Matching
(360)
52886
90 90 90 90
Service Multiplex.
52886 90
2nd Interleaving
52976
TFCI
TF CI
16
Slot segmentation
SF=2
512 chips
8
2200 MA 2200
2208 MA 2208
234
TS #1...#12

C.3.8 DL reference measurement channel for MBSFN only UEs (28kbps)

C.3.8.1 3,84 Mcps TDD IMB Option

Table C.3.8.1: DL reference measurement channel, physical parameters (28kbps)

Parameter	Value
Information data rate	28 kbps
DTX position	Flexible
Spreading factor	16
Number of codes	2
Number of data bits/slot	560
Number of data bits/frame	1680
Modulation	QPSK
Slot format #	Format 2 and 3
TFCI	On

Table C.3.8.2: DL reference measurement channel, transport parameters (28kbps)

Higher layer	RAB/signalling RB		RAB
	User of Radio Bearer		MBMS
RLC	Logical channel type		MTCH
	RLC mode		UM
	Payload sizes, bit		544
	Max data rate, bps		27200
	UMD PDU header, bit		8
MAC	MAC header, bit		8
	MAC multiplexing		N/A
Layer 1	TrCH type		FACH
	TB sizes, bit		560
	TFS	TF0, bits	0x560
		TF1, bits	1x560
	TTI, ms		20
	Coding type		TC
	CRC, bit		16
	Max number of bits/TTI after channel coding		1740
	Max number of bits/radio frame before rate matching		870
	RM attribute		256

Table C.3.8.3: DL reference measurement channel, TFCS (28 kbps)

TFCS size	2
TFCS	TF0, TF1

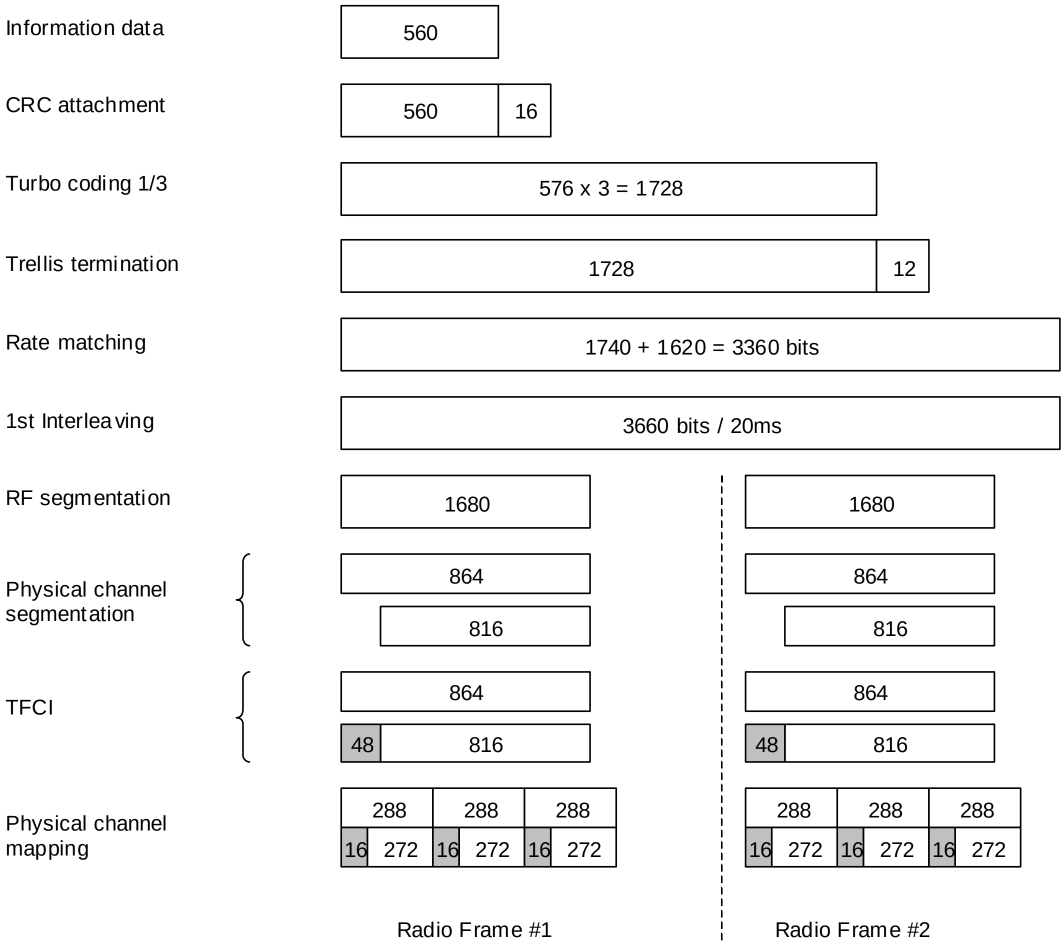


Table C.3.8.4 defines the physical channels that are transmitted simultaneously with the IMB DL reference measurement channel. Table C.3.8.4 is applicable for all measurements on the receiver characteristics (clause 6). OCNS physical channels are applicable only in the case of subclause 6.3.

Table C.3.8.4: Additional downlink physical channels transmitted simultaneously with the IMB DL reference measurement channel

Physical Channel	Ec / Ior	Notes
P-CPICH	-10 dB	
T-CPICH	-0.457 dB	
P-CCPCH	-12 dB	
SCH	-12 dB	
OCNS[1]	Necessary power so that total transmit power spectral density of Node B (Ior) adds to one	OCNS consists of 8 physical channels each using SF16 and QPSK modulation. Each OCNS code has equal power.
NOTE [1]: Applicable only in the case of sub-clause 6.3		

C.4 HSDPA reference measurement channels

C.4.1 HSDPA reference measurement channels for 3,84 Mcps TDD option

C.4.1.1 Reference measurement channels for 7,3 Mbps – Category 8 - UE

C.4.1.1.1 QPSK modulation scheme for test 1, 2, 3

Table C.4.1.1: HS-PDSCH fixed reference channel for the PA3, PB3, and VA30 Channel models - Category 8

Parameter	Unit	Value
Maximum information bit throughput	Mbps	2,6496
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	26496
Number Code Blocks	Blocks	6
Total Available of Soft Channel bits in UE	Bits	353280
Number of Soft Channel bit per HARQ Proc.	Bits	88320
Number of coded bits per TTI	Bits	35328
Coding Rate		3/4
Number of HS-PDSCH Timeslots	Slots	8
Number of HS-PDSCH codes per TS	Codes	16
Spreading factor	SF	16

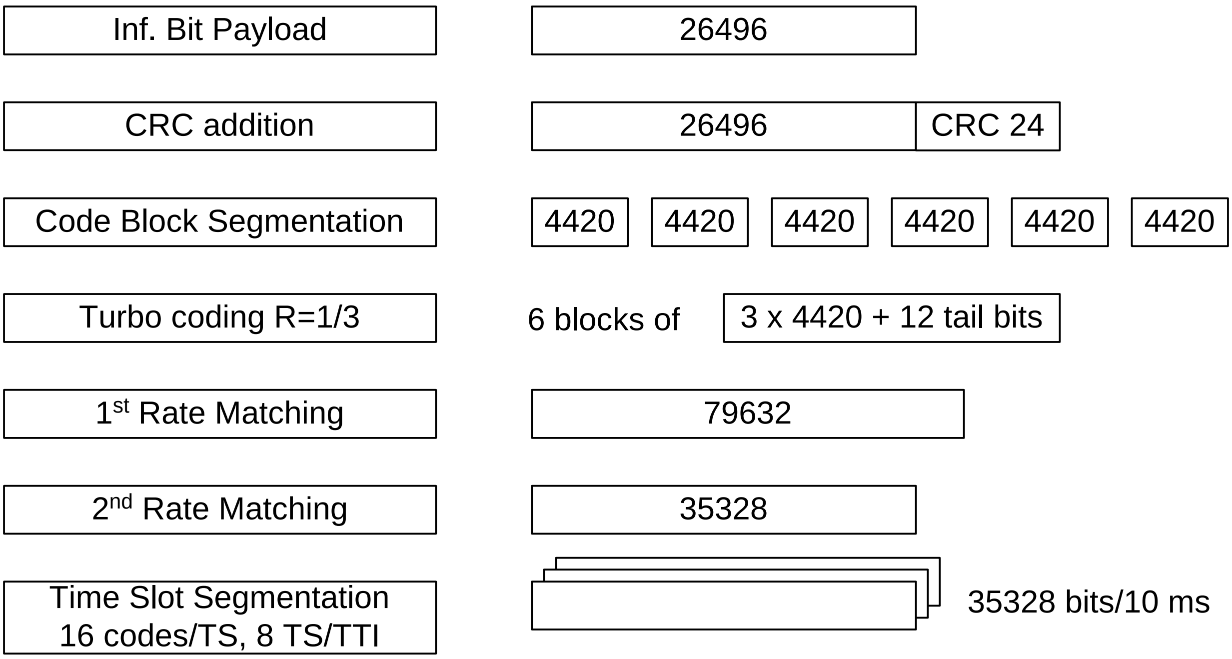


Figure C.4.1.1: Coding for HS-PDSCH fixed reference channel with QPSK modulation for the PA3, PB3, and VA30 Channels – Category 8

C.4.1.1.2 QPSK modulation scheme for test 4

Table C.4.1.2: HS-PDSCH fixed reference channel for the VA120 Channel model - Category 8

Parameter	Unit	Value
Maximum information bit throughput	Mbps	2,3176
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	23176
Number Code Blocks	Blocks	5
Total Available of Soft Channel bits in UE	Bits	353280
Number of Soft Channel bit per HARQ Proc.	Bits	88320
Number of coded bits per TTI	Bits	30912
Coding Rate		3/4
Number of HS-PDSCH Timeslots	Slots	8
Number of HS-PDSCH codes per TS	Codes	14
Spreading factor	SF	16

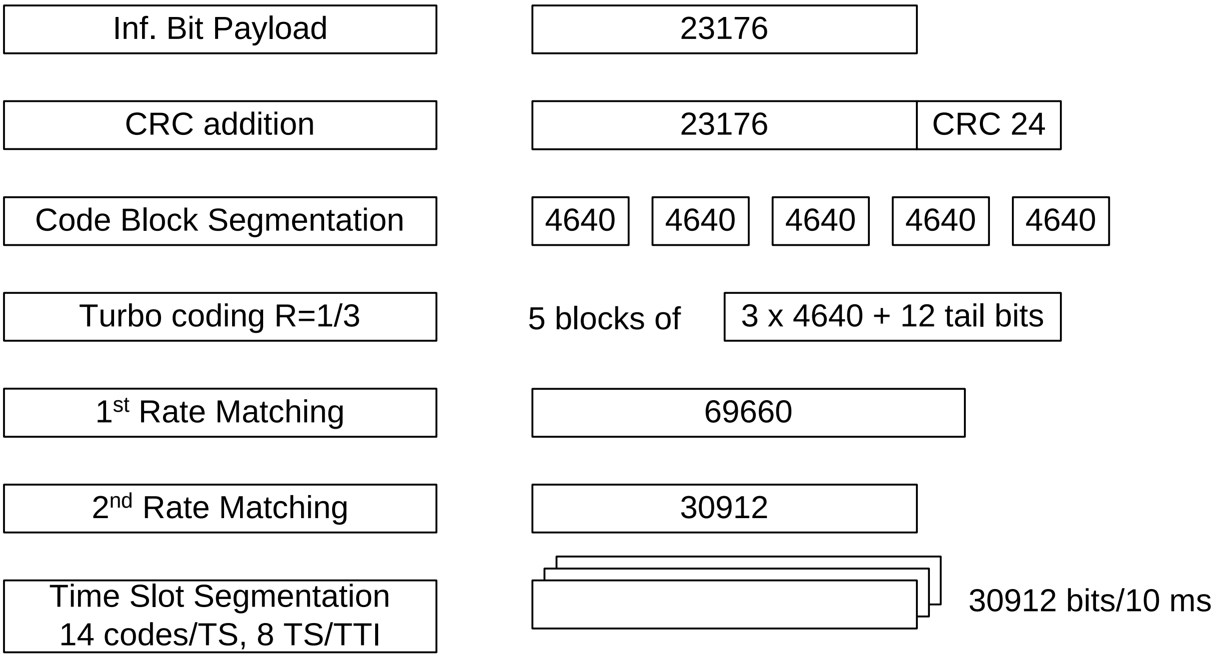


Figure C.4.1.2: Coding for HS-PDSCH fixed reference channel with QPSK modulation for the VA120 Channel – Category 8

C.4.1.1.3 16QAM modulation scheme for test 1, 2, 3

Table C.4.1.3: HS-PDSCH fixed reference channel for the PA3, PB3, and VA30 Channel models - Category 8

Parameter	Unit	Value
Modulation		**16-QAM**
Maximum information bit throughput	Mbps	5,2996
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	52996
Number Code Blocks	Blocks	11
Total Available of Soft Channel bits in UE	Bits	353280
Number of Soft Channel bit per HARQ Proc.	Bits	88320
Number of coded bits per TTI	Bits	70656
Coding Rate		3/4
Number of HS-PDSCH Timeslots	Slots	8
Number of HS-PDSCH codes per TS	Codes	16
Spreading factor	SF	16

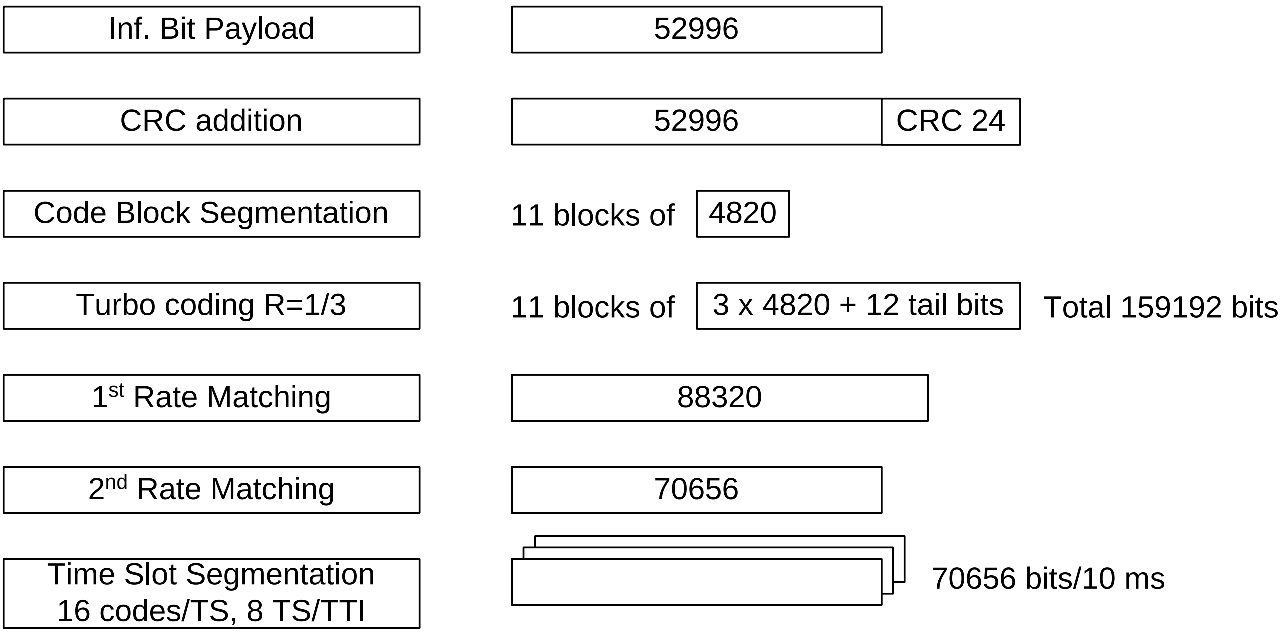


Figure C.4.1.3: Coding for HS-PDSCH fixed reference channel with 16-QAM modulation for the PA3 PB3, and VA30 Channels – Category 8

C.4.1.1.4 16QAM modulation scheme for test 4

Table C.4.1.4: HS-PDSCH fixed reference channel for the PA3, PB3, and VA30 Channel models - Category 8

Parameter	Unit	Value
Modulation		**16-QAM**
Maximum information bit throughput	Mbps	3,4773
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	34773
Number Code Blocks	Blocks	7
Total Available of Soft Channel bits in UE	Bits	353280
Number of Soft Channel bit per HARQ Proc.	Bits	88320
Number of coded bits per TTI	Bits	61824
Coding Rate		9/16
Number of HS-PDSCH Timeslots	Slots	8
Number of HS-PDSCH codes per TS	Codes	14
Spreading factor	SF	16

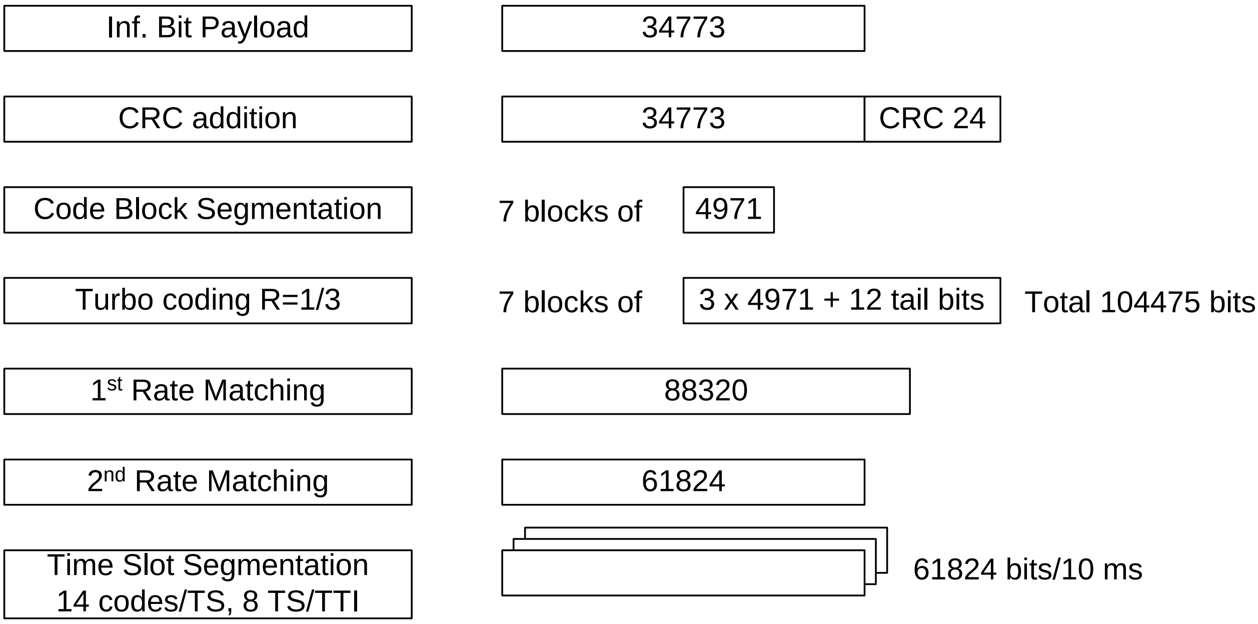


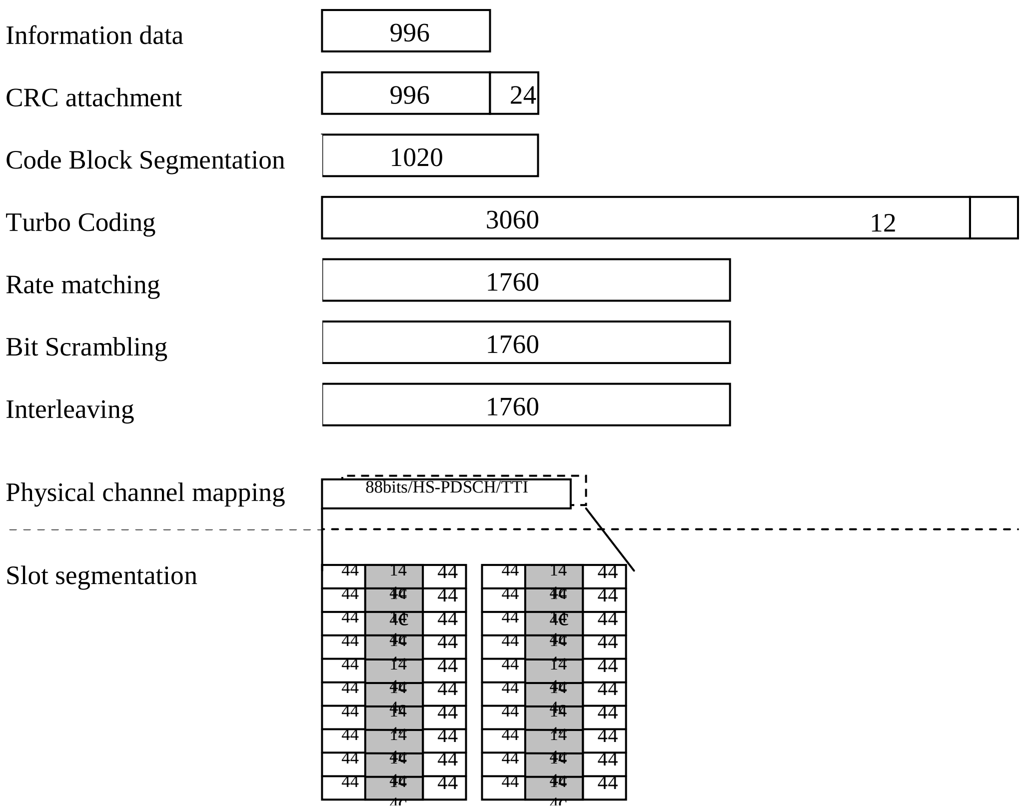
Figure C.4.1.4: Coding for HS-PDSCH fixed reference channel with 16-QAM modulation for the VA120 Channel – Category 8

C.4.2 HSDPA reference measurement channels for 1.28 Mcps TDD option

C.4.2.1 Reference measurement channels for 0.5Mbps UE class

C.4.2.1.1 QPSK modulation scheme

Parameter	Unit	Value
Modulation	-	QPSK
Maximum information bit throughput	Kbps	199.2
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	996
Number Code Blocks	Blocks	1
Total Available of Soft Channel bits in UE	Bits	11264
Number of Soft Channel bit per HARQ Proc.	Bits	2816
Number of coded bits per TTI	Bits	1760
Coding Rate	-	0.5795
Number of HS-DSCH Timeslots	Slots	2
Number of HS-PDSCH codes per TS	Codes	10
Spreading factor	SF	16



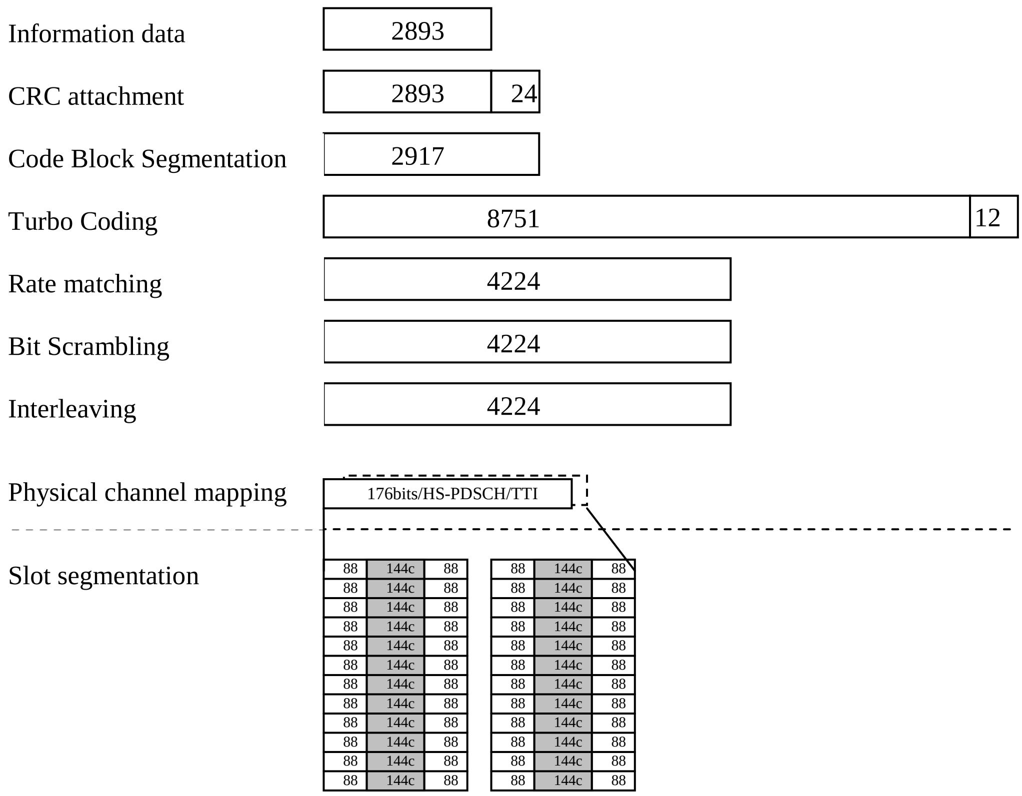
C.4.2.2 Reference measurement channels for 1.1Mbps UE class

C.4.2.2.1 QPSK modulation scheme

Reference channel in C.4.2.1.1 applies.

C.4.2.2.2 16QAM modulation scheme

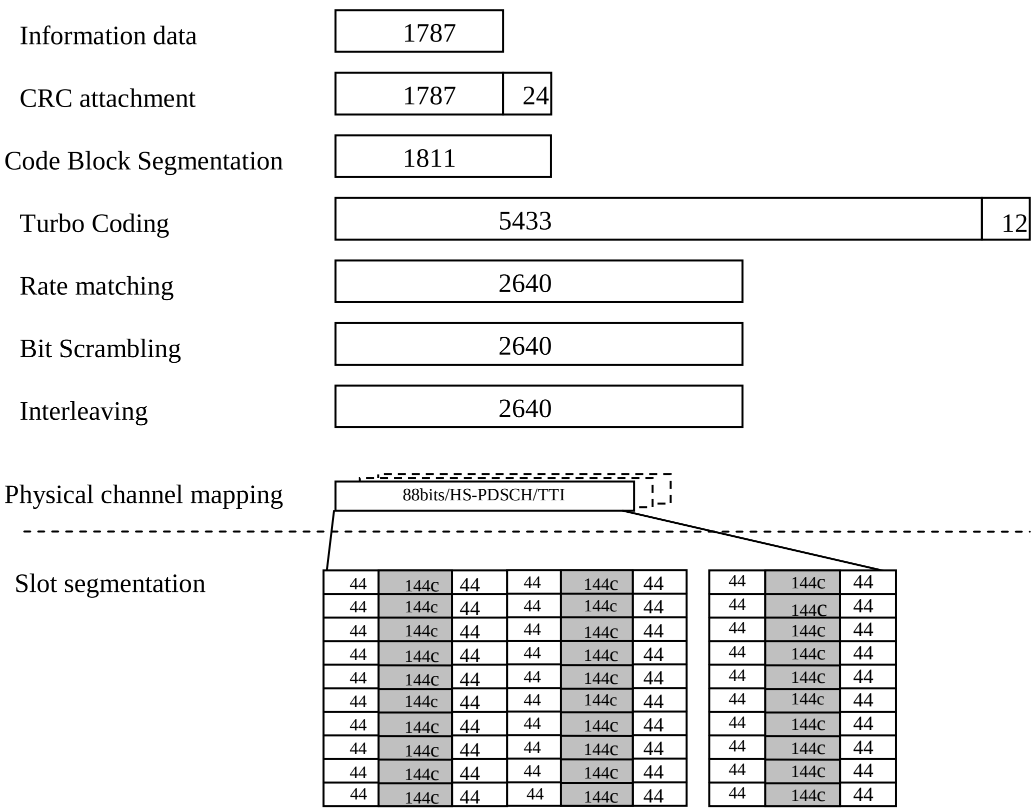
Parameter	Unit	Value
Modulation	-	16QAM
Maximum information bit throughput	Kbps	578.6
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	2893
Number Code Blocks	Blocks	1
Total Available of Soft Channel bits in UE	Bits	22528
Number of Soft Channel bit per HARQ Proc.	Bits	5632
Number of coded bits per TTI	Bits	4224
Coding Rate	-	0.69
Number of HS-DSCH Timeslots	Slots	2
Number of HS-PDSCH codes per TS	Codes	12
Spreading factor	SF	16



C.4.2.3 Reference measurement channels for 1.6Mbps UE class

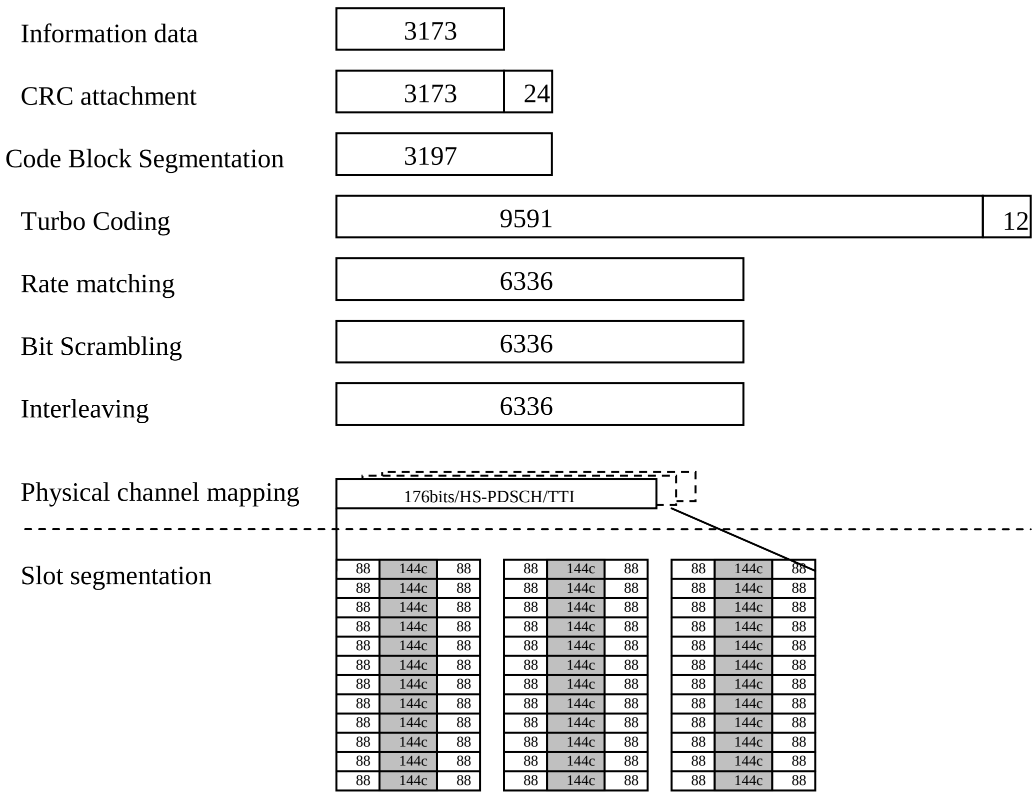
C.4.2.3.1 QPSK modulation scheme

Parameter	Unit	Value
Modulation	-	QPSK
Maximum information bit throughput	Kbps	357.4
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	1787
Number Code Blocks	Blocks	1
Total Available of Soft Channel bits in UE	Bits	33792
Number of Soft Channel bit per HARQ Proc.	Bits	8448
Number of coded bits per TTI	Bits	2640
Coding Rate	-	0.686
Number of HS-DSCH Timeslots	Slots	3
Number of HS-PDSCH codes per TS	Codes	10
Spreading factor	SF	16



C.4.2.3.2 16QAM modulation scheme

Parameter	Unit	Value
Modulation	-	16QAM
Maximum information bit throughput	Kbps	634.6
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	3173
Number Code Blocks	Blocks	1
Total Available of Soft Channel bits in UE	Bits	33792
Number of Soft Channel bit per HARQ Proc.	Bits	8448
Number of coded bits per TTI	Bits	6336
Coding Rate	-	0.505
Number of HS-DSCH Timeslots	Slots	3
Number of HS-PDSCH codes per TS	Codes	12
Spreading factor	SF	16

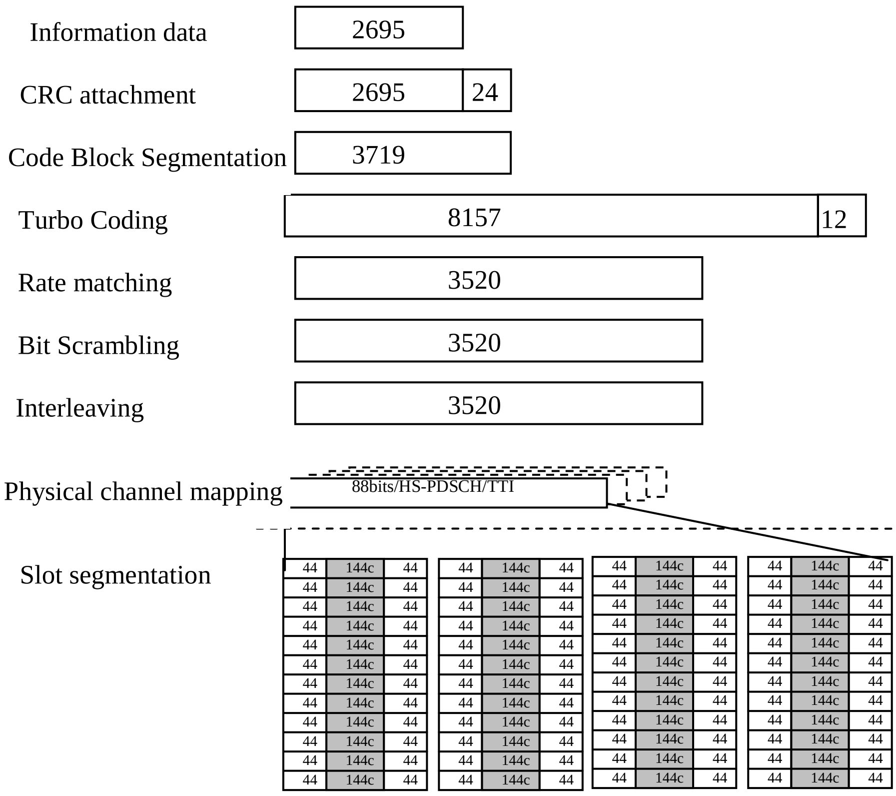


C.4.2.4 Reference measurement channels for 2.2Mbps UE class

C.4.2.4.1 QPSK modulation scheme

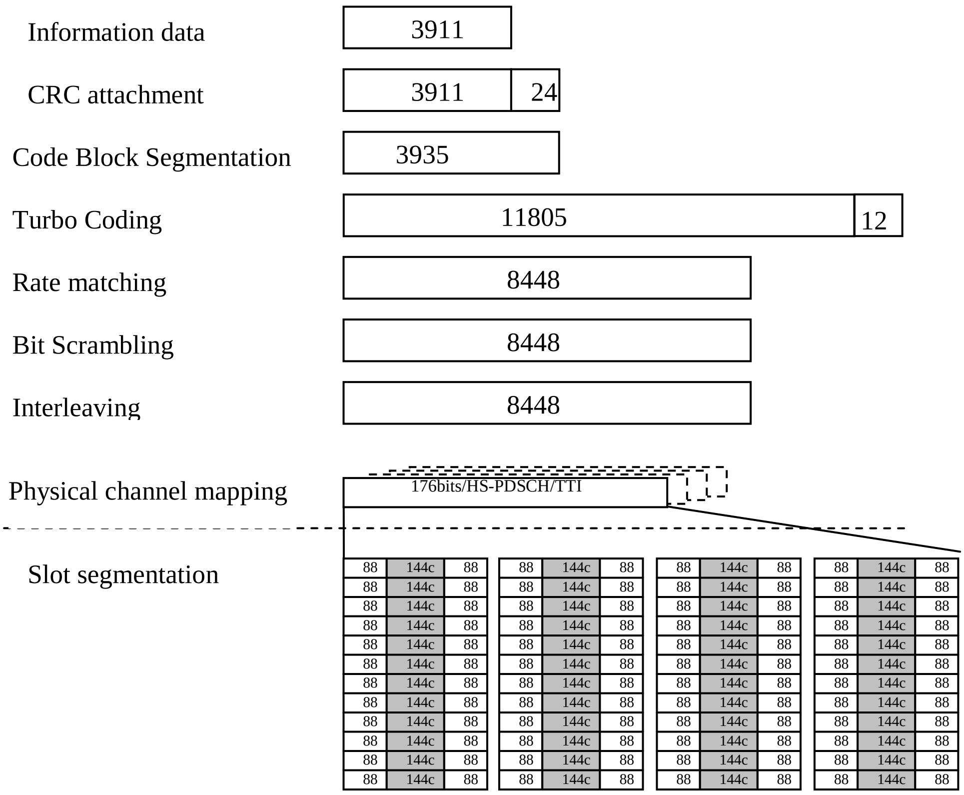
Parameter	Unit	Value
Modulation	-	QPSK
Maximum information bit throughput	Kbps	539
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	2695
Number Code Blocks	Blocks	1
Total Available of Soft Channel bits in UE	Bits	45056
Number of Soft Channel bit per HARQ Proc.	Bits	11264
Number of coded bits per TTI	Bits	3520
Coding Rate	-	0.772
Number of HS-DSCH Timeslots	Slots	4

Number of HS-PDSCH codes per TS	Codes	10
Spreading factor	SF	16



C.4.2.4.2 16QAM modulation scheme

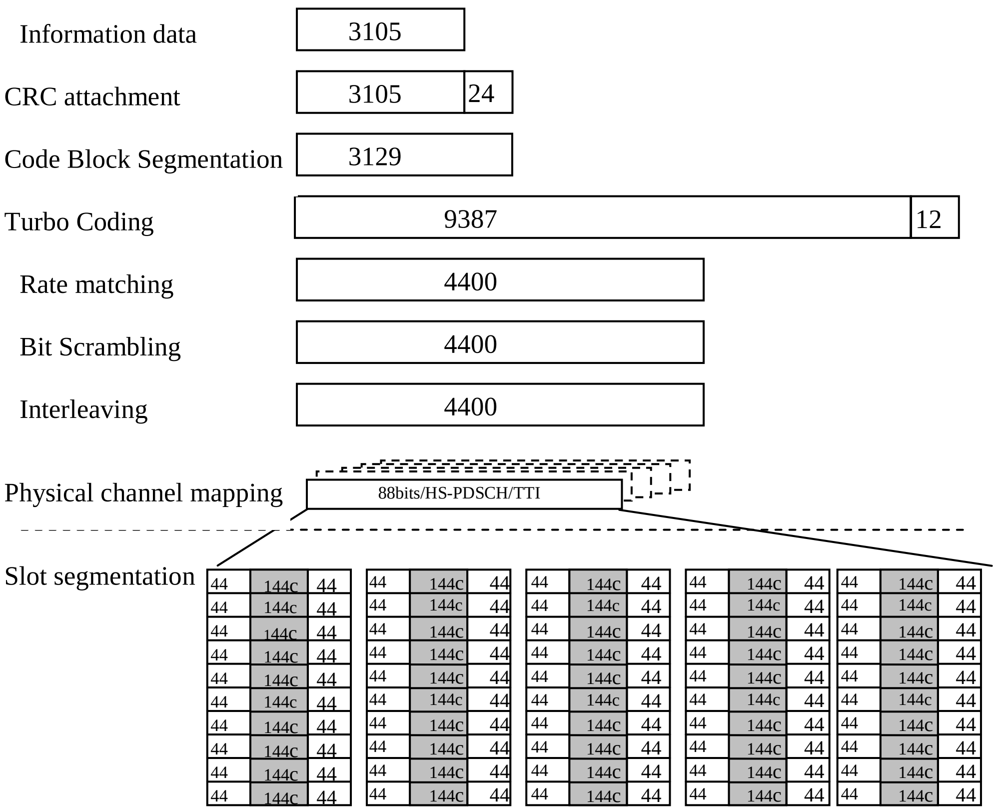
Parameter	Unit	Value
Modulation	-	16QAM
Maximum information bit throughput	Kbps	782.2
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	3911
Number Code Blocks	Blocks	1
Total Available of Soft Channel bits in UE	Bits	45056
Number of Soft Channel bit per HARQ Proc.	Bits	11264
Number of coded bits per TTI	Bits	8448
Coding Rate	-	0.4658
Number of HS-DSCH Timeslots	Slots	4
Number of HS-PDSCH codes per TS	Codes	12
Spreading factor	SF	16



C.4.2.5 Reference measurement channels for 2.8Mbps UE class

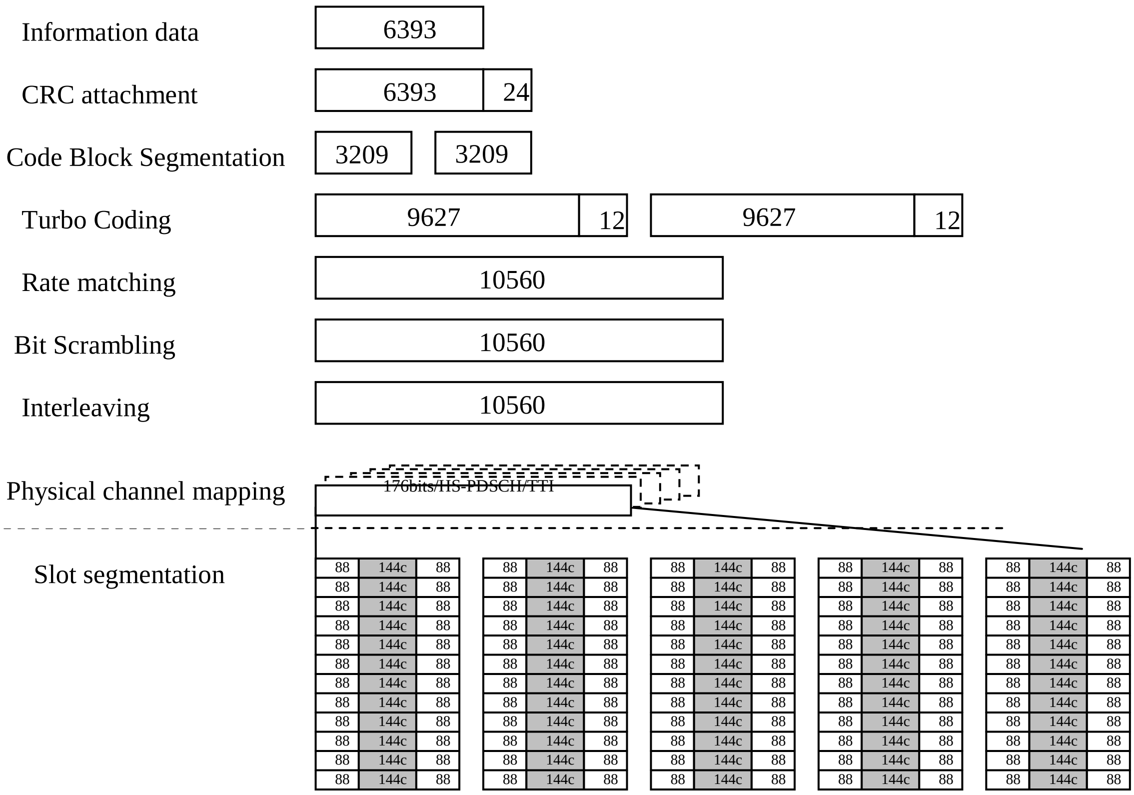
C.4.2.5.1 QPSK modulation scheme

Parameter	Unit	Value
Modulation	-	QPSK
Maximum information bit throughput	Kbps	621
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	3105
Number Code Blocks	Blocks	1
Total Available of Soft Channel bits in UE	Bits	56320
Number of Soft Channel bit per HARQ Proc.	Bits	14080
Number of coded bits per TTI	Bits	4400
Coding Rate	-	0.711
Number of HS-DSCH Timeslots	Slots	5
Number of HS-PDSCH codes per TS	Codes	10
Spreading factor	SF	16



C.4.2.5.2 16QAM modulation scheme

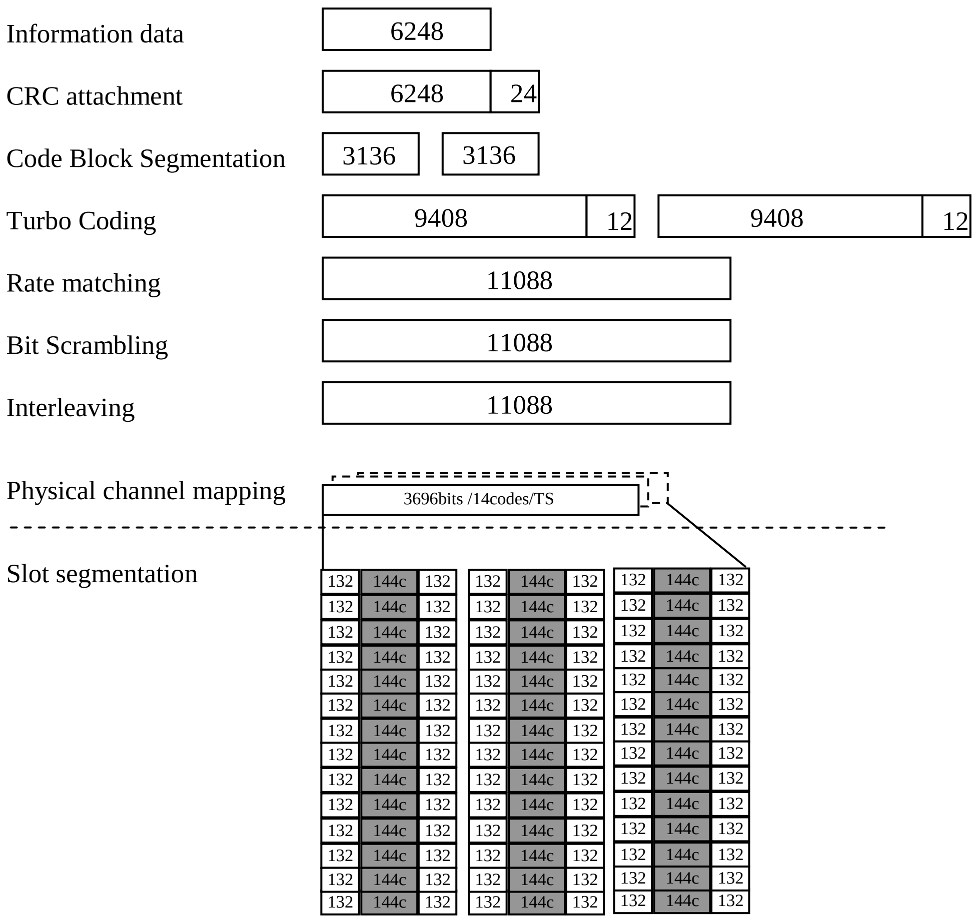
Parameter	Unit	Value
Modulation	-	16QAM
Maximum information bit throughput	Kbps	1278.6
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	6393
Number Code Blocks	Blocks	1
Total Available of Soft Channel bits in UE	Bits	56320
Number of Soft Channel bit per HARQ Proc.	Bits	14080
Number of coded bits per TTI	Bits	10560
Coding Rate	-	0.6077
Number of HS-DSCH Timeslots	Slots	5
Number of HS-PDSCH codes per TS	Codes	12
Spreading factor	SF	16



