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Abstract of document:

This technical report captures the results of the work on the work item “Low chip rate TDD RF Radio Transmission/Reception, System Performance Requirements and Conformance Testing”. It includes the UE Transmission/Reception, BS Transmission/Reception, BS Conformance testing, BS electromagnetic compatibility, System Performance Requirements, the RF Parameters in support of Radio Resource Management, and RF system scenarios.

Changes since last presentation to TSG-RAN Meeting:

The Contents of Section 4 (RF Parameters in support of Radio Resource Management) were updated in alignment with FDD and 3,84Mcps TDD. The new time mask and spectrum emission mask requirements of UE and BS were added. Especially, the multilevel ACLR requirements of BS were added in order to co-exist with other systems. In addition, some measurement channels were also complemented in the corresponding appendixes.

Outstanding Issues:

Contentious Issues:

3G TR 25.945 V2.4.0 (2001-03)

Technical Report

3rd Generation Partnership Project (3GPP);
Technical Specification Group (TSG);
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RF requirements for 1.28Mcps UTRA TDD option

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Contents

Foreword

This Technical Report has been produced by the 3GPP.

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of this TS, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version 3.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 Indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the specification.

1 Scope

This technical Report identifies the RF Radio Transmission/Reception and Radio Resource Management requirements for the 1.28Mcps UTRA TDD option, including the commonalties and differences. Furthermore, the impact on the RF system Sceaniors and BS conformance testing is also identified.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an TS shall also be taken to refer to later versions published as an EN with the same number.

[1] 25.102 UE Radio transmission and reception (TDD)

[3] 25.105 BS Radio transmission and reception (TDD)

[4] 25.123 RF parameters in support of RRM (TDD)

[5] 25.142 Base Station conformance testing (TDD)

[6] 25.113 Base Station EMC

[7] 25.942 RF System scenarios

[8] 25.922 RRM Strategies

3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

4 RF Parameters in Support of Radio Resource Management

4.1 Idle Mode

4.1.1 Cell Selection

4.1.1.1 Introduction

After a UE has switch on and a PLMN has been selected, the cell selection process takes place. This process allows the UE to select a suitable cell where to camp on in order to access available services. In this process the UE can use stored information (stored information cell selection) or not (initial cell selection)

4.1.2 Cell Re-Selection

4.1.2.1 Introduction

The cell re-selection procedure allows the UE to select a more suitable cell and camp on it.

When the UE is in Normally Camped state it shall attempt to detect, synchronise and monitor cells indicated in the measurement control system information of the serving cell. If the occasions/triggers occur, as specified in 25.304, the UE shall perform the Cell Re-selection Evaluation process.

4.1.2.2 Requirements

4.1.2.2.1 Measurement and evaluation of cell selection criteria S of serving cell

The UE shall measure the PCCPCH RSCP level of the serving cell and evaluate the cell selection criterion S defined in TS25.304 for the serving cell once per DRX cycle. The UE shall filter the PCCPCH RSCP level of the serving cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureNTDD}/2$ (see table 4.1).

If the UE has evaluated in N_{serv} successive measurements that the serving cell does not fulfill the cell selection criterion S the UE shall initiate the measurements of all neighbour cells indicated in the measurement control system information, regardless of the measurement rules currently limiting UE measurement activities.

If the UE has not found any new suitable cell based the on searches and measurements of the neighbour cells indicated in the measurement control system information for [TBD] s, the UE shall initiate cell selection procedures for the selected PLMN as defined in TS25.304.

4.1.2.2.2 Measurement of intra-frequency cells

The UE shall measure PCCPCH RSCP at least every $T_{measureNTDD}$ (see table 4.1) for intra-frequency cells that are detected and measured according to the measurement rules. $T_{measureNTDD}$ is defined in Table 4.1. The UE shall filter PCCPCH RSCP measurements of each measured intra-frequency cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureNTDD}/2$.

The filtering shall be such that the UE shall be capable of evaluating that an intra-frequency cell has become better than the serving cell within $T_{evaluateNTDD}$ (see table 4.1), from the moment the intra-frequency cell became at least [2]dB better ranked than the current serving cell, provided that $T_{reselection}$ timer is set to zero and PCCPCH RSCP is used as measurement quantity for cell reselection.

If parameter $T_{reselection}$ has value different from zero, the UE shall evaluate an intra-frequency cell better than the serving cell during the $T_{reselection}$ time, before the UE shall reselect the new cell.

4.1.2.2.3 Measurement of 1,28Mcps TDD inter-frequency cells

The UE shall measure PCCPCH RSCP at least every ($N_{carrier}$-1) * $T_{measureNTDD}$ (see table 4.1) for inter-frequency cells that are detected and measured according to the measurement rules. The parameter $N_{carrier}$ is the number of carriers used for NTDD cells. The maximum number of carriers is [3] including the carrier the UE is camped on. The UE shall filter PCCPCH RSCP measurements of each measured inter-frequency cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureNTDD}$/2.

The filtering of PCCPCH RSCP shall be such that the UE shall be capable of evaluating that an already detected inter-frequency cell has become better ranked than the serving cell within ($N_{carrier}$-1) * $T_{evaluateNTDD}$ from the moment the inter-frequency cell became at least [3]dB better than the current serving cell provided that $T_{reselection}$ timer is set to zero. For non-detected inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell has become better ranked than the serving cell within 30s from the moment the inter-frequency cell became at least [3]dB better than the current serving cell provided that $T_{reselection}$ timer is set to zero.

If $T_{reselection}$ timer has a value different from zero, the UE shall evaluate an inter-frequency cell better than the serving cell during the $T_{reselection}$ time, before the UE shall reselect the new cell.

4.1.2.3 High Chip Rate TDD re-selection

This requirement only applies to UEs supporting this mode.

The ranking of the low and high chip rate TDD cells shall be made according to the cell reselection criteria specified in TS25.304. The use of mapping functions is indicated in the broadcast.

The UE shall measure PCCPCH RSCP at least every $N_{TDDcarrier}$ * $T_{measureTDD}$ (see table 4.1) for inter-frequency cells that are detected and measured according to the measurement rules. The parameter $N_{carrier}$ is the number of carriers used for 3.84Mcps TDD cells. The maximum number of carriers is 3.The UE shall filter PCCPCH RSCP measurements of each measured high chip rate TDD cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureTDD}$/2.

The filtering of PCCPCH RSCP shall be such that the UE shall be capable of evaluating that a high chip rate TDD cell has become better ranked than the serving cell within $N_{TDDcarrier}$ * $T_{evaluateTDD}$ from the moment the inter-frequency cell became at least [3] better ranked than the current serving cell provided that $T_{reselection}$ timer is set to zero. For non-detected inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell has become better ranked than the serving cell within 30s from the moment the inter-frequency cell became at least [3]dB better than the current serving cell provided that $T_{reselection}$ timer is set to zero.

4.1.2.4 FDD Cell re-selection

This requirement only applies to UEs supporting this mode.

The UE shall measure the signal level CPICH RSCP of each FDD neighbour cell indicated in the measurement control system information of the serving cell, according to the measurement rules defined in TS25.304, at least every $T_{measureFDD}$ (see table 4.1). The UE shall filter CPICH RSCP measurements of each measured inter-frequency cell using at least 2 measurements. The measurement samples for each cell shall be as far as possible uniformly distributed over the averaging period.

CPICH RSCP is used as measurement quantity for cell reselection, the filtering shall be such that the UE shall be capable of evaluating that an already detected inter-frequency cell has become better ranked than the serving cell within $NFDD_{carrier}$ * $T_{evaluateFDD}$ from the moment the inter-frequency cell became at least [5]dB better than the current serving cell provided that $T_{reselection}$ timer is set to zero. For non-detected inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell has become better ranked than the serving cell within 30s from the moment the inter-frequency cell became at least [5]dB better than the current serving cell provided that $T_{reselection}$ timer is set to zero.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS25.304. The use of mapping functions is indicated in the broadcast.

4.1.3 Measurement of inter-RAT GSM cells

These requirements only apply to UEs supporting GSM.

The UE shall measure the signal level of each GSM neighbour cell indicated in the measurement control system information of the serving cell, according to the measurement rules defined in TS25.304, at least every $T_{measureGSM}$ (see table 4.1). The UE shall maintain a running average of 4 measurements for each cell. The measurement samples for each cell shall be as far as possible uniformly distributed over the averaging period.

The UE shall attempt to verify the BSIC for each of the 4 best ranked GSM BCCH carriers (the best ranked according to the cell reselection criteria defined in TS25.304) at least every 30 seconds if GSM cells are measured according to the measurement rules. If a change of BSIC is detected for one GSM cell then that GSM BCCH carrier shall be treated as a new GSM neighbour cell.

If the UE detects a BSIC, which is not indicated in the measurement control system information, the UE shall not consider that GSM BCCH carrier in cell reselection. The UE also shall not consider the GSM BCCH carrier in cell reselection, if the UE can not demodulate the BSIC of that GSM BCCH carrier.

4.1.4 Evaluation of cell reselection criteria

The UE shall evaluate the cell re-selection criteria defined in TS 25.304 for the cells, which have new measurement results available, at least every DRX cycle.

Cell reselection shall take place immediately after the UE has found a better suitable cell unless the UE has made cell reselection within the last 1 second.

4.1.5 Maximum interruption time in paging reception

UE shall perform the cell re-selection with minimum interruption in monitoring downlink channels for paging reception.

At intra-frequency cell re-selection, the UE shall monitor the downlink of current serving cell for paging reception until the UE is capable to start monitoring downlink channels of the target intra-frequency cell for paging reception. The interruption time shall not exceed [50]ms.

At inter-frequency and inter-RAT cell re-selection, the UE shall monitor the downlink of current serving cell for paging reception until the UE is capable to start monitoring downlink channels for paging reception of the target inter-frequency cell. The interruption time must not exceed T_REP + [50] ms. T_REP is the longest repetition period for the system information required to be read by the UE to camp on the cell.

These requirements assume sufficient radio conditions, so that decoding of system information can be made without errors.

Table 4.1 $T_{measureNTDD}$, $T_{evaluateNTDD}$, $T_{measureTDD}$, $T_{evaluateTDD}$, $T_{measureFDD}$, $T_{evaluateFDD}$ and $T_{measureGSM}$

DRX cycle length [s]	N_{serv} [number of successive	$T_{measureNTDD}$ [s] (number of	$T_{evaluateNTDD}$ [s] (number of DRX	$T_{measureTDD}$ [s] (number of	$T_{evaluateTDD}$ [s] (number of DRX

	measurements]	DRX cycles)	cycles)	DRX cycles)	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)

DRX cycle length [s]	N_{serv} [number of successive measurements]	$T_{measureFDD}$ [s] (number of DRX cycles)	$T_{evaluateFDD}$ [s] (number of DRX cycles)	$T_{measureGSM}$ [s] (number of DRX cycles)
0.08	4	0.64 (8DRX cycles)	2.56 (32 DRX cycles)	2.56 (32 DRX cycles)
0.16	4	0.64 (4)	2.56 (16)	2.56 (16)
0.32	4	1.28 (4)	5.12 (16)	5.12 (16)
0.64	4	1.28 (2)	5.12 (8)	5.12 (8)
1.28	2	1.28 (1)	6.4 (5)	6.4 (5)
2.56	2	2.56 (1)	7.68 (3)	7.68 (3)
5.12	1	5.12 (1)	10.24 (2)	10.24 (2)

In idle mode, UE shall support DRX cycles lengths 0.64, 1.28, 2.56 and 5.12 s.

4.1.6 Numbers of cells in neighbouring cell list

The UE shall be capable of monitoring [32] intra-frequency NTDD cells (including serving cell),

- [32] inter-frequency cells including low and high chip rate TDD Mode cells and FDD Mode cells if FDD and/or high chip rate TDD is supported by the UE

- the NTDD inter-frequency cells can be located on [x] additional frequencies besides the serving cell.

- the inter-frequency cells can be located on up to [x] carriers.

In addition the UE shall be able to monitor 32 GSM carriers if GSM is supported by the UE. UE measurement activity is controlled by measurement rules defined in in TS25.304, allowing the UE to limit its measurement activity if certain conditions are fulfilled.

4.2 Connected Mode

4.2.1 TDD/TDD Handover

The requirements apply for 1.28Mcps and 3.84Mcps handover.

4.2.1.1 Introduction

The purpose of TDD/TDD handover is to change the cell of the connection between UE and UTRAN. The handover procedure is initiated from UTRAN with a RRC message that implies a handover. The handover procedure may cause the UE to change its frequency.

The handover process should be implemented in both the UE and UTRAN. The UE measurements and which radio links the UE shall use is controlled by UTRAN with RRC signaling. For the handover preparation the UE receives from the UTRAN a list of cells (e.g. 1.28Mcps TDD, or GSM). Which the UE shall monitor (see 'monitored set' in 3GPP RAN TS 25.331 'RRC Protocol Specification’) in its idle timeslots.

At the beginning of the measurement process the UE shall find synchronization to the cell to measure using the synchronization channel (DwPCH). This is described under 'cell search' in 3GPP RAN TR 25.928 ' if the monitored cell is a 1.28Mcps TDD cell.For a TDD cell to monitor after this procedure the exact timing of the midamble of the P-CCPCH is known and the measurements can be performed. Depending on the UE implementation and if timing information about the cell to monitor is available, the UE may perform the measurements on the P-CCPCH directly without prior DwPCH synchronization.

4.2.1.2 Requirements

Requirements for 3.84Mcps are only applicable if high chip rate TDD is supported by the UE.

4.2.1.2.1 Handover delay

Procedure delay for all procedures, that can command a hard handover, are specified in TS25.331.

When the UE receives a RRC message that implies a handover, with the activation time "now" or earlier than $D_{handover}$ seconds from the end of the last TTI containing the RRC command,,the UE shall start transmission within $D_{handover}$ seconds from the end of the last TTI containing the RRC command.

If the access is delayed to an indicated activation time later than $D_{handover}$ seconds from the end of the last TTI containing the RRC command, the UE shall be ready to start the transmission of the new uplink DPCH at the designated activation time.

where:

$D_{handover}$ equals the RRC procedure delay defined in TS25.331 Section 13.5.2 plus the interruption time stated in section 4.2.1.2.2.

4.2.1.2.2 Interruption time

The interruption time i.e. the time between the last TTI containing a transport block on the old DPCH and the time the UE starts transmission of the new uplink DPCCH, shall be less than the value in table 4.2.1.1. There is different requirement on the interruption time depending on if the cell is known or not.

A cell shall be regarded as known by the UE if it has been measured during the last 5 seconds or a dedicated connection existed between the UE and the cell during the last 5 seconds.

Table 4.2.1.1 TDD/ TDD handover – interruption time

cell in the handover command message	Maximum delay [ms]	
	Known Cell	Cell
1	[40]	[350]

The interruption time includes the time that can elapse till the appearance of the channel required for the synchronisation. And the the time that can elapse till the appearance of the DwPTS in which the new uplink SYNC1 shall be transmitted ,or in case of high chip rate TDD the new uplink DPCH, shall be transmitted , which can be up to one frame (10ms).

The requirement in Table 4.2.1.1 for the unknown cell shall apply if the signal quality of the unknown cell is good enough for successful synchronisation with one attempt.

NOTE:

One synchronisation attempt can consist of coherent averaging using several frames.

4.2.2 1,28Mcps TDD/FDD Handover

4.2.2.1 Introduction

The purpose of 1.28Mcps TDD/FDD handover is to change the mode between 1.28Mcps TDD and FDD.

The handover procedure is initiated from UTRAN with a handover command message. The handover procedure causes the UE to change its frequency.

4.2.2.2 Requirements

These requirements shall apply only to 1.28McpsTDD/FDD UE.

The requirements do not apply if FDD macro-diversity is used.

4.2.2.2.1 Handover delay

Procedure delay for all procedures, that can command a hard handover, are specified in [TS25.331 section 11.5].

When the UE receives a RRC message that implies a handover with the activation time "now" or earlier than $D_{handover}$ seconds from the end of the last TTI containing the RRC command, the UE shall be ready to start the transmission of the new uplink DPCCH within $D_{handover}$ s from the end of the last TTI containing the RRC command.

If the access is delayed to an indicated activation time later than $D_{handover}$ seconds from the end of the last TTI containing the RRC command, the UE shall be ready to start the transmission of the new uplink DPCCH at the designated activation time.

where:

$D_{handover}$ equals the RRC procedure delay defined in TS25.331 Section 13.5.2 plus the interruption time stated in section 5.2.2.2 plus the time required for any kind of baseband or RF reconfiguration due to the change of the UTRAN mode.

4.2.2.2.2 Interruption time

The interruption time, i.e. the time between the end of the last TTI containing a transport block on the old DPCH and the time the UE starts transmission of the new uplink DPCCH, shall be less than the value in table 4.2.2.1 There is different requirement on the interruption time depending on if the cell is known or not.

The definition of known cell can be found in section 4.2.1.2.2.

Table 4.2.2.1 1.28Mcps TDD/FDD interruption time

cell in the handover command message	Maximum delay [ms]	
	Known cell	Unknown cell
1	[100]	[350]

The interruption time includes the interruption uncertainty when changing the timing from the old NTDD to the new FDD cell, which can be up to one frame (10ms) and the time required for measuring the downlink DPCCH channel as stated in TS 25.214 section 4.3.1.2 into account.

The requirement in Table 4.2.2.1 for the unknown cell shall apply if the signal quality of the unknown cell is good enough for successful synchronisation with one attempt.

4.2.3 1,28Mcps TDD/GSM Handover

In the early days of UMTS deployment it can be anticipated that the service area will not be as contiguous and extensive as existing second generation systems. It is also anticipated that UMTS network will be an overlay on the 2^{nd} generation network and utilise the latter, in the minimum case, as a fall back to ensure continuity of service and maintain a good QoS as perceived by the user.

4.2.3.1 Introduction

The purpose of inter-RAT handover from UTRAN 1,28Mcps TDD to GSM is to transfer a connection between the UE and UTRAN 1,28Mcps TDD to GSM. The handover procedure is initiated from UTRAN with a RRC message (HANDOVER FROM UTRAN COMMAND). The procedure is described in TS25.331 section 8.3.7.

4.2.3.2 Requirements

These requirements only apply to UE supporting GSM.

4.2.3.2.1 Handover delay

When the UE receives a RRCHANDOVER FROM UTRAN COMMAND with the activation time "now" or earlier than the value in Table 4-3 from the end of the last TTI containing the RRC command, the UE shall be ready to transmit (as specified in GSM 05.10) on the new channel the new RAT within the value in Table 4-3from the last TTI containing the RRC command, If the access is delayed to an indicated activation time later than the value in Table 4.2.3.1 from the end of the last TTI containing the RRC command, the UE shall be ready to transmit (as specified in GSM 05.10) on the channel of the new RAT at the designated activation time.

The UE shall process the RRC procedures for the RRC HANDOVER FROM UTRAN COMMAND within 50 ms. If the activation time is used, it corresponds to the CFN of the UTRAN channel.

Table 4.2.3.1: 1,28Mcps TDD/GSM handover –handover delay

UE synchronisation status	handover delay [ms]
The UE has synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received	90
The UE has not synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received	190

4.2.3.2.2 Interruption time

The interruption time, i.e. the time between the end of last TTI containing a transport block on the old channel and the time the UE is ready to transmit on the new channel, shall be less than the value in Table 4-4. The requirement in Table 4.2.3.2 for the case, that UE is not synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received, is valid when the signal quality of the GSM cell is good enough for successful synchronisation with one attempt.

Table 4.2.3.2: TDD/GSM handover - interruption time

Synchronisation status	Interruption time [ms]
The UE has synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received	40
The UE has not synchronised to the GSM cell before the HANDOVER FROM UTRAN COMMAND is received	140

4.2.4 Cell Re-selection in CELL_FACH

Note: Data in this section needs to be revised.

Cell re-selection, especially inter-frequency (TDD or FDD) and inter-system (GSM), in Cell_FACH state is still under discussion in WG4., due to possible loss of FACH data during reselection process.

4.2.4.1 Introduction

Common with TS25.123.

4.2.4.2 Requirements

Common with TS25.123.

4.2.4.2.1 Cell re-selection delay

Common with TS25.123.

4.2.4.2.1.1 All cells in the neighbour list belong to the same frequency

Common with TS25.123.

NOTE: The test parameter of this section will be found in A.4.2.4.1

4.2.4.2.1.2 The cells in the neighbour list belong to different frequencies

NOTE: This requirement should be reconsidered based on RAN2 decisions. the test of parameter of this section will be found in A.4.2.4.2

The cell re-selection delay in CELL_FACH state shall be less than [x] seconds when the cells in the neighbour list belong to less than [x] frequencies.

NOTE: The test parameter of this section will be found in A.4.2.4

4.2.5 Cell Re-selection in CELL_PCH

4.2.5.1 Introduction

Common with re-selection in idle mode..

4.2.5.2 Requirements

Same requirements as for cell re-selection in idle mode apply.

4.2.6 Cell Re-selection in URA_PCH

4.2.6.1 Introduction

Common with re-selection in idle mode.

4.2.6.2 Requirements

Same requirements as for cell re-selection in idle mode.

4.3 Dynamic Channel Allocation

4.3.1 Introduction

common with 25.123

4.3.2 Implementation Requirements

common with 25.123

4.3.3 Number of timeslots to be measured

The number of down link timeslots to be measured in the UE is broadcasted on the BCH in each cell. In general, the number of downlink timeslots in question will be less than [6], but in worst case the UE shall be capable to measure [6] downlink timeslots. In case of “simple UE [FFS] timeslots shall at least be measured.

[Explanation]:

In NTDD there are 7 common timeslots and 3 special timeslots, in the 7 common timeslots Ts1 is always allocated to UL. So the number of downlink timeslots in question will be less than 6,in the worst case the UE shall be capable to measure 6 timeslots.

4.3.4 Measurement reporting delay

In order to save battery lifetime, in idle mode no measurements are performed for DCA. ISCP measurements are started at all establishments. Taking into account that the measured interference of the timeslots is preferable averaged over [FFS] frames, the measurement reporting delay in connecting phase shall not exceed [FFS] milliseconds.

4.4 Timing characterisitics

4.4.1 Timing Advance (TA) Requirements

For 1.28 Mcps TDD the timing advance in the UE is adjusted by means of uplink synchronisation. For the random access procedure the node B commands the UE to adjust its synchronisation shift by means of signalling the received position of the UpPTS in the FPACH. During the connection the node B measures the timing in the uplink and transmits a SS (Synchronisation Shift) command to the UE at least once per sub-frame.

These SS commands determined whether the UE synchronisation shift is either left unchanged, or adjusted 1 step up or 1 step down. The step size of the SS adjustment is (k/8)Tc where k (=1,2, …,8) is signalled by higher layer signalling.

4.4.1.1 Uplink synchronization control requirements for UE for 1.28Mcps TDD option

Uplink synchronization control is the ability of the UE transmitter to adjust its TX timing in accordance with one or more SS commands received in the downlink.

4.4.1.1.1 Uplink synchronization control steps

The SS step is the change in UE transmission timing in response to a single SS command, SS_cmd, received by the UE.

4.4.1.1.1.1 Minimum requirement

The UE transmitter shall have the capability of changing the transmission timing with a step size of 1/8, 2/8, 3/8, …, 1 chip according to the value of Δ_{SS}, n=(1,2,…,14) time slot after the SS_cmd arrived (closed loop). For the open loop any step being a multiple of 1/8 chip has to be allowed.

(a) The minimum transmission timing step $\Delta_{SS,min}$ due to closed loop uplink synchronization control shall be within the range shown in Table Y.

(b) In case uplink synchronization control implies to perform a bigger step than the minimum step the UE shall perform the a multiple number of minimum steps m. Within the implementation grid of the applicable timing steps of the UE the step being closest to the required step should be executed.

Table Y: Uplink synchronisation control range

SS_ cmd	Uplink synchronisation control range for minimum step	
	1/8 chip step size	
	Lower	Upper
Up	1/9 chip – 0.1 ppm	1/7 chip + 0.1 ppm
Down	1/9 chip – 0.1 ppm	1/7 chip + 0.1 ppm

4.4.1.1.2 Timing Advance (T_{ADV}) for 1.28 Mcps TDD

This measurement refers to TS25.225 subsection 5.1.14.

4.4.1.1.2.1 Accuracy requirements

Parameter	Unit	Accuracy	Conditions
			Range [chips]

Timing Advance	chips period	+/- 0.125	0, …, 255.875

4.4.1.1.2.2 Range/mapping

The reporting range for *Timing Advance* is from 0 ... 255.875 chips.

In table X the mapping of the measured quantity is defined. The signalling range may be larger than the guaranteed accuracy range.

Table X

Reported value	Measured quantity value	Unit
TIMING_ADVANCE_0000	Timing Advance < 0	chip
TIMING_ADVANCE_0001	0 ≤ Timing Advance < 0.125	chip
TIMING_ADVANCE_0002	0.125 ≤ Timing Advance < 0.25	chip
…	…	…
TIMING_ADVANCE_1024	127.875≤ Timing Advance < 128	chip
…	…	…
TIMING_ADVANCE_2045	255.625 ≤ Timing Advance < 255.75	chip
TIMING_ADVANCE_2046	255.75 ≤ Timing Advance < 255.875	chip
TIMING_ADVANCE_2047	255.875 ≤ RX Timing Advance	chip

NOTE: This measurement can be used for timing advance (synchronisation shift) calculation for uplink synchronisation or location services.

[Explanation difference:]

In 3.84 Mcps TDD timing advance control is carried out by means of higher layer signalling: The network transmits a highly protected timing advance command containing the total timing advance and the UE executes it. Consequently the network can be sure of the timing advance applied by the UE.

In 1.28 Mcps TDD the network transmits SS symbols giving commands like a step up or down or no change at all in every sub-frame. These SS symbols are not protected by a special channel coding including CRC etc. Consequently, the network cannot know whether is commands have been executed or not. Thus, the network cannot obtain the timing advance of the UE by tracking its SS commands. Instead, the UE has to measure its timing advance and transmit it to the network by means of the timing advance measurement.

4.4.2 Cell synchronisation accuracy

Common with 3,84Mcps TDD option.

[Explanation]:

Considering intersystem compatibility , cell synchronisaton accuracy is the same as 3,84Mcps TDD option.

4.4.2.1 Definition

4.4.2.2 Minimum Requirements

4.5 UE Measurements Procedures

4.5.1 Measurements in CELL_DCH State

The monitor mechanism in this state is ffs for 1.28 chip rate TDD.

[Explanation]:

This section contains requirements on the UE regarding measurement reporting in CELL_DCH State. Because of the difference between the frame structure of 1.28Mcps and that of 3.84Mcps, the idle time slots which can be used for monitoring will be different, hence the detail of this subclause would be different compared with 3.84Mcps.

4.5.1.1 Introduction

4.5.1.2 Requirements

4.5.2 Measurements in CELL_FACH State

Commons with 3.84Mcps TDD.

[Explanation]:

The section describes the requirements on the UE regarding measurement reporting in CELL_FACH state. The requirements independent with bandwidth and chip rate should be the same. Hence the contents need no modification.

4.5.2.1 Introduction

4.5.2.2 Requirements

4.6 Measurements Performance Requirements

4.6.1 Measurements Performance for UE

4.6.1.1 Performance for UE Measurements in Downlink (RX)

4.6.1.1.1 P-CCPCH RSCP (1,28Mcps TDD)

Common with 3.84Mcps TDD.

[Explanation]:

The result of this measurement is not energy and it is independent with the bandwidth, so there should not be modification.

4.6.1.1.2 CPICH Measurements (FDD)

Common with 3.84Mcps TDD.

4.6.1.1.3 Timeslot ISCP

Common with 3.84Mcps TDD.

[Explanation]:

The result of this measurement is not energy and it is independent with the bandwidth, so there should not be modification.

4.6.1.1.4 UTRA carrier RSSI

Common with 3.84Mcps TDD.

[Explanation]:

This measurement relies on the signal-detecting algorithm which independent with the bandwidth and chip rate, so it needs no modification.

4.6.1.1.5 GSM carrier RSSI

Common with 3.84Mcps TDD.

[Explanation]:

This measurement relies on GSM, so it needs no modification.

4.6.1.1.6 SIR

Common with 3.84Mcps TDD.

[Explanation]:

This measurement mainly used to meet the requirement of service performance which independent with the bandwidth and chip rate, so there should be no modification.

4.6.1.1.7 Transport channel BLER

Common with 3.84Mcps TDD.

[Explanation]:

This measurement is mainly used to meet the requirement of service performance which independent with the bandwidth and chip rate, so there should be no modification.

4.6.1.1.8 SFN-SFN observed time difference

The measurement period for CELL_DCH state can be found in section 4.5.

4.6.1.1.8.1 Accuracy requirements

Table 4.6.1.16 SFN-SFN observed time difference accuracy

Parameter	Unit	Accuracy	Conditions
			Io [dBm]
SFN-SFN observed time difference	Chip	+/-0,5 for type 1 but +/- 0.125 for type 2	-94...-50

4.6.1.1.8.2 Range/mapping

The reporting range for *SFN-SFN observed time difference type 1* is from 0 ... 3276800 chip.

In table 4.6.1.17 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 4.6.1.17

Reported value	Measured quantity value	Unit
T1_SFN-SFN_TIME _0000000	0 ≤ SFN-SFN observed time difference type 1 < 1	chip
T1_SFN-SFN_TIME _0000001	1 ≤ SFN-SFN observed time difference type 1 < 2	chip
T1_SFN-SFN_TIME _0000002	2 ≤ SFN-SFN observed time difference type 1 < 3	chip
…	…	…
T1_SFN-SFN_TIME _3276797	3276797 ≤ SFN-SFN observed time difference type 1 < 3276798	chip
T1_SFN-SFN_TIME _3276798	3276798 ≤ SFN-SFN observed time difference type 1 < 3276799	chip
T1_SFN-SFN_TIME _3276799	3276799 ≤ SFN-SFN observed time difference type 1 < 3276800	chip

The reporting range for *SFN-SFN observed time difference type 2* is from –6400 ... +6400 chip.

In table 4.6.1.18 mapping of the measured quantity is defined. Signalling range may be larger than the guaranteed accuracy range.

Table 4.6.1.18

Reported value	Measured quantity value	Unit
T2_SFN-SFN_TIME _00000	SFN-SFN observed time difference type 2 < -6390,00	chip
T2_SFN-SFN_TIME _00001	-6390,00 ≤ SFN-SFN observed time difference type 2 < -6399,75	chip
T2_SFN-SFN_TIME _00002	-6399,75 ≤ SFN-SFN observed time difference type 2 < -6399,50	chip
…	…	…
T2_SFN-SFN_TIME _51199	6399,50 ≤ SFN-SFN observed time difference type 2 < 6399,75	chip
T2_SFN-SFN_TIME _51200	6399,75 ≤ SFN-SFN observed time difference type 2 < 6400,00	chip
T2_SFN-SFN_TIME _51201	6400,00 ≤ SFN-SFN observed time difference type 2	chip

[Explanation difference]:

In 1.28Mcps TDD there are 12800chips per frame while in 3.84Mcps TDD there are 38400chips. According to this chip number difference, the observed time difference range in type 1 should be changed correspondingly.

There are 3 kind of special time slot (DwPTS, UpPTS and GP) in 1.28Mcps TDD frame structure (see section 7.2.1 'frame structure' in TR 25.928). When calculation the SFN-SFN observed time difference in type 2, it needs to consider the position and affection of these 3 special time slots.

Let us suppose:

T_{RxTSi} : time of start of timeslot#0 received of the serving TDD cell i.

T_{RxTSk} : time of start of timeslot#0 received from the target UTRA cell k that is closest in time to the start of the timeslot of the serving TDD cell i.

SFN-SFN observed time difference = T_{RxTSk} - T_{RxTSi}, in chips, which means to calculate the the time difference of the start position of the current frame in cell i to the closest starting position of one frame in cell k.

[Editor Note:]

Here in type 2 we only consider to measure the difference of two cells of 1.28Mcps TDD. The measurement method is like that in TS25.215. In type 2 measurement of TS25.215, it measures the time difference of the start position of the P-CPICH of two cells. That is just something like in 1.28Mcps TDD.

4.6.1.1.9 Observed time difference to GSM cell

Common with 3.84Mcps TDD.

[Explanation]:

For different systems, the measurement that is used to realize the compatibility should be the same. So it is independent with bandwidth and chip rate and there should be no modification.

4.6.1.1.10 UE GPS Timing of Cell Frames for LCS

Common with 3.84Mcps TDD.

[Explanation]:

The GPS timing of cell frames should be the same for different systems having LCS, so it needs no modification.

4.6.1.1.11 SFN-CFN observed time difference

Common with 3.84Mcps TDD.

[Explanation]:

For the measurement used for the interwork between cells, which belong to the same system or different systems, should be the same and independent with bandwidth and chip rate. So it needs no modification.

4.6.1.2 Performance for UE Measurements in Uplink (TX)

4.6.1.2.1 UE transmitted power

Common with 3.84Mcps TDD.

[Explanation]:

The *UE transmitted power* is represented by energy density and it is independent with the bandwidth, so there should not be modification.

4.6.2 Measurements Performance for UTRAN

4.6.2.1 Performance for UTRAN Measurements in Uplink (RX)

4.6.2.1.1 RSCP

Common with 3,84Mcps TDD option.

4.6.2.1.2 Timeslot ISCP

Common with 3,84Mcps TDD option

4.6.2.1.3 RSSI

Common with 3,84Mcps TDD option

4.6.2.1.4 SIR

Common with 3,84Mcps TDD option

4.6.2.1.5 Transport Channel BER

Common with 3,84Mcps TDD option

4.6.2.1.6 RX Timing Deviation

The definition of RX Timing Deviation here is common with 3.84Mcps but only accuracy and range are different between two TDD mode.

4.6.2.1.6.1 Accuracy requirements

Parameter	Unit	Accuracy	Conditions
			Range [chips]
RX Timing Deviation	chips period	+/- 0.125	-128, …, 128

4.6.2.1.6.2 Range/mapping

The reporting range for *RX Timing Deviation* is from-128 ... 128 chips.

In table 4.6.2.12 mapping of the measured quantity is defined. Signaling range may be larger than the guaranteed accuracy range.

Table 4.6.2.12

Reported value	Measured quantity value	Unit
RX_TIME_DEV_0001	RX Timing Deviation < –128,000	chip
RX_TIME_DEV_0002	-128,000≤ RX Timing Deviation < -127,875	chip
RX_TIME_DEV_0003	-127,875≤ RX Timing Deviation < -127,750	chip
…	…	…
RX_TIME_DEV_1024	000,000≤ RX Timing Deviation < 000,125	chip
…	…	…
RX_TIME_DEV_2046	127,750 ≤ RX Timing Deviation < 127,875	chip
RX_TIME_DEV_2047	127,875 ≤ RX Timing Deviation < 128,000	chip
RX_TIME_DEV_2048	128,000 ≤ RX Timing Deviation	chip

NOTE: This measurement can be used for timing advance (synchronisation shift) calculation for uplink synchronisation or location services.

[Explanation difference]:

In 3.84Mcps TDD the 'RX Timing Deviation' measurement is only needed to report to the higher layer for timing advance calculation or location services. It does not need to measure this value continuously.

While in 1.28Mcps TDD this measurement is not only reported to higher layer, but also severed as a physical signal ('Synchronization Shift' or 'SS') to keep uplink synchronization. It needs to be refreshed every 5ms (every sub-frame). The resolution requirement is 1/8 chip as described in section 10.2 'Timing Advance' of TR25.928.

Because SS is served as a physical layer signal in 1.28Mcps TDD, it needs to consider how to map this value onto data burst. When in random access procedure the SS control step should have a large range to quickly establish the uplink synchronization. While in normal working procedure to maintain the uplink synchronization it should use as little bits as possible to reduce the affection to the DPCH capacity. These considerations are described in section 10.2 'Timing Advance' and section 8.2.2 'Coding of Synchronization Shift' of TR25.928.

Others section of 4.6.2.1 are common with 25.123

4.6.2.1.7 SYNC-UL Timing Deviation for 1.28 Mcps

This measurement refers to TS25.225 subsection 5.2.8.1.

4.6.2.1.7.1 Accuracy requirements

Parameter	Unit	Accuracy	Conditions
			Range [chips]
SYNC-UL Timing Deviation	chips period	+/- 0.125	0, …, 255.875

4.6.2.1.7.2 Range/mapping

The reporting range for *SYNC-UL Timing Deviation* is from 0 ... 255.875 chips.

In table 4.6.2.13 the mapping of the measured quantity is defined. Signaling range may be larger than the guaranteed accuracy range.

Table 4.6.2.13

Reported value	Measured quantity value	Unit
SYNC_UL_TIME_DEV_0000	**SYNC-UL** Timing Deviation < 0	chip
SYNC_UL_TIME_DEV_0001	0 ≤ **SYNC-UL** Timing Deviation < 0.125	chip
SYNC_UL_TIME_DEV_0002	0.125 ≤ **SYNC-UL** Timing Deviation < 0.25	chip
…	…	…
SYNC_UL_TIME_DEV_1024	127.875 ≤ **SYNC-UL** Timing Deviation < 128	chip
…	…	…
SYNC_UL_TIME_DEV_2045	255.625 ≤ **SYNC-UL** Timing Deviation < 255.75	chip
SYNC_UL_TIME_DEV_2046	255.75 ≤ **SYNC-UL** Timing Deviation < 255.875	chip
SYNC_UL_TIME_DEV_2047	255.875 ≤ **SYNC-UL** Timing Deviation	chip

NOTE: This measurement can be used for timing advance (synchronisation shift) calculation for uplink synchronisation or location services.

[Explanation difference:]

In 1.28 Mcps TDD there is a two step approach for the random access procedure. In the first step the UpPCH is transmitted by the UE. The node B received the UpPCH and responds with the FPACH which contains the received position of the SYNC-UL sequence. This allows the UE to adjust its timing advance for the PRACH in order to allow the node B to receive the PRACH synchronously with the other physicals channels in the time slot carrying the PRACH.

As there is a special time slot of random access in 3.84 Mcps TDD there is no need for this measurement in 3.84 Mcps TDD.

4.6.2.2 Performance for UTRAN Measurements in Downlink (TX)

4.6.2.2.1 Transmitted carrier power

Common with 3,84Mcps TDD option.

[Explanation]:

These parameters in this section are not energy ,so they are independent with bandwidth . There need not to any change compare with the 3,84Mcps TDD option.

4.6.2.2.2 Transmitted code power

Common with 3,84Mcps TDD option.

[Explanation]:

These parameters in this section are not energy ,so they are independent with bandwidth. There need not to any change compare with the 3,84Mcps TDD option.

4.7 FPACH physical layer information field definition (1.28 Mcps TDD)

1.28 Mcps TDD introduces the FPACH (Forward Physical Access CHannel) which carries physical layer information. Two of these information fields are the 'received starting position of the UpPCH' (Uplink Pilot CHannel) and the '**transmit power level command for the RACH message'. Both information fields are directly (**received starting position of the UpPCH**) or can be indirectly (transmit power level command for the RACH message) derived from measurements but are no measurements themselves.**

[Explanation difference:]

In 1.28Mcps TDD the random access procedure follows a two step approach. After the 1st step (UpPCH) the FPACH also carries the information fields related to the initialisation of uplink synchronisation control and uplink power control for the PRACH (2nd step). This is ensuring that the PRACH can be transmitted in the time slots carrying the DPCH.