C.4.2.6 Reference measurement channels for Category 16-24 UE

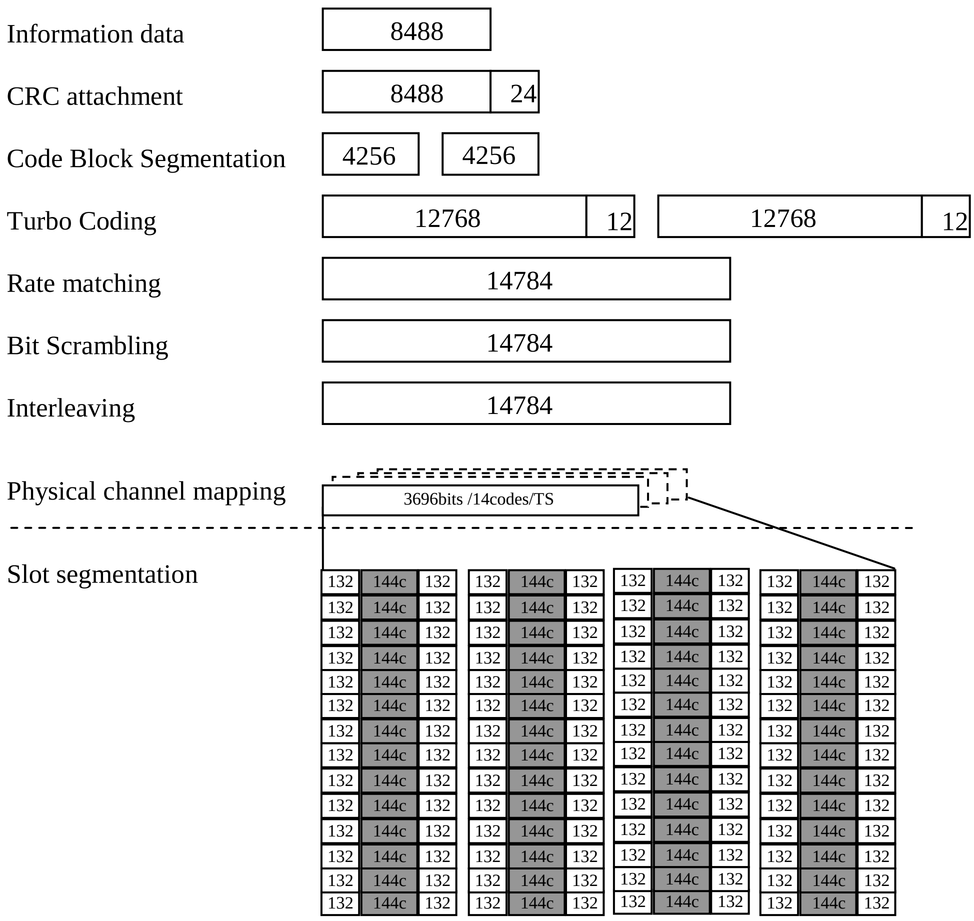
C.4.2.6.1 Reference measurement channel for category 16-18 UE

Parameter	Unit	Value
Modulation	-	64QAM
Maximum information bit throughput	Mbps	1.2496
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	6248
Number Code Blocks	Blocks	2
Total Available of Soft Channel bits in UE	Bits	50688
Number of Soft Channel bit per HARQ Proc.	Bits	12672
Number of coded bits per TTI	Bits	11088
Coding Rate	-	0.5635
Number of HS-DSCH Timeslots	Slots	3
Number of HS-PDSCH codes per TS	Codes	14
Spreading factor	SF	16



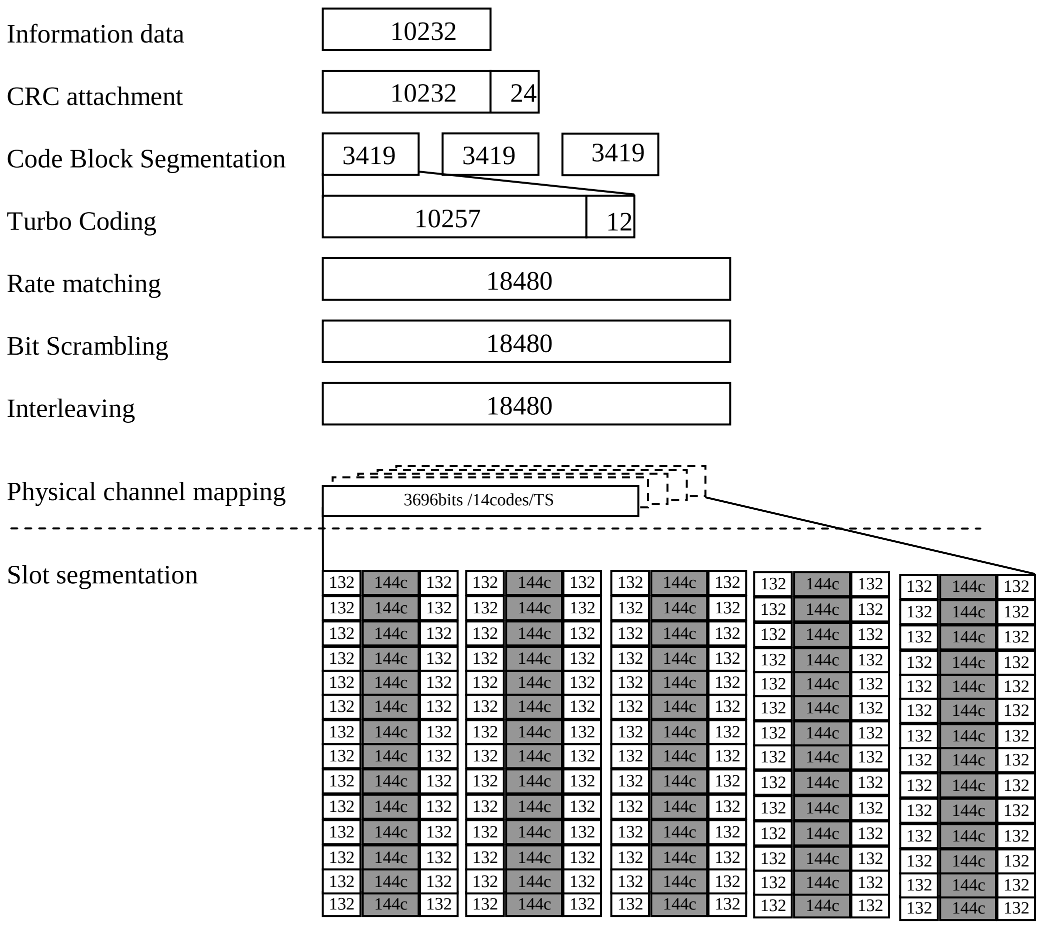
C.4.2.6.2 Reference measurement channel for category 19-21 UE

Parameter	Unit	Value
Modulation	-	**64QAM**
Maximum information bit throughput	Mbps	1.6976
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	8488
Number Code Blocks	Blocks	2
Total Available of Soft Channel bits in UE	Bits	67584
Number of Soft Channel bit per HARQ Proc.	Bits	16896
Number of coded bits per TTI	Bits	14784
Coding Rate	-	0.57
Number of HS-DSCH Timeslots	Slots	4
Number of HS-PDSCH codes per TS	Codes	14
Spreading factor	SF	16



C.4.2.6.3 Reference measurement channel for category 22-24 UE

Parameter	Unit	Value
Modulation	-	**64QAM**
Maximum information bit throughput	Mbps	2.0464
Number of HARQ Processes	Processes	4
Information Bit Payload (N_{INF})	Bits	10232
Number Code Blocks	Blocks	3
Total Available of Soft Channel bits in UE	Bits	84480
Number of Soft Channel bit per HARQ Proc.	Bits	21120
Number of coded bits per TTI	Bits	18480
Coding Rate	-	0.55
Number of HS-DSCH Timeslots	Slots	5
Number of HS-PDSCH codes per TS	Codes	14
Spreading factor	SF	16



C.4.2.7 Reference measurement channels for Category 25 UE

C.4.2.7.1 QPSK modulation scheme

Table C.4.2.7.1: Reference Measurement Channel for Category 25 (QPSK)

Parameter	Unit	Value	
Stream		1st stream	2nd stream
Modulation	-	QPSK	QPSK
Combined Nominal Avg. Inf. Bit Rate	Mbps	1.0976	
Nominal Avg. Inf. Bit Rate per stream	kbps	564.8	532.8
Number of HARQ Processes	Processes	4	4
Information Bit Payload (N_{INF})	Bits	2824	2664
Number Code Blocks	Blocks	1	1
Total Available of Soft Channel bits in UE	Bits	202752	
Number of Soft Channel bit per HARQ Proc.	Bits	25344	25344
Number of coded bits per TTI	Bits	4224	4224
Coding Rate	-	0.6697	0.6323
Number of HS-DSCH Timeslots	Slots	3	3
Number of HS-PDSCH codes per TS	Codes	16	16
Spreading factor	SF	16	16
Note: For UE support SF=1 only in dual stream transmission, both the number of HS-PDSCH codes per TS and spreading factor in the FRC should be changed to 1.			

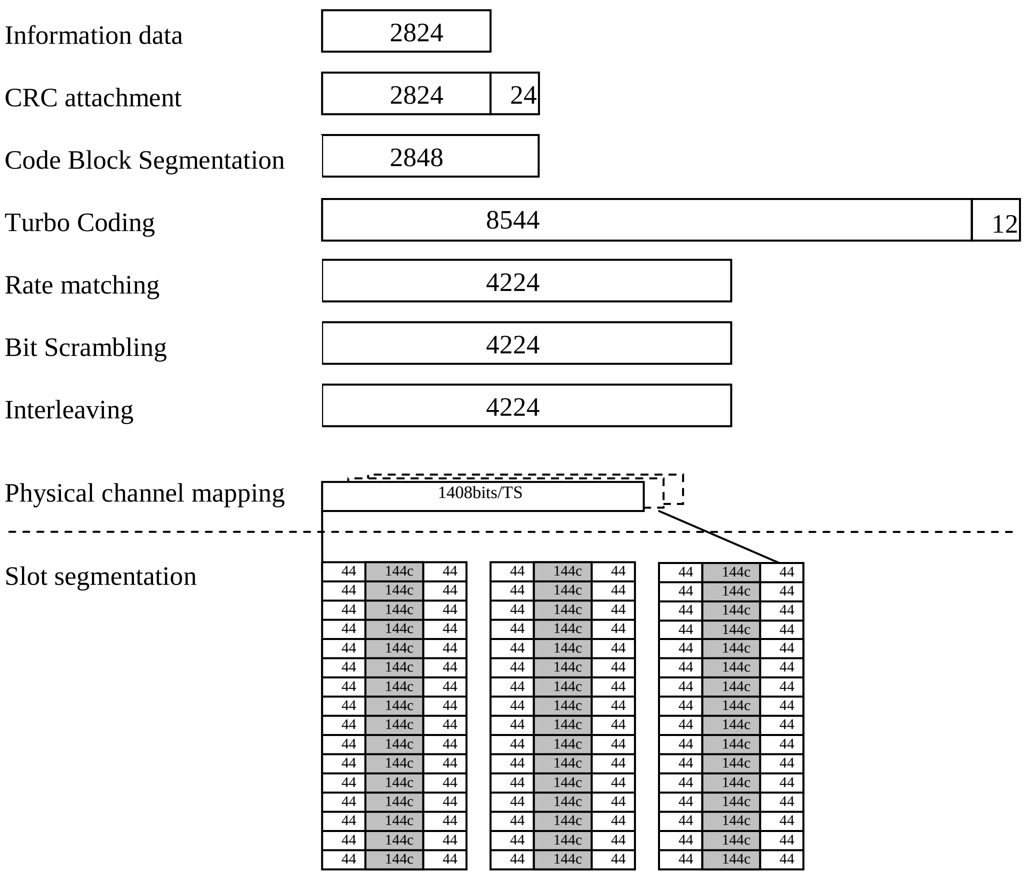


Figure C.4.2.7.1a Reference Measurement Channel for Category 25 (QPSK) - First Stream

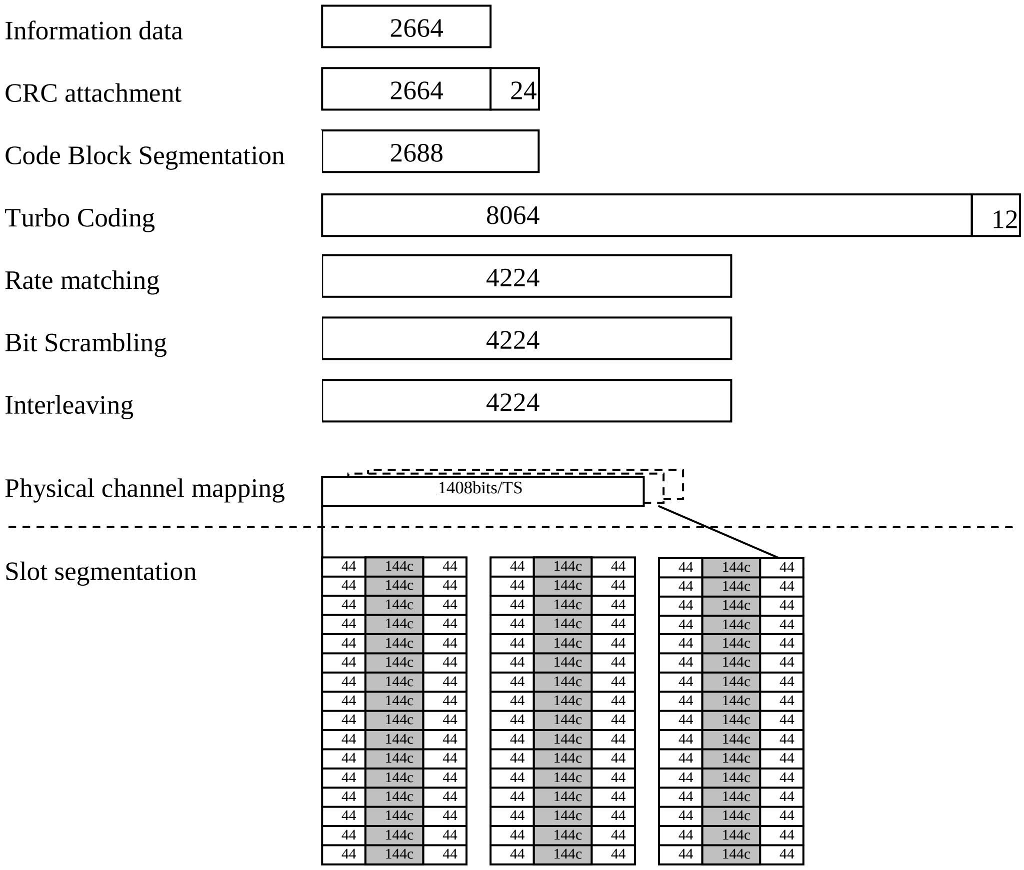


Figure C.4.2.7.1b Reference Measurement Channel for Category 25 (QPSK) - Second Stream

C.4.2.7.2 16QAM modulation scheme

Table C.4.2.7.2 Reference Measurement Channel for Category 25 (16QAM)

Parameter	Unit	Value	
Stream		1st stream	2nd stream
Modulation	-	16QAM	16QAM
Combined Nominal Avg. Inf. Bit Rate	Mbps	1.8416	
Nominal Avg. Inf. Bit Rate per stream	kbps	947.2	894.4
Number of HARQ Processes	Processes	4	4
Information Bit Payload (N_{INF})	Bits	4736	4472
Number Code Blocks	Blocks	1	1
Total Available of Soft Channel bits in UE	Bits	202752	
Number of Soft Channel bit per HARQ Proc.	Bits	25344	25344
Number of coded bits per TTI	Bits	8448	8448
Coding Rate	-	0.561	0.529
Number of HS-DSCH Timeslots	Slots	3	3
Number of HS-PDSCH codes per TS	Codes	16	16
Spreading factor	SF	16	16
Note: For UE support SF=1 only in dual stream transmission, both the number of HS-PDSCH codes per TS and spreading factor in the FRC should be changed to 1.			

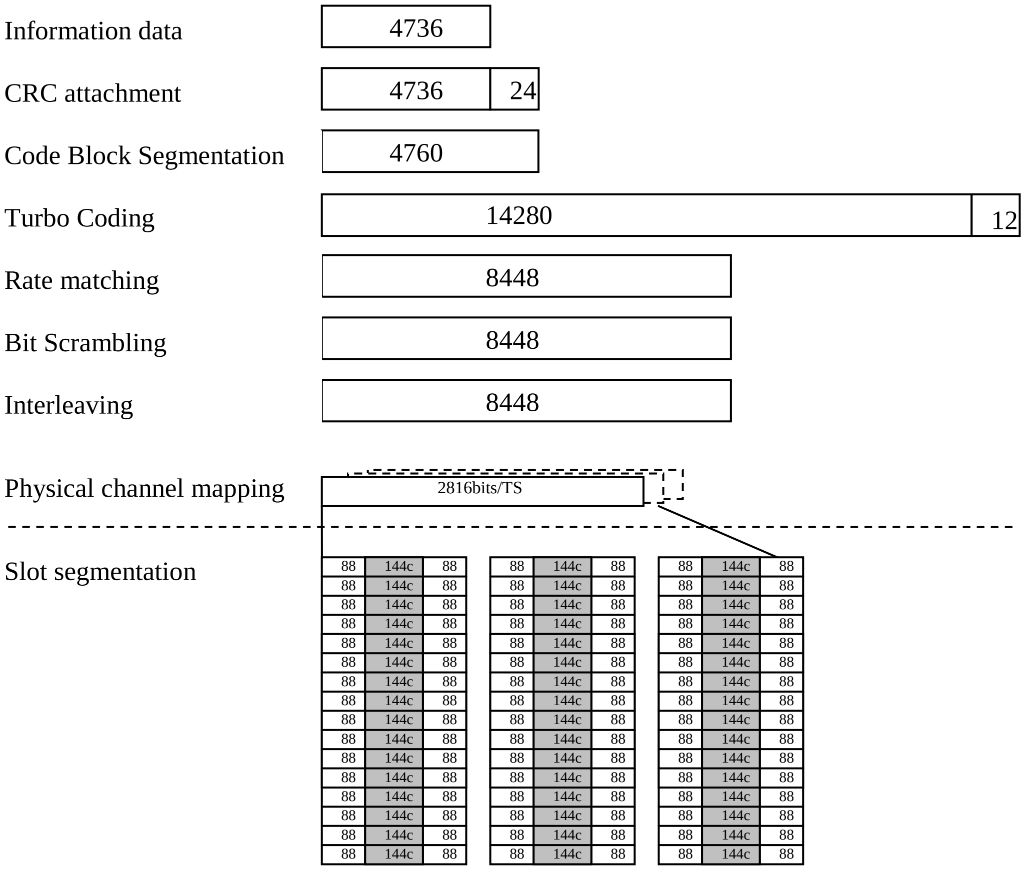


Figure C.4.2.7.2a Reference Measurement Channel for Category 25 (16QAM) - First Stream

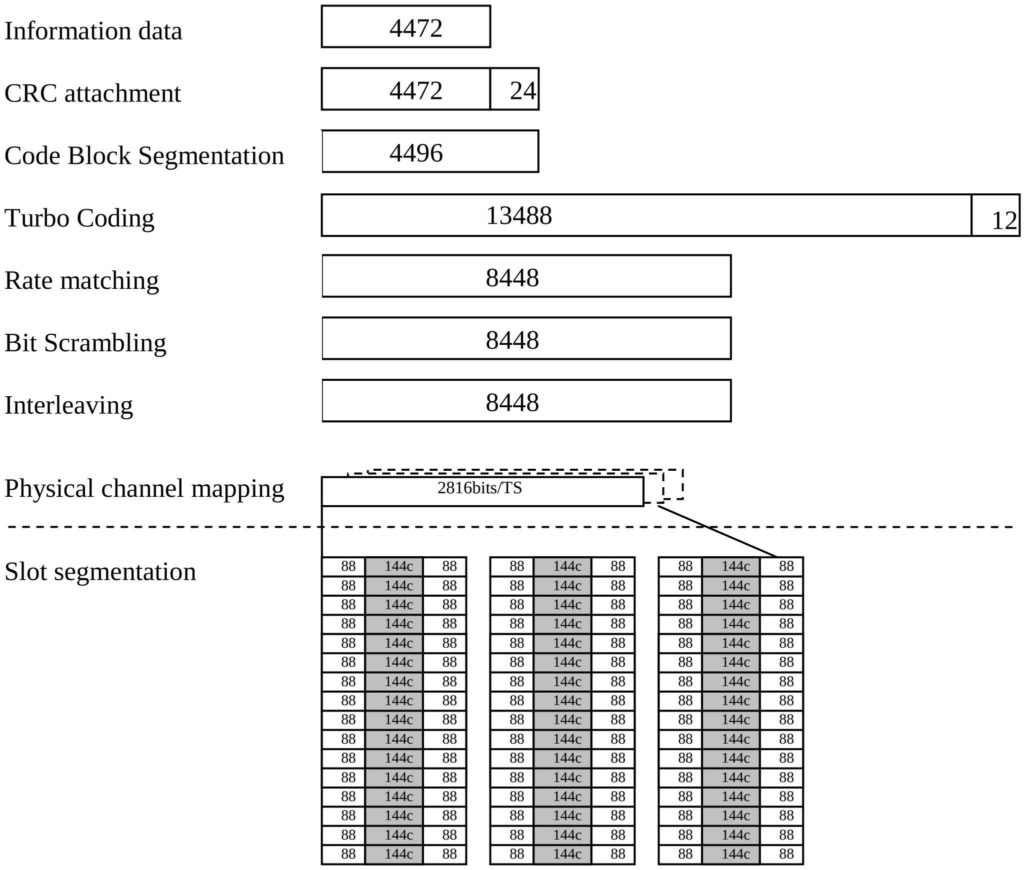


Figure C.4.2.7.2b Reference Measurement Channel for Category 25 (16QAM) - Second Stream

C.4.2.8 Reference Measurement Channel for category 26 UE

C.4.2.8.1 QPSK modulation scheme

Table C.4.2.8.1: Reference Measurement Channel for Category 26 (QPSK)

Parameter	Unit	Value	
Stream		1st stream	2nd stream
Modulation	-	QPSK	QPSK
Combined Nominal Avg. Inf. Bit Rate	Mbps	1.5152	
Nominal Avg. Inf. Bit Rate per stream	kbps	780.8	734.4
Number of HARQ Processes	Processes	4	4
Information Bit Payload (N_{INF})	Bits	3904	3672
Number Code Blocks	Blocks	1	1
Total Available of Soft Channel bits in UE	Bits	270336	
Number of Soft Channel bit per HARQ Proc.	Bits	33792	33792
Number of coded bits per TTI	Bits	5632	5632
Coding Rate	-	0.693	0.652
Number of HS-DSCH Timeslots	Slots	4	4
Number of HS-PDSCH codes per TS	Codes	16	16
Spreading factor	SF	16	16
Note: For UE support SF=1 only in dual stream transmission, both the number of HS-PDSCH codes per TS and spreading factor in the FRC should be changed to 1.			

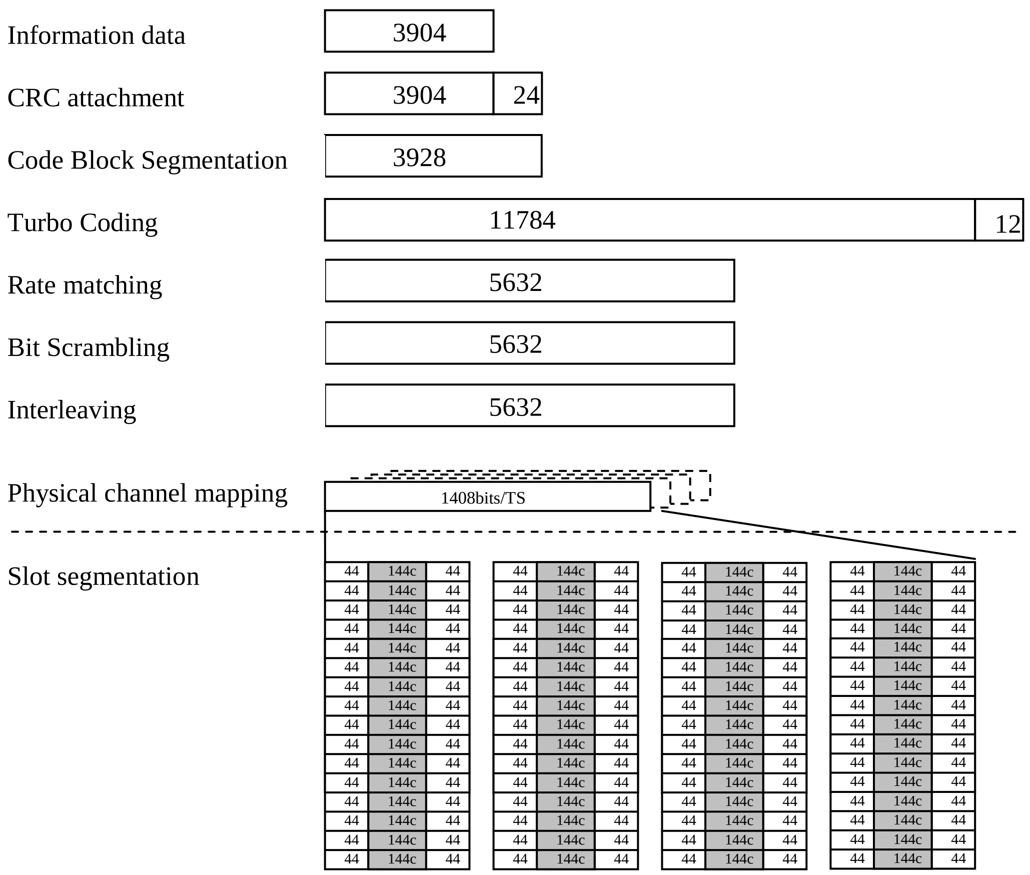


Figure C.4.2.8.1a Reference Measurement Channel for Category 26 (QPSK) - First Stream

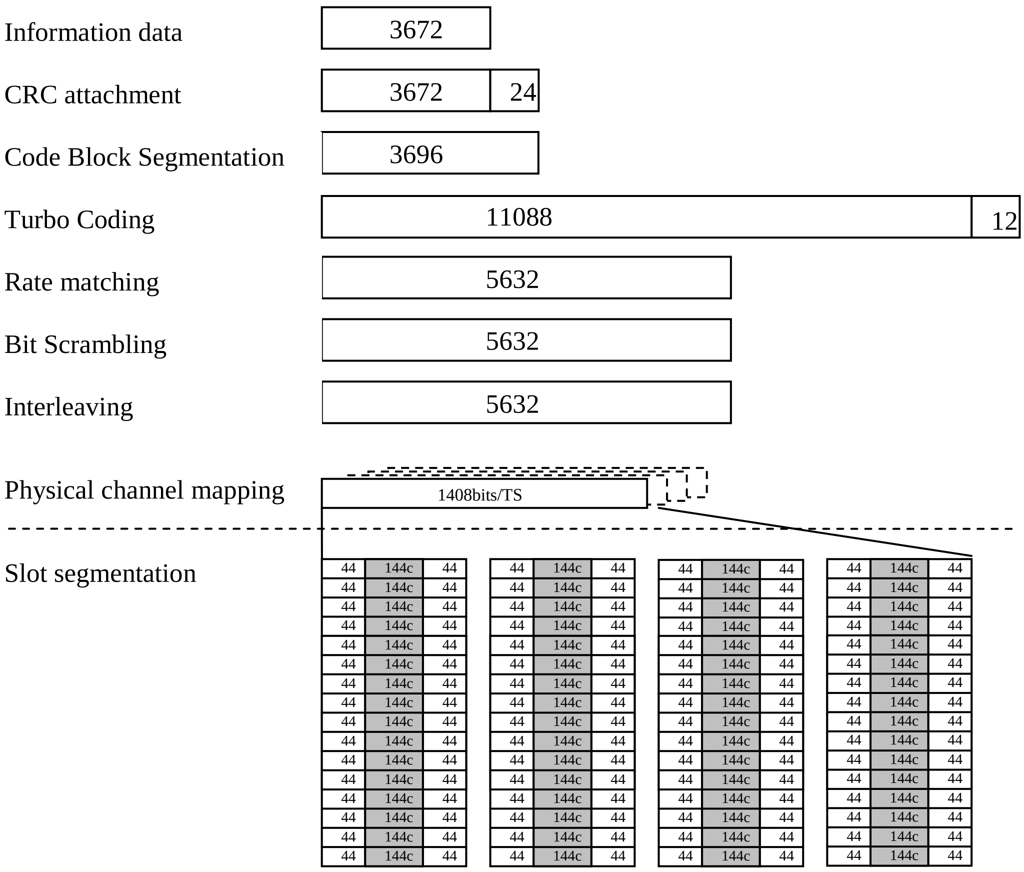


Figure C.4.2.8.1b: Reference Measurement Channel for Category 26 (QPSK) - Second Stream

C.4.2.8.2 16QAM modulation scheme

Table C.4.2.8.2: Reference Measurement Channel for Category 26 (16QAM)

Parameter	Unit	Value	
Stream		1st stream	2nd stream
Modulation	-	16QAM	16QAM
Combined Nominal Avg. Inf. Bit Rate	Mbps	2.8192	
Nominal Avg. Inf. Bit Rate per stream	kbps	1452.8	1366.4
Number of HARQ Processes	Processes	4	4
Information Bit Payload (N_{INF})	Bits	7264	6832
Number Code Blocks	Blocks	2	2
Total Available of Soft Channel bits in UE	Bits	270336	
Number of Soft Channel bit per HARQ Proc.	Bits	33792	33792
Number of coded bits per TTI	Bits	11264	11264
Coding Rate	-	0.645	0.607
Number of HS-DSCH Timeslots	Slots	4	4
Number of HS-PDSCH codes per TS	Codes	16	16
Spreading factor	SF	16	16
Note: For UE support SF=1 only in dual stream transmission, both the number of HS-PDSCH codes per TS and spreading factor in the FRC should be changed to 1.			

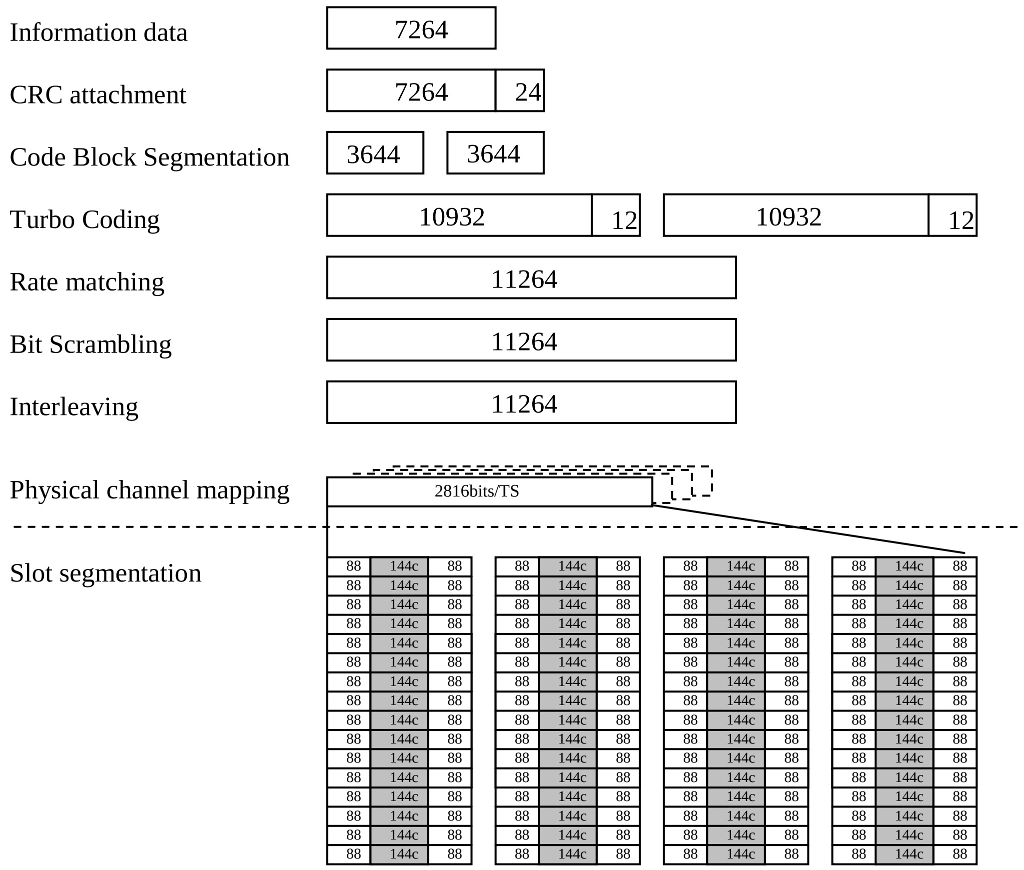


Figure C.4.2.8.2a Reference Measurement Channel for Category 26 (16QAM) - First Stream

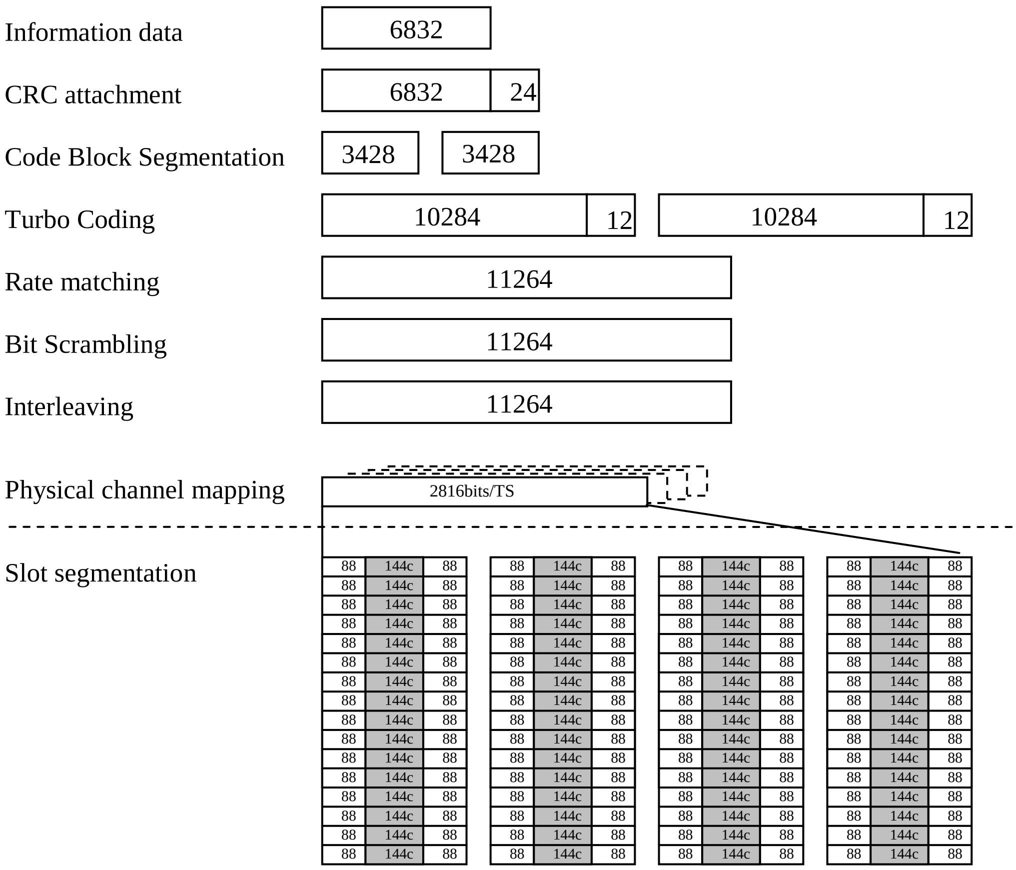


Figure C.4.2.8.2b Reference Measurement Channel for Category 26 (16QAM) - Second Stream

C.4.2.9 Reference Measurement Channel for category 27 UE

C.4.2.9.1 QPSK modulation scheme

Table C.4.2.9.1 Reference Measurement Channel for Category 27 (QPSK)

Parameter	Unit	Value	
Stream		1^{st} stream	2^{nd} stream
Modulation	-	QPSK	QPSK
Combined Nominal Avg. Inf. Bit Rate	Mbps	1.7808	
Nominal Avg. Inf. Bit Rate per stream	kbps	920	860.8
Number of HARQ Processes	Processes	4	4
Information Bit Payload (N_{INF})	Bits	4600	4304
Number Code Blocks	Blocks	1	1
Total Available of Soft Channel bits in UE	Bits	337920	
Number of Soft Channel bit per HARQ Proc.	Bits	42240	42240
Number of coded bits per TTI	Bits	7040	7040
Coding Rate	-	0.653	0.611
Number of HS-DSCH Timeslots	Slots	5	5
Number of HS-PDSCH codes per TS	Codes	16	16
Spreading factor	SF	16	16
Note: For UE support SF=1 only in dual stream transmission, both the number of HS-PDSCH codes per TS and spreading factor in the FRC should be changed to 1.			

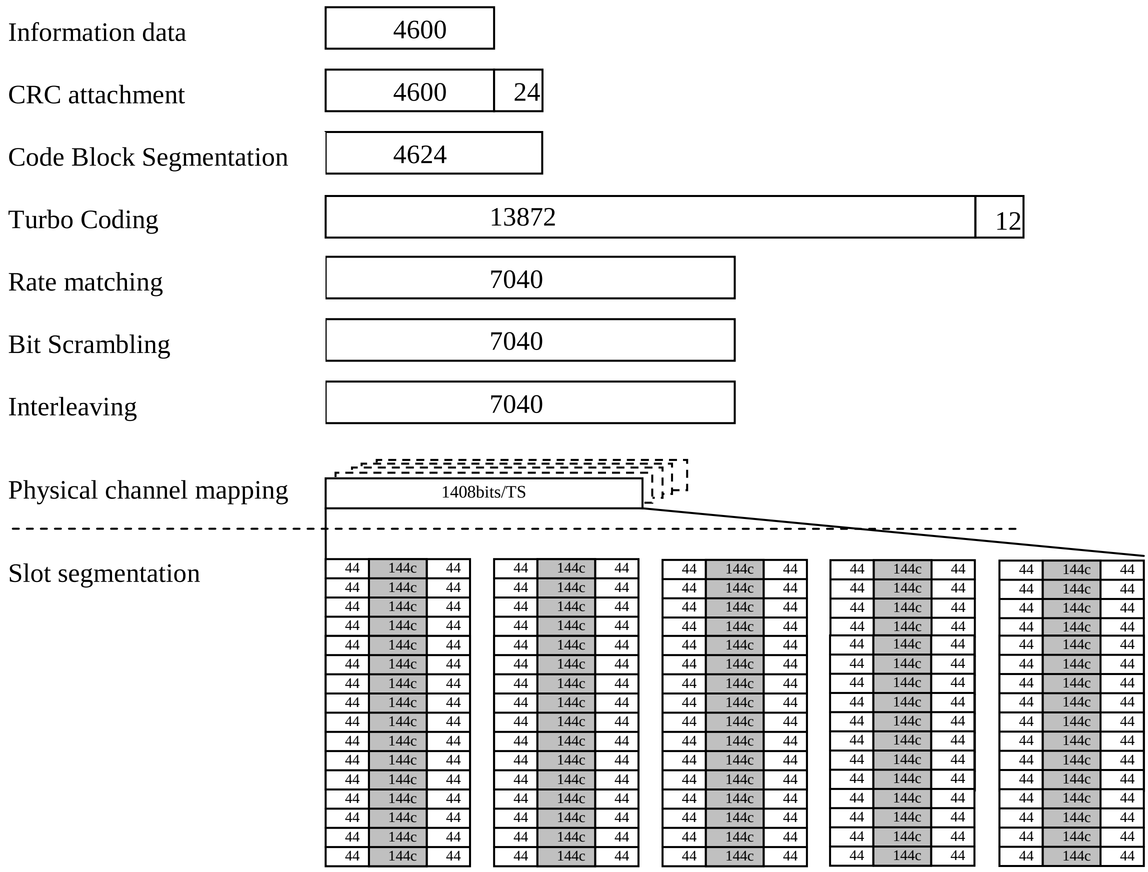


Figure C.4.2.9.1a Reference Measurement Channel for Category 27 (QPSK) - First Stream

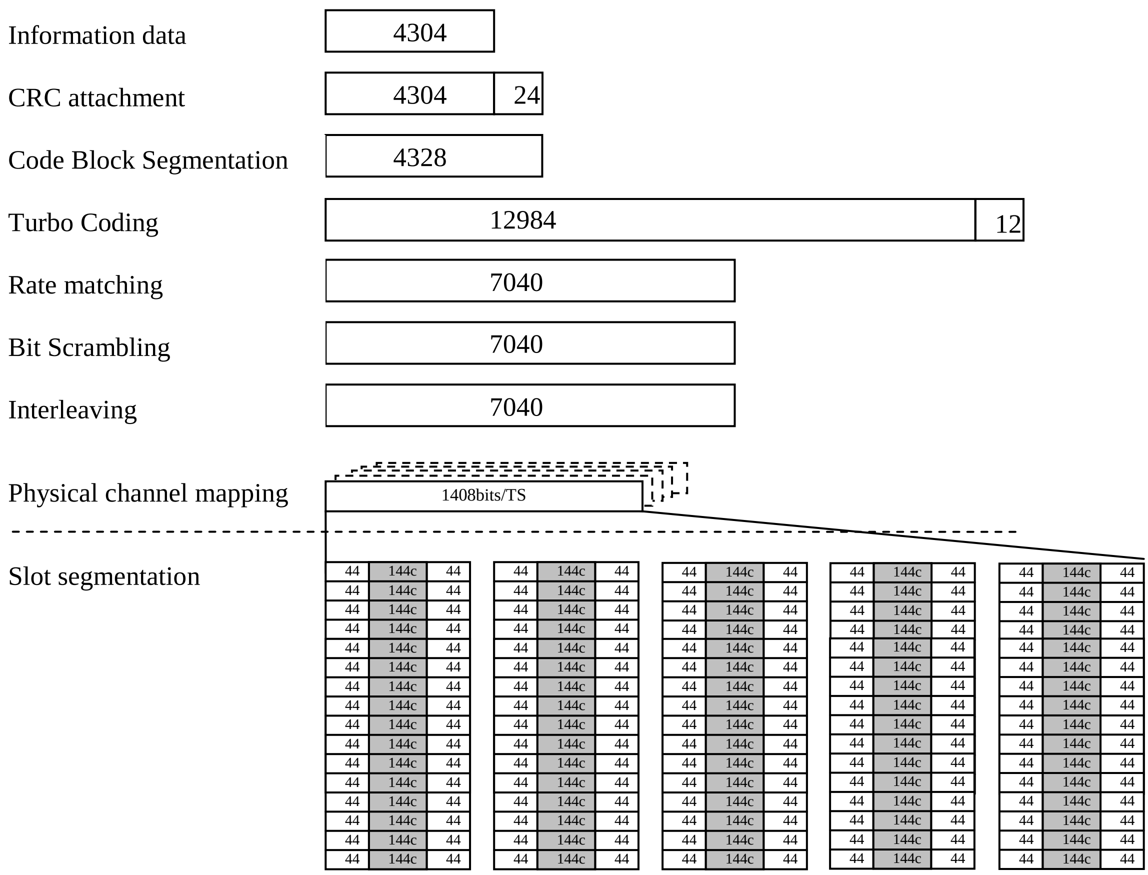


Figure C.4.2.9.1b Reference Measurement Channel for Category 27 (QPSK) - Second Stream

C.4.2.9.2 16QAM modulation scheme

Table A.25A: Reference Measurement Channel for Category 27 (16QAM)

Parameter	Unit	Value	
Stream		1st stream	2nd stream
Modulation	-	16QAM	16QAM
Combined Nominal Avg. Inf. Bit Rate	Mbps	3.4336	
Nominal Avg. Inf. Bit Rate per stream	kbps	1772.8	1660.8
Number of HARQ Processes	Processes	4	4
Information Bit Payload (N_{INF})	Bits	8864	8304
Number Code Blocks	Blocks	2	2
Total Available of Soft Channel bits in UE	Bits	337920	
Number of Soft Channel bit per HARQ Proc.	Bits	42240	42240
Number of coded bits per TTI	Bits	14080	14080
Coding Rate	-	0.630	0.590
Number of HS-DSCH Timeslots	Slots	5	5
Number of HS-PDSCH codes per TS	Codes	16	16
Spreading factor	SF	16	16
Note: For UE support SF=1 only in dual stream transmission, both the number of HS-PDSCH codes per TS and spreading factor in the FRC should be changed to 1.			

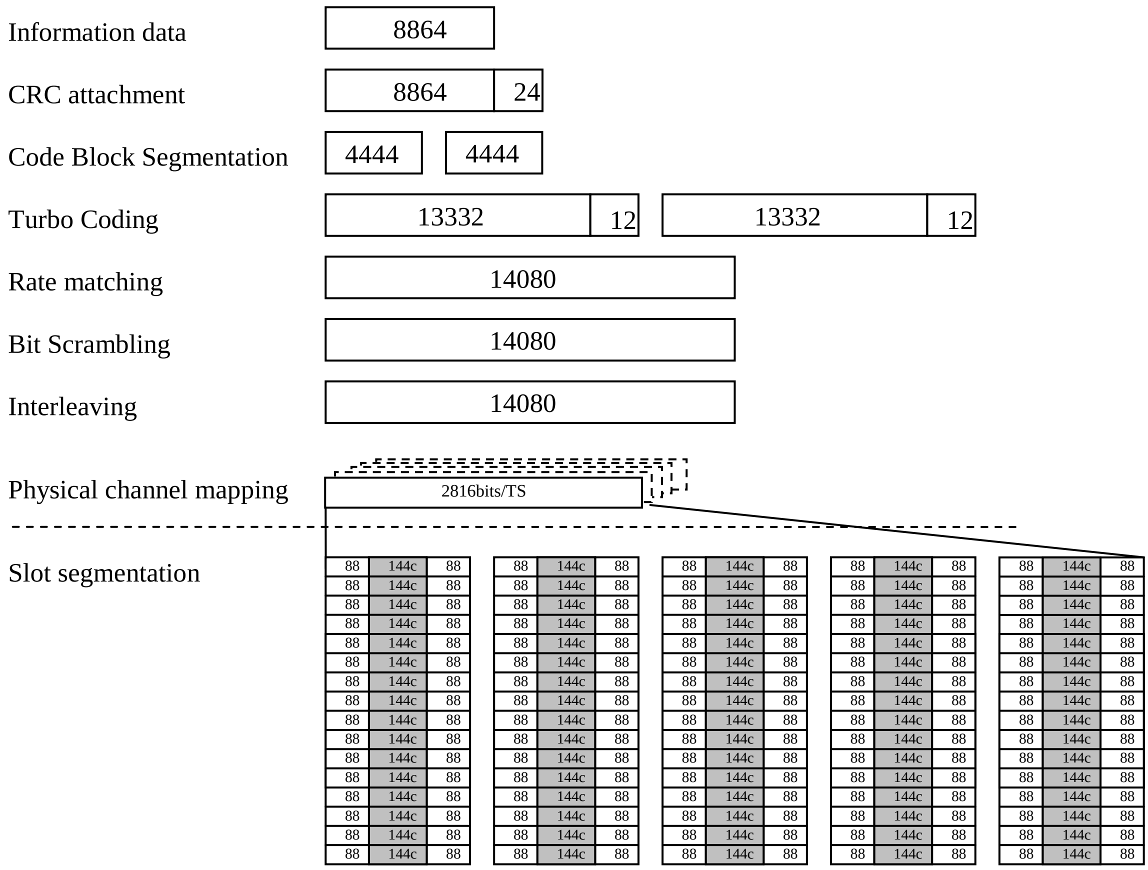


Figure C.4.2.9.2a: Reference Measurement Channel for Category 27 (16QAM) - First Stream

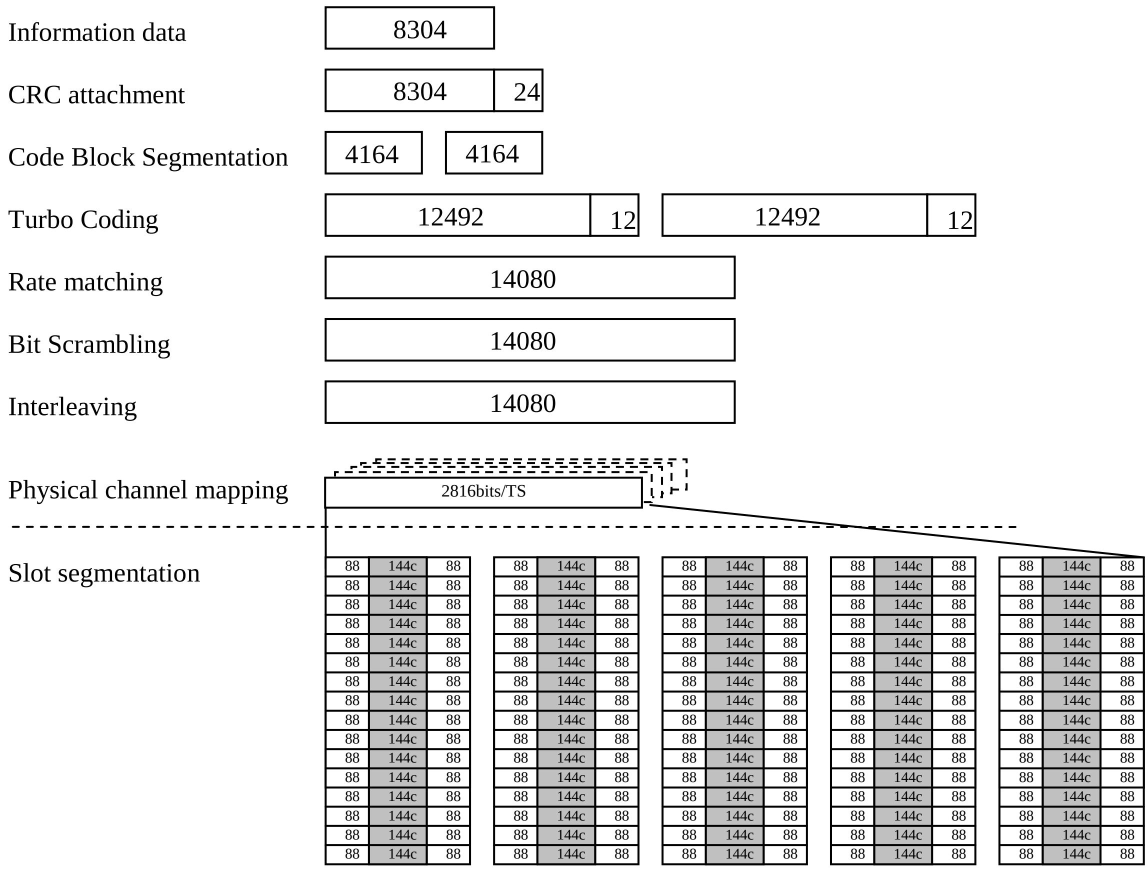


Figure C.4.2.9.2b: Reference Measurement Channel for Category 27 (16QAM) - Second Stream

C.4.2.10 Reference Measurement Channel for category 28 UE

C.4.2.10.1 64QAM modulation scheme

Table C.4.2.10.1: Reference Measurement Channel for Category 28 (64QAM)

Parameter	Unit	Value	
Stream		1st stream	2nd stream
Modulation	-	64QAM	64QAM
Combined Nominal Avg. Inf. Bit Rate	Mbps	3.128	
Nominal Avg. Inf. Bit Rate per stream	kbps	1614.4	1513.6
Number of HARQ Processes	Processes	4	4
Information Bit Payload (N_{INF})	Bits	8072	7568
Number Code Blocks	Blocks	2	2
Total Available of Soft Channel bits in UE	Bits	304128	
Number of Soft Channel bit per HARQ Proc.	Bits	38016	38016
Number of coded bits per TTI	Bits	12672	12672
Coding Rate	-	0.637	0.597
Number of HS-DSCH Timeslots	Slots	3	3
Number of HS-PDSCH codes per TS	Codes	16	16
Spreading factor	SF	16	16
Note: For UE support SF=1 only in dual stream transmission, both the number of HS-PDSCH codes per TS and spreading factor in the FRC should be changed to 1.			

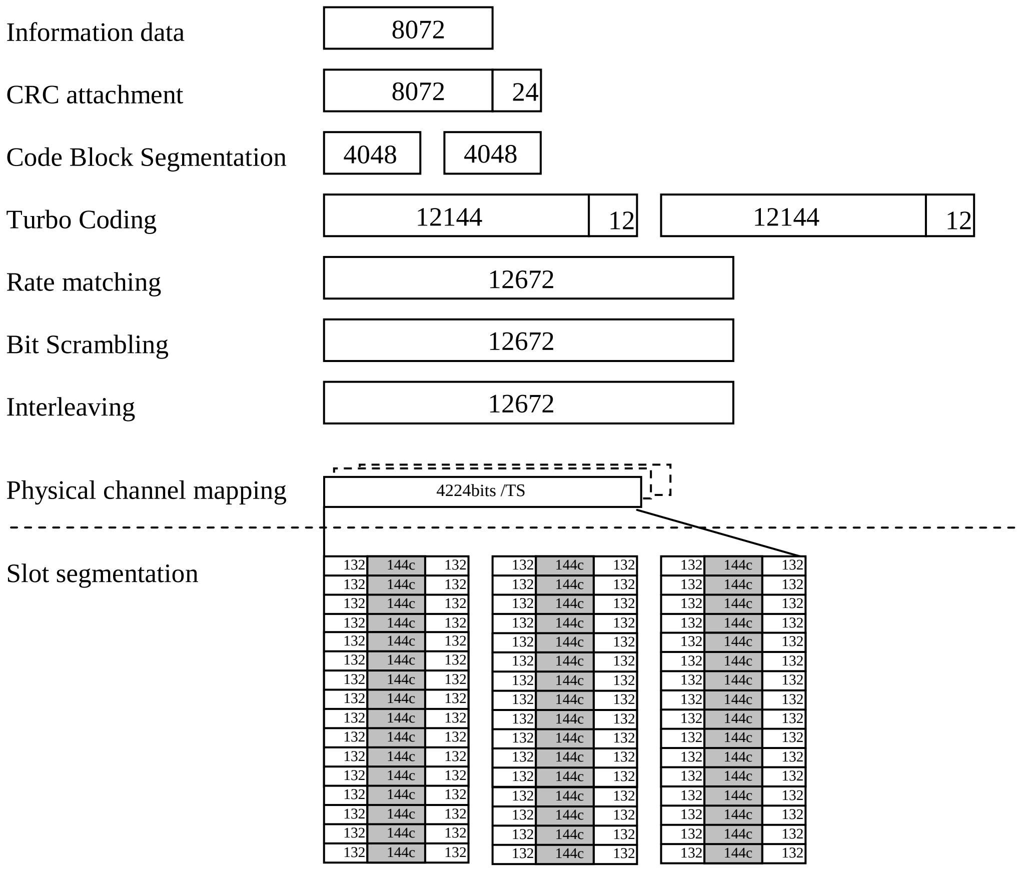


Figure C.4.2.10.1a: Reference Measurement Channel for Category 28 (64QAM) - First Stream

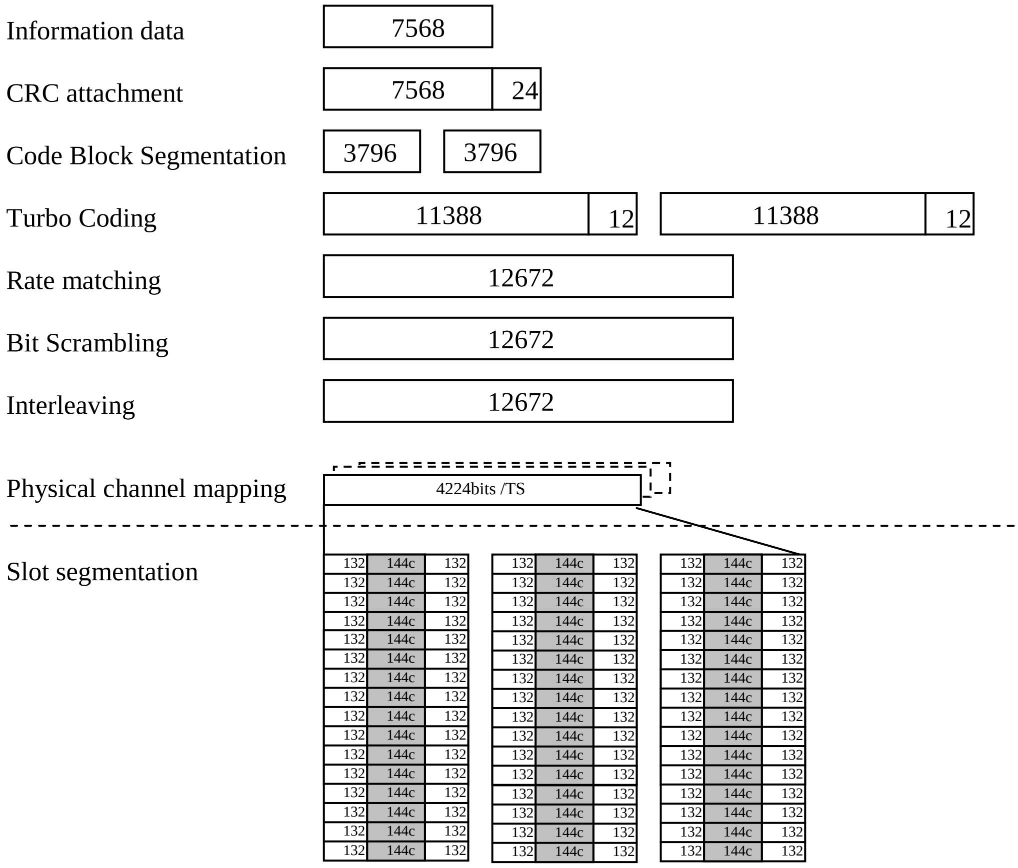


Figure C.4.2.10.1b: Reference Measurement Channel for Category 28 (64QAM) - Second Stream

C.4.2.11 Reference Measurement Channel for category 29 UE

C.4.2.11.1 64QAM modulation scheme

Table C.4.2.11.1: Reference Measurement Channel for Category 29 (64QAM)

Parameter	Unit	Value	
Stream		1st stream	2nd stream
Modulation	-	64QAM	64QAM
Combined Nominal Avg. Inf. Bit Rate	Mbps	4.032	
Nominal Avg. Inf. Bit Rate per stream	kbps	2084.8	1947.2
Number of HARQ Processes	Processes	4	4
Information Bit Payload (N_{INF})	Bits	10424	9736
Number Code Blocks	Blocks	3	2
Total Available of Soft Channel bits in UE	Bits	405504	
Number of Soft Channel bit per HARQ Proc.	Bits	50688	50688
Number of coded bits per TTI	Bits	16896	16896
Coding Rate	-	0.617	0.576
Number of HS-DSCH Timeslots	Slots	4	4
Number of HS-PDSCH codes per TS	Codes	16	16
Spreading factor	SF	16	16
Note: For UE support SF=1 only in dual stream transmission, both the number of HS-PDSCH codes per TS and spreading factor in the FRC should be changed to 1.			

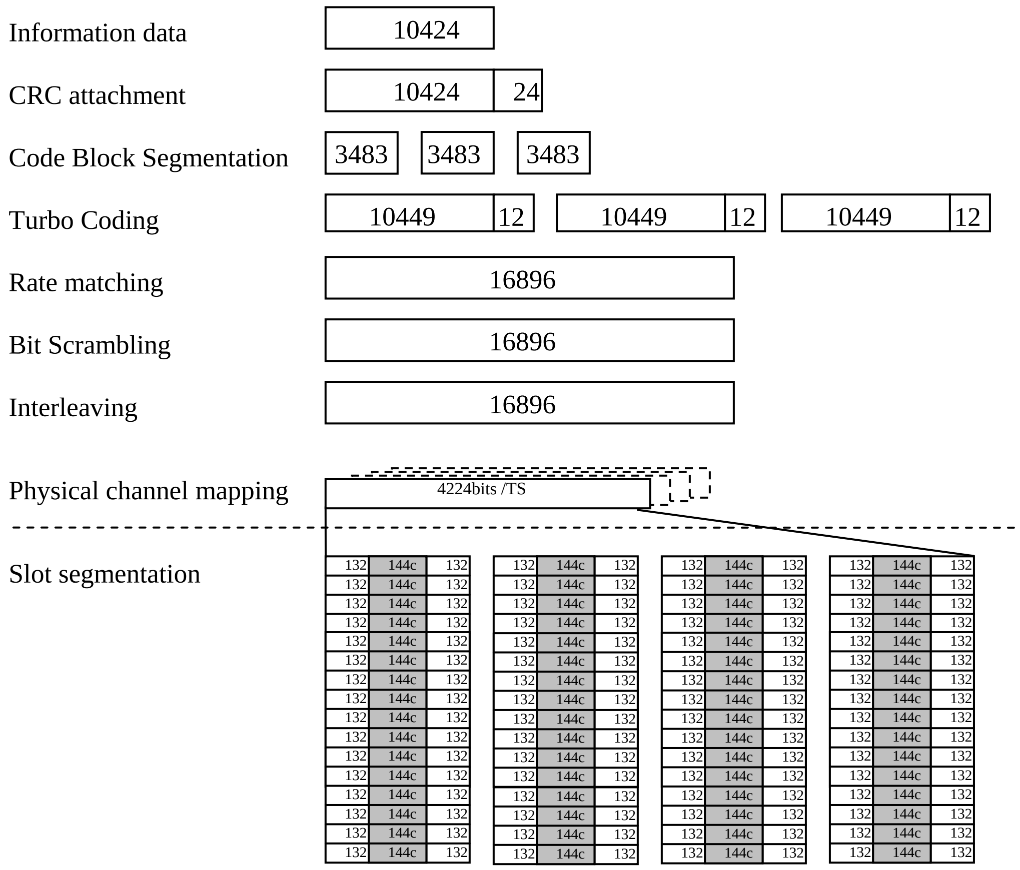


Figure C.4.2.11.1a: Reference Measurement Channel for Category 29 (64QAM) - First Stream

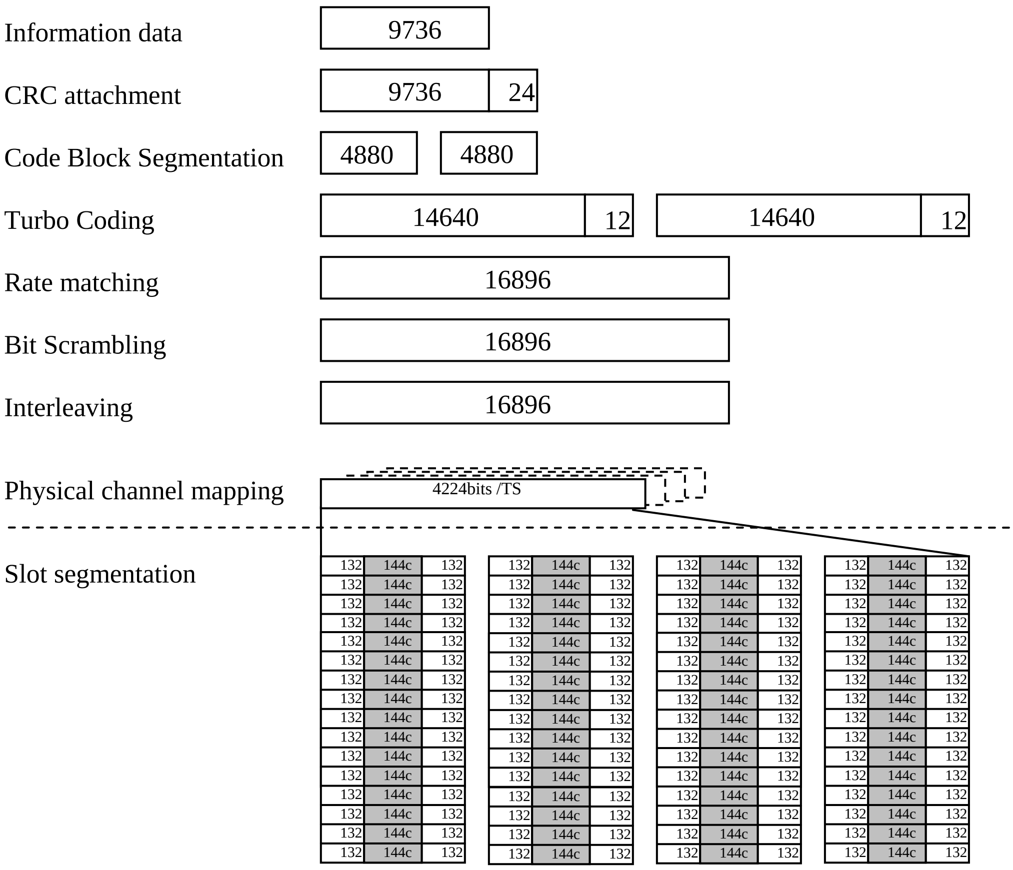


Figure C.4.2.11.1b: Reference Measurement Channel for Category 29 (64QAM) - Second Stream

C.4.2.12 Reference Measurement Channel for category 30 UE

C.4.2.12.1 64QAM modulation scheme

Table C.4.2.12: Reference Measurement Channel for Category 30 (64QAM)

Parameter	Unit	Value	
Stream		1st stream	2nd stream
Modulation	-	64QAM	64QAM
Combined Nominal Avg. Inf. Bit Rate	Mbps	4.9072	
Nominal Avg. Inf. Bit Rate per stream	kbps	2542.4	2364.8
Number of HARQ Processes	Processes	4	4
Information Bit Payload (N_{INF})	Bits	12712	11824
Number Code Blocks	Blocks	3	3
Total Available of Soft Channel bits in UE	Bits	506880	
Number of Soft Channel bit per HARQ Proc.	Bits	63360	63360
Number of coded bits per TTI	Bits	21120	21120
Coding Rate	-	0.602	0.560
Number of HS-DSCH Timeslots	Slots	5	5
Number of HS-PDSCH codes per TS	Codes	16	16
Spreading factor	SF	16	16
Note: For UE support SF=1 only in dual stream transmission, both the number of HS-PDSCH codes per TS and spreading factor in the FRC should be changed to 1.			

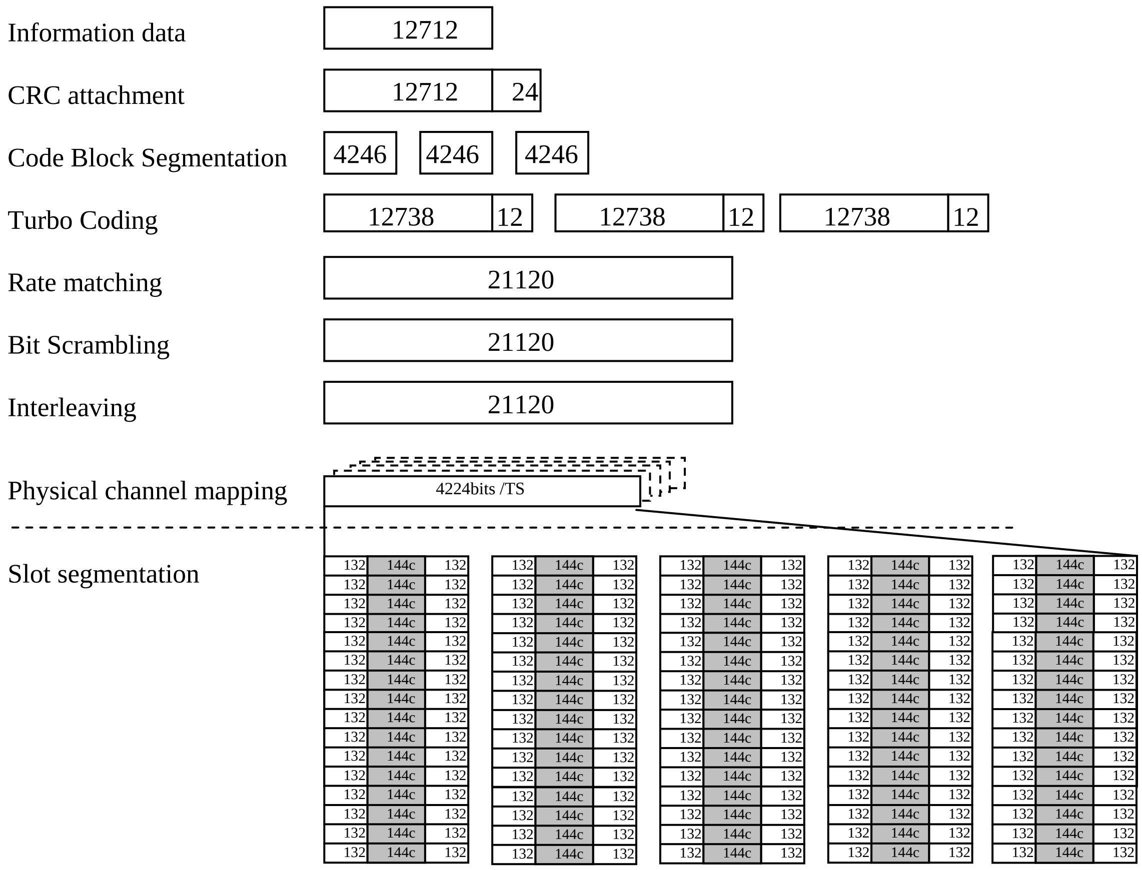


Figure C.4.2.12a: Reference Measurement Channel for Category 30 (64QAM) - First Stream

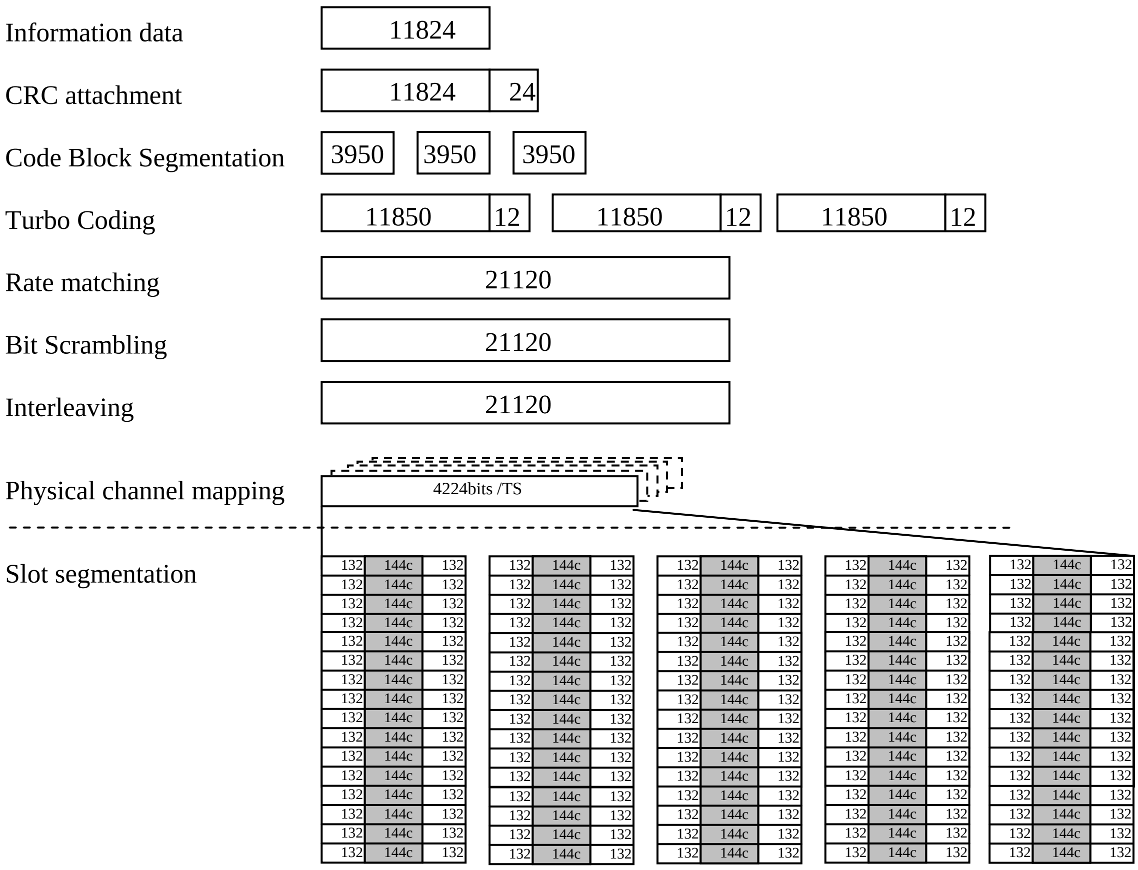


Figure C.4.2.12b: Reference Measurement Channel for Category 30 (64QAM) - Second Stream

C.4.2A HSDPA reference measurement channels for 7,68 Mcps TDD option

C.4.2A.1 Reference measurement channels for 5,3 Mbps - Category 8 - UE

C.4.2A.1.1 QPSK modulation scheme for test 1, 2, 3 & 4

Table C.4.2A.1a: HS-PDSCH fixed reference channel for the PA3, PB3, VA30 and VA120 Channel models - Category 8

Parameter	Unit	Value
Maximum information bit throughput	Mbps	1.7612
Number of HARQ Processes	Processes	3
Information Bit Payload (N_{INF})	Bits	17612
Number Code Blocks	Blocks	4
Total Available of Soft Channel bits in UE	Bits	211968
Number of Soft Channel bit per HARQ Proc.	Bits	70656
Number of coded bits per TTI	Bits	35328
Coding Rate		1/2
Number of HS-PDSCH Timeslots	Slots	4
Number of HS-PDSCH codes per TS	Codes	32
Spreading factor	SF	32

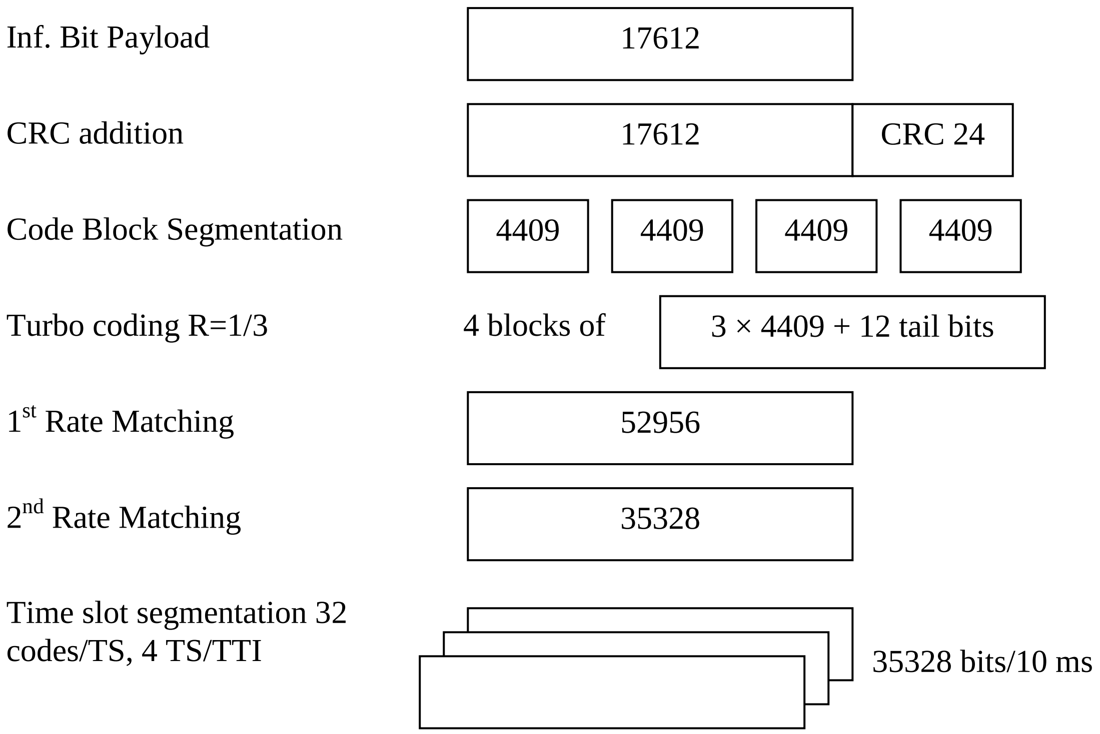


Figure C.4.2A.1b: Coding for HS-PDSCH fixed reference channel with QPSK modulation for the PA3, PB3, VA30 and VA120 Channels - Category 8

C.4.2A.1.2 16QAM modulation scheme for test 1, 2, 3 & 4

Table C.4.2A.1c: HS-PDSCH fixed reference channel for the PA3, PB3, VA30 and VA120 Channel models - Category 8

Parameter	Unit	Value
Modulation		**16-QAM**
Maximum information bit throughput	Mbps	3.5066
Number of HARQ Processes	Processes	3
Information Bit Payload (N_{INF})	Bits	35066
Number Code Blocks	Blocks	7
Total Available of Soft Channel bits in UE	Bits	211968
Number of Soft Channel bit per HARQ Proc.	Bits	70656
Number of coded bits per TTI	Bits	70656
Coding Rate		½
Number of HS-PDSCH Timeslots	Slots	4
Number of HS-PDSCH codes per TS	Codes	32
Spreading factor	SF	32

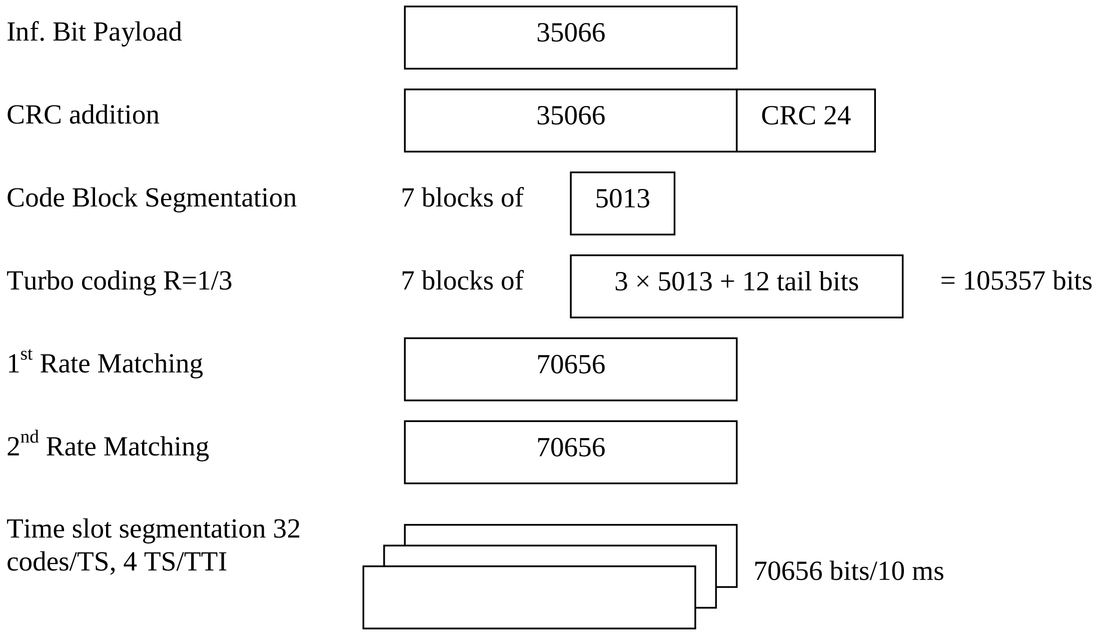


Figure C.4.2A.1d: Coding for HS-PDSCH fixed reference channel with 16-QAM modulation for the PA3 PB3, VA30 and VA120 Channels - Category 8

C.4.3 Variable Reference Channel definition for 3,84 Mcps and 1,28 Mcps TDD options

The variable reference measurement channels are defined by:

a) The maximum information bit payload that is determined by the UE capability class under test and the allocated resource units (and hence implicitly by the CQI table applicable to the UE under test as derived from TS25.321).

b) The most recently received UE CQI report.

C.5 Downlink reference parameters for MBMS tests

C.5.1 MCCH

C.5.1.1 3.84 Mcps TDD Option

The parameters for the MCCH demodulation tests are specified in Table C.5.1.1a and Table C.5.1.1b.

Table C.5.1.1a: Physical channel parameters for S-CCPCH

Parameter	Unit	Level
Channel bit rate	kbps	22.8
Channel symbol rate	ksps	11.4
Slot Format #i	-	3
TFCI	-	ON

Table C.5.1.1b: Transport channel parameters for S-CCPCH

Parameter	MCCH
User Data Rate	7.2 kbps
Number Transport Channel	1
Transport Block Size	581
Transport Block Set Size	581
RLC SDU block size	4088
Transmission Time Interval	80 ms
Repetition period	640 ms
Modification period	1280 ms
Type of Error Protection	Turbo
Coding Rate	1/3
Rate Matching attribute	256
Size of CRC	16

C.5.1.2 1.28 Mcps TDD Option

The parameters for the MCCH demodulation tests are specified in Table C5.1.2a and Table C5.1.2b.

Table C5.1.2a: Physical channel parameters for S-CCPCH

Parameter	Unit	Level
Channel bit rate	kbps	17.6
Channel symbol rate	ksps	8.8
Slot Format		No TPC&SS
SF	-	16
TFCI	-	ON

Table C5.1.2b: Transport channel parameters for S-CCPCH

Parameter	MCCH
User Data Rate	7.6 kbps
Number Transport Channel	1
Transport Block Size	72
Transport Block Set Size	72
RLC SDU block size	4088
Transmission Time Interval	10 ms
Repetition period	640 ms
Modification period	1280 ms
Type of Error Protection	Convolutional code 1/3
Coding Rate	1/3
Rate Matching attribute	160
Size of CRC	16
TFCI	ON

C.5.1.3 7.68 Mcps TDD Option

The parameters for the MCCH demodulation tests are specified in Table C.5.1.3a and Table C.5.1.3b.

Table C.5.1.3a: Physical channel parameters for S-CCPCH

Parameter	Unit	Level
Channel bit rate	kbps	22.8
Channel symbol rate	ksps	11.4
Slot Format #i	-	3
TFCI	-	ON

Table C.5.1.3b: Transport channel parameters for S-CCPCH

Parameter	MCCH
User Data Rate	7.2 kbps
Number Transport Channel	1
Transport Block Size	581
Transport Block Set Size	581
RLC SDU block size	4088
Transmission Time Interval	80 ms
Repetition period	640 ms
Modification period	1280 ms
Type of Error Protection	Turbo
Coding Rate	1/3
Rate Matching attribute	256
Size of CRC	16

C.5.2 MTCH

C.5.2.1 3.84 Mcps TDD Option (non-IMB)

The parameters for the MTCH demodulation tests are specified in Table C.5.2.1a and Table C.5.2.1b.

Table C.5.2.1a: Physical channel parameters for S-CCPCH

Parameter	Unit	Level	Level
User Data Rate	kpbs	256	128
Channel bit rate	kbps	388.8	388.8
Channel symbol rate	ksps	194.4	194.4
Slot Format #i	-	3 and 0	3 and 0
TFCI	-	ON	ON

Table C.5.2.1b: Transport channel parameters for S-CCPCH

Parameter	MTCH	
User Data Rate	256 kbps	128 kbps
Number of Transport Channel	1	1
Transport Block Size	2561	2561
Transport Block Set Size	10244	5122
Nr of transport blocks/TTI	4	2
RLC SDU block size	10160	5072
Transmission Time Interval	40 ms	40 ms
Type of Error Protection	Turbo	Turbo
Coding Rate	1/3	1/3
Rate Matching attribute	256	256
Size of CRC	16	16

C.5.2.1A 3.84 Mcps TDD Option (IMB)

The parameters for the MTCH demodulation tests are specified in Table A.46A, Table A.46B and Table A.46C.

Table C.5.2.1Aa: Physical channel parameters for S-CCPCH frame type 2

Parameter	Unit	Level
User Data Rate	kbps	512
Modulation	-	16QAM
Channel bit rate	kbps	960
Channel symbol rate	ksps	240
Slot Format #i	-	4 and 5
TFCI	-	ON
Physical resources	-	5 codes x SF16 1 x 2ms sub-frame

Table C.5.2.1Ab: Transport channel parameters for S-CCPCH frame type 2

Parameter	MTCH
User Data Rate	512 kbps
Number of Transport Channel	1
Transport Block Size	2560
Transport Block Set Size	40960
Nr of transport blocks/TTI	16
RLC SDU block size	40688
Transmission Time Interval	80 ms
Type of Error Protection	Turbo
Coding Rate	1/3
Rate matching Attribute	256
Size of CRC	16

Table C.5.2.1Ac: Configuration of other physical channels during MTCH test

Physical Channel	Power Ratio (Ec/Ior)	NOTE
P-CPICH	-10 dB	
T-CPICH	-0.457 dB	
P-CCPCH	-12 dB	
S-CCPCH frame type 1	-24 dB	
SCH	-12 dB	This power shall be divided equally between Primary and Secondary synchronous channels
OCNS	Necessary power so that total transmit power spectral density of Node B (Ior) adds to one	OCNS interference consists of 10 codes of equal power, each code using SF16 and QPSK modulation

C.5.2.2 1.28 Mcps TDD Option

The parameters for the MTCH demodulation tests are specified in Table C5.2.2a and Table C5.2.2b.

Table C5.2.2a: Physical channel parameters for S-CCPCH

Parameter	Unit	Level	Level	level		level	
User Data Rate	kpbs	128	64	384		192	
Channel bit rate	kbps	246.4	140.8	563.2 [1]	614.4 [2]	281.6 [1]	307.2 [2]
Channel symbol rate	ksps	123.2	70.4	140.8 [1]	153.6 [2]	140.8 [1]	153.6 [2]
Slot Format	-	No TPC&SS	No TPC&SS	No TPC SS		No TPC SS	
TFCI	-	ON	ON	ON		ON	
Note1 used for test 1 and test 2 in section 10.2A.2.2 Note2 used for test 3 and test 4 in section 10.2A.2.2							

Table C5.2.2b: Transport channel parameters for S-CCPCH

Parameter	MTCH			
User Data Rate	128 kbps	64 kbps	384kbps	192kbps
Number of Transport Channel	1	1	1	1
Transport Block Size	2561	1281	2561	2561
Transport Block Set Size	5122	2562	15366	7683
Nr of transport blocks/TTI	2	2	6	3
RLC SDU block size	5072	2512	15248	7616
Transmission Time Interval	40 ms	40 ms	40ms	40ms
Type of Error Protection	Turbo	Turbo	Turbo	Turbo
Coding Rate	1/3	1/3	1/3	1/3
Rate Matching attribute	2448	1392	256	256
Size of CRC	16	16	16	16

Parameters for combined MTCH demodulation and cell identification requirements are defined in Table C5.2.2c.

Table C5.2.2c: Cell reselection parameters

Parameter	Unit	Value
Serving cell in the initial condition	-	Cell1
Neighbour cells	-	Cell 2 and cell 3
Cell_selection_and_reselection_quality_measure	-	P-CCPCH
Qrxlevmin	dBm	-103
UE_TXPWR_MAX_RACH	dBm	21
Treselection	seconds	4
Sintrasearch	dB	not sent
IE "FACH Measurement occasion info"	-	not sent

C.5.2.3 7.68 Mcps TDD Option

The parameters for the MTCH demodulation tests are specified in Table C.5.2.3a and Table C.5.2.3b.

Table C.5.2.3a: Physical channel parameters for S-CCPCH

Parameter	Unit	Level	Level
User Data Rate	kpbs	256	128
Channel bit rate	kbps	388.8	388.8
Channel symbol rate	ksps	194.4	194.4
Slot Format #i	-	3 and 0	3 and 0
TFCI	-	ON	ON

Table C.5.2.3b: Transport channel parameters for S-CCPCH

Parameter	MTCH	
User Data Rate	256 kbps	128 kbps
Number of Transport Channel	1	1
Transport Block Size	2561	2561
Transport Block Set Size	10244	5122
Nr of transport blocks/TTI	4	2
RLC SDU block size	10160	5072
Transmission Time Interval	40 ms	40 ms
Type of Error Protection	Turbo	Turbo
Coding Rate	1/3	1/3
Rate Matching attribute	256	256
Size of CRC	16	16

C.6 E-DCH Reference measurement channels

C.6.1 E-DCH Fixed Reference Channels

C.6.1.1 3,84 Mcps TDD Option

C.6.1.1.1 Fixed Reference Channel 1 (FRC1)

Table C.6.1.1a: E-DCH Fixed Reference Channel 1 (3.84 Mcps TDD Option)

Parameter	Unit	Value
Maximum information bit throughput	kbps	34.7
Information Bit Payload (N_{INF})	Bits	347
Number Code Blocks	Blocks	1
Number of coded bits per TTI	Bits	1200
Coding Rate		0.312
Modulation		QPSK
Number of E-DCH Timeslots	Slots	6
Number of E-DCH codes per TS	Codes	1
Spreading factor	SF	16
Number of E-UCCH per TTI		4

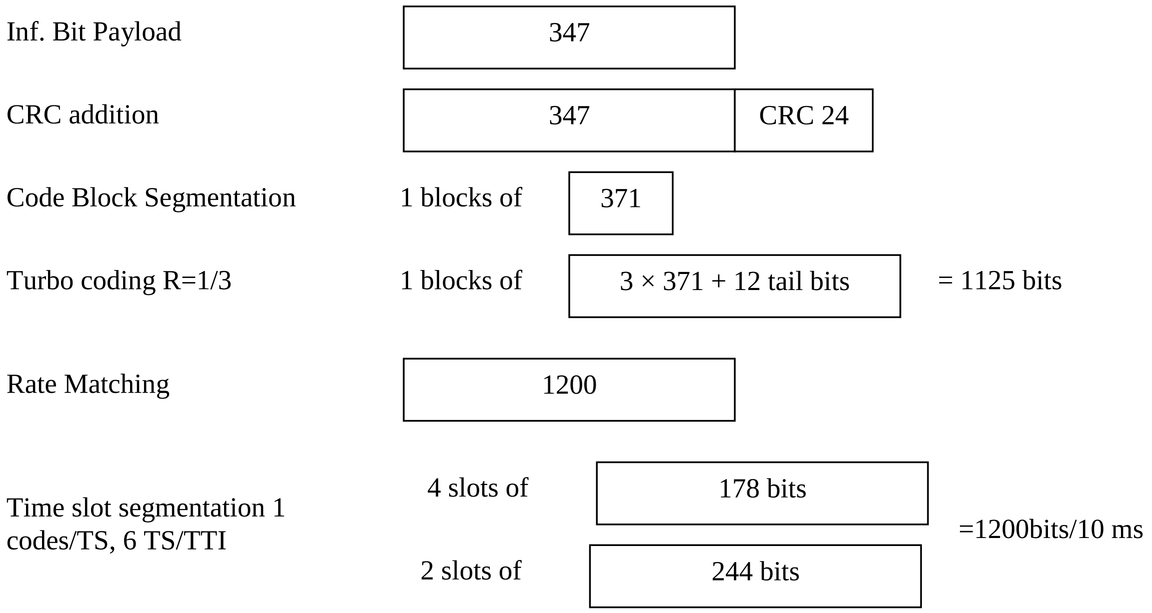


Figure A.9: Coding for E-DCH FRC1 (3.84 Mcps TDD Option)

C.6.1.1.2 Fixed Reference Channel 2 (FRC2)

Table C.6.1.1b: E-DCH Fixed Reference Channel 2 (3.84 Mcps TDD Option)

Parameter	Unit	Value
Maximum information bit throughput	kbps	1083.1
Information Bit Payload (N_{INF})	Bits	10831
Number Code Blocks	Blocks	3
Number of coded bits per TTI	Bits	22272
Coding Rate		0.488
Modulation		16QAM
Number of E-DCH Timeslots	Slots	6
Number of E-DCH codes per TS	Codes	1
Spreading factor	SF	2
Number of E-UCCH per TTI		2

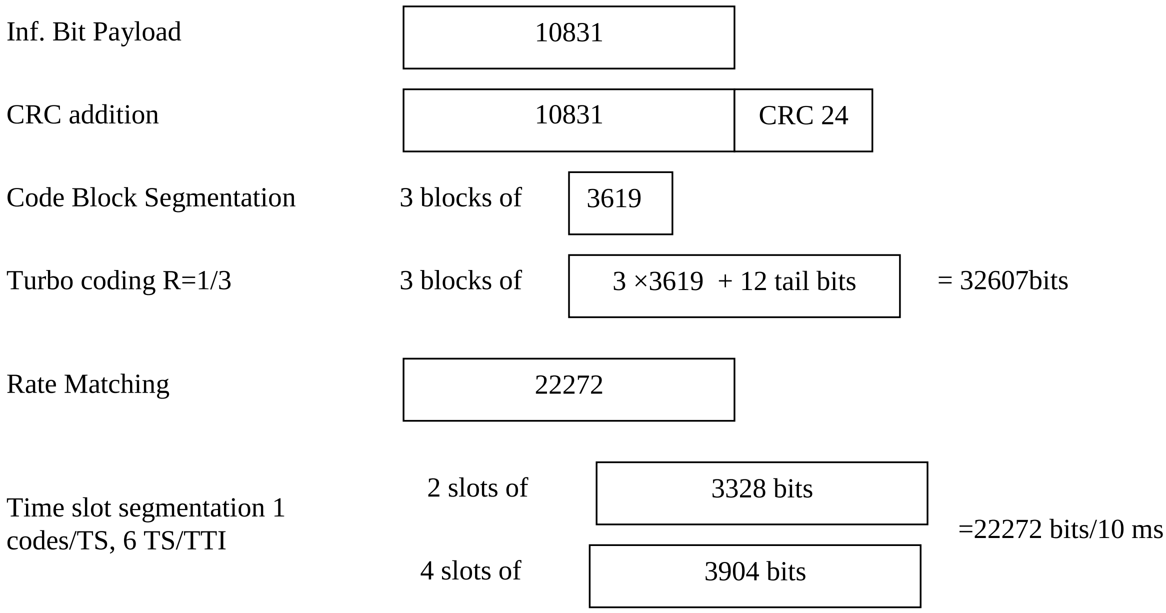


Figure A.10: Coding for E-DCH FRC2 (3.84 Mcps TDD Option)

C.6.1.1.3 Fixed Reference Channel 3 (FRC3)

Table C.6.1.1c: E-DCH Fixed Reference Channel 3 (3.84 Mcps TDD Option)

Parameter	Unit	Value
Maximum information bit throughput	kbps	2073.7
Information Bit Payload (N_{INF})	Bits	20737
Number Code Blocks	Blocks	5
Number of coded bits per TTI	Bits	28992
Coding Rate		0.716
Modulation		16QAM
Number of E-DCH Timeslots	Slots	4
Number of E-DCH codes per TS	Codes	1
Spreading factor	SF	1
Number of E-UCCH per TTI		2

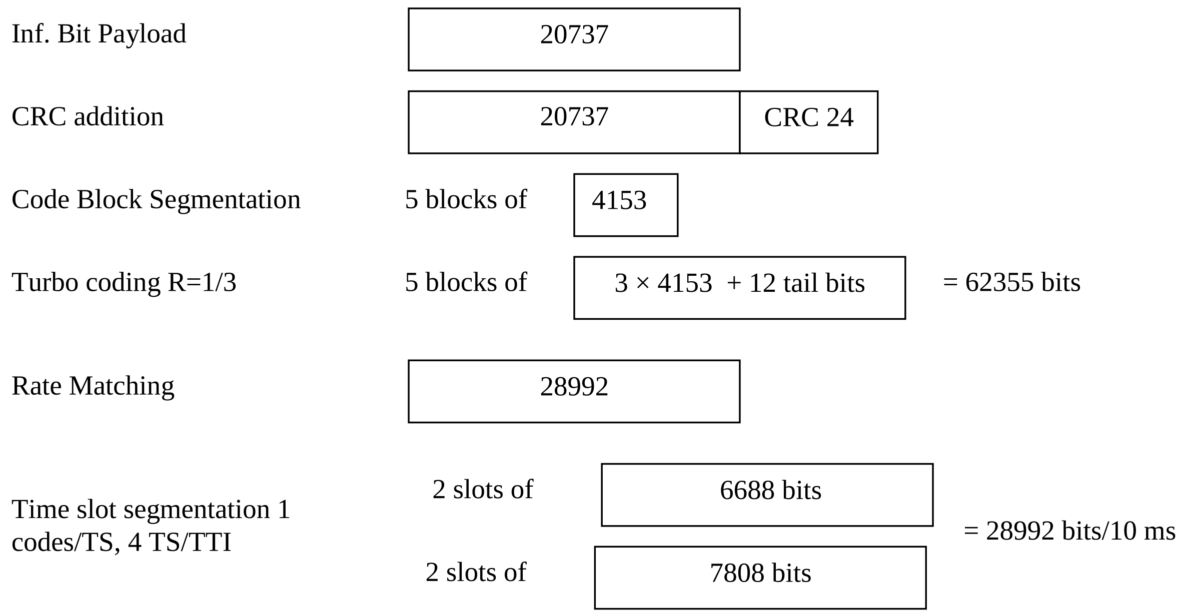


Figure A.11: Coding for E-DCH FRC3 (3.84 Mcps TDD Option)