4.7.1 Received starting position of the UpPCH ($UpPCH_{POS}$) (1.28 Mcps TDD)

Range/mapping

Range/mapping	$UpPCH_{POS}$ FIELD is given with a resolution of 1/8 chip with the range [0,255.875] chip. $UpPCH_{POS}$ FIELD shall be transmitted in the FPACH where: $UpPCH_{POS}$ FIELD_LEV_0000: $UpPCH_{POS}$ < 0 chip $UpPCH_{POS}$ FIELD_LEV_0001: 0 chip ≤ $UpPCH_{POS}$ < 0.125 chip $UpPCH_{POS}$ FIELD_LEV_0002: 0.125 chip ≤ $UpPCH_{POS}$ < 0.25 chip ... $UpPCH_{POS}$ FIELD_LEV_2045: 255.625 chip ≤ $UpPCH_{POS}$ < 255.75 chip $UpPCH_{POS}$ FIELD_LEV_2046: 255.75 chip ≤ $UpPCH_{POS}$ < 255.875 chip $UpPCH_{POS}$ FIELD_LEV_2047: 255.875 chip ≤ $UpPCH_{POS}$

Accuracy requirements

Parameter	Unit	Accuracy	Conditions
			Range [chips]

Received starting position of the UpPCH	chips period	+/- 0.125	0, …, 255.875

4.7.2 Transmit Power Level Command for the RACH message (1.28 Mcps TDD)

Range/mapping

Range/mapping	$PRX_{PRACH,des}$ FIELD is given with a resolution of 0.5 dB with the range [-120,-80] dBm. $PRX_{PRACH,des}$ FIELD shall be transmitted in the FPACH where: $PRX_{PRACH,des}$ FIELD_LEV_00: $PRX_{PRACH,des}$ < -120 dBm $PRX_{PRACH,des}$ FIELD_LEV_01: -120 dBm ≤ $PRX_{PRACH,des}$ < -119.5 dBm $PRX_{PRACH,des}$ FIELD_LEV_02: -119.5 dBm ≤ $PRX_{PRACH,des}$ < -119 dBm ... $PRX_{PRACH,des}$ FIELD_LEV_78: -81 dBm ≤ $PRX_{PRACH,des}$ < -80.5 dBm $PRX_{PRACH,des}$ FIELD_LEV_79: -80.5 dBm ≤ $PRX_{PRACH,des}$ < -80 dBm $PRX_{PRACH,des}$ FIELD_LEV_80: -80 dBm ≤ $PRX_{PRACH,des}$

Accuracy requirements:

Since this is a desired RX power at the node B and this is no measured value and the derivation of this value in the node B is implementation specific, accuracy requirements are not applicable.

Annex 4.A (Normative) Test Cases

A.4.a Purpose of Annex

Same contents as TS25.123 section A.1.

A.4.b Requirement classification for statistical testing

Same contents as TS25.123 section A.2.

A.4.b.1 Types of requirements in TS 25.123

Same contents as TS25.123 section A.2.1.

A.4.c Reserved for Future Use

A.4.1 Idle Mode

A.4.1.1 Cell selection

This section is included for consistency in the numbering.

A4.1.2 Cell Re-Selection

For each of the re-selection scenarios in section 4.2 a test is proposed.

For NTDD/NTDD re-selection two scenarios are considered:

Scenario 1: Single carrier case

Scenario 2: Multi carrier case

A.4.1.2.1 Single carrier case NTDD/NTDD cell re-selection

A.4.1.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the cell re-selection delay in the single carrier case reported in section 4.2.

This scenario implies the presence of 1 carrier and 6 cells as given in Table A.4-1 and A.4-2. Cell 1 and cell2 shall belong to different Location Areas.

Table A.4-1: General test parameters for Single carrier NTDD/NTDD cell re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
Access Service Class (ASC#0) - Persistence value		0..1	1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	
T2		s	15	

Table A.4-2: Cell re-selection single carrier multi-cell case

Parameter	**Unit**	**Cell 1**				**Cell 2**				**Cell 3**			
Timeslot Number		**0**		**DWPTS**		**0**		**DWPTS**		**0**		**DWPTS**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	dB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	dB	[9]	[7]	[9]	[7]	[7]	[9]	[7]	[9]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	dBm	[-64]	[-66]			[-66]	[-64]			[-74]	[-74]		
Qoffset		[0]		[0]		[0]		[0]		[0]		[0]	
Qhyst Treselection Sintrasearch	 s dB	[0] [0] not sent		[0] [0] not sent		[0] [0] not sent		[0] [0] not sent		[0] [0] not sent		[0] [0] not sent	
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**DWPTS**		**0**		**DWPTS**		**0**		**DWPTS**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	dB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	dB	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	dBm	[-74]	[-74]			[-74]	[-74]			[-74]	[-74]		
Qoffset		[0]		[0]		[0]		[0]		[0]		[0]	
Qhyst Treselection Sintrasearch	 s dB	[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]	
I_{oc}	dBm/1.28 MHz	-70											
Propagation Condition		AWGN											

A.4.1.2.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RRC CONNECTION REQUEST message to perform a Location Registration on cell 2.

The cell re-selection delay shall be less than 8 s.

NOTE:

The cell re-selection delay can be expressed as: $T_{evaluateNTDD} + T_{SI}$, where:

$T_{evaluateNTDD}$ A DRX cycle length of 1280ms is assumed for this test case, this leads to a $T_{evaluate\ NTDD}$ of 6.4s according to Table 4.1 in section 4.2.2.7.

T_{SI} Maximum repetition rate of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

A.4.1.2.2 NTDD/NTDD cell re-selection multi carrier case

A.4.1.2.2.1 Test Purpose and Environment

This test is to verify the requirement for the cell re-selection delay in the multi carrier case reported in section 4.1.2

This scenario implies the presence of 2 carriers and 6 cells as given in Table A.4-3 and A.4-4. Cell 1 and cell 2 shall belong to different Location Areas.

Table A.4-3 General test parameters for Cell Re-selection in Multi carrier case

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
Final condition	Active cell		Cell2	
Access Service Class (ASC#0) – Persistence value			1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	
T2		s	15	

Table A.4-4: Cell re-selection multi carrier multi cell case

Parameter	Unit	Cell 1				Cell 2				Cell 3			
Timeslot Number		0		DWPTS		0		DWPTS		0		DWPTS	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel 1				Channel 2				Channel 1			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	dB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	dB	[9]	[7]	[9]	[7]	[7]	[9]	[7]	[9]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	dBm	[-64]	[-66]			[-66]	[-64]			[-74]	[-74]		
Qoffset		[0]		[0]		[0]		[0]		[0]		[0]	
Qhyst Treselection Qintrasearch	 s dB	[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]	
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		0		DWPTS		0		DWPTS		0		DWPTS	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
UTRA RF Channel Number		Channel				Channel 2				Channel			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	dB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	dB	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	dBm	[-74]	[-74]			[-74]	[-74]			[-74]	[-74]		
Qoffset		[0]		[0]		[0]		[0]		[0]		[0]	
Qhyst Treselection Qintrasearch	 s dB	[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]		[0] [0] [not sent]	
I_{oc}	dBm/3,84 MHz	-70											
Propagation Condition		AWGN											

A.4.1.2.2.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RRC CONNECTION REQUEST message to perform a Location Registration on cell 2.

The cell re-selection delay shall be less than 8 s.

NOTE:

The cell re-selection delay can be expressed as: $T_{evaluateNTDD} + T_{SI}$, where:

$T_{evaluateNTDD}$ A DRX cycle length of 1280ms is assumed for this test case, this leads to a $T_{evaluate\ NTDD}$ of 6.4s according to Table 4.1 in section 4.1.5.

T_{SI} Maximum repetition rate of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

A.4.1.2.3 High chip rate TDD cell re-selection

A.4.1.2.3.1 Test Purpose and Environment

This test is to verify the requirement for the NTDD/TDD cell re-selection delay reported in section 4.1.2.3.

This scenario implies the presence of 1 low chip rate (NTDD) and 1 high chip rate (TDD) cell as given in Table A.4-5 and A.4-6.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS25.304.

For this test environment the ranking/mapping function indicated in the broadcast of cell 1 shall be in such a way as to enable the UE to evaluate that the NTDD cell 1 is better ranked as the TDD cell 2 during T1 and the TDD cell 2 is better ranked than the NTDD cell 1 during T2.

Cell 1 and cell 2 shall belong to different Location Areas.

Table A.4-5: General test parameters for TDD low chip rate to TDD high chip rate cell re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	NTDD cell
	Neighbour cell		Cell2	TDD cell
Final condition	Active cell		Cell2	
Access Service Class (ASC#0) - Persistence value			1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
DRX cycle length		s	1,28	
T1		s	15	Cell 1 better ranked than cell 2
T2		s	15	Cell2 better ranked than cell 1

Table A.4-6: Test parameters for TDD low chip rate to TDD high chip rate cell re-selection

Parameter	Unit	Cell 1				Cell 2			
Timeslot Number		0		DwPts		0		8	
		T1	**T2**	**T 1**	**T 2**	**T1**	**T2**	**T 1**	**T 2**
UTRA RF Channel Number		Channel 1				Channel 2			
PCCPCH_Ec/Ior	dB	-3	-3			-3	-3		
DwPCH_Ec/Ior	dB			0	0	n.a.		n.a.	
SCH_Ec/Ior	dB	n.a.		n.a.		-9	-9	-9	-9
SCH_t_{offset}		n.a.		n.a.		0	0	0	0
PICH_Ec/Ior								-3	-3
OCNS	dB	n.a.		n.a.		-4,28	-4,28	-4,28	-4,28
$\hat{I}_{or}/I_{oc}$	dB	[10]	[7]			[7]	[10]	[7]	[10]
I_{oc}	dBm/3.84 MHz	-70							
PCCPCH_RSCP	dBm	[-63]	[-66]			[-66]	[-63]		
Treselection	s	0				0			
Propagation Condition		AWGN				AWGN			

A.4.1.2.3.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send the RRC CONNECTION REQUEST message to perform a Location Registration on cell 2.

The cell re-selection delay shall be less than 8 s.

Note: The re-selection delay equals $T_{TDDevaluate}$ + T_{rep} repetition period of the broadcast information of the selected cell

A.4.1.2.4 FDD cell re-selection

A.4.1.2.4.1 Test Purpose and Environment

This test is to verify the requirement for the NTDD/FDD cell re-selection delay reported in section 4.1.2.4.

This scenario implies the presence of 1 low chip rate TDD and 1 FDD cell as given in Table A.4-5 and A.4-6.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS25.304.

For this test environment the ranking/mapping function indicated in the broadcast of cell 1 shall be in such a way as to enable the UE to evaluate that the NTDD cell 1 is better ranked as the FDD cell 2 during T1 and the FDD cell 2 is better ranked than the NTDD cell 1 during T2.

Cell 1 and cell 2 shall belong to different Location Areas.

Table A.4-7: General test parameters for the TDD/FDD cell re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	NTDD cell
	Neighbour cells		Cell2	FDD cell
Final condition	Active cell		Cell2	
Access Service Class (ASC#0) - Persistence value			1	Selected so that no additional delay is caused by the random access procedure. The value shall be used for all cells in the test.
DRX cycle length		s	1.28	The value shall be used for all cells in the test.
T1		s	15	
T2		s	15	

Table A.4-8: Test parameters for the NTDD/FDD cell re-selection

Parameter	Unit	Cell 1				Cell 2	
Timeslot Number		0		DwPts		n.a.	
		T1	**T2**	**T 1**	**T 2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2	
PCCPCH_Ec/Ior	dB	-3	-3			-12	-12
DwPCH_Ec/Ior	dB			0	0	n.a.	
CPICH_Ec/Ior	dB	n.a.		n.a.		-10	-10
SCH_Ec/Ior	dB	n.a.		n.a.		-12	-12
PICH_Ec/Ior						-15	-15
OCNS	dB	n.a.		n.a.		-0,941	-0,941
$\hat{I}_{or}/I_{oc}$	dB	[ ]	[ ]			[ ]	[ ]
I_{oc}	dBm/1.28 MHz	-70					
PCCPCH_RSCP	dBm	[ ]	[ ]			n.a.	n.a.
CPICH_Ec/Io		n.a.				[ ]	[ ]
Treselection	s	0				0	
Propagation Condition		AWGN					

A.4.1.2.4.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Location Registration on cell 2.

The cell re-selection delay shall be less than 8 s.

NOTE:

The cell re-selection delay can be expressed as: $T_{evaluateFDD}$ + T_{SI}, where:

$T_{evaluateFDD}$ See Table 4.1 in section 4.1.5.

T_{SI} Maximum repetition rate of relevant system info blocks that needs to be received by the UE to camp on a cell. 1280 ms is assumed in this test case.

This gives a total of 7.68 s, allow 8s in the test case.

A.4.1.3 Inter-RAT(GSM) cell re-selection

A.4.1.3.1 Scenario

A.4.1.3.1.1 Test Purpose and Environment

This test is to verify the requirement for the UTRAN to GSM cell re-selection delay reported in section 4.1.3

This scenario implies the presence of 1 UTRAN serving cell, and 1 GSM cell to be re-selected. Test parameters are given in Table, A.4-9, A.4-10, A.4-11.

The ranking of the cells shall be made according to the cell reselection criteria specified in TS25.304.

For this test environment the ranking/mapping function indicated in the broadcast of cell 1 shall be in such a way as to enable the UE to evaluate that the NTDD cell 1 is better ranked as the GSM cell 2 during T1 and the GSM cell 2 is better ranked than the NTDD cell 1 during T2.

Table A.4-9: General test parameters for UTRAN (NTDD) to GSM Cell Re-selection

Parameter		Unit	Value	Comment
Initial condition	Active cell		Cell1	
	Neighbour cell		Cell2	
Final condition	Active cell		Cell2	
DRX cycle length		s	1,28	
T1		s	15	
T2		s	15	

Table A.4-10: Cell re-selection UTRAN to GSM cell case (cell 1)

Parameter	**Unit**	**Cell 1 (UTRA)**			
Timeslot Number		**0**		**DwPTS**	
		T1	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1		Channel 1	
PCCPCH_Ec/Ior	dB	-3	-3		
DwPCH_Ec/Ior	dB			0	0
$\hat{I}_{or}/I_{oc}$	dB	[9]	[7]	[9]	[7]
I_{oc}	dBm/1.28 MHz	–70		–70	
PCCPCH RSCP	dBm	[-64]	[-66]		
Propagation Condition		AWGN		AWGN	
Cell_selection_and_reselection_quality_measure		P-CCPCH RSCP			
Treselection	s	[ ]			
$Ssearch_{RAT}$	dB	[ ]			

Table A.4-11: Cell re-selection UTRAN to GSM cell case (cell 2)

Parameter	**Unit**	**Cell 2 (GSM)**	
		T1	**T2**
Absolute RF Channel Number		ARFCN 1	
RXLEV	dBm	-80	-70
RXLEV_ACCESS_MIN	dBm	[-100	
MS_TXPWR_MAX_CCH	dBm	30	

A.4.1.3.1.2 Test Requirements

The cell re-selection delay is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send LOCATION UPDATING REQUEST message to perform a Location update.

The cell re-selection delay shall be less than [8] s.

NOTE:

The UE shall keep a running average of 4 measurements, thus gives 4*1280ms ($T_{measureGSM}$ Table 4.1), means 5.12 seconds can elapse from the beginning of time period T2 before the UE has finished the measurements to evaluate that the GSM cell fulfils the re-selection criteria.

The cell selection parameters in the BCCH of the GSM cell in system info 3 and 4 are transmitted at least every second.

A.4.2 UTRAN Connected Mode Mobility

A.4.2.1 1.28Mcps TDD/TDD Handover

A.4.2.2 1.28Mcps TDD/FDD Handover

NOTE: This section is included for consistency with numbering with section 4.2, currently no test covering requirements in sections 4.2.2.2.1 and 4.2.2.2.2 exists.

A.4.2.3 1.28Mcps TDD/GSM Handover

NOTE: This section is included for consistency with numbering with section 4.2 currently no test covering requirements in sections 4.2.3.2.1 and 4.2.3.2.2 exists.

A.4.2.4 Cell Re-selection in CELL_FACH

A.4.2.4.1 One frequency present in neighbour list

A.4.2.4.1.1 Test Purpose and Environment

Note: Cell reselection in Cell-fach is still under discussion.

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL_FACH state in the single carrier case reported in section 4.2.4.2.1.1.

The test parameters are given in Table A.4.2.1 and A.4.2.2

Table A.4.2.1 General test parameters for Cell Re-selection in CELL_FACH

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
final condition	Active cell		Cell2	
T1		s		T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s		T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2.2 Cell specific test parameters for Cell Re-selection in CELL_FACH

Parameter	**Unit**	**Cell 1**				**Cell 2**				**Cell 3**			
Timeslot Number		**0**		**DWPTS**		**0**		**DWPTS**		**0**		**DWPTS**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	DB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	DB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	DB	[9]	[7]	[9]	[7]	[7]	[9]	[7]	[9]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	DBm	-64	-66			-66	-64			-74	-74		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	DBm DB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**DWPTS**		**0**		**DWPTS**		**0**		**DWPTS**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 1				Channel 1			
PCCPCH_Ec/Ior	DB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	DB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	DB	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	DBm	-74	-74			-74	-74			-74	-74		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	DBm DB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
I_{oc}	dBm/1.28 MHz	-70											
Propagation Condition		AWGN											

A.4.2.4.1.2 Test Requirements

The UE shall select cell 2 within a cell re-selection delay specified in 4.2.4.2.1.1

A.4.2.4.2 Two frequencies present in the neighbour list

A.4.2.4.2.1 Test Purpose and Environment

The purpose of this test is to verify the requirement for the cell re-selection delay in CELL_FACH state in section 4.2.4.2.1.2.The test parameters are given in Table A4.2-3 and A4.2-4.

Table A.4.2-3: General test parameters for Cell Re-selection in CELL_FACH

Parameter		Unit	Value	Comment
initial condition	Active cell		Cell1	
	Neighbour cells		Cell2, Cell3,Cell4, Cell5, Cell6	
final condition	Active cell		Cell2	
T1		s		T1 need to be defined so that cell re-selection reaction time is taken into account.
T2		s		T2 need to be defined so that cell re-selection reaction time is taken into account.

Table A.4.2-4: Cell specific test parameters for Cell re-selection in CELL_FACH state

Parameter	**Unit**	**Cell 1**				**Cell 2**				**Cell 3**			
Timeslot Number		**0**		**DWPTS**		**0**		**DWPTS**		**0**		**DWPTS**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2				Channel 1			
PCCPCH_Ec/Ior	DB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	DB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	DB	[9]	[7]	[9]	[7]	[7]	[9]	[7]	[9]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	DBm	[-64]	[-66]			[-66]	[-64]			[-74]	[-74]		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	DBm DB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
		Cell 4				**Cell 5**				**Cell 6**			
Timeslot		**0**		**DWPTS**		**0**		**DWPTS**		**0**		**DWPTS**	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel				Channel 2				Channel			
PCCPCH_Ec/Ior	DB	-3	-3			-3	-3			-3	-3		
DwPCH_Ec/Ior	DB			0	0			0	0			0	0
$\hat{I}_{or}/I_{oc}$	DB	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]	[-1]
PCCPCH RSCP	DBm	[-74]	[-74]			[-74]	[-74]			[-74]	[-74]		
Qoffset		[ ]		[ ]		[ ]		[ ]		[ ]		[ ]	
Qhyst Treselection Qintrasearch	DBm DB	[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]		[ ] [ ] [ ]	
I_{oc}	dBm/1.28 MHz	-70											
Propagation Condition		AWGN											

Note: PCCPCH_RSCP is the quality measure for cell selection and re-selection.

A.4.2.4.2.2 Test Requirements

The UE shall select cell 2 within a cell re-selection delay specified in 4.2.4.2.1.

A.4.2.5 Cell Re-selection in CELL_PCH

Same requirements and test cases valid as for cell re-selection in idle mode.

A.4.2.6 Cell Re-selection in URA_PCH

Same requirements and test cases valid as for cell re-selection in idle mode.

A.4.3 Dynamic Channel Allocation

A.4.4 Timing characteristics

A.4.5 UE Measurements Procedures

A.4.5.1 1.28Mcps TDD measurements

A.4.5.1.1 Event triggered reporting in AWGN propagation conditions

A.4.5.1.1.1 Test Purpose and Environment

This test will derive that the terminal makes correct reporting of an event Cell 1 is the active cell, Cell 2 is a neighbour cell on the used frequency. The power level on Cell 1 is kept constant and the power level of Cell 2 is changed using "change of best cell event" as illustrated in Figure A.4.5.1. The test parameters are shown in Table A.4.5.1. Hysteresis, absolute Threshold and Time to Trigger values are given in the table below and they are signalled from test device. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 1G shall be used. P-CCPCH RSCP of the best cell has to be reported together with Event 1G reporting. New measurement control information, which defines neighbour cells etc., is always sent before the event starts.

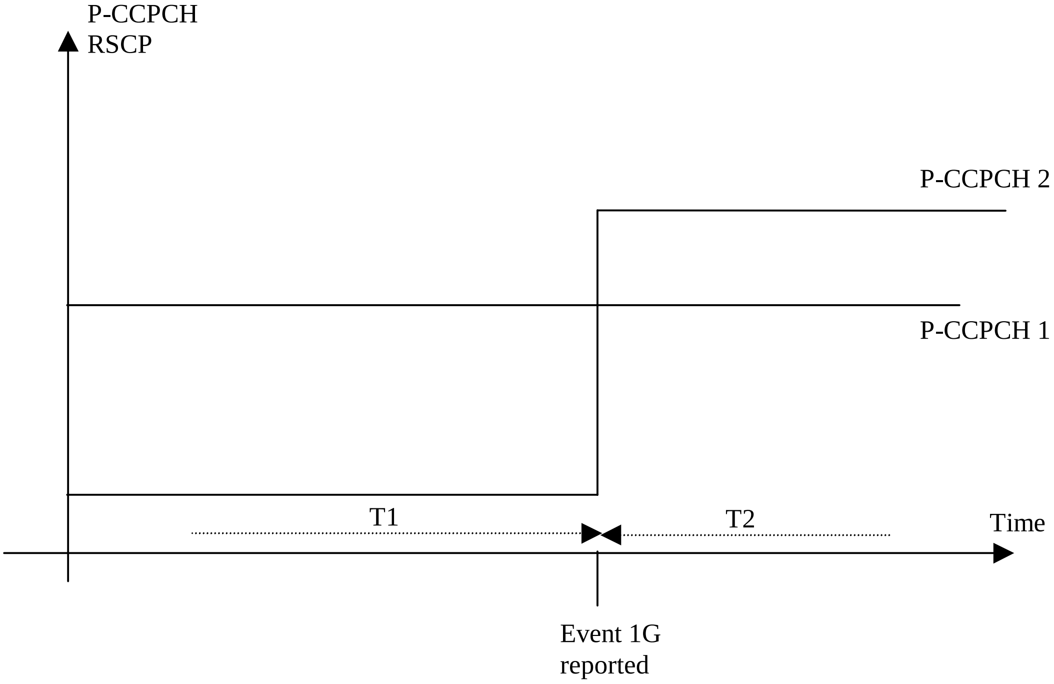


Figure A.4.5.1: Illustration of parameters for handover measurement reporting test case

Table A.4.5.1

Parameter	**Unit**	**Cell 1**				**Cell 2**			
Timeslot Number		0		DwPTS		0		DwPTS	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2			
PCCPCH_Ec/Ior	dB	-3				-3			
DwPCH_Ec/Ior	dB			0				0	
$\hat{I}_{or}/I_{oc}$	dB	[3]	[3]			-Infinity	[6]		
I_{oc}	dBm/1.28 MHz	-70							
PCCPCH_RSCP	dBm	[-70]	[-70]			-Infinity	[-67]		
Absolute Threshold (SIR)	dB	[ ]							
Hysteresis	dB	[ ]							
Time to Trigger	msec	[ ]							
Propagation Condition		AWGN							

NNote: The DPCH of all cells are located in a timeslot other than 0.

[Explanation difference]:

In 1.28Mcps TDD the PICH is mapped onto P-CCPCH as describe in TR25.928. So the PICH-Ec/Ior is no longer used. The function of the SCH is achieved by DwPTS in 1.28Mcps TDD and it is allocated to a dedicated timeslot. And the P-CCPCH is always mapped onto time slot 0, so time slot 8 is not considered in 1.28Mcps TDD.

The parameter *Îor/Ioc* is measured to report to UE for its handover or cell selection and reselection.

A.4.5.1.1.2 Test Requirements

The UE shall send one Event 1G triggered measurement report, with a measurement reporting delay less than [480] ms from the beginning of time period T2.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

A.4.5.2 FDD measurements

A.4.5.2.1 Correct reporting of neighbours in AWGN propagation condition

A.4.5.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event when doing inter frequency measurements. The test will partly verify the requirements in section 4.5.1.2.2.

This test will derive that the terminal makes correct reporting of an event Cell 1 is the active cell, Cell 2 is a neighbour cell on the used frequency. The power level on Cell 1 is kept constant and the power level of Cell 2 is changed using "change of best cell event" as illustrated in Figure A.4.5.1. The test parameters are shown in Table A.4.5.2. Hysteresis, absolute Threshold and Time to Trigger values are given in the table below and they are signalled from test device. In the measurement control information it is indicated to the UE that event-triggered reporting with Event 2C shall be used. P-CCPCH RSCP of the best cell has to be reported together with Event 2C reporting. New measurement control information, which defines neighbour cells etc., is always sent before the event starts.

The test parameters are shown in Table A.4.5.2.

Table A.4.5.2 Cell Specific Parameters for Correct Reporting of Neighbours in AWGN Propagation Condition

Parameter	Unit	Cell 1				Cell 2			
Timeslot Number		0		DwPTS		0		DwPTS	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2			
PCCPCH_Ec/Ior	dB	-3				-3			
DwPCH_Ec/Ior	dB			0				0	
$\hat{I}_{or}/I_{oc}$	dB	[3]	[3]			-Infinity	[6]		
I_{oc}	dBm/1.28 MHz	-70							
PCCPCH_RSCP	dBm	[-70]	[-70]			-Infinity	[-67]		
Absolute Threshold (SIR)	dB	[ ]							
Hysteresis	dB	[ ]							
Time to Trigger	msec	[ ]							
Propagation Condition		AWGN							

Note: The DPCH of all cells are located in a timeslot other than 0.

[Explanation difference]:

In 1.28Mcps TDD the PICH is mapped onto P-CCPCH as describe in TR25.928. So the PICH-Ec/Ior is no longer used. The function of the SCH is achieved by DwPTS in 1.28Mcps TDD and it is allocated to a dedicated timeslot. And the P-CCPCH is always mapped onto time slot 0, so time slot 8 is not considered in 1.28Mcps TDD.

A.4.5.2.1.2 Test Requirements

The UE shall send one Event 2C triggered measurement report, with a measurement reporting delay less than [5] s from the beginning of time period T2.

The UE shall not send any measurement reports, as long as the reporting criteria are not fulfilled.

A.4.6 Measurement Performance Requirements

A.4.6.1 Measurement Performance for UE

If not otherwise stated, the test parameters in table A.4.6.1 should be applied for UE RX measurements requirements in this clause.

A.4.6.1.1 TDD intra frequency measurements

If not otherwise stated, the test parameters in table A.4.6.1 should be applied for UE RX measurements requirements in this section.

Table A.4.6.1 Intra frequency test parameters for UE RX Measurements

Parameter	Unit	Cell 1				Cell 2			
Timeslot Number		0		DwPTS		0		DwPTS	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2			
PCCPCH_Ec/Ior	dB	-3				-3			
DwPCH_Ec/Ior	dB			0				0	
$\hat{I}_{or}/I_{oc}$	dB	[3]	[3]			-Infinity	[6]		
I_{oc}	dBm/1.28 MHz	-70							
Range 1:Io *Range 2:Io*	dBm	-94..-70 –94..-50				-94..-70 –94..-50			
Propagation condition	AWGN								

Note 1: *P-CCPCH_RSCP1,2* ≥ -[102] dBm.

Note 2: | *P-CCPCH_RSCP1 – PCCPCH_RSCP2* |≤ 20 dB.

Note 3: | *Io – P-CCPCH_RSCP*| ≤ [20] dB.

Note 4: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.

Note 5: The DPCH of all cells are located in a timeslot other than 0

[Explanation difference]:

In 1.28Mcps TDD the PICH is mapped onto P-CCPCH as describe in TR25.928. So the PICH-Ec/Ior is no longer used. The function of the SCH is achieved by DwPTS in 1.28Mcps TDD and it is allocated to a dedicated timeslot. And the P-CCPCH is always mapped onto time slot 0, so time slot 8 is not considered in 1.28Mcps TDD.

The parameter *Îor/Ioc* is measured to report to UE for its handover or cell selection and reselection.

A.4.6.1.2 TDD inter frequency measurements

If not otherwise stated, the test parameters in table A.4.6.2 should be applied for UE RX measurements requirements in this section.

Table A.4.6.2 Intra frequency test parameters for UE RX Measurements

Parameter	Unit	Cell 1				Cell 2			
Timeslot Number		0		DwPTS		0		DwPTS	
		T1	**T2**	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
UTRA RF Channel Number		Channel 1				Channel 2			
PCCPCH_Ec/Ior	dB	-3				-3			
DwPCH_Ec/Ior	dB			0				0	
$\hat{I}_{or}/I_{oc}$	dB	[3]	[3]			-Infinity	[6]		
I_{oc}	dBm/1.28 MHz	-70							
Range 1:Io *Range 2:Io*	dBm	-94..-70 –94..-50				-94..-70 –94..-50			
Propagation condition	AWGN								

Note 1: *P-CCPCH_RSCP1,2* ≥ -[102] dBm.

Note 2: | *P-CCPCH_RSCP1 – PCCPCH_RSCP2* |≤ 20 dB.

Note 3: | *Io –P-CCPCH_RSCP1,2*| ≤ [20] dB.

Note 4: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.

Note 5: The DPCH of all cells are located in a timeslot other than 0

[Explanation difference]:

In 1.28Mcps TDD the PICH is mapped onto P-CCPCH as describe in TR25.928. So the PICH-Ec/Ior is no longer used. The function of the SCH is achieved by DwPTS in 1.28Mcps TDD and it is allocated to a dedicated timeslot. And the P-CCPCH is always mapped onto time slot 0, so time slot 8 is not considered in 1.28Mcps TDD.

The parameter *Îor/Ioc* is measured to report to UE for its handover or cell selection and reselection.

A.4.6.1.3 UTRA carrier RSSI inter frequency measurements

The table A.4.6.3 and notes 1,2 define the limits of signal strengths, where the requirement is applicable.

Table A.4.6.3 UTRA carrier RSSI Inter frequency test parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channei number	-	Channel 1	Channel 2
Îor/Ioc	DB	-1	-1
Ioc	dBm/1.28 MHz	Note 2	Note 2
Range 1: Io *Range 2: Io*	dBm/1.28 MHz	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	

Note 1: For relative accuracy requirement | *Channel 1_Io –Channel 2_Io* | < *20 dB.*

Note 2: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.

A.4.6.2 Measurement Performance for UTRAN

If not otherwise stated, the test parameters in table A.4.6.4 should be applied for UTRAN RX measurements requirements in this section.

Table A.4.6.4 Intra frequency test parameters for UTRAN RX Measurements

Parameter	Unit	Cell 1
UTRA RF Channel number		Channel 1
Timeslot		[ ]
DPCH Ec/Ior	dB	[ ]
Îor/Ioc	dB	[ ]
Ioc	dBm/1.28 MHz	-89
Range: Io	dBm	-105..-74
Propagation condition	AWGN	

5 UE Radio Transmission and Reception

5.1 Frequency bands and channel arrangement

5.1.1 General

The information presented in this section is based on a chip rate of 1,28Mcps.

5.1.2 Frequency bands

Common with 3,84Mcps TDD option.

5.1.3 TX–RX frequency separation

[Description:]

> No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe of 1.28Mcps TDD consists of 7 main timeslots (TS0 ~ TS6) where TS0 (before DL to UL switching point) are always allocated DL, the timeslots (at least the first one) before the switching point (vice versa) are allocated UL and the timeslots after the switching point (vice versa) are allocated DL.

[Explanation of difference:]

> The frame structure for 3.84Mcps TDD and 1.28Mcps TDD is different. For 3.84 Mcps TDD, each TDMA frame consists of 15 timeslots where each timeslot can be allocated to either transmit or receive.

5.1.4 Channel arrangement

5.1.4.1 Channel spacing

5.1.4.1.1 Background

The chip rate is 1.28Mcps with a roll-off factor of 0.22, therefore the occupied bandwidth is1.6MHz;

It is just nominal 1.6MHz, and it is also flexible to adjust the channel raster step 200kHz to narrow as 1.4MHz for strict requirement situations if needed.

5.1.4.1.2 Channel spacing

The channel spacing for 1.28Mcps chip rate option is 1.6MHz.

5.1.4.2 Channel raster

Common with 3,84Mcps TDD option.

5.1.4.3 Channel number

Common with 3,84Mcps TDD option.

5.2 Transmitter characteristics

5.2.1 General

Common with 3,84Mcps TDD option.

5.2.2 Transmit power

5.2.2.1 User Equipment maximum output power

Common with 3,84Mcps TDD option.

5.2.3 UE frequency stability

Common with 3,84Mcps TDD option.

5.2.4 Output power dynamics

Power control is used to limit the interference level.

5.2.4.1 Open loop power control

Open loop power control is the ability of the UE transmitter to sets its output power to a specific value. The open loop power control tolerance is given in Table 5.2.4.1.1

5.2.4.1.1 minimum requirement

The UE open loop power is defined as the average power in a timeslot or ON power duration, whichever is available, and they are measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate.

Table 5.2.4.1.1: Open loop power control

Normal conditions	± 9 dB
Extreme conditions	± 12 dB

5.2.4.2 Closed loop power control in the uplink

Closed loop power control in the Uplink is the ability of the UE transmitter to adjust its output power in accordance with one or more TPC commands received in the downlink.

5.2.4.2.1 Power control steps

The power control step is the change in the UE transmitter output power in response to a single TPC command, TPC_cmd, arrived at the UE.

5.2.4.2.1.1 Minimum requirement

The UE transmitter shall have the capability of changing the output power with a step size of 1, 2 and 3 dB according to the value of Δ_{TPC} or Δ_{RP-TPC}, in the slot immediately after the TPC_cmd can be arrived.

(a) The transmitter output power step due to closed loop power control shall be within the range shown in Table 5.2.4.

(b) The transmitter average output power step due to closed loop power control shall be within the range shown in Table 5.2.5. Here a TPC_cmd group is a set of TPC_cmd values derived from a corresponding sequence of TPC commands of the same duration.

The closed loop power is defined as the relative power differences between averaged power of original (reference) timeslot and averaged power of the target timeslot without transient duration. They are measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate.

Table 5.2.4: Transmitter power control range

TPC_ cmd	Transmitter power control range					
	1 dB step size		2 dB step size		3 dB step size	
	Lower	Upper	Lower	Upper	Lower	Upper
Up	+0.5 dB	+1.5 dB	+1 dB	+3 dB	+1.5 dB	+4.5 dB
Down	-0.5 dB	-1.5 dB	-1 dB	-3 dB	-1.5 dB	-4.5 dB

Table 5.2.5: Transmitter average power control range

TPC_ cmd group	Transmitter power control range after 10 equal TPC_ cmd groups					
	1 dB step size		2 dB step size		3 dB step size	
	Lower	Upper	Lower	Upper	Lower	Upper
Up	+8 dB	+12 dB	+16 dB	+24 dB	+24 dB	+36 dB
Down	-8 dB	-12 dB	-16 dB	-24 dB	-24 dB	-36 dB

5.2.4.3 Minimum transmit output power

The minimum controlled output power of the UE is when the power control setting is set to a minimum value. This is when both the closed loop and open loop power control indicate a minimum transmit output power is required.

5.2.4.3.1 Minimum requirement

The minimum transmit power is defined as an averaged power in a time slot measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off $\alpha = 0.22$ and a bandwidth equal to the chip rate. The minimum transmit power shall be better than –49 dBm/1.28MHz.

[Rationale:]

For the power control issue, the open loop and closed loop power control procedure is introduced in 1.28Mcps TDD option [4], basically has the similar requirements as that of UTRA FDD.

The minimum transmit output power is basically kept in line with 3.84Mcps TDD mode, just considering the RRC measurement filter bandwidth is 1/3 of 3.84Mcps TDD mode, so the figure is scaleable change accordingly.

5.2.4.4 Out-of-synchronisation handling of output power

The UE shall monitor the DPCH quality in order to detect a loss of the signal on Layer 1. The thresholds Q_{out} and Q_{in} specify at what DPCH quality levels the UE shall shut its power off and when it may turn its transmitter on, respectively. The thresholds are not defined explicitly, but are defined by the conditions under which the UE shall shut its transmitter off and turn it on, as stated in this clause.

5.2.4.4.1 Requirement

The parameters in Table 5.2.6 are defined using the DL reference measurement channel (12.2) kbps specified in Annex 5.A.2.1, where the CRC bits are replaced by data bits, and with static propagation conditions.

Table 5.2.6: DCH parameters for test of Out-of-synch handling

Parameter	Unit	Value
$\hat{I}_{or}/I_{oc}$	dB	-1
I_{oc}	dBm/1.28 MHz	-60
$\frac{\Sigma DPCH\_E_c}{I_{or}}$	dB	See figure 1
Information Data Rate	kbps	12.2
TFCI	-	On

The conditions for when the UE shall shut its transmitter on and when it shall turn it on are defined by the parameters in Table 5.2.6 together with the DPCH power level as defined in Figure 1.

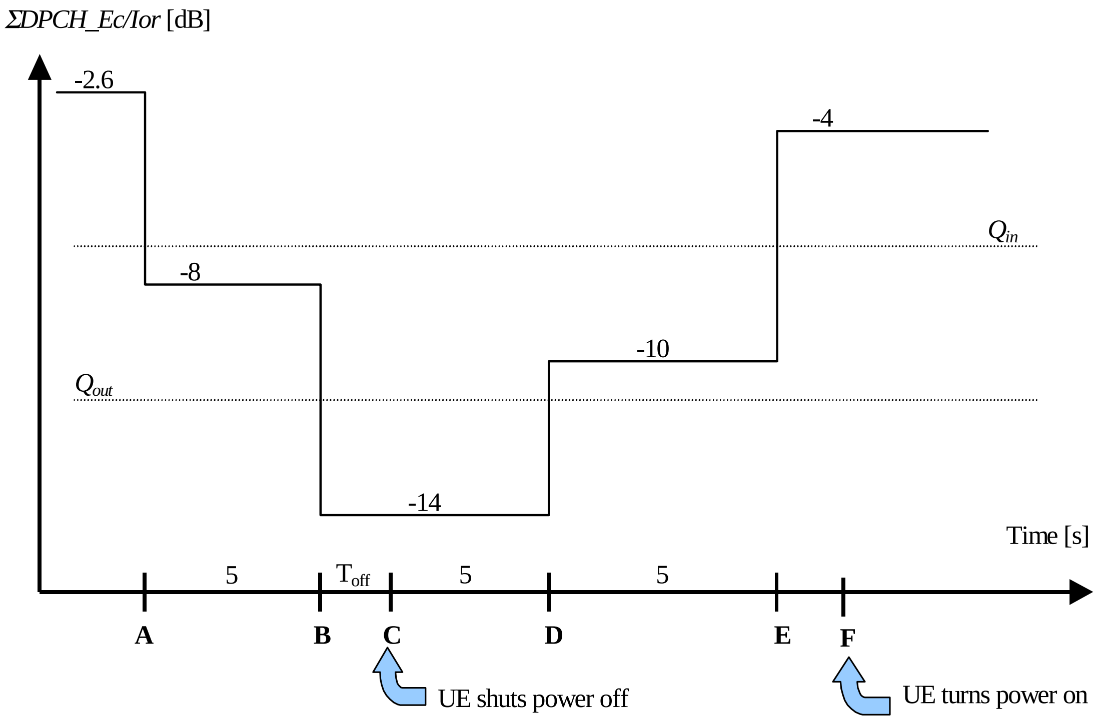


Figure 1. Conditions for out-of-synch handling in the UE. The indicated thresholds Q_{out} andQ_{in} are only informative.

The requirements for the UE are that

The UE shall not shut its transmitter off before point B.

The UE shall shut its transmitter off before point C, which is T_{off} = 200 ms after point B

The UE shall not turn its transmitter on between points C and E.

The UE shall turn its transmitter on before point F, which is T_{on} = 200 ms after Point E.