C.6.1.2 1.28Mcps TDD Option

C6.1.2.1 E-DCH Fixed reference channel 1(FRC1)

Table A.9: E-DCH Fixed reference channel 1 (1.28Mcps TDD option)

Parameter	Unit	Value
Maximum information bit throughput	kbps	56.4
Information Bit Payload (N_{INF})	Bits	282
Number Code Blocks	Blocks	1
Number of coded bits per TTI	Bits	306
Coding Rate		0.5387
Modulation		QPSK
Number of E-DCH Timeslots	Slots	2
Number of E-DCH codes per TS	Codes	1
Spreading factor	SF	4
Number of E-UCCH per TTI		4

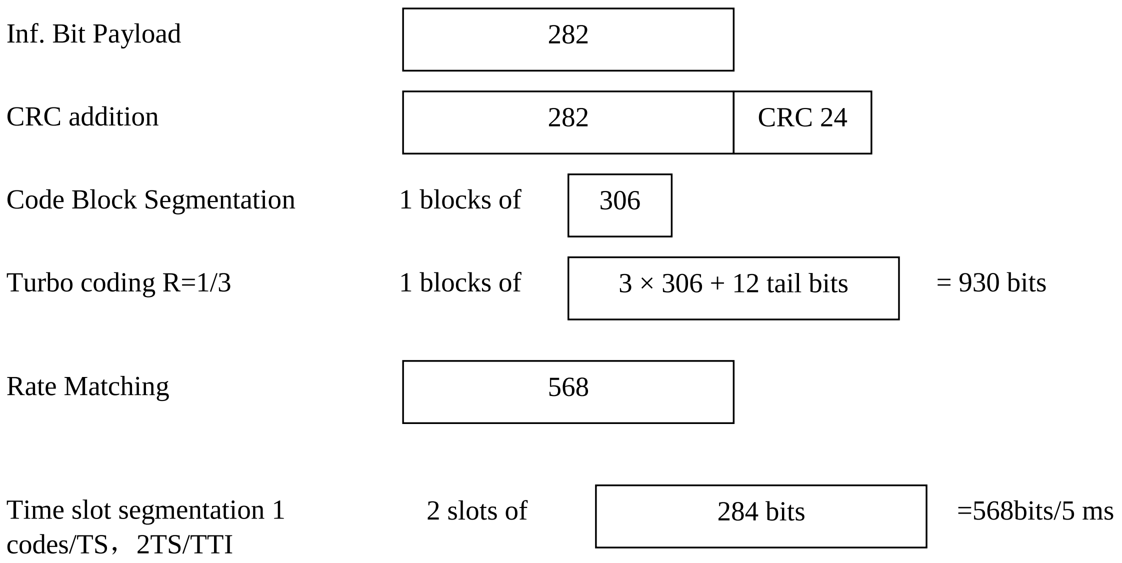


Figure A.12: Coding for E-DCH FRC1 (1.28 Mcps TDD Option)

C6.1.2.2 Fixed reference channel 2(FRC2)

Table A.11: E-DCH Fixed reference channel 2 (1.28Mcps TDD option)

Parameter	Unit	Value
Maximum information bit throughput	kbps	515.6
Information Bit Payload (N_{INF})	Bits	2578
Number Code Blocks	Blocks	1
Number of coded bits per TTI	Bits	2602
Coding Rate		0.6365
Modulation		16QAM
Number of E-DCH Timeslots	Slots	3
Number of E-DCH codes per TS	Codes	1
Spreading factor	SF	2
Number of E-UCCH per TTI		2

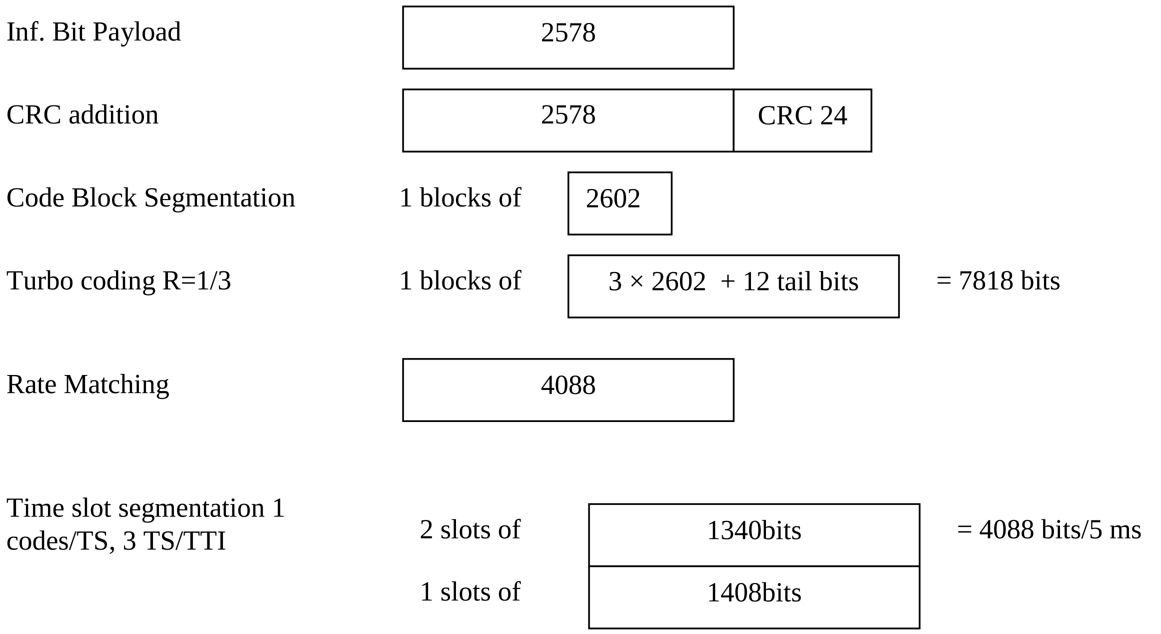


Figure A.13: Coding for E-DCH FRC2 (1.28 Mcps TDD Option)C.6.1.3 7,68 Mcps TDD Option

C6.1.2.3 Fixed reference channel 3(FRC3)

Table C6.1.2.3.a: E-DCH Fixed reference channel 3 (1.28Mcps TDD option)

Parameter	Unit	Value
Maximum information bit throughput	kbps	342.4
Information Bit Payload (N_{INF})	Bits	1712
Number Code Blocks	Blocks	1
Number of coded bits per TTI	Bits	1736
Coding Rate		0.63173
Modulation		16QAM
Number of E-DCH Timeslots	Slots	1
Number of E-DCH codes per TS	Codes	1
Spreading factor	SF	1
Number of E-UCCH per TTI		1

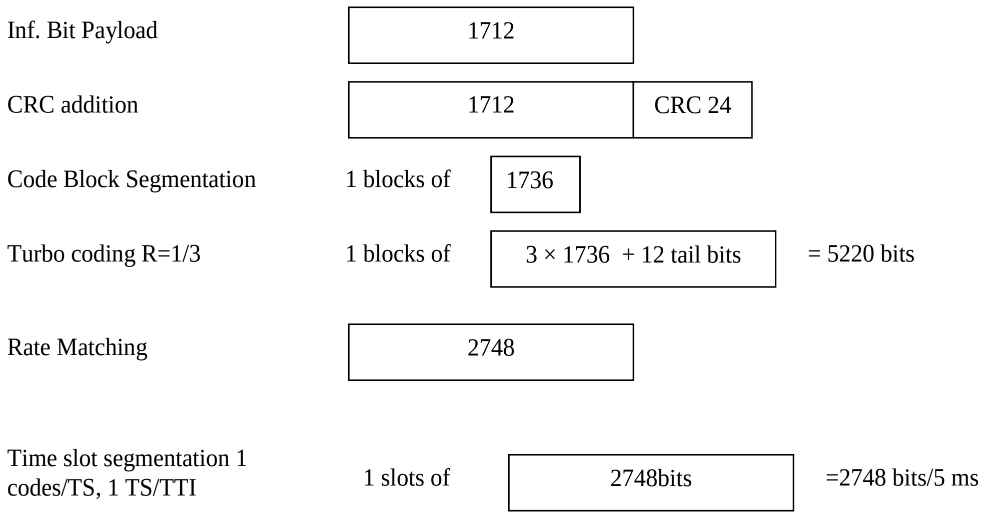


Figure A.12: Coding for E-DCH FRC3 (1.28 Mcps TDD Option)

C.6.1.3.1 Fixed Reference Channel 1 (FRC1)

Table C.6.1.3a: E-DCH Fixed Reference Channel 1 (7.68 Mcps TDD Option)

Parameter	Unit	Value
Maximum information bit throughput	kbps	35.9
Information Bit Payload (N_{INF})	Bits	359
Number Code Blocks	Blocks	1
Number of coded bits per TTI	Bits	1200
Coding Rate		0.323
Modulation		QPSK
Number of E-DCH Timeslots	Slots	6
Number of E-DCH codes per TS	Codes	1
Spreading factor	SF	32
Number of E-UCCH per TTI		4

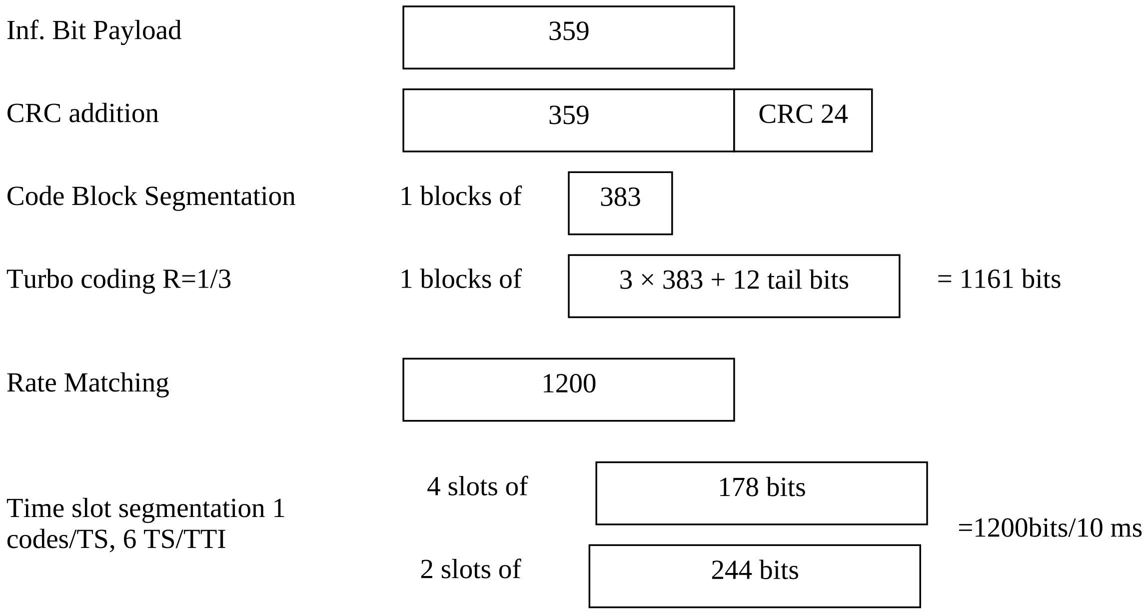


Figure A.12: Coding for E-DCH FRC1 (7.68 Mcps TDD Option)

C.6.1.3.2 Fixed Reference Channel 2 (FRC2)

Table C.6.1.3b: E-DCH Fixed Reference Channel 2 (7.68 Mcps TDD Option)

Parameter	Unit	Value
Maximum information bit throughput	kbps	1083.1
Information Bit Payload (N_{INF})	Bits	10831
Number Code Blocks	Blocks	3
Number of coded bits per TTI	Bits	22272
Coding Rate		0.488
Modulation		16QAM
Number of E-DCH Timeslots	Slots	6
Number of E-DCH codes per TS	Codes	1
Spreading factor	SF	4
Number of E-UCCH per TTI		2

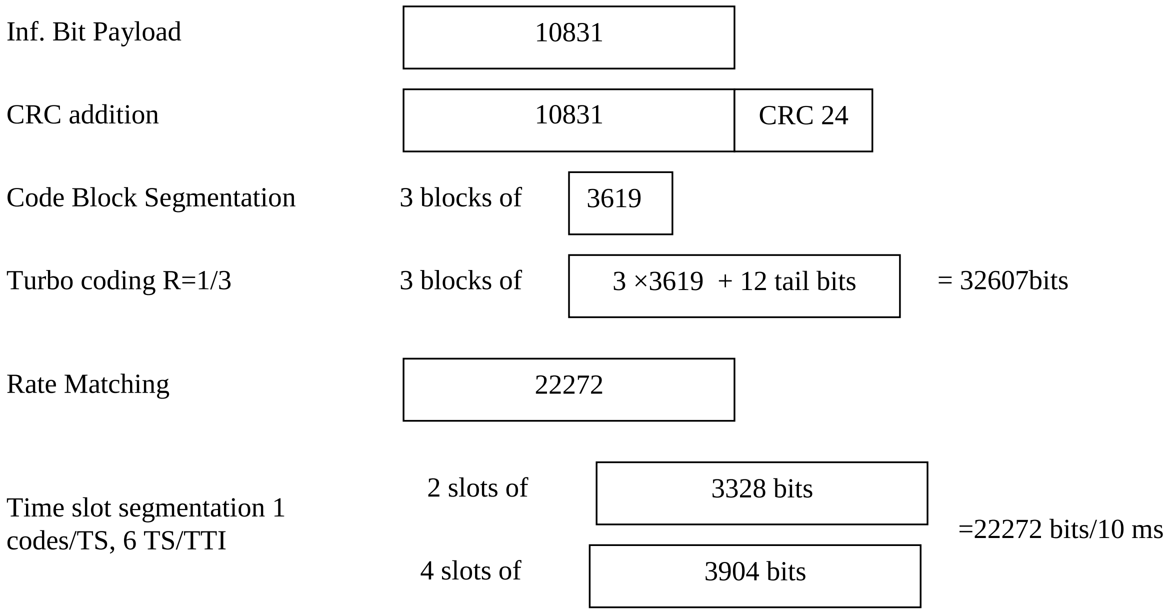


Figure A.13: Coding for E-DCH FRC2 (7.68 Mcps TDD Option)

C.6.1.3.3 Fixed Reference Channel 3 (FRC3)

Table C.6.1.3c: E-DCH Fixed Reference Channel 3 (7.68 Mcps TDD Option)

Parameter	Unit	Value
Maximum information bit throughput	kbps	2085.1
Information Bit Payload (N_{INF})	Bits	20851
Number Code Blocks	Blocks	5
Number of coded bits per TTI	Bits	28992
Coding Rate		0.720
Modulation		16QAM
Number of E-DCH Timeslots	Slots	6
Number of E-DCH codes per TS	Codes	1
Spreading factor	SF	2
Number of E-UCCH per TTI		2

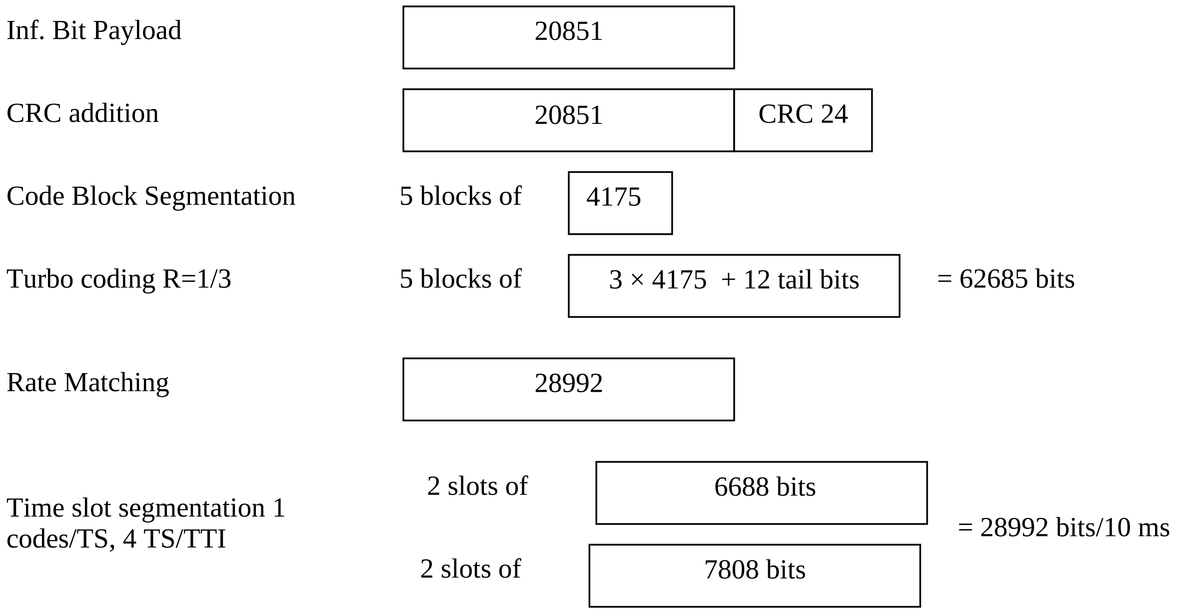


Figure A.14: Coding for E-DCH FRC3 (7.68 Mcps TDD Option)

Annex D (normative): Propagation conditions

D.1 Test Environments

Table D.1 details the test services, the information data and the propagation conditions.

Table D.1: Test Environments for UE Performance Specifications

Test Services	Information Data Rate	Static	Multipath Case 1	Multipath Case 2	Multipath Case 3
		Performance metric			
Paging Message			-	-	-
FACH Message			-	-	-
Circuit Switched Services	12,2 kbps	BLER <	BLER <	BLER <	BLER <
	64 kbps	BLER <	BLER <	BLER <	BLER <
	144 kbps	BLER <	BLER <	BLER <	BLER <
	384 kbps	BLER <	BLER <	BLER <	BLER <
	2048 kbps	BLER <	-	-	-
Packet Switched Data	TBD	TBD	TBD	TBD	TBD

D.2 Propagation Conditions

D.2.1 Static propagation condition

The propagation for the static performance measurement is an Additive White Gaussian Noise (AWGN) environment. No fading and multi-paths exist for this propagation model.

D.2.2 Multi-path fading propagation conditions

D.2.2.1 3,84 Mcps TDD Option

Table D.2.2.1 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum.

Table D.2.2.1: 3,84 Mcps Propagation Conditions for Multi path Fading Environments

Case 1, speed 3km/h		Case 2, speed 3 km/h		Case 3, speed 120 km/h		Case 4, speed 3 km/h	
Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]
0	0	0	0	0	0	0	0
976	-10	976	0	260	-3	976	0
		12000	0	521	-6		
				781	-9		

Table D.2.2.1A: Propagation Conditions for Multi-Path Fading Environments for HSDPA Performance Requirements

ITU Pedestrian A Speed 3km/h (PA3)		ITU Pedestrian B Speed 3Km/h (PB3)		ITU vehicular A Speed 30km/h (VA30)		ITU vehicular A Speed 120km/h (VA120)	
Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]
0	0	0	0	0	0	0	0
110	-9.7	200	-0.9	310	-1.0	310	-1.0
190	-19.2	800	-4.9	710	-9.0	710	-9.0
410	-22.8	1200	-8.0	1090	-10.0	1090	-10.0
		2300	-7.8	1730	-15.0	1730	-15.0
		3700	-23.9	2510	-20	2510	-20

Table D.2.2.1B: Propagation Conditions for Multi-Path Fading Environments for MTCH and MCCH Performance Requirements under an extended delay spread environment

Extended Delay Spread Speed 3km/h (EDS)	
Relative Delay [ns]	Relative Mean Power [dB]
0	0
310	-1
710	-9
1090	-10
1730	-15
2510	-20
12490	-10
12800	-11
13200	-19
13580	-20
14220	-25
15000	-30
27490	-20
27800	-21
28200	-29
28580	-30
29220	-35
30000	-40

D.2.2.2 1,28 Mcps TDD Option

Table D2.2.2 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum.

Table D.2.2.2.1 : 1,28Mcps Propagation Conditions for Multi-Path Fading Environments

Case 1		Case 2		Case 3	
Speed for operating band a, b, c, f: 3km/h		Speed for operating band a, b, c, f: 3km/h		Speed for operating band a, b, c, f: 120km/h	
Speed for operating band d: 2.3km/h		Speed for operating band d: 2.3km/h		Speed for operating band d: 92km/h	
Speed for operating band e: 2.6km/h		Speed for operating band e: 2.6km/h		Speed for operating band e: 102km/h	
Relative Delay [ns]	**Relative Mean Power [dB]**	**Relative Delay [ns]**	**Relative Mean Power [dB]**	**Relative Delay [ns]**	**Relative Mean Power [dB]**
0	0	0	0	0	0
2928	-10	2928	0	781	-3
		12000	0	1563	-6
				2344	-9

Table D.2.2.2.2: 1,28Mcps Propagation Conditions for Multi-Path Fading Environments for HSDPA Performance Requirements

ITU Pedestrian A (PA3)		ITU Pedestrian B (PB3)		ITU vehicular A (VA30)		ITU vehicular A (VA120)	
Speed for operating band a, b, c, f: 3km/h		Speed for operating band a, b, c, f: 3km/h		Speed for operating band a, b, c, f: 30km/h		Speed for operating band a, b, c, f: 120km/h	
Speed for operating band d: 2.3km/h		Speed for operating band d: 2.3km/h		Speed for operating band d: 23km/h		Speed for operating band d: 92km/h	
Speed for operating band e: 2.6km/h		Speed for operating band e: 2.6km/h		Speed for operating band e: 26km/h		Speed for operating band e: 102km/h	
Relative Delay [ns]	**Relative Mean Power [dB]**	**Relative Delay [ns]**	**Relative Mean Power [dB]**	**Relative Delay [ns]**	**Relative Mean Power [dB]**	**Relative Delay [ns]**	**Relative Mean Power [dB]**
0	0	0	0	0	0	0	0
110	-9.7	200	-0.9	310	-1.0	310	-1.0
190	-19.2	800	-4.9	710	-9.0	710	-9.0
410	-22.8	1200	-8.0	1090	-10.0	1090	-10.0
		2300	-7.8	1730	-15.0	1730	-15.0
		3700	-23.9	2510	-20	2510	-20

Table D.2.2.2.3: Propagation Conditions for Multi-Path Fading Environments for MBSFN Demodulation Performance Requirements

MBSFN model 1		MBSFN channel model 2	
Speed for Band a, b, c 30 km/h		Speed for Band a, b, c 30 km/h	
Speed for Band d: 23 km/h		Speed for Band d: 23 km/h	
Speed for Band e: 26 km/h		Speed for Band e: 26km/h	
Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]
0	0.0	0	0.0
310	-1.0	310	-1.0
710	-9.0	710	-9.0
1090	-10.0	1090	-10.0
1730	-15.0	1730	-15.0
2510	-20.0	2510	-20.0
2734	-6.6	5859	-6.8
3044	-7.6	6169	-7.8
3444	-15.6	6569	-15.8
3824	-16.6	6949	-16.8
4464	-21.6	7589	-21.8
5469	-8.5	10938	-13.3
5779	-9.5	11248	-14.3
6179	-17.5	11648	-22.3
6559	-18.5	12028	-23.3
8428	-12.6	15459	-15.0
8738	-13.6	15769	-16.0
9138	-21.6	16169	-24.0

NOTE: D.2.2.2.3 shows propagation conditions that are used for MBSFN demodulation performance measurements in multi-path fading environment. All taps have classical Doppler spectrum.

In the case of Rx diversity, the fading of the signals and the AWGN signals provided in each receiver antenna port shall be independent.

D.2.2.3 7,68 Mcps TDD Option

Tables D.2.2.3.1 and D.2.2.3.2 shows propagation conditions that are used for the performance measurements in multi-path fading environment for frequency bands a, b and c in section 4.2. All taps have classical Doppler spectrum.

Table D.2.2.3.1: Propagation Conditions for Multi path Fading Environmentsfor operations referenced in 4.2 a), 4.2 b) and 4.2 c)

Case 1 speed 3km/h		Case 2 speed 3 km/h		Case 3 speed 120 km/h		CASE 4 speed 50 km/h *	
Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]
0	0	0	0	0	0	0	0
976	-10	976	0	260	-3	976	-10
		12000	0	521	-6		
				781	-9		

Table D.2.2.3.2: Propagation Conditions for Multi-Path Fading Environments for HSDPA Performance Requirements for operations referenced in 4.2 a), 4.2 b) and 4.2 c)

ITU Pedestrian A Speed 3km/h (PA3)		ITU Pedestrian B Speed 3Km/h (PB3)		ITU vehicular A Speed 30km/h (VA30)		ITU vehicular A Speed 120km/h (VA120)	
Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]
0	0	0	0	0	0	0	0
110	-9.7	200	-0.9	310	-1.0	310	-1.0
190	-19.2	800	-4.9	710	-9.0	710	-9.0
410	-22.8	1200	-8.0	1090	-10.0	1090	-10.0
		2300	-7.8	1730	-15.0	1730	-15.0
		3700	-23.9	2510	-20	2510	-20

Tables D.2.2.3.3 and D.2.2.3.4 shows propagation conditions that are used for the performance measurements in multi-path fading environment for frequency band d in section 4.2.

Table D.2.2.3.3: Propagation Conditions for Multi path Fading Environments for operations referenced in 4.2 d)

Case 1 speed 2.3km/h		Case 2 speed 2.3 km/h		Case 3 speed 92 km/h		Case 4 speed 38 km/h *	
Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]
0	0	0	0	0	0	0	0
976	-10	976	0	260	-3	976	-10
		12000	0	521	-6		
				781	-9		

Table D.2.2.3.4: Propagation Conditions for Multi-Path Fading Environments for HSDPA Performance Requirements for operations referenced in 4.2 d)

ITU Pedestrian A Speed 2.3km/h (PA3)		ITU Pedestrian B Speed 2.3Km/h (PB3)		ITU vehicular A Speed 23 km/h (VA30)		ITU vehicular A Speed 92 km/h (VA120)	
Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]
0	0	0	0	0	0	0	0
110	-9.7	200	-0.9	310	-1.0	310	-1.0
190	-19.2	800	-4.9	710	-9.0	710	-9.0
410	-22.8	1200	-8.0	1090	-10.0	1090	-10.0
		2300	-7.8	1730	-15.0	1730	-15.0
		3700	-23.9	2510	-20	2510	-20

Table D.2.2.3.5: Propagation Conditions for Multi-Path Fading Environments for MTCH and MCCH Performance Requirements under an extended delay spread environment

Extended Delay Spread			
Operations referenced in 4.2 a), 4.2 b) and 4.2 c) Speed 3km/h (EDS)		Operations referenced in 4.2 d) Speed 2.3km/h (EDS)	
Relative Delay [ns]	Relative Mean Power [dB]	Relative Delay [ns]	Relative Mean Power [dB]
0	0	0	0
310	-1	310	-1
710	-9	710	-9
1090	-10	1090	-10
1730	-15	1730	-15
2510	-20	2510	-20
12490	-10	12490	-10
12800	-11	12800	-11
13200	-19	13200	-19
13580	-20	13580	-20
14220	-25	14220	-25
15000	-30	15000	-30
27490	-20	27490	-20
27800	-21	27800	-21
28200	-29	28200	-29
28580	-30	28580	-30
29220	-35	29220	-35
30000	-40	30000	-40

D.2.3 Moving propagation conditions

The dynamic propagation conditions for the test of the baseband performance are non fading channel models with two taps. The moving propagation condition has two taps, one static, Path0, and one moving, Path1. The time difference between the two paths is according Equation D.2.3.1. The taps have equal strengths and equal phases.

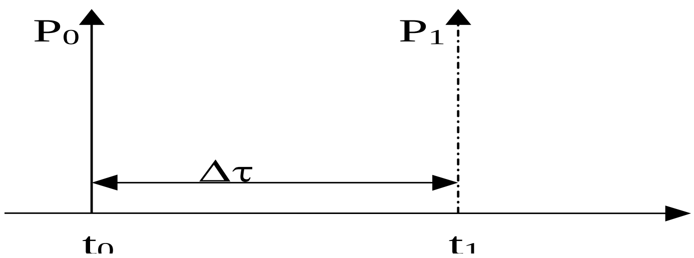


Figure D.2.3.1: The moving propagation conditions

$$\Delta\tau = B + \frac{A}{2}\left(1+\sin(\Delta\omega \cdot t)\right)$$ **Equation D.2.3.1**

The parameters in the equation are shown in.

A	5 µs
B	1 µs
Δω	$40 \cdot 10^{-3}\ s^{-1}$

D.2.4 Birth-Death propagation conditions

The dynamic propagation conditions for the test of the baseband performance is a non fading propagation channel with two taps. The moving propagation condition has two taps, Path1 and Path2 while alternate between 'birth' and 'death'. The positions the paths appear are randomly selected with an equal probability rate and are shown in figure D.2.4.1.

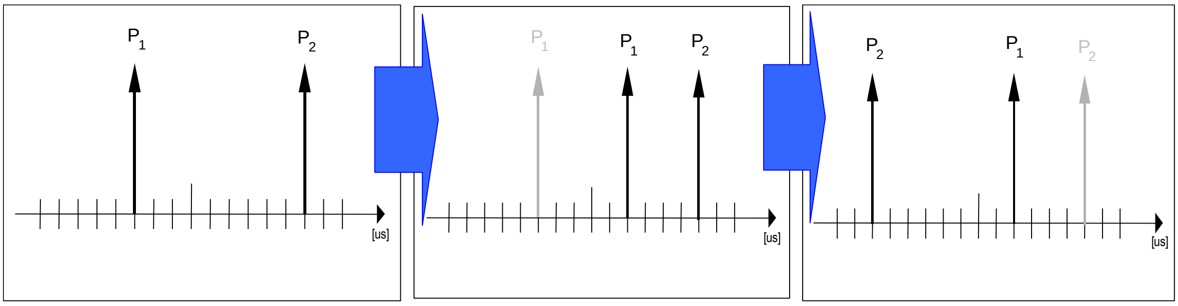


Figure D.2.4.1: Birth death propagation sequence

NOTE 1: Two paths, Path1 and Path2 are randomly selected from the group [-3, -2, -1, 0, 1, 2, 3] chip. The paths have equal strengths and equal phases.

NOTE 2: After 191 ms, Path1 vanishes and reappears immediately at a new location randomly selected from the group [-3, -2, -1, 0, 1, 2, 3]chip but excludes the point Path2.

NOTE 3: After additional 191 ms, Path2 vanishes and reappears immediately at a new location randomly selected from the group [-3, -2, -1, 0, 1, 2, 3] chip but excludes the point Path1.

NOTE 4: The sequence in 2) and 3) is repeated.

D.2.4A High speed train condition

The high speed train condition for the test of the baseband performance is a non fading propagation channel with one tap. Doppler shift is given by

$$f_s(t) = f_d \cos\theta(t) \quad \text{(D.2.4A.1)}$$

where $f_s(t)$ is the Doppler shift and f_d is the maximum Doppler frequency. The cosine of angle $\theta(t)$ is given by

$$\cos\theta(t) = \frac{D_s/2 - vt}{\sqrt{D_{\min}{}^2 + (D_s/2 - vt)^2}},\ 0 \le t \le D_s/v \quad \text{(D.2.4A.2)}$$

$$\cos\theta(t) = \frac{-1.5D_s + vt}{\sqrt{D_{\min}{}^2 + (-1.5D_s + vt)^2}},\ D_s/v < t \le 2D_s/v \quad \text{(D.2.4A.3)}$$

$$\cos\theta(t) = \cos\theta(t \mod (2D_s/v)),\ t > 2D_s/v \quad \text{(D.2.4A.4)}$$

where $D_s/2$ is the initial distance of the train from BS, and $D_{\min}$ is BS-Railway track distance, both in meters; v is the velocity of the train in m/s, t is time in seconds.

Doppler shift and cosine angle is given by equation D.2.4A.1 and D.2.4A.2-D.2.4A.4 respectively, where the required input parameters listed in table D.2.4A.1 and the resulting Doppler shift shown in Figure D.2.4A.1 are applied for all frequency bands.

Table D.2.4A.1

Parameter	Value
D_s	300 m
$D_{\min}$	2 m
v	300 km/h
f_d	560 Hz

NOTE1: Parameters for HST conditions in table D.2.4A.1 including f_d and Doppler shift trajectories presented on figure D.2.4A.1 were derived for Band a).

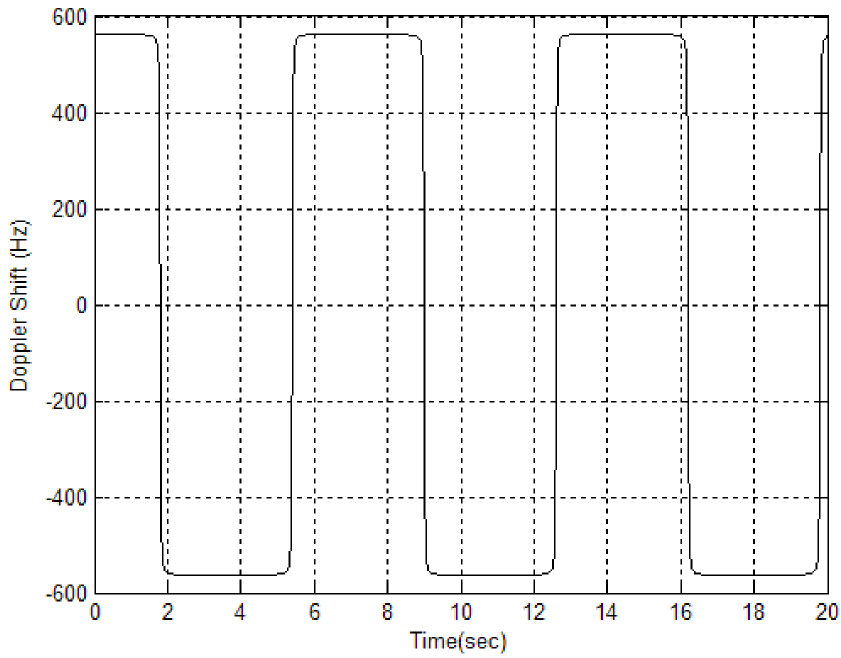


Figure D.2.4A.1: Doppler shift trajectory

D.2.5 Multi-path fading propagation conditions

D.2.5.1 3.84 Mcps TDD Option

<void>

D.2.5.1 1.28 Mcps TDD Option

MIMO propagation conditions are defined for a 2x2 antenna configuration. The resulting propagation channel shall be characterized by a complex 2x2 matrix termed

$$\mathbf{H} = \begin{pmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{pmatrix}.$$

D.2.5.1.1 MIMO Dual Stream Static Orthogonal Conditions

The channel coefficients of the resulting propagation channel under MIMO dual stream conditions shall be given by

$$\mathbf{H} = \begin{pmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{pmatrix} = \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$$

The generation of the resulting channel coefficients for MIMO dual stream conditions and the association with the transmitter and receiver ports are depicted Figure D.2.5.1.1. Figure D.2.5.1.1 does not restrict test system implementation.

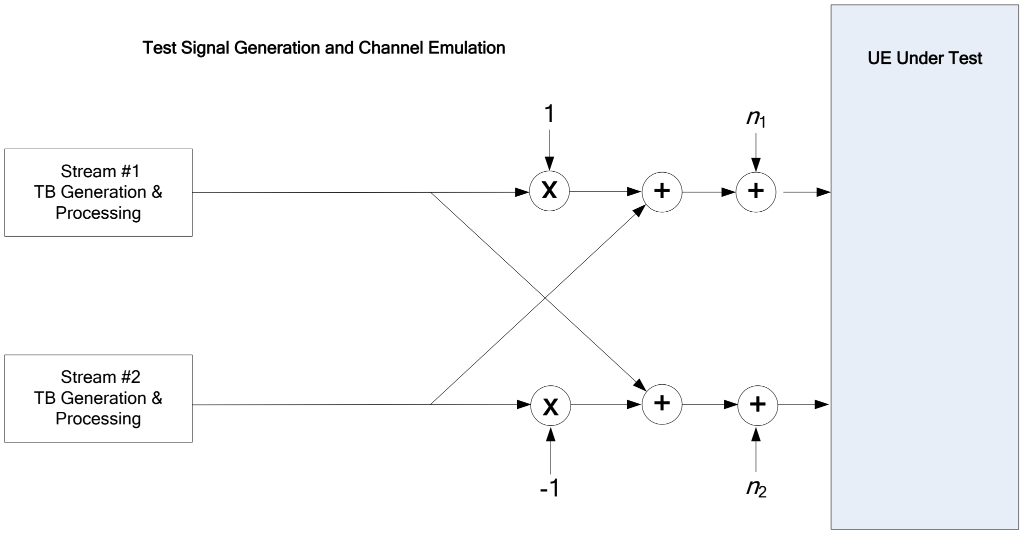


Figure D.2.5.1.1: Test setup under MIMO Dual Stream Static Orthogonal Conditions

D.2.5.1 7.68 Mcps TDD Option

<void>

Annex E (normative): Common RF test conditions

E.1 General

This normative annex specifies the common RF test conditions that are needed for setting a connection and channels that are needed during a connection.

E.2 Connection Set-up

Table E.2 describes the downlink Physical Channels that are required for connection set up.

Table E.2: Downlink Physical Channels required for connection set-up

Physical Channel
DwPCH
PCCPCH
SCCPCH
PICH
FPACH
DPCH

E.3 During connection

The following clauses describes the uplink and downlink Physical Channels that are transmitted during a connection i.e., when measurements are done.

E.3.1 Measurement of Tx Characteristics

Table E.3.1 is applicable for measurements on the Transmitter Characteristics (Clause 5) with the exception of clause 5.2 (UE maximum output power), 5.3 (Frequency Stability), 5.4.1 (Uplink Power Control). For these cases certain parameters are defined individually.

Table E.3.1.1: Common downlink test condition RF parameters

Physical Channel	Power	Note
Ior	-75 dBm	
DwPCH	DwPCH_Ec / Ior = 0 dB	
PCCPCH	∑P-CCPCH_Ec / Ior = -3 dB	
SCCPCH	∑S-CCPCH_Ec / Ior = -6 dB	
PICH	∑PICH_Ec / Ior = -6 dB	
FPACH	FPACH_Ec / Ior = -6 dB	
DL DPCH	∑DPCH_Ec / Ior = 0 dB	
NOTE: OCNS channels might be used to fill the frame gap between PICH and SCCPCH if there is any, so that total transmit power spectral density of Node B (Ior) adds to one.		

Table E.3.1.2: Common TX test parameters

Parameter	Value/description
UL Reference measurement channel	12,2kbps, according to annex C.2.1
Uplink Power Control	SS level and signalling values such that UE transmits maximum power.
Data content	real life (sufficient irregular)

E.3.2 Measurement of Rx Characteristics

Table E.3.2 is applicable for measurements on the Receiver Characteristics (Clause 6) including clause 5.3, excluding clauses 6.3 (Maximum Input Level) and 6.8 (Spurious Emissions). For these cases certain parameters are defined individually.

Table E.3.2: Downlink Physical Channels transmitted during a connection

Physical Channel	Power	Note
Ior	Test dependent power	
DwPCH	DwPCH_Ec / Ior = 0 dB	
PCCPCH	∑P-CCPCH_Ec / Ior = -3 dB	
SCCPCH	∑S-CCPCH_Ec / Ior = -6 dB	
PICH	∑PICH_Ec / Ior = -6 dB	
FPACH	FPACH_Ec / Ior = -6 dB	
DL DPCH	∑DPCH_Ec / Ior = 0 dB	
NOTE: OCNS channels might be used to fill the frame gap between PICH and SCCPCH if there is any, so that total transmit power spectral density of Node B (Ior) adds to one.		

E.3.3 Measurement of Performance requirements

Table E.3.3 is applicable for measurements on the Performance requirements (Clause 7)

Table E.3.3: Downlink Physical Channels transmitted during a connection

Physical Channel	Power	Note
Ior	Test dependent power	
DwPCH	DwPCH_Ec / Ior = 0 dB	
PCCPCH	∑P-CCPCH_Ec / Ior = -3 dB	
SCCPCH	∑S-CCPCH_Ec / Ior = -6 dB	
PICH	∑PICH_Ec / Ior = -6 dB	
FPACH	FPACH_Ec / Ior = -6 dB	
DL DPCH	∑DPCH_Ec / Ior = 0 dB	
OCNS	Necessary power so that total transmit power spectral density of Node B (Ior) adds to one[1]	OCNS consists of 8 physical channels each using SF16 and QPSK modulation. Each OCNS code has equal power.
NOTE 1: For dynamic power correction required to compensate for the presence of transient channels, e.g. control channels, a subset of the OCNS DPCH channels may be used.		

Annex F (normative): General test conditions and declarations

The requirements of this clause apply to all applicable tests in the present document.

Many of the tests in the present document measure a parameter relative to a value that is not fully specified in the UE specifications. For these tests, the Minimum Requirement is determined relative to a nominal value specified by the manufacturer.

When specified in a test, the manufacturer shall declare the nominal value of a parameter, or whether an option is supported.

.In all the relevant clauses in this clause all Bit Error Ratio (BER), Block Error Ratio (BLER) measurements shall be carried out according to the general rules for statistical testing in annex F.6.

F.1 Acceptable uncertainty of Test System

The maximum acceptable uncertainty of the Test System is specified below for each test, where appropriate. The Test System shall enable the stimulus signals in the test case to be adjusted to within the specified range, and the equipment under test to be measured with an uncertainty not exceeding the specified values. All tolerances and uncertainties are absolute values, and are valid for a confidence level of 95 %, unless otherwise stated.

A confidence level of 95% is the measurement uncertainty tolerance interval for a specific measurement that contains 95% of the performance of a population of test equipment.

For RF tests it should be noted that the uncertainties in clause F.1 apply to the Test System operating into a nominal 50 ohm load and do not include system effects due to mismatch between the DUT and the Test System.

F.1.1 Measurement of test environments

The measurement accuracy of the UE test environments defined in Annex G, Test environments shall be.

- Pressure ±5 kPa.
- Temperature ±2 degrees.
- Relative Humidity ±5 %.
- DC Voltage ±1,0 %.
- AC Voltage ±1,5 %.
- Vibration 10 %.
- Vibration frequency 0,1 Hz.

The above values shall apply unless the test environment is otherwise controlled and the specification for the control of the test environment specifies the uncertainty for the parameter.

F.1.2 Measurement of transmitter

Table F.1.2: Maximum Test System Uncertainty for transmitter tests

Clause	Maximum Test System Uncertainty
5.2 UE Maximum Output Power	±0.7 dB
5.3 Frequency Stability	± 10Hz
5.4.1 Uplink power control	Relative ±[0.3] dB
5.4.2 Minimum Transmit Power	±1.0 dB
5.4.3 Transmit OFF Power	±1.5 dB
5.4.4 Transmit ON/OFF Power	TBD
5.4.5 Out-of-synchronisation handling of output power	±0,4 dB
5.5.1 Occupied Bandwidth	±100 kHz
5.5.2.1 Spectrum emission mask	±1.5 dB
5.5.2.2 ACLR	± 0,8 dB
5.5.3 Spurious emissions	± 2.0 dB for UE and coexistenece bands for results > -60 dBm ± 3.0 dB for results < -60 dBm Outside above: f≤2.2GHz : ± 1.5 dB 2.2 GHz < f ≤ 4 GHz : ± 2.0 dB f > 4 GHz : ±4.0 dB
5.6 Transmit intermodulation:	Will be based on BS, need to work out freq and level ranges.
5.7.1 Transmit modulation: EVM	±2.5 %
5.7.2 Transmit modulation: peak code domain error	±1 dB

F.1.3 Measurement of receiver

Table F.1.3: Maximum Test System Uncertainty for receiver tests

Clause	Maximum Test System Uncertainty
6.2 Reference Sensitivity Level	± 0.7 dB
6.3 maximum input level:	TBD
6.4 Adjacent Channel Selectivity (ACS)	Overall system uncertainty ± 1.1 dB
6.5 Blocking Characteristics (3,84 Mcps TDD option)	Using ± 0.7 dB for signal and interferer as currently defined, and 68 dB ACLR @ 10 MHz.System error with f <15 MHz offset: ± 1.4 dB f >= 15 MHz offset and f ≤ 2.2 GHz: ± 1.0 dB 2.2 GHz < f ≤ 4 GHz : ±1.7 dB f > 4 GHz: ±3.1 dB
6.5 Blocking Characteristics (1,28 Mcps TDD option)	Using ± 0.7 dB for signal and interferer as currently defined, and 68 dB ACLR @ 3,2 MHz.System error with f <4,8 MHz offset: ± 1.4 dB f >= 4,8 MHz offset and f ≤ 2.2 GHz: ± 1.0 dB 2.2 GHz < f ≤ 4 GHz : ±1.7 dB f > 4 GHz: ±3.1 dB
6.6 Spurious Response	f < 2.2 GHz: ±1.0dB 2.2 < f < 4GHz: ±1.7dB f > 4 GHz: ±3.1dB
6.7 Intermodulation Characteristics	± 1.3 dB with Formula = $\sqrt{(2 \cdot CW\_level\_error)^2 + (\text{mod}\_level\_error)^2 + (wanted\_signal\_level\_error)^2}$ (Using CW interferer ±0.5 dB, modulated interferer ±0.5 dB, wanted signal ±0.7 dB)
6.8 Spurious Emissions	± 3.0 dB for UE receive band Outside above: f≤2.2GHz : ± 2.0dB 2.2 GHz < f ≤ 4 GHz : ± 2.0 dB f > 4 GHz : ±4.0 dB

F.1.4 Performance requirement

Table F.1.4: Maximum Test System Uncertainty for Performance Requirements

Clause	Maximum Test System Uncertainty
7.6 Uplink Power Control	0.3 dB (relative tolerance for 10 dB stepsize)

F.1.5 Requirements for support of RRM

Table F.1.5: Maximum Test System Uncertainty for RRM Requirements

Clause	Maximum Test System Uncertainty	Derivation of Test System Uncertainty
8.2.2.6.1 UTRA to E-UTRA TDD cell reselection: E-UTRA is of higher priority	UTRA cell I_{oc} ±0.7 dB $\hat{I}_{or} / I_{oc}$ ±0.3 dB PCCPCH E_C/I_{or} ±0.1 dB DwPCH_E_C/I_{or} ±0.1 dB E-UTRA cell N_{oc} ±0.7 dB averaged over BW_{Config} $\hat{E}_S / N_{oc}$ ±0.3 dB averaged over BW_{Config}	Note: I_{oc} is the AWGN on cell 1 frequency $\hat{I}_{or} / I_{oc}$ is the ratio of cell 1 signal / AWGN PCCPCH E_c / I_{or} is the fraction of cell 1 power assigned to the PCCPCH Physical channel DwPCH_ E_c / I_{or} is the fraction of cell 1 power assigned to the DwPCH channel N_{oc} is the AWGN on cell 2 frequency $\hat{E}_S / N_{oc}$ is the ratio of cell 2 signal / AWGN
8.2.2.6.2 UTRA to E-UTRA TDD cell reselection: E-UTRA is of lower priority	UTRA cell I_{oc} ±0.7 dB $\hat{I}_{or} / I_{oc}$ ±0.3 dB PCCPCH E_C/I_{or} ±0.1 dB DwPCH_E_C/I_{or} ±0.1 dB E-UTRA cell N_{oc} ±0.7 dB averaged over BW_{Config} $\hat{E}_S / N_{oc}$ ±0.3 dB averaged over BW_{Config}	Note: I_{oc} is the AWGN on cell 1 frequency $\hat{I}_{or} / I_{oc}$ is the ratio of cell 1 signal / AWGN PCCPCH E_c / I_{or} is the fraction of cell 1 power assigned to the PCCPCH Physical channel DwPCH_E_C/I_{or} is the fraction of cell 1 power assigned to the DwPCH channel N_{oc} is the AWGN on cell 2 frequency $\hat{E}_S / N_{oc}$ is the ratio of cell 2 signal / AWGN
8.3.3a UTRA TDD to E-UTRA FDD Handover	UTRA cell I_{oc} ±0.7 dB $\hat{I}_{or} / I_{oc}$ ±0.3 dB PCCPCH E_C/I_{or} ±0.1 dB DwPCH_E_C/I_{or} ±0.1 dB E-UTRA cell N_{oc} ±0.7 dB averaged over BW_{Config} $\hat{E}_S / N_{oc}$ ±0.3 dB averaged over BW_{Config}	Note: I_{oc} is the AWGN on cell 1 frequency $\hat{I}_{or} / I_{oc}$ is the ratio of cell 1 signal / AWGN PCCPCH E_c / I_{or} is the fraction of cell 1 power assigned to the PCCPCH Physical channel DwPCH_E_C/I_{or} is the fraction of cell 1 power assigned to the DwPCH channel N_{oc} is the AWGN on cell 2 frequency $\hat{E}_S / N_{oc}$ is the ratio of cell 2 signal / AWGN
8.3.3b UTRA TDD to E-UTRA TDD Handover	Same as 8.3.3a	Same as 8.3.3a

Clause	Maximum Test System Uncertainty	Derivation of Test System Uncertainty
8.3.3c UTRA TDD to E-UTRA FDD Handover: unknown target cell	UTRA cell I_{oc} ±0.7 dB $\hat{I}_{or}$ / I_{oc} ±0.3 dB PCCPCH E_C/I_{or} ±0.1 dB DwPCH_E_C/I_{or} ±0.1 dB E-UTRA cell N_{oc} ±0.7 dB averaged over BW_{Config} $\hat{E}_S$ / N_{oc} ±0.3 dB averaged over BW_{Config}	Note: I_{oc} is the AWGN on cell 1 frequency $\hat{I}_{or}$ / I_{oc} is the ratio of cell 1 signal / AWGN PCCPCH E_c / I_{or} is the fraction of cell 1 power assigned to the PCCPCH Physical channel DwPCH_E_C/I_{or} is the fraction of cell 1 power assigned to the DwPCH channel N_{oc} is the AWGN on cell 2 frequency $\hat{E}_S$ / N_{oc} is the ratio of cell 2 signal / AWGN
8.3.3d UTRA TDD to E-UTRA TDD Handover: unknown target cell	Same as 8.3.3c	Same as 8.3.3c

Clause	Maximum Test System Uncertainty	Derivation of Test System Uncertainty
8.3.3e TDD/GSM Handover: non-synchronization target cell	UTRA Cell I_{oc} ±0.7 dB $\hat{I}_{or}$ / I_{oc} ±0.3 dB PCCPCH E_C/I_{or} ±0.1 dB DwPCH_E_C/I_{or} ±0.1 dB GSM cell Signal level ±0.7 dB	Note: I_{oc} is the AWGN on Cell 1 (UTRA TDD) frequency I_{or}/I_{oc} is the ratio of Cell 1 signal/AWGN PCCPCH_E_C /I_{or} is the fraction on Cell 1 power assigned to the CPCCPCH physical channel DwPCH_E_C /I_{or} is the fraction on Cell 1 power assigned to the DwPCH physical channel Cell 2 (GSM) has only the wanted signal, without AWGN
8.6.5.1 UTRA TDD to E-UTRA FDD cell search under fading propagation conditions	UTRA cell I_{oc} ±0.7 dB $\hat{I}_{or}$ / I_{oc} ±0.6 dB PCCPCH E_C/I_{or} ±0.1 dB DwPCH_E_C/I_{or} ±0.1 dB E-UTRA cell N_{oc} ±0.7 dB averaged over BW_{Config} $\hat{E}_S$ / N_{oc} ±0.6 dB averaged over BW_{Config}	Note: I_{oc} is the AWGN on cell 1 frequency $\hat{I}_{or}$ / I_{oc} is the ratio of cell 1 signal / AWGN PCCPCH E_c / I_{or} is the fraction of cell 1 power assigned to the PCCPCH Physical channel DwPCH_E_C/I_{or} is the fraction of cell 1 power assigned to the DwPCH channel N_{oc} is the AWGN on cell 2 frequency $\hat{E}_S$ / N_{oc} is the ratio of cell 2 signal / AWGN For Cell 1 and Cell 2: I_{or} / I_{oc} uncertainty or Ês / N_{oc} uncertainty for fading condition comprises two quantities: 1. Signal-to-noise ratio uncertainty 2. Fading profile power uncertainty Items 1 and 2 are assumed to be uncorrelated so can be root sum squared: Ês / N_{oc} uncertainty or I_{or} / I_{oc} uncertainty = SQRT (Signal-to-noise ratio uncertainty^2 + Fading profile power uncertainty^2) Signal-to-noise ratio uncertainty ±0.3 dB Fading profile power uncertainty ±0.5 dB
8.6.5.2 UTRA TDD to E-UTRA TDD cell search under fading propagation conditions	Same as 8.6.5.1	Same as 8.6.5.1

Clause	Maximum Test System Uncertainty	Derivation of Test System Uncertainty
8.6.5.3 Combined UTRA TDD inter-frequency and E-UTRA FDD cell search under fading propagation conditions	UTRA cell 1 I_{oc} ±0.7 dB $\hat{I}_{or}$ / I_{oc} ±0.3 dB PCCPCH E_C/I_{or} ±0.1 dB DwPCH_E_C/I_{or} ±0.1 dB UTRA cell 2 I_{oc} ±0.7 dB $\hat{I}_{or}$ / I_{oc} ±0.6 dB PCCPCH E_C/I_{or} ±0.1 dB DwPCH_E_C/I_{or} ±0.1 dB E-UTRA cell 3 N_{oc} ±0.7 dB averaged over BW_{Config} $\hat{E}_S$ / N_{oc} ±0.6 dB averaged over BW_{Config}	Note: I_{oc} is the AWGN on cell 1 or cell 2 frequencies $\hat{I}_{or}$ / I_{oc} is the ratio of cell 1 or cell 2 signal / AWGN PCCPCH E_c / I_{or} is the fraction of cell 1 or cell 2 power assigned to the PCCPCH Physical channel DwPCH_E_C/I_{or} is the fraction of cell 1 or cell 2 power assigned to the DwPCH channel N_{oc} is the AWGN on cell 3 frequency $\hat{E}_S$ / N_{oc} is the ratio of cell 3 signal / AWGN For Cell 2 and Cell 3: I_{or} / I_{oc} uncertainty or $\hat{E}s$ / N_{oc} uncertainty for fading condition comprises two quantities: 1. Signal-to-noise ratio uncertainty 2. Fading profile power uncertainty Items 1 and 2 are assumed to be uncorrelated so can be root sum squared: $\hat{E}s$ / N_{oc} uncertainty or I_{or} / I_{oc} uncertainty = SQRT (Signal-to-noise ratio uncertainty^2 + Fading profile power uncertainty^2) Signal-to-noise ratio uncertainty ±0.3 dB Fading profile power uncertainty ±0.5 dB
8.6.5.4 Combined UTRA TDD inter-frequency and E-UTRA TDD cell search under fading propagation conditions	Same as 8.6.5.3	Same as 8.6.5.3
8.7.14 E-UTRAN FDD RSRP	UTRA cell I_{oc} ±0.7 dB $\hat{I}_{or}$ / I_{oc} ±0.3 dB PCCPCH E_C/I_{or} ±0.1 dB DwPCH_E_C/I_{or} ±0.1 dB E-UTRA cell N_{oc} ±0.7 dB averaged over BW_{Config} N_{oc} ±1.0 dB for PRBs #22-27 $\hat{E}_S$ / N_{oc} ±0.3 dB averaged over BW_{Config} $\hat{E}s$ / N_{oc} ±0.8 dB for PRBs #22-27	Note: I_{oc} is the AWGN on cell 1 frequency $\hat{I}_{or}$ / I_{oc} is the ratio of cell 1 signal / AWGN PCCPCH E_c / I_{or} is the fraction of cell 1 power assigned to the PCCPCH Physical channel DwPCH_ E_c / I_{or} is the fraction of cell 1 power assigned to the DwPCH channel N_{oc} is the AWGN on cell 2 frequency $\hat{E}_S$ / N_{oc} is the ratio of cell 2 signal / AWGN
8.7.15 E-UTRAN TDD RSRP	Same as 8.7.14	Same as 8.7.14
8.7.16 E-UTRAN FDD RSRQ	Same as 8.7.14	Same as 8.7.14
8.7.17 E-UTRAN TDD RSRQ	Same as 8.7.14	Same as 8.7.14

F.1.6 Performance requirement (HSDPA)

Table F.1.6: Maximum Test System Uncertainty for Performance Requirements (HSDPA)

Clause	Maximum Test System Uncertainty	Derivation of Test System Uncertainty
9.3.1 HS-DSCH throughput for Fixed Reference Channels	$\hat{I}_{or}/I_{oc}$ ±0.6 dB I_{oc} ±1.0 dB $\frac{E_c}{I_{or}}$ ±0.1 dB	0.1 dB uncertainty in Ec/Ior ratio Worst case gain uncertainty due to the fader from the calibrated static profile is ±0.5 dB per output In addition the same ±0.3 dB $\hat{I}_{or}/I_{oc}$ ratio error as 7.2. These are uncorrelated so can be RSS. Overall error in $\hat{I}_{or}/I_{oc}$ is $(0.5^2 + 0.3^2)^{0.5}$ = 0.6 dB
9.3.2 HS-DSCH throughput for Variable Reference Channels	Same as 9.3.1	Same as 9.3.1
9.3.3 Reporting of HS-DSCH Channel Quality Indicator	No test system uncertainty applied	
9.3.4 HS-SCCH Detection Performance	Same as 9.3.1	Same as 9.3.1

F.2 Test Tolerances (This clause is informative)

The Test Tolerances defined in this clause have been used to relax the Minimum Requirements in the present document to derive the Test Requirements.

The Test Tolerances are derived from Test System uncertainties, regulatory requirements and criticality to system performance. As a result, the Test Tolerances may sometimes be set to zero.

The test tolerances should not be modified for any reason e.g. to take account of commonly known test system errors (such as mismatch, cable loss, etc.).

F.2.1 Transmitter

Table F.2.1: Test Tolerances for transmitter tests

Clause	Test Tolerance
5.2 Maximum Output Power	0,7 dB
5.3 UE Frequency Stability	10 Hz
5.4.1.1 Uplink Power Control, Initial Accuracy	+1,0 dB
5.4.1.2 Uplink Power Control, differential Accuracy	1dB step: 0,1 dB 2 dB step: 0,15 dB 3dB step: 0,2 dB 10 dB step: 0,5 dB 20 dB step: 0,7 dB 30 dB step: 0,7 dB >30 dB step: 1,0 dB
5.4.1.3 Open Loop Power Control	+1,0 dB
5.4.2 Minimum Transmit Power	1,0 dB
5.4.5 Out-of-synchronisation handling of output power: $\frac{\Sigma DPCH\_E_c}{I_{or}}$	0,4 dB
5.4.5 Out-of-synchronisation handling of output power: transmit ON/OFF time	0 ms
5.5.1 Transmit OFF power	1,5 dB
5.5.1 Occupied Bandwidth	0 kHz
5.5.2.1 Spectrum emission mask	1,5 dB
5.5.2.2 Adjacent Channel Leakage Power Ratio (ACLR)	0.8 dB
5.5.3 Spurious Emissions	0 dB
5.6 Transmit Intermodulation	0 dB
5.7.1 Error Vector Magnitude	0%
5.7.2 Peak code domain error	1,0 dB

NOTE: Unless explicitly specified test tolerances are set to be equal in the case of 3,84 Mcps TDD Option as well as in the case of 1,28 Mcps TDD Option.

F.2.2 Receiver

Table F.2.2: Test Tolerances for receiver tests

Clause	Test Tolerance
6.2 Reference sensitivity level	0.7 dB
6.4 Adjacent channel selectivity	0 dB
6.5 Blocking characteristics	0 dB
6.6 Spurious Response	0 dB
6.7 Intermodulation Characteristics	0 dB
6.8 Spurious emissions	0 dB

NOTE: Unless explicitly specified test tolerances are set to be equal in the case of 3,84 Mcps TDD Option as well as in the case of 1,28 Mcps TDD Option.

F.2.3 Performance requirements

Table F.2.3: Test Tolerances for Performance Requirements

Clause	Test Tolerance
7.2 Demodulation in Static Propagation Condition	0.3 dB for $\hat{I}_{or}/I_{oc}$
7.3 Demodulation of DCH in Multiplath Fading conditions	0.6 dB for $\hat{I}_{or}/I_{oc}$
7.3A Demodulation of DCH in high speed train conditions	0.6 dB for $\hat{I}_{or}/I_{oc}$
7.4, Base Station Transmit diversity modes	0.8 dB for $\hat{I}_{or}/I_{oc}$
7.6 Uplink Power Control	0.5 dB (relative tolerance for 10 dB stepsize)

F.2.4 Requirements for support of RRM

F.2.4.1 TDD/TDD Cell Reselection on intra-frequency cells

F.2.4.1.1 3,84 Mcps TDD Option

Void.

F.2.4.1.2 1,28 Mcps Option

The test tolerances TT1 and TT2 given in table 8.2.3.1.5.2 shall not exceed [0,2 dB] for the interacting cells 1, 2 and [0,7 dB] for the additional (e.g. noniteracting) cells 3-6, respectively with a DRX cycle length given in table F.2.4.1A.

Table F.2.4.1A: $T_{measureNTDD}$, $T_{evaluateNTDD}$, $T_{measureTDD}$, $T_{evaluateTDD}$, $T_{measureFDD}$, $T_{evaluateFDD}$ and $T_{measureGSM}$ (1,28 Mcps TDD Option)

DRX cycle length [s]	N_{serv} [number of successive measurements]	$T_{measureNTDD}$ [s] (number of DRX cycles)	$T_{evaluateNTDD}$ [s] (number of DRX cycles)	$T_{measureTDD}$ [s] (number of DRX cycles)	$T_{evaluateTDD}$ [s] (number of DRX cycles)
0,08	4	0,64 (8 DRX cycles)	2,56 (32 DRX cycles)	0,64 (8 DRX cycles)	2,56 (32 DRX cycles)
0,16	4	0,64 (4)	2,56 (16)	0,64 (4)	2,56 (16)
0,32	4	1,28 (4)	5,12 (16)	1,28 (4)	5,12 (16)
0,64	4	1,28 (2)	5,12 (8)	1,28 (2)	5,12 (8)
1,28	2	1,28 (1)	6,4 (5)	1,28 (1)	6,4 (5)
2,56	2	2,56 (1)	7,68 (3)	2,56 (1)	7,68 (3)
5,12	1	5,12 (1)	10,24 (2)	5,12 (1)	10,24 (2)

NOTE: In idle mode, UE shall support DRX cycles lengths 0.64, 1,28, 2.56 and 5.12 s.

F.2.4.1.3 7,68 Mcps TDD Option

Void

F.2.5 Performance requirements (HSDPA)

Table F.2.5: Test Tolerances for Performance Requirements (HSDPA)

Clause	Test Tolerance
9.3.1 HS-DSCH throughput for Fixed Reference Channels	0.6 dB for $\hat{I}_{or}/I_{oc}$ 0.1 dB for Ec/Ior
9.3.2 HS-DSCH throughput for Variable Reference Channels	Same as 9.3.1
9.3.3 Reporting of HS-DSCH Channel Quality Indicator	No test tolerances applied
9.3.4 HS-SCCH Detection Performance	Same as 9.3.1

F.2.6 Performance requirements (Multiple-cell)

Table F.2.6: Test Tolerances for Performance Requirements (Multiple-cell)

Clause	Test Tolerance
12.2 Demodulation of DCH in static propagation conditions	0.6 dB for $\hat{I}_{or1}/I_{oc}$ 0.1 dB for Ec/Ioc
12.3 Demodulation of DCH in Multipath fading Case 1 conditions	1.2 dB for $\hat{I}_{or1}/I_{oc}$ 0.1 dB for Ec/Ioc
12.4 Demodulation of DCH in Multipath fading Case 3 conditions	1.2 dB for $\hat{I}_{or1}/I_{oc}$ 0.1 dB for Ec/Ioc

F.3 Interpretation of measurement results

The measurement results returned by the Test System are compared - without any modification - against the Test Requirements as defined by the shared risk principle.

The Shared Risk principle is defined in ETR 273 Part 1 sub-part 2 clause 6.5.

The actual measurement uncertainty of the Test System for the measurement of each parameter shall be included in the test report.

The recorded value for the Test System uncertainty shall be, for each measurement, equal to or lower than the appropriate figure in clause F.1 of the present document.

If the Test System for a test is known to have a measurement uncertainty greater than that specified in clause F.1, it is still permitted to use this apparatus provided that an adjustment is made value as follows.

Any additional uncertainty in the Test System over and above that specified in clause F.1 shall be used to tighten the Test Requirement – making the test harder to pass. (For some tests e.g. receiver tests, this may require modification of stimulus signals). This procedure will ensure that a Test System not compliant with clause F.1does not increase the chance of passing a device under test where that device would otherwise have failed the test if a Test System compliant with clause F.1 had been used.

F.4 Derivation of Test Requirements (This clause is informative)

The Test Requirements in the present document have been calculated by relaxing the Minimum Requirements of the core specification using the Test Tolerances defined in clause F.2. When the Test Tolerance is zero, the Test Requirement will be the same as the Minimum Requirement. When the Test Tolerance is non-zero, the Test Requirements will differ from the Minimum Requirements, and the formula used for this relaxation is given in table F.4.

F.4.1 3.84Mcps TDD Option

Table F.4.1: Derivation of Test Requirements

Test	Minimum Requirement in TS 25.102	Test Tolerance (TT)	Test Requirement in TS 34.122
5.2 Maximum Output Power	Power single code Power class 1 (30 dBm) Tolerance = +1/-3 dB Power class 2 (24 dBm) Tolerance = +1/-3 dB Power class 3 (21 dBm) Tolerance = +2/-2 dB Power multi code Power class 2 (21 dBm) Tolerance = +1/-3 dB Power class 3 (18 dBm) Tolerance = ±2 dB Power class 4 (10 dBm) Tolerance = ± 4 dB	0.7 dB	Formula: Upper Tolerance limit + TT Lower Tolerance limit – TT For power classes 1 and 2 (single and multi): Upper Tolerance limit = +1.7 dB Lower Tolerance limit = -3.7 dB For power class 3 (single and milti): Upper Tolerance limit = +2.7 dB Lower Tolerance limit = -2.7 dB For power class 4 (single and multi) Upper Tolerance limit = +4.7 dB Lower Tolerance limit = -4.7 dB
5.3 UE Frequency Stability	The UE modulated carrier frequency shall be accurate to within ±0.1 ppm compared to the carrier frequency received from the Node B.	10 Hz	Formula: modulated carrier frequency error + TT modulated carrier frequency error = ±(0.1 ppm + 10 Hz).
5.4.1.1 Uplink Power Control, Initial accuracy	± 9dB normal conditions ± 12dB extreme conditions	1.0 dB	Formula: Upper Tolerance limit + TT Lower Tolerance limit – TT Nominal expected TX power ± 10dB (normal conditions) ± 13dB (extreme conditions)
5.4.1.2 Uplink Power Control, differential accuracy	SIR Target Pow Step Tol <1 dB 0.5 dB <2dB 1 dB <3 dB 1.5 dB <10 dB 2 dB <20dB 4 dB <30 dB 6 dB > 30 dB 9 dB	TT 0.1 dB 0.15 dB 0.2 dB 0.5 dB 0.7 dB 0.7 dB 1.0 dB	Formula: Upper Tolerance limit + TT Lower Tolerance limit – TT
5.4.1.3 Open Loop Power Control	± 9dB normal conditions ± 12dB extreme conditions	1.0 dB	Formula: Upper Tolerance limit + TT Lower Tolerance limit – TT Nominal expected TX power ± 10dB (normal conditions) ± 13dB (extreme conditions)
5.4.2 Minimum Transmit Power	UE minimum transmit power shall be less than –44 dBm	1.0 dB	Formula: UE minimum transmit power + TT UE minimum transmit power = –43 dBm

5.4.5 Out-of-synchronisation handling of output power:	$\frac{\Sigma DPCH\_E_c}{I_{or}}$ levels before A –4.6 dB AB: -10 dB BD: -16 dB DE: -12 dB EF: -6 dB transmit ON/OFF time 200ms		0,4 dB for $\frac{\Sigma DPCH\_E_c}{I_{or}}$ 0 ms for timing measurement	Formulas: Ratio between A and B + TT Ratio between B and D - TT Ratio between D and E - TT Ratio between E and F + TT transmit ON/OFF time + TT timing $\frac{\Sigma DPCH\_E_c}{I_{or}}$ levels: Before A: -4.6 AB: -10 + 0,4 dB BD: -16 – 0,4 dB DE: -12 - 0,4 dB EF: -6 + 0,4 dB Uncertainty of OFF power measurement is handled by Transmit OFF power test and uncertainty of ON power measurement is handled by Minimum output power test.transmit ON/OFF time 200ms	
5.5.1 Transmit OFF power	Transmit OFF power shall be less than –65 dBm		1.5 dB	Formula: Transmit OFF power + TT Transmit OFF power = –63.5 dBm	
5.5.1 Occupied Bandwidth	The occupied channel bandwidth shall be less than 5 MHz based on a chip rate of 3,84 Mcps.		0 kHz	Formula: occupied channel bandwitdh: + TT occupied channel bandwidth = 5.0 MHz	
5.5.2.1 Spectrum emission mask	Minimum requirement defined in TS25.101 table 6.10. The lower limit shall be −50 dBm / 3,84 MHz or which ever is higher.		1.5 dB	Formula: Minimum requirement + TT Lower limit + TT Add 1.5 to Minimum requirement entries in TS25.101 table 6.10 The lower limit shall be −48.5 dBm / 3,84 MHz or which ever is higher.	
5.5.2.2 Adjacent Channel Leakage Power Ratio (ACLR)	Power Classes 2 and 3: UE channel +5 MHz or -5 MHz, ACLR limit: 33 dB UE channel +10 MHz or -10 MHz, ACLR limit: 43 dB		0.8 dB	Formula: ACLR limit - TT Power Classes 2 and 3: UE channel +5 MHz or -5 MHz, ACLR limit: 32.2 dB UE channel +10 MHz or -10 MHz, ACLR limit: 42.2 dB	
5.5.3 Spurious Emissions				Formula: Minimum Requirement+ TT Add zero to all the values of Minimum Requirements in table 5.5.3	
	Frequency Band	Minimum Requirement		Frequency Band	Minimum Requirement
	9 kHz ≤ f < 150 kHz	−36dBm /1kHz	0 dB	9kHz ≤ f < 1GHz	−36dBm /1kHz
	150 kHz ≤ f < 30 MHz	−36dBm /10kHz	0 dB	150 kHz ≤ f < 30 MHz	−36dBm /10kHz
	30 MHz ≤ f < 1000 MHz	−36dBm /100kHz	0 dB	30 MHz ≤ f < 1000 MHz	−36dBm /100kHz
	1 GHz ≤ f < 12.75 GHz	−30dBm /1MHz	0 dB	1 GHz ≤ f < 2.2 GHz	−30dBm /1MHz
			0 dB	2.2 GHz ≤ f < 4 GHz	−30dBm /1MHz
			0 dB	4 GHz ≤ f < 12.75 GHz	−30dBm /1MHz

	925 MHz < f < 935 MHz	−67dBm /100kHz	0 dB	925 MHz < f < 935 MHz	−67dBm /100kHz
	935 MHz ≤ f ≤ 960 MHz	−79dBm /100kHz	0 dB	935 MHz ≤ f ≤ 960 MHz	−79dBm /100kHz
	1805 MHz < f ≤ 1880 MHz	−71dBm /100kHz	0 dB	1805 MHz < f ≤ 1880 MHz	−71dBm /100kHz
	1884.5 MHz ≤ f ≤ 1919.6 MHz	−41dBm* /300kHz	0 dB	1884.5 MHz ≤ f ≤ 1919.6 MHz	−41dBm* /300kHz
5.6 Transmit Intermodulation	Intermodulation Product 5MHz -31 dBc 10MHz -41 dBc		0 dB	Formula: Intermodulation Product + TT Intermodulation Product 5MHz -31 dBc 10MHz -41 dBc	
5.7.1 Error Vector Magnitude	The Error Vector Magnitude shall not exceed 17.5 %		0%	Formula: EVM limit + TT EVM limit = 17.5 %	
5.7.2 Peak code domain error	The peak code domain error shall not exceed -21dB		±1.0 dB	Formula: Peak code domain error + TT Peak code domain error = -20 dB	
6.2 Reference sensitivity level	$\hat{I}_{or}$ = -105 dBm / 3,84 MHz BER limit = 0.001		0.7 dB	Formula: $\hat{I}_{or}$+ T BER limit unchanged $\hat{I}_{or}$ = -104.3 dBm / 3,84 MHz	
6.4 Adjacent Channel Selectivity	I_{or} = -91 dBm / 3,84 MHz Ioac (modulated) = -52 dBm/3,84 MHz BER limit = 0.001		0 dB	Formula: I_{or} unchanged Ioac - TT BER limit unchanged Ioac = -52 dBm/3,84 MHz	
6.5 Blocking Characteristics	See table 6.5.2a and 6.5.2b. in TS34.122 BER limit = 0.001		0 dB	Formula: $I_{blocking}$ (modulated) - TT (dBm/3,84MHz) $I_{blocking}$ (CW) - TT (dBm) BER limit unchanged	
6.6 Spurious Response	Iblocking(CW) –44 dBm Fuw: Spurious response frequencies BER limit = 0.001		0 dB	Formula: $I_{blocking}$ (CW) - TT (dBm) Fuw unchanged BER limit unchanged Iblocking(CW) -44 dBm	
6.7 Intermodulation Characteristics	Iouw1 (CW) -46 dBm Iouw2 (modulated) –46 dBm / 3,84 MHz Fuw1 (offset) 10 MHz Fuw2 (offset) 20 MHz BER limit = 0.001		0 dB	Formula: TBD BER limit unchanged.	
6.8 Spurious Emissions				Formula: Maximum level+ TT Add zero to all the values of Maximum Level in table 6.8.1.	
	Frequency Band	Maximum level		Frequency Band	Maximum level
	9kHz ≤ f < 1GHz	-57dBm /100kHz	0 dB	9kHz ≤ f < 1GHz	-57dBm /100kHz
	1.9-1.92 GHz 2.01-2.025GHz 2.11-2.170GHz	-60 dBm / 3,84MHz	0 dB	1.9-1.92 GHz 2.01-2.025GHz 2.11-2.170GHz	-60 dBm / 3,84MHz
	1 –1.9GHz, 1.92–2.01 GHz 2.025–2.11GHz	-47 dBm/1MHz	0 dB	1 –1.9GHz, 1.92–2.01 GHz 2.025–2.11GHz	-47 dBm/1MHz
	1GHz ≤ f ≤ 12.75GHz	-47dBm /1MHz	0 dB	1GHz ≤ f ≤ 2.2GHz	-47dBm /1MHz

<table>
<tr><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2" colspan="2"></td><td>0 dB</td><td>2.2GHz < f ≤ 4GHz</td><td>-47dBm /1MHz</td></tr>
<tr><td>0 dB</td><td>4GHz < f ≤ 12.75GHz</td><td>-47dBm /1MHz</td></tr>
<tr><td rowspan="3">7.6 Downlink Power Control</td><td></td><td>TS #1,9</td><td>TS #7,14</td><td rowspan="3">0.5 dB for 10 dB change in output power, 0 otherwise.</td><td rowspan="3" colspan="2">Formula for 10 dB change in transmit power: Upper Tolerance limit + TT
Lower Tolerance limit – TT</td></tr>
<tr><td>1st frame</td><td>15 ±4.0 dBm</td><td>5 ±0.5 dBm</td></tr>
<tr><td>2nd frame</td><td>15 ±4.0 dBm</td><td>15 ±4.0 dBm</td></tr>
<tr><td>9.3.1 HS-DSCH throughput for Fixed Reference Channels</td><td colspan="3">$\frac{E_c}{I_{or}}$ -10,-9.5 dB

I_{OC} = -60 dBm

$\hat{I}_{or}/I_{oc}$ = 10 dB</td><td>0.1 dB for $\frac{E_c}{I_{or}}$

0.6 dB for $\hat{I}_{or}/I_{oc}$</td><td colspan="2">Formulas:
$\frac{E_c}{I_{or}}$ = ratio + TT
$\hat{I}_{or}/I_{oc}$ = ratio + TT

I_{OC} unchanged</td></tr>
<tr><td>9.3.2 HS-DSCH throughput for Variable Reference Channels</td><td colspan="3">$\frac{E_c}{I_{or}}$ -10dB

I_{OC} = -60 dBm

$\hat{I}_{or}/I_{oc}$ = 8 and 10 dB</td><td>0.1 dB for $\frac{E_c}{I_{or}}$

0.6 dB for $\hat{I}_{or}/I_{oc}$</td><td colspan="2">Formulas:
$\frac{E_c}{I_{or}}$ = ratio + TT
$\hat{I}_{or}/I_{oc}$ = ratio + TT

I_{OC} unchanged</td></tr>
<tr><td>9.3.3 Reporting of HS-DSCH Channel Quality Indicator</td><td colspan="3"></td><td>No test tolerances applied</td><td colspan="2"></td></tr>
<tr><td>9.3.4 HS-SCCH Detection Performance</td><td colspan="3">$\frac{E_c}{I_{or}}$ -10dB

I_{OC} = -60 dBm

$\hat{I}_{or}/I_{oc}$ = 12 and 16 dB</td><td>0.1 dB for $\frac{E_c}{I_{or}}$

0.6 dB for $\hat{I}_{or}/I_{oc}$</td><td colspan="2">Formulas:
$\frac{E_c}{I_{or}}$ = ratio + TT
$\hat{I}_{or}/I_{oc}$ = ratio + TT

I_{OC} unchanged</td></tr>
<tr><td colspan="7">* Applicable for transmission in 2010-2025 MHz as defined in subclause 4.2 (a).</td></tr>
</table>

F.4.2 1.28Mcps TDD Option

F.4.2.1 Transmitter

Table F.4.2.1: Derivation of Transmitter Test Requirements

Test	Minimum Requirement in TS 25.102	Test Tolerance (TT)	Test Requirement in TS 34.122
5.2 Maximum Output Power	Power single code Power class 1 (33 dBm) Tolerance = +1/-3 dB Power class 2 (24 dBm) Tolerance = +1/-3 dB Power class 3 (21 dBm) Tolerance = +2/-2 dB Power multi code Power class 2 (21 dBm) Tolerance = +1/-3 dB Power class 3 (18 dBm) Tolerance = ±2 dB Power class 4 (27 dBm) Tolerance = +1/-3 dB	0.7 dB	Formula: Upper Tolerance limit + TT Lower Tolerance limit – TT For power classes 1 and 2 (single and multi): Upper Tolerance limit = +1.7 dB Lower Tolerance limit = -3.7 dB For power class 3 (single and milti): Upper Tolerance limit = +2.7 dB Lower Tolerance limit = -2.7 dB For power class 4 (single and multi) Upper Tolerance limit = +1.7 dB Lower Tolerance limit = -3.7 dB
5.3 UE Frequency Stability	The UE modulated carrier frequency shall be accurate to within 0.1 ppm compared to the carrier frequency received from the Node B.	10 Hz	Formula: modulated carrier frequency error + TT modulated carrier frequency error = □(0.1 ppm + 10 Hz).
5.4.1.1 Uplink Power Control, Initial accuracy	- □9dB normal conditions - □12dB extreme conditions	1.0 dB	Formula: Upper Tolerance limit + TT Lower Tolerance limit – TT Nominal expected TX power 10dB (normal conditions) □13dB (extreme conditions)
5.4.1.2 Uplink Power Control, differential accuracy	 SIR Target Pow Step Tol <1 dB 0.5 dB <2dB 1 dB <3 dB 1.5 dB <10 dB 2 dB <20dB 4 dB <30 dB 6 dB > 30 dB 9 dB	 TT 0.1 dB 0.15 dB 0.2 dB 0.5 dB 0.7 dB 0.7 dB 1.0 dB	Formula: Upper Tolerance limit + TT Lower Tolerance limit – TT
5.4.1.3 Open Loop Power Control	□9dB normal conditions □12dB extreme conditions	1.0 dB	Formula: Upper Tolerance limit + TT Lower Tolerance limit – TT Nominal expected TX power 10dB (normal conditions) □13dB (extreme conditions)
5.4.2 Minimum Transmit Power	UE minimum transmit power shall be less than –49 dBm	1.0 dB	Formula: UE minimum transmit power + TT UE minimum transmit power = –48 dBm

<table>
<tr><td>5.4.5 Out-of-synchronisation handling of output power</td><td colspan="2">$\frac{\Sigma DPCH\_E_c}{I_{or}}$ levels
before A –2.4 dB
AB: -10 dB
BD: -16 dB
DE: -12 dB
EF: -6 dB
transmit ON/OFF time
200ms</td><td>0,4 dB for $\frac{\Sigma DPCH\_E_c}{I_{or}}$
0 ms for timing measurement</td><td colspan="2">Formulas:
Ratio between A and B + TT
Ratio between B and D - TT
Ratio between D and E - TT
Ratio between E and F + TT
transmit ON/OFF time + TT timing

$\frac{\Sigma DPCH\_E_c}{I_{or}}$ levels:
Before A: -4.6
AB: -10 + 0,4 dB
BD: -16 – 0,4 dB
DE: -12 - 0,4 dB
EF: -6 + 0,4 dB
Uncertainty of OFF power measurement is handled by Transmit OFF power test and uncertainty of ON power measurement is handled by Minimum output power test.transmit ON/OFF time
200ms</td></tr>
<tr><td>5.5.1 Transmit OFF power</td><td colspan="2">Transmit OFF power shall be less than –65 dBm</td><td>1.5 dB</td><td colspan="2">Formula: Transmit OFF power + TT
Transmit OFF power = –63.5 dBm</td></tr>
<tr><td>5.5.1 Occupied Bandwidth</td><td colspan="2">The occupied channel bandwidth shall be less than 1.6 MHz based on a chip rate of 1.28 Mcps.</td><td>0 kHz</td><td colspan="2">Formula: occupied channel bandwitdh: + TT

occupied channel bandwidth = 1.6 MHz</td></tr>
<tr><td>5.5.2.1 Spectrum emission mask</td><td colspan="2">Minimum requirement defined in TS25.102 table 6.5A.
The lower limit shall be −55 dBm / 1.28 MHz or which ever is higher.</td><td>1.5 dB</td><td colspan="2">Formula: Minimum requirement + TT
Lower limit + TT
Add 1.5 to Minimum requirement entries in TS25.102 table 6.5A
The lower limit shall be −53.5 dBm / 1.28 MHz or which ever is higher.</td></tr>
<tr><td>5.5.2.2 Adjacent Channel Leakage Power Ratio (ACLR)</td><td colspan="2">Power Classes 2 and 3:
UE channel +1.6 MHz or -1.6MHz, ACLR limit: 33 dB
UE channel +3.2 MHz or -3.2 MHz, ACLR limit: 43 dB</td><td>0.8 dB</td><td colspan="2">Formula: ACLR limit - TT
Power Classes 2 and 3:
UE channel +1.6 MHz or -1.6 MHz, ACLR limit: 32.2 dB
UE channel +3.2 MHz or -3.2 MHz, ACLR limit: 42.2 dB</td></tr>
<tr><td rowspan="8">5.5.3 Spurious Emissions</td><td colspan="2"></td><td></td><td colspan="2">Formula: Minimum Requirement+ TT
Add zero to all the values of Minimum Requirements in table 5.5.3</td></tr>
<tr><td>Frequency Band</td><td>Minimum Requirement</td><td></td><td>Frequency Band</td><td>Minimum Requirement</td></tr>
<tr><td>9 kHz ≤ f < 150 kHz</td><td>−36dBm /1kHz</td><td>0 dB</td><td>9kHz ≤ f < 1GHz</td><td>−36dBm /1kHz</td></tr>
<tr><td>150 kHz ≤ f < 30 MHz</td><td>−36dBm /10kHz</td><td>0 dB</td><td>150 kHz ≤ f < 30 MHz</td><td>−36dBm /10kHz</td></tr>
<tr><td>30 MHz ≤ f < 1000 MHz</td><td>−36dBm /100kHz</td><td>0 dB</td><td>30 MHz ≤ f < 1000 MHz</td><td>−36dBm /100kHz</td></tr>
<tr><td rowspan="3">1 GHz ≤ f < 12.75 GHz</td><td rowspan="3">−30dBm /1MHz</td><td>0 dB</td><td>1 GHz ≤ f < 2.2 GHz</td><td>−30dBm /1MHz</td></tr>
<tr><td>0 dB</td><td>2.2 GHz ≤ f < 4 GHz</td><td>−30dBm /1MHz</td></tr>
<tr><td>0 dB</td><td>4 GHz ≤ f < 12.75 GHz</td><td>−30dBm /1MHz</td></tr>
</table>

	925 MHz < f < 935 MHz	−67dBm /100kHz	0 dB	925 MHz < f < 935 MHz	−67dBm /100kHz
	935 MHz ≤ f ≤ 960 MHz	−79dBm /100kHz	0 dB	935 MHz ≤ f ≤ 960 MHz	−79dBm /100kHz
	1805 MHz < f ≤ 1880 MHz	−71dBm /100kHz	0 dB	1805 MHz < f ≤ 1880 MHz	−71dBm /100kHz
	1884.5 MHz ≤ f ≤ 1919.6 MHz	−41dBm* /300kHz	0 dB	1884.5 MHz ≤ f ≤ 1919.6 MHz	−41dBm* /300kHz
5.6 Transmit Intermodulation	Intermodulation Product 1.6MHz -31 dBc 3.2MHz -41 dBc		0 dB	Formula: Intermodulation Product + TT Intermodulation Product 1.6MHz -31 dBc 3.2MHz -41 dBc	
5.7.1 Error Vector Magnitude	The Error Vector Magnitude shall not exceed 17.5 %		0%	Formula: EVM limit + TT EVM limit = 17.5 %	
5.7.2 Peak code domain error	The peak code domain error shall not exceed -21dB		1.0 dB	Formula: Peak code domain error + TT Peak code domain error = -20 dB	

F.4.2.2 Receiver

Table F.4.2.2: Derivation of Receiver Test Requirements

Test	Minimum Requirement in TS 25.102	Test Tolerance (TT)	Test Requirement in TS 34.122
6.2 Reference sensitivity level	Îor = -108 dBm / 1.28 MHz BER limit = 0.001	0.7 dB	Formula: Îor+ T BER limit unchanged Îor = -107.3 dBm / 1.28MHz
6.4 Adjacent Channel Selectivity	Îor = -91 dBm / 1.28 MHz Ioac (modulated) = -54 dBm/1.28 MHz BER limit = 0.001	0 dB	Formula: Îor unchanged Ioac - TT BER limit unchanged Ioac = -54 dBm/1.28MHz
6.5 Blocking Characteristics	See table 6.5.2a and 6.5.2b. in TS34.122 BER limit = 0.001	0 dB	Formula: $I_{blocking}$ (modulated) - TT (dBm/1.28MHz) $I_{blocking}$ (CW) - TT (dBm) BER limit unchanged
6.6 Spurious Response	Iblocking(CW) –44 dBm Fuw: Spurious response frequencies BER limit = 0.001	0 dB	Formula: $I_{blocking}$ (CW) - TT (dBm) Fuw unchanged BER limit unchanged Iblocking(CW) -44 dBm
6.7 Intermodulation Characteristics	Iouw1 (CW) -46 dBm Iouw2 (modulated) –46 dBm / 1.28 MHz Fuw1 (offset) 3.2MHz Fuw2 (offset) 6.4 MHz BER limit = 0.001	0 dB	Formula: TBD BER limit unchanged.
6.8 Spurious Emissions			Formula: Maximum level+ TT Add zero to all the values of Maximum Level in table 6.8.1.
	Frequency Band: Maximum level		Frequency Band: Maximum level
	9kHz ≤ f < 1GHz: -57dBm /100kHz	0 dB	9kHz ≤ f < 1GHz: -57dBm /100kHz
	1.9-1.92 GHz 2.01-2.025GHz 2.11-2.170GHz: -60 dBm / 3,84MHz	0 dB	1.9-1.92 GHz 2.01-2.025GHz 2.11-2.170GHz: -60 dBm / 3,84MHz
	1 –1.9GHz, 1.92–2.01 GHz 2.025–2.11GHz: -47 dBm/1MHz	0 dB	1 –1.9GHz, 1.92–2.01 GHz 2.025–2.11GHz: -47 dBm/1MHz
	1GHz ≤ f ≤ 12.75GHz: -47dBm /1MHz	0 dB	1GHz ≤ f ≤ 2.2GHz: -47dBm /1MHz
		0 dB	2.2GHz < f ≤ 4GHz: -47dBm /1MHz
		0 dB	4GHz < f ≤ 12.75GHz: -47dBm /1MHz
7.6 Downlink Power Control	(TS #1,9 / TS #7,14) 1st frame: 15 ±4.0 dBm / 5 ±0.5 dBm 2nd frame: 15 ±4.0 dBm / 15 ±4.0 dBm	0.5 dB for 10 dB change in output power, 0 otherwise.	Formula for 10 dB change in transmit power: Upper Tolerance limit + TT Lower Tolerance limit – TT

F.4.2.3 Performance requirement

Table F.4.2.3: Derivation of Performance Test Requirements

Test	Minimum Requirement in TS 25.102	Test Tolerance (TT)	Test Requirement in TS 34.122
7.2 Demodulation in Static Propagation Condition	$\hat{I}_{or}/I_{oc}$ =2.4 to 3.6dB I_{oc} = -60 dBm/1.28MHz	0.3 dB for $\hat{I}_{or}/I_{oc}$	Formulas: $\hat{I}_{or}/I_{oc}$ = Minimum Requirement + TT I_{oc} unchanged $\hat{I}_{or}/I_{oc}$ =2.7 to 3.9 dB
7.3.1 Demodulation of DCH in Multiplath Fading case 1	$\hat{I}_{or}/I_{oc}$ =15.8 to 23.9dB I_{oc} = -60 dBm/1.28MHz	0.6 dB for $\hat{I}_{or}/I_{oc}$	Formulas: $\hat{I}_{or}/I_{oc}$ = Minimum Requirement + TT I_{oc} unchanged $\hat{I}_{or}/I_{oc}$ =16.4 to 24.5 dB
7.3.2 Demodulation of DCH in Multiplath Fading case 2	$\hat{I}_{or}/I_{oc}$ =9.8 to 14.4dB I_{oc} = -60 dBm/1.28MHz	0.6 dB for $\hat{I}_{or}/I_{oc}$	Formulas: $\hat{I}_{or}/I_{oc}$ = Minimum Requirement + TT I_{oc} unchanged $\hat{I}_{or}/I_{oc}$ =10.4 to 15 dB
7.3.3 Demodulation of DCH in Multiplath Fading case 3	$\hat{I}_{or}/I_{oc}$ =9.0 to 14.3dB I_{oc} = -60 dBm/1.28MHz	0.6 dB for $\hat{I}_{or}/I_{oc}$	Formulas: $\hat{I}_{or}/I_{oc}$ = Minimum Requirement + TT I_{oc} unchanged $\hat{I}_{or}/I_{oc}$ =9.6 to 14.9 dB
7.3A Demodulation of DCH in high speed train conditions	$\hat{I}_{or}/I_{oc}$ =6.2 to 8.5dB I_{oc} = -60 dBm/1.28MHz	0.6 dB for $\hat{I}_{or}/I_{oc}$	Formulas: $\hat{I}_{or}/I_{oc}$ = Minimum Requirement + TT I_{oc} unchanged $\hat{I}_{or}/I_{oc}$ =6.8 to 9.1 dB
7.6 Downlink Power Control	| TS #1,9 | TS #7,14 1st frame | 15 ±4.0 dBm | 5 ±0.5 dBm 2nd frame | 15 ±4.0 dBm | 15 ±4.0 dBm	0.5 dB for 10 dB change in output power, 0 otherwise.	Formula for 10 dB change in transmit power: Upper Tolerance limit + TT Lower Tolerance limit – TT

F.4.2.4 Performance of HSDPA

Table F.4.2.4: Derivation of Performance of HSDPA Test Requirements

Test	Minimum Requirement in TS 25.102	Test Tolerance (TT)	Test Requirement in TS 34.122
9.3.1 HS-DSCH throughput for Fixed Reference Channels	$\frac{E_c}{I_{or}}$ -10,-9.5 dB I_{oc} = -60 dBm $\hat{I}_{or}/I_{oc}$ = 10 dB	0.1 dB for $\frac{E_c}{I_{or}}$ 0.6 dB for $\hat{I}_{or}/I_{oc}$	Formulas: $\frac{E_c}{I_{or}}$ = ratio + TT $\hat{I}_{or}/I_{oc}$ = ratio + TT I_{oc} unchanged
9.3.2 HS-DSCH throughput for Variable Reference Channels	$\frac{E_c}{I_{or}}$ -10dB I_{oc} = -60 dBm $\hat{I}_{or}/I_{oc}$ = 8 and 10 dB	0.1 dB for $\frac{E_c}{I_{or}}$ 0.6 dB for $\hat{I}_{or}/I_{oc}$	Formulas: $\frac{E_c}{I_{or}}$ = ratio + TT $\hat{I}_{or}/I_{oc}$ = ratio + TT I_{oc} unchanged
9.3.3 Reporting of HS-DSCH Channel Quality Indicator		No test tolerances applied	
9.3.4 HS-SCCH Detection Performance	$\frac{E_c}{I_{or}}$ -10dB I_{oc} = -60 dBm $\hat{I}_{or}/I_{oc}$ = 12 and 16 dB	0.1 dB for $\frac{E_c}{I_{or}}$ 0.6 dB for $\hat{I}_{or}/I_{oc}$	Formulas: $\frac{E_c}{I_{or}}$ = ratio + TT $\hat{I}_{or}/I_{oc}$ = ratio + TT I_{oc} unchanged