[Rationale]:

A test procedure was introduced for the case of testing the UE ability to shut down its power if the received power is bellow a certain limit. The power will be varied at the input of the 3.84Mcps TDD Option UE according to the following figure:

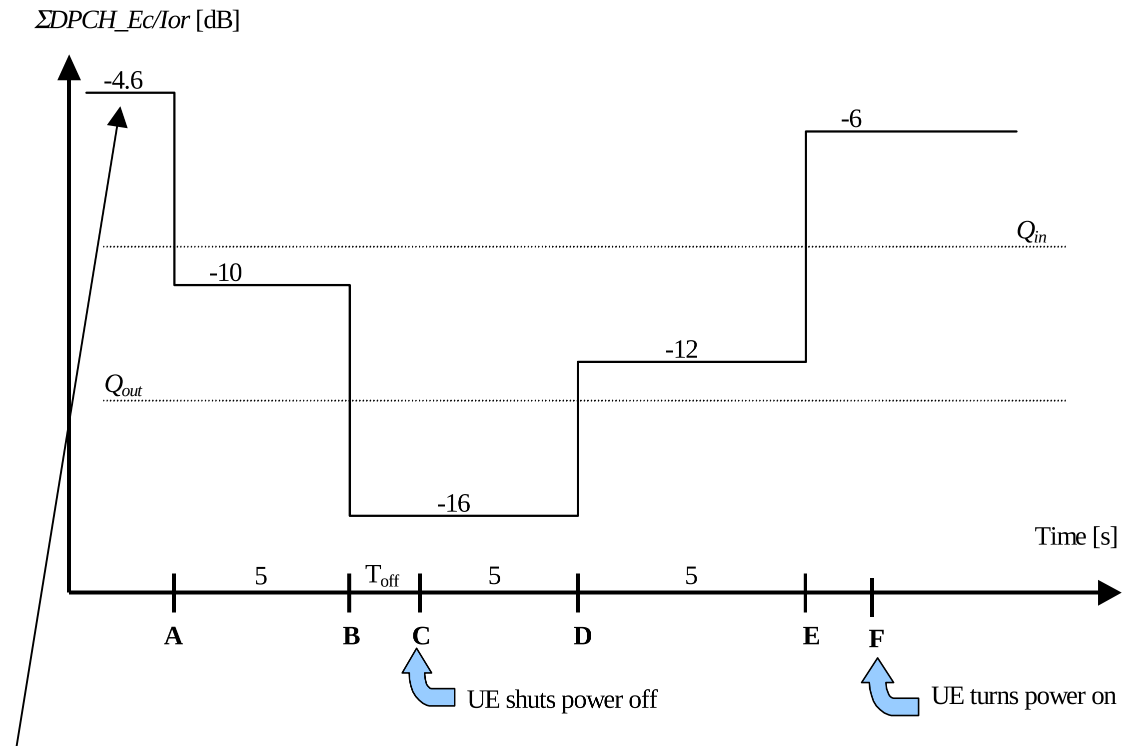


Figure 1. Conditions for out-of-synch handling in the 3.84Mcps TDD Option UE. The indicated thresholds Q_{out} and Q_{in} are only informative.

This entry point of the power is the sensitivity limit of the 3.84Mcps TDD Option UE. According to the link level simulations in TR25.942 the UE needs a I_{OR}/I_{OC}=0.4dB (-1.6dB+2dB margin) at DPCH_E_C/I_{OR}=-6dB for the required performance in case of 12.2kBit/sec service and AWGN propagation. That means also that the required DPCH_E_C/I_{OC}=-5.6dB. In the testcase of “out-of-sync handling” the test shall be carried out with I_{OR}/I_{OC}= -1dB. That means if the UE shall operate at the same BER limit described above the DPCH_E_C/I_{OR} shall be –4.6 dB. (DPCH_E_C/I_{OR} = (DPCH_E_C/I_{OC})*(I_{OC}/I_{OR})=-5.6db+1dB=-4.6dB).

Doing the same calculations for the 1.28Mcps TDD Option UE, the required I_{OR}/I_{OC}=3.2dB (1.2dB+2dB margin) at DPCH_E_C/I_{OR}=-7dB. That means also that the required DPCH_E_C/I_{OC}=-3.8dB. Setting the I_{OR}/I_{OC}= -1dB for the test case the required DPCH_E_C/I_{OR}= (DPCH_E_C/I_{OC})*(I_{OC}/I_{OR})=-3.8db+1dB= -2.8dB. That is the entry point in the test case for the 1.28Mcps TDD Option UE. A **–2.6dB** will be proposed for this entry point level to have a convenient scaling level from 3.84Mcps TDD Option to 1.28Mcps TDD Option.

5.2.5 Transmit ON/OFF power

5.2.5.1 Transmit OFF power

The transmit OFF power state is when the UE does not transmit. This parameter is defined as the maximum output transmit power within the channel bandwidth when the transmitter is OFF.

5.2.5.1.1 Minimum Requirement

The requirement for transmit OFF power shall be better than –65 dBm measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll off α=0.22 and a bandwidth equal to the chip rate.

[Rational]:

In TDD mode, various users are transmitting and receiving on the same frequency band. A maximum transmit output power in the transmitter idle mode has to be defined not to affect other nearby receiving mobiles or BSs. Then received power due to a near by UE has to be required below the noise floor.

The maximum acceptable transmit off power level can be represented as follows

Transmit off power level [dBm] < -174 [dBm/Hz] + 10log(1.28M[Hz]) +NF+MCL,

Assuming a minimum coupling loss (MCL) of 40 dB between mobiles and a noise figure (NF) of 9 dB for the UE, then we can get:

Transmit off power level [dBm] < -113 +9+40=-64dBm,

I.e., the transmit off power level has to be below –64 dBm.

A selected value of –65 dBm leads to minor degradation in the receiver sensitivity, and also leads to well compatible with 3.84Mcps TDD option.

5.2.5.2 Transmit ON/OFF Time mask

The time mask transmit ON/OFF defines the tramping time allowed for the UE between transmit OFF power and transmit ON power.

5.2.5.2.1 Minimum Requirement

The transmit power level versus time shall meet the mask specified in figure 5.2.2, where the transmission period refers to the burst without guard period for a single transmission slot, and to the period from the beginning of the burst in the first transmission slot to the end of the burst without guard period in the last transmission timeslot for consecutive transmission slots.

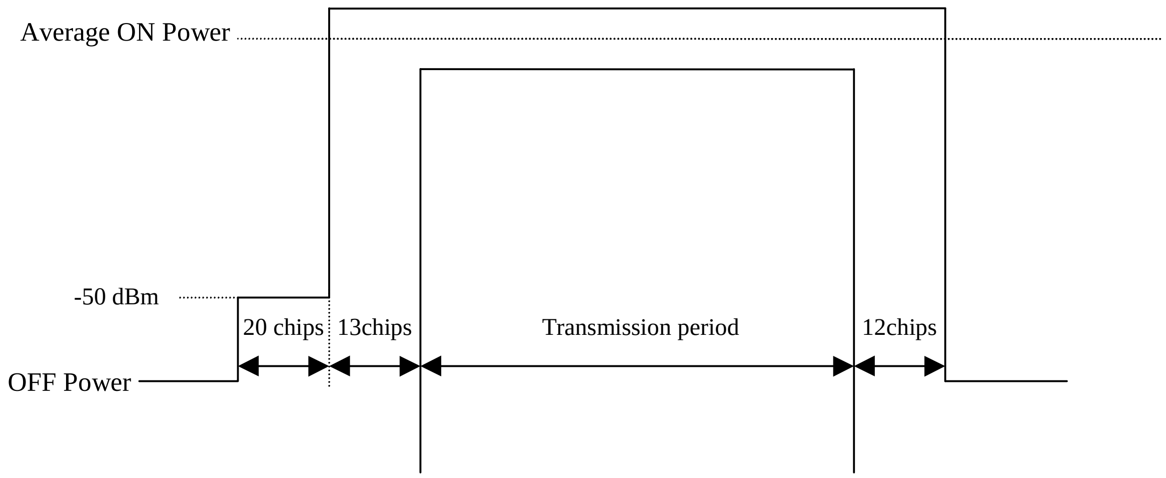


Figure 5.2.2: Transmit ON/OFF template

[Rationales]

A time mask should be included for relevant UE transmit power on/off scenarios. Requirements should be specified to limit impact on system performance and allow reasonable implementation.

To limit impact on the system performance, the time allowed for ramping should be small compared to the time period of continuous transmission. From implementation point of view ramping time should be as long as possible. Shorter ramping time will introduce more ripples in output power.

Depending on the size of a TDD cell it is required for the received signals from different users at the Node B be advanced in timing.

As described [4], there are four key parameters that have to be taken into account when specifying transmit time mask, especially when considering ramping during a guard period.

1. **Timing advance**

   For large cells, the timing advance is necessary, otherwise channel estimation will not work properly. Currently, a cell radius of having 8.7km for rural/macro case is assumed for illustration. This corresponds to round trip delay of 58µs. 29us for timing advance is expected..

2. **Switching time**

   Based on state-of-art semiconductor technology, about 10us of switching time could be expected to easy to handle and implementation in UE side.

3. **Delay spread**

   Under typical urban fading conditions, delay spread is mostly not greater than 3.125µs (4chips)

4. **BS Synchronization accuracy**

   The timing error of BSs synchronized to each other shall be less than 3.125us (4chips)

   The figure 1 illustrates a situation [5],

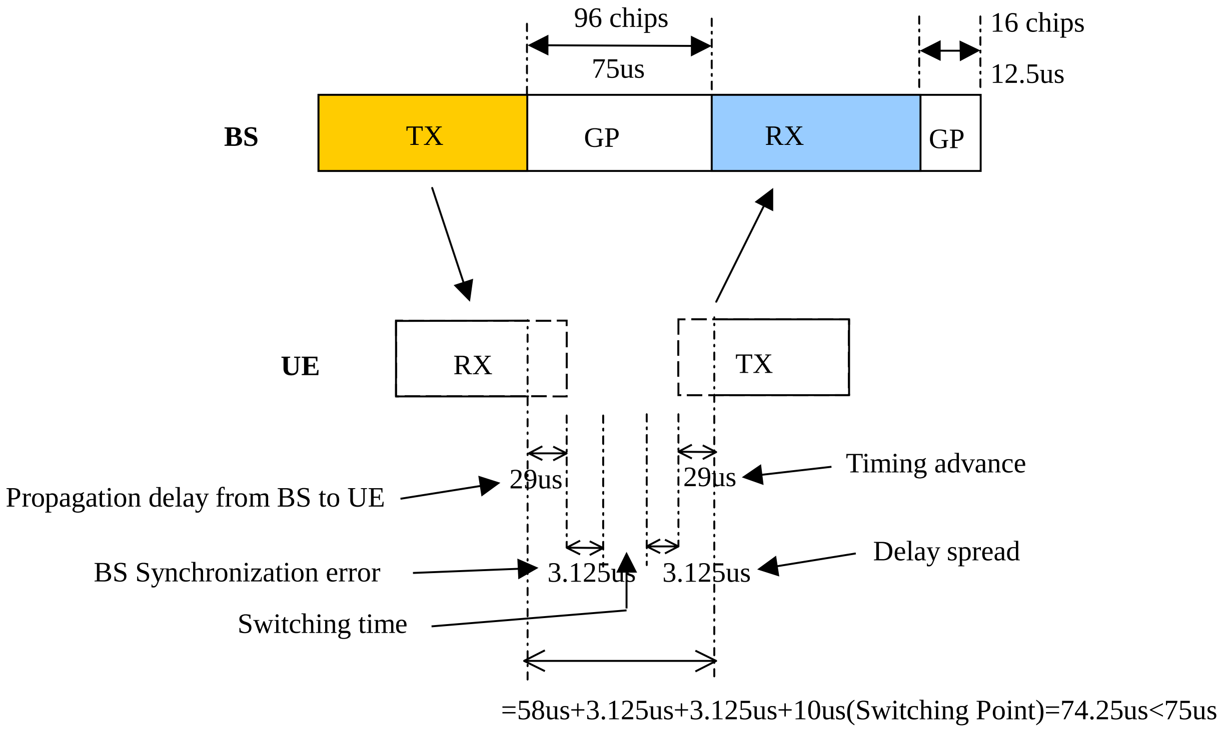


Figure 1: Cell with timing advance

Based on above analysis and consideration, the 13chips(10us) period in 1.28Mcps TDD UE is feasible for ramp up.

Considering the easy implementation aspects, a 20chips(about 15us) transient time is considered for ramp up when transmitter on.

For the ramp down transition in 1.28Mcps TDD, the BS Synchronization error should be considered, there are 12chips(12.5-3.125=9.375us) period is proposed for TX ramp down. It is reasonable to implementation based on the state-of-art semiconductor level.

5.2.6 Output RF spectrum emissions

5.2.6.1 Occupied bandwidth

[Description:]

Occupied bandwidth is a measure of the bandwidth containing 99% of the total integrated power for transmitted spectrum and is centered on the assigned channel frequency. The occupied channel bandwidth is about 1.6 MHz based on a chip rate of 1.28 Mcps.

[Explanation of difference:]

In 3.84Mcps TDD, the occupied channel bandwidth is less than 5MHz based on 3.84Mcps.

But in 1.28Mcps TDD, as the background analysis in WG4#12 Meeting Tdoc515, which has been accepted to into the TR25.945, the occupied channel bandwidth should be less than 1.6 MHz based on 1.28 Mcps.

5.2.6.2 Out of band emission

Out of band emissions are unwanted emissions immediately outside the nominal channel resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit is specified in terms of a spectrum emission mask and adjacent channel power ratio.

5.2.6.2.1 Spectrum emission mask

The spectrum emission mask of the UE applies to frequencies, which are between 0.8 and 4.0MHz from a carrier frequency. The out of channel emission is specified relative to the UE output power in measured in a 1.28 MHz bandwidth.

5.2.6.2.1.1 Minimum Requirement

The power of any UE emission shall not exceed the levels specified in Table 5.2.6.2.1.

Table 5.2.6.2.1: Spectrum Emission Mask Requirement (1.28Mcps chip rate option)

Frequency offset from carrier Δf	Minimum requirement	Measurement bandwidth
0.8 MHz	-35 dBc	30 kHz
0.8-1.8 MHz	-35 – 14*(Δf-0.8) dBc	30 kHz
1.8-2.4 MHz	-49 – 25*(Δf-1.8)dBc	30 kHz
2.4 – 4.0MHz	-49 dBc	1MHz

Note:

1. The first and last measurement position with a 30 kHz filter is 0.815 MHz and 2.385 MHz
2. The first and last measurement position with a 1 MHz filter is 2.9MHz and 3.5MHz
3. The lower limit shall be –55dBm/1.28 MHz or which ever is the higher.

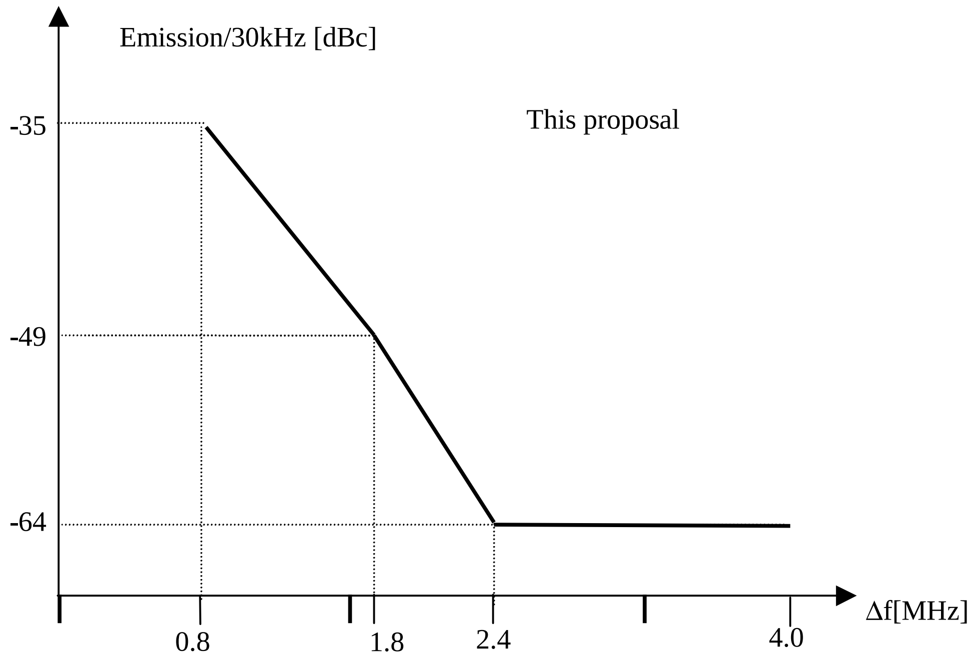


Fig 1 Proposed spectrum emission mask measured in 30kHz bandwidth

[Rationale:]

Based on the discussion, the mask in Table 5.2.6.2.1.1 is proposed for power class 5 (21 dBm), given in dBc compared with 21dBm/1.28MHz. The rationale for each specification point is outlined in the table together with the proposed mask and the corresponding mask values, measured in 30 kHz (the smallest measurement bandwidth used):

Table 5.2.6.2.1.1 Proposed spectrum emission mask values and rationale.

Frequency offset Δf	Minimum requirement (whichever is lower)	Measurement bandwidth	Comments for rationale	Corresponding value in 30 kHz
0.8 MHz	(-14dBm) -35 dBc	30 kHz	Based on FCC part 24: -13 dBm/14.6kHz ; And 1.28Mcps TDD emission specification 1)	-35 dBc
0.8-1.8 MHz	-35 – 14*(Δf-0.8) dBc	30 kHz	Dropping linearly from 0.8 to 1 MHz 2)	
1.8MHz	(-28dBm) -49dBc	30kHz	Based on FCC part 24: -13dBm/1MHz	-49dBc
1.8-2.4 MHz	-49 – 25*(Δf-1.8) dBc	30kHz 3)	Based on ACLR @1.6 MHz -33 dBc/1.28 MHz for 21 dBm UE 4)	
2.4-4.0 MHz	(-28dBm) -49dBc	1MHz	Based on ACLR @3.2 MHz -43 dBc/1.28 MHz for 21 dBm UE	-64 dBc

1. Frequency offset: in FCC, frequency offset reference is the allocated band edge. Since spectrum definition has to be independent of operator allocation, the reference has been changed to the center frequency of the measured carrier. Assuming that the nominal carrier spacing is 1.6MHz for low chip rate TDD option, so spectrum mask definition starts at 0.8MHz offset.

2. Measurement bandwidth: the "-26dB modulation bandwidth" is approximately equal to 1.46MHz in low chip rate option. This leads to 14.6kHz-measurement bandwidth. Since this value is not available in most measurement devices such as spectrum analyzers, a standard value of 30kHz was adopted.

3. Mask shape:

1) According to FCC rules, the emission should be –13dBm/14.6kHz or –10dBm/30kHz. But in accordance with the 3.84Mcps TDD emission only –14dBm is allowed to have no more ‘dBm/Hz power‘ in the adjacent band as the 3.84Mcps TDD has. (Because the physical origin of the modulation side band is the same in both cases the level of the leakage power should also be the same.)

2) The level of the slope from 0.8MHz to 1.8 MHz has been set in order to maintain a monotonic requirement around the 1.8MHz offset where the measurement bandwidth changes from 30kHz to 1MHz.

3) Based on FCC rules, after 1MHz offset (1.8MHz frequency point here) from the allocated frequency band edge, the measurement bandwidth should be 1MHz then, but considering that from 1.8MHz to 2.4MHz (2nd carrier band limit) only 0.6MHz, it is less than 1MHz. Thus we change back to 30kHz so that it could be reasonable to measurement.

4) Based on the ACLR@3.2MHz requirement, the emission value is tighter than that of the FCC rules, therefore the tighter value has been deployed in the table.

5.2.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the transmitted power to the power measured in an adjacent channels. Both the transmitted power and the adjacent channel power are measured with a filter response that has a Root-Raised Cosine (RRC) filter response with roll-off $\alpha = 0.22$ and a bandwidth equal to the chip rate.

If the adjacent power is greater than –55dBm then the ACLR shall be better then the values specified in the following Table.

Table 5.2.6.2.2-1 : UE ACLR (1.28Mcps chip rate)

Power Class	UE channel	ACLR limit
21dBm	± 1.6 MHz	33 dB
21dBm	± 3.2 MHz	43 dB

Note

1. The requirement shall still be met in the presence of switching transients.
2. The ACLR requirements reflect what can be achieved with present state of the art technology.
3. Requirement on the UE shall be reconsidered when the state of the art technology progresses.

5.2.6.3 Spurious emissions

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products, but exclude out of band emissions.

The frequency boundary and the detailed transitions of the limits between the requirement for out band emissions and spectrum emissions are based on ITU-R Recommendations SM.329.

5.2.6.3.1 Minimum Requirement

These requirements are only applicable for frequencies which are greater than 4 MHz away from the UE center carrier frequency.

Table 5.2.6.3-1a : General Spurious emissions requirements

Frequency Bandwidth	Resolution Bandwidth	Minimum requirement
9 kHz ≤ f < 150 kHz	1 kHz	-36 dBm
150 kHz ≤ f < 30 MHz	10 kHz	-36 dBm
30 MHz ≤ f < 1000 MHz	100 kHz	-36 dBm
1 GHz ≤ f < 12.75 GHz	1 MHz	-30 dBm

Table 5.2.6.3.-1b : Additional Spurious emissions requirements

Frequency Bandwidth	Resolution Bandwidth	Minimum requirement
925 MHz ≤ f ≤ 935 MHz	100 KHz	-67 dBm*
935 MHz < f ≤ 960 MHz	100 KHz	-79 dBm*
1805 MHz ≤ f ≤ 1880 MHz	100 KHz	-71 dBm*

Note

* The measurements are made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the applicable requirements defined in Table 5.2.7-1 are permitted for each UARFCN used in the measurement.

[Explanation of difference:]

The UE TX Spurious emissions requirements basically keep in line with UTRAN FDD and 3.84Mcps TDD.

For the frequency offset, as ITU specification SM.329, the frequency limit between out of band emissions and spurious emissions is defined as 250% of the necessary bandwidth. In 1.28Mcps option the necessary bandwidth is 1.6MHz, so the frequency offset from carrier frequency is $250\% \times 1.6MHz = 4MHz$.

5.2.7 Transmit intermodulation

The transmit intermodulation performance is a measure of the capability of the transmitter to inhibit the generation of signals in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna.

5.2.7.1 Minimum requirements

User Equipment(s) transmitting in close vicinity of each other can produce intermodulation products, which can fall into the UE, or BS receive band as an unwanted interfering signal. The UE intermodulation attenuation is defined by the ratio of the output power of the wanted signal to the output power of the intermodulation product when an interfering CW signal is added at a level below the wanted signal. Both the wanted signal power and the intermodulation product power are measured with a filter response that is root-raised cosine (RRC) with roll-off α=0.22 and with a bandwidth equal to the chip rate.

For the 1.28Mcps chip rate option, the requirement of transmitting intermodulation for carrier spacing 1.6MHz is prescribed in the following table.

Table 5.2.7-1 . Transmitting intermodulation attenuation.

Interference signal frequency offset	1.6MHz	3.2MHz
Interference signal level	-40dBc	

Minimum requirement of intermodulation products	-31 dBc	-41 dBc

Note: This requirement is applicable to the 21 dBm power class of UE.

5.2.8 Transmit Modulation

5.2.8.1 Transmit pulse shape filter

The transmit pulse-shaping filter is a root-raised cosine (RRC) with roll-off α =0.22 in the frequency domain. The impulse response of the chip impulse filter $RC_0(t)$ is

$$RC_0(t) = \frac{\sin\left(\pi \frac{t}{T_C}(1-\alpha)\right) + 4\alpha \frac{t}{T_C}\cos\left(\pi \frac{t}{T_C}(1+\alpha)\right)}{\pi \frac{t}{T_C}\left(1-\left(4\alpha \frac{t}{T_C}\right)^2\right)}$$

Where the roll-off factor α =0.22 and the chip duration: $T_C = \frac{1}{chiprate} = 0.78125\mu s$

5.2.8.2 Error Vector Magnitude

Common with 3.84Mcps TDD option.

5.2.8.2.1 Minimum Requirement

Common with 3.84Mcps TDD option.

5.2.8.3 Peak Code Domain Error

Common with 3.84Mcps TDD option.

5.2.8.3.1 Minimum Requirement

Common with 3.84Mcps TDD option.

[Rational:]

For 3.84Mcps and FDD, the minimum requirements for the error vector magnitude and peak code domain error ensures that

the error vector magnitude does not degrade the performance

the error vector magnitude leads only to low increase for the transmitted output power to remain the Eb/N0

The theoretical investigations have shown that the error vector magnitude is related to the spreading factor. Because the same spreading factors are used for low chip rate TDD and for high chiprate TDD, the same minimum requirement applies.

5.3 Receiver characteristics

5.3.1 General

Common with 3,84Mcps TDD option.

5.3.2 Diversity characteristics

Common with 3,84Mcps TDD option.

5.3.3 Reference sensitivity level

The reference sensitivity is the minimum receiver input power measured at the antenna port at which the BIT Error Ratio BER does not exceed a specific value.

5.3.3.1 Minimum Requirements

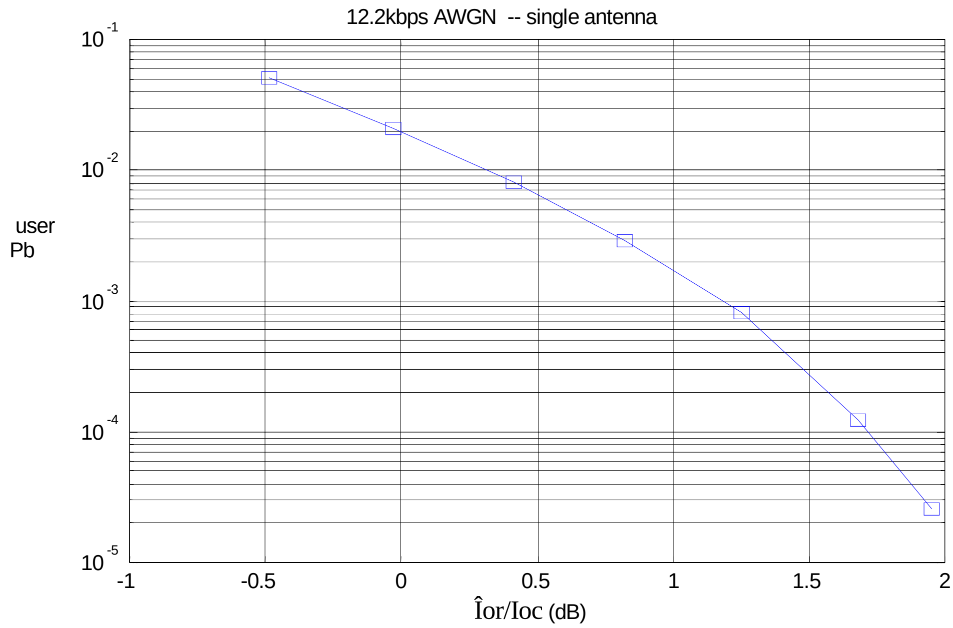
The BER shall not exceed 0.001 for the parameters specified in Table 5.3.3-1.

Table 5.3.3-1 : Test parameters for reference sensitivity

Parameter	Level	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	dB
$\hat{I}_{or}$	-108	dBm/1.28 MHz

[Simulation results:]

The simulation is done to 12.2kb/s data in static propagation condition for UE of 1.28Mcps TDD. Please refer to the R400TDD054.The service-mapping is specified in ANNEX: *Measurement Channel*, and the simulation assumption is specified in "*Simulation Assumption for 1.28Mcps Chip Rate TDD option*".



Îor/Ioc	Pb
-0.49	5.09E-2
-0.03	2.12E-2
0.41	8.11E-3
0.82	2.90E-3
1.25	8.12E-4
1.68	1.23E-4
1.95	2.61E-5

Rationale:

the simulations has been made with $\frac{\Sigma DPCH\_Ec}{I_{or}}$=-7dB. That means that the reference sensitivity is P_{Noise}+Noise-Figure+Îor/Ioc_{Limit}-Own_Code_Power+Implementaion_Margin=-113dBm+9dB+1.2dB-7dB+2dB=-107.7dBm. Roughly –108dBm which is the defined reference sensitivity level.

5.3.4 Maximum input level

This is defined as the maximum receiver input power at the UE antenna port which does not degrade the specified BER performance.

5.3.4.1 Minimum Requirements

The BER shall not exceed 0.001 for the parameters specified in Table 5.3.4-1

Table 5.3.4-1: Maximum input level

Parameter	Level	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	-7	dB
$\hat{I}_{or}$	-25	dBm/1.28 MHz

5.3.5 Adjacent Channel Selectivity (ACS)

Adjacent Channel Selectivity is a measure of a receiver’s ability to receive a wanted signal at its assigned channel frequency in the presence of adjacent channel signal at a given frequency offset from the centre frequency of the assigned channel. ACS is the ratio of the receive filter attenuation on the assigned channel frequency to the receiver filter attenuation on the adjacent channel(s).

5.3.5.1 Minimum Requirement

The ACS shall be better than the value indicated in Table 5.3.5-1 for the test parameters specified in Table 5.3.5-2 where the BER shall not exceed 0.001

Table 5.3.5-1: Adjacent Channel Selectivity

Power Class	Unit	ACS

2	dB	33
3	dB	33

Table 5.3.5-2: Test parameters for Adjacent Channel Selectivity

Parameter	Unit	Level
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	dB	0
$\hat{I}_{or}$	dBm/1.28MHz	-91
I_{oac}	dBm/1.28 MHz	-54
F_{uw} offset	MHz	+1.6 or –1.6

[Rationale:]

The ACS performance of terminals is largely determined by an IF filter (usually a SAW), the A/D converter and digital baseband filtering. And the ACS requirements should reflect what can be achieved with present state of the art technology. So we can select the same receiver filter performance as 3.84Mcps TDD, ACS equals to 33 dBc.

The wanted signal is set at –91dBm, just like that of 3.84Mcps TDD, i.e., the wanted signal is 17dB above sensitivity level. Actually it has to be –94dBm to have the same distance to the reference sensitivity as the WTDD UE has. But the impact is neglegable. In that case the signal is large enough compared to the noise. Which means in turn that the impact of the noise can be neglected and only the filter characteristic will be taken into consideration which is the intention with that test case.

Then the unwanted adjacent level could be derived as below:

$P_I \leq$ sensitivity [dBm] + 17dB (because the wanted signal is 17dB above the sensitivity) + ACS + 6dB (interference could be 6dB higher for the required BER as the wanted signal: see reference sensitivity) - 2dB (implementation margin) = -54dBm.

5.3.6 Blocking characteristics

The blocking characteristics is a measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occur.

5.3.6.1 Minimum Requirement

The BER shall not exceed 0.001 for the parameters specified in table5.3.6-1 and table 5.3.6-2. For table 13 up to 24 exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1MHz step size.

Table 5.3.6-1: In-band blocking

Parameter	Offset	Offset	Unit
Wanted Signal Level	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/1.28 MHz
Unwanted Signal Level (modulated)	-61	-49	dBm/1.28 MHz
F_{uw} (offset)	+3.2 or –3.2	+4.8 or –4.8	MHz

Table 5.3.6-2: Out of band blocking

Parameter	Band 1	Band 2	Band 3	Unit
Wanted Signal Level	<REFSENS> + 3 dB	<REFSENS> + 3 dB	<REFSENS> + 3 dB	dBm/1.28 MHz
Unwanted Signal Level (CW)	-44	-30	-15	dBm
F_{uw} For operation in frequency bands as definded in subclause 5.2(a)	1840 <f <1895.2 1924.8 <f <2005.2 2029.8 <f <2085	1815 <f <1840 2085 <f <2110	1< f <1815 2110< f <12750	MHz
F_{uw} For operation in frequency bands as definded in subclause 5.2(b)	1790 < f < 1845.2 1994.8 < f < 2050	1765 < f < 1790 2050 < f < 2075	1 < f < 1765 2075 < f < 12750	MHz
F_{uw} For operation in frequency bands as definded in subclause 5.2(c)	1850 < f < 1905.2 1934.8 < f < 1990	1825 < f < 1850 1990 < f < 2015	1 < f < 1825 2015 < f < 12750	MHz

Note: 1. For operation referenced in 5.1.2(a), from 1895.2 <f< 1900 MHz, 1920 <f< 1924.8 MHz, 2005.2 <f< 2010 MHz and 2025<f< 2029.8 MHz , the appropriate in-band blocking or adjacent channel selectivity in section 5.3.5.1shall be applied.

For operation referenced in 5.1.2(b), from 1845.2 < f < 1850 MHz and 1990< f < 1994.8 MHz, the appropriate in-band blocking or adjacent channel selectivity in section 5.3.5.1 shall be applied.

For operation referenced in 5.1.2(c), from 1905.2 < f < 1910 MHz and 1930< f < 1934.8 MHz, the appropriate in-band blocking or adjacent channel selectivity in section 5.3.5.1 shall be applied.

[Rationale]:

- 3.2MHz blocking requirement

From [1,2] the required interfering signal level can be calculated, just like FDD (which is of course true only if the wanted signal is 3dB above the reference level),

$$I_{blocking} = NF + 10 \cdot \log(1.28 Mcps) - 174 dBm/Hz + ACS2,$$

$$I_{blocking} = 9\ dB + 61\ dB - 174 dBm/Hz + 43\ dB = -61\ dBm.$$

ACS Adjacent channel selectivity

NF Noise figure

In the equations above, the ACS2 is assumed as 43dB, and NF is assumed as 9dB. The principle is basically like FDD and 3.84Mcps TDD, just the chiprate has been changed, so the in band blocking value is also scalable changed.

Considering the chiprate is 1.28Mcps, so the unwanted signal frequency offset is also scalable changed from 3.84Mcps TDD.

- Out of band blocking requirement

The relevant frequency bands for out of band blocking are calculated according to the specified frequency bands for FDD in [3] and 3.84Mcps TDD in [4]. The 3dB tougher requirement comparing to the WTDD/FDD is based on the assumption that the overall interference power is the same as in the other cases due to the same deployment scenarios. The NTDD UE has to withstand the same interference power as the WTDD/FD UE has to.

Note: Reference

1.Nokia, Ericsson, FDD UE Blocking Requirement, TSGR4#6(99) 393

2.Siemens, Blocking characteristics, Spurious response, Intermodulation characteristics for UE TDD, TSGR4#7(99) 457

3. Nokia, Ericsson, Revised FDD UE Blocking Requirement, TSGR4#6(99) 431

4. TS 25.102 V3.30

5.3.7 Spurious response

Spurious response is a measure of the receiver's ability to receive a wanted signal on its assigned channel frequency without exceeding a given degradation due to the presence of an unwanted CW interfering signal at any other frequency at which a response is obtained i.e. for which the blocking limit is not met.

5.3.7.1 Minimum Requirements

For the 1.28Mcps chip rate option, the requirement of Spurious response for carrier spacing 1.6MHz is prescribed in the following table.

Table 5.3.7.1: Spurious Response (1.28MHz chiprate)

Parameter	Level	Unit
Wanted Signal Level	<REFSENS> + 3 dB	dBm/1.28 MHz
Unwanted Signal Level (CW)	-44	dBm
F_{uw}	Spurious response frequencies	MHz

Rationale:

The 3dB tougher requirement comparing to the WTDD/FDD is based on the assumption that the overall interference power is the same as in the other cases due to the same deployment scenarios. The NTDD UE has to withstand the same interference power as the WTDD/FD UE has to.

5.3.8 Intermodulation characteristics

Third and higher order mixing of the two interfering RF signals can produce an interfering signal in the band of the desired channel. Intermodulation response rejection is a measure of the capability of the receiver to receiver a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.

5.3.8.1 Minimum Requirements

For the 1.28Mcps chip rate option, the requirement of intermodulation for carrier spacing 1.6MHz is prescribed in the following table.

Table 5.3.8-1: Receive intermodulation characteristics (1.28MHz chiprate)

Parameter	Level	Unit
$\frac{\Sigma DPCH\_Ec}{I_{or}}$	0	dB
$\hat{I}_{or}$	<REFSENS> + 3 dB	dBm/1.28 MHz
$I_{ouw1\ (CW)}$	-46	dBm
I_{ouw2} (modulated)	-46	dBm/1.28 MHz
F_{uw1} (CW)	3.2	MHz
F_{uw2} (Modulated)	6.4	MHz

Rationale:

The 3dB tougher requirement comparing to the WTDD/FDD is based on the assumption that the overall interference power is the same as in the other cases due to the same deployment scenarios. The NTDD UE has to withstand the same interference power as the WTDD/FD UE has to.

5.3.9 Spurious emissions

The Spurious Emissions Power is the power of emissions generated or amplified in a receiver that appear at the UE antenna connector.

5.3.9.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 5.3.9-1: Receiver spurious emission requirements

Band	Maximum level	Measurement Bandwidth	Note
9 kHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 1.9 GHz and 1.92 GHz – 2.01 GHz and 2.025 GHz – 2.11 GHz	-47 dBm	1 MHz	With the exception of frequencies between 4MHz below the first carrier frequency and 4MHz above the last carrier frequency used by the UE.
1.9 GHz – 1.92 GHz and 2.01 GHz – 2.025 GHz and 2.11 GHz – 2.170 GHz	-64 dBm	1.28 MHz	With the exception of frequencies between 4MHz below the first carrier frequency and 4MHz above the last carrier frequency used by the UE.
2.170 GHz – 12.75 GHz	-47 dBm	1 MHz	

[Rationale]:

The inband (Band 3 in the above table) RX spuiours emission value could be conducted as below.

Assumptions:

The Noise Figure (NF) of the UE receiver is 9dB;

The MCL for UE's is 40dB.

So the derivation is as follows:

Spurious level – MCL (Minimum Coupling Loss) < Thermal noise

Spurious level < Thermal noise + MCL = kTo + NF + MCL = –174dBm/Hz + 9dB + 40dB = –125dBm/Hz

In other way, in 1.28Mcps TDD,

Spurious level < –64dBm/ 1.28MHz (= –125dBm/Hz)

The spurious levels in Band 1,2 and 4 are independent if the disturber is a FDD UE or aTDD UE. Therefore we propose to adopt these values for 1.28Mcps TDD UE, just like 3.84Mcps TDD UE.

The values of the 1.28Mcps TDD UE receiver spurious levels from point 1 to 4 are proposed for approval for 1.28Mcps TDD taking into account the impact of the TDD UE receiver spurious emission to the FDD UE receiver band.

For the frequency offset, as ITU specification, the frequency limit between out of band emissions and spurious emissions is defined as 250% of the necessary bandwidth. In 1.28Mcps option the necessary bandwidth is 1.6MHz, so the frequency offset from carrier frequency is $250\% \times 1.6MHz = 4MHz$.

5.4 Performance requirement

5.4.1 General

The performance requirements for the UE in this section are specified for the measurement channels specified in Annex 5.A and the propagation condition specified in Annex 5.B.

Table 5.4.1: Summary of UE performance targets

Test Chs.	Information Data Rate	Static	Multi-path Case 1	Multi-path Case 2	Multi-path Case 3
		Performance metric			
DCH	12.2 kbps	BLER<10^{-2}	BLER<10^{-2}	BLER<10^{-2}	BLER<10^{-2}
	64 kbps	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}, 10^{-3}
	144 kbps	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}, 10^{-3}
	384 kbps	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}, 10^{-3}

5.4.2 Demodulation in static propagation conditions

5.4.2.1 Demodulation of DCH

The performance requirement of DCH in static propagation conditions is determined by the maximum Block

Error Ratio (BLER). The BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

5.4.2.1.1 Minimum requirement

For the parameters specified in Table 5.4.2 the BLER should not exceed the piece-wise linear BLER curve specified in Table 5.4.3.

Table 5.4.2: DCH parameters in static propagation conditions

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		8[1)]	2	2	0
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-10[1)]	-10	-10	0
I_{oc}	dBm/1.28MHz	-60			
Information Data Rate	Kbps	12.2	64	144	384

1) Rational:

The simulation will be carried out with ten codes and each has the same power (-10dB/code). The number of interfering signals are 8. That means that the number of own codes are 2 or other way round the relation between the number of own codes divided by the whole number of codes is 2/10 or –7dB. That is the correction factor for the Test1. The other test cases above and throughout the following subclauses can be explained on the same way.

Table 5.4.3: Performance requirements in AWGN channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	3.1	10^{-2}
2	2.1	10^{-1}
	2.4	10^{-2}
3	2.5	10^{-1}
	2.8	10^{-2}
4	2.8	10^{-1}
	3.0	10^{-2}

5.4.3 Demodulation of DCH in multipath fading conditions

5.4.3.1 Multipath fading Case 1

The performance requirement of DCH is determined by the maximum Block Error Ratio (BLER). The BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

5.4.3.1.1 Minimum requirement

For the parameters specified in Table 5.4.4 the BLER should not exceed the piece-wise linear BLER curve specified in Table 5.4.5.