F.4.2.5 Measurement of RRM requirements

Table F.4.2.5: Derivation of RRM Test Requirements

Test	Minimum Requirement in TS 25.123	Test Tolerance (TT)	Test Requirement in TS 34.122
8.2.2.6.1 UTRA to E-UTRA TDD cell reselection: E-UTRA is of higher priority	During T1: UTRA Cell 1 I_{oc}: -80dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: +11.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -98dBm/15kHz $\hat{E}_S / N_{oc}$: -infinity During T2: UTRA Cell 1 I_{oc}: -80dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: +11.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -98dBm /15kHz $\hat{E}_S / N_{oc}$: +11.00dB During T3: UTRA Cell 1 I_{oc}: -80dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: +11.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -98dBm/15kHz $\hat{E}_S / N_{oc}$: -3.00dB	During T1: 0dB 0dB 0dB 0dB 0dB 0dB During T2: 0dB 0dB 0dB 0dB 0dB 0dB During T3: 0dB 0dB 0dB 0dB 0dB 0dB	During T1: I_{oc}: -80.0dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: +11.0dB PCCPCH_E_c/I_{or}: -3dB DwPCH_E_c/I_{or}: 0dB N_{oc}: -98.0dBm/15kHz $\hat{E}_S / N_{oc}$: -infinity During T2: I_{oc}: -80.0dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: +11.0dB PCCPCH_E_c/I_{or}: -3dB DwPCH_E_c/I_{or}: 0dB N_{oc}: -98.0dBm /15kHz $\hat{E}_S / N_{oc}$: +11.0dB During T3: I_{oc}: -80.0dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: +11.0dB PCCPCH_E_c/I_{or}: -3dB DwPCH_E_c/I_{or}: 0dB N_{oc}: -98.0dBm/15kHz $\hat{E}_S / N_{oc}$: -3.0dB
8.2.2.6.2 UTRA to E-UTRA TDD cell reselection: E-UTRA is of lower priority	During T1: UTRA Cell 1 I_{oc}: -80dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: +11.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -98dBm/15kHz $\hat{E}_S / N_{oc}$: +11.00dB During T2: UTRA Cell 1 I_{oc}: -80dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: -3.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -98dBm /15kHz $\hat{E}_S / N_{oc}$: +11.00dB	During T1: 0dB 0dB 0dB 0dB 0dB 0dB During T2: 0dB 0dB 0dB 0dB 0dB 0dB	During T1: I_{oc}: -80.0dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: +11.0dB PCCPCH_E_c/I_{or}: -3dB DwPCH_E_c/I_{or}: 0dB N_{oc}: -98.0dBm/15kHz $\hat{E}_S / N_{oc}$: +11.0dB During T2: I_{oc}: -80.0dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: -3.0dB PCCPCH_E_c/I_{or}: -3dB DwPCH_E_c/I_{or}: 0dB N_{oc}: -98.0dBm /15kHz $\hat{E}_S / N_{oc}$: +11.0dB

8.3.3a UTRA TDD to E-UTRA FDD Handover	During T1: UTRA Cell 1 I_{oc}: -80 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +11.00 dB PCCPCH_E_C/I_{or}: -3 dB DwPCH_E_C/I_{or}: 0 dB E-UTRA Cell 2 N_{oc}: -98 dBm/15kHz $\hat{E}_S$ / N_{oc}: -3.00 dB During T2: UTRA Cell 1 I_{oc}: -80 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: -3.00 dB PCCPCH_E_C/I_{or}: -3 dB DwPCH_E_C/I_{or}: 0 dB E-UTRA Cell 2 N_{oc}: -98 dBm /15kHz $\hat{E}_S$ / N_{oc}: +13.00 dB During T3: UTRA Cell 1 I_{oc}: -80 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: -3.00 dB PCCPCH_E_C/I_{or}: -3 dB DwPCH_E_C/I_{or}: 0 dB E-UTRA Cell 2 N_{oc}: -98 dBm /15kHz $\hat{E}_S$ / N_{oc}: +13.00 dB	During T1: -0.8 dB 1.6 dB 0 dB 0 dB -0.8 dB 0 dB During T2: -0.8 dB 0 dB 0 dB 0 dB -0.8 dB 1.6 dB During T3: -0.8 dB 0 dB 0 dB 0 dB -0.8 dB 1.6 dB	During T1: I_{oc}: -80.8 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +12.6 dB PCCPCH_E_c/I_{or}: -3 dB DwPCH_E_c/I_{or}: 0 dB N_{oc}: -98.8 dBm/15kHz $\hat{E}_S$ / N_{oc}: -3.0 dB During T2: I_{oc}: -80.8 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: -3.0 dB PCCPCH_E_c/I_{or}: -3 dB DwPCH_E_c/I_{or}: 0 dB N_{oc}: -98.8 dBm /15kHz $\hat{E}_S$ / N_{oc}: +14.6 dB During T3: I_{oc}: -80.8 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: -3.0 dB PCCPCH_E_c/I_{or}: -3 dB DwPCH_E_c/I_{or}: 0 dB N_{oc}: -98.8 dBm /15kHz $\hat{E}_S$ / N_{oc}: +14.6 dB
8.3.3b UTRA TDD to E-UTRA TDD Handover	Same as 8.3.3a	Same as 8.3.3a	Same as 8.3.3a
8.3.3c UTRA TDD to E-UTRA FDD Handover: unknown target cell	During T1: UTRA Cell 1 I_{oc}: -80 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +4 dB PCCPCH_E_C/I_{or}: -3 dB DwPCH_E_C/I_{or}: 0 dB E-UTRA Cell 2 N_{oc}: -98 dBm/15kHz $\hat{E}_S$ / N_{oc}: -infinity dB During T2: UTRA Cell 1 I_{oc}: -80 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +4 dB PCCPCH_E_C/I_{or}: -3 dB DwPCH_E_C/I_{or}: 0 dB E-UTRA Cell 2 N_{oc}: -98 dBm /15kHz $\hat{E}_S$ / N_{oc}: 0 dB	During T1: 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB During T2: 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB	During T1: I_{oc}: -80.00 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +4.00 dB PCCPCH_E_c/I_{or}: -3 dB DwPCH_E_c/I_{or}: 0 dB N_{oc}: -98.00 dBm/15kHz $\hat{E}_S$ / N_{oc}: -infinty dB During T2: I_{oc}: -80.00 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +4.00 dB PCCPCH_E_c/I_{or}: -3 dB DwPCH_E_c/I_{or}: 0 dB N_{oc}: -98.00 dBm /15kHz $\hat{E}_S$ / N_{oc}: 0 dB
8.3.3d UTRA TDD to E-UTRA TDD Handover: unknown target cell	Same as 8.3.3c	Same as 8.3.3c	Same as 8.3.3c
8.3.3e TDD/GSM Handover: non-synchronization target cell	UTRA Cell 1 I_{oc}: -70 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +5 dB PCCPCH_E_C/I_{or}: -3 dB DwPCH_E_C/I_{or}: 0 dB GSM Cell 2 during T2 RXLEV -75dBm	 0 dB 0 dB 0 dB 0 dB 0 dB	UTRA Cell 1 I_{oc}: -70 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +5 dB PCCPCH_E_C/I_{or}: -3 dB DwPCH_E_C/I_{or}: 0 dB GSM Cell 2 during T2 RXLEV -75dBm

8.6.5.1 UTRA TDD to E-UTRA FDD cell search under fading propagation conditions	During T1: UTRA Cell 1 I_{oc}: -70 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +3.00 dB PCCPCH_E_C/I_{or}: -3 dB DwPCH_E_C/I_{or}: 0 dB E-UTRA Cell 2 N_{oc}: -98 dBm/15kHz $\hat{E}_S$ / N_{oc}: -infinite dB During T2: UTRA Cell 1 I_{oc}: -70 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: -3.00 dB PCCPCH_E_C/I_{or}: -3 dB DwPCH_E_C/I_{or}: 0 dB E-UTRA Cell 2 N_{oc}: -98 dBm /15kHz $\hat{E}_S$ / N_{oc}: +9.00 dB	During T1: 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB During T2: 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB	During T1: I_{oc}: -70.0 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +3 dB PCCPCH_E_c/I_{or}: -3 dB DwPCH_E_c/I_{or}: 0 dB N_{oc}: -98.0 dBm/15kHz $\hat{E}_S$ / N_{oc}: -infinite dB During T2: I_{oc}: -70.0 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: -3.0 dB PCCPCH_E_c/I_{or}: -3 dB DwPCH_E_c/I_{or}: 0 dB N_{oc}: -98.0 dBm /15kHz $\hat{E}_S$ / N_{oc}: +9.00 dB
8.6.5.2 UTRA TDD to E-UTRA TDD cell search under fading propagation conditions	Same as 8.6.5.1	Same as 8.6.5.1	Same as 8.6.5.1
8.6.5.3 Combined UTRA TDD inter-frequency and E-UTRA FDD cell search under fading propagation conditions	During T1: UTRA Cell 1 I_{oc}: -80 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +4.00 dB PCCPCH_E_C/I_{or}: -3 dB DwPCH_E_C/I_{or}: 0 dB UTRA Cell 2 I_{oc}: -80 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: -infinite dB E-UTRA Cell 3 N_{oc}: -98 dBm/15kHz $\hat{E}_S$ / N_{oc}: -infinite dB During T2: UTRA Cell 1 I_{oc}: -80 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +4.00 dB PCCPCH_E_C/I_{or}: -3 dB DwPCH_E_C/I_{or}: 0 dB UTRA Cell 2 I_{oc}: -80 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: 12.00 dB PCCPCH_E_C/I_{or}: -3 dB DwPCH_E_C/I_{or}: 0 dB E-UTRA Cell 3 N_{oc}: -98 dBm /15kHz $\hat{E}_S$ / N_{oc}: +9.00 dB	During T1: 0 dB -0.8 dB 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB During T2: 0 dB -0.8 dB 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB	During T1: I_{oc}: -80.00 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +3.20 dB PCCPCH_E_c/I_{or}: -3 dB DwPCH_E_c/I_{or}: 0 dB I_{oc}: -80.00 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: -infinite dB N_{oc}: -98.0 dBm/15kHz $\hat{E}_S$ / N_{oc}: -infinite dB During T2: I_{oc}: -80.00 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +3.20 dB PCCPCH_E_c/I_{or}: -3 dB DwPCH_E_c/I_{or}: 0 dB I_{oc}: -80.00 dBm/1.28MHz $\hat{I}_{or}$ / I_{oc}: +12.00 dB PCCPCH_E_c/I_{or}: -3 dB DwPCH_E_c/I_{or}: 0 dB N_{oc}: -98.0 dBm /15kHz $\hat{E}_S$ / N_{oc}: +9.00 dB
8.6.5.4 Combined UTRA TDD inter-frequency and E-UTRA TDD cell search under fading propagation conditions	Same as 8.6.5.3	Same as 8.6.5.3	Same as 8.6.5.3

8.7.14 E-UTRAN FDD RSRP	Test 1: UTRA Cell 1 I_{oc}: -75dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: +3.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -88.65dBm /15kHz $\hat{E}_S / N_{oc}$: +10dB Reported RSRP values: ±8dB Test 2: UTRA Cell 1 I_{oc}: -75dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: +3.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -117dBm or -115dBm or -113.5 or -114dBm or -116dBm /15kHz depending on operating band $\hat{E}s / N_{oc}$: -4.00dB Reported RSRP values: ±6dB	Test 1: 0dB 0dB 0dB 0dB -0.30dB 0dB Via mapping Test 2: 0dB 0dB 0dB 0dB 0dB +0.80dB Via mapping	Test 1: UTRA Cell 1 I_{oc}: -75dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: +3.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -88.95dBm /15kHz $\hat{E}_S / N_{oc}$: +10dB RSRP_52 to RSRP_71 Test 2: UTRA Cell 1 I_{oc}: -75dBm/1.28MHz $\hat{I}_{or} / I_{oc}$: +3.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -117dBm or -115dBm or -113.5 or -114dBm or -116dBm /15kHz depending on operating band $\hat{E}s / N_{oc}$: -3.20dB RSRP_13 to RSRP_28 RSRP_15 to RSRP_30 RSRP_17 to RSRP_31 RSRP_16 to RSRP_31 RSRP_14 to RSRP_29 depending on operating band
	The derivation of the RSRP values takes into account the uncertainty in Cell 2 RSRP from N_{oc} and $\hat{E}s / N_{oc}$, the allowed UE reporting accuracy, and the UE mapping function. The RSRP values given above are for normal conditions. In all cases the RSRP values are 3dB wider at each end for extreme conditions.		
8.7.15 E-UTRAN TDD RSRP	Same as 8.7.14	Same as 8.7.14	Same as 8.7.14

8.7.16 E-UTRAN FDD RSRQ	Test 1: UTRA Cell 1 I_{oc}: -75dBm/1.28MHz $\hat{I}_{or}$ /I_{oc}: +3.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -80.00dBm /15kHz $\hat{E}_S/N_{oc}$: -1.75dB Reported RSRQ values: ±2.5dB Test 2: UTRA Cell 1 I_{oc}: -75dBm/1.28MHz $\hat{I}_{or}/I_{oc}$: +3.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -104.70dBm /15kHz Ês / N_{oc}: -4.00dB Reported RSRQ values: ±3.5dB Test 3: UTRA Cell 1 I_{oc}: -75dBm/1.28MHz $\hat{I}_{or}/I_{oc}$: +3.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -119.5dBm or -118.5dBm or -117.5 or -116.5dBm or -116dBm /15kHz depending on operating band Ês/N_{oc}: -4.00dB Reported RSRP values: ±3.5dB	Test 1: 0dB 0dB 0dB 0dB -0.80dB 0dB Via mapping Test 2: 0dB 0dB 0dB 0dB 0dB +0.80dB Via mapping Test 3: 0dB 0dB 0dB 0dB 0dB +0.80dB Via mapping	Test 1: UTRA Cell 1 I_{oc}: -75dBm/1.28MHz $\hat{I}_{or}/I_{oc}$: +3.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -80.80dBm /15kHz $\hat{E}_S/N_{oc}$: -1.75dB RSRQ_04 to RSRQ_16 Test 2: UTRA Cell 1 I_{oc}: -75dBm/1.28MHz $\hat{I}_{or}/I_{oc}$: +3.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -104.70dBm /15kHz Ês / N_{oc}: -3.20dB RSRQ_00 to RSRQ_16 Test 3: UTRA Cell 1 I_{oc}: -75dBm/1.28MHz $\hat{I}_{or}/I_{oc}$: +3.00dB PCCPCH_E_C/I_{or}: -3dB DwPCH_E_C/I_{or}: 0dB E-UTRA Cell 2 N_{oc}: -119.5dBm or -118.5dBm or -117.5 or -116.5dBm or -116dBm /15kHz depending on operating band Ês/N_{oc}: -3.20dB RSRQ_00 to RSRQ_16
	The derivation of the RSRQ values takes into account the uncertainty in Cell 2 RSRQ from N_{oc} and Ês / N_{oc}, the allowed UE reporting accuracy, and the UE mapping function. The RSRQ values given above are for normal conditions. In Test 1 the RSRQ values are 1.5dB wider at each end and in Test 2 and 3 the RSRQ values are 0.5dB wider at each end for extreme conditions.		
8.7.17 E-UTRAN TDD RSRQ	Same as 8.7.16	Same as 8.7.16	Same as 8.7.16

F.4.2.6 Performance requirements (Multiple-cell)

Table F.4.2.6: Derivation of Performance of Multiple-cell Test Requirements

Test	Minimum Requirement in TS 25.102	Test Tolerance (TT)	Test Requirement in TS 34.122
12.2 Demodulation of DCH in static propagation conditions	$\hat{I}_{or1}/I_{oc}$ =-0.3 to 12.9 dB I_{oc} = -80 dBm/1.28MHz	0.6 dB for $\hat{I}_{or1}/I_{oc}$	Formulas: $\hat{I}_{or1}/I_{oc}$ = Minimum Requirement + TT I_{oc} unchanged $\hat{I}_{or1}/I_{oc}$ = 0.3 to 13.5 dB
12.3 Demodulation of DCH in Multipath fading Case 1 conditions	$\hat{I}_{or1}/I_{oc}$ =11.8 to 21.1 dB I_{oc} = -80 dBm/1.28MHz	1.2 dB for $\hat{I}_{or1}/I_{oc}$	Formulas: $\hat{I}_{or1}/I_{oc}$ = Minimum Requirement + TT I_{oc} unchanged $\hat{I}_{or1}/I_{oc}$ = 13.0 to 22.3 dB
12.4 Demodulation of DCH in Multipath fading Case 3 conditions	$\hat{I}_{or1}/I_{oc}$ =6.5 to 17.0 dB I_{oc} = -80 dBm/1.28MHz	1.2 dB for $\hat{I}_{or1}/I_{oc}$	Formulas: $\hat{I}_{or1}/I_{oc}$ = Minimum Requirement + TT I_{oc} unchanged $\hat{I}_{or1}/I_{oc}$ = 7.7 to 18.2 dB

F.4.3 7.68Mcps TDD Option

Table F.4.3: Derivation of Test Requirements

Test	Minimum Requirement in TS 25.102	Test Tolerance (TT)	Test Requirement in TS 34.122
5.2 Maximum Output Power	Power single code Power class 1 (30 dBm) Tolerance = +1/-3 dB Power class 2 (24 dBm) Tolerance = +1/-3 dB Power class 3 (21 dBm) Tolerance = +2/-2 dB Power multi code Power class 2 (21 dBm) Tolerance = +1/-3 dB Power class 3 (18 dBm) Tolerance = ±2 dB Power class 4 (10 dBm) Tolerance = ± 4 dB	0.7 dB	Formula: Upper Tolerance limit + TT Lower Tolerance limit – TT For power classes 1 and 2 (single and multi): Upper Tolerance limit = +1.7 dB Lower Tolerance limit = -3.7 dB For power class 3 (single and milti): Upper Tolerance limit = +2.7 dB Lower Tolerance limit = -2.7 dB For power class 4 (single and multi) Upper Tolerance limit = +4.7 dB Lower Tolerance limit = -4.7 dB
5.3 UE Frequency Stability	The UE modulated carrier frequency shall be accurate to within 0.1 ppm compared to the carrier frequency received from the Node B.	10 Hz	Formula: modulated carrier frequency error + TT modulated carrier frequency error = (0.1 ppm + 10 Hz).
5.4.1.1 Uplink Power Control, Initial accuracy	- □9dB normal conditions - □12dB extreme conditions	1.0 dB	Formula: Upper Tolerance limit + TT Lower Tolerance limit – TT Nominal expected TX power - □10dB (normal conditions) - □13dB (extreme conditions)
5.4.1.2 Uplink Power Control, differential accuracy	SIR Target Pow Step Tol <1 dB 0.5 dB <2dB 1 dB <3 dB 1.5 dB <10 dB 2 dB <20dB 4 dB <30 dB 6 dB > 30 dB 9 dB	TT 0.1 dB 0.15 dB 0.2 dB 0.5 dB 0.7 dB 0.7 dB 1.0 dB	Formula: Upper Tolerance limit + TT Lower Tolerance limit – TT
5.4.1.3 Open Loop Power Control	- 9dB normal conditions - 12dB extreme conditions	1.0 dB	Formula: Upper Tolerance limit + TT Lower Tolerance limit – TT Nominal expected TX power: 10dB (normal conditions) □13dB (extreme conditions)
5.4.2 Minimum Transmit Power	UE minimum transmit power shall be less than –44 dBm	1.0 dB	Formula: UE minimum transmit power + TT UE minimum transmit power = –43 dBm

<table>
<tr><td>5.4.5 Out-of-synchronisation handling of output power</td><td colspan="2">$\frac{\Sigma DPCH\_E_c}{I_{or}}$ levels
before A –4.6 dB
AB: -10 dB
BD: -16 dB
DE: -12 dB
EF: -6 dB
transmit ON/OFF time
200ms</td><td>0,4 dB for $\frac{\Sigma DPCH\_E_c}{I_{or}}$
0 ms for timing measurement</td><td colspan="2">Formulas:
Ratio between A and B + TT
Ratio between B and D - TT
Ratio between D and E - TT
Ratio between E and F + TT
transmit ON/OFF time + TT timing

$\frac{\Sigma DPCH\_E_c}{I_{or}}$ levels:
Before A: -4.6
AB: -10 + 0,4 dB
BD: -16 – 0,4 dB
DE: -12 - 0,4 dB
EF: -6 + 0,4 dB
Uncertainty of OFF power measurement is handled by Transmit OFF power test and uncertainty of ON power measurement is handled by Minimum output power test.transmit ON/OFF time
200ms</td></tr>
<tr><td>5.5.1 Transmit OFF power</td><td colspan="2">Transmit OFF power shall be less than –65 dBm</td><td>1.5 dB</td><td colspan="2">Formula: Transmit OFF power + TT
Transmit OFF power = –63.5 dBm</td></tr>
<tr><td>5.5.1 Occupied Bandwidth</td><td colspan="2">The occupied channel bandwidth shall be less than 5 MHz based on a chip rate of 3,84 Mcps.</td><td>0 kHz</td><td colspan="2">Formula: occupied channel bandwitdh: + TT

occupied channel bandwidth = 5.0 MHz</td></tr>
<tr><td>5.5.2.1 Spectrum emission mask</td><td colspan="2">Minimum requirement defined in TS25.101 table 6.10.
The lower limit shall be −50 dBm / 3,84 MHz or which ever is higher.</td><td>1.5 dB</td><td colspan="2">Formula: Minimum requirement + TT
Lower limit + TT
Add 1.5 to Minimum requirement entries in TS25.101 table 6.10
The lower limit shall be −48.5 dBm / 3,84 MHz or which ever is higher.</td></tr>
<tr><td>5.5.2.2 Adjacent Channel Leakage Power Ratio (ACLR)</td><td colspan="2">Power Classes 2 and 3:
UE channel +5 MHz or -5 MHz, ACLR limit: 33 dB
UE channel +10 MHz or -10 MHz, ACLR limit: 43 dB</td><td>0.8 dB</td><td colspan="2">Formula: ACLR limit - TT
Power Classes 2 and 3:
UE channel +5 MHz or -5 MHz, ACLR limit: 32.2 dB
UE channel +10 MHz or -10 MHz, ACLR limit: 42.2 dB</td></tr>
<tr><td rowspan="8">5.5.3 Spurious Emissions</td><td colspan="2"></td><td></td><td colspan="2">Formula: Minimum Requirement+ TT
Add zero to all the values of Minimum Requirements in table 5.5.3</td></tr>
<tr><td>Frequency Band</td><td>Minimum Requirement</td><td></td><td>Frequency Band</td><td>Minimum Requirement</td></tr>
<tr><td>9 kHz ≤ f < 150 kHz</td><td>−36dBm /1kHz</td><td>0 dB</td><td>9kHz ≤ f < 1GHz</td><td>−36dBm /1kHz</td></tr>
<tr><td>150 kHz ≤ f < 30 MHz</td><td>−36dBm /10kHz</td><td>0 dB</td><td>150 kHz ≤ f < 30 MHz</td><td>−36dBm /10kHz</td></tr>
<tr><td>30 MHz ≤ f < 1000 MHz</td><td>−36dBm /100kHz</td><td>0 dB</td><td>30 MHz ≤ f < 1000 MHz</td><td>−36dBm /100kHz</td></tr>
<tr><td rowspan="3">1 GHz ≤ f < 12.75 GHz</td><td rowspan="3">−30dBm /1MHz</td><td>0 dB</td><td>1 GHz ≤ f < 2.2 GHz</td><td>−30dBm /1MHz</td></tr>
<tr><td>0 dB</td><td>2.2 GHz ≤ f < 4 GHz</td><td>−30dBm /1MHz</td></tr>
<tr><td>0 dB</td><td>4 GHz ≤ f < 12.75 GHz</td><td>−30dBm /1MHz</td></tr>
</table>

	925 MHz < f < 935 MHz	–67dBm /100kHz	0 dB	925 MHz < f < 935 MHz	–67dBm /100kHz
	935 MHz ≤ f ≤ 960 MHz	–79dBm /100kHz	0 dB	935 MHz ≤ f ≤ 960 MHz	–79dBm /100kHz
	1805 MHz < f ≤ 1880 MHz	–71dBm /100kHz	0 dB	1805 MHz < f ≤ 1880 MHz	–71dBm /100kHz
	1884.5 MHz ≤ f ≤ 1919.6 MHz	–41dBm* /300kHz	0 dB	1884.5 MHz ≤ f ≤ 1919.6 MHz	–41dBm* /300kHz
5.6 Transmit Intermodulation	Intermodulation Product 5MHz -31 dBc 10MHz -41 dBc		0 dB	Formula: Intermodulation Product + TT Intermodulation Product 5MHz -31 dBc 10MHz -41 dBc	
5.7.1 Error Vector Magnitude	The Error Vector Magnitude shall not exceed 17.5 %		0%	Formula: EVM limit + TT EVM limit = 17.5 %	
5.7.2 Peak code domain error	The peak code domain error shall not exceed -21dB		1.0 dB	Formula: Peak code domain error + TT Peak code domain error = -20 dB	
6.2 Reference sensitivity level	Îor = -105 dBm / 3,84 MHz BER limit = 0.001		0.7 dB	Formula: Îor+ T BER limit unchanged Îor = -104.3 dBm / 3,84 MHz	
6.4 Adjacent Channel Selectivity	Ior = -91 dBm / 3,84 MHz Ioac (modulated) = -52 dBm/3,84 MHz BER limit = 0.001		0 dB	Formula: Ior unchanged Ioac - TT BER limit unchanged Ioac = -52 dBm/3,84 MHz	
6.5 Blocking Characteristics	See table 6.5.2a and 6.5.2b. in TS34.122 BER limit = 0.001		0 dB	Formula: $I_{blocking}$ (modulated) - TT (dBm/3,84MHz) $I_{blocking}$ (CW) - TT (dBm) BER limit unchanged	
6.6 Spurious Response	Iblocking(CW) –44 dBm Fuw: Spurious response frequencies BER limit = 0.001		0 dB	Formula: $I_{blocking}$ (CW) - TT (dBm) Fuw unchanged BER limit unchanged Iblocking(CW) -44 dBm	
6.7 Intermodulation Characteristics	Iouw1 (CW) -46 dBm Iouw2 (modulated) –46 dBm / 3,84 MHz Fuw1 (offset) 10 MHz Fuw2 (offset) 20 MHz BER limit = 0.001		0 dB	Formula: TBD BER limit unchanged	
6.8 Spurious Emissions				Formula: Maximum level+ TT Add zero to all the values of Maximum Level in table 6.8.1.	
	Frequency Band	Maximum level		Frequency Band	Maximum level
	9kHz ≤ f < 1GHz	-57dBm /100kHz	0 dB	9kHz ≤ f < 1GHz	-57dBm /100kHz
	1.9-1.92 GHz 2.01-2.025GHz 2.11-2.170GHz	-60 dBm / 3,84MHz	0 dB	1.9-1.92 GHz 2.01-2.025GHz 2.11-2.170GHz	-60 dBm / 3,84MHz
	1 –1.9GHz, 1.92–2.01 GHz 2.025–2.11GHz	-47 dBm/1MHz	0 dB	1 –1.9GHz, 1.92–2.01 GHz 2.025–2.11GHz	-47 dBm/1MHz
	1GHz ≤ f ≤ 12.75GHz	-47dBm /1MHz	0 dB	1GHz ≤ f ≤ 2.2GHz	-47dBm /1MHz

				0 dB	2.2GHz < f ≤ 4GHz	-47dBm /1MHz
				0 dB	4GHz < f ≤ 12.75GHz	-47dBm /1MHz
7.6 Downlink Power Control		TS #1,9	TS #7,14	0.5 dB for 10 dB change in output power, 0 otherwise	Formula for 10 dB change in transmit power: Upper Tolerance limit + TT Lower Tolerance limit – TT	
	1st frame	15 ±4.0 dBm	5 ±0.5 dBm			
	2nd frame	15 ±4.0 dBm	15 ±4.0 dBm			
9.3.1 HS-DSCH throughput for Fixed Reference Channels	$\frac{E_c}{I_{or}}$ -10,-9.5 dB I_{oc} = -60 dBm $\hat{I}_{or}/I_{oc}$ = 10 dB			0.1 dB for $\frac{E_c}{I_{or}}$ 0.6 dB for $\hat{I}_{or}/I_{oc}$	Formulas: $\frac{E_c}{I_{or}}$ = ratio + TT $\hat{I}_{or}/I_{oc}$ = ratio + TT I_{oc} unchanged	
9.3.2 HS-DSCH throughput for Variable Reference Channels	$\frac{E_c}{I_{or}}$ -10dB I_{oc} = -60 dBm $\hat{I}_{or}/I_{oc}$ = 8 and 10 dB			0.1 dB for $\frac{E_c}{I_{or}}$ 0.6 dB for $\hat{I}_{or}/I_{oc}$	Formulas: $\frac{E_c}{I_{or}}$ = ratio + TT $\hat{I}_{or}/I_{oc}$ = ratio + TT I_{oc} unchanged	
9.3.3 Reporting of HS-DSCH Channel Quality Indicator				No test tolerances applied		
9.3.4 HS-SCCH Detection Performance	$\frac{E_c}{I_{or}}$ -10dB I_{oc} = -60 dBm $\hat{I}_{or}/I_{oc}$ = 12 and 16 dB			0.1 dB for $\frac{E_c}{I_{or}}$ 0.6 dB for $\hat{I}_{or}/I_{oc}$	Formulas: $\frac{E_c}{I_{or}}$ = ratio + TT $\hat{I}_{or}/I_{oc}$ = ratio + TT I_{oc} unchanged	
* Note: Applicable for transmission in 2010-2025 MHz as defined in subclause 4.2 (a).						

F.5 Acceptable uncertainty of Test Equipment (This clause is informative)

This informative clause specifies the critical parameters of the components of an overall Test System (e.g. Signal generators, Signal Analyzers etc.) which are necessary when assembling a Test System that complies with clause F.1 Acceptable Uncertainty of Test System. These Test Equipment parameters are fundamental to the accuracy of the overall Test System and are unlikely to be improved upon through System Calibration.

F.5.1 Transmitter measurements

Table F.5.1: Equipment accuracy for transmitter measurements

Test	Equipment accuracy	Test conditions
5.2 UE Maximum Output Power	Not applicable	
5.3 Frequency Stability	± 10Hz	
5.4.1 Uplink power control		
5.4.2 Minimum Transmit Power		
5.4.3 Transmit OFF Power		
5.4.4 Transmit ON/OFF Power		
5.4.5 Out-of-synchronisation handling of output power $\frac{DPCCH\_E_c}{I_{or}}$		
5.4.5 Out-of-synchronisation handling of output power: transmit ON/OFF time		
5.5.1 Occupied Bandwidth	100 kHz	
5.5.2.1 Spectrum emission mask	Not applicable	
5.5.2.2 ACLR		
5.5.3 Spurious emissions		
5.5.3 Spurious emissions: additional		
5.6 Transmit intermodulation:	Not applicable	
5.7.1 Transmit modulation: EVM	2.5 %	
5.7.2 Transmit modulation: peak code domain error	±[1 dB]	

F.5.2 Receiver measurements

Table F.5.2: Equipment accuracy for receiver measurements

Clause	Equipment accuracy	Test conditions
6.2 Reference Sensitivity Level	Not applicable	
6.3 maximum input level:	Not applicable	
6.4 Adjacent Channel Selectivity (ACS)	Not applicable	
6.5 Blocking Characteristics	Not applicable	
6.6 Spurious Responce	Not applicable	
6.7 Intermodulation Characteristics	Not applicable	
6.8 Spurious Emissions	Not applicable	

F.5.3 Performance measurements

Table G.3: Equipment accuracy for performance measurements

Clause	Equipment accuracy	Test conditions
TBD	TBD	

F.5.5 Performance measurements (HSDPA)

Table F.5.5: Equipment accuracy for performance measurements (HSDPA)

Clause	Equipment accuracy	Test conditions
9.3.1 HS-DSCH throughput for Fixed Reference Channels	$\frac{E_c}{I_{or}}$ ±0.1 dB	-10 and -9.5dB
9.3.2 HS-DSCH throughput for Variable Reference Channels	Same as 9.3.1	-10dB
9.3.3 Reporting of HS-DSCH Channel Quality Indicator	Same as 9.3.1	-10dB
9.3.4 HS-SCCH Detection Performance	Same as 9.3.1	-10dB

F.6 General rules for statistical testing

F.6.1 Statistical testing of receiver BER/BLER performance

F.6.1.1 Error Definition

1) Bit Error Ratio (BER)

   The Bit Error Ratio is defined as the ratio of the bits wrongly received to all data bits sent. The bits are the information bits above the convolutional/turbo decoder

2) Block Error Ratio (BLER)

   A Block Error Ratio is defined as the ratio of the number of erroneous blocks received to the total number of blocks sent. An erroneous block is defined as a Transport Block, the cyclic redundancy check (CRC) of which is wrong.

F.6.1.2 Test Method

Each test is performed in the following manner:

a) Setup the required test conditions.

b) Record the number of samples tested and the number of occurred events (bit error or block error)

c) Stop the test at a stop criterion which is minimum test time or an early pass or an early fail event.

d) Once the test is stopped decide according to the pass fail decision rules (subclause F.6.1.7)

F.6.1.3 Test Criteria

The test shall fulfil the following requirements:

a) good pass fail decision

   1) to keep reasonably low the probability (risk) of passing a bad unit for each individual test;

   2) to have high probability of passing a good unit for each individual test;

b) good balance between test time and statistical significance

   3) to perform measurements with a high degree of statistical significance;

   4) to keep the test time as low as possible.

F.6.1.4 Calculation assumptions

F.6.1.4.1 Statistical independence

It is assumed, that error events are rare (lim BER BLER → 0) independent statistical events. However the memory of the convolutional /turbo coder is terminated after one TTI. Samples and errors are summed up every TTI. So the assumption of independent error events is justified.

In the BLER test with fading there is the memory of the multipath fading channel which interferes the statistical independence. A minimum test time is introduced to average fluctuations of the multipath fading channel. So the assumption of independent error events is justified approximately.

F.6.1.4.2 Applied formulas

The formulas, applied to describe the BER BLER test, are primarily based on the following experiment:

(1) After having observed a certain number of errors (**ne**) the number of samples are counted to calculate BER BLER.

Provisions are made (note 1) such that the complementary experiment is valid as well:

(2) After a certain number of samples (**ns**) the number of errors, occurred, are counted to calculate BER BLER.

Experiment (1) stipulates to use the following Chi Square Distribution with degree of freedom ne: 2*dchisq(2*NE,2*ne) for all calculations.

Experiment (2) stipulates to use the Poisson Distribution: dpois(ne,NE)

(NE: average of the distribution)

To determine the early stop conditions, the following inverse cumulative operation is applied:

0.5 * qchisq(D,2*ne). This is applicable for experiment (1) and (2).

D: wrong decision risk per test step

NOTE: other inverse cumulative operations are available, however only this is suited for experiment (1) and (2).

F.6.1.4.3 Test procedure

The test procedure is as follows:

During a running measurement for a UE ns (number of samples) and ne (number of errors) are accumulated and from this the preliminary BER BLER is calculated. Then new samples up to the next error are taken. The entire past and the new samples are basis for the next preliminary BER BLER. Depending on the result at every step, the UE can pass, can fail or must continue the test.

As early pass- and early fail-UEs leave the statistical totality under consideration, the experimental conditions are changed every step resulting in a distribution that is truncated more and more towards the end of the entire test. Such a distribution can not any more be handled analytically. The unchanged distribution is used as an approximation to calculate the early fail and early pass bounds.

F.6.1.5 Definition of good pass fail decision

This is defined by the probability of wrong decision F at the end of the test. The probability of a correct decision is 1-F.

The probability (risk) to fail a good DUT shall be ≤ F according to the following definition: A DUT is failed, accepting a probability of ≤ Fthat the DUT is still better than the specified error ratio (Test requirement).

The probability to pass a bad DUT shall be ≤ Faccording to the following definition: A DUT is passed, accepting a probability of ≤ Fthat the DUT is still worse than M times the specified error ratio. (M>1 is the bad DUT factor).

This definitions lead to an early pass and an early fail limit:

Early fail: ber≥ $berlim_{fail}$

$$ber\lim_{fail}(D,ne) = \frac{2*ne}{qchisq(D,2*ne)} \qquad (1)$$

For ne≥[5]

Early pass: ber≤$berlimbad_{pass}$

$$ber\lim bad_{pass}(D,ne) = \frac{2*ne*M}{qchisq(1-D,2*ne)} \qquad (2)$$

For ne ≥1

With

ber (normalized BER,BLER): BER,BLER according to F.6.1.1 divided by Test requirement

D: wrong decision probability for a test step. This is a numerically evaluated fraction of F, the wrong decision probability at the end of the test. see table F.6.1.1

ne: Number of error events

M: bad DUT factor see table F.6.1.1

qchisq: inverse cumulative chi squared distribution

F.6.1.6 Good balance between testtime and statistical significance

There independent test parameters are introduced into the test and shown in Table F.6.1.6.1. These are the obvious basis of test time and statistical significance. From the first two of them four dependent test parameters are derived. The third independent test parameter is justified separately.

Table F.6.1.6.1: independent and dependent test parameters

Independent test parameters			Dependent test parameters		
Test Parameter	Value	Reference	Test parameter	Value	Reference
Bad DUT factor M	1.5	Table F.6.1.8	Early pass/fail condition	Curves	Subclause F.6.1.5 Figure 6.1.9
Final probability of wrong pass/fail decision F	0.2% 0.02%, note 2	Subclause F.6.1.5	Target number of error events	345	Table 6.1.8
			Probability of wrong pass/fail decision per test step D	0.0085% 0.0008% and 0.008%, note 2	
			Test limit factor TL	1.234	Table 6.1.8
Minimum test time		Table F.6.1.6.2			

The minimum test time is derived from the following justification:

1) For no propagation conditions and static propagation condition

   No early fail calculated from fractional number of errors <1 see note 1

2) For multipath fading condition

   No stop of the test until 999wavelengths are crossed during relevant UE reception timeslots, relevant for BER BLER testing, with the speed given in the fading profile.

Table F.6.1.6.2: minimum Test time

Fading profile	Minimum test time
Multipath propagation 3 km/h	[164 s*TSPF/TSRX *)]
Multipath propagation 50 km/h	[9.8 s* TSPF/TSRX]
Multipath propagation 120 km/h	[4.1 s * TSPF/TSRX]
Multipath propagation 250 km/h	[2s* TSPF/TSRX]
*) TSPF = Time slots per frame, TSRX = relevant UE reception timeslots per frame, relevant for the BER BLER test	

TSPF and TSRX form the prolongation factor and depend on the user data rate and the TDD Option (3,84 Mchip/s, 1,28 Mchip/s or 7.68Mcps)

Table F.6.1.6.3: Prolongation factor for minimum Test time

User Data rate	TSPF/TSRX for TDD 3,84 Mchip/s and 7,68Mchip/s	TSPF/TSRX for TDD 1,28 Mchip/s
12.2 kbit/s	15/1	7/1
64 kbit/s	15/1	7/1
144 kbit/s	15/1	7/2
384 kbit/s	15/3	7/4

In table F.6.1.8 the minimum test time is converted in minimum number of samples

F.6.1.7 Pass fail decision rules

No decision is allowed before the minimum test time is elapsed

1) If minimum Test time < time for target number of error events then the following applies: The required confidence level 1-F (= correct decision probability) shall be achieved. This is fulfilled at an early pass or early fail event.

   For BER: For every TTI (Transmit Time Interval) sum up the number of bits (ns) and the number if errors (ne) from the beginning of the test and calculate

   BER_1 (including the artificial error at the beginning of the test (Note 1))and

   BER_0 (excluding the artificial error at the beginning of the test (Note 1)).

   If BER_0 is above the early fail limit, fail the DUT.

   If BER_1 is below the early pass limit, pass the DUT.

   Otherwise continue the test

   For BLER: For every block sum up the number of blocks (ns) and the number if erroneous blocks (ne) from the beginning of the test and calculate,

   $BLER_1$ (including the artificial error at the beginning of the test (Note 1))and

   $BLER_0$ (excluding the artificial error at the beginning of the test (Note 1)).

   If $BLER_1$ is below the early pass limit, pass the DUT.

   If $BLER_0$ is above the early fail limit, fail the DUT.

   Otherwise continue the test

2) If the minimum test time >= time for target error events, then the test runs for the minimum test time and the decision is done by comparing the result with the test limit.

   For BER:

   For every TTI (Transmit Time Interval) sum up the number of bits (ns) and the number if errors (ne) from the beginning of the test and calculate BER_0

   For BLER:

   For every block sum up the number of blocks (ns) and the number of erroneous blocks (ne) from the beginning of the test and calculate $BLER_0$

   If BER_0/$BLER_0$ is above the test limit, fail the DUT.

   If BER_0/$BLER_0$ is on or below the test limit, pass the DUT.

F.6.1.8 Test conditions for BER,BLER tests

Table F.6.1.8: Test conditions for a single BER/BLER tests

Type of test (BER)	Test requirement (BER/BLER)	Test limit (BER/BLER)= Test requirement (BER/BLER)x TL TL	Target number of error events (time)	Minimum number of samples	Prob that good unit will fail = Prob that bad unit will pass [%]	Bad unit BER/BLER factor M
Reference Sensitivity Level	0.001	1.234	345 (22.9s)	Note 1	0.2	1.5
Maximum Input Level	0.001	1.234	345 (22.9s)	Note 1	0.2	1.5
Adjacent Channel Selectivity	0.001	1.234	345 (22.9s)	Note 1	0.2	1.5
Blocking Characteristics Pass condition Note 2	0.001	1.251	403 (26.4s)	Note 1	0.2	1.5
Blocking Characteristics Fail condition Note 2	0.001	1.251	403 (26.4s)	Note 1	0.02	1.5
Spurious Response	0.001	1.234	345 (22.9s)	Note 1	0.2	1.5
Intermodulatio n Characteristics	0.001	1.234	345 (22.9s)	Note 1	0.2	1.5
HS-SCCH Detection Performance	0.01	FFS	FSS	Note 1	0.2	1.5

Table F.6.1.8-2: Test conditions for BLER tests

Type of test (BLER)	Information Bit rate	Test requirement (BER/BLER)	Test limit (BER/BLER)= Test requirement (BER/BLER)x TL TL	Target number of error events (time)	Minimum number of samples TDD 3,84 Mchip/s	Minimum number of samples TDD 1,28 Mchip/s	Prob that bad unit will pass = Prob that good unit will fail [%]	Bad unit BER/BLER factor M
Demodulation in Static Propagation conditions	 12.2 64 144 384	 0.01 0.1 0.01 0.1 0.01 0.1 0.01	1.234	345 (559.16s) (55.92s) (559.16s) (55.92s) (559.16s) (27.96s) (279.58s)	Note1	Note1	0.2	1.5
Demodulation of DCH in Multi-path Fading conditions								
3km/h (Case 1, Case 2)	 12.2 64 144 384	 0.01 0.1 0.01 0.1 0.01 0.1 0.01	1.234	345 (559.16s) (55.92s) (559.16s) (55.92s) (559.16s) (27.96s) (279.58s)	 [1350] [1350] [1350] [1350] [1350] [450] [450]	 57400 57400 57400 28700 28700 14350 14350	0.2	1.5
120 km/h (Case3)	 12.2 64 144 384	 0.01 0.1 0.01 0.1 0.01 0.1 0.01	1.234	345 (559.16s) (55.92s) (559.16s) (55.92s) (559.16s) (27.96s) (279.58s)	 [34] [34] [34] [34] [34] [12] [12]	 1435 1435 1435 718 718 359 359	0.2	1.5
250 km/h								
Power control in the downlink				Not applicable				

F.6.1.9 Practical Use (informative)

See figure F.6.1.9:

The early fail limit represents formula (1) in F.6.1.5 The range of validity is ne>7, >8 in case of blocking test] to ne =345

The early pass limit represents the formula (2) in F.6.1.5 The range of validity is ne=1 to ne =345. See note 1

The intersection co-ordinates of both curves are: Target number of errors ne = 345 and test limit TL = 1.234

The range of validity for TL is ne>345

A typical BER BLER test, calculated form the number of samples and errors (F.6.1.2.(b)) using experimental method (1) or (2) (see F.6.1.4. calculation assumptions) runs along the yellow trajectory. With an errorless sample the trajectory goes down vertically. With an erroneous sample it goes up right. The tester checks if the BER BLER test intersects the early fail or early pass limits. The real time processing can be reduced by the following actions:

BLER is calculated only in case of an error event.

BER is calculated only in case of an error event within a TTI.

So the early fail limit cannot be missed by errorless samples.

The check against the early pass limit may be done by transforming formula (2) in F.6.1.5 such that the tester checks against a Limit-Number-of-samples (NL(ne)) depending on the current number of errors.

Early pass if

$$NL(ne) \geq \frac{qchisq(1-D, 2*ne)}{2*TR*M}$$

TR: test requirement (0.001)

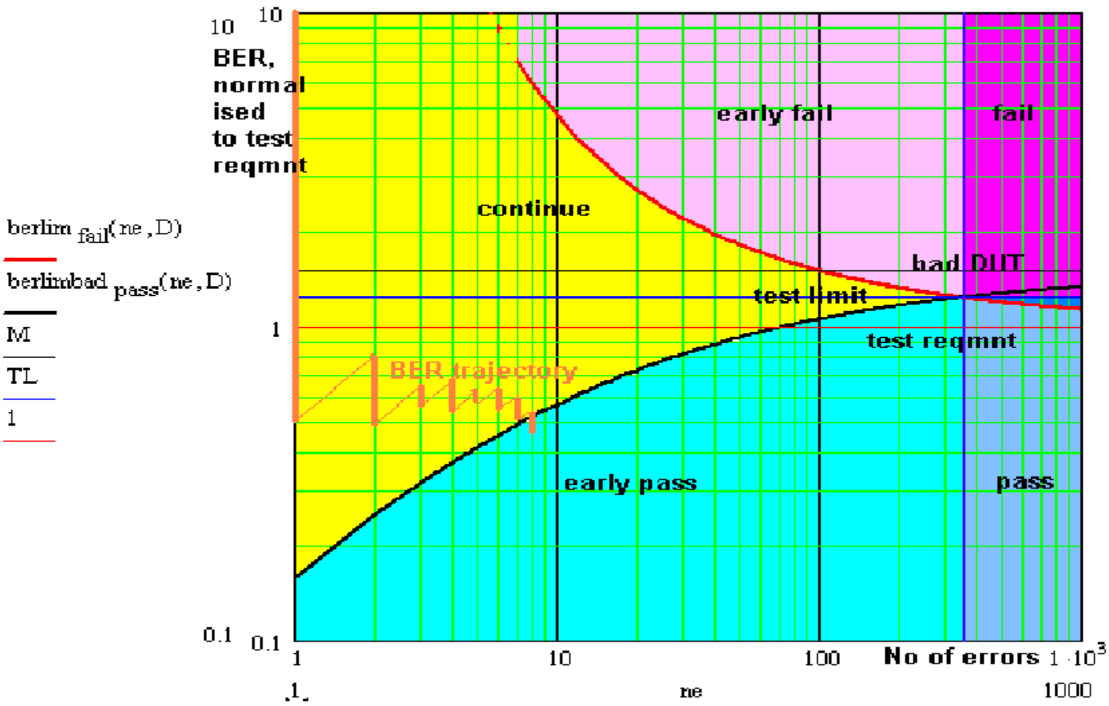


Figure F.6.1.9

NOTE 1: At the beginning of the test, an artificial error is introduced. This ensures that an ideal DUT meets the valid range of the early pass limit. In addition this ensures that the complementary experiment (F.6.1.4. bullet point (2)) is applicable as well.

Due to the nature of the test, namely discrete error events, the early fail condition shall not be valid, when fractional errors <1 are used to calculate the early fail limit: Any early fail decision is postponed until number of errors ne >7. In the blocking test any early fail decision is postponed until number of errors ne >8

NOTE 2: F=0.2% is intended to be used for a test containing a few BER/BLER tests (e.g. receiver sensitivity is repeated 12 times). For a test containing many BER/BLER tests (e.g. blocking test) this value is not appropriate for a single BER/BLER test.

The blocking test contains approx. 12750 single BER tests. A DUT on the limit will fail approx. 25 to 26 times due to statistical reasons (wrong decision probability [0.2]%). 24 fails are allowed in the blocking test but they are reserved for spurious responses. This shall be solved by the following rule:

All passes (based on F=0.2%) are accepted, including the wrong decisions due to statistical reasons.

An early fail limit based on F=0.02% instead of 0.2% is established, that ensures that wrong decisions due to statistical reasons are reduced to 2 to 3.

These asymmetric test conditions ensure that a DUT on the test limit consumes hardly more test time for a blocking test than in the symmetric case and on the other hand discriminates sufficiently between statistical fails and spurious response cases.

F.6.2 Statistical testing of RRM delay performance

F.6.2.1 Test Method

Each test is performed in the following manner:

a) Setup the required test conditions.

b) Measure the delay repeated times. Start each repetition after sufficient time, such that each delay test is independent from the previous one. The delay-times, measured, are simplified to:

a good delay, if the measured delay is ≤ limit.

a bad delay, if the measured delay is > limit

c) Record the number of delays (ns), tested, and the number of bad delays (ne)

d) Stop the test at an early pass or an early fail event.

e) Once the test is stopped, decide according to the pass fail decision rules (subclause F.6.2.7)

F.6.2.2 Bad Delay Ratio (ER)

The Bad Delay Ratio (ER) is defined as the ratio of bad delays (ne) to all delays (ns).

(1-ER is the success ratio)

F.6.2.3 Test Criteria

The test shall fulfil the following requirements:

a) good pass fail decision

1) to keep reasonably low the probability (risk) of passing a bad unit for each individual test;

2) to have high probability of passing a good unit for each individual test;

b) good balance between test-time and statistical significance

3) to perform measurements with a high degree of statistical significance;

4) to keep the test time as low as possible.

F.6.2.4 Calculation assumptions

F.6.2.4.1 Statistical independence

It is arranged by test conditions, that bad delays are independent statistical events.

F.6.2.4.2 Applied formulas

The specified ER is 10% in most of the cases. This stipulates to use the binomial distribution to describe the RRM delay statistics. With the binomial distribution optimal results can be achieved. However the inverse cumulative operation for the binomial distribution is not supported by standard mathematical tools. The use of the Poisson or Chi Square Distribution requires ER→0. Using one of this distributions instead of the binomial distribution gives sub-optimal results in the conservative sense: a pass fail decision is done later than optimal and with a lower wrong decision risk than predefined.

The formulas, applied to describe the RRM delay statistics test, are based on the following experiment:

(1) After having observed a certain number of bad delays (**ne**) the number of all delays (**ns**) are counted to calculate ER. Provisions are made (note 1) such that the complementary experiment is valid as well:

(2) After a certain number of delays (**ns**) the number of bad delays (**ne**), occurred, are counted to calculate ER.

Experiment (1) stipulates to use the Chi Square Distribution with degree of freedom ne: 2*dchisq(2*NE,2*ne).

Experiment (2) stipulates to use the Poisson Distribution: dpois(ne,NE)

(NE: mean value of the distribution)
To determine the early stop conditions, the following inverse cumulative operation is applied:
0.5 * qchisq(D,2*ne) for experiment (1) and (2)
D: wrong decision risk per test step

NOTE: other inverse cumulative operations are available, however only this is suited for experiment (1) and (2).

F.6.2.4.3 Approximation of the distribution

The test procedure is as follows:

During a running measurement for a UE ns (Number of Delays) and ne (Number of bad delays) are accumulated and from this the preliminary ER is calculated. Then new samples up to the next bad delay are taken. The entire past and the new samples are basis for the next preliminary ER. Depending on the result at every step, the UE can pass, can fail or must continue the test.

As early pass- and early fail-UEs leave the statistical totality under consideration, the experimental conditions are changed every step resulting in a distribution that is truncated more and more towards the end of the entire test. Such a distribution can not any more be handled analytically. The unchanged distribution is used as an approximation to calculate the early fail and early pass bounds.

F.6.2.5 Definition of good pass fail decision.

This is defined by the probability of wrong decision F at the end of the test. The probability of a correct decision is 1- F.

The probability (risk) to fail a good DUT shall be ≤ F according to the following definition: A DUT is failed, accepting a probability of ≤ F that the DUT is still better than the specified bad delay ratio (Test requirement).

The probability (risk) to pass a bad DUT shall be ≤ F according to the following definition: A DUT is passed, accepting a probability of ≤ F that the DUT is still worse than M times the specified bad delay ratio. (M>=1 is the bad DUT factor).

This definitions lead to an early pass and an early fail limit:

Early fail: er≥ er**lim**$_{fail}$

$$er\lim_{fail}(D,ne)=\frac{2*ne}{qchisq(D,2*ne)} \qquad (1)$$

For ne ≥ [5],

Early pass: er ≤ er**lim**bad$_{pass}$

$$er\lim bad_{pass}(D,ne)=\frac{2*ne*M}{qchisq(1-D,2*ne)} \qquad (2)$$

For ne ≥1,

With,

er (normalized ER): ER according to F.6.2.2 divided by specified ER

D: wrong decision probability for a test step . This is a numerically evaluated fraction of F, the wrong decision probability at the end of the test. see table F.6.2.6.1

ne: Number of bad delays

M: bad DUT factor see table F.6.2.6.1

qchisq: inverse cumulative chi squared distribution

F.6.2.6 Good balance between test-time and statistical significance

Two independent test parameters are introduced into the test and shown in Table F.6.2.6.1. These are the obvious basis of test time and statistical significance. From them four dependent test parameters are derived.

Table F.6.2.6: Independent and dependent test parameters

Independent test parameters			Dependent test parameters		
Test Parameter	**Value**	**Reference**	**Test parameter**	**Value**	**Reference**
Bad DUT factor M	1.5	Table F.6.1.8	Early pass/fail condition	Curves	Subclause F.6.2.5 Figure 6.2.9
Final probability of wrong pass/fail decision F	5%	Table F.6.2.8	Target number of bad delays	154	Table 6.2.8
			Probability of wrong pass/fail decision per test step D	0.6 %	
			Test limit factor TL	1.236	Table 6.2.8

F.6.2.7 Pass fail decision rules

The required confidence level 1-F (= correct decision probability) shall be achieved. This is fulfilled at an early pass or early fail event. Sum up the number of all delays (ns) and the number of bad delays from the beginning of the test and calculate:

ER_1 (including the artificial error at the beginning of the test (Note 1))and

ER_0 (excluding the artificial error at the beginning of the test (Note 1)).

If ER_0 is on or above the early fail limit, fail the DUT.

If ER_1 is on or below the early pass limit, pass the DUT.

Otherwise continue the test.

F.6.2.8 Test conditions for RRM delay tests

Table F.6.2.8: Test conditions for a single RRM delay tests(3.84 Mcps TDD option)

Type of test	Test requirement Delay (s)	Test requirement (ER)	Testlimit(ER)= Test requirement (ER)x TL TL	Target number of bad delays	Prob that good unit will fail = Prob that bad unit will pass [%]	Bad unit factor M
8.2.2.1 TDD/TDD Cell re-selection in Idle mode (single carrier)	8	0.1	[1.236]	[154]	[5]	[1.5]
8.2.2.2 TDD/TDD Cell re-selection in Idle Mode (mulit-carrier)	8	0.1	[1.236]	[154]	[5]	[1.5]
8.2.2.3 TDD/FDD Cell re-selection in Idle Mode	8					
8.2.2.4 UTRAN to GSM cell re-selection in Idle Mode	27.9	0.1	[1.236]	[154]	[5]	[1.5]
8.3.1 TDD/TDD handover	40 ms	0.1	[1.236]	[154]	[5]	[1.5]
8.3.2 TDD/FDD handover	100 ms	0.1	[1.236]	[154]	[5]	[1.5]
8.3.3 TDD/GSM handover	40ms	0.1	[1.236]	[154]	[5]	[1.5]
8.3.4 TDD/TDD Cell Re-selection in CELL_FACH	2.5	0.1	[1.236]	[154]	[5]	[1.5]
8.3.5 TDD/TDD Cell Re-selection in CELL_PCH	8	0.1	[1.236]	[154]	[5]	[1.5]
8.3.6 TDD/TDD Cell Re-selection in URA_PCH	8	0.1	[1.236]	[154]	[5]	[1.5]

Table F.6.2.8A: Test conditions for a single RRM delay tests(1.28Mcps TDD option)

Type of test	Test requirement Delay (s)	Test requirement (ER)	Testlimit(ER)= Test requirement (ER)x TL TL	Target number of bad delays	Prob that good unit will fail = Prob that bad unit will pass [%]	Bad unit factor M
8.2.2.1 TDD/TDD Cell re-selection in Idle mode (single carrier)	8	0.1	1.236	154	5	1.5
8.2.2.2 TDD/TDD Cell re-selection in Idle Mode (multi-carrier)	8	0.1	1.236	154	5	1.5
8.2.2.3 TDD/FDD Cell re-selection in Idle Mode	8	0.1	1.236	154	5	1.5
8.2.2.4 UTRAN to GSM cell re-selection Scenario 4	8	0.1	1.236	154	5	1.5
8.2.2.5 UTRAN to GSM cell re-selection in Idle Mode Scenario 4A	27.9	0.1	1.236	154	5	1.5
8.3.1A TDD/TDD handover	160 ms	0.1	1.236	154	5	1.5
8.3.2A TDD/FDD handover	100 ms	0.1	1.236	154	5	1.5
8.3.3 TDD/GSM handover	90ms	0.1	1.236	154	5	1.5
8.3.4.1 TDD/TDD Cell Re-selection in CELL_FACH (single carrier)	1.6	0.1	1.236	154	5	1.5
8.3.4.2 TDD/TDD Cell Re-selection in CELL_FACH (multi-carrier)	2	0.1	1.236	154	5	1.5
8.3.5 TDD/TDD Cell Re-selection in CELL_PCH	8	0.1	1.236	154	5	1.5
8.3.6 TDD/TDD Cell Re-selection in URA_PCH	8	0.1	1.236	154	5	1.5

Table F.6.2.8B: Test conditions for a single RRM delay tests(7.68 Mcps TDD option)

Type of test	Test requirement Delay (s)	Test requirement (ER)	Testlimit(ER)= Test requirement (ER)x TL TL	Target number of bad delays	Prob that good unit will fail = Prob that bad unit will pass [%]	Bad unit factor M
8.2.2.1 TDD/TDD Cell re-selection in Idle mode (single carrier)	8	0.1	[1.236]	[154]	[5]	[1.5]
8.2.2.2 TDD/TDD Cell re-selection in Idle Mode (mulit-carrier)	8	0.1	[1.236]	[154]	[5]	[1.5]
8.2.2.3 TDD/FDD Cell re-selection in Idle Mode	8					
8.2.2.4 UTRAN to GSM cell re-selection in Idle Mode	27.9	0.1	[1.236]	[154]	[5]	[1.5]
8.3.1B TDD/TDD handover	40 ms	0.1	[1.236]	[154]	[5]	[1.5]
8.3.2B TDD/FDD handover	100 ms	0.1	[1.236]	[154]	[5]	[1.5]
8.3.3 TDD/GSM handover	40ms	0.1	[1.236]	[154]	[5]	[1.5]
8.3.4 TDD/TDD Cell Re-selection in CELL_FACH	2.5	0.1	[1.236]	[154]	[5]	[1.5]
8.3.5 TDD/TDD Cell Re-selection in CELL_PCH	8	0.1	[1.236]	[154]	[5]	[1.5]
8.3.6 TDD/TDD Cell Re-selection in URA_PCH	8	0.1	[1.236]	[154]	[5]	[1.5]

F.6.2.9 Practical Use (informative)

See figure F.6.2.9:

The early fail limit represents formula (1) in F.6.2.5. The range of validity is ne≥ 5 to ne = 154

The early pass limit represents the formula (2) in F.6.2.5. The range of validity is ne=1 to ne =154. See note 1. The intersection co-ordinates of both curves are : target number of bad delays ne = 154 and test limit TL = 1.236 .

A typical delay test, calculated form the number of samples and errors (F.6.2.2) using experimental method (1) or (2) (see F.6.2.4.2. calculation assumptions) runs along the yellow trajectory. With an good delay the trajectory goes down vertically. With a bad delay it jumps up right. The tester checks if the ER test intersects the early fail or early pass limits.

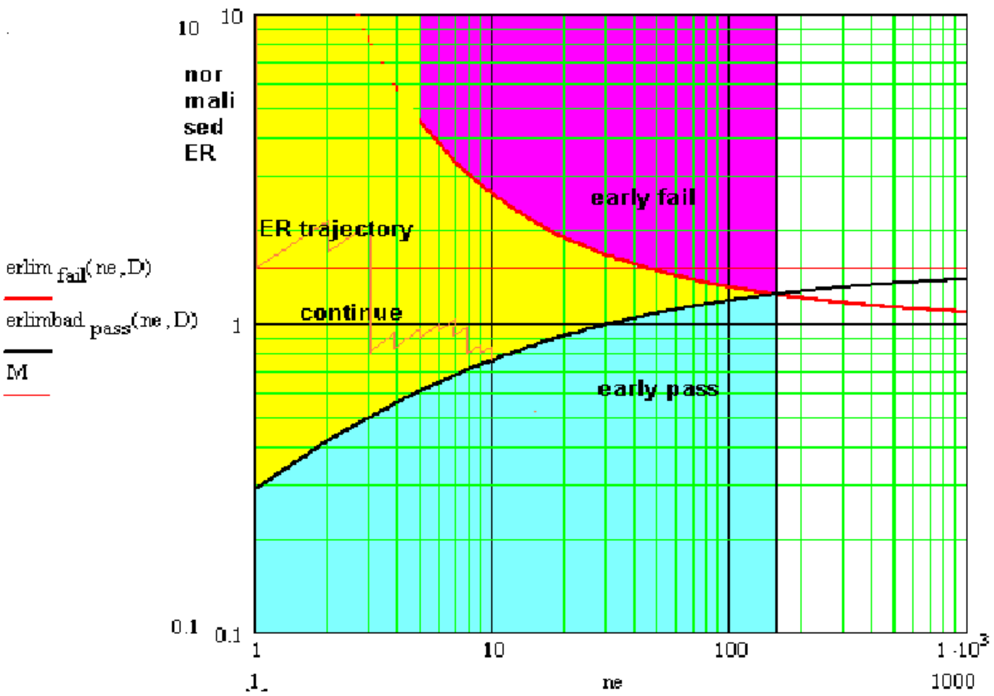


Figure F.6.2.9

NOTE 1: At the beginning of the test, an artificial bad delay is introduced. This ensures that an ideal DUT meets the valid range of the early pass limit. In addition this ensures that the complementary experiment (F.6.2.4.2. bullet point (2)) is applicable as well. For the check against the early fail limit the artificial bad delay sample, introduced at the beginning of the test , is disregarded.

Due to the nature of the test, namely discrete bad delay events, the early fail condition shall not be valid, when fractional bad delays <1 are used to calculate the early fail limit: Any early fail decision is postponed until number of errors ne ≥ [5].

F.6.3 Statistical Testing of HSDPA Receiver Performance

F.6.3.1 Definition

Information Bit Throughput R:

The measured information bit throughput R is defined as the sum (in kilobits) of the information bit payloads (excluding the 24-bit HS-DSCH CRC) successfully received during the test interval, divided by the duration of the test interval (in seconds).

F.6.3.2 Mapping throughput to block error ratio

a) In measurement practice the UE indicates successfully received information bit payload by signalling an ACK to the SS.
If payload is received, but damaged and cannot be decoded, the UE signals a NACK.

b) Only the ACK and NACK signals, not the data bits received, are accessible to the SS.
The number of bits is known in the SS from knowledge of what payload was sent.

c) For fixed reference channel the number of bits in a TTI is fixed during one test.

d) The time in the measurement interval is composed of successful TTIs (ACK), unsuccessful TTIs (NACK) and DTX-TTIs.

e) DTX-TTIs occur regularly according to the test. (regDTX).
In real live this is the time when other UEs are served.
regDTX vary from test to test but are fixed within the test.

f) Additional DTX-TTIs occur statistically when the UE is not responding ACK or NACK where it should. (statDTX)
This may happen when the UE was not expecting data or decided that the data were not intended for it.

The pass / fail decision is done by observing the:

- number of NACKs
- number of ACKs and
- number of statDTXs (regDTX is implicitly known to the SS)

The ratio `(NACK + statDTX)/(NACK+ statDTX +ACK)` is the Block Error Ratio BLER. For fixed referece channel ,taking into account the time consumed by the ACK-, NACK-, and DTX-TTIs (regular and statistical), BLER can be mapped unambiguously to throughput for any single test.

F.6.3.3 Bad DUT factor

NOTE: Data throughput in a communication system is of statistical nature and must be measured and decided pass or fail. The specified limit of throughput related to the ideal throughput in different throughput tests is in the range of a few % to near 100%. To make it comparable with BER, we define the complement of the relative throughput: BLER as defined above. Complementary this is in the range of near 100% down to a few % For e.g. BLER = 1%, the currently in BER BLER used Bad DUT factor M=1.5 is highly meaningful. For e.g. BLER = 99%, the currently used M=1.5 obviously meaningless.

An appropriate definition of the bad DUT factor is illustrated in figure F.6.3.3: constant and variable Bad DUT factor.

It illustrates how to find the Bad BLER when the nominal BLER is given.

1) In the range 0%< nominal BLER>10% the Bad DUT factor is constant 1.5

2) In the range 90%< bad BLER>100% it decreases to 1. (symmetrical to (1))

3) The range in between is interpolated by an arc section.

The example shows: nominal BLER=35,6% → bad BLER=47.67.5% → M=1.34

(blue mapping)

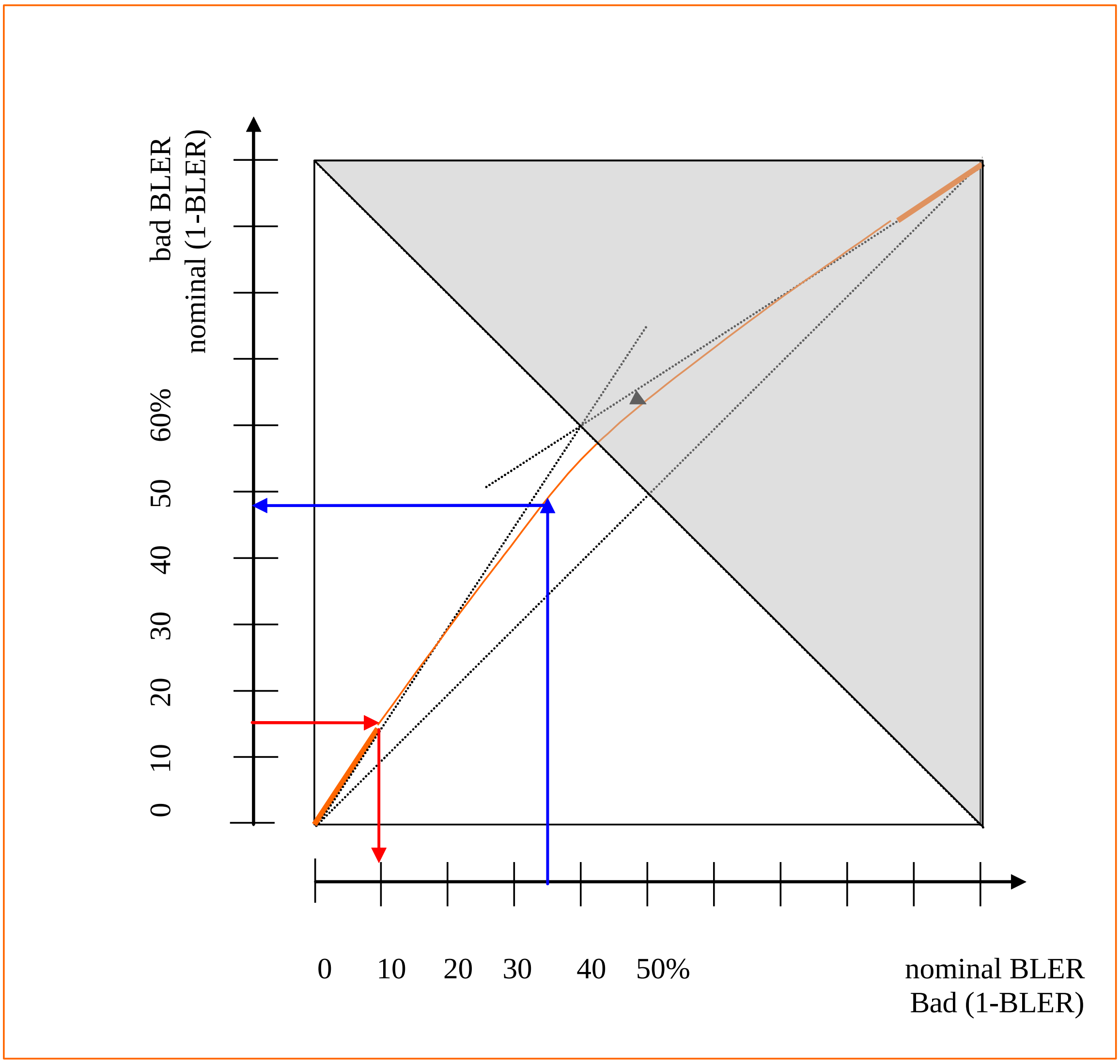


Figure F.6.3.3: constant and variable Bad DUT factor

Formula:

For 0 < BLER<= 0.1 M = 1.5

For 0.1 <BLER <0.9

$$M(BLER) := \frac{\sqrt{r^2 - (BLER - 2.35)^2}}{BLER} - \frac{1.35}{BLER}$$

For 0.9 <= BLER < 1 M(BLER)= 2/3BLER + 1/3

With BLER: nominal Block Error Ratio (0<BLER<1)

With r = 2.70415 (Radius of the arc)

F.6.3.3.1 Bad DUT factor, range of applicability

Inaccuracy is one practical reason to avoid the grey shaded area of figure F.6.3.3: constant and variable Bad DUT factor. For BLER near 1 the Bad DUT factor M is near 1. For M=1,exactly, the pass and fail criteria do not intersect. The test never is finalised.

For M near 1 the pass and fail criteria exhibit a very smooth intersection. In addition the binomial distribution and its inverse are of discrete nature. Therefore the test limit and the number of samples is calculable only very ambiguous.

It is proposed to apply the bad DUT factor only in the not shaded area of figure F.6.3.3.

This is done by the following:

BLER mode:

Use BLER as defined above in the range of 0 to 50%, use M >1 as defined above.

The Test Limit will be > the Test Requirement in the table F.6.3.5 below.

Relative Throughput mode:

If BLER is in the range 50 to 100%, use 1-BLER instead. Use m<1 instead of M.

1-BLER is the relative throughput with respect to the ideal throughput.

As a consequence, the Test Limit < Test Requirement

Formula for m:

For 0 < (1-BLER) <= 0.15 m = 1/1.5

For 0.15 <(1-BLER) <.85 $$m := \frac{2.35 - \sqrt{r^2 - [(1 - BLER) + 1.35]^2}}{(1 - BLER)}$$

In the figure F.6.3.3: this is represented by the red mapping.

The tables F.6.3.5. below distinguishe between m and M.

F.6.3.4 Minimum Test time

Same as with BER BLER there is a minimum test time is necessary for multipath fading profiles with the same justification:

profile	Minimum Test time
PA3, PB3	164s
VA30	16.4s
VA 120	4.1s

F.6.3.5 Pass fail decision rules

The purpose of tables F.6.3.5.1 to F.6.3.5.2 is to decide throughput pass or fail.

(the Ior/Ioc levels are only for reference)

Meaning of a decision:

- A passed DUT is not worse than a Bad DUT with 95%confidence level.
- A failed DUT is not better than a Limit DUT with 95%confidence level.

The minimum Test Time is

1) the minimum test time due to statistical reasons

   (To ensure the confidence level, the test must be continued until a certain number of samples (NACK+ statDTX +ACK) is reached.)

2) the minimum test time due to multipath fading.

The longer test time applies. It is marked in table F.6.3.5. which one applies.

Statistical independence:

If a process works within an incremental redundancy sequence, the samples are not independent. The incremental redundancy sequence for every process must be finalised, successfully or unsuccessfully, on or beyond the minimum test time.

Then the BLER (or 1-BLER) is compared with the Test Limit to decide pass or fail.

NOTE: It is FFS, if correlation within groups of retransmissions may influence the confidence level of the test.

Formula:

The theory, to derive the minimum number of samples and the Test Limit, takes into consideration that BLER is in the range of near 0% to near 100%. Hence it is based on the binomial distribution and its inverse cumulative function: qbinom:

For the BLER test mode:

ne_{low}=qbinom(D,ns,M*$BLER_{limit}$) (1)

ne_{high}=qbinom(1-D,ns,$BLER_{limit}$) (2)

given: 1-D: confidence level= 95%

$BLER_{limit}$=Block error ratio at the limit

M: Bad DUT factor >1

Input: ns: number of samples (NACK+ statDTX + ACK)

Output ne: number of events (NACK+ statDTX)

The intersection of (1) and (2) is the Test Limit with the coordinates: ns and ne

For the Relative Throughput test mode:

ne_{low}=qbinom(D,ns,1-$BLER_{limit}$) (3)

ne_{high}=qbinom(1-D,ns,m*(1-$BLER_{limit}$)) (4)

given: 1-D: confidence level= 95%

1-$BLER_{limit}$= Relative Throughtput at the limit

m: Bad DUT factor <1

Input: ns: number of samples (NACK+ statDTX + ACK)

Output ne: number of events (ACK)

The intersection of (3) and (4) is the Test Limit with the coordinates: ns and ne

NOTE: In contrast to BER BLER test, this approach does not contain any test time optimisation.

(early pass, early fail)

Nomenclature used in the tables F.6.3.5 below:

- NACK+ statDTX + ACK is summarised as No of samples
- NACK+ statDTX is summarised as No of errors
- ACK is summarised as No of successes
- In the BLER test mode the ratio: No of errors/ No of samples is recorded. In this mode a pass is below the test limit
- In the Relative Throughput test mode (1-BLER) the ratio: No of successes/ No of samples is recorded. In this mode a pass is above the test limit

- The test mode, used, is indicated in the rightmost column with BL or RT
- The transition from the BL to the RT test mode can also be seen in the column relative test requirement: BLER%→ (1-BLER%)
- The generic term for No of errors (BLER mode) or No of successes (Relative Throughput mode) is No of events. This is used in the table column Test Limit.

Table F.6.3.5.1: Test case 9.3.1A for fixed reference measurement channel requirements for 0.5 Mbps UE class QPSK of 1.28Mcps HS-DSCH

Single link performance $\hat{I}_{or}/I_{oc}$ =10dB	Absolute Test requirement (kbps)		Relative Test requirement (normalized to ideal=199.2kbps) No of events / No of samples in %	Test limit expressed as No of events / min No of samples (Bad DUT factor)	Min No of samples (number of events to pass) Mandatory, if applicable	Test time in s Mandatory if fading, Informative and approx. if statistical	BL / RT
Test1 QPSK	PA3	160	19.68%	54/226 (M=1.4527)	N.A.	164s (fading)	BL
Test2	PB3	170	14.66%	52/289 (M=1.4845)	N.A	164s (fading)	BL
Test3	VA30	161	19.18%	55/236 (M=1.4562)	N.A.	16.4s(fading)	BL
Test4	VA120	153	23.20%	57/204 (M=1.4277)	N.A.	4.1s(fading)	BL

Table F.6.3.5.2: Test case 9.3.1B for fixed reference measurement channel requirements for 1.1 Mbps UE class 16QAMof 1.28Mcps HS-DSCH

Single link performance $\hat{I}_{or}/I_{oc}$ =15dB	Absolute Test requirement (kbps)		Relative Test requirement (normalized to ideal=578.6kbps) No of events / No of samples in % No of events/No of samples in % BL → (RT)	Test limit expressed as No of events / min No of samples (Bad DUT factor)	Min No of samples (number of events to pass) Mandatory, if applicable	Test time in s Mandatory if fading, Informative and approx. if statistical	BL / RT
Test1	PA3	388	32.94%	69/179 (M=1.3573)	N.A.	164s (fading)	BL
Test2	PB3	347	40.03%	78/169 (M=1.3085)	N.A	164s (fading)	BL
Test3	VA30	316	45.39%	84/163 (M=1.2735)	N.A.	16.4s(fading)	BL
Test4	VA120	274	52.74%→ (47.36%)	70/170 (m=0.7459)	N.A.	4.1s(fading)	RT

Table F.6.3.5.3: Test case 9.3.1C for fixed reference measurement channel requirements for 1.6 Mbps UE class QPSK of 1.28Mcps HS-DSCH

Single link performance $\hat{I}_{or}/I_{oc}$ =10dB	Absolute Test requirement (kbps)		Relative Test requirement (normalized to ideal=357.4kbps) No of events / No of samples in %	Test limit expressed as No of events / min No of samples (Bad DUT factor)	Min No of samples (number of events to pass) Mandatory, if applicable	Test time in s Mandatory if fading, Informative and approx. if statistical	BL / RT
Test1	PA3	270	24.45%	59/201 (M =1.4186)	N.A.	164s (fading)	BL
Test2	PB3	278	22.22%	57/212 (M=1.4348)	N.A	164s (fading)	BL
Test3	VA30	259	27.53%	60/183 (M=1.3962)	N.A.	16.4s(fading)	BL
Test4	VA120	242	32.29%	65/171 (M=1.3620)	N.A.	4.1s(fading)	BL

Table F.6.3.5.4: Test case 9.3.1C for fixed reference measurement channel requirements for 1.6 Mbps UE class 16QAM of 1.28Mcps HS-DSCH

Single link performance $\hat{I}_{or}/I_{oc}$ =15dB	Absolute Test requirement (kbps)		Relative Test requirement (normalized to ideal=634.6kbps) No of events / No of samples in %	Test limit expressed as No of events / min No of samples (Bad DUT factor)	Min No of samples (number of events to pass) Mandatory, if applicable	Test time in s Mandatory if fading, Informative and approx. if statistical	BL / RT
Test5	PA3	488	23.10%	57/205 (M =1.4284)	N.A.	164s (fading)	BL
Test6	PB3	471	25.78%	58/188 (M=1.4089)	N.A	164s (fading)	BL
Test7	VA30	431	32.18%	65/172 (M=1.3634)	N.A.	16.4s(fading)	BL
Test8	VA120	377	40.59%	78/167 (M=1.3047)	N.A.	4.1s(fading)	BL

Table F.6.3.5.5: Test case 9.3.1D for fixed reference measurement channel requirements for 2.2 Mbps UE class QPSK of 1.28Mcps HS-DSCH

Single link performance $\hat{I}_{or}/I_{oc}$ =10dB	Absolute Test requirement (kbps)		Relative Test requirement (normalized to ideal=539kbps) No of events / No of samples in %	Test limit expressed as No of events / min No of samples (Bad DUT factor)	Min No of samples (number of events to pass) Mandatory, if applicable	Test time in s Mandatory if fading, Informative and approx. if statistical	BL / RT
Test1	PA3	360	33.21%	67/172 (M =1.3554)	N.A.	164s (fading)	BL
Test2	PB3	343	36.36%	71/168 (M=1.3334)	N.A	164s (fading)	BL
Test3	VA30	320	40.63%	79/169 (M=1.3045)	N.A.	16.4s(fading)	BL
Test4	VA120	275	48.98%	92/167 (M=1.2509)	N.A.	4.1s(fading)	BL

Table F.6.3.5.6: Test case 9.3.1D for fixed reference measurement channel requirements for 2.2 Mbps UE class 16QAM of 1.28Mcps HS-DSCH

Single link performance $\hat{I}_{or}/I_{oc}$ =15dB	Absolute Test requirement (kbps)		Relative Test requirement (normalized to ideal=782.2kbps) No of events / No of samples in %	Test limit expressed as No of events / min No of samples (Bad DUT factor)	Min No of samples (number of events to pass) Mandatory, if applicable	Test time in s Mandatory if fading, Informative and approx. if statistical	BL / RT
Test5	PA3	615	21.38%	57/220 (M =1.4408)	N.A.	164s (fading)	BL
Test6	PB3	606	22.53%	56/206 (M=1.4325)	N.A	164s (fading)	BL
Test7	VA30	554	29.17%	63/182 (M=1.3843)	N.A.	16.4s(fading)	BL
Test8	VA120	493	36.97%	71/165 (M=1.3292)	N.A.	4.1s(fading)	BL

Table F.6.3.5.7: Test case 9.3.1E for fixed reference measurement channel requirements for 2.8 Mbps UE class QPSK of 1.28Mcps HS-DSCH

Single link performance $\hat{I}_{or}/I_{oc}$ =10dB	Absolute Test requirement (kbps)		Relative Test requirement (normalized to ideal=621kbps) No of events / No of samples in %	Test limit expressed as No of events / min No of samples (Bad DUT factor)	Min No of samples (number of events to pass) Mandatory, if applicable	Test time in s Mandatory if fading, Informative and approx. if statistical	BL / RT
Test1	PA3	461	25.76%	60/195 (M =1.4090)	N.A.	164s (fading)	BL
Test2	PB3	470	24.32%	59/202 (M=1.4196)	N.A	164s (fading)	BL
Test3	VA30	438	29.47%	63/180 (M=1.3822)	N.A.	16.4s(fading)	BL
Test4	VA120	409	34.14%	69/173 (M=1.3489)	N.A.	4.1s(fading)	BL

Table F.6.3.5.8: Test case 9.3.1E for fixed reference measurement channel requirements for 2.8 Mbps UE class 16QAM of 1.28Mcps HS-DSCH

Single link performance $\hat{I}_{or}/I_{oc}$ =15dB	Absolute Test requirement (kbps)		Relative Test requirement (normalized to ideal=1278.6kbps) No of events / No of samples in %	Test limit expressed as No of events / min No of samples (Bad DUT factor)	Min No of samples (number of events to pass) Mandatory, if applicable	Test time in s Mandatory if fading, Informative and approx. if statistical	BL / RT
Test5	PA3	890	30.39%	64/178 (M =1.3755)	N.A.	164s (fading)	BL
Test6	PB3	810	36.65%	72/169 (M=1.3315)	N.A	164s (fading)	BL
Test37	VA30	730	42.91%	80/163 (M=1.2895)	N.A.	16.4s(fading)	BL
Test8	VA120	630	50.73%→ (49.27%)	71/165 (m=0.7528)	N.A.	4.1s(fading)	RT

Table F.6.3.5.9: Test case 9.2.1 demodulation of 3.84Mcps HS-DSCH(QPSK)

Single link Performance QPSK Test number	Absolute Test requirement (kbps)		Relative test requirement (normalized to: ideal for tests 1,2,3=2649.6 kbps ideal for test 4=2317.6 kbps) No of events/No of samples in % BL → (RT)	Test limit expressed as No of events/min No of samples (Bad DUT factor)	Min No of samples (number of events to pass) Mandatory if applicable	Test time in s Mandatory if fading Informative and approx. if statistical	BL / RT
1 ($\hat{I}_{or}/I_{oc}$ = 8,5 dB)	PA3	1300	50.94%→ (49.06%)	77/179 (m = 0.752)	N.A.	164s (fading)	RT
2 ($\hat{I}_{or}/I_{oc}$ = 9,0 dB)	PB3	1300	50.94%→ (49.06%)	77/179 (m = 0.752)	N.A	164s (fading)	RT
3 ($\hat{I}_{or}/I_{oc}$ = 9,75 dB)	VA30	1300	50.94%→ (49.06%)	77/179 (m = 0.752)	N.A	164s (fading)	RT
4 ($\hat{I}_{or}/I_{oc}$ = 11,5 dB)	VA120	1400	39.59%	80/175 (M=1.312)	N.A	164s (fading)	BL

Table F.6.3.5.10: Test case 9.2.1 demodulation of 3.84Mcps HS-DSCH(16QAM)

Single link Performance QPSK Test number	Absolute Test requirement (kbps)		Relative test requirement (normalized to: ideal for tests 1,2,3=5299.6 kbps ideal for tests 4=3477.3 kbps) No of events/No of samples in % BL → (RT)	Test limit expressed as No of events/min No of samples (Bad DUT factor)	Min No of samples (number of events to pass) Mandatory if applicable	Test time in s Mandatory if fading Informative and approx. if statistical	BL / RT
1 ($\hat{I}_{or}/I_{oc}$ = 16.0 dB)	PA3	2600	50.94%→ (49.06%)	77/179 (m = 0.752)	N.A.	164s (fading)	RT
2 ($\hat{I}_{or}/I_{oc}$ = 17.5 dB)	PB3	2600	50.94%→ (49.06%)	77/179 (m = 0.752)	N.A	164s (fading)	RT
3 ($\hat{I}_{or}/I_{oc}$ = 18.5 dB)	VA30	2600	50.94%→ (49.06%)	77/179 (m = 0.752)	N.A	164s (fading)	RT
4 ($\hat{I}_{or}/I_{oc}$ = 14.5 dB)	VA12 0	1600	53.99%%→ (46.01%)	72/180 (M=0.741)	N.A	164s (fading)	BL

Table F.6.3.5.11: Test case 9.4.1 demodulation of 7.68Mcps HS-DSCH(QPSK)

Single link Performance QPSK Test number	Absolute Test requirement (kbps)		Relative test requirement (normalized to: ideal =2119.68 kbps) No of events/No of samples in % BL → (RT)	Test limit expressed as No of events/min No of samples (Bad DUT factor)	Min No of samples (number of events to pass) Mandatory if applicable	Test time in s Mandatory if fading Informative and approx. if statistical	BL / RT
1 ($\hat{I}_{or}/I_{oc}$ = 5,2 dB)	PA3	880	58.48%→ (41.52%)	68/190 (m = 0.7261)	N.A.	164s (fading)	RT
2 ($\hat{I}_{or}/I_{oc}$ = 5,5 dB)	PB3	880	58.48%→ (41.52%)	68/190 (m = 0.7261)	N.A	164s (fading)	RT
3 ($\hat{I}_{or}/I_{oc}$ = 6,2 dB)	VA30	880	58.48%→ (41.52%)	68/190 (m = 0.7261)	N.A	164s (fading)	RT
4 ($\hat{I}_{or}/I_{oc}$ = 6,2 dB)	VA120	880	58.48%→ (41.52%)	68/190 (m = 0.7261)	N.A	164s (fading)	BL

Table F.6.3.5.12: Test case 9.4.1 demodulation of 7.68Mcps HS-DSCH(16QAM)

Single link Performance QPSK Test number	Absolute Test requirement (kbps)		Relative test requirement (normalized to: ideal =4239.36 kbps) No of events/No of samples in % BL → (RT)	Test limit expressed as No of events/min No of samples (Bad DUT factor)	Min No of samples (number of events to pass) Mandatory if applicable	Test time in s Mandatory if fading Informative and approx. if statistical	BL / RT
1 ($\hat{I}_{or}/I_{oc}$ = 11.1 dB)	PA3	1765	58.37%→ (41.63%)	77/179 (m = 0.7264)	N.A.	164s (fading)	RT
2 ($\hat{I}_{or}/I_{oc}$ = 13.2 dB)	PB3	1765	58.37%→ (41.63%)	77/179 (m = 0.752)	N.A	164s (fading)	RT
3 ($\hat{I}_{or}/I_{oc}$ = 13.7 dB)	VA30	1765	58.37%→ (41.63%)	77/179 (m = 0.752)	N.A	164s (fading)	RT
4 ($\hat{I}_{or}/I_{oc}$ = 13.6 dB)	VA120	1765	58.37%→ (41.63%)	72/180 (M=0.741)	N.A	164s (fading)	BL

Table F.6.3.5.13: Maximum Input Level for HS-PDSCH Reception (16QAM)

Maximum Input Level for HS-PDSCH Reception (16QAM) 16 QAM	Absolute Test requirement (kbps)	Relative test requirement (normalized to ideal=578.6 kbps) No of events/No of samples in %	Test limit expressed as No of events/min No of samples (Bad DUT factor)	Min No of samples (number of events to pass) Mandatory if applicable	Test time in s Mandatory if fading Informative and approx. if statistical	BL / RT
	500	13.58%	53/317 (M=1.4899)	N.A	2.8s (stat)	BL

Annex G (normative): Environmental conditions

G.1 General

This normative annex specifies the environmental requirements of the UE. Within these limits the requirements of the present documents shall be fulfilled.

G.2 Environmental requirements

The requirements in this clause apply to all types of UE(s)

G.2.1 Temperature

The UE shall fulfil all the requirements in the full temperature range of:

+15°C to +35°C	for normal conditions (with relative humidity of 25 % to 75 %)
-10°C to +55°C	for extreme conditions (see IEC publications 68-2-1 and 68-2-2)

Outside this temperature range the UE, if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the UE exceed the transmitted levels as defined in TS 25.102 [1] for extreme operation.

Some tests in the present document are performed also in extreme temperature conditions. These test conditions are denoted as TL (temperature low, −10°C) and TH (temperature high, +55°C).

G.2.2 Voltage

The UE shall fulfil all the requirements in the full voltage range, i.e. the voltage range between the extreme voltages.

The manufacturer shall declare the lower and higher extreme voltages and the approximate shutdown voltage. For the equipment that can be operated from one or more of the power sources listed below, the lower extreme voltage shall not be higher, and the higher extreme voltage shall not be lower than that specified below.

Power source	Lower extreme voltage	Higher extreme voltage	Normal conditions voltage
AC mains	0,9 * nominal	1,1 * nominal	nominal
Regulated lead acid battery	0,9 * nominal	1,3 * nominal	1,1 * nominal
Non regulated batteries: Leclanché / lithium Mercury/nickel & cadmium	 0,85 * nominal 0,90 * nominal	 Nominal Nominal	 Nominal Nominal

Outside this voltage range the UE if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the UE exceed the transmitted levels as defined in [1] TS 25.102 for extreme operation. In particular, the UE shall inhibit all RF transmissions when the power supply voltage is below the manufacturer declared shutdown voltage.

Some tests in the present document are performed also in extreme voltage conditions. These test conditions are denoted as VL (lower extreme voltage) and VH (higher extreme voltage).

G.2.3 Vibration

The UE shall fulfil all the requirements when vibrated at the following frequency/amplitudes:

Frequency	ASD (Acceleration Spectral Density) random vibration
5 Hz to 20 Hz	0,96 m^2/s^3
20 Hz to 500 Hz	0,96 m^2/s^3 at 20 Hz, thereafter –3 dB/Octave

Outside the specified frequency range the UE, if powered on, shall not make ineffective use of the radio frequency spectrum. In no case shall the UE exceed the transmitted levels as defined in TS 25.102 [1] for extreme operation.

G.2.4 Specified frequency range

The manufacturer shall declare, which of the frequency bands defined in clause 4.2 is supported by the UE.

Some tests in the present document are performed also in low, mid and high range of the operating frequency band of the UE. The UARFCN's to be used for low, mid and high range are defined in TS 34.108 [3] clause 5.1.2.

Annex H (normative): Terminal Baseline and Service Implementation Capabilities (TDD)

H.1 Baseline Implementation Capabilities of 3.84 Mcps TDD

Table H.1: Baseline implementation capabilities of 3.84 Mcps TDD

Capability TDD	Clause	UE*	Comments
Chip rate 3,84 Mcps		M	
Frequency bands: (uplink and downlink) ________________________________ 1900-1920 MHz 2010-2025 MHz ________________________________ 1850-1910 MHz 1930-1990 MHz ________________________________ 1910-1930 MHz ________________________________ Other spectrum Carrier raster 200 kHz		 M M M M M O M	 As Declared
UE maximum output power	6.2.1	M	2, 3

(* M = mandatory, O = optional)

- The special conformance testing functions and the logical test interface as specified in TS 34.109 [3]. This issue is currently under investigation.
- Uplink reference measurement channel 12,2 kbps (TDD), TS 25.102 [1] clause A.2.1.
- Downlink reference measurement channel 12,2 kbps (TDD), TS 25.102 [1] clause A.2.2.

H.1A Baseline Implementation Capabilities of 1.28 Mcps TDD

Table H.1A: Baseline implementation capabilities of 1.28 Mcps TDD

Capability TDD	Clause	Value range
Chip rate 1.28 Mcps		Yes
Frequency bands: (uplink and downlink)	25.102 clause 5.2[1]	a), b), c), a+b), a+c), b+c), a+b+c)
UE maximum output power	25.102 clause 6.2.1[1]	2, 3

- The special conformance testing functions and the logical test interface as specified in TS 34.109 [3]. This issue is currently under investigation.
- Uplink reference measurement channel 12,2 kbps (TDD), TS 25.102 [1] clause A.2.1.
- Downlink reference measurement channel 12,2 kbps (TDD), TS 25.102 [1] clause A.2.2.

H.1B Baseline Implementation Capabilities of 7.68 Mcps TDD

Table H.1: Baseline implementation capabilities of 7.68 Mcps TDD

Capability TDD	Clause	UE*	Comments
Chip rate 7,68 Mcps		M	
Frequency bands: (uplink and downlink) 1900-1920 MHz 2010-2025 MHz 1850-1910 MHz 1930-1990 MHz 1910-1930 MHz 2570-2620 MHz Other spectrum Carrier raster 200 kHz		 M M M M M M O M	 As Declared
UE maximum output power	6.2.1	M	2, 3

(* M = mandatory, O = optional)

- The special conformance testing functions and the logical test interface as specified in TS 34.109 [3]. This issue is currently under investigation.
- Uplink reference measurement channel 12,2 kbps (TDD), TS 25.102 [1] clause A.2.1.3.
- Downlink reference measurement channel 12,2 kbps (TDD), TS 25.102 [1] clause A.2.2.3.

H.2 Service Implementation Capabilities:

- Downlink reference measurement channel 64 kbps (TDD), TS 25.102 clause A.2.3.
- Downlink reference measurement channel 144 kbps (TDD), TS 25.102 clause A.2.4.
- Down-link reference measurement channel 384 kbps (TDD), TS 25.102 clause A.2.5.
- BCH Reference Measurement Channel(TDD),TS 25.102 clause A.2.6.

Annex I (normative): Default Message Contents

This Annex contains the default values of common messages, other than those described in TS 34.108. The messages are primarily concerning the RRM test cases in clause 8 and unless indicated otherwise in specific test cases, shall be transmitted and checked by the system simulator. The necessary messages are listed in alphabetical order.

In this Annex, decimal values are normally used. However, sometimes, a hexadecimal value, indicated by an "H", or a binary value, indicated by a "B" is used.

Contents of MEASUREMENT REPORT message for Intra frequency TDD test cases

Information Element	Value/remark
Message Type	
Integrity check info	The presence of this IE is dependent on IXIT statements in TS 34.123-2. If integrity protection is indicated to be active, this IE shall be present with the values of the sub IEs as stated below. Else, this IE and the sub-IEs shall be absent.
- Message authentication code	This IE is checked to see if it is present. The value is compared against the XMAC-I value computed by SS.
- RRC Message sequence number	This IE is checked to see if it is present. The value is used by SS to compute the XMAC-I value.
Measurement identity	1
Measured Results	
- Intra-frequency measured results list	
- Cell measured results	
- Cell Identity	Not present
- SFN-SFN observed time difference	If reporting of "SFN-SFN observed time difference " is configured then check that this IE is present. If reporting of "OFF" measurement is not configured then no check is needed.
- Cell synchronisation information	
- CHOICE mode	TDD
- COUNT-C-SFN frame difference	If reporting of "COUNT-C-SFN frame difference " is configured then check that this IE is present. If reporting of "COUNT-C-SFN frame difference " measurement is not configured then no check is needed.
- OFF	If reporting of "OFF" is configured then check that this IE is present. If reporting of "OFF" measurement is not configured then no check is needed.
- CHOICE mode	TDD
- Cell Parameters ID	4
- Primary CCPCH RSCP	Checked that this IE is present
- Pathloss	absent
- Timeslot ISCP	If reporting of "Timeslot ISCP " is configured then check that this IE is present. If reporting of "Timeslot ISCP " measurement is not configured then no check is needed.
Measured results on RACH	If reporting of "Measured results on RACH" is configured then check that this IE is present. If reporting of "Measured results on RACH" measurement is not configured then no check is needed.
Additional measured results	This IE does not need to be checked.
Event results	If reporting of "Event results" is configured then check that this IE is present. If reporting of "Event results" measurement is not configured then no check is needed.