Table 5.4.4: DCH parameters in multipath Case 1 channel

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		8	2	2	0
$\frac{DPCH_o\_E_c}{I_{or}}$	DB	-10	-10	-10	0
I_{oc}	dBm/1.28MHz	-60			
Information Data Rate	Kbps	12.2	64	144	384

Table 5.4.5: Performance requirements in multipath Case 1 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	22.2	10^{-2}
2	15.0	10^{-1}
	22.0	10^{-2}
3	16.0	10^{-1}
	23.0	10^{-2}
4	16.0	10^{-1}
	23.0	10^{-2}

5.4.3.2 Multipath fading Case 2

The performance requirement of DCH is determined by the maximum Block Error Ratio (BLER). The BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

5.4.3.2.1 Minimum requirement

For the parameters specified in Table 5.4.6 the BLER should not exceed the piece-wise linear BLER curve specified in Table 5.4.7.

Table 5.4.6: DCH parameters in multipath Case 2 channel

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		8	2	2	0
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-10	-10	-10	0
I_{oc}	dBm/1.28MHz	-60			
Information Data Rate	Kbps	12.2	64	144	384

Table 5.4.7: Performance requirements in multipath Case 2 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	13.2	10^{-2}
2	9.5	10^{-1}
	13.7	10^{-2}
3	10.0	10^{-1}
	14.0	10^{-2}
4	10.0	10^{-1}
	14.0	10^{-2}

5.4.3.3 Multipath fading Case 3

The performance requirement of DCH is determined by the maximum Block Error Ratio (BLER). The BLER is specified for each individual data rate of the DCH. DCH is mapped into the Dedicated Physical Channel (DPCH).

5.4.3.3.1 Minimum requirement

For the parameters specified in Table 5.4.8 the BLER should not exceed the piece-wise linear BLER curve specified in Table 5.4.9.

Table 5.4.8: DCH parameters in multipath Case 3 channel

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		8	2	2	0
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-10	-10	-10	0
I_{oc}	dBm/1.28MHz	-60			
Information Data Rate	Kbps	12.2	64	144	384

Table 5.4.9: Performance requirements in multipath Case 3 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	10.8	10^{-2}
2	8.3	10^{-1}
	11.1	10^{-2}
	13.8	10^{-3}
3	8.7	10^{-1}
	10.6	10^{-2}
	11.8	10^{-3}
4	8.8	10^{-1}

	10.3	10^{-2}
	11.5	10^{-3}

[Explanation difference:]

The different performance requirement is result from different propagation condition (Annex 5.B), different service mapping (Annex 5.A) ,different simulation assumption and different chip rate with 3.84Mcps chip rate TDD.

The BCH test case, is testing the block STTD capability of the terminal. Block STTD is currently not supported by 1.28Mcps chip rate TDD, as specified in TR 25.928. Therefore this test case is not needed for 1.28Mcps chip rate TDD.

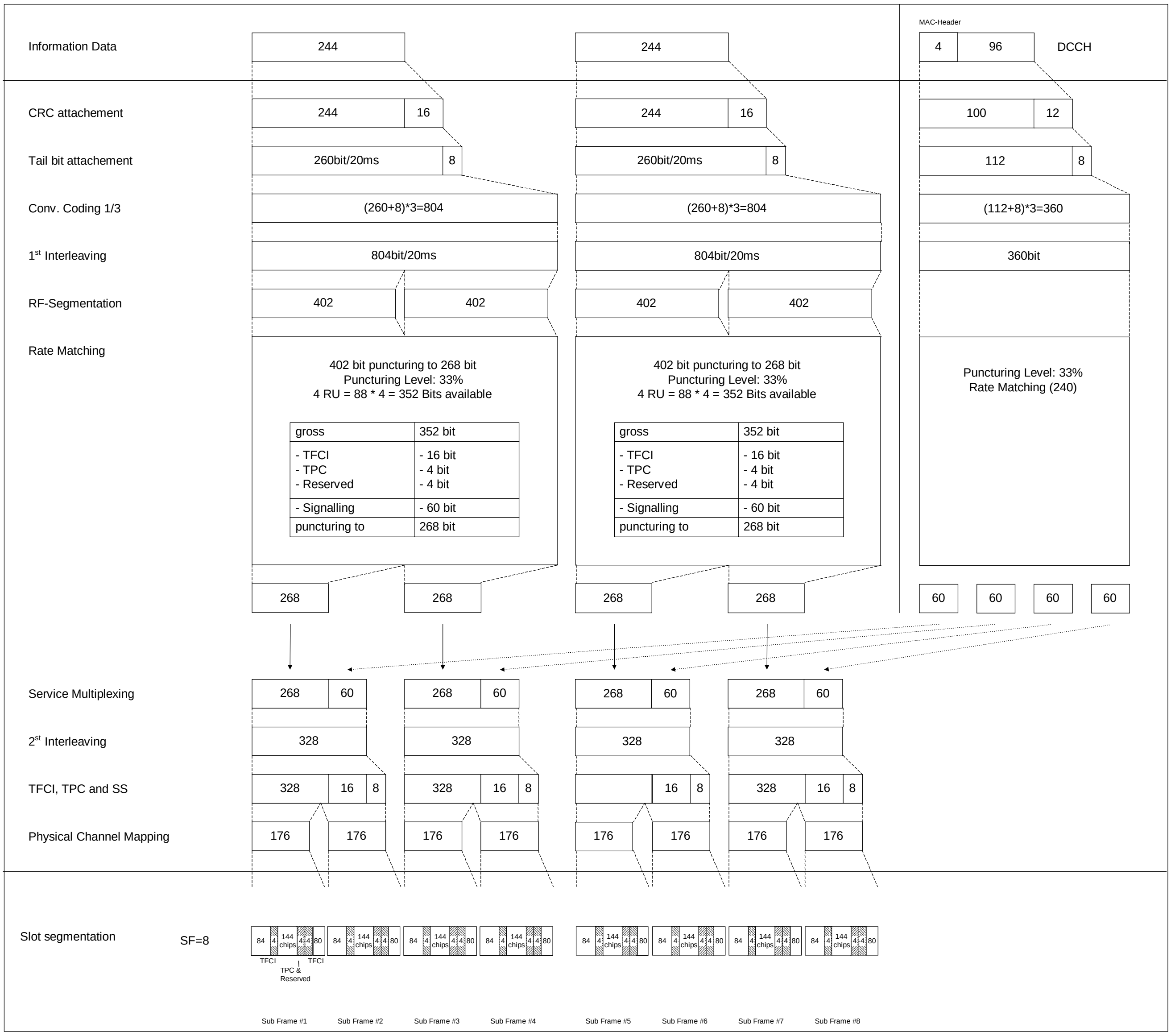
Annex 5.A (normative): Measurement Channels

5.A.1 General

5.A.2 Reference Measurement Channels

5.A.2.1 UL reference measurement channel (12.2 kbps)

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
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 / DCCH	33% / 33%



Rationale:

There is only one burst type for normal time slot in the low chip rate option. It provides the possibility for transmission of TFCI and TPC both in up- and downlink. The SS information will be used only in down link but in order to have the same burst structure for both directions the place of the SS bits are also reserved for up link and may be used in a future enhancement. Taking the mentioned features into consideration the up link multicode reference measurement channel can be the same as the down link 12.2kBit/s reference measurement channel (aligned to 3.84Mcps TDD Option) with the exception that the SS bits are not used.

The following example will be used from WG1 with 3.4kBit/sec signalling (signalling can be varied between 1.7kBit/sec and 3.4kBit/sec):

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

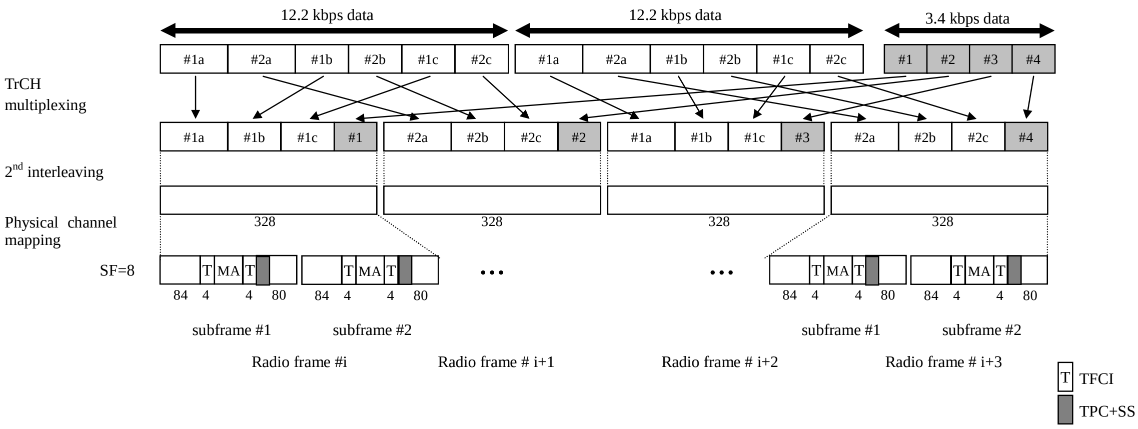


Figure 1: Channel coding and multiplexing example for multiplexing of 12.2 kbps data and 3.4 kbps data

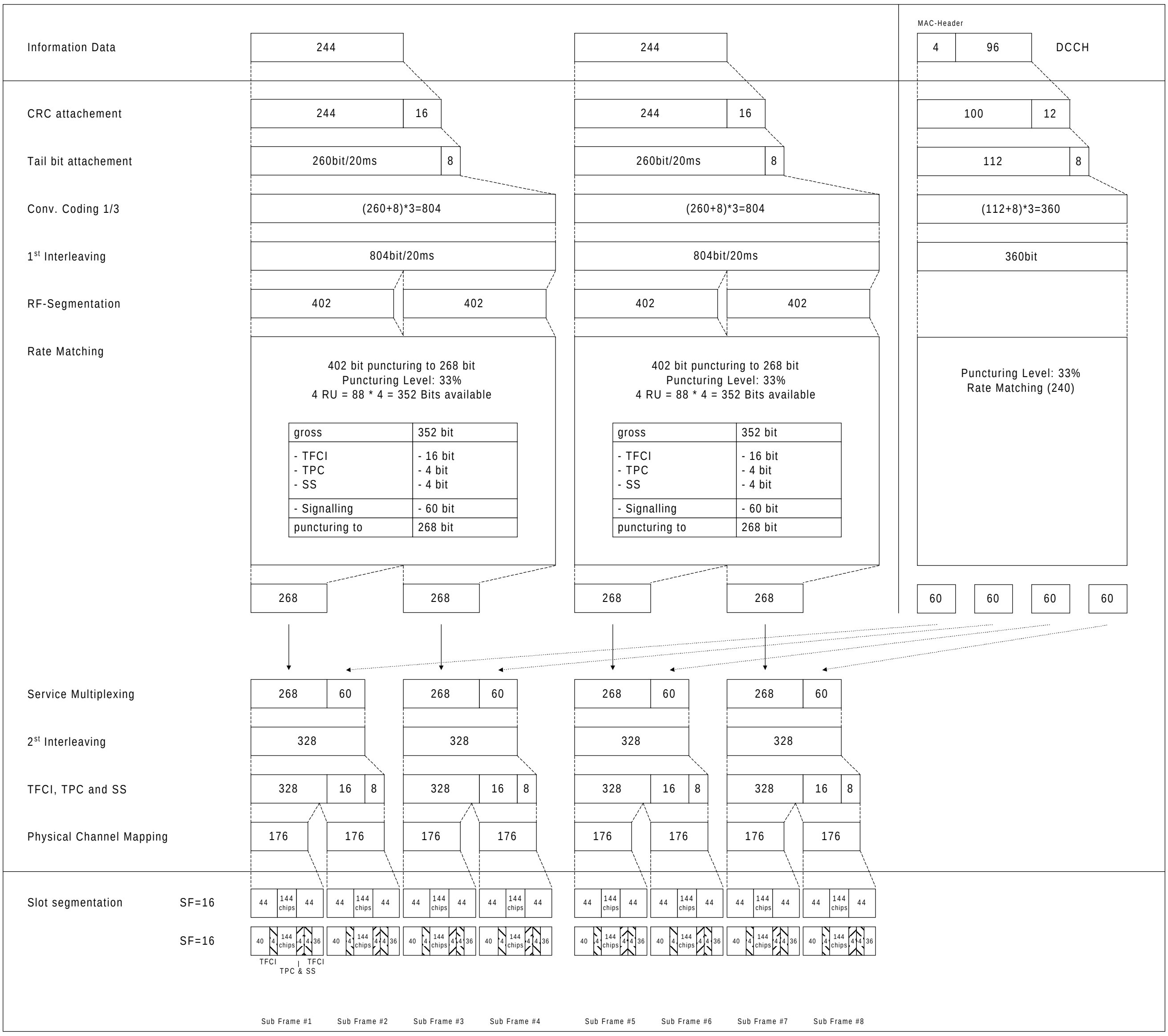
Table 1: Physical channel parameters for multiplexing of 12.2 kbps data and 3.4 kbps data

Codes and time slots	SF8 x 1 code x 1 time slot
TFCI	16 bits per user
TPC + SS	2 bit + 2bit

In WG4 the performance simulations have been done with a signalling of 2.4kBit/sec (as an average signalling rate). So the mapping above will be modified for the 2.4kbit/sec signalling rate also.

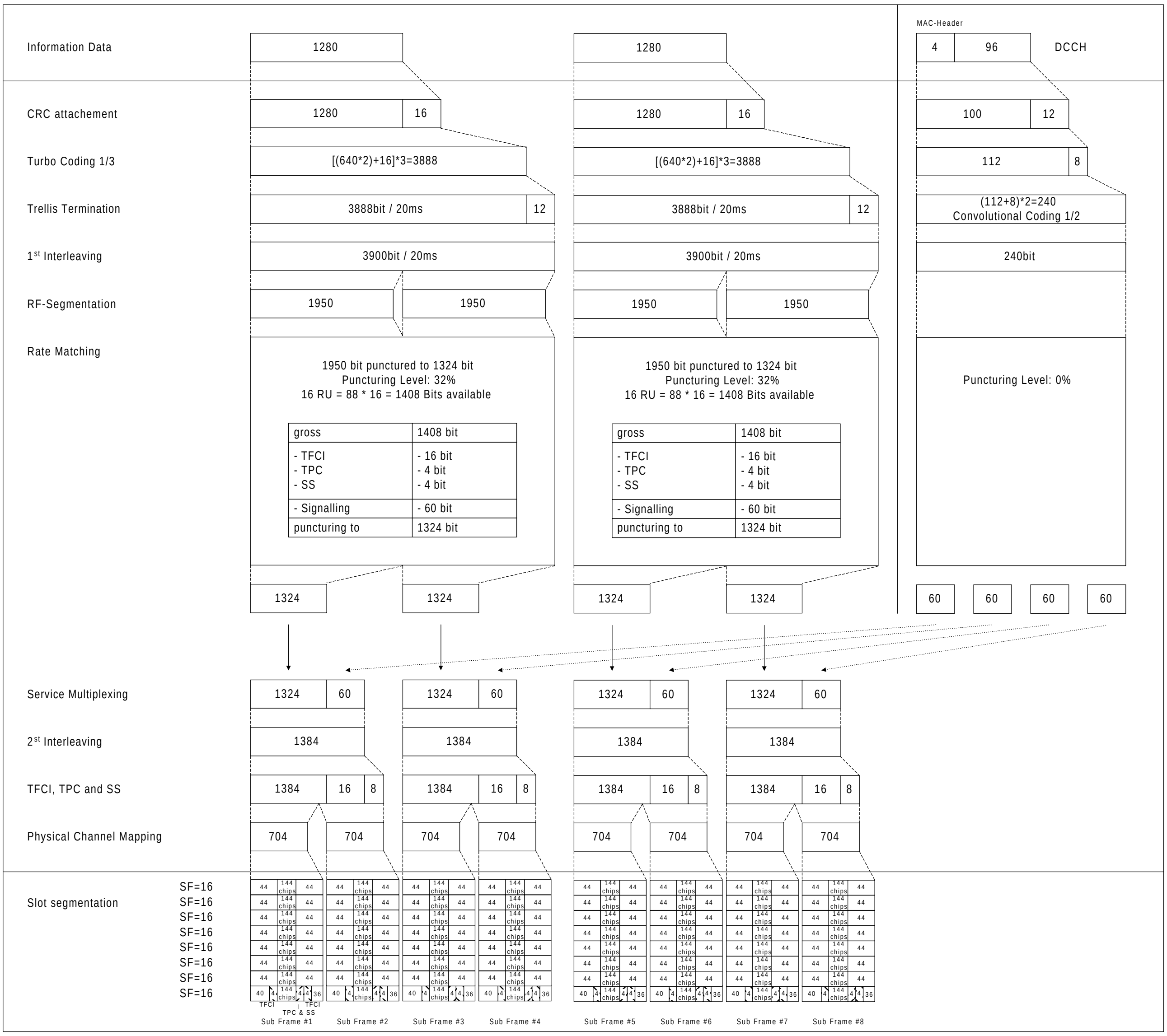
5.A.2.2 DL reference measurement channel (12.2 kbps)

Parameter	
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 / DCCH	33% / 33%



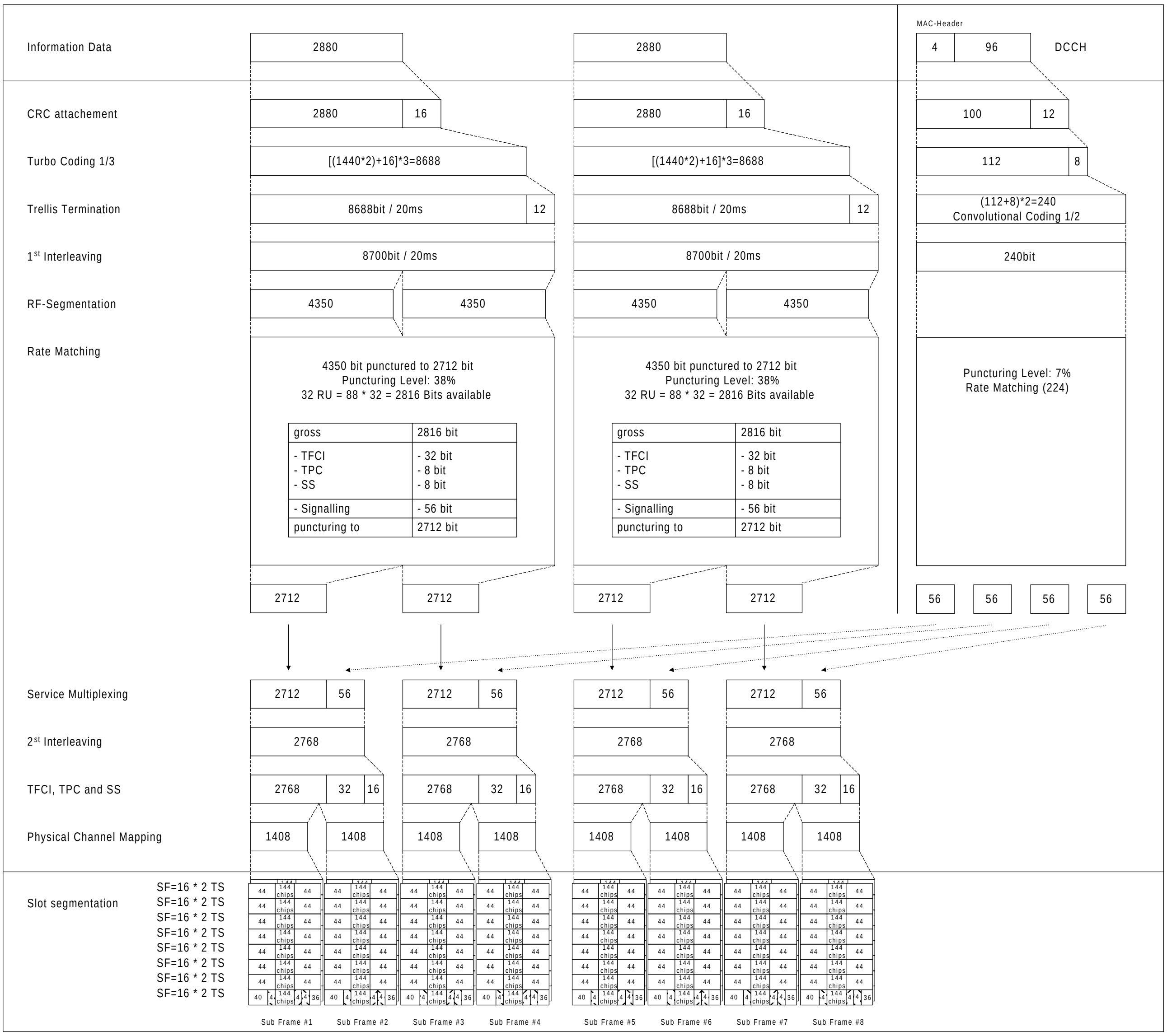
5.A.2.3 DL reference measurement channel (64 kbps)

Parameter	
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 / ½ DCCH	32% / 0



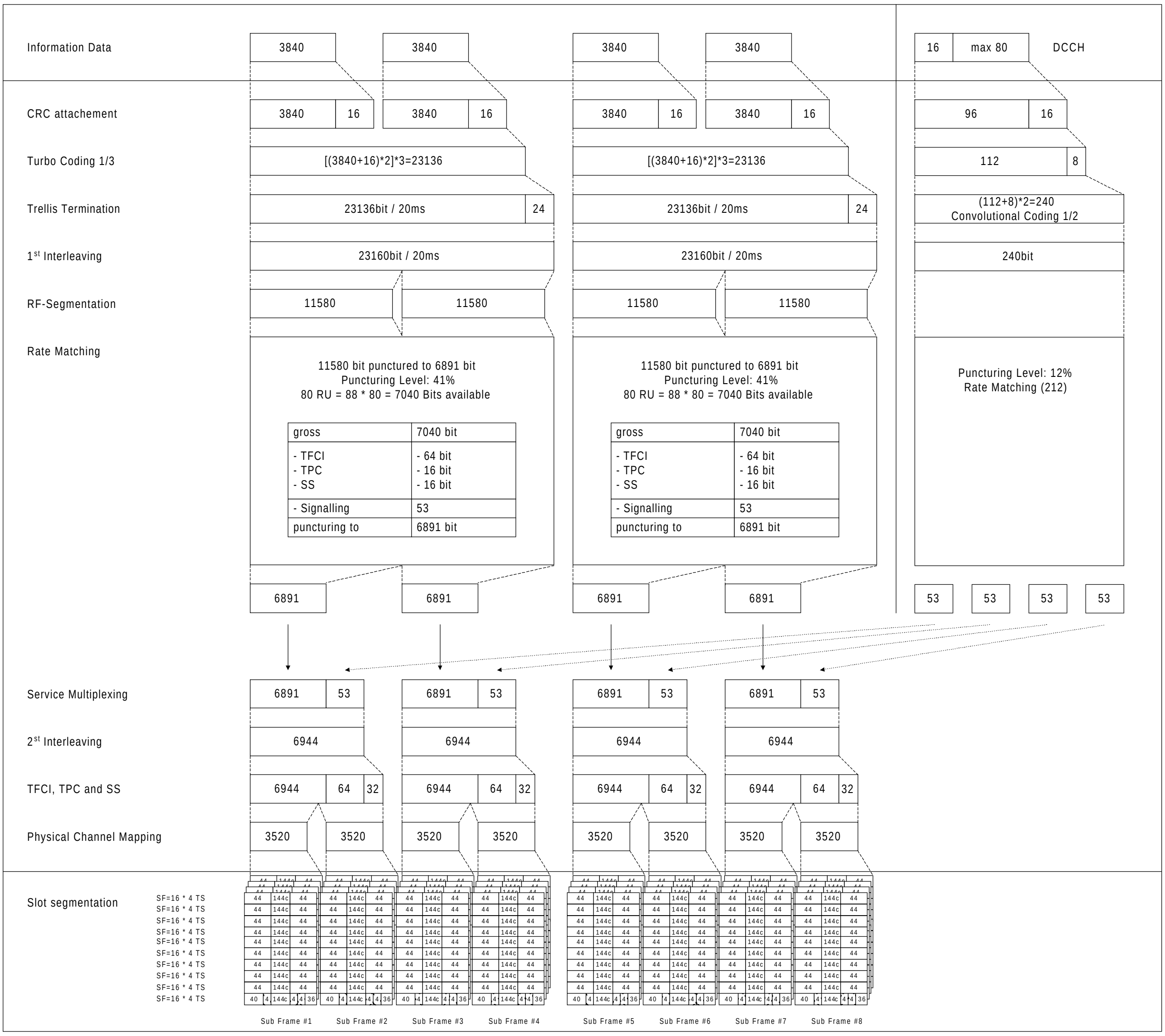
5.A.2.4 DL reference measurement channel (144 kbps)

Parameter	
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 / ½ DCCH	38% / 7%



5.A.2.5 DL reference measurement channel (384 kbps)

Parameter	
Information data rate	384 kbps
RU's allocated	4TS (10*SF16) = 40RU/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	Max.2 kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	41% / 12%



[Explanation difference:]

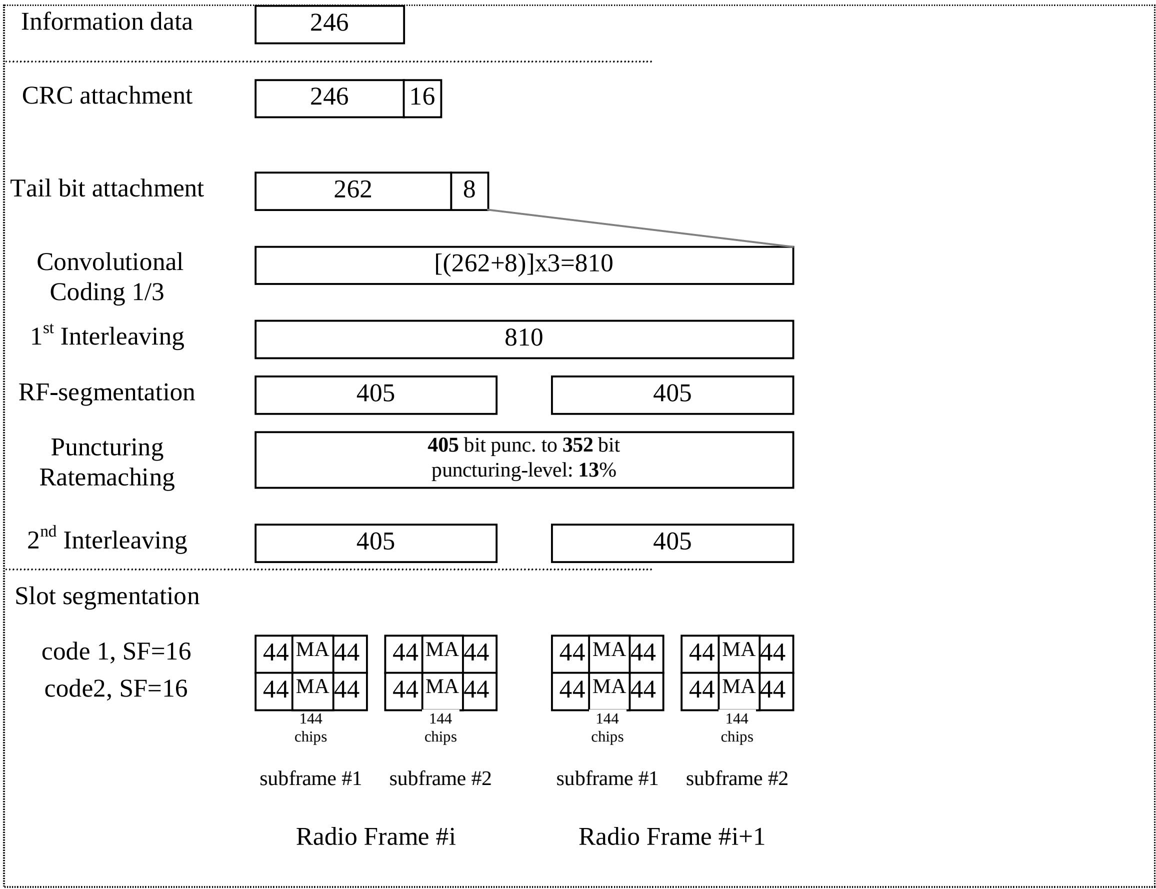
For the 1.28Mcps chip rate TDD option, one frame (10ms) consists of two sub-frames(5ms), and one Sub-frame consists of 7 timeslots. The structure of timeslot in 1.28Mcps chip rate TDD (shown inTR25.928) is different from the structure of timeslot in 3.84Mcps TDD. So the service mapping of variance data rate of 1.28Mcps chip rate TDD option is different from that of 3.84Mcps chip rate TDD option.

5.A.2.6 BCH reference measurement channel

[mapped to 2 code SF16]

Parameter	
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%



[Rationale]:

A test procedure was introduced for testing the UE BCH decoding performance. In WG1 the following service mapping for BCH was proposed:

Table1 : Parameters for BCH

Transport block size	246 bits
CRC	16 bits
Coding	CC, coding rate = 1/3
TTI	20 ms
Codes and time slots	SF = 16 x 2 codes x 1 time slot
TFCI	0 bit
TPC	0 bit

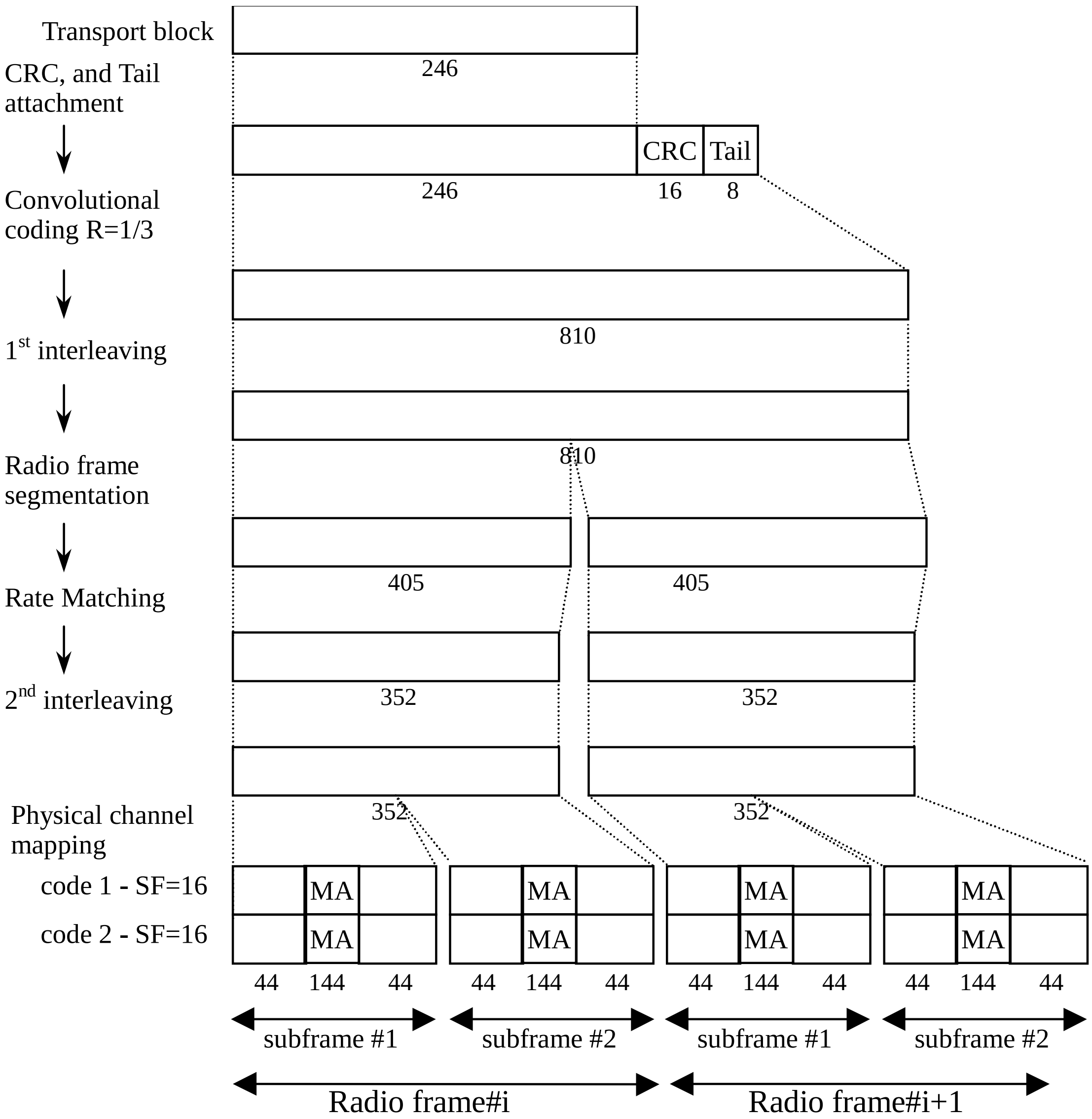


Figure 1: Channel coding for BCH

According to that service mapping the following BCH reference measurement channel will be proposed.

5.A.2.7 UL multi code reference measurement channel (12.2 kbps)

Parameter	
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 / DCCH	33% / 33%

[Rationale]:

A test procedure was introduced for testing the UE PA linearity. For that purpose two codes will be transmitted from the UE and will be analyzed (peak code domain error).

There is only one burst type for normal time slot in the low chip rate option. It provides the possibility for transmission of TFCI and TPC both in up- and downlink. The SS information will be used only in down link but in order to have the same burst structure for both directions the place of the SS bits are also reserved for up link and may be used in a future enhancement. Taking the mentioned features into consideration the up link multicode reference measurement channel can be the same as the down link 12.2kBit/s reference measurement channel (requirement is aligned to 3.84Mcps TDD option) with the exception that the SS bits are not used.

Annex 5.B (normative): Propagation conditions

5.B.1 Static Propagation conditions

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

5.B.2 Multi-path fading propagation conditions

Table 5.B.2 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum.

Table 5.B.2: Propagation Conditions for Multi-Path Fading Environments

Case 1, speed 3km/h		Case 2, speed 3km/h		Case 3, speed 120km/h	
Relative Delay [ns]	Average Power [dB]	Relative Delay [ns]	Average Power [dB]	Relative Delay [ns]	Average Power [dB]
0	0	0	0	0	0
2928	-10	2928	0	781	-3
		12000	0	1563	-6
				2344	-9

[Rationale]:

The channel estimation can only resolve paths which are separated by at least one chip in delay. Otherwise the paths fall into the same tap. Even though this happens in realistic environments, it is not useful to base the propagation models for the performance requirements on a scenario with a delay spread of less than 1 chip, because the baseband is not tested in this case. Therefore, it is proposed to keep the same delay for the path in units of chips for the 1.28Mcps chip rate TDD-mode as for the 3.84Mcps chip rate TDD-mode. The tap delays in units of time are changed accordingly to take into account the difference in the chip rate. Due to the request to have the same maximum delay spread for 1.28Mcps chip rate TDD as for 3.84Mcps chip rate TDD, the delay spread of tap 3^{rd} for the case 2 propagation conditions is set to 12 ms.:

Annex 5.C (normative): Environmental conditions

5.C.1 General

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

5.C.2 Environmental requirements for the UE

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

5.C.2.1 Temperature

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

+15°C – +35° C	for normal conditions (with relative humidity of 25 % to 75 %);
-10°C - +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 TR25.945 UE Section for extreme operation.

5.C.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 inTR25.945 UE section for extreme operation. In particular, the UE shall inhibit all RF transmissions when the power supply voltage is below the manufacturer declared shutdown voltage.

5.C.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 TR25.945 UE section for extreme operation.

[Rationale:]

The environmental conditions of UE specification is kept in line with 3.84Mcps TDD, because these specification do not consider the bandwidth of the signal nor any other difference between 3.84Mcps TDD and 1.28Mcps TDD.

Annex 5.D (informative): Terminal capabilities (TDD)

This section provides the UE capabilities related to TR25.945.

Notes:

This section shall be aligned with Ts25.306 UE Radio Access Capabilities regarding TDD RF parameters. These RF UE Radio Access capabilities represent options in the UE, that require signalling to the network.

Table D.1 provides the list of UE radio access capability parameters and possible values for TR25.945

Table D.1: RF UE Radio Access Capabilities	**UE radio access capability parameter**	**Value range**
TDD RF parameters	UE power class (TR25.945 section 5.2.2.1)	2, 3 NOTE: Only power classes 2 and 3 are part of R99
	Radio frequency bands (TR25.945 section 5.1.2)	a), b), c), a+b), a+c), a+b+c)
	Chip rate capability (25.945)	1.28Mcps

[Rationale]:

For the Annex 5.D (informative): Terminal capabilities related to TR25.945, this section shall be aligned with TS25.306 now, which includes the related chapters discussing both 3.84Mcps TDD Option and 1.28 Mcps TDD Option UE Radio Access Capabilities. Therefore it is proposed to change some word descriptions in TR25.945.

6 BS radio transmission and reception

6.1 Frequency bands and channel arrangement

6.1.1 General

The information presented in this section is based on a chip rate of 1,28Mcps.

6.1.2 Frequency bands

Common with 3,84Mcps TDD option.

6.1.3 TX–RX frequency separation

[Description:]

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe of 1.28Mcps TDD consists of 7 main timeslots (TS0 ~ TS6) where TS0 (before DL to UL switching point) are always allocated DL, the timeslots (at least the first one) before the switching point (vice versa) are allocated UL and the timeslots after the switching point (vice versa) are allocated DL.

[Explanation of difference:]

The frame structure for 3.84Mcps TDD and 1.28Mcps TDD is different. For 3.84 Mcps TDD, each TDMA frame consists of 15 timeslots where each timeslot can be allocated to either transmit or receive.

6.1.4 Channel arrangement

6.1.4.1 Channel spacing

6.1.4.1.1 Background

The chip rate is 1.28Mcps with a roll-off factor of 0.22, therefore the occupied bandwidth is 1.6MHz.

It is just nominal for 1.6MHz, and it is also flexible to adjust the channel raster step 200kHz to narrow as 1.4MHz for strict requirement situations if needed.

6.1.4.1.2 Channel spacing

The channel spacing for 1.28Mcps chip rate option is 1.6MHz.

6.1.4.2 Channel raster

Common with 3,84Mcps TDD option.

6.1.4.3 Channel number

Common with 3,84Mcps TDD option.

6.2 Transmitter characteristics

6.2.1 General

Common with 3,84Mcps TDD option.

6.2.2 Base station output power

Common with 3,84Mcps TDD option.

6.2.2.1 Base station maximum output power

Common with 3,84Mcps TDD option.

6.2.2.1.1 Minimum requirement

Common with 3,84Mcps TDD option.

6.2.3 Frequency stability

Common with 3,84Mcps TDD option.

6.2.4 Output power dynamics

Common with 3,84Mcps TDD option.

6.2.4.1 Inner loop power control

Common with 3,84Mcps TDD option.

6.2.4.2 Power control steps

Common with 3,84Mcps TDD option.

6.2.4.2.1 Minimum requirement

Common with 3,84Mcps TDD option.

6.2.4.3 Power control dynamic range

Common with 3,84Mcps TDD option.

6.2.4.3.1 Minimum requirement

Common with 3,84Mcps TDD option.

6.2.4.4 Minimum transmit power

Common with 3,84Mcps TDD option.

6.2.4.4.1 Minimum requirement

Common with 3,84Mcps TDD option.

6.2.4.5 Primary CCPCH power

Common with 3,84Mcps TDD option.

6.2.5 Transmit ON/OFF power

6.2.5.1 Transmit OFF power

The transmit OFF power state is when the BS does not transmit. This parameter is defined as maximum output transmit power within the channel bandwidth when the transmitter is OFF.

6.2.5.1.1 Minimum Requirement

The requirement of transmitOFF power shall be better than –82 dBm measured with a filter that has a Root Raised Cosine (RRC) filter response with a roll off α=0.22 and a bandwidth equal to the chip rate.

[Rationale:]

Assuming the Noise Figure(NF) of BS is 7dB and Minimum Couple Loss(MCL) is 30dB. For the victim receiver ,the Tx OFF power should not exceed the thermal noise. If Tx OFF power is 6dB below thermal noise, it will introduce 1dB degradation. The proposal for Tx OFF power is as follows:

$$P_N = -174\,\text{dBm/Hz} + 10\log(1.28\,\text{MHz/Hz}) + \text{NF}(7\,\text{dB}) = \text{-}106\,\text{dBm}$$

$$P_{Tx\_OFF} \le P_N - 6dB + MCL = -106 - 6 + 30 = -82dBm$$

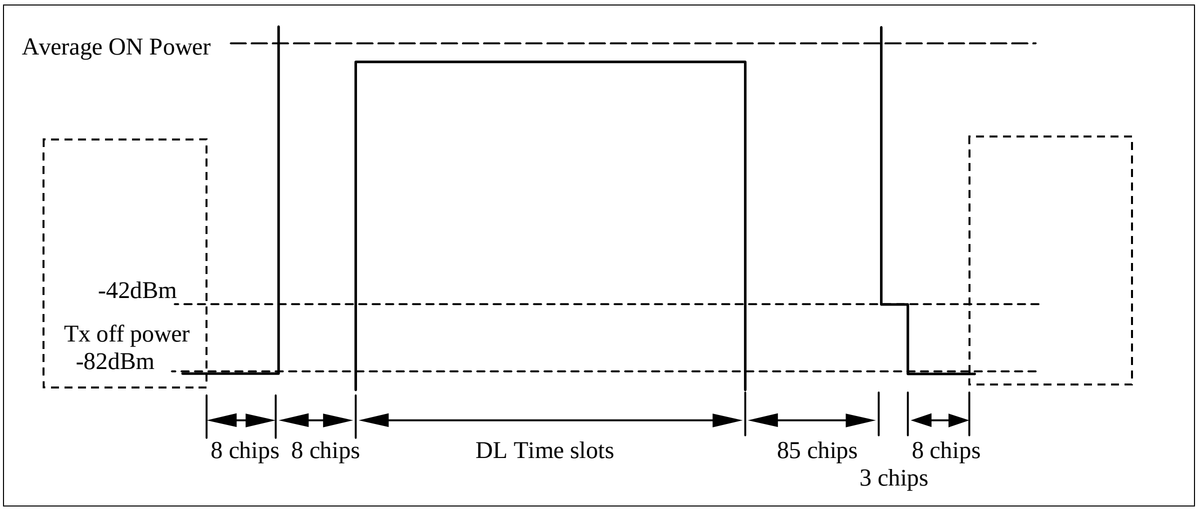
Note: In 1.28Mcps TDD option, The noise figure of BS is assumed to be 7dB, it is based on that this parameter has been approved by CWTS yet and it is easier for implementation of BS.

6.2.5.2 Transmit ON/OFF Time mask

The time mask transmit ON/OFF defines the ramping time allowed for the BS between transmit OFF power and transmit ON power.

6.2.5.2.1 Minimum Requirement

The transmit power level versus time should meet the mask specified in below figure.



6.2.6 Output RF spectrum emissions

6.2.6.1 Occupied bandwidth

[Description:]

Occupied bandwidth is a measure of the bandwidth containing 99% of the total integrated power for transmitted spectrum and is centered on the assigned channel frequency. The occupied channel bandwidth is about 1.6 MHz based on a chip rate of 1.28 Mcps.

[Explanation of difference:]

In 3.84Mcps TDD, the occupied channel bandwidth is less than 5MHz based on 3.84Mcps.

But in 1.28Mcps TDD, as the background analysis in WG4#12 Meeting Tdoc515, which has been accepted to into the TR25.945, the occupied channel bandwidth should be less than 1.6 MHz based on 1.28 Mcps.

6.2.6.2 Out of band emission

6.2.6.2.1 Spectrum emission mask

The mask defined in Tables 6.2.6.2.1-1 to 6.2.6.2.1-4 below may be mandatory in certain regions. In other regions this mask may not be applied.

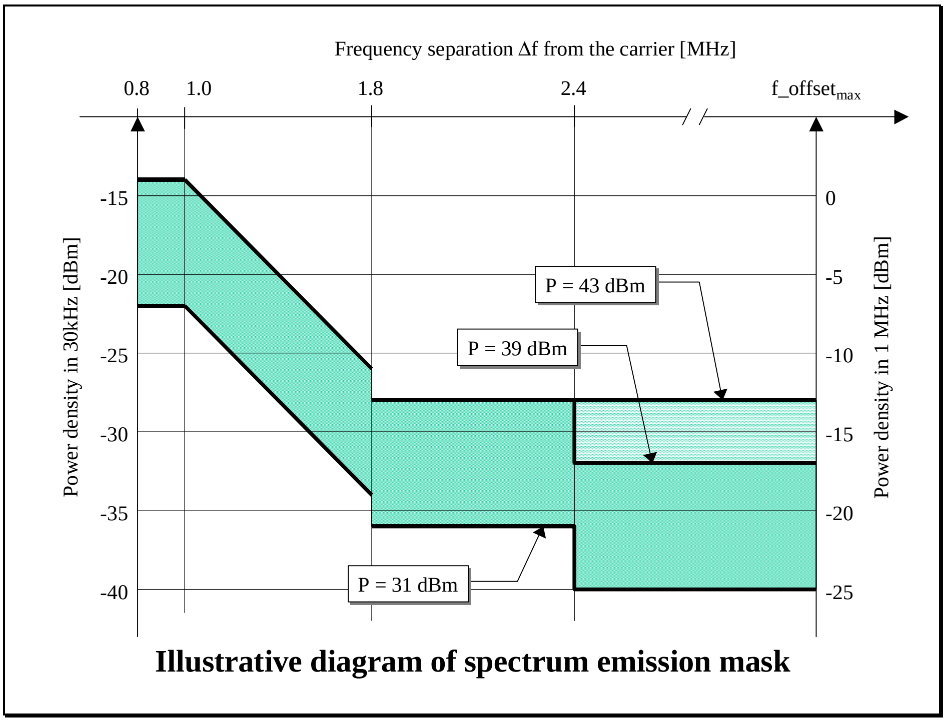


Table 6.2.6.2.1-1: Spectrum emission mask values, BS maximum output power P ≥ 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
0.8 ≤ Δf < 1.0 MHz	0.815MHz ≤ f_offset < 1.015MHz	-14 dBm	30 kHz
1.0 ≤ Δf < 1.8 MHz	1.015MHz ≤ f_offset < 1.815MHz	- 14 - 15·(f_offset – 1.015) dBm	30 kHz
See note	1.815MHz ≤ f_offset < 2.3MHz	-28 dBm	30 kHz
1.8 ≤ Δf MHz	2.3MHz ≤ f_offset < f_offset_{max}	-13 dBm	1 MHz

Table 6.2.6.2.1-2: Spectrum emission mask values, BS maximum output power 39 ≤ P < 43 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
0.8 ≤ Δf < 1.0 MHz	0.815MHz ≤ f_offset < 1.015MHz	-14 dBm	30 kHz
1.0 ≤ Δf < 1.8 MHz	1.015MHz ≤ f_offset < 1.815MHz	-14 - 15·(f_offset – 1.015) dBm	30 kHz
1.8 ≤ Δf < 2.4 MHz	1.815MHz ≤ f_offset < 2.415MHz	-28 dBm	30 kHz
See note	2.415MHz ≤ f_offset < 2.9MHz	P-71 dBm	30 kHz
2.4 ≤ Δf MHz	2.9MHz ≤ f_offset < f_offset_{max}	P - 56 dBm	1 MHz

Table 6.2.6.2.1-3: Spectrum emission mask values, BS maximum output power 31 ≤ P < 39 dBm

Frequency offset of	Frequency offset of measurement	Maximum level	Measurement

measurement filter – 3dB point,Δf	filter centre frequency, f_offset		bandwidth
0.8 ≤ Δf < 1.0 MHz	0.815MHz ≤ f_offset < 1.015MHz	P - 53 dBm	30 kHz
1.0 ≤ Δf < 1.8 MHz	1.015MHz ≤ f_offset < 1.815MHz	P - 53 - 15·(f_offset – 1.015) dBm	30 kHz
1.8 ≤ Δf < 2.4 MHz	1.815MHz ≤ f_offset < 2.415MHz	P - 67 dBm	30 kHz
See note	2.415MHz ≤ f_offset < 2.9MHz	P - 71 dBm	30 kHz
2.4 ≤ Δf MHz	2.9MHz ≤ f_offset < f_offset$_{max}$	P - 56 dBm	1 MHz

Table 6.2.6.2.1-4: Spectrum emission mask values, BS maximum output power P < 31 dBm

Frequency offset of measurement filter – 3dB point, Δf	Frequency offset of measurement filter centre frequency, f_offset	Maximum level	Measurement bandwidth
0.8 ≤ Δf < 1.0 MHz	0.815MHz ≤ f_offset < 1.015MHz	-22 dBm	30 kHz
1.0 ≤ Δf < 1.8 MHz	1.015MHz ≤ f_offset < 1.815MHz	-22 - 15·(f_offset – 1.015) dBm	30 kHz
1.8 ≤ Δf < 2.4 MHz	1.815MHz ≤ f_offset < 2.415MHz	-36 dBm	30 kHz
See note	2.415MHz ≤ f_offset < 2.9MHz	-40 dBm	30 kHz
2.4 ≤ Δf MHz	2.9MHz ≤ f_offset < f_offset$_{max}$	-25 dBm	1 MHz

- f_offset$_{max}$ is either 4.0 MHz or the offset to the UMTS Tx band edge as defined in section 6.1.2 of TR25.945 whichever is the greater.

NOTE: This frequency range ensures that the range of values of f_offset is continuous.

[Explanation]

Frequency offset: Because the nominal bandwidth of 1.28Mcps TDD option, the spectrum mask definition starts at 0.8MHz offset.

Measurement bandwidth: "-26dB modulation bandwidth" of 1,28Mcps TDD option is smaller than that of 3,84Mcps TDD option, so a higher emission is allowed. However, in accordance with the 3,84Mcps TDD option, the same level and measurement bandwidth are used.

Mask shape: For the flat region from 0.8MHz to 1.0MHz, it gives sufficient margin to cope with the unwanted spectral response due to baseband modulation, and allows to provide additional protection for the second narrow-band channel in case of narrow-band services (using 200kHz channel raster). In addition, the slope from 1.0MHz to 1.8MHz is for reflecting more accurately PA behaviour and providing further guarantee on levels in adjacent bandwidth.

6.2.6.2.2 Adjacent Channel Leakage power Ratio(ACLR)

6.2.6.2.2.1 Minimum requirement

For the 1.28Mcps chip rate option, the ACLR shall be better than the value specified in the following Table.

Table 6.2.6.2.2-1 : BS ACLR (1.28Mcps chip rate)

BS adjacent channel offset	ACLR limit

± 1.6 MHz	40 dB
± 3.2 MHz	50 dB

Note: This requirement is valid for co-existence with frame and switching point synchronized systems, or for non-synchronized systems if the path loss between the BSs is greater than 107dB.

6.2.6.2.2.2 Requirement in case of operation in proximity to TDD BS or FDD BS operating on an adjacent frequency

In case the equipment is operated in proximity to another TDD BS or FDD BS and both BSs operating on an adjacent frequency band , the requirement is specified in terms of power level of the transmitting BS. This requirement is valid for co-existence with non-frame and non-switching point synchronised systems operating on the closest used carrier. The interference power level shall not exceed the limit in Table 6.2.6.2.2-2.

Table 6.2.6.2.2-2**: BS ACLR in case of operation in proximity**

Center Frequency for Measurement	Maximum Level of the interference power (in case of multiple antennas the interference powers shall be summed at all antenna connectors)	Measurement Bandwidth
Closest used carrier of the victim receiver: Either FDD carrier Or 3.84 Mcps TDD carrier Or 1.28 Mcps TDD carrier	-36 dBm	chip rate of the victim receiver: In case of FDD: 3.84 MHz In case of 3.84 Mcps TDD: 3.84 MHz In case of 1.28 Mcps TDD: 1.28 MHz

The closest used carrier with respect to the regarded carrier of one system is defined by

1. a minimum difference in centre frequency between the regarded carrier and the carriers used in the other system and the chip rate of the other system.

If the actual allowed interference level $P_{int,\ allowed,\ actual}$ at the victim receiver is higher than –106dBm, this requirement may be relaxed by the amount $P_{int,\ allowed,\ actual}$ – (-106dBm).

6.2.6.2.2.3 Requirement in case of co-siting with TDD BS or FDD BS operating on an adjacent frequency

In case the equipment is co-sited to another TDD BS or FDD BS and both BSs operating on an adjacent frequency band, the requirement is specified in terms of power level of the transmitting BS. This requirement is valid for co-existence with a non-frame and non-switching point synchronised systems operating on closest used carrier. The interference power level shall not exceed the limit in Table 6.2.6.2.2-3.

Table 6.2.6.2.2-3 **: BS ACLR in case of co-siting**

Center Frequency for Measurement	Maximum Level of the interference power (in case of multiple antennas the interference powers shall be summed at all antenna connectors)	Measurement Bandwidth

Closest used carrier of the victim receiver: Either FDD carrier Or 3.84 Mcps TDD arrier Or 1.28 Mcps TDD arrier	-76 dBm	Chip rate of victim receiver: In case of FDD: 3.84 MHz In case of 3.84 Mcps TDD: 3.84 MHz In case of 1.28 Mcps TDD: 1.28 MHz

The closest used carrier with respect to the regarded carrier of one system is defined by

1. a minimum difference in centre frequency between the regarded carrier and the carriers used in the other system and the chip rate of the other system.

If the actual MCL_{actual} is higher than 30dB, this requirement may be relaxed by the amount MCL_{actual} – 30dB.

If the actual allowed interference level $P_{int,\ allowed,\ actual}$ at the victim receiver is higher than –106dBm, this requirement may be relaxed by the amount $P_{int,\ allowed,\ actual}$ – (-106dBm).

6.2.6.3 Spurious emissions

Common with 3.84Mcps option.

6.2.6.3.1 Mandatory Requirements

The requirements of either subclause 6.2.6.3.1.1 or subclause 6.2.6.3.1.2 shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's.

Either requirement applies at frequencies within the specified frequency ranges which are more than 4MHz under the first carrier frequency used or more than 4 MHz above the last carrier frequency used.

[Explanation of difference]

In 3.84Mcps option, the frequency offset from carrier frequency is greater than 12.5MHz, while in 1.28Mcps option it is greater than 4 MHz.

In ITU specification, the frequency limit between out of band emissions and spurious emissions is defined as 250% of the necessary bandwidth. In 1.28Mcps option the necessary bandwidth is 1.6MHz, so the frequency offset from carrier frequency is $250\% \times 1.6 MHz = 4 MHz$.

6.2.6.3.1.1 Spurious emissions (Category A)

Common with 3.84Mcps option.

6.2.6.3.1.2 Spurious emissions (Category B)

The following requirements shall be met in cases where Category B limits for spurious emissions, as defined in ITU-R Recommendation SM.329-7, are applied.

6.2.6.3.1.2.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.2.6.3.1.2.1 BS Mandatory spurious emissions limits, Category B

Band	Maximum Level	Measurement Bandwidth	Note
9kHz – 150kHz	- 36 dBm	1 kHz	Bandwidth as in ITU

			SM.329-7, s4.1
150kHz – 30MHz	- 36 dBm	10 kHz	Bandwidth as in ITU SM.329-7, s4.1
30MHz – 1GHz	- 36 dBm	100 kHz	Bandwidth as in ITU SM.329-7, s4.1
1GHz ↔ Fc1 – 19.2 MHz or Fl - 3.2 MHz *whichever is the higher*	- 30 dBm	1 MHz	Bandwidth as in ITU SM.329-7, s4.1
Fc1 - 19.2 MHz or Fl - 3.2MHz *whichever is the higher* ↔ Fc1 - 16 MHz or Fl - 3.2 MHz *whichever is the higher*	- 25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc1 - 16 MHz or Fl - 3.2 MHz *whichever is the higher* ↔ Fc2 + 16 MHz or Fu + 3.2 MHz *whichever is the lower*	- 15 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc2 + 16 MHz or Fu + 3.2 MHz *whichever is the lower* ↔ Fc2 + 19.2MHz or Fu + 3.2MHz *whichever is the lower*	- 25 dBm	1 MHz	Specification in accordance with ITU-R SM.329-7, s4.1
Fc2 + 19.2 MHz or Fu + 3.2 MHz *whichever is the lower* ↔ 12,5 GHz	- 30 dBm	1 MHz	Bandwidth as in ITU-R SM.329-7, s4.1. Upper frequency as in ITU-R SM.329-7, s2.6

Fc1: Center frequency of emission of the first carrier transmitted by the BS

Fc2: Center frequency of emission of the last carrier transmitted by the BS

Fl: Lower frequency of the band in which TDD operates

Fu: Upper frequency of the band in which TDD operates

6.2.6.3.2 Co-existence with GSM 900

Common with 3,84Mcps TDD option.

6.2.6.3.2.1 Operation in the same geographic area

Common with 3,84Mcps TDD option.

6.2.6.3.2.1.1 Minimum requirement

Common with 3,84Mcps TDD option.

6.2.6.3.2.2 Co-located base stations

Common with 3,84Mcps TDD option.

6.2.6.3.2.2.1 Minimum requirement

Common with 3,84Mcps TDD option.

6.2.6.3.3 Co-existence with DCS 1800

Common with 3,84Mcps TDD option.

6.2.6.3.3.1 Operation in the same geographic area

Common with 3,84Mcps TDD option.

6.2.6.3.3.1.1 Minimum requirement

Common with 3,84Mcps TDD option.

6.2.6.3.3.2 Co-located base stations

Common with 3,84Mcps TDD option.

6.2.6.3.3.2.1 Minimum requirement

Common with 3,84Mcps TDD option.

6.2.6.3.4 Co-existence with UTRA FDD

Common with 3,84Mcps TDD option.

6.2.6.3.4.1 Operation in the same geographic area

Common with 3,84Mcps TDD option.

6.2.6.3.4.1.1 Minimum requirement

Common with 3,84Mcps TDD option.

6.2.6.3.4.2 Co-located base stations

Common with 3,84Mcps TDD option.

6.2.6.3.4.2.1 Minimum requirement

Common with 3,84Mcps TDD option.

6.2.7 Transmit intermodulation

The transmit intermodulation performance is a measure of the capability of the transmitter to inhibit the generation of signals in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna.

The transmit intermodulation level is the power of the intermodulation products when a CDMA modulated interference signal is injected into the antenna connector at a level of 30 dB lower than that of the subject signal. The frequency of the interference signal shall be ±1.6 MHz, ±3.2 MHz and ±4.8 MHz offset from the subject signal.

[Explanation of difference:]

In 1.28Mcps option, the necessary bandwidth is 1.6MHz. The frequency of interference signal is 1*NB,2*NB and 3*NB offset from the subject, that means ±1.6 MHz, ±3.2 MHz and ±4.8 MHz.

In 3.84Mcps option, the necessary bandwidth is 5 MHz. So the frequency of interference signal is ±5 MHz, ±10 MHz and ±15 MHz offset from subject signal.

6.2.7.1 Minimum requirement

The Transmit intermodulation level shall not exceed the out of band or the spurious emission requirements of section 6.2.6.2 and 6.2.6.3 in TR25.945.

6.2.8 Transmit modulation

6.2.8.1 Transmit pulse shape filter

The transmit pulse-shaping filter is a root-raised cosine (RRC) with roll-off α =0.22 in the frequency domain. The impulse response of the chip impulse filter $RC_0(t)$ is

$$RC_0(t) = \frac{\sin\left(\pi \frac{t}{T_C}(1-\alpha)\right) + 4\alpha \frac{t}{T_C}\cos\left(\pi \frac{t}{T_C}(1+\alpha)\right)}{\pi \frac{t}{T_C}\left(1-\left(4\alpha \frac{t}{T_C}\right)^2\right)}$$

Where the roll-off factor α =0.22 and the chip duration: $T_C = \frac{1}{chiprate} = 0.78125\mu s$

[Explanation of difference:]

The chip rate for 1.28Mcps TDD option is 1.28Mcps, the chip duration is $T_C = \frac{1}{chiprate} = 0.78125\mu s$.

While in 3.84 Mcps TDD option, the chip rate is 3.84Mcps, the duration is $T_C = \frac{1}{chiprate} \approx 0.26042\mu s$.

6.2.8.2 Modulation Accuracy

Common with 3.84Mcps TDD option.

6.2.8.2.1 Minimum Requirement

Common with 3.84Mcps TDD option.

6.2.8.3 Peak Code Domain Error

Common with 3.84Mcps TDD option.

6.2.8.3.1 Minimum Requirement

Common with 3.84Mcps TDD option.

[Rationale:]

For 3.84Mcps TDD and FDD, the minimum requirements for the error vector magnitude and peak code domain error ensures that

the error vector magnitude does not degrade the performance

the error vector magnitude leads only to low increase for the transmitted output power to remain the Eb/N0

The theoretical investigations have shown that the error vector magnitude is related to the spreading factor.

Because the same spreading factors are used for 1.28Mcps TDD and for 3.84Mcps TDD, the same minimum requirement applies.

6.3 Receiver characteristics

6.3.1 General

Common with 3,84Mcps TDD option.

6.3.2 Reference sensitivity level

The reference sensitivity is the minimum receiver input power measured at the antenna connector at which the FER/BER does not exceed the specific value indicated in section 6.3.2.1.

6.3.2.1 Minimum Requirement

For the measurement channel specified in the Annex6.A:*Measurement Channel*, the reference sensitivity level and performance of the BS shall be as specified in table 6.3.2-1 below.

Table6.3.2-1: BS reference sensitivity levels

Data rate	BS reference sensitivity level (dBm)	FER/BER
12.2 kbps	-110 dBm	BER shall not exceed 0.001

[Rationale:]

The reference sensitivity value of BS for 1.28Mcps TDD is derived from the following formula. Assuming the noise figure(NF) of BS is 7dB, the noise floor is:

$$P_N = -174\,\text{dBm/Hz} + 10\log(1.28\,\text{MHz/Hz}) + \text{NF}(7\,\text{dB}) = -106\,\text{dBm}$$

According to the simulation results for 12.2Kbps measurement channel, the BER=0.001 is achieved at Îor/Ioc = 1.2dB with an own code power of 1/5 of the whole transmit code power (-7dB). In simulation, assume Îor equal to Ior, we can get:

$$\frac{DPCH\_E_c}{I_{oc}} = \frac{DPCH\_E_c}{I_{or}} \frac{\hat{I}_{or}}{I_{oc}} = -7\,\text{dB} + 1.2\text{dB} = -5.8\,\text{dB}$$

The sensitivity value without implementation is calculated as follows:

$$P_s = \frac{DPCH\_E_c}{I_{oc}} P_N = -106\,\text{dBm} - 5.8\text{dB} = -111.8\text{dBm}$$

If the implementation margin is considered to be 1.5dB, the final sensitivity value is:

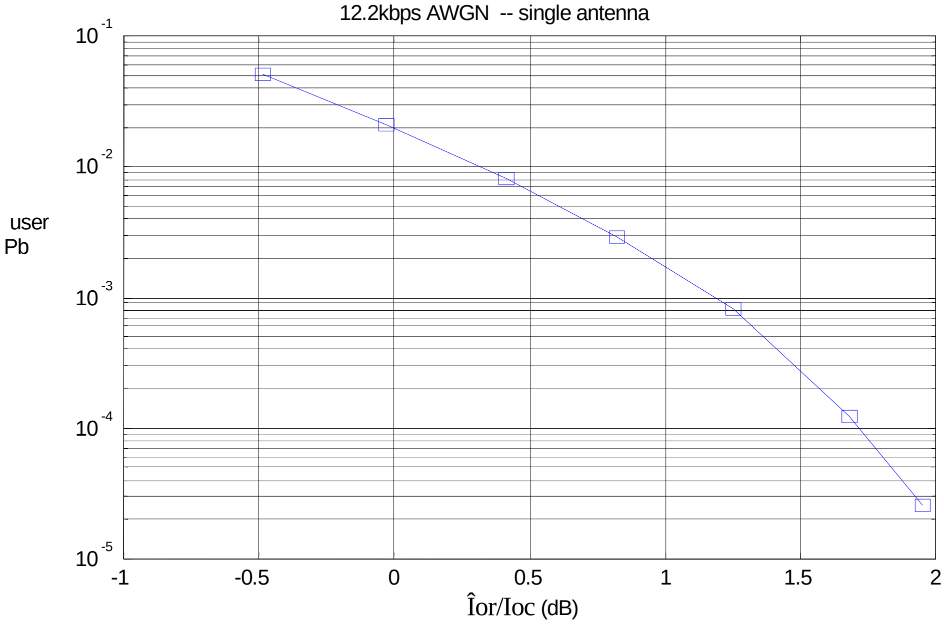
$$P_s = -111.8\,\text{dBm} + \text{margin} = -110.3\text{dBm}$$

The reference sensitivity value of –110dBm is proposed to the BS specification for 1.28Mcps TDD .

Note: In 1.28Mcps TDD option, The noise figure of BS is assumed to be 7dB, it is based on that this parameter has been approved by CWTS yet and it is easier for implementation of BS.

[Simulation results:]

The simulation is done to 12.2kb/s data in static propagation condition for BS of 1.28Mcps TDD. The service-mapping is specified in Annex6.A:*Measurement Channel*, and the simulation assumption is specified in "*Simulation Assumption for 1.28Mcps Chip Rate TDD option*".



Îor/Ioc	Pb
-0.49	5.09E-2
-0.03	2.12E-2
0.41	8.11E-3
0.82	2.90E-3
1.25	8.12E-4
1.68	1.23E-4
1.95	2.61E-5

6.3.2.2 Maximum Frequency Deviation for Receiver Performance

The need for such a requirement is for further study.

6.3.3 Dynamic range

Receiver dynamic range is the receiver ability to handle a rise of interference in the reception frequency channel. The receiver shall fulfil a specified BER requirement for a specified sensitivity degradation of the wanted signal in the presence of an interfering AWGN signal in the same reception frequency channel.

6.3.3.1 Minimum requirement

The BER shall not exceed 0.001 for the parameters specified in Table 6.3.3-1.

Table 6.3.3-1: Dynamic Range

Parameter	Level	Unit

Data rate	12.2	kbps
Wanted signal	<REFSENS> + 30 dB	dBm
Interfering AWGN signal	-76dBm	dBm/1.28 MHz

[Rationale:]

When wanted signal level is 30 dB above the reference sensitivity level, in order to keep the performance of BER≤0.001 the maximum interfering signal P_I needs meet the following requirement:

$$\begin{aligned} P_I &\le \text{noisefloor}\,[\text{dBm}] + \text{noisefigure}\,[\text{dB}] + 30\,\text{dB} \\ &= -113\,\text{dBm} + 7\,\text{dB} + 30\,\text{dB} \\ &= -76\,\text{dBm} \end{aligned}$$

It is also proposed to the BS conformance test, the section 8.4.3 in TR25.945.

Note: In 1.28Mcps TDD option, The noise figure of BS is assumed to be 7dB, it is based on that this parameter has been approved by CWTS yet and it is easier for implementation of BS.

6.3.4 Adjacent Channel Selectivity (ACS)

Adjacent channel selectivity (ACS) is a measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an adjacent channel signal at a given frequency offset from the center frequency of the assigned channel.ACS is the ratio of the receiver filter attenuation on the assigned channel frequency to the receive filter attenuation on the adjacent channel(s).

6.3.4.1 Minimum Requirement

The BER shall not exceed 0.001 for the parameters specified in table 6.3.4-1.

Table 6.3.4-1 : Adjacent channel selectivity

Parameter	**Level**	**Unit**
Data rate	12.2	kbps
Wanted signal	Reference sensitivity level + 6dB	dBm
Interfering signal	–55	dBm
Fuw (Modulated)	1.6	MHz

[Rationale:]

Assuming the receiver filter ACS equals to 45 dBc, in order to keep the performance of BER, the interference signal level P_I should meet the following requirement:

$$\begin{aligned} P_I &\le \text{noisefloor}\,[\text{dBm}] + \text{noisefigure}\,[\text{dB}] + 6\,\text{dB (because the wanted signal is 6 dB above sensitivity)} + \text{ACS} \\ &= -113\,\text{dBm} + 7\,\text{dB} + 6\,\text{dB} + 45\,\text{dBc} \\ &= -55\,\text{dBm} \end{aligned}$$

Note: In 1.28Mcps TDD option, The noise figure of BS is assumed to be 7dB, it is based on that this parameter has been approved by CWTS yet and it is easier for implementation of BS.

6.3.5 Blocking characteristics

The blocking characteristics is a measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the adjacent channels. The blocking performance shall apply at all frequencies as specified in the tables below, using a 1MHz step size.

6.3.5.1 Minimum Requirements

For the 1.28Mcps chip rate option, the requirement of Blocking for carrier spacing 1.6MHz is prescribed in the following table.

Table 6.3.5-1 (a): Blocking requirements for operating bands defined in 6.1.2(a)

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1900 – 1920 MHz, 2010 – 2025 MHz	-40 dBm	<REFSENS> + 6 dB	3.2MHz	Narrow band CDMA signal with one code
1880 – 1900 MHz, 1990 – 2010 MHz, 2025 – 2045 MHz	-40 dBm	<REFSENS> + 6 dB	3.2MHz	Narrow band CDMA signal with one code
1920 – 1980 MHz	-40 dBm	<REFSENS> + 6 dB	3.2MHz	Narrow band CDMA signal with one code
1 – 1880 MHz, 1980 – 1990 MHz, 2045 – 12750 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

Table6.3.5-1(b) : Blocking requirements for operating bands defined in 6.1.2(b)

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1850 – 1990 MHz	-40 dBm	<REFSENS> + 6 dB	3.2MHz	Narrow band CDMA signal with one code
1830 – 1850 MHz, 1990 – 2010 MHz	-40 dBm	<REFSENS> + 6 dB	3.2MHz	Narrow band CDMA signal with one code
1 – 1830 MHz, 2010 – 12750 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

Table 6.3.5-1(c) : Blocking requirements for operating bands defined in 6.1.2(c)

Center Frequency of Interfering Signal	Interfering Signal Level	Wanted Signal Level	Minimum Offset of Interfering Signal	Type of Interfering Signal
1910 – 1930 MHz	-40 dBm	<REFSENS> + 6 dB	3.2MHz	Narrow band CDMA signal with one code
1890 – 1910 MHz, 1930 – 1950 MHz	-40 dBm	<REFSENS> + 6 dB	3.2MHz	Narrow band CDMA signal with one code
1 – 1890 MHz, 1950 – 12750 MHz	-15 dBm	<REFSENS> + 6 dB	—	CW carrier

6.3.6 Intermodulation characteristics

Third and higher order mixing of the two interfering RF signals can produce an interfering signal in the band of the desired channel. Intermodulation response rejection is a measure of the capability of the receiver to receiver a wanted signal on its assigned channel frequency in the presence of two or more interfering signals which have a specific frequency relationship to the wanted signal.

The static reference performance as specified in clause 6.3.2.1 should be met when the following signals are coupled to BS antenna input.

A wanted signal at the assigned channel frequency, 6 dB above the static reference level.

Two interfering signals with the following parameters.

Table 6.3.6-1: Intermodulation requirement (1.28Mcps chiprate)

Interfering Signal Level	Offset	Type of Interfering Signal
- 48 dBm	3.2 MHz	CW signal
- 48 dBm	6.4 MHz	Narrow band CDMA signal with one code

[Rationale:]

Intermodulation characteristics mean the BS receiver needs to have a sufficient capability to reject the interfering signals. Same frequency bands is applied for 1.28Mcps and 3.84Mcps TDD, therefore 1.28Mcps TDD should be resistant to the same level of interfering signals at other frequencies. The level –48dBm is proposed for interfering signals without brackets.

6.3.7 Spurious emissions

The spurious emissions power is the power of emissions generated or amplified in a receiver that appear at the BS antenna connector. The requirements apply to all BS with separate RX and TX antenna port. The test shall be performed when both TX and RX are on with the TX port terminated.

For all BS with common RX and TX antenna port the transmitter spurious emission as specified in section 6.2.6.3 is valid.

6.3.7.1 Minimum Requirement

The power of any spurious emission shall not exceed:

Table 6.3.7-1 : Receiver spurious emission requirements

Band	Maximum level	Measurement Bandwidth	Note
9 kHz – 1 GHz	-57 dBm	100 kHz	
1 GHz – 1.9 GHz and 1.98 GHz – 2.01 GHz	-47 dBm	1 MHz	With the exception of frequencies between 4MHz below the first carrier frequency and 4MHz above the last carrier frequency used by the BS.
1.9 GHz – 1.98 GHz and 2.01 GHz – 2.025 GHz	-83 dBm	1.28 MHz	With the exception of frequencies between 4MHz below the first carrier frequency and 4MHz above the last carrier frequency used by the BS.
2.025 GHz – 12.75 GHz	-47 dBm	1 MHz	With the exception of frequencies between 4MHz below the first carrier frequency and 4MHz above the last carrier frequency used by the BS.

[Rationale:]

Assuming the Minimum Couple Loss (MCL) is 30dB. For the victim receiver, the spurious emissions power generated by the BS receiver should not exceed the thermal noise. . The proposal for spurious emission power that located in the 1.9 GHz – 1.98 GHz and 2.01 GHz – 2.025 GHz band is as follows:

$$P_N = -174\,\text{dBm/Hz} + 10\log(1.28\,\text{MHz/Hz}) = \text{-}113\,\text{dBm}$$

$$P_{Spurious} \le P_N + MCL = -113 + 30 = -83 dBm$$

This leads to the same requirement as for 3.84 Mcps TDD. The different value is only due to the 1.28 MHz measurement bandwidth.

6.4 Performance requirement

6.4.1 General

Performance requirements for the BS are specified for the measurement channels defined in Annex 6.A and the propagation conditions in Annex 6.B. The requirements only apply to those measurement channels that are supported by the base station.

The requirements only apply to a base station with dual receiver antenna diversity. The required $\hat{I}_{or}/I_{oc}$ shall be applied separately at each antenna port.

Table 6.4.1: Summary of Base Station performance targets

Physical channel	**Measurement channel**	**Static**	**Multi-path Case 1**	**Multi-path Case 2**	**Multi-path Case 3**
		Performance metric			
DCH	12.2 kbps	BLER<10^{-2}	BLER<10^{-2}	BLER<10^{-2}	BLER<10^{-2}
	64 kbps	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}, 10^{-3}

	144 kbps	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}, 10^{-3}
	384 kbps	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}	BLER< 10^{-1}, 10^{-2}, 10^{-3}

6.4.2 Demodulation in static propagation conditions

6.4.2.1 Demodulation of DCH

The performance requirement of DCH in static propagation conditions is determined by the maximum Block Error Rate (BLER) allowed when the receiver input signal is at a specified $\hat{I}_{or}/I_{oc}$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

6.4.2.1.1 Minimum requirement

For the parameters specified in Table 6.4.2 the BLER should not exceed the piece-wise linear BLER curve specified in Table 6.4.3.

Table 6.4.2: Parameters in static propagation conditions

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	8	-
$\frac{DPCH_o\_E_c}{I_{or}}$	DB	-7	-7	-7	0
I_{oc}	DBm/1.28MHz	-91			
Information Data Rate	Kbps	12.2	64	144	384

Table 6.4.3: Performance requirements in AWGN channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER Required E_b/N_0
1	0.6	10^{-2}
2	-0.9	10^{-1}
	-0.4	10^{-2}
3	-0.3	10^{-1}
	-0.1	10^{-2}
4	0.5	10^{-1}
	0.6	10^{-2}

6.4.3 Demodulation of DCH in multipath fading conditions

6.4.3.1 Multipath fading Case 1

The performance requirement of DCH in multipath fading Case 1 is determined by the maximum Block Error Rate (BLER) allowed when the receiver input signal is at a specified $\hat{I}_{or}/I_{oc}$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

6.4.3.1.1 Minimum requirement

For the parameters specified in Table 6.4.4 the BLER should not exceed the piece-wise linear BLER curve specified in Table 6.4.5.

Table 6.4.4: Parameters in multipath Case 1 channel

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	8	-
$\frac{DPCH_o\_E_c}{I_{or}}$	DB	-7	-7	-7	0
I_{oc}	dBm/1.28 MHz	-91			
Information Data Rate	Kbps	12.2	64	144	384

Table 6.4.5: Performance requirements in multipath Case 1 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	10.4	10^{-2}
2	5.3	10^{-1}
	9.4	10^{-2}
3	5.7	10^{-1}
	10.1	10^{-2}
4	6.0	10^{-1}
	10.0	10^{-2}

6.4.3.2 Multipath fading Case 2

The performance requirement of DCH in multipath fading Case 2 is determined by the maximum Block Error Rate (BLER) allowed when the receiver input signal is at a specified $\hat{I}_{or}/I_{oc}$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

6.4.3.2.1 Minimum requirement

For the parameters specified in Table 6.4.6 the BLER should not exceed the piece-wise linear BLER curve specified in Table 6.4.7.

Table 6.4.6: Parameters in multipath Case 2 channel

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	8	-
$\frac{DPCH_o\_E_c}{I_{or}}$	DB	-7	-7	-7	0
I_{oc}	dBm/1.28 MHz	-91			
Information Data Rate	Kbps	12.2	64	144	384

Table 6.4.7: Performance requirements in multipath Case 2 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	6.7	10^{-2}
2	3.6	10^{-1}
	5.9	10^{-2}
3	4.2	10^{-1}
	6.3	10^{-2}
4	4.6	10^{-1}
	6.0	10^{-2}

6.4.3.3 Multipath fading Case 3

The performance requirement of DCH in multipath fading Case 3 is determined by the maximum Block Error Rate (BLER) allowed when the receiver input signal is at a specified $\hat{I}_{or}/I_{oc}$ limit. The BLER is calculated for each of the measurement channels supported by the base station.

6.4.3.3.1 Minimum requirement

For the parameters specified in Table 6.4.8 the BLER should not exceed the piece-wise linear BLER curve specified in Table 6.4.9.

Table 6.4.8: Parameters in multipath Case 3 channel

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	8	-
$\frac{DPCH_o\_E_c}{I_{or}}$	DB	-7	-7	-7	0
I_{oc}	dBm/1.28 MHz	-91			
Information Data Rate	Kbps	12.2	64	144	384

Table 6.4.9: Performance requirements in multipath Case 3 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	5.6	10^{-2}
2	3.2	10^{-1}
	4.6	10^{-2}
	5.9	10^{-3}
3	3.7	10^{-1}
	4.8	10^{-2}
	5.9	10^{-3}
4	4.2	10^{-1}
	5.1	10^{-2}
	5.9	10^{-3}

[Explanation difference:]

The different performance requirement is result from different propagation condition (Annex 6.B), different service mapping (Annex 6.A), different simulation assumption and different chip rate with 3.84Mcps chip rate TDD.