Contents of MEASUREMENT REPORT message for Inter frequency TDD test cases

Information Element	Value/remark
Message Type	
Integrity check info	The presence of this IE is dependent on IXIT statements in TS 34.123-2. If integrity protection is indicated to be active, this IE shall be present with the values of the sub IEs as stated below. Else, this IE and the sub-IEs shall be absent.
- Message authentication code	This IE is checked to see if it is present. The value is compared against the XMAC-I value computed by SS.
- RRC Message sequence number	This IE is checked to see if it is present. The value is used by SS to compute the XMAC-I value.
Measurement identity	1
Measured Results	
- Inter-frequency measured results list	
- UTRA Carrier RSSI	If reporting of “UTRA Carrier RSSI “ is configured then check that this IE is present. If reporting of “UTRA Carrier RSSI “ measurement is not configured then no check is needed.
- Inter-frequency cell measurement results	
- Cell measured results	
- Cell Identity	Not present
- SFN-SFN observed time difference	If reporting of “SFN-SFN observed time difference “ is configured then check that this IE is present. If reporting of “SFN-SFN observed time difference “ measurement is not configured then no check is needed.
- Cell synchronisation information	
- CHOICE mode	TDD
- COUNT-C-SFN frame difference	If reporting of “COUNT-C-SFN frame difference “ is configured then check that this IE is present. If reporting of “COUNT-C-SFN frame difference “ measurement is not configured then no check is needed.
- OFF	If reporting of “OFF“ is configured then check that this IE is present. If reporting of “OFF“ measurement is not configured then no check is needed.
- CHOICE mode	TDD
- Cell Parameters ID	4
- Primary CCCPCH RSCP	Checked that this IE is present
- Pathloss	absent
- Timeslot ISCP	If reporting of “Timeslot ISCP “ is configured then check that this IE is present. If reporting of “Timeslot ISCP “ measurement is not configured then no check is needed.
Measured results on RACH	If reporting of “Measured results on RACH“ is configured then check that this IE is present. If reporting of “Measured results on RACH“ measurement is not configured then no check is needed.
Additional measured results	This IE does not need to be checked.
Event results	If reporting of “Event results“ is configured then check that this IE is present. If reporting of “Event results“ measurement is not configured then no check is needed.

Contents of MEASUREMENT REPORT message for Inter frequency FDD test cases

Information Element	Value/remark
Message Type	
Integrity check info	The presence of this IE is dependent on IXIT statements in TS 34.123-2. If integrity protection is indicated to be active, this IE shall be present with the values of the sub IEs as stated below. Else, this IE and the sub-IEs shall be absent.
- Message authentication code	This IE is checked to see if it is present. The value is compared against the XMAC-I value computed by SS.
- RRC Message sequence number	This IE is checked to see if it is present. The value is used by SS to compute the XMAC-I value.
Measurement identity	1
Measured Results	
- Inter-frequency measured results list	
- UTRA Carrier RSSI	If reporting of "UTRA Carrier RSSI" measurement is configured then check that this IE is present. If reporting of "UTRA Carrier RSSI" measurement is not configured then no check is needed.
- Inter-frequency cell measurement results	
- Cell measured results	
- Cell Identity	Not present
- SFN-SFN observed time difference	Checked that this IE is present
- Cell synchronisation information	
-Tm	If reporting of "Tm" measurement is configured then check that this IE is present. If reporting of "Tm" measurement is not configured then no check is needed.
- OFF	If reporting of "OFF" measurement is configured then check that this IE is present. If reporting of "OFF " measurement is not configured then no check is needed.
- CHOICE mode	FDD
- Primary CPICH info	Checked that this IE is present
- Primary scrambling code	See Annex K and TS 34.108 [3]
- CPICH Ec/N0	If reporting of "CPICH Ec/N0" measurement is configured then check that this IE is present. If reporting of "CPICH Ec/N0 " measurement is not configured then no check is needed.
- CPICH RSCP	If reporting of "CPICH RSCP" measurement is configured then check that this IE is present. If reporting of "CPICH RSCP" measurement is not configured then no check is needed.
- Pathloss	absent
Measured results on RACH	If reporting of "Measured results on RACH" is configured then check that this IE is present. If reporting of "Measured results on RACH "measurement is not configured then no check is needed.
Additional measured results	This IE does not need to be checked.
Event results	If reporting of "Event results" is configured then check that this IE is present. If reporting of "Event results" measurement is not configured then no check is needed.

Contents of MEASUREMENT REPORT message for inter – RAT test cases

Information Element	Value/remark
Message Type	
Integrity check info	The presence of this IE is dependent on IXIT statements in TS 34.123-2. If integrity protection is indicated to be active, this IE shall be present with the values of the sub IEs as stated below. Else, this IE and the sub-IEs shall be absent.
- Message authentication code	This IE is checked to see if it is present. The value is compared against the XMAC-I value computed by SS.
- RRC Message sequence number	This IE is checked to see if it is present. The value is used by SS to compute the XMAC-I value.
Measurement identity	1
Measured Results	
- Inter-RAT measured results list	
- CHOICE system	GSM
- Measured GSM cells	Checked that this IE is present
- GSM carrier RSSI	If reporting of “GSM carrier RSSI“ measurement is configured then check that this IE is present. If reporting of “GSM carrier RSSI “ measurement is not configured then no check is needed.absent
- Pathloss	This IE does not need to be checked.
- Observed time difference to GSM cell	
Measured results on RACH	If reporting of “Measured results on RACH“ is configured then check that this IE is present. If reporting of “Measured results on RACH“ measurement is not configured then no check is needed.
Additional measured results	This IE does not need to be checked.
Event results	If reporting of “Event results“ is configured then check that this IE is present. If reporting of “Event results“ measurement is not configured then no check is needed.
Inter-RAT cell info indication	If reporting of “Inter-RAT cell info indication “ is configured then check that this IE is present. If reporting of “Inter-RAT cell info indication “ measurement is not configured then no check is needed.

Annex J (normative): Cell configuration mapping

The cells defined in TS 25.133 [2] and used in TS 34.122 do not correspond to the cells defined in TS 34.108 [3] section 6.1.4 and TS 36.508 [33] section 4.4.2 and 4.4.3. Table J.1 and J.2 describes the mapping between cells described in TS 34.122 and those defined in TS 34.108 [3] and TS 36.508 [33] respectively. For each test case in section 8 the cells as defined in TS 34.108 [3] section 6.1.4 or TS 36.508 [33] section 4.4.2 and 4.4.3are listed in one row. The test case shall apply the RF parameters as defined in TS 34.121 according to the column heading. The use of cells as defined in TS 34.108 [3] and TS 36.508 [33] is important in order to have consistent SIB11 configurations between the different cells.

NOTE: For example if the second cell in a test case is an inter-frequency cell then Cell4 from TS 34.108 [3] section 6.1.4 is used with the radio parameters as defined for Cell2 in TS 34.121.

Table J.1: Cell configuration mapping for RF testing between TS34.122 and TS 34.108

Test Case	Description	34.122 Cell1	34.122 Cell2	34.122 Cell3	34.122 Cell4	34.122 Cell5	34.122 Cell6

Table J.2: Cell configuration mapping for UTRA-EUTRA RRM test cases between TS 34.122 and TS 36.508

Test Case	Description	34.122 Cell1	34.122 Cell2	34.122 Cell3	34.122 Cell4	34.122 Cell5	34.122 Cell6
8.2.2.6.1	UTRA to E-UTRA TDD cell reselection E-UTRA is of higher priority	Cell 8	Cell 6				
8.2.2.6.2	UTRA to E-UTRA TDD cell reselection E-UTRA is of lower priority	Cell 8	Cell 6				
8.3.3a	UTRAN Connected Mode Mobility / UTRA TDD to E-UTRA FDD Handover	Cell 8	Cell 1				
8.3.3b	UTRAN Connected Mode Mobility / UTRA TDD to E-UTRA TDD Handover	Cell 8	Cell 6				
8.3.3c	UTRAN Connected Mode Mobility / UTRA TDD to E-UTRA FDD Handover: unknown target cell	Cell 8	Cell 1				
8.3.3d	UTRAN Connected Mode Mobility / UTRA TDD to E-UTRA TDD Handover: unknown target cell	Cell 8	Cell 6				
8.6.5.1	UTRA TDD to E-UTRA FDD cell search under fading propagation conditions	Cell 8	Cell 1				
8.6.5.2	UTRA TDD to E-UTRA TDD cell search under fading propagation conditions	Cell 8	Cell 6				
8.6.5.3	Combined UTRA TDD inter-frequency and E-UTRA FDD cell search under fading propagation conditions	Cell 8	Cell 9	Cell 1			
8.6.5.4	Combined UTRA TDD inter-frequency and E-UTRA TDD cell search under fading propagation conditions	Cell 8	Cell 9	Cell 6			
8.7.14	Measurements Performance Requirements / E-UTRAN FDD RSRP	Cell 8	Cell 1				
8.7.15	Measurements Performance Requirements / E-UTRAN TDD RSRP	Cell 8	Cell 6				
8.7.16	Measurements Performance Requirements / E-UTRAN FDD RSRQ	Cell 8	Cell 1				
8.7.17	Measurements Performance Requirements / E-UTRAN TDD RSRQ	Cell 8	Cell 6				

Annex K (informative): Change history

Meeting -1st-Level	Doc-1st-Level	CR	Rev	Subject	Cat	Version -Current	Version -New	Doc-2nd-Level
TP-22	TP-030281	181	1	Addition of LCR GSM neighbour reporting	F	4.9.0	5.0.0	T1-031615
TP-22	TP-030281	182	1	Addition of LCR GSM handover test	F	4.9.0	5.0.0	T1-031616
TP-22	TP-030281	183	1	Update to LCR GSM RSSI measurement	F	4.9.0	5.0.0	T1-031617
TP-22	TP-030281	184	1	Update to inter frequency measurements	F	4.9.0	5.0.0	T1-031618
TP-22	TP-030281	185	1	Correction of LCR ISCP test case	F	4.9.0	5.0.0	T1-031619
TP-22	TP-030281	186	1	Addition of TDD HSDPA section & creation Rel 5	B	4.9.0	5.0.0	T1-031620
TP-22	TP-030281	187	1	HSDPA HS DSCH throughput (fixed and variable)	B	4.9.0	5.0.0	T1-031621
TP-22	TP-030281	188	1	Addition of Reporting of HS DSCH CQI	B	4.9.0	5.0.0	T1-031622
TP-22	TP-030281	189	1	Addition of HS-SCCH Detection Performance	B	4.9.0	5.0.0	T1-031623
RP-29	RP-050514	190	-	CR to 34.122 Rel-5: Correction to Cell Re-selection in CELL_FACH for 1.28Mcps TDD	F	5.0.0	5.1.0	R5-051217
RP-29	RP-050514	191	-	CR to 34.122 Rel-5: Correction to Cell Re-selection in idle for 1.28Mcps TDD	F	5.0.0	5.1.0	R5-051218
RP-29	RP-050514	192	-	CR to 34.122 Rel-5:Correction to UE Measurements Procedures for 1.28Mcps TDD	F	5.0.0	5.1.0	R5-051219
RP-29	RP-050514	193	-	CR to 34.122 Rel-5:Correction to UE Measurements Performance Requirements for 1.28Mcps TDD	F	5.0.0	5.1.0	R5-051220
RP-30	RP-050777	194	-	Adding terminal Baseline and Service Implementation Capabilities of 1.28Mcps TDD	F	5.1.0	5.2.0	R5-051886
RP-30	RP-050777	195	-	Correction to power control downlink – 1.28 Mcps TDD option	F	5.1.0	5.2.0	R5-051887
RP-30	RP-050777	196	-	Correction to blocking exceptions for 1.28 Mcps TDD option	F	5.1.0	5.2.0	R5-051888
RP-30	RP-050777	197	-	Name correction of logical and transport channels	F	5.1.0	5.2.0	R5-051889
RP-30	RP-050777	198	-	Correction to power definitions	F	5.1.0	5.2.0	R5-051890
RP-30	RP-050777	199	-	Completing 1.28Mcps TDD/FDD cell reselection in idle mode	F	5.1.0	5.2.0	R5-051891
RP-30	RP-050777	200	-	Adding OCNS_Ec/Ior and correcting Ioc	F	5.1.0	5.2.0	R5-051892
RP-30	RP-050777	201	-	Correction of Cell Re-selection in CELL_FACH	F	5.1.0	5.2.0	R5-051893
RP-31	RP-060163	202	-	Correcting cell reselection test procedure	F	5.2.0	5.3.0	R5-060453
RP-31	RP-060146	203	-	Adding statistical Testing of HSDPA Receiver Performance	F	5.2.0	5.3.0	R5-060034
RP-31	RP-060146	204	-	Completing the test of reporting of HS-DSCH Channel Quality Indicator	F	5.2.0	5.3.0	R5-060033
RP-31	RP-060146	205	-	Completing HS-SCCH Detection Performance test	F	5.2.0	5.3.0	R5-060032
RP-31	RP-060146	206	-	Completing HS-DSCH throughput for variable reference channels	F	5.2.0	5.3.0	R5-060031
RP-31	RP-060146	207	-	Completing HS-DSCH throughput for fixed reference channels	F	5.2.0	5.3.0	R5-060030
RP-31	RP-060146	208	-	Adding general test conditions and declarations for HSDPA	F	5.2.0	5.3.0	R5-060029
RP-32	RP-060329	209	-	Update of HCR reference channels	F	5.3.0	5.4.0	R5-061150
RP-32	RP-060328	210	-	Correcting the handover delay for 1.28Mcps TDD option	F	5.3.0	5.4.0	R5-061426
RP-32	RP-060328	211	-	Correcting inter RAT cell re-selection for 1.28Mcps TDD option	F	5.3.0	5.4.0	R5-061427
RP-32	RP-060336	212	-	Addition of HCR HS- DSCH throughput for fixed reference channels	F	5.3.0	5.4.0	R5-061142
RP-32	RP-060336	213	-	Addition of HCR HS- DSCH throughput for variable reference channels	F	5.3.0	5.4.0	R5-061143
RP-32	RP-060336	214	-	Addition of HCR reporting of HS-DSCH channel quality indicator	F	5.3.0	5.4.0	R5-061144
RP-32	RP-060336	215	-	Addition of HCR HSDPA reference channels	F	5.3.0	5.4.0	R5-061145
RP-32	RP-060336	216	-	Addition of HCR multi-path fading environments for HSDPA performance requirements	F	5.3.0	5.4.0	R5-061146
RP-32	RP-060336	217	-	Addition of statistical testing of HSDPA receiver performance for HCR to Annex F	F	5.3.0	5.4.0	R5-061147
RP-33	RP-060552	218	-	Correction to Handover to GSM for 1.28Mcps TDD option	F	5.4.0	5.5.0	R5-062124
RP-33	RP-060552	219	-	Correcting the RRC re-establishment delay for 1.28Mcps TDD option	F	5.4.0	5.5.0	R5-062125
RP-33	RP-060552	220	-	Correcting the statistical testing of receiver BER/BLER performance	F	5.4.0	5.5.0	R5-062126
RP-33	RP-060552	221	-	Correcting the statistical testing of RRM delay performance	F	5.4.0	5.5.0	R5-062128

RP-33	RP-060549	222	-	Clarification of Tx spurious emission level from 3.84 Mcps TDD UE into PHS band.	F	5.4.0	5.5.0	R5-062267_r1
RP-34	RP-060732	223	-	Adding test case of GSM measurement of without BSIC verification required	F	5.5.0	5.6.0	R5-063106
RP-34	RP-060732	224	-	Correction to GSM measurement for 1.28Mcps TDD option	F	5.5.0	5.6.0	R5-063154
RP-34	RP-060747	225	-	HS-SCCH detection test for HCR TDD	F	5.5.0	5.6.0	R5-063218
RP-35	RP-070104	228		Correcting the inter frequency measurement for 1.28Mcps TDD option	F	5.6.0	5.7.0	R5-070119
RP-35	RP-070104	229		Correcting the intra frequency measurement test case for 1.28Mcps TDD option	F	5.6.0	5.7.0	R5-070120
RP-35	RP-070104	230		Correcting the test case of open loop power control for 1.28Mcps TDD option	F	5.6.0	5.7.0	R5-070121
RP-35	RP-070104	231		Adding the test criteria in RRM test cases for 1.28Mcps TDD option	F	5.6.0	5.7.0	R5-070122
RP-35	RP-070104	232		Adding test case of Timing Advance for 1.28Mcps TDD option	F	5.6.0	5.7.0	R5-070123
RP-35	RP-070105	227		34.122 v5.7.0 pointer to Release 6 version	F	5.6.0	5.7.0	R5-070076
RP-35	RP-070111	226		34.122 v6.0.0 pointer to Release 7 version	F	5.6.0	6.0.0	R5-070075
RP-35	RP-070091	233		Addition of 7.68Mcps to Frequency bands and channel arrangement (section 4 of 34.122)	F	5.6.0	7.0.0	R5-070175
RP-35	RP-070091	234		Addition of 7.68Mcps tests to transmitter characteristics (section 5 of 34.122)	F	5.6.0	7.0.0	R5-070538
RP-35	RP-070091	235		Addition of 7.68Mcps tests to receiver characteristics (section 6 of 34.122)	F	5.6.0	7.0.0	R5-070539
RP-35	RP-070091	236		Addition of 7.68Mcps tests to performance requirements (section 7 of 34.122)	F	5.6.0	7.0.0	R5-070178
RP-35	RP-070091	237		Addition of 7.68Mcps tests to connected mode mobility requirements for support of RRM (section 8.3 of 34.122)	F	5.6.0	7.0.0	R5-070540
RP-35	RP-070091	238		Addition of 7.68Mcps tests to RRC connection control for support of RRM (section 8.4 of 34.122)	F	5.6.0	7.0.0	R5-070180
RP-35	RP-070091	239		Addition of 7.68Mcps tests to idle mode requirements for support of RRM (section 8.2 of 34.122)	F	5.6.0	7.0.0	R5-070181
RP-35	RP-070091	240		Addition of 7.68Mcps tests to UE measurement procedures (section 8.6 of 34.122)	F	5.6.0	7.0.0	R5-070182
RP-35	RP-070091	241		Addition of 7.68Mcps tests to measurements performance requirements (section 8.7 of 34.122)	F	5.6.0	7.0.0	R5-070183
RP-35	RP-070091	242		Addition of 7.68Mcps tests to timing charcteristics for support of RRM (section 8.5 of 34.122)	F	5.6.0	7.0.0	R5-070184
RP-35	RP-070091	243		Addition of 7.68Mcps tests to Performance requirements for HSDPA (section 9 of 34.122)	F	5.6.0	7.0.0	R5-070541
RP-35	RP-070091	244		Addition of 7.68Mcps reference measurement channels to Annex C of 34.122	F	5.6.0	7.0.0	R5-070542
RP-35	RP-070091	245		Addition of 7.68Mcps propagation conditions to Annex D of 34.122	F	5.6.0	7.0.0	R5-070543
RP-35	RP-070091	246		Addition of 7.68Mcps cases to Annex F of 34.122	F	5.6.0	7.0.0	R5-070544
RP-35	RP-070091	247		Addition of 7.68Mcps to Annex H of 34.122	F	5.6.0	7.0.0	R5-070545
RP-35	RP-070091	248		Addition of 7.68Mcps messages to Annex I of 34.122	F	5.6.0	7.0.0	R5-070190
RP-35	RP-070092	249		Addition of measurement parameters for MBMS tests to Annex C of 34.122	F	5.6.0	7.0.0	R5-070192
RP-35	RP-070093	250		Addition of E-DCH reference measurement channels for E-DCH tests to Annex C of 34.122	F	5.6.0	7.0.0	R5-070191
RP-36	RP-070366	251		Addition of E-AGCH demodulation performance tests for 3.84 and 7.68Mcps TDD	F	7.0.0	7.1.0	R5-071281
RP-36	RP-070364	252		Addition of Scenario 2C: 3,84 Mcps TDD cell re-selection for 7,68 Mcps TDD UE (section 8 of 34.122)	F	7.0.0	7.1.0	R5-071285
RP-36	RP-070365	253		MTCH demodulation tests for 3.84 and 7.68Mcps TDD	F	7.0.0	7.1.0	R5-071288
RP-36	RP-070364	254		Addition of Scenario 2D: 3,84 Mcps TDD cell re-selection for 7,68 Mcps TDD UE (section 8 of 34.122)	F	7.0.0	7.1.0	R5-071313
RP-36	RP-070344	255		Correcting the test requirement for 1.28Mcps TDD option	F	7.0.0	7.1.0	R5-071425
RP-36	RP-070344	256		Correcting the message content for 1.28Mcps TDD option	F	7.0.0	7.1.0	R5-071426
RP-36	RP-070344	257		Correcting the Spectrum emission mask for 1.28Mcps TDD option	F	7.0.0	7.1.0	R5-071427
RP-37	RP-070609	258	-	Addition of MCCH demodulation tests for 3.84Mcps and 7.68Mcps	F	7.1.0	7.2.0	R5-072294
RP-37	RP-070610	259	-	Addition of Detection of E-DCH HARQ ACK Indicator Channel (E-HICH) for 3.84Mcps and 7.68Mcps TDD	F	7.1.0	7.2.0	R5-072293
RP-37	RP-070616	260	-	Adding the test case of MTCH demodulation	F	7.1.0	7.2.0	R5-072382

				performance for 1.28Mcps TDD option				
RP-37	RP-070616	261	-	Adding the test case of MTCH demodulation and cell identification for 1.28Mcps TDD option	F	7.1.0	7.2.0	R5-072383
RP-38	RP-070876	262		Introduction of multi-frequency operation for LCR TDD and corrections	F	7.2.0	7.3.0	R5-073331
RP-38	RP-070876	263		Correcting the test case of maximum output power for 1.28Mcps TDD option	F	7.2.0	7.3.0	R5-073293
RP-38	RP-070876	264		Updating of HSDPA demodulation performance requirements for 1.28Mcps TDD option	F	7.2.0	7.3.0	R5-073294
RP-38	RP-070878	265		Deleting test case of MCCH demodulation requirement for 1.28Mcps TDD option	F	7.2.0	7.3.0	R5-073295
RP-38	RP-070878	266		Correcting test case of MTCH demodulation requirement for 1.28Mcps TDD option	F	7.2.0	7.3.0	R5-073296
RP-39	RP-080102	267		Correcting the pass fail decision rule in annex F6.3.5 for 1.28Mcps TDD option	F	7.3.0	7.4.0	R5-080389
RP-39	RP-080102	268		Adding the test tolerance of performance requiremet for 1.28Mcps TDD option	F	7.3.0	7.4.0	R5-080095
RP-39	RP-080102	269		Adding the test parameter of midamble allocation for performance requiremet for LCR TDD	F	7.3.0	7.4.0	R5-080096
RP-39	RP-080102	270		Adding the test case of maximum input level for HS-PDSCH reception for 1.28Mcps TDD option	F	7.3.0	7.4.0	R5-080097
RP-39	RP-080115	271		Adding the test case of E-HICH detection parameter for 1.28Mcps TDD Option	F	7.3.0	7.4.0	R5-080191
RP-39	RP-080115	272		Adding the test case of E-AGCH detection parameter for 1.28Mcps TDD Option	F	7.3.0	7.4.0	R5-080192
RP-40	RP-080377	0273		Adding the test case of E-AGCH detection parameters for 1.28Mcps TDD Option	F	7.4.0	7.5.0	R5-081103
RP-40	RP-080377	0274		Adding the test case of E-HICH detection parameter for 1.28Mcps TDD Option	F	7.4.0	7.5.0	R5-081104
RP-40	RP-080377	0275		Adding the test case of EVM with E-DCH16QAM for 1.28Mcps TDD Option	F	7.4.0	7.5.0	R5-081105
RP-40	RP-080365	0276		Modifiying the test parameter of HS-SCCH for 1.28Mcps TDD Options	F	7.4.0	7.5.0	R5-081106
RP-41	RP-080557	0277		Correction to test case RRC re-establishment delay to an known target cell test parameters	F	7.5.0	7.6.0	R5-083057
RP-41	RP-080557	0278		Correction to test case RRC re-establishment delay to an unknown target cell test parameters	F	7.5.0	7.6.0	R5-083058
RP-41	RP-080557	0279		Correcting the test case of spurious emissions	F	7.5.0	7.6.0	R5-083303
RP-41	RP-080557	0280		Adding the test tolerance of performance requirement for HSDPA	F	7.5.0	7.6.0	R5-083304
RP-41	RP-080569	0281		Adding the test case of MBSFN capable UE for LCR TDD	F	7.5.0	7.6.0	R5-083305
RP-41	RP-080568	0282		Addition of RF tests for MBSFN for 3.84Mcps and 7.68Mcps TDD	F	7.6.0	8.0.0	R5-083320
RP-41	RP-080568	0283		Update of annex with new test configuration and multi path channel definition required for MBSFN testing for 3.84Mcps and 7.68Mcps TDD	F	7.6.0	8.0.0	R5-083823
RP-41	RP-080565	0284		Adding the test case of UE Transmission Power Headroom for 1.28Mcps TDD Option	F	7.5.0	7.6.0	R5-083824
RP-41	RP-080561	0285		Update of Detection of E-DCH HARQ ACK Indicator Channel (E-HICH) and Demodulation of E-DCH Absolute Grant Channel (E-AGCH) tests for 3.84Mcps and 7.68Mcps TDD	F	7.6.0	8.0.0	R5-083826
RP-43	RP-090219	0286	-	Maximum Input Level for HS-PDSCH Reception (1.28TDD 64QAM)	F	8.0.0	8.1.0	R5-090249
RP-43	RP-090219	0287	-	Test requirements for HS-DSCH 64QAM 1.28TDD	F	8.0.0	8.1.0	R5-090251
RP-43	RP-090200	0288	-	Modifying the reference measurement channel and performance requirement of 384kbps for LCR TDD	F	8.0.0	8.1.0	R5-090331
RP-43	RP-090200	0289	-	Adding the additional requirement of Adjacent Channel Selectivity for LCR TDD	F	8.0.0	8.1.0	R5-090332
RP-43	RP-090200	0290	-	Correction Intra/Inter-frequency cell power level of cell re-selection and handover test cases for LCR TDD	F	8.0.0	8.1.0	R5-090333
RP-43	RP-090200	0291	-	Changing the tables of HSDPA reference measurement channels for LCR TDD	F	8.0.0	8.1.0	R5-090334
RP-43	RP-090200	0292	-	Changing the tables of E-DCH fixed reference channels for LCR TDD	F	8.0.0	8.1.0	R5-090335
RP-43	RP-090200	0293	-	Adding the test parameters of MBMS for LCR TDD	F	8.0.0	8.1.0	R5-090336
RP-43	RP-090200	0294	-	Modifying P-CCPCH RSCP intra frequency relative requirement for LCR TDD	F	8.0.0	8.1.0	R5-090337
RP-43	RP-090201	0295	-	Modifications of Test Parameters for LCR-TDD HSDPA Performance	F	8.0.0	8.1.0	R5-090540
RP-43	RP-090204	0296	-	Introduction of UE Transmitted Power	F	8.0.0	8.1.0	R5-091099
RP-44	RP-090448	0297	-	UTRA TDD to E-UTRA TDD cell reselection: E-UTRA is of lower priority scenario	F	8.1.0	8.2.0	R5-092313

RP-44	RP-090448	0298	-	UTRA TDD to E-UTRA TDD cell reselection: E-UTRA is of higher priority scenario	F	8.1.0	8.2.0	R5-092314
RP-44	RP-090434	0299	-	Correction on 64QAM Reference measurement channel for 1.28Mcps TDD	F	8.1.0	8.2.0	R5-092446
RP-44	RP-090434	0300	-	Correction on UPH reporting accuracy and UE transmitted power absolute accuracy requirements for 1.28Mcps TDD	F	8.1.0	8.2.0	R5-092447
RP-45	RP-090803	0301	-	Correction on the test case of MBSFN capable UE for LCR TDD	F	8.2.0	8.3.0	R5-094275
RP-45	RP-090801	0302	-	UTRA TDD to E-UTRA TDD Cell search	F	8.2.0	8.3.0	R5-094543
RP-45	RP-090801	0303	-	UTRA TDD to E-UTRA FDD Cell search	F	8.2.0	8.3.0	R5-094544
RP-45	RP-090801	0304	-	Add new spec references in 34.122	F	8.2.0	8.3.0	R5-094545
RP-45	RP-090798	0305	-	Corrections on LCR TDD 64QAM FRCs and requirements	F	8.2.0	8.3.0	R5-094954
RP-45	RP-090801	0306	-	Addition of the UTRA TDD to E-UTRA FDD handover test case	F	8.2.0	8.3.0	R5-094964
RP-45	RP-090801	0307	-	Addition of the UTRA TDD to E-UTRA TDD handover test case	F	8.2.0	8.3.0	R5-094965
RP-46	RP-091130	0308	-	Introduction of 3.84 Mcps TDD IMB option in 34.122	F	8.3.0	8.4.0	R5-095690
RP-46	RP-091130	0309	-	Receiver characteristics for 3.84 Mcps TDD IMB	F	8.3.0	8.4.0	R5-095692
RP-46	RP-091119	0310	-	Maximum output power with E-DCH for TDD And FRC	F	8.3.0	8.4.0	R5-095760
RP-46	RP-091130	0311	-	Tests to verify the demodulation of MTCH for 3.84 Mcps TDD IMB UEs	F	8.3.0	8.4.0	R5-095779
RP-46	RP-091119	0312	-	Adding Demodulation test case for LCR TDD 64QAM	F	8.3.0	8.4.0	R5-096094
RP-46	RP-091119	0313	-	Adding CQI test for LCR TDD 64QAM	F	8.3.0	8.4.0	R5-096095
RP-46	RP-091121	0314	-	Combined UTRA TDD - UTRA TDD and E-UTRA FDD cell search in fading	F	8.3.0	8.4.0	R5-096249
RP-46	RP-091130	0315	-	DL reference measurement parameters for 3.84 Mcps TDD IMB tests	F	8.3.0	8.4.0	R5-096279
RP-47	RP-100142	0316	-	maximum output power with multi-code for TDD	F	8.4.0	8.5.0	R5-100194
RP-47	RP-100142	0317	-	maximum output power with HS-SICH and DPCH for TDD	F	8.4.0	8.5.0	R5-100195
RP-47	RP-100142	0318	-	ACLR with HS-SICH and DPCH for TDD	F	8.4.0	8.5.0	R5-100196
RP-47	RP-100142	0319	-	Spectrum emission mask with HS-SICH and DPCH for TDD	F	8.4.0	8.5.0	R5-100197
RP-47	RP-100142	0320	-	EVM with HS-SICH and DPCH for TDD	F	8.4.0	8.5.0	R5-100198
RP-47	RP-100142	0321	-	Demodulation of DCH in birth-death conditions for TDD	F	8.4.0	8.5.0	R5-100199
RP-47	RP-100142	0322	-	Demodulation of DCH in moving conditions for TDD	F	8.4.0	8.5.0	R5-100200
RP-47	RP-100142	0323	-	HS-SICH and DPCH reference measurement channel	F	8.4.0	8.5.0	R5-100201
RP-47	RP-100142	0324	-	Moving conditions for TDD	F	8.4.0	8.5.0	R5-100202
RP-47	RP-100142	0325	-	Birth-Death conditions for TDD	F	8.4.0	8.5.0	R5-100203
RP-47	RP-100142	0326	-	E-TFC selection in UE	F	8.4.0	8.5.0	R5-100204
RP-47	RP-100142	0327	-	Serving HS-DSCH cell change	F	8.4.0	8.5.0	R5-100205
RP-47	RP-100142	0344	-	Test case of E-UTRA TDD RSRP absolute accuracy in UTRAN TDD mode	F	8.4.0	8.5.0	R5-100208
RP-47	RP-100142	0345	-	Test case of E-UTRA TDD RSRQ absolute accuracy in UTRAN TDD mode	F	8.4.0	8.5.0	R5-100209
RP-47	RP-100158	0346	-	Introduction of HS-DSCH Performance test case for MIMO of 1.28Mcps TDD	F	8.4.0	8.5.0	R5-100390
RP-47	RP-100142	0328	-	Addition of BLER requirements for 3.84 Mcps TDD IMB receiver characteristics	F	8.4.0	8.5.0	R5-100413
RP-47	RP-100138	0329	-	Reorganization and update of section 9.3.1 HS-DSCH throughput for Fixed Reference Channels	F	8.4.0	8.5.0	R5-100423
RP-47	RP-100138	0330	-	Reorganization and update of section 9.3.2 HS-DSCH throughput for Variable Reference Channels	F	8.4.0	8.5.0	R5-100424
RP-47	RP-100138	0331	-	Reorganization and update of section 9.3.3 Reporting of HS-DSCH Channel Quality Indicator	F	8.4.0	8.5.0	R5-100425
RP-47	RP-100138	0332	-	Addition of new test case-UTRAN to GSM Cell Re-Selection: HCS with only UTRA level changed for 1,28 Mcps TDD Option	F	8.4.0	8.5.0	R5-100426

RP-47	RP-100138	0333	-	Addition of test case-Cell Re-selection in CELL_FACH: Cell Reselection to GSM for 1,28 Mcps TDD	F	8.4.0	8.5.0	R5-100429
RP-47	RP-100138	0334	-	Addition of 2 test cases - Random Access for 1,28 Mcps TDD	F	8.4.0	8.5.0	R5-100430
RP-47	RP-100138	0335	-	Addition of test case - TDD/TDD Handover for 1,28 Mcps Option: Handover to inter-band cell: Scenario 2	F	8.4.0	8.5.0	R5-100431
RP-47	RP-100138	0336	-	Inter-band handover for 1.28Mcps TDD	F	8.4.0	8.5.0	R5-100477
RP-47	RP-100138	0337	-	Inter-band Cell Re-selection for 1.28Mcps TDD	F	8.4.0	8.5.0	R5-100478
RP-47	RP-100138	0338	-	Extension of P-CCPCH RSCP absolute accuracy requirement for 1.28Mcps TDD	F	8.4.0	8.5.0	R5-100484
RP-47	RP-100142	0339	-	UTRAN TDD - E-UTRAN FDD RSRP Measurement Accuracy Tests	F	8.4.0	8.5.0	R5-100870
RP-47	RP-100142	0340	-	UTRAN TDD - E-UTRAN FDD RSRQ Measurement Accuracy Tests	F	8.4.0	8.5.0	R5-100871
RP-47	RP-100141	0341	-	Combined UTRA TDD inter-frequency and GSM cell search under AWGN	F	8.4.0	8.5.0	R5-100884
RP-47	RP-100141	0342	-	UTRAN TDD to GSM Handover: Non-synchronization target cell Test Case	F	8.4.0	8.5.0	R5-100885
RP-47	RP-100158	0343	-	Introduction of CQI test case for MIMO of 1.28Mcps TDD	F	8.4.0	8.5.0	R5-101182
RP-47	-	-	-	Moved to v9.0.0 with no change	-	8.5.0	9.0.0	-
RP-48	RP-100506	0347	-	Addition of test case - Inter-RAT cell change order from UTRAN TDD to GSM(GPRS) for 1.28 Mcps TDD Option	F	9.0.0	9.1.0	R5-103194
RP-48	RP-100506	0348	-	Addition of 2 test cases - UE uplink synchronization control during handover for 1.28 Mcps TDD	F	9.0.0	9.1.0	R5-103195
RP-48	RP-100506	0349	-	Modification of test case - Event 1H and 1I triggered reporting in AWGN propagation condition for 1.28 Mcps TDD Option	F	9.0.0	9.1.0	R5-103197
RP-48	RP-100530	0350	-	UE test requirements in high speed train condition for LCR TDD	F	9.0.0	9.1.0	R5-103269
RP-48	RP-100527	0351	-	Introduction of measurement channels for MIMO of 1.28Mcps TDD	F	9.0.0	9.1.0	R5-103431
RP-48	RP-100511	0352	-	Introduction of Band e and Band f requirements for LCR TDD	F	9.0.0	9.1.0	R5-103722
RP-48	RP-100527	0353	-	Introduction of method of CQI test for MIMO of 1.28Mcps TDD	F	9.0.0	9.1.0	R5-103772
RP-49	RP-100812	0361	-	SEM with E-DCH for TDD	F	9.1.0	9.2.0	R5-104843
RP-49	RP-100812	0358	-	maximum output power with E-DCH for TDD	F	9.1.0	9.2.0	R5-104349
RP-49	RP-100812	0359	-	ACLR with E-DCH for TDD	F	9.1.0	9.2.0	R5-104350
RP-49	RP-100828	0360	-	Test case of E-UTRAN TDD - UTRAN TDD handover: unknown target cell	F	9.1.0	9.2.0	R5-104386
RP-49	RP-100809	0355	-	Correction to test case 8.3.4 - Cell Re-selection in CELL_FACH	F	9.1.0	9.2.0	R5-104227
RP-49	RP-100809	0357	-	Correction to test case 8.3.6 - Cell Re-selection in URA_PCH	F	9.1.0	9.2.0	R5-104229
RP-49	RP-100809	0356	-	Correction to test case 8.3.5 - Cell Re-selection in CELL_PCH	F	9.1.0	9.2.0	R5-104228
RP-49	RP-100809	0354	-	Correction to test case 5.5.2.1 and 5.5.2.1B - Remove 0.8M offset of Spectrum emission mask for 1.28M TDD	F	9.1.0	9.2.0	R5-104223
RP-50	RP-101137	0362	-	Correction in test procedure to remove redundant frequency range of measurement	F	9.2.0	9.3.0	R5-106161
RP-50	RP-101146	0363	-	Correction in Procedure Settings for test case 9.3.1A till 9.3.1E and corresponding Annex F.6.3.5	F	9.2.0	9.3.0	R5-106173
RP-50	RP-101137	0364	-	Introduction of new Power Control TC in the Downlink for 1.28Mcps TDD	F	9.2.0	9.3.0	R5-106860
RP-51	RP-110156	0365	-	Correction in test requirement of 9.3.2A/B/C/D/E	F	9.3.0	9.4.0	R5-110321
RP-51	RP-110156	0366	-	Add Mid UARFCN channel testing in Clause 5.5.2.1, 5.5.2.1A & 5.5.2.1B Intial Conditions settings	F	9.3.0	9.4.0	R5-110322
RP-51	RP-110165	0367	-	Correction on Annex F.6.3.5, Table F.6.3.5.1 to correlate Clause 9.3.1A.5, Table 9.3.1A.3	F	9.3.0	9.4.0	R5-110323
RP-51	RP-110156	0368	-	Correction in Test Requirements Settings for test case 9.3.2E based on corresponding Annex F.2.5, Table F.2.5	F	9.3.0	9.4.0	R5-110324

RP-51	RP-110157	0369	-	Correction of Maximum Input Level Test for HS-PDSCH Transmission for 1.28Mcps TDD	F	9.3.0	9.4.0	R5-110614
RP-51	RP-110156	0370	-	Introduction of new DL power control TC, wind up effects for 1.28Mcps TDD	F	9.3.0	9.4.0	R5-110923
RP-51	RP-110156	0371	-	Modification of a test case for inter-band handover for 1.28 Mcps TDD Scenario 2	F	9.3.0	9.4.0	R5-110924
RP-51	RP-110156	0372	-	Addition of a new test case for inter-band handover for 1.28 Mcps TDD Scenario 3	F	9.3.0	9.4.0	R5-110925
RP-51	RP-110156	0373	-	Correction in test procedure of User Equipment maximum output power with HS-SICH and DPCH test cases	F	9.3.0	9.4.0	R5-110977
RP-52	RP-110639	0375	-	Correction in test procedure of User Equipment maximum output power with HS-SICH and DPCH test cases	F	9.4.0	9.5.0	R5-112198
RP-52	RP-110639	0376	-	Complement release applicability for 1.28Mcps TDD (clause 5)	F	9.4.0	9.5.0	R5-112344
RP-52	RP-110639	0377	-	Complement the release applicability for 1.28Mcps TDD (clause 7)	F	9.4.0	9.5.0	R5-112345
RP-52	RP-110639	0378	-	Complement the release applicability for 1.28Mcps TDD (clause 8)	F	9.4.0	9.5.0	R5-112346
RP-52	RP-110639	0379	-	Addition of test case - UE uplink synchronization control for PRACH for 1,28 Mcps TDD	F	9.4.0	9.5.0	R5-112347
RP-53	RP-111131	0380	-	Correction in test procedure of User Equipment maximum output power with E-DCH	F	9.5.0	9.6.0	R5-113247
RP-53	RP-111133	0381	-	Introduction of new DL power control TC, initial convergence for 1.28Mcps TDD	F	9.5.0	9.6.0	R5-113338
RP-54	RP-111575	0382	-	Completing for test case in section 8.2.2.6.1 of 34.122	F	9.6.0	9.7.0	R5-115295
RP-54	RP-111575	0383	-	Completing for test case in section 8.2.2.6.2 of 34.122	F	9.6.0	9.7.0	R5-115297
RP-54	RP-111575	0384	-	Update of Annex in 34.122	F	9.6.0	9.7.0	R5-115378
RP-54	-	-	-	moved to Rel-10 with no change	-	9.7.0	10.0.0	-
RP-54	RP-111601	0385	-	Addition of test cases for performance requirement under multiple-cell scenario for 1,28 Mcps TDD	F	10.0.0	11.0.0	R5-115880
RP-54	RP-111601	0386	-	Addition of connection diagram for performance requirement under multiple-cell scenario for 1,28 Mcps TDD	F	10.0.0	11.0.0	R5-115881
RP-55	RP-120175	0389	-	Update of cell configuration mapping in Annex J	F	11.0.0	11.1.0	R5-120332
RP-55	RP-120175	0390	-	Add TC 8.3.3c +8.3.3d in 34.122	F	11.0.0	11.1.0	R5-120383
RP-55	RP-120175	0391	-	Update of E-UTRAN RSRP and RSRQ measure tests	F	11.0.0	11.1.0	R5-120815
RP-55	RP-120173	0392	-	Add Mid UARFCN channel testing in test case 6.8 of Spurious Emissions	F	11.0.0	11.1.0	R5-120817
RP-55	RP-120174	0393	-	Differentiate test case name of Spectrum Emission Mask	F	11.0.0	11.1.0	R5-120818
RP-55	RP-120205	0394	-	Complete the test cases for performance requirement under multiple-cell scenario for 1,28 Mcps TDD	F	11.0.0	11.1.0	R5-120819
RP-55	RP-120205	0395	-	Complete the test tolerances for performance requirement under multiple-cell scenario for 1,28 Mcps TDD	F	11.0.0	11.1.0	R5-120820
RP-55	RP-120205	0396	-	Complete the derivation of test requirements for performance requirement under multiple-cell scenario for 1,28 Mcps TDD	F	11.0.0	11.1.0	R5-120821
RP-55	RP-120175	0397	-	Completing for test case 8.3.3a and 8.3.3b of 34.122	F	11.0.0	11.1.0	R5-120849
RP-55	RP-120175	0398	-	Completing for test case 8.6.5.1 and 8.6.5.2 of 34.122	F	11.0.0	11.1.0	R5-120851
RP-55	RP-120175	0399	-	Completing for TC 8.6.5.3 and adding TC 8.6.5.4 of 34.122	F	11.0.0	11.1.0	R5-120853
RP-55	RP-120175	0400	-	Corrections of inter-RAT E-UTRA RSRP, RSRQ band dependency	F	11.0.0	11.1.0	R5-120855
RP-55	RP-120175	0401	-	Adding the references for statistical testing and 36.508 default messages	F	11.0.0	11.1.0	R5-120856
RP-55	RP-120184	0402	-	Corrections to Common RF Test Conditions	F	11.0.0	11.1.0	R5-120887
RP-55	RP-120175	0403	-	Adding the references for statistical testing in E-UTRA TDD cell reselection	F	11.0.0	11.1.0	R5-120911
RP-56	RP-120648	0408	-	Clarification of the scope of Band a for 1.28 Mcps TDD option in TS 34.122	F	11.1.0	11.2.0	R5-121455

RP-56	RP-120637	0406	-	Serving cell parameters definition in test case 5.4.1.3	F	11.1.0	11.2.0	R5-121325
RP-56	RP-120640	0410	-	Addition of Measurement bandwidth in Measurement Control	F	11.1.0	11.2.0	R5-121536
RP-56	RP-120640	0409	-	Correction to UTRA to E-UTRA Handover	F	11.1.0	11.2.0	R5-121535
RP-56	RP-120640	0405	-	Uncertainties and Test Tolerances for E-UTRAN FDD, TDD RSRP Test cases 8.7.14 and 8.7.15	F	11.1.0	11.2.0	R5-121239
RP-56	RP-120637	0407	-	Incorrect Test Setup Diagram reference in Initial Conditions Settings	F	11.1.0	11.2.0	R5-121326
RP-56	RP-120640	0404	-	Uncertainties and Test Tolerances for E-UTRAN RSRQ Test cases 8.7.16 and 8.7.17	F	11.1.0	11.2.0	R5-121187
RP-56	RP-120640	0411	-	Correction to the test frequency references in TDD with E-UTRA tests	F	11.1.0	11.2.0	R5-121622
RP-56	RP-120649	0412	-	Update on Annex E	F	11.1.0	11.2.0	R5-121976
RP-57	RP-121102	0413	-	Corrections to the frequency band requirements	F	11.2.0	11.3.0	R5-123145
RP-57	RP-121094	0414	-	Completing Test case 8.7.16 in 34.122	F	11.2.0	11.3.0	R5-123189
RP-57	RP-121094	0415	-	Correction to 8.7.15 E-UTRAN TDD RSRP	F	11.2.0	11.3.0	R5-123341
RP-57	RP-121094	0416	-	Alignment of test procedure steps in TDD cell reselection tests	F	11.2.0	11.3.0	R5-123342
RP-57	RP-121094	0417	-	Clarification of the release of UTRAN-EUTRAN Inter-RAT RRM test cases in 34.122	F	11.2.0	11.3.0	R5-123787
RP-58	RP-121655	0418	-	Correction to UTRA TDD to E-UTRA FDD Handover in 34.122	F	11.3.0	11.4.0	R5-125396
RP-58	RP-121655	0419	-	Correction to wait time for RSRP/RSRQ tests in 34.122	F	11.3.0	11.4.0	R5-125825
RP-58	RP-121672	0420	-	Completing TC8.3.3d, UTRAN TDD to E-UTRAN TDD Handover unknown target cell	F	11.3.0	11.4.0	R5-125826
RP-58	RP-121672	0421	-	Completing TC8.3.3c, UTRAN TDD to E-UTRAN FDD Handover unknown target cell	F	11.3.0	11.4.0	R5-125827
RP-58	RP-121672	0422	-	Completing TC8.3.3e, UTRAN TDD to GSM Handover non-synchronization target cell	F	11.3.0	11.4.0	R5-125828
RP-58	RP-121672	0423	-	Correction of TC8.3.3a, UTRAN TDD to E-UTRAN FDD Handover	F	11.3.0	11.4.0	R5-125829
RP-58	RP-121672	0424	-	Correction of TC8.3.3b, UTRAN TDD to E-UTRAN TDD Handover	F	11.3.0	11.4.0	R5-125830
RP-60	RP-130625	0425	-	Editors note for test cases where Test Requirement not valid above 3GHz	F	11.4.0	11.5.0	R5-131273
RP-60	RP-130611	0426	-	Incorrect definition for I^or/Ioc in Clause F.6.3.5	F	11.4.0	11.5.0	R5-131548
RP-60	RP-130607	0427	-	Incorrect references for test requirements tables in SEM Tests	F	11.4.0	11.5.0	R5-131549
RP-60	RP-130635	0428	-	Update additional spurious emission requirements towards TDD bands	F	11.4.0	11.5.0	R5-131950
RP-60	RP-130635	0429	-	Update receiver spurious emission requirements towards TDD band 41 and band 44	F	11.4.0	11.5.0	R5-131951
RP-61	RP-131102	0430	-	Clarification of starting time in TDD HO test cases	F	11.5.0	11.6.0	R5-133844