Annex 6.A (normative): Measurement Channels

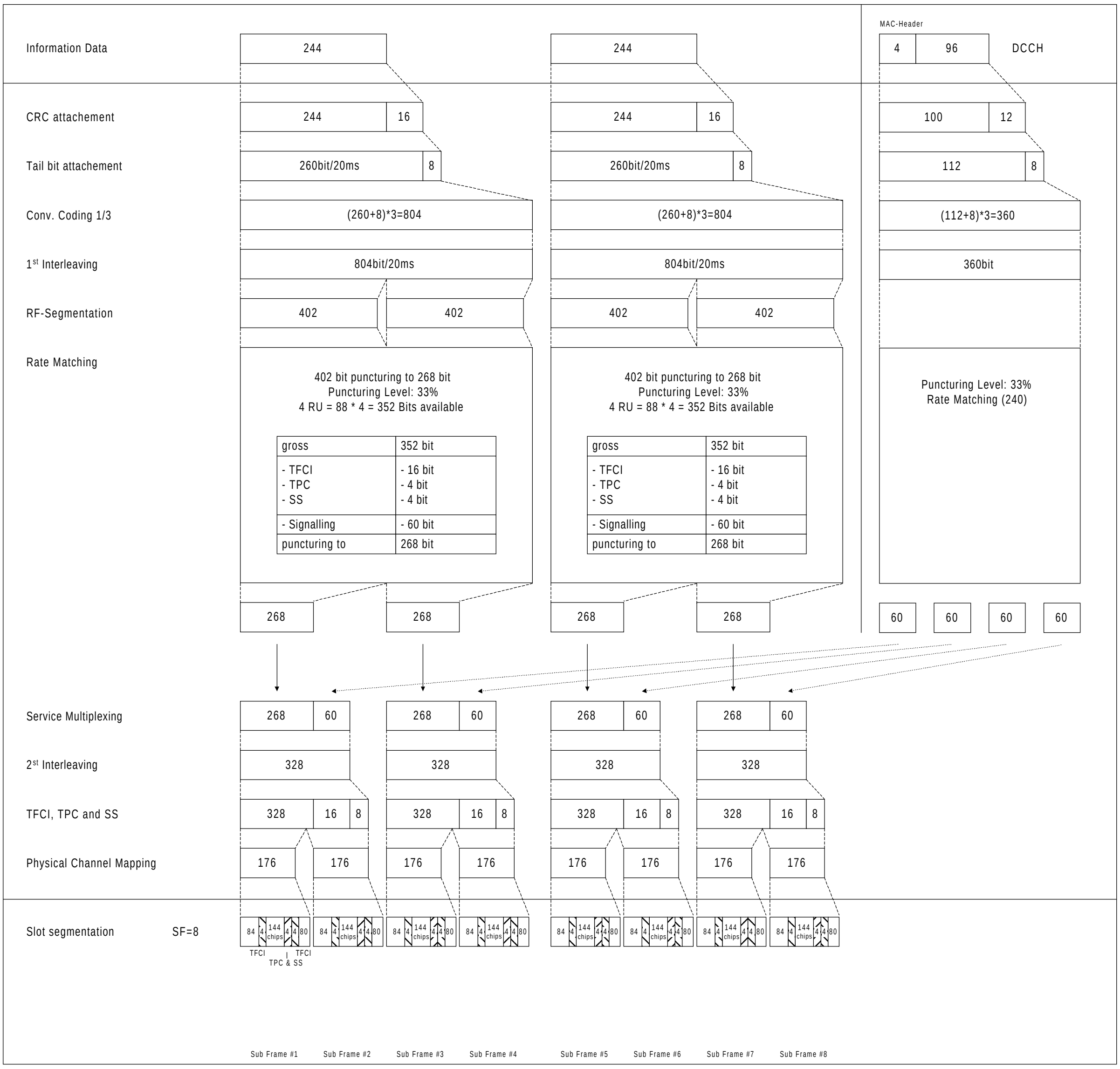
6.A.1: General

6.A.2: Reference Measurement Channel;

6.A.2.1 UL reference measurement channel (12.2 kbps)

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

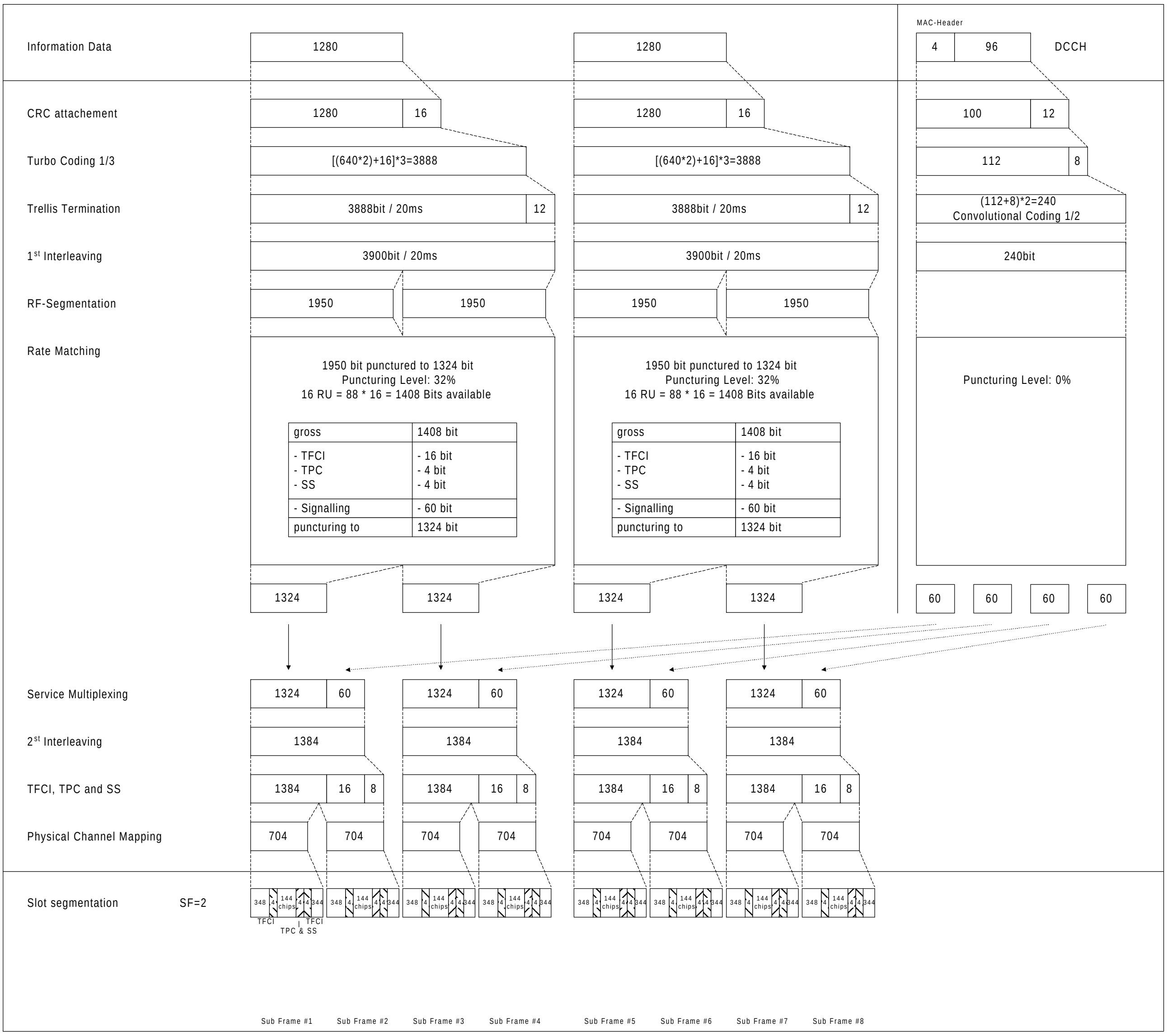
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate 1/3: DCH / DCCH	33% / 33%



6.A.2.2 UL reference measurement channel (64 kbps)

Parameter	
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

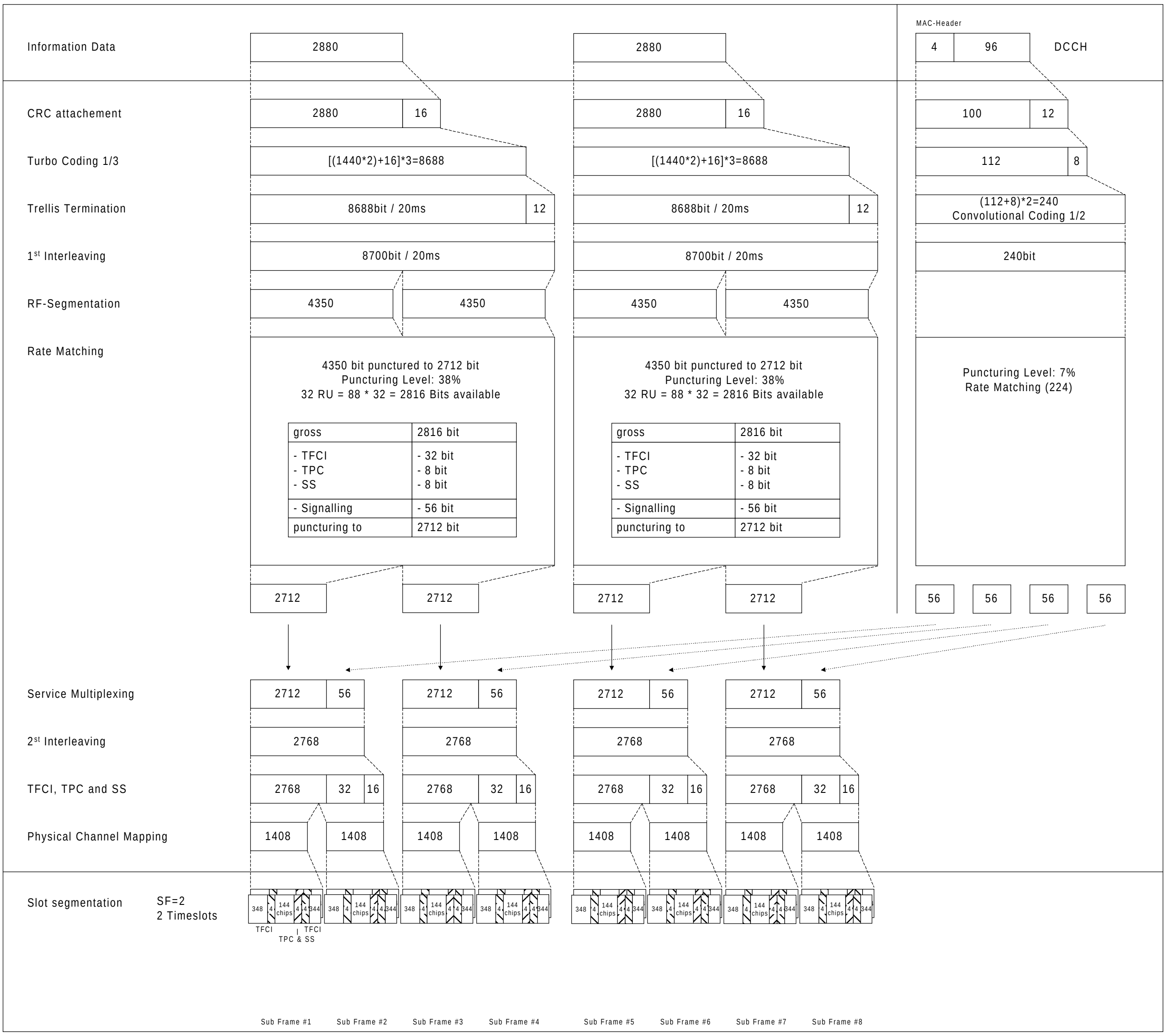
Synchronisation Shift (SS)	4 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	32% / 0



6.A.2.3 UL reference measurement channel (144 kbps)

Parameter	
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

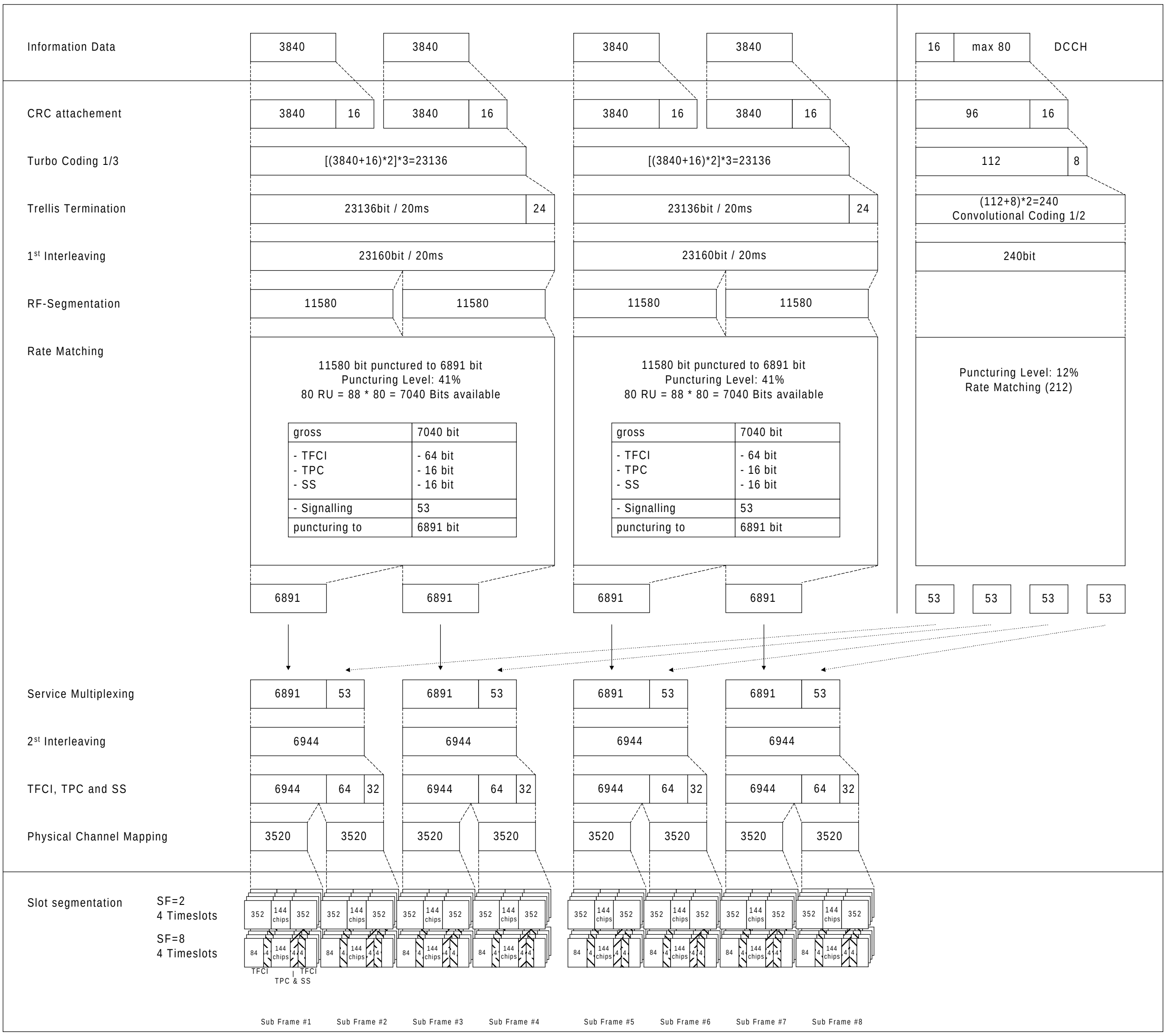
TFCI	32 Bit/user/10ms
Synchronisation Shift (SS)	8 Bit/user/10ms
Inband signalling DCCH	2.4 kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	38% / 7%



6.A.2.4 UL reference measurement channel (384 kbps)

Parameter	
Information data rate	384 kbps
RU's allocated	4TS (1*SF2 + 1*SF8) = 40RU/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	Max.2 kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	41% / 12%



6.A.2.5 RACH reference measurement channel

Parameter	
Information data rate: $$N_{RACH} = \frac{\frac{88*\frac{16}{SF}\left(\frac{N_{RM}}{100}+1\right)}{2}-8}{B_{RACH}}-16$$ **SF16** (RU's allocated:1):	B_{RACH} =1 CRC length = 16 Tail Bits = 8

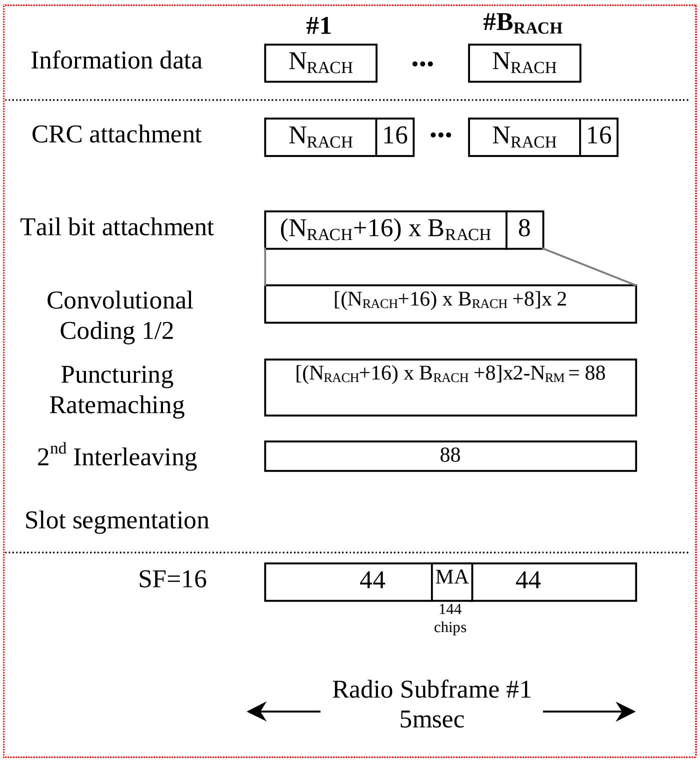
0% puncturing rate at CR=1/2 ~10% puncturing rate at CR=1/2 **SF8** (RU's allocated:2): 0% puncturing rate at CR=1/2 ~10% puncturing rate at CR=1/2 **SF4** (RU's allocated:4): 0% puncturing rate at CR=1/2 ~10% puncturing rate at CR=1/2	20 bits per frame and TB 24 bits per frame and TB 64 bits per frame and TB 73 bits per frame and TB 152 bits per frame and TB 170 bits per frame and TB
TTI	5msec
Midamble	144 chips
Power control	0 bit
TFCI	0 bit

N_{RACH} = number of bits per TB

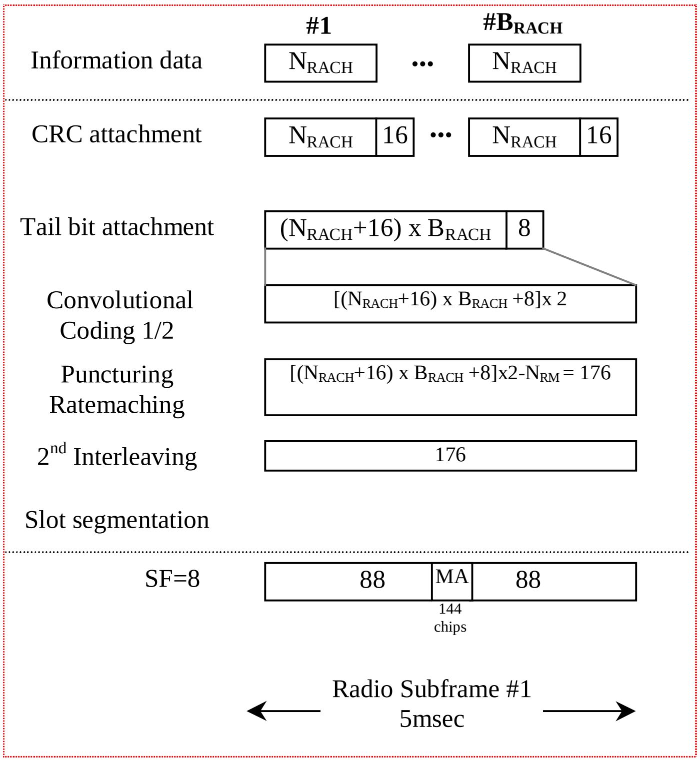
B_{RACH} = number of TBs

N_{RM} = puncturing rate

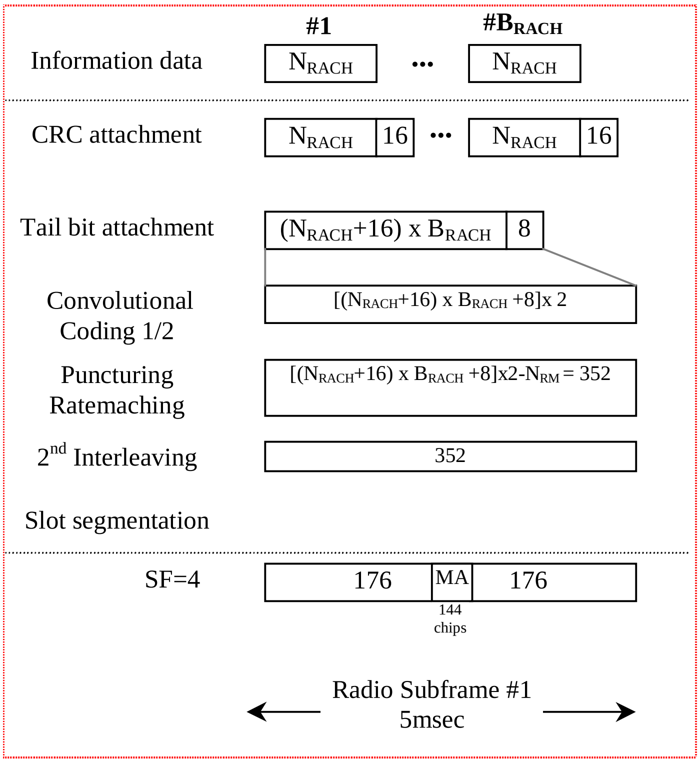
6.A.2.5.1 RACH mapped to 1 code SF16



6.A.2.5.2 RACH mapped to 1 code SF8



6.A.2.5.3 RACH mapped to 1 code SF4



[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame (10ms) consists of two sub-frames(5ms), and one Sub-frame consists of 7 timeslots. The structure of timeslot in 1.28Mcps chip rate TDD (shown inTR25.928) is different from the structure of timeslot in 3.84Mcps TDD. So the service mapping of variance data rate of 1.28Mcps chip rate TDD option is different from that of 3.84Mcps chip rate TDD option.

Annex 6.B (normative): Propagation conditions

6.B.1 Static Propagation conditions

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

6.B.2 multi-path fading Propagation conditions

Table 6.B.2 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum.

Table 6.B.2: Propagation Conditions for Multi-Path Fading Environments

Case 1, speed 3km/h		Case 2, speed 3km/h		Case 3, speed 120km/h	
Relative Delay [ns]	Average Power [dB]	Relative Delay [ns]	Average Power [dB]	Relative Delay [ns]	Average Power [dB]
0	0	0	0	0	0
2928	-10	2928	0	781	-3
		12000	0	1563	-6
				2344	-9

[Rationale]:

The channel estimation can only resolve paths which are separated by at least one chip in delay. Otherwise the paths fall into the same tap. Even though this happens in realistic environments, it is not useful to base the propagation models for the performance requirements on a scenario with a delay spread of less than 1 chip, because the baseband is not tested in this case. Therefore, it is proposed to keep the same delay for the path in units of chips for the 1.28Mcps chip rate TDD-mode as for the 3.84Mcps chip rate TDD-mode. The tap delays in units of time are changed accordingly to take into account the difference in the chip rate. Due to the request to have the same maximum delay spread for 1.28Mcps chip rate TDD as for 3.84Mcps chip rate TDD, the delay spread of tap 3rd for the case 2 propagation conditions is set to 12 us.:

7 Base Station EMC

7.1 Test conditions

7.1.1 General

Common with 3,84Mcps Chip rate TDD option.

7.1.2 Arrangements for establishing a communication link

Common with 3,84Mcps Chip rate TDD option.

7.1.3 Narrow band responses on receivers

For 1.28Mcps chip rate TDD option, responses on receivers or duplex transceivers occurring during the test at discrete frequencies which are narrow band responses (spurious responses), are identified by the following method:

1. if during an immunity test the quantity being monitored goes outside the specified tolerances, it is necessary to establish whether the deviation is due to a narrow band response or to a wide band (EMC) phenomenon. Therefore, the test shall be repeated with the unwanted signal frequency increased, and then decreased by 3.2MHz;

- if the deviation disappears in either or both of the above 3.2 MHz offset cases, then the response is considered as a narrow band response;
- if the deviation does not disappear, this may be due to the fact that the offset has made the frequency of the unwanted signal correspond to the frequency of another narrow band response. Under these circumstances the procedure is repeated with the increase and decrease of the frequency of the unwanted signal set to 4MHz;
- if the deviation does not disappear with the increased and/or decreased frequency, the phenomenon is considered wide band and therefore an EMC problem and the equipment fails the test.

Narrow band responses are disregarded.

7.2 Performance assessment

7.2.1 General

Common with 3,84Mcps Chip rate TDD option.

7.2.2 Ancillary equipment

Common with 3,84Mcps Chip rate TDD option.

7.3 Performance Criteria

7.3.1 Performance criteria A for continuous phenomena for BS

Common with 3,84Mcps Chip rate TDD option.

7.3.2 Performance criteria B for transient phenomena for BS

Common with 3,84Mcps Chip rate TDD option.

7.3.3 Performance criteria C for BS

Common with 3,84Mcps Chip rate TDD option.

7.3.4 Performance criteria A for continous phenomena for Ancillary equipment

Common with 3,84Mcps Chip rate TDD option.

7.3.5 Performance criteria B for transient phenomena for Ancillary equipment

Common with 3,84Mcps Chip rate TDD option.

7.3.6 Performance criteria C for Ancillary equipment

Common with 3,84Mcps Chip rate TDD option.

7.4 Applicability overview

7.4.1 Emission

Common with 3,84Mcps Chip rate TDD option.

7.4.2 Immunity

Common with 3,84Mcps Chip rate TDD option.

Annex 7.A (normative): Methods of measurement

7.A.1: Emission

7.A.1.1 Methods of measurement and limits for EMC emissions

Common with 3,84Mcps Chip rate TDD option.

7.A.1.2 Test configurations

Common with 3,84Mcps Chip rate TDD option.

7.A.1.3 Radiated spurious emission from Base station and ancillary equipment

7.A.1.3.1 Radiated spurious emission, Base stations

7.A.1.3.1.1 Definition

Common with 3,84Mcps Chip rate TDD option.

7.A.1.3.1.2 Test method

a) Common with 3,84Mcps TDD option.

b) The BS shall transmit with maximum power declared by the manufacturer with all transmitters active. Set the base station to transmit a signal as stated in Table 8.3.2-1 of TR25.945.

c) The received power shall be measured over the frequency range 30 MHz to 12.75 GHz, excluding 4MHz below the first carrier frequency to 4 MHz above the last carrier frequency used. The measurement bandwidth shall be 100 kHz between 30 MHz and 1 GHz and 1 MHz above 1 GHz as given in ITU-R SM.329-7 [1]. The video bandwidth shall be approximately three times the resolution bandwidth. If this video bandwidth is not available on the measuring receiver, it shall be the maximum available and at least 1 MHz. At each frequency at which a component is detected, the maximum effective radiated power of that component shall be determined, as described in step a.

[Explanation difference:]

To identify responses on receivers or duplex transceivers occurring during the test at discrete frequencies which are narrow band responses, the test shall be repeated with the unwanted signal frequency increased, and then decreased by several bandwidths.

Due to the different bandwidth of the low chip rate TDD option from that of the high chip rate TDD option, the frequency increased and/or decreased is changed from 10MHz to 3.2MHz, from 12.5MHz to 4MHz.

7.A.1.3.1.3 Limits

Common with 3,84Mcps Chip rate TDD option.

7.A.1.3.2 Radiated spurious emission, Ancillary equipment

Common with 3,84Mcps Chip rate TDD option.

7.A.1.4 Conducted emission DC power input/output port

Common with 3,84Mcps Chip rate TDD option.

7.A.1.5 Conducted emissions, AC mains power input/output port

Common with 3,84Mcps Chip rate TDD option.

7.A.1.6 Harmonic Current emissions (AC mains input port)

Common with 3,84Mcps Chip rate TDD option.

7.A.1.7 Voltage fluctuations and flicker (AC mains input port)

Common with 3,84Mcps Chip rate TDD option.

7.A.2: Immunity

Common with 3,84Mcps Chip rate TDD option.

8 BS conformance testing

8.1 Frequency bands and channel arrangement

8.1.1 General

The information presented in this section is based on a chip rate of 1,28Mcps.

8.1.2 Frequency bands

Common with 3,84Mcps TDD option.

8.1.3 TX–RX frequency separation

[Description:]

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe of 1.28Mcps TDD consists of 7 main timeslots (TS0 ~ TS6) where TS0 (before DL to UL switching point) are always allocated DL, the timeslots (at least the first one) before the switching point (vice versa) are allocated UL and the timeslots after the switching point (vice versa) are allocated DL.

[Explanation of difference:]

The frame structure for 3.84Mcps TDD and 1.28Mcps TDD is different. For 3.84 Mcps TDD, each TDMA frame consists of 15 timeslots where each timeslot can be allocated to either transmit or receive.

8.1.4 Channel arrangement

8.1.4.1 Channel spacing

8.1.4.1.1 Background

The roll filter factor is would be 0.22, then we select the nominal bandwidth as 1.6MHz;

Considering the easy co-existence with Wide-band TDD mode, for its 3 times bandwidth would be 4.8, less than the nominal bandwidth of wide band UTRA TDD;

It is just nominal for 1.6MHz, and it is also flexible to adjust the channel raster step 200kHz to narrow as 1.4MHz for strict requirement situations if needed;

Considering the easy to implementation, for too narrow band of the bandwidth would be very difficult to implementation.

8.1.4.1.2 Channel spacing

The channel spacing for 1.28Mcps chip rate option is 1.6MHz.

8.1.4.2 Channel raster

Common with 3,84Mcps TDD option.

8.1.4.3 Channel number

Common with 3,84Mcps TDD option.

8.2 General test conditions and declarations

8.2.1 Base station classes

Common with 3,84Mcps TDD option.

8.2.2 Output power and determination of power class

Common with 3,84Mcps TDD option.

8.2.3 Specified frequency range

Common with 3,84Mcps TDD option.

8.2.4 Spectrum emission mask

Common with 3,84Mcps TDD option.

8.2.5 Adjacent Channel Leakage power Ratio (ACLR)

Common with 3,84Mcps TDD option.

8.2.6 Tx spurious emissions

8.2.6.1 Category of spurious emissions limit

Common with 3,84Mcps TDD option.

8.2.6.2 Co-existence with GSM

Common with 3,84Mcps TDD option.

8.2.6.3 Co-existence with DCS 1800

Common with 3,84Mcps TDD option.

8.2.6.4 Co-existence with UTRA FDD

Common with 3,84Mcps TDD option.

8.2.7 Blocking characteristics

Common with 3,84Mcps TDD option.

8.2.8 Test environments

Common with 3,84Mcps TDD option.

8.2.9 Interpretation of measurement results

Common with 3,84Mcps TDD option.

8.2.10 Selection of configurations for testing

Common with 3,84Mcps TDD option.

8.2.11 BS Configurations

Common with 3,84Mcps TDD option.

8.2.12 Overview of the conformance test requirements

Common with 3,84Mcps TDD option.

8.2.13 Format and interpretation of tests

Common with 3,84Mcps TDD option.

8.3 Transmitter characteristics

8.3.1 General

Common with 3,84Mcps TDD option.

8.3.2 Maximum output power

8.3.2.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.3.2.2 Conformance requirements

Common with 3,84Mcps TDD option.

8.3.2.3 Test purpose

Common with 3,84Mcps TDD option.

8.3.2.4 Method of test

8.3.2.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) Common with the 3.84Mcps chip rate

(3) Common with the 3.84Mcps chip rate

(4) For 1.28Mcps chip rate TDD option, set the parameters of the transmitted signal according to the following table.

Table 8.3.2-1: Parameters of the transmitted signal for maximum output power test for 1.28Mcps chip rate TDD option

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

8.3.2.4.2 Procedure

(1) Measure thermal power over the 848 active chips of a transmit time slot (this excludes the guard periods), and with a measurement bandwidth of at least 1.6 MHz.

(2) Average over TBD time slots.

(3) Run steps (1) and (2) for RF channels Low / Mid / High.

8.3.2.5 Test requirements

Common with 3,84Mcps TDD option.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, the structure of the subframe is shown in section 7.2.1 of TR 25.928. So the number of timeslot i should be 0, 1,…,6. In addition, for the 1.28Mcps chip rate TDD option, the DL reference measurement channel for 144kbits/s need two timeslots, each consists of 8 DPCH(SF=16).So the number of DPCH in each active TS should be 8.

For the 1.28Mcps chip rate TDD option, each TS consists of 864 chips, but 16 chips is for Guard Period, so the measuring thermal power should over 848 active chips.

8.3.3 Frequency stability

8.3.3.1 Definition and applicabilily

Common with 3,84Mcps TDD option.

8.3.3.2 Conformance requirement

Common with 3,84Mcps TDD option.

8.3.3.3 Test purpose

Common with 3,84Mcps TDD option.

8.3.3.4 Method of test

8.3.3.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) Common with the 3.84Mcps chip rate

(3) Common with the 3.84Mcps chip rate

(4) For 1.28Mcps chip rate TDD option, set the parameters of the transmitted signal according to the following table.

Table 8.3.3-1: Parameters of the transmitted signal for Frequency stability test for 1.28Mcps chip rate TDD option

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: transmit, if i is 0, 4,5,6; receive, if i is 1,2,3.
Number of DPCH in each active TS	1
BS output power setting	PRAT
Data content of DPCH	real life (sufficient irregular)

8.3.3.4.2 Procedure

(1) Common with 3.84Mcps chip rate TDD option.

(2) Common with 3.84Mcps chip rate TDD option.

(3) Common with 3.84Mcps chip rate TDD option.

8.3.3.5 Test requirement

Common with 3,84Mcps TDD option.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, (the structure of the subframe is shown in section7.2.1 of 3GPP TR 25.928), so the number of timeslot i should be 0, 1,…,6.

The frequency stability is a characteristic of the local oscillator and will not change, if the number of DPCH is varied. In these cases, it is felt that the use of only 1 DPCH will make the measurement easier and, at least for some parameters, more exact. Therefore, it is proposed to specify the test for frequency stability with 1 DPCH only also in the case of 1.28 Mcps TDD option.

8.3.4 Output power dynamics

8.3.4.1 Inner loop power control

Common with 3,84Mcps TDD option.

8.3.4.2 Power control steps

8.3.4.2.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.3.4.2.2 Conformance requirements

Common with 3,84Mcps TDD option.

8.3.4.2.3 Test purpose

Common with 3,84Mcps TDD option.

8.3.4.2.4 Method of test

8.3.4.2.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) Common with the 3.84Mcps chip rate

(3) For 1.28Mcps chip rate TDD option, set the initial parameters of the transmitted signal according to the following table.

(4) Common with the 3.84Mcps chip rate

(5) Common with the 3.84Mcps chip rate

Table 8.3.4-1: Parameters of the transmitted signal for Power control step test for 1.28Mcps chip rate TDD option

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: transmit, if i is 0, 4,5,6; receive, if i is 1,2,3.
Number of DPCH in each active TS	1
DPCH power	Minimun
Data content of DPCH	real life (sufficient irregular)

8.3.4.2.4.2 Procedure

(1) Common with 3.84Mcps chip rate TDD option.

(2) Set the BS tester to produce a sequence of TPC commands related to the active DPCH. This sequence shall be transmitted to the BS within the time slots TS i=1,2,3, and shall consist of a series of TPC commands with content "Increase Tx power", followed by a series of TPC commands with content "Decrease Tx power". Each of these series should be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its maximum and its minimum, respectively.

(3) Measure the power of the active DPCH over the 848 active chips of each time slot TS i=0,4,5,6 (-this

excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0{,}22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.

(4) Common with 3.84Mcps chip rate TDD option.

(5) Common with 3.84Mcps chip rate TDD option.

8.3.4.2.5 Test requirements

Common with 3,84Mcps TDD option.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, (the Structure of subframe is shown in section7.2.1 of 3GPP TR 25.928), so the number of timeslot i should be 0, 1,…,6.

For the 1.28Mcps chip rate TDD option, each TS consists of 864 chips, but 16 chips is for Guard Period,so the measuring power should over 848 active chips.

8.3.4.3 Power control dynamic range

8.3.4.3.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.3.4.3.2 Conformance requirements

Common with 3,84Mcps TDD option.

8.3.4.3.3 Test purpose

Common with 3,84Mcps TDD option.

8.3.4.3.4 Method of test

8.3.4.3.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) For 1.28Mcps chip rate TDD option, set the initial parameters of the transmitted signal according to the following table.

(3) Common with the 3.84Mcps chip rate

(4) Common with the 3.84Mcps chip rate

Table 8.3.4-2: Parameters of the transmitted signal for Power control dynamic range test for 1.28Mcps chip rate TDD option

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: transmit, if i is 0, 4,5,6; receive, if i is 1,2,3.
Number of DPCH in each active TS	1
Data content of DPCH	real life (sufficient irregular)

8.3.4.3.4.2 Procedure

(1) Common with 3.84Mcps chip rate TDD option.

(2) Set the BS tester to produce a sequence of TPC commands related to the active DPCH, with content "Increase Tx power". This sequence shall be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its maximum, and shall be transmitted to the BS within the TS i =1,2,3 time slots.

(3) Measure the power of the active DPCH over the 848 active chips of each time slot TS i=0,4,5,6 (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.

(4) Common with 3.84Mcps chip rate TDD option.

(5) Set the BS tester to produce a sequence of TPC commands related to the active DPCH, with content "Decrease Tx power". This sequence shall be sufficiently long so that the transmit output power of the active DPCH is controlled to reach its minimum, and shall be transmitted to the BS within the time slots TS i=1,2,3.

(6) Measure the power of the active DPCH over the 848 active chips of each time slot TS i=0,4,5,6 (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0,22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.

(7) Common with 3.84Mcps chip rate TDD option.

(8) Common with 3.84Mcps chip rate TDD option.

(9) Common with 3.84Mcps chip rate TDD option.

8.3.4.3.5 Test requirements

Common with 3,84Mcps TDD option.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, (the structure of the subframe is shown in section7.2.1 of 3GPP TR 25.928), so the number of timeslot i should be 0, 1,…,6.

For the 1.28Mcps chip rate TDD option, each TS consists of 864 chips, but 16 chips is for Guard Period,so the measuring power should over 848 active chips.

8.3.4.4 Minimum transmit power

8.3.4.4.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.3.4.4.2 Conformance requirements

Common with 3,84Mcps TDD option.

8.3.4.4.3 Test purpose

Common with 3,84Mcps TDD option.

8.3.4.4.4 Method of test

8.3.4.4.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) For 1.28Mcps chip rate TDD option, set the parameters of the transmitted signal according to the following table.

(3) Common with the 3.84Mcps chip rate

(4) Common with the 3.84Mcps chip rate

Table 8.3.4-3: Parameters of the transmitted signal for Minimum transmit power test for 1.28Mcps chip rate TDD option

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

8.3.4.4.4.2 Procedure

(1) Common with 3.84Mcps chip rate TDD option.

(2) Set the BS tester to produce a sequence of TPC commands related to all active DPCH, with content "Decrease Tx power". This sequence shall be sufficiently long so that the transmit output power of all active DPCH is controlled to reach its minimum, and shall be transmitted to the BS within the time slots TS i=1,2,3(receive time slots of the BS).

(3) Measure the power of the BS output signal over the 848 active chips of each time slot TS i=0,4,5,6 (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off $\alpha = 0{,}22$ and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points.

(4) Average over TBD time slots.

(5) Common with 3.84Mcps chip rate TDD option.

8.3.4.4.5 Test requirements

Common with 3,84Mcps TDD option.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, the structure of subframe is shown in Section 7.2.1 of TR 25.928.So the number of timeslot i should be 0, 1,…,6. In addition, for the 1.28Mcps chip rate TDD option, the DL reference measurement channel for 144kbits/s need two timeslots, each consists of 8 DPCH(SF=16).So the number of DPCH in each active TS should be 8.

For the 1.28Mcps chip rate TDD option, each TS consists of 864 chips, but 16 chips is for Guard Period,so the measuring thermal power should over 848 active chips.

8.3.4.5 Primary CCPCH power

8.3.4.5.1 Definition and applicabilily

Common with 3,84Mcps TDD option.

8.3.4.5.2 Conformance requirement

Common with 3,84Mcps TDD option.

8.3.4.5.3 Test purpose

Common with 3,84Mcps TDD option.

8.3.4.5.4 Method of test

8.3.4.5.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) For 1.28Mcps chip rate TDD option, set the parameters of the transmitted signal according to the following table.

Table 8.3.4-4 : Parameters of the BS transmitted signal for Primary CCPCH power testing for 1.28Mcps chip rate TDD option

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
Time slots carrying PCCPCH	TS 0
BS output power setting	PRAT
Relative power of PCCPCH	1/2 of BS output power
Data content of DPCH	real life (sufficient irregular)

8.3.4.5.4.2 Procedure

(1) Measure the PCCPCH power in TS 0 by applying the global in-channel Tx test method described in Annex C.

(2) Reduce the base station output power by 2 dB, 5 dB and 13 dB, without changing the relative powers of the PCCPCH, and repeat step (1) for each output power setting.

8.3.4.5.5 Test requirement

Common with 3,84Mcps TDD option.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, the structure of subframe is shown in section 7.2.1 of TR 25.928. So the number of timeslot i should be 0, 1,…,6.

In 1,28Mcps TDD option, likely scenario is that TS 0 is only used for broadcast, so no DPCH in TS 0.

8.3.5 Transmit ON/OFF power

8.3.5.1 Transmit OFF power

8.3.5.1.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.3.5.1.2 Conformance requirements

The transmit OFF power shall be less than –82 dBm measured with a filter that has a Root-Raised Cosine (RRC) filter response with a roll-off α = 0,22 and a bandwidth equal to the chip rate.

8.3.5.1.3 Test purpose

Common with 3,84Mcps TDD option.

8.3.5.1.4 Method of test

8.3.5.1.4.1 Initial conditions

The conformance testing of transmit OFF power is included in the conformance testing of transmit ON/OFF time mask; therefore, see subclause 8.3.5.2.4.1 for initial conditions.

8.3.5.1.4.2 Procedure

The conformance testing of transmit OFF power is included in the conformance testing of transmit ON/OFF time mask; therefore, see subclause 8.3.5.2.4.2 for procedure.

8.3.5.1.5 Test requirements

The conformance testing of transmit OFF power is included in the conformance testing of transmit ON/OFF time mask; therefore, see subclause 8.3.5.2.5 for test requirements.

8.3.5.2 Transmit ON/OFF time mask

8.3.5.2.1 Definition and applicability

Common with 3,84Mcps TDD.

8.3.5.2.2 Conformance requirements

The transmit power level versus time should meet the mask specified in figure 8.3.5.2.2.1.

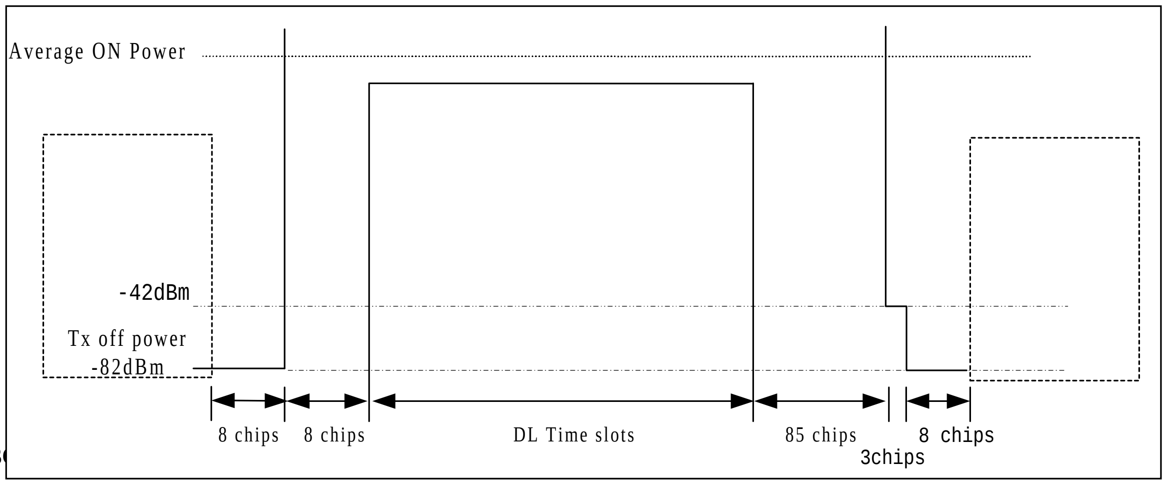


Figure 8.3.5.2.2.1: Transmit ON/OFF template for 1,28Mcps TDD

The reference for this requirement is subclause 6.2.5.2 of this Technique Report.

8.3.5.2.3 Test purpose

Common with 3,84Mcps TDD

8.3.5.2.4 Method of test

8.3.5.2.4.1 Initial conditions

(1) Connect the power measuring equipment to the BS antenna connector.

(2) Set the parameters of the transmitted signal according to table 8.3.5.2.4.1.1.

Table 8.3.5.2.4.1.1: Parameters of the transmitted signal for transmit ON/OFF time mask test for 1,28Mcps TDD

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is UpPCH,1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

8.3.5.2.4.2 Procedure

(1) Measure the power of the BS output signal chipwise (i.e. averaged over time intervals of one chip duration) over the transmit off power period starting 11 chips before the start of the receive time slot TS i = UpPCH, and ending 8 chips before the next transmit time slot TS i = 4 starts, and with a measurement filter that has a RRC filter response with a roll off α = 0,22 and a bandwidth equal to the chip rate. If the power measuring equipment is based on signal sampling, the sampling theorem shall be met. In this case, the power is determined by calculating the RMS value of the signal samples taken at the measurement filter output over one chip duration.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, (the subframe is shown in section7.2.1 of 3GPP TR 25.928), so the number of timeslot i should be 0, 1,…,6. In addition, for the 1.28Mcps chip rate TDD option, the DL reference measurement channel for 144kbits/s need two timeslots, each consists of 8 DPCH(SF=16).So the number of DPCH in each active TS should be 8.

8.3.5.2.5 Test requirements

Each value of the power measured according to subclause 8.3.5.2.4.2 shall be below the limits defined in figure 8.3.5.2.2.1 of subclause 8.3.5.2.2.

8.3.6 Output RF spectrum emissions

8.3.6.1 Occupied bandwidth

8.3.6.1.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.3.6.1.2 Conformance requirements

The occupied bandwidth shall be less than 1,6 MHz based on a chip rate of 1,28 Mcps.

8.3.6.1.3 Test purpose

Common with 3,84Mcps TDD option.

8.3.6.1.4 Method of test

8.3.6.1.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) For 1.28Mcps chip rate TDD option, set the parameters of the transmitted signal according to the following table.

Table 8.3.6-1: Parameters of the transmitted signal for occupied bandwidth test for 1.28Mcps chip rate TDD option

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

8.3.6.1.4.2 Procedure

(1) Measure the power of the transmitted signal with a measurement filter of bandwidth 30 kHz. The characteristic of the filter shall be approximately Gaussian (typical spectrum analyzer filter). The center frequency of the filter shall be stepped in contiguous 30 kHz steps from a minimum frequency, which shall be (2,4 – 0,015) MHz below the assigned channel frequency of the transmitted signal, up to a maximum frequency, which shall be (2,4 – 0,015) MHz above the assigned channel frequency of the transmitted signal. The time duration of each step shall be sufficiently long to capture one active time slot. The measured power shall be recorded for each step.

(2) Determine the transmitted power within the assigned channel bandwidth by accumulating the recorded power measurements results of all steps with center frequencies from (0,8 – 0,015) MHz below the assigned channel frequency up to (0,8 – 0,015) MHz above the assigned channel frequency.

(3) Determine the total transmitted power by accumulating the recorded power measurements results of all steps.

(4) Calculate the ratio

transmitted power within the assigned channel bandwidth acc. to (2) / total transmitted power acc. to (3).

8.3.6.1.5 Test requirements

Common with 3,84Mcps TDD option.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, the structure of subframe is shown in section 7.2.1 of TR 25.928. So the number of timeslot i should be 0, 1,…,6. In addition, for the 1.28Mcps chip rate TDD option, the DL reference measurement channel for 144kbits/s need two timeslots, each consists of 8 DPCH(SF=16).So the number of DPCH in each active TS should be 8.

8.3.6.2 Out of band emission

8.3.6.2.1 Spectrum emission mask

8.3.6.2.1.1 Definition and applicability

For 1.28Mcps chip rate TDD option, the spectrum emission mask specifies the limit of the transmitter out of band emissions at frequency offsets from the assigned channel frequency of the wanted signal between 0,8 MHz and 4,0 MHz.

8.3.6.2.1.2 Conformance requirements

Emissions shall not exceed the maximum level specified in tables in Section 6.2.6.2.1 of TR 25.945.

8.3.6.2.1.3 Test purpose

The test purpose is to verify that the BS out of band emissions do not result in undue interference to any other system (wideband, narrowband) operating at frequencies close to the assigned channel bandwidth of the wanted signal.

This test is independent of the characteristics of possible victim systems and, therefore, complements the tests on occupied bandwidth in 8.3.6.1 of TR 25.945 (verifying the spectral concentration of the BS Tx emissions) and on ACLR in 8.3.6.2.2 of TR 25.945 (simulating the perception of other receivers).

8.3.6.2.1.4 Method of test

8.3.6.2.1.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) For 1.28Mcps chip rate TDD option, set the parameters of the transmitted signal according to the following table.

Table 1: Parameters of the transmitted signal for spectrum emission mask test for 1.28Mcps chip rate TDD option

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

8.3.6.2.1.4.2 Procedure

Measure the power of the BS spectrum emissions by applying measurement filters with bandwidths as specified in the relevant table in subclause 8.3.6.2.1.2. The characteristic of the filters shall be approximately Gaussian (typical spectrum analyzer filters). The center frequency of the filter shall be stepped in contiguous steps over the frequency bands as given in the tables. The step width shall be equal to the respective measurement bandwidth. The time duration of each step shall be sufficiently long to capture one active time slot.

8.3.6.2.1.5 Test requirements

The spectrum emissions measured according to subclause 8.3.6.2.1.4.2 shall be within the mask defined in the relevant table of subclause 8.3.6.2.1.2.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, the structure of subframe is shown in section 7.2.1 of TR 25.928. So the number of timeslot i should be 0, 1,…,6. In addition, for the 1.28Mcps chip rate TDD option, the DL reference measurement channel for 144kbits/s need two timeslots, each consists of 8 DPCH(SF=16).So the number of DPCH in each active TS should be 8.

8.3.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)

8.3.6.2.2.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.3.6.2.2.2 Conformance requirements

The ACLR shall be equal to or greater than the limits given in Tables insection 6.2.6.2.2 of TR 25.945.

8.3.6.2.2.3 Test purpose

Common with 3,84Mcps TDD option.

8.3.6.2.2.4 Method of test

8.3.6.2.2.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) For 1.28Mcps chip rate TDD option, set the parameters of the transmitted signal according to the following table.

Table 8.3.6-2: Parameters of the transmitted signal for ACLR test for 1.28Mcps chip rate TDD option

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

8.3.6.2.2.4.2 Procedure

(1) Measure transmitted power over the 848 active chips of the time slots TS i=0,4,5,6 (this excludes the

guard period), and with a measurement filter that has a RRC filter response with a roll off α = 0,22 and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken at the decision points. (The global in-channel Tx test described in Annex C may be applied.)

(2) Average over TBD time slots.

(3) Measure interference power at the first lower adjacent RF channel (center frequency 1,6 MHz below the assigned channel frequency of the transmitted signal) over the useful part of the burst within the time slots TS i=0,4,5,6 (this excludes the guard period), and with a measurement filter that has a RRC filter response with a roll off α = 0,22 and a bandwidth equal to the chip rate. The power is determined by calculating the RMS value of the signal samples at the measurement filter output taken with adherence to the sampling theorem.

(4) Average over TBD time slots.

(5) Calculate the ACLR by the ratio

ACLR = transmitted power acc. to (2) / interference power acc. to (4).

(6) Repeat steps (3), (4) and (5) for the second lower adjacent RF channel (center frequency 3,2 MHz below the assigned channel frequency of the transmitted signal) and also for the first and second upper adjacent RF channel (center frequency 1,6 MHz and 3,2 MHz above the assigned channel frequency of the transmitted signal, respectively).

8.3.6.2.2.5 Test requirements

The ACLR calculated in step (5) of subclause 8.3.6.2.2.4.2 shall be equal or greater than the limits given in table 6.2.6.2.2-1 in section 6.2.6.2.2 of TR 25.945. In case of operation in proximity to or co-siting with TDD BS or FDD BS operating on an adjacent frequency, the interference power calculated in (4) shall be equal or less than the limits given in table 6.2.6.2.2-2 and 6.2.6.2.2-3 respectively, and the center frequency as well as the measurement bandwidth shall be equal to those listed in the corresponding tables.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, (the structure of subframe is shown in TR 25.928), so the number of timeslot i should be 0, 1,…,6. In addition, for the 1.28Mcps chip rate TDD option, the DL reference measurement channel for 144kbits/s need two timeslots, each consists of 8 DPCH(SF=16).So the number of DPCH in each active TS should be 8.

For the 1.28Mcps chip rate TDD option, each TS consists of 864 chips, but 16 chips is for Guard Period, so the measuring thermal power should be over 848 active chips.

8.3.6.3 Spurious emissions

8.3.6.3.1 Definition and applicability

Spurious emissions are emissions which are caused by unwanted transmitter effects such as harmonics emission, parasitic emission, intermodulation products and frequency conversion products, but exclude out of band emissions. This is measured at the base station RF output port.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

8.3.6.3.2 Conformance requirements

The requirements of either subclause 6.2.6.3.1 or subclause 6.2.6.3.2 of TR 25.945 shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer.

Either requirement applies at frequencies within the specified frequency ranges which are more than 4 MHz under the first carrier frequency used or more than 4 MHz above the last carrier frequency used.

The power of any spurious emission shall not exceed the maximum level given in Tables in subclause 6.2.6.3 of TR 25.945.

8.3.6.3.3 Test purpose

The test purpose is to verify the ability of the BS to limit the interference caused by unwanted transmitter effects to other systems operating at frequencies which are more than 4 MHz away from of the UTRA band used.

8.3.6.3.4 Method of test

8.3.6.3.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) For 1.28Mcps chip rate TDD option, set the parameters of the transmitted signal according to the following table.

Table 8.3.6-3: Parameters of the transmitted signal for spurious emissions for 1.28Mcps chip rate TDD option

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

8.3.6.3.4.2 Procedure

Measure the power of the spurious emissions by applying measurement filters with bandwidths as specified in the relevant tables of 8.3.6.3.2. The characteristic of the filters shall be approximately Gaussian (typical spectrum analyzer filters). The center frequency of the filter shall be stepped in contiguous steps over the frequency bands as given in the tables. The step width shall be equal to the respective measurement bandwidth. The time duration of each step shall be sufficiently long to capture one active time slot.

8.3.6.3.5 Test requirements

The spurious emissions measured according to subclause 8.3.6.3.4.2 shall not exceed the limits specified in the relevant tables of 8.3.6.3.2.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, (the subframe is shown in section7.2.1 of 3GPP TR 25.928), so the number of timeslot i should be 0, 1,…,6. In addition, for the 1.28Mcps chip rate TDD option, the DL reference measurement channel for 144kbits/s need two timeslots, each consists of 8 DPCH(SF=16).So the number of DPCH in each active TS should be 8.

8.3.7 Transmit intermodulation

8.3.7.1 Definition and applicability

The transmit intermodulation performance is a measure of the capability of the transmitter to inhibit the generation of signals in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna.

The transmit intermodulation level is the power of the intermodulation products when a CDMA modulated interference signal is injected into the antenna connector at a level of 30 dB lower than that of the subject signal. The frequency of the interference signal shall be ±1,6 MHz, ±3,2 MHz and ±4,8 MHz offset from the subject signal.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

8.3.7.2 Conformance requirements

The transmit intermodulation level shall not exceed the out of band or the spurious emission requirements of subclause 8.3.6.2 and 8.3.6.3, respectively.

8.3.7.3 Test purpose

The test purpose is to verify the ability of the BS transmitter to restrict the generation of intermodulation products in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna to below specified levels.

8.3.7.4 Method of test

8.3.7.4.1 Initial conditions

Common with the 3.84Mcps chip rate

(2) For 1.28Mcps chip rate TDD option, set the parameters of the transmitted signal according to the following table.

Table 8.3.7-1: Parameters of the transmitted signal for transmit intermodulation for 1.28Mcps chip rate TDD option

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, 3, 4, 5, 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

(3) Configure the CDMA signal generator to produce an interference signal with a level of 30 dB lower than that of the BS transmitted signal. The interference signal shall be like-modulated as the BS transmitted signal, and the active time slots of both signals shall be synchronized. The frequency of the interference signal shall be ±1,6 MHz, ±3,2 MHz and ±4,8 MHz offset from the BS transmitted signal.

8.3.7.4.2 Procedure

Apply the test procedures for out of band and spurious emissions as described in 8.3.6.2 and 8.3.6.3, respectively. The frequency band occupied by the interference signal are excluded from the measurements.

8.3.7.5 Test requirements

The conformance requirements for out of band and spurious emissions as specified in 8.3.6.2 and 8.3.6.3 shall be met.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, (the structure of the subframe is shown in section7.2.1 of 3GPP TR 25.928), so the number of timeslot i should be 0, 1,…,6. In addition, for the 1.28Mcps chip rate TDD option, the DL reference measurement channel for 144kbits/s need two timeslots, each consists of 8 DPCH(SF=16).So the number of

DPCH in each active TS should be 8.

Because the bandwidth of 1,28Mcps TDD option is 1,6MHz, the frequency offset of interference signal shall be ±1,6 MHz, ±3,2 MHz and ±4,8 MHz.

8.3.8 Transmit Modulation

8.3.8.1 Modulation accuracy

8.3.8.1.1 Definition and applicability

The modulation accuracy is a measure of the difference between the measured waveform and the theoretical modulated waveform (the error vector). A quantitative measure of the modulation accuracy is the error vector magnitude (EVM) which is defined as the square root of the ratio of the mean error vector power to the mean reference signal power expressed as %. The measurement interval is one timeslot.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

NOTE: The theoretical modulated waveform shall be calculated on the basis that the transmit pulse shaping filter is a root-raised cosine (RRC) with roll-off α=0,22 in the frequency domain. The impulse response of the chip impulse filter $RC_0(t)$ is

$$RC_0(t)=\frac{\sin\left(\pi\frac{t}{T_C}(1-\alpha)\right)+4\alpha\frac{t}{T_C}\cos\left(\pi\frac{t}{T_C}(1+\alpha)\right)}{\pi\frac{t}{T_C}\left(1-\left(4\alpha\frac{t}{T_C}\right)^2\right)}$$

Where the roll-off factor α = 0,22 and for 1.28Mcps chip rate option the chip duration

$$T_C=\frac{1}{chiprate}=0.78125\mu s.$$

8.3.8.1.2 Conformance requirements

Common with 3,84Mcps TDD option.

8.3.8.1.3 Test purpose

Common with 3,84Mcps TDD option.

8.3.8.1.4 Method of test

8.3.8.1.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) For 1.28Mcps chip rate TDD option, set the parameters of the transmitted signal according to the following table.

Table 8.3.8-1: Parameters of the transmitted signal for modulation accuracy for 1.28Mcps chip rate TDD option

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: Transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
Number of DPCH in each active TS	1
Base station power	maximum, according to manufacturer's declaration
Data content of DPCH	real life (sufficient irregular)

8.3.8.1.4.2 Procedure

Common with 3,84Mcps Chip rate TDD option

8.3.8.1.5 Test requirements

Common with 3,84Mcps TDD option.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, so the number of timeslot i should be 0, 1,…,6. The structure of subframe is shown in section 7.2.1 of TR 25.928.

8.3.8.2 Peak code domain error

8.3.8.2.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.3.8.2.2 Conformance requirements

Common with 3,84Mcps TDD option.

8.3.8.2.3 Test purpose

Common with 3,84Mcps TDD option.

8.3.8.2.4 Method of test

8.3.8.2.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) For 1.28Mcps chip rate TDD option, set the parameters of the transmitted signal according to the following table.

Table 8.3.8-2: Parameters of the transmitted signal for Peak code domain error for 1.28Mcps chip rate TDD option

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)
Spreading factor	16

8.3.8.2.4.2 Procedure

Common with 3,84Mcps Chip rate TDD option

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, (the structure of subframe is shown in section7.2.1 of 3GPP TR 25.928)), so the number of timeslot i should be 0, 1,…,6. In addition, for the 1.28Mcps chip rate TDD option, the DL reference measurement channel for 144kbits/s need two timeslots, each consists of 8 DPCH(SF=16).So the number of DPCH in each active TS should be 8.

8.3.8.2.5 Test requirements

Common with 3,84Mcps TDD option.

8.4 Receiver characteristics

8.4.1 General

Common with 3,84Mcps TDD option.

8.4.2 Reference sensitivity level

8.4.2.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.4.2.2 Conformance requirements

For the measurement channel specified in Annex 8.A.2.1, the reference sensitivity level and performance of the BS shall be as specified in table section 6.3.2.1 of TR 25.945.

8.4.2.3 Test purpose

Common with 3,84Mcps TDD option.

8.4.2.4 Method of test

8.4.2.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) Common with the 3.84Mcps chip rate

(3) Common with the 3.84Mcps chip rate.

(4) The level of BS tester output signal measured at the BS antenna connector shall be adjusted to -110 dBm.

8.4.2.4.2 Procedure

Common with 3,84Mcps chip rate TDD option.

8.4.2.5 Test requirements

Common with 3,84Mcps TDD option.

[Explanation difference:]

There is no difference in the test method and test procedure between high chip rate TDD and low chip rate TDD, however the requirement is changed according to section 6.3.2.1 of TR 25.945.

8.4.3 Dynamic range

8.4.3.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.4.3.2 Conformance requirements

The BER shall not exceed 0,001 for the parameters specified in table in section 6.3.3 of TR 25.945.

8.4.3.3 Test purpose

Common with 3,84Mcps TDD option.

8.4.3.4 Method of test

8.4.3.4.1 Initial conditions

Common with the 3.84Mcps chip rate

The level of the BS tester output signal measured at the BS antenna connector shall be adjusted as specified in table in subclause 8.4.3.2

The power spectral density of the band-limited white noise source measured at the BS antenna connector shall be adjusted as specified in table in subclause 8.4.3.2. The minimum bandwidth of the white noise source shall be 1,5 times the chip rate (1,92 MHz for a chip rate of 1,28 Mcps).

8.4.3.4.2 Procedure

Common with 3,84Mcps chip rate TDD option.

8.4.3.5 Test requirement

Common with 3,84Mcps TDD option.

[Explanation difference:]

Due to the smaller bandwidth in low chip rate TDD the bandwidth of the white noise source is changed.

8.4.4 Adjacent Channel Selectivity (ACS)

8.4.4.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.4.4.2 Conformance requirements

The BER, measured on the wanted signal in the presence of an interfering signal, shall not exceed 0,001 for the parameters specified in table in section 6.3.4 of TR 25.945.

8.4.4.3 Test purpose

Common with 3,84Mcps TDD option.

8.4.4.4 Method of test

8.4.4.4.1 Initial conditions

Common with the 3.84Mcps chip rate

Common with the 3.84Mcps chip rate

Start transmission from the BS tester to the BS using the UL reference measurement channel (12.2 kbps) defined in Annex 8.A of TR 25.945.The level of the UE simulator signal measured at the BS antenna connector shall be adjusted to the value specified in table in subclause 8.4.4.2

Set the signal generator to produce an interfering signal that is equivalent to a continuous narrow band CDMA signal with one code of chip frequency 1,28 Mchip/s, filtered by an RRC transmit pulse-shaping filter with roll-off $\alpha = 0,22$ and 1.6MHz bandwidth. The level of the interfering signal measured at the BS antenna connector shall be adjusted to the value specified in table in subclause 8.4.4.2

8.4.4.4.2 Procedure

Set the center frequency of the interfering signal to 1,6 MHz above the assigned channel frequency of the wanted signal.

Measure the BER of the wanted signal at the BS receiver.

Set the center frequency of the interfering signal to 1,6 MHz below the assigned channel frequency of the wanted signal.

Measure the BER of the wanted signal at the BS receiver.

Interchange the connections of the BS Rx ports and repeat the measurements according to steps (1) to (4).

8.4.4.5 Test requirements

The BER measured according subclause 8.4.4.4.2 to shall not exceed 0,001.

[Explanation difference:]

Because bandwidth of 1,28Mcps TDD option is 1,6MHz, the frequency offset of the interfering singal should be

1,6MHz.

8.4.5 Blocking characteristics

8.4.5.1 Definition and applicability

The blocking characteristics is a measure of the receiver ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the adjacent channels. The blocking performance shall apply at all frequencies as specified in tables in section 6.3.2 of TR 25.945 respectively, using a 1 MHz step size.

The requirements in this subclause shall apply to base stations intended for general-purpose applications.

8.4.5.2 Conformance requirements

The static reference performance as specified in the section 6.3.2 of TR 25.945 should be met with a wanted and an interfering signal coupled to the BS antenna input using the parameters specified in tables in section 6.3.5 of TR 25.945 respectively, using a 1 MHz step size..

8.4.5.3 Test purpose

The test stresses the ability of the BS receiver to withstand high-level interference from unwanted signals at frequency offsets of 3.2 MHz or more, without undue degradation of its sensitivity.

8.4.5.4 Method of test

8.4.5.4.1 Initial conditions

Connect an UE simulator operating at the assigned channel frequency of the wanted signal and a signal generator to the antenna connector of one Rx port.

Terminate or disable any other Rx port not under test.

Start transmission from the BS tester to the BS using the UL reference measurement channel (12.2 kbps) defined inAnnex 8.A.2 of TR 25.945.The level of the UE simulator signal measured at the BS antenna connector shall be set to 6 dB above the reference sensitivity level specified section 6.3.2 of TR 25.945.

8.4.5.4.2 Procedure

Set the signal generator to produce an interfering signal at a frequency offset Fuw from the assigned channel frequency of the wanted signal which is given by

$$Fuw = \pm (n \times 1\ MHz),$$

where n shall be increased in integer steps from n = 10 up to such a value that the center frequency of the interfering signal covers the range from 1 MHz to 12,75 GHz. The interfering signal level measured at the antenna connector shall be set in dependency of its center frequency, as specified in tables in section 6.3.5 of TR 25.945. respectively. The type of the interfering signal is either equivalent to a continuous narrow band CDMA signal with one code of chip frequency 1,28 Mchip/s, filtered by an RRC transmit pulse-shaping filter with roll-off $\alpha = 0{,}22$, or a CW signal; see tables in section 6.3.5 of TR 25.945 respectively.

Common with 3,84Mcps chip rate TDD option.

8.4.5.5 Test requirements

In all measurements made according to subclause 8.4.5.4.2, the BER shall not exceed 0,001.

[Explanation difference:]

Because the chip rate of the wanted signal is 1,28Mcps, the type of the interfering signal is either equivalent to a continuous narrow band CDMA signal with one code of chip frequency 1,28 Mchip/s.

8.4.6 Intermodulation characteristics

8.4.6.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.4.6.2 Conformance requirements

The static reference performance as specified in clause 8.4.2 of TR 25.945 should be met when the following signals are coupled to the BS antenna input.

A wanted signal at the assigned channel frequency, 6 dB above the static reference level.

Two interfering signals with the parameters specified in following table.

Table 8.4.6-1: Parameters of the interfering signals for intermodulation characteristics testing of 1,28Mcps TDD option

Interfering Signal Level	Offset	Type of Interfering Signal
- 48 dBm	3,2 MHz	CW signal
- 48 dBm	6,4 MHz	NCDMA signal with one code

The reference for this requirement is TR 25.945 subclause 6.3.6.

8.4.6.3 Test purpose

Common with 3,84Mcps TDD option.

8.4.6.4 Method of test

8.4.6.4.1 Initial conditions

Common with 3,84Mcps chip rate TDD option.

Common with 3,84Mcps chip rate TDD option.

Start transmission from the BS tester to the BS using the UL reference measurement channel (12.2 kbps) defined in Annex 8.A.2 of TR 25.945 The level of the UE simulator signal measured at the BS antenna connector shall be set to 6 dB above the reference sensitivity level specified section 6.3.2 of TR 25.945.

Set the first signal generator to produce a CW signal with a level measured at the BS antenna connector of - 48 dBm.

Set the second signal generator to produce an interfering signal equivalent to a narrow band CDMA signal with one code of chip frequency 1,28 Mchip/s, filtered by an RRC transmit pulse-shaping filter with roll-off α = 0,22. The level of the signal measured at the BS antenna connector shall be set to - 48 dBm.

8.4.6.4.2 Procedure

The frequency of the first and the second signal generator shall be set to 3,2 MHz and 6,4 MHz, respectively, above the assigned channel frequency of the wanted signal.

Measure the BER of the wanted signal at the BS receiver.

The frequency of the first and the second signal generator shall be set to 3,2 MHz and 6,4 MHz, respectively, below the assigned channel frequency of the wanted signal.

Measure the BER of the wanted signal at the BS receiver.

Interchange the connections of the BS Rx ports and repeat the measurements according to steps (1) to (4).

8.4.6.5 Test requirements

The BER measured according subclause 8.4.6.4.2 to shall not exceed 0,001.

[Explanation difference:]

Because the bandwidth of 1,28Mcps TDD is 1,6MHz, the frequency offsets of first and second interference signal should be 3,2MHz and 6,4MHz respectively.

8.4.7 Spurious emissions

8.4.7.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.4.7.2 Conformance requirements

The power of any spurious emission shall not exceed the values given in table in section 6.3.7 of TR 25.945

8.4.7.3 Test requirements

Common with 3,84Mcps TDD option.

8.4.7.4 Method of test

8.4.7.4.1 Initial conditions

(1) Common with the 3.84Mcps chip rate

(2) Common with the 3.84Mcps chip rate

(3) Common with the 3.84Mcps chip rate

(4) Set the BS to transmit a signal with parameters according to following table.

(5) Common with the 3.84Mcps chip rate

Table 8.4.7-1: Parameters of the transmitted signal for Rx spurious emissions test

Parameter	Value/description
TDD Duty Cycle	TS i; i = 0, 1, 2, ..., 6: transmit, if i is 0,4,5,6; receive, if i is 1,2,3.
BS output power setting	PRAT
Number of DPCH in each active TS	8
Power of each DPCH	1/8 of Base Station output power
Data content of DPCH	real life (sufficient irregular)

8.4.7.4.2 Procedure

(1) Measure the power of the spurious emissions by applying the measuring equipment with the settings as specified in following table. The characteristics of the measurement filter with the bandwidth 1,28 MHz shall be RRC with roll-off α = 0,22. The characteristics of the measurement filters with bandwidths 100 kHz and 1 MHz shall be approximately Gaussian (typical spectrum analyzer filter). The center frequency of the filters shall be stepped in contiguous steps over the frequency bands as specified in following table. The time duration of each step shall be sufficiently long to capture one transmit time slot.

(2) If the BS is equipped with more than one Rx port, interchange the connections of the BS Rx ports and repeat the measurement according to (1).

Table 8.4.7-2: Measurement equipment settings

Stepped frequency range	Measurement bandwidth	Step width	Note	Detection mode
9 kHz – 1 GHz	100 kHz	100 kHz		true RMS
1 GHz – 1,900 GHz	1 MHz	1 MHz	With the exception of frequencies between 4 MHz below the first carrier frequency and 4 MHz above the last carrier frequency used by the BS	
1,900 GHz – 1,980 GHz	1,28 MHz	200 kHz		
1,980 GHz – 2,010 GHz	1 MHz	1 MHz		
2,010 GHz – 2,025 GHz	1,28 MHz	200 kHz		
2,025 GHz – 12,75 GHz	1 MHz	1 MHz		

8.4.7.5 Test requirements

The spurious emissions measured according to subclause 8.4.7.4.2 shall not exceed the limits specified in subclause 8.4.7.2.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, the structure of subframe is shown in section 7.2.1 of TR 25.928. So the number of timeslot i should be 0, 1,…,6. In addition, for the 1.28Mcps chip rate TDD option, the DL reference measurement channel for 144kbits/s need two timeslots, each consists of 8 DPCH(SF=16).So the number of DPCH in each active TS should be 8.

Due to the smaller bandwidth in low chip rate TDD the measurement bandwidth is changed.

8.5 Performance requirements

8.5.1 General

8.5.2 Demodulation in static propagation conditions

8.5.2.1 Demodulation of DCH

8.5.2.1.1 Definition and applicability

Common with 3,84Mcps TDD.

8.5.2.1.2 Conformance requirements

For the parameters specified in table 8.5.2.1.2.1, the BLER should not exceed the piece-wise linear BLER curve specified in table 8.5.2.1.2.2.

Table 8.5.2.1.2.1: Parameters in static propagation conditions for 1,28Mcps TDD option

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	8	
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-7	-7	-7	–
I_{oc}	dBm/1,28 MHz	-91			
Information Data Rate	kbps	12,2	64	144	384

Table 8.5.2.1.2.2: Performance requirements in AWGN channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	0.6	10^{-2}
2	-0.9	10^{-1}
	-0.4	10^{-2}
3	-0.3	10^{-1}
	-0.1	10^{-2}
4	0.5	10^{-1}
	0.6	10^{-2}

The reference for this requirement is TR 25.945 subclause 6.4.2.

8.5.2.1.3 Test purpose

Common with 3,84Mcps TDD option.

8.5.2.1.4 Method of test

8.5.2.1.4.1 Initial conditions

Connect the BS tester (UE simulator) generating the wanted signal and a set of interference generators to both BS antenna connectors for diversity reception via a combining network. The set of interference generators comprises a number of CDMA generators, each representing an individual intracell interferer (subsequently called $DPCH_0$ generators) that the $DPCH_0$s are synchronous, and an additional band-limited white noise source, simulating interference from other cells. Each $DPCH_0$ generator shall produce an interfering signal that is equivalent to a valid 1,28Mcps TDD signal with spreading factor 8, using the same time slot(s) than the wanted signal and applying the same cell-specific scrambling code. The number of the $DPCH_0$ generators used in each test is given in table 8.5.2.1.2.1.

8.5.2.1.4.2 Procedure

Adjust the power of the band-limited white noise source in such a way that its power spectral density measured at the BS antenna connector takes on the value I_{oc} as specified in table 8.5.2.1.2.1.

For a given test defined by the information data rate and the BLER objective, set the power of each $DPCH_0$ measured at the BS antenna connector during the active time slots to the value specified in table 8.5.2.1.4.2.1.

Set up a call between the BS tester generating the wanted signal and the BS. The characteristics of the call shall be configured according to the information data rate to be provided and the corresponding UL reference measurement channel defined in Annex 8.A. Depending on the information data rate, the UL reference measurement channel makes use of one or two Dedicated Physical Channels ($DPCH_1$ and $DPCH_2$) with different spreading factors SF. The power(s) of $DPCH_1$ and $DPCH_2$ (if applicable) measured at the BS antenna connector during the active time slots shall be set to the value(s) given in table 8.5.2.1.4.2.1.

Measure the BLER of the wanted signal at the BS receiver.

Table 8.2.1.4.2.1: Parameters of $DPCH_0$ and the wanted signal

Test Number	BLER objective	Number of $DPCH_0$	Power of each $DPCH_0$ measured at the BS antenna connector [dBm]	Parameters of the wanted signal		
				DPCH	SF	Power measured at the BS antenna connector [dBm]
1	10^{-2}	4	-97.4	$DPCH_1$	8	-97.4
2	10^{-1}	1	-98.9	$DPCH_1$	2	-92.9
	10^{-2}	1	-98.4	$DPCH_1$	2	-92.5
3	10^{-1}	1	-98.3	$DPCH_1$	2	-92.3
	10^{-2}	1	-98.1	$DPCH_1$	2	-92.1
4	10^{-1}	0	–	$DPCH_1$	8	-97.5
				$DPCH_2$	2	-91.5
	10^{-2}	0	–	$DPCH_1$	8	-97.4
				$DPCH_2$	2	-91.4

8.5.2.1.5 Test requirements

The BLER measured according to subclause 8.5.2.1.4.2 shall not exceed the limits specified in table 8.5.2.1.2.2.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, (the structure of subframe is shown in TR 25.928). Considering the chip rate, the burst structure of 1,28Mcps TDD for normal traffic is different from that of 3,84Mcps TDD option, (the burst structure for normal traffic is shown in TR 25.928). So the propagation conditions, service mapping and simulation assumption of the measurement channel 12.2kps, 64pks, 144kps and 384kps should be different from those of 3,84Mcps TDD option. As a result, the relevant parameters should be different.

8.5.3 Demodulation of DCH in multipath fading conditions

8.5.3.1 Multipath fading Case 1

8.5.3.1.1 Definition and applicability

Common with 3,84Mcps TDD option.

8.5.3.1.2 Conformance requirements

For the parameters specified in table 8.5.3.1.2.1, the BLER should not exceed the piece-wise linear BLER curve specified in table 8.5.3.1.2.2.

Table 8.5.3.1.2.1: Parameters multipath Case 1 channel for 1,28Mcps TDD option

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	8	
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-7	-7	-7	–
I_{oc}	dBm/1,28 MHz	-91			
Information Data Rate	kbps	12,2	64	144	384

Table 8.5.3.1.2.2: Performance requirements multipath Case 1 channel

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	10.4	10^{-2}
2	5.3	10^{-1}
	9.4	10^{-2}
3	5.7	10^{-1}
	10.1	10^{-2}
4	6.0	10^{-1}
	10.0	10^{-2}

The reference for this requirement is TR 25.945 subclause 6.4.2.

8.5.3.1.3 Test purpose

Common with 3,84Mcps TDD option.

8.5.3.1.4 Method of test

8.5.3.1.4.1 Initial conditions

(1) Connect the BS tester (UE simulator) generating the wanted signal and a set of interference generators to both BS antenna connectors for diversity reception via a combining network. The set of interference generators comprises a number of CDMA generators, each representing an individual intracell interferer (subsequently called $DPCH_0$ generators) that the $DPCH_0$s are synchronous, and an additional band-limited white noise source, simulating interference from other cells. Each $DPCH_0$ generator shall produce an interfering signal that is equivalent to a valid 1,28Mcps TDD signal with spreading factor 8, using the same time slot(s) than the wanted signal and applying the same cell-specific scrambling code. The number of the $DPCH_0$ generators used in each test is given in table 8.5.3.1.2.1.

(2) The wanted signal produced by the BS tester and the interfering signals produced by the $DPCH_0$ generators are individually passed through independent Multipath Fading Simulators (MFS) before entering the combining network. Each MFS shall be configured to simulate multipath fading Case 1.

8.5.3.1.4.2 Procedure

Adjust the power of the band-limited white noise source in such a way that its power spectral density measured at the BS antenna connector takes on the value I_{oc} as specified in table 8.5.3.1.2.1.

For a given test defined by the information data rate and the BLER objective, set the power of each $DPCH_0$ measured at the BS antenna connector during the active time slots to the value specified in table 8.5.3.1.4.2.1.

Set up a call between the BS tester generating the wanted signal and the BS. The characteristics of the call shall be configured according to the information data rate to be provided and the corresponding UL reference measurement channel defined in Annex 8.A. Depending on the information data rate, the UL reference measurement channel makes use of one or two Dedicated Physical Channels ($DPCH_1$ and $DPCH_2$) with different spreading factors SF. The power(s) of $DPCH_1$ and $DPCH_2$ (if applicable) measured at the BS antenna connector during the active time slots shall be set to the value(s) given in table 8.5.3.1.4.2.1.

Measure the BLER of the wanted signal at the BS receiver.

Table 8.5.3.1.4.2.1: Parameters of $DPCH_0$ and the wanted signal

Test Number	BLER objective	Number of $DPCH_0$	Power of each $DPCH_0$ measured at the BS antenna connector [dBm]	Parameters of the wanted signal		
				DPCH	SF	Power measured at the BS antenna connector [dBm]
1	10^{-2}	4	-87.6	$DPCH_1$	8	-87.6
2	10^{-1}	1	-92.7	$DPCH_1$	2	-86.7
	10^{-2}	1	-88.6	$DPCH_1$	2	-82.6
3	10^{-1}	1	-92.3	$DPCH_1$	2	-86.3
	10^{-2}	1	-87.9	$DPCH_1$	2	-81.9
4	10^{-1}	0	–	$DPCH_1$	8	-92.0
				$DPCH_2$	2	-86.0
	10^{-2}	0	–	$DPCH_1$	8	-88.0
				$DPCH_2$	2	-82.0

8.5.3.1.5 Test requirements

The BLER measured according to subclause 8.5.3.1.4.2 shall not exceed the limits specified in table 8.5.3.1.2.2.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, (the structure of subframe is shown in TR 25.928). Considering the chip rate, the burst structure of 1,28Mcps TDD for normal traffic is different from that of 3,84Mcps TDD option, (the burst structure for normal traffic is shown in TR 25.928). So the propagation conditions, service mapping and simulation assumption of the measurement channel 12.2kps, 64pks, 144kps and 384kps should be different from those of 3,84Mcps TDD option. As a result, the relevant parameters should be different.

8.5.3.2 Multipath fading Case 2

8.5.3.2.1 Definition and applicabily

Common with 3,84Mcps TDD option.

8.5.3.2.2 Conformance requirements

For the parameters specified in table 8.5.3.2.2.1, the BLER should not exceed the piece-wise linear BLER curve specified in table 8.5.3.2.2.2.

Table 8.5.3.2.2.1: Parameters multipath Case 2 channel for 1,28Mcps TDD option

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	8	
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-7	-7	-7	–
I_{oc}	dBm/1,28 MHz	-91			
Information Data Rate	kbps	12,2	64	144	384

Table 8.5.3.2.2.2: Performance requirements multipath Case 2 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	6.7	10^{-2}
2	3.6	10^{-1}
	5.9	10^{-2}
3	4.2	10^{-1}
	6.3	10^{-2}
4	4.6	10^{-1}
	6.0	10^{-2}

The reference for this requirement is TR 25.945 subclause 6.4.2.

8.5.3.2.3 Test purpose

Common with 3,84Mcps TDD option.

8.5.3.2.4 Method of test

8.5.3.2.4.1 Initial conditions

(1) Connect the BS tester (UE simulator) generating the wanted signal and a set of interference generators to both BS antenna connectors for diversity reception via a combining network. The set of interference generators comprises a number of CDMA generators, each representing an individual intracell interferer (subsequently called $DPCH_0$ generators) that the $DPCH_0$s are synchronous, and an additional band-limited white noise source, simulating interference from other cells. Each $DPCH_0$ generator shall produce an interfering signal that is equivalent to a valid 1,28Mcps TDD signal with spreading factor 8, using the same time slot(s) than the wanted signal and applying the same cell-specific scrambling code. The number of the $DPCH_0$ generators used in each test is given in table 8.5.3.2.2.1.

(2) The wanted signal produced by the BS tester and the interfering signals produced by the $DPCH_0$ generators are individually passed through independent Multipath Fading Simulators (MFS) before entering the combining network. Each MFS shall be configured to simulate multipath fading Case 2.

8.5.3.2.4.2 Procedure

Adjust the power of the band-limited white noise source in such a way that its power spectral density measured at the BS antenna connector takes on the value I_{oc} as specified in table 8.5.3.2.2.1.

For a given test defined by the information data rate and the BLER objective, set the power of each $DPCH_0$ measured at the BS antenna connector during the active time slots to the value specified in table 8.5.3.2.4.2.1.

Set up a call between the BS tester generating the wanted signal and the BS. The characteristics of the call shall be configured according to the information data rate to be provided and the corresponding UL reference measurement channel defined in Annex 8.A. Depending on the information data rate, the UL reference measurement channel makes use of one or two Dedicated Physical Channels ($DPCH_1$ and $DPCH_2$) with different spreading factors SF. The power(s) of $DPCH_1$ and $DPCH_2$ (if applicable) measured at the BS antenna connector during the active time slots shall be set to the value(s) given in table 8.5.3.2.4.2.1.

Measure the BLER of the wanted signal at the BS receiver.

Table 8.5.3.2.4.2.1: Parameters of $DPCH_0$ and the wanted signal

Test Number	BLER objective	Number of $DPCH_0$	Power of each $DPCH_0$ measured at the BS antenna connector [dBm]	Parameters of the wanted signal		
				DPCH	SF	Power measured at the BS antenna connector [dBm]
1	10^{-2}	4	-91.3	$DPCH_1$	8	-91.3
2	10^{-1}	1	-94.4	$DPCH_1$	2	-88.4
	10^{-2}	1	-92.1	$DPCH_1$	2	-86.1
3	10^{-1}	1	-93.8	$DPCH_1$	2	-87.8
	10^{-2}	1	-91.7	$DPCH_1$	2	-85.7
4	10^{-1}	0	–	$DPCH_1$	8	-93.4
				$DPCH_2$	2	-87.4
	10^{-2}	0	–	$DPCH_1$	8	-92.0
				$DPCH_2$	2	-86.0

8.5.3.2.5 Test requirements

The BLER measured according to subclause 8.5.3.2.4.2 shall not exceed the limits specified in table 8.5.3.2.2.2.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, (the structure of subframe is shown in TR 25.928). Considering the chip rate, the burst structure of 1,28Mcps TDD for normal traffic is different from that of 3,84Mcps TDD option, (the burst structure for normal traffic is shown in TR 25.928). So the propagation conditions, service mapping and simulation assumption of the measurement channel 12.2kps, 64pks, 144kps and 384kps should be different from those of 3,84Mcps TDD option. As a result, the relevant parameters should be different.

8.5.3.3 Multipath fading Case 3

8.5.3.3.1 Definition and applicabily

Common with 3,84Mcps TDD option.

8.5.3.3.2 Conformance requirements

For the parameters specified in table 8.5.3.3.2.1, the BLER should not exceed the piece-wise linear BLER curve specified in table 8.5.3.3.2.2.

Table 8.5.3.3.2.1: Parameters multipath Case 3 channel for 1,28Mcps TDD option

Parameters	Unit	Test 1	Test 2	Test 3	Test 4
Number of $DPCH_o$		4	1	1	0
Spread factor of $DPCH_o$		8	8	8	
$\frac{DPCH_o\_E_c}{I_{or}}$	dB	-7	-7	-7	–
I_{oc}	dBm/1,28 MHz	-91			
Information Data Rate	kbps	12,2	64	144	384

Table 8.5.3.3.2.2: Performance requirements multipath Case 3 channel.

Test Number	$\frac{\hat{I}_{or}}{I_{oc}}$ [dB]	BLER
1	5.6	10^{-2}
2	3.2	10^{-1}
	4.6	10^{-2}
	5.9	10^{-3}
3	3.7	10^{-1}
	4.8	10^{-2}
	5.9	10^{-3}
4	4.2	10^{-1}
	5.1	10^{-2}
	5.9	10^{-3}

The reference for this requirement is TR 25.945 subclause 6.4.2.

8.5.3.3.3 Test purpose

Common with 3,84Mcps TDD option.

8.5.3.3.4 Method of test

8.5.3.3.4.1 Initial conditions

(1) Connect the BS tester (UE simulator) generating the wanted signal and a set of interference generators to both BS antenna connectors for diversity reception via a combining network. The set of interference generators comprises a number of CDMA generators, each representing an individual intracell interferer (subsequently called $DPCH_0$ generators) that the $DPCH_0$s are synchronous, and an additional band-limited white noise source, simulating interference from other cells. Each $DPCH_0$ generator shall produce an interfering signal that is equivalent to a valid 1,28Mcps TDD signal with spreading factor 8, using the same time slot(s) than the wanted signal and applying the same cell-specific scrambling code. The number of the $DPCH_0$ generators used in each test is given in table 8.5.3.3.2.1.

(2) The wanted signal produced by the BS tester and the interfering signals produced by the $DPCH_0$ generators are individually passed through independent Multipath Fading Simulators (MFS) before entering the combining network. Each MFS shall be configured to simulate multipath fading Case 3.

8.5.3.3.4.2 Procedure

Adjust the power of the band-limited white noise source in such a way that its power spectral density measured at the BS antenna connector takes on the value I_{oc} as specified in table 8.5.3.3.2.1.

For a given test defined by the information data rate and the BLER objective, set the power of each $DPCH_0$ measured at the BS antenna connector during the active time slots to the value specified in table 8.5.3.3.4.2.1.

Set up a call between the BS tester generating the wanted signal and the BS. The characteristics of the call shall be configured according to the information data rate to be provided and the corresponding UL reference measurement channel defined in Annex 8.A. Depending on the information data rate, the UL reference measurement channel makes use of one or two Dedicated Physical Channels ($DPCH_1$ and $DPCH_2$) with different spreading factors SF. The power(s) of $DPCH_1$ and $DPCH_2$ (if applicable) measured at the BS antenna connector during the active time slots shall be set to the value(s) given in table 8.5.3.3.4.2.1.

Measure the BLER of the wanted signal at the BS receiver.

Table 8.5.3.3.4.2.1: Parameters of $DPCH_0$ and the wanted signal

Test Number	BLER objective	Number of $DPCH_0$	Power of each $DPCH_0$ measured at the BS antenna connector [dBm]	Parameters of the wanted signal		
				DPCH	SF	Power measured at the BS antenna connector [dBm]
1	10^{-2}	4	-92.4	$DPCH_1$	8	-92.4
2	10^{-1}	1	-94.8	$DPCH_1$	2	-88.8
	10^{-2}	1	-93.4	$DPCH_1$	2	-87.4
	10^{-3}	1	-92.1	$DPCH_1$	2	-86.1
3	10^{-1}	1	-94.3	$DPCH_1$	2	-88.3
	10^{-2}	1	-93.2	$DPCH_1$	2	-87.2
	10^{-3}	1	-92.1	$DPCH_1$	2	-86.1
4	10^{-1}	0	–	$DPCH_1$	8	-93.8
				$DPCH_2$	2	-87.8
	10^{-2}	0	–	$DPCH_1$	8	-92.9
				$DPCH_2$	2	-86.9
	10^{-3}	0	–	$DPCH_1$	8	-92.1
				$DPCH_2$	2	-86.1

8.5.3.3.5 Test requirements

The BLER measured according to subclause 8.5.3.3.4.2 shall not exceed the limits specified in table 8.5.3.3.2.2.

[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame(10ms) consists of two subframes(5ms), and one subframe consists of 7 timeslots, (the structure of subframe is shown in TR 25.928). Considering the chip rate, the burst structure of 1,28Mcps TDD for normal traffic is different from that of 3,84Mcps TDD option, (the burst structure for normal traffic is shown in TR 25.928). So the propagation conditions, service mapping and simulation assumption of the measurement channel 12.2kps, 64pks, 144kps and 384kps should be different from those of 3,84Mcps TDD option. As a result, the relevant parameters should be different.

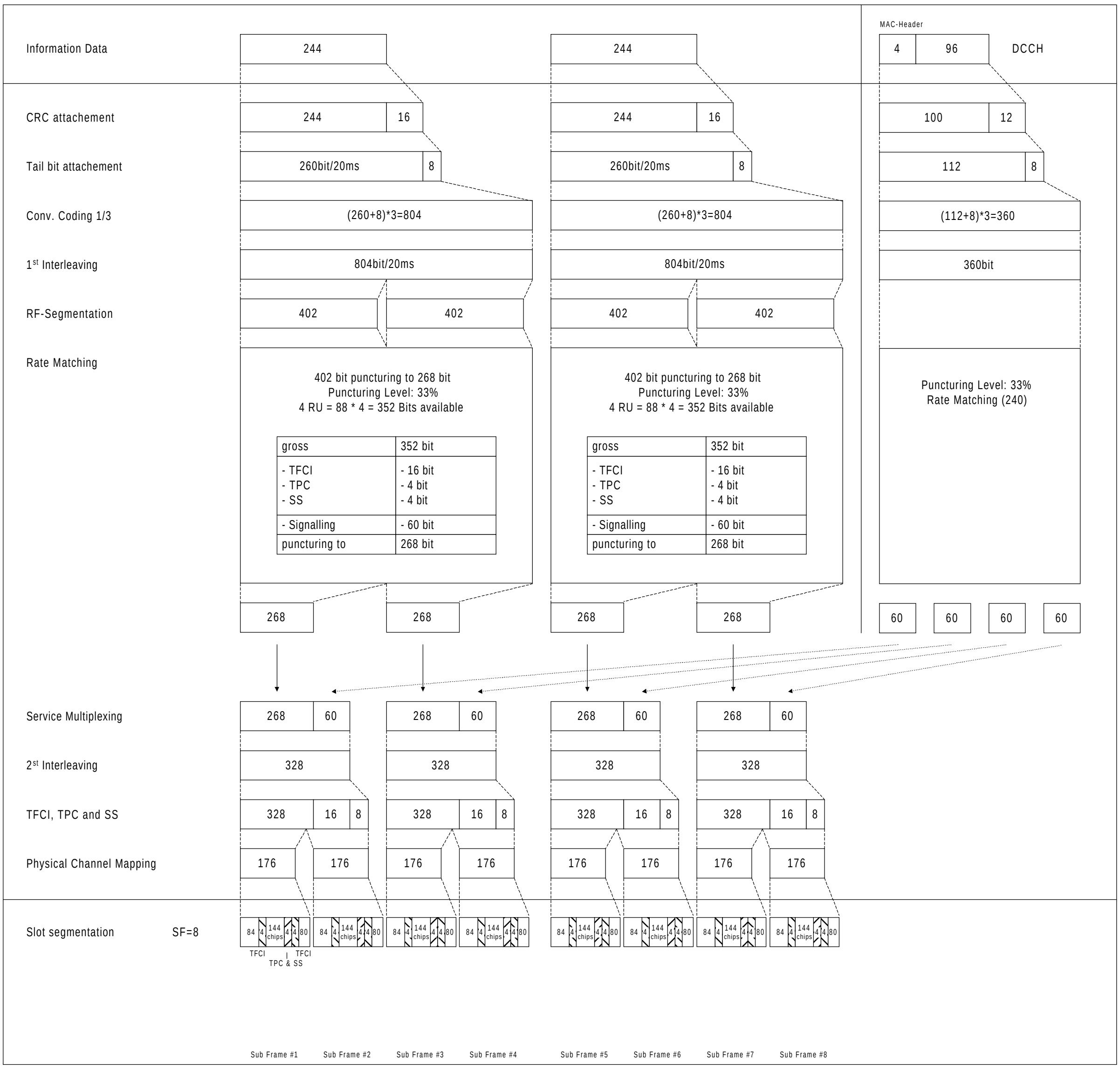
Annex 8.A (normative): Measurement Channels

8.A.1: General

8.A.2: Reference measurement channel

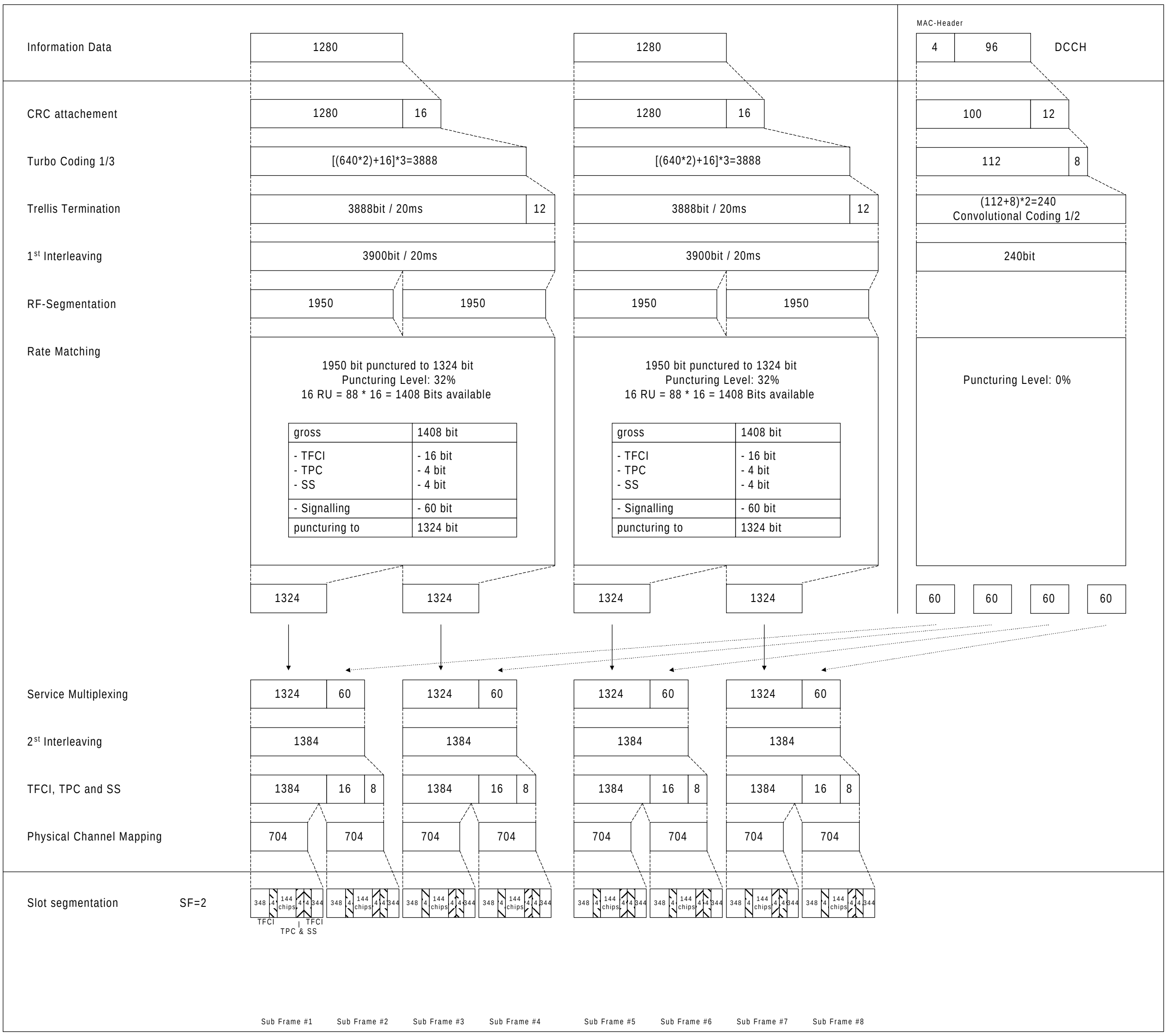
8.A.2.1 UL reference measurement channel (12.2 kbps)

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	2.4kbps
Puncturing level at Code rate 1/3: DCH / DCCH	33% / 33%



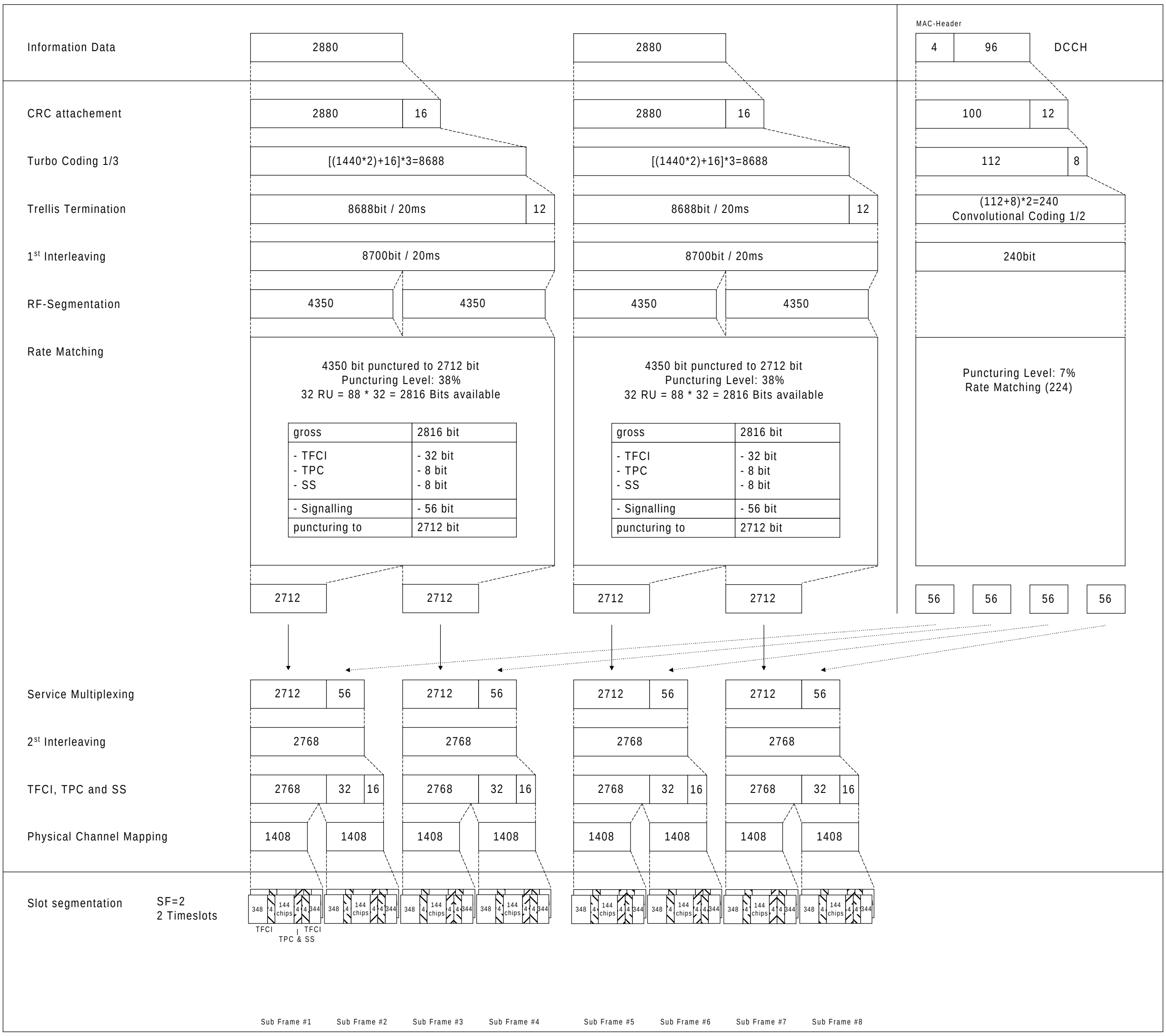
8.A.2.2 UL reference measurement channel (64 kbps)

Parameter	
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	2.4kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	32% / 0



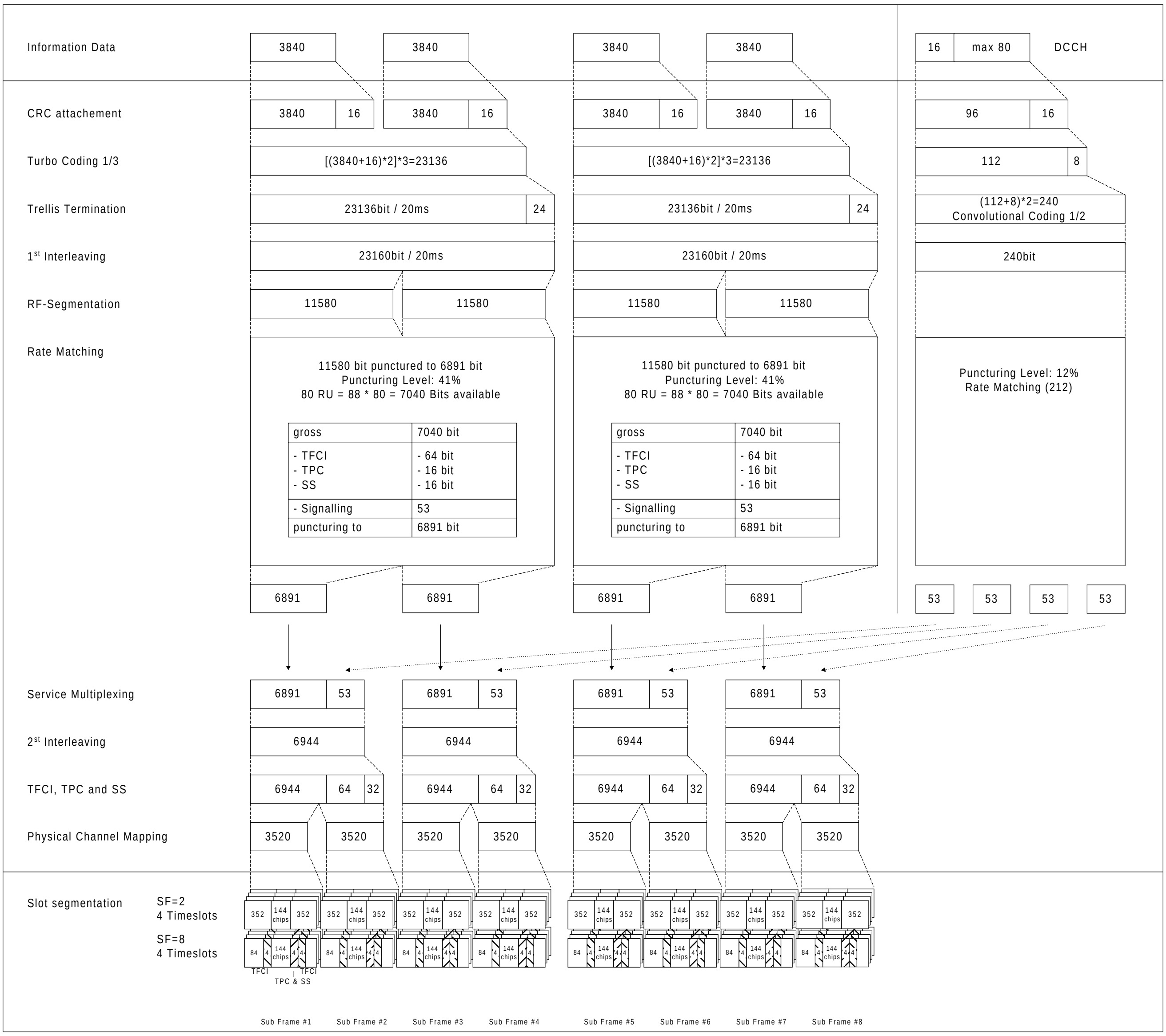
8.A.2.3 UL reference measurement channel (144 kbps)

Parameter	
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	2.4kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	38% / 7%



8.A.2.4 UL reference measurement channel (384 kbps)

Parameter	
Information data rate	384 kbps
RU's allocated	4TS (1*SF2 + 1*SF8) = 40RU/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	Max. 2kbps
Puncturing level at Code rate: 1/3 DCH / ½ DCCH	41% / 12%



8.A.2.5 RACH reference measurement channel

Parameter	
Information data rate: $$N_{RACH}=\frac{\frac{88*\frac{16}{SF}\left(\frac{N_{RM}}{100}+1\right)}{2}-8}{B_{RACH}}-16$$	B_{RACH} =1 CRC length = 16 Tail Bits = 8
SF16 (RU's allocated:1): 0% puncturing rate at CR=1/2 ~10% puncturing rate at CR=1/2	 20 bits per frame and TB 24 bits per frame and TB
SF8 (RU's allocated:2): 0% puncturing rate at CR=1/2 ~10% puncturing rate at CR=1/2	 64 bits per frame and TB 73 bits per frame and TB

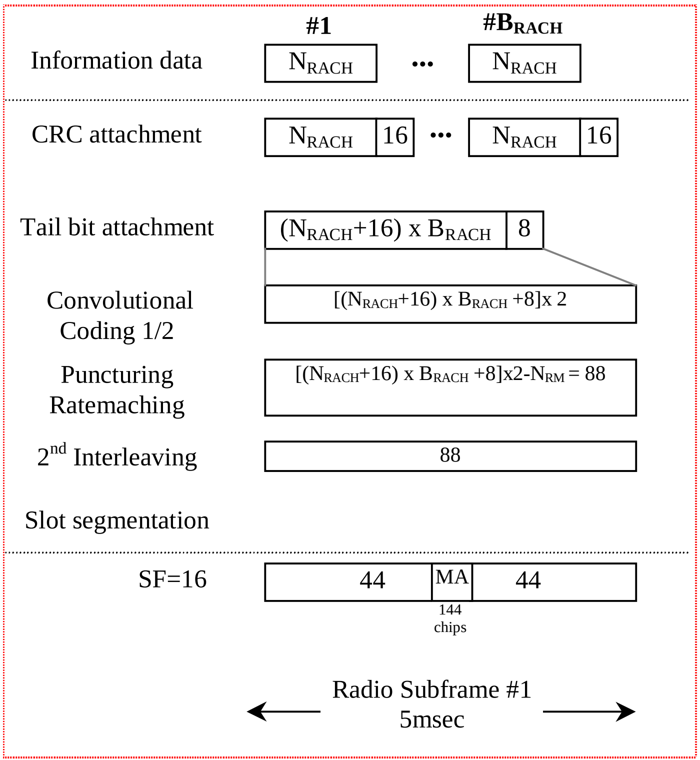
SF4 (RU's allocated:4): 0% puncturing rate at CR=1/2 ~10% puncturing rate at CR=1/2	 152 bits per frame and TB 170 bits per frame and TB
TTI	5msec
Midamble	144 chips
Power control	0 bit
TFCI	0 bit

N_{RACH} = number of bits per TB

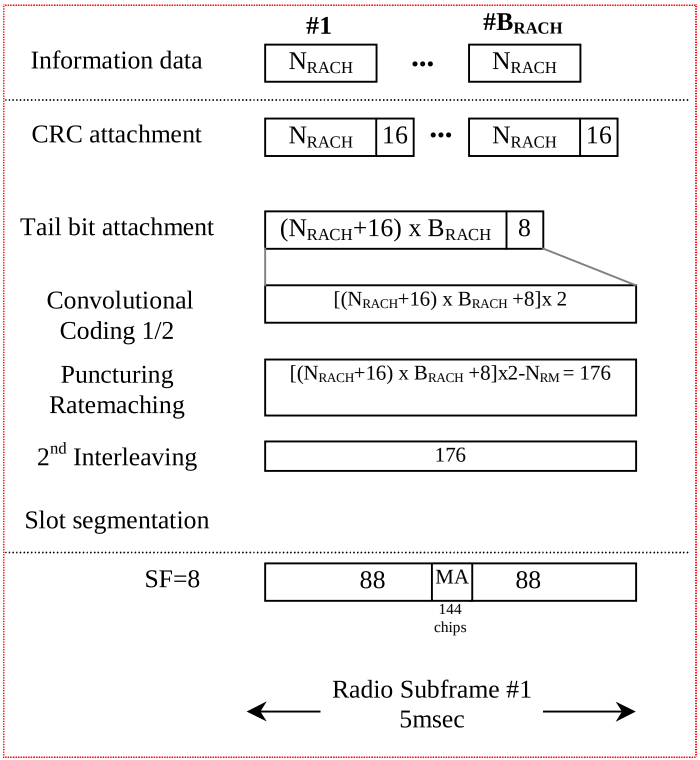
B_{RACH} = number of TBs

N_{RM} = puncturing rate

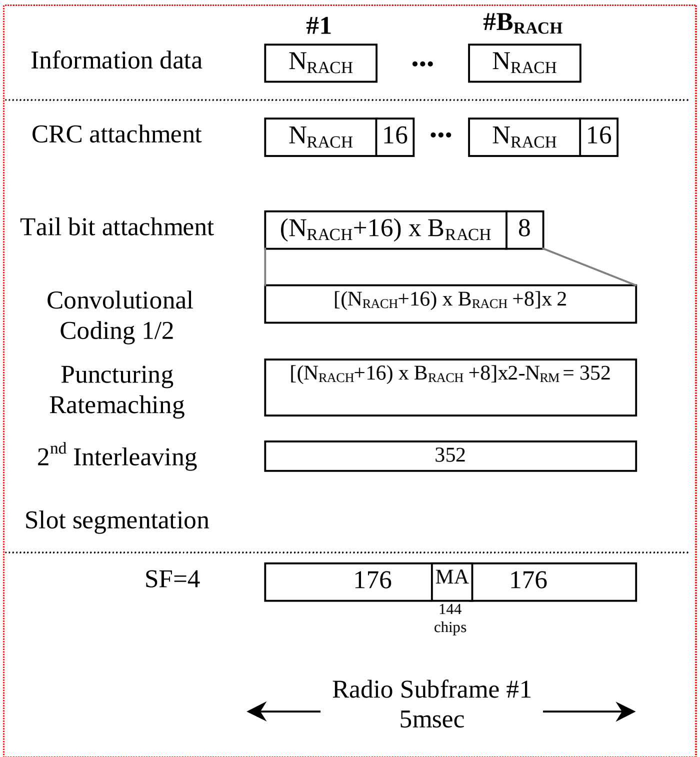
8.A.2.5.1 RACH mapped to 1 code SF16



8.A.2.5.2 RACH mapped to 1 code SF8



8.A.2.5.3 RACH mapped to 1 code SF4



[Explanation difference:]

For the 1.28Mcps chip rate TDD option, one frame (10ms) consists of two sub-frames(5ms), and one Sub-frame consists of 7 timeslots. The structure of timeslot in 1.28Mcps chip rate TDD (shown inTR25.928) is different from the structure of timeslot in 3.84Mcps TDD. So the service mapping of variance data rate of 1.28Mcps chip rate TDD option is different from that of 3.84Mcps chip rate TDD option.

Annex 8.B (normative):Propagation conditions

8.B.1 Static Propagation conditions

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

8.B.2 multi-path fading Propagation conditions

Table 8.B.2-1 shows propagation conditions that are used for the performance measurements in multi-path fading environment. All taps have classical Doppler spectrum.

Table 8.B.2-1: Propagation Conditions for Multi-Path Fading Environments

Case 1, speed 3km/h		Case 2, speed 3km/h		Case 3, speed 120km/h	
Relative Delay [ns]	Average Power [dB]	Relative Delay [ns]	Average Power [dB]	Relative Delay [ns]	Average Power [dB]
0	0	0	0	0	0
2928	-10	2928	0	781	-3
		12000	0	1563	-6
				2344	-9

[Rationale]:

The channel estimation can only resolve paths with are separated by at least one chip in delay. Otherwise the paths fall into the same tap. Even though this happens in realistic environments, it is not useful to base the propagation models for the performance requirements on a scenario with a delay spread of less than 1 chip, because the baseband is not tested in this case. Therefore, it is proposed to keep the same delay for the path in units of chips for the 1.28Mcps chip rate TDD-mode as for the 3.84Mcps chip rate TDD-mode. The tap delays in units of time are changed accordingly to take into account the difference in the chip rate. Due to the request to have the same maximum delay spread for 1.28Mcps chip rate TDD as for 3.84Mcps chip rate TDD, the delay spread of tap 3rd for the case 2 propagation conditions is set to 12 ms.:

Annex 8.C (normative): Global in-channel Tx test

8.C.1: General

Description is common with 3,84Mcps TDD option.

8.C.2: Definition of the process

8.C.2.1 Basic principle

Description is common with 3,84Mcps TDD option.

8.C.2.2 Output signal of the Tx under test

Description is common with 3,84Mcps TDD option

8.C.2.3 Reference signal

Description is common with 3,84Mcps TDD option

8.C.2.4 Classification of measurement results

Description is common with 3,84Mcps

8.C.2.5 Process definition to achieve results of type "deviation"

Description is common with 3,84Mcps TDD option.

8.C.2.6 Process definition to achieve results of type "residual"

Description is common with 3,84Mcps TDD option.

8.C.2.6.1 Error Vector Magnitude (EVM)

Description is common with 3,84Mcps TDD option.

8.C.2.6.2 Peak Code Domain Error (PCDE)

Description is common with 3,84Mcps TDD option.

8.C.3: Applications

This process may be applied in the measurements defined in the following subclauses:

8.3.3 Frequency Stability

8.3.4 Output Power Dynamics

8.3.4.2 Power control steps

8.3.4.3 Power control dynamic range

8.3.4.4 Minimum transmit power

8.3.4.5 Primary CCPCH power

8.3.6.2.2 Adjacent Channel Leakage power Ratio (ACLR)

8.3.8 Transmit Modulation

8.3.8.1 Modulation accuracy

8.3.8.2 Peak Code Domain Error

8.C.4 Notes

NOTE: Symbol length
Description is common with 3,84Mcps TDD option

NOTE: Deviation
Description is common with 3,84Mcps TDD option.

NOTE: Residual
Description is common with 3,84Mcps TDD option.

NOTE: Scrambling code
Description is common with 3,84Mpcs TDD option.

NOTE: TDD
Description is common with 3,84Mcps TDD option.

[Rationale:]

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, not only FDD and all options of TDD.

9 RF System scenarios

9.1 General

To develop the 3GPP standard, all the relevant scenarios need to be considered and the most critical cases need to be identified for the various aspects of operation so that final parameters can be derived to meet both service and implementation requirements.

Parameters possibly influenced by the scenarios are listed in 25.102, 25.105 and 25.945. These include, but are not limited to:

Out of band emissions;

Spurious emissions;

Intermodulation rejection;

Intermodulation between MS;

Blocking.

9.2 Methodology for coexistence studies 1.28Mcps TDD / FDD

9.2.1 Overview of the simulation

The focus of the simulations in the first step is on coexistence of macro cells considering a vehicular environment (case 3: 120km/h) with speech users only.

The simulation is a Monte-Carlo based snapshot method calculating CDFs for C/I for large numbers of stochastic mobile distributions over cells (including power control).

It should be pointed out that no kind of synchronisation or coordination between the different systems is assumed in the coexistence simulations presented here and before.

The goal of simulation procedure is to determine the relative capacity loss of a victim system for a considered link (uplink or downlink) due to the presence of a second system – the interfering system. The reference for the capacity loss is the capacity of the victim system alone without the interfering system.

The ***capacity of the system*** is defined as the mean number of mobile stations per cell (i.e. the load in different cells may be different while the mean load, i.e. the total number of users in the simulated scenario, remains constant) that can be active at a time while the probability that the C/I of a mobile station falls below a given threshold C/I_{min} is below 5% (i.e the percentage of users which do not satisfy the C/I criteria for the speech service is 5%).

This definition is different but strongly related to the so-called “satisfied user criterion” (i.e. 98% of all users have to be able to complete their call without being dropped due to interference). However the “satisfied user criterion” requires the mapping of C/I to BER/BLER values and time-continuous simulation techniques, while here a Monte Carlo snap shot method is used.

The simulation is done in two steps.

At first N_{single} the capacity of the ***single operator*** case (i.e. only the victim system is present) is determined which means that the capacity depends on the co-channel interference (i.e. there is no adjacent channel interference).

The co-channel interference power itself depends on a number of parameters, especially on the number of mobiles, their position and their power control behaviour. N_{single} is the maximum mean number of mobiles per cell that can be active at a time in the single operator case.

The second step is the calculation of the ***multi operator*** capacity (i.e. victim and interferer system are present) which means the maximum mean number of mobiles per cell N_{multi} in the victim system that can be active at a time considering co-channel and adjacent channel interference.

To determine N_{multi} the multi operator simulation is started with $N_{multi} = N_{single}$. Due to the additional adjacent channel interference the outage of users with C/I below the threshold C/I_{min} is increased compared to the single operator case (5%).

By decreasing N_{multi} until the outage of 5% is reached again the capacity loss due to adjacent channel interference can be determined.

(The number of users in the interfering system is chosen in that way that a single operator simulation with this system would result in an outage of 5%.)

Finally the relative capacity loss can be calculated as

$$C = 1 - \frac{N_{multi}}{N_{single}}$$

9.2.2 Simulation parameters

Receiver Parameters

No.	parameter		FDD		1.28Mcps TDD	
			MS	BS	MS	BS
RX1	Sensitivity	dBm	-117	-121	-108	-110
RX2	Noise figure	dB	9	5	9	7
RX3	Antenna gain (incl. losses)	dBi	0	11	0	11
RX4	ACS	dB	33	45	33	45
RX5	Min. CIR for 8kbps speech	dB	-15.7	-20.9	-1.5	-6.7

Transmitter Parameters

No.	Parameter		FDD		1.28Mcps TDD	
			MS	BS	MS	BS
TX1	Max. TX power	dBm	21	43 (27 per user)	30	43 (33 per user)
TX2	Min.Tx power per user	dBm	-50	27-25=2	-44	33-30=3
TX3	Antenna gain	dB	See RX3			
TX4	PC dynamic range (1 code considered)	dB	Max –(-50) = 71	25	Max –(-44) = 74	30
TX5	ACLR	dB	33 (43)	45 (50)	33 (43)	40 (50)

This section compares the different RF parameters for FDD and 1.28Mcps TDD which are used to describe the ‚victim system‘ and the ‚interferer system‘ in the coexistence simulation scenarios.

As a first step concerning the minimum C/I ratio values of the 1.28Mcps TDD system the results of R4-00TDD054 [5] and R4-00TDD055 [6] for a 12.2kbps service for case 3 were used:

UL (i.e. receiving BS): C/Imin = -4.9dB

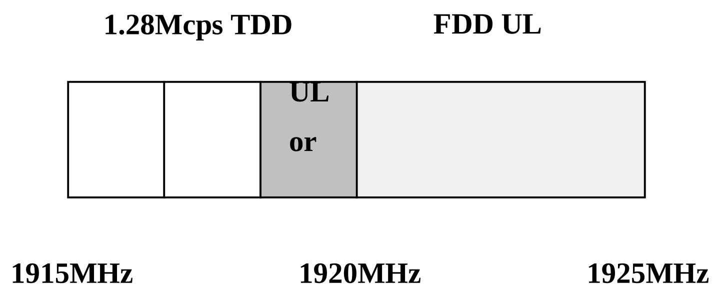
DL (i.e. receiving MS): C/Imin = 0.3dB.

Considering the mapping of the information data bits for the 12.2kbps service in UL and DL (see R4-00TDD051 [3]): 244 bits are mapped on 536 bits. We assumed in a first approach that for a 8kbps speech service 244*(8kbps/12.2kbps) bits are mapped on 536bits which results in a subtraction of 1.83dB for the both C/Imin values mentioned before which finally leads to the values in the table.

The ACLR and ACS values were taken from the specifications 25.101, 25.102, 25.104, 25.105 and the report 25.945 for 1.28Mcps TDD.

For the investigations the cluster size of the 1.28Mcps TDD, i.e. the reuse of a frequency channel, may be chosen to be 1 (like for 3.84Mcps TDD) or 3 (since the 1.28Mcps TDD has one third of the bandwidth of the 3.84Mcps TDD).

9.2.3 Scenarios



The scenarios considered in this document refer to the frequency range about 1920MHz where TDD and FDD are allocated in adjacent frequency bands.

Since the TDD band may be used for uplink (UL) or downlink (DL) communication 3 different scenarios are of interest depending on which station (MS or BS) is receiving (RX) or transmitting (TX):

TDD MS (UL TX) causes interference to FDD BS (RX of UL)

FDD MS (UL TX) causes interference to TDD BS (RX of UL)

FDD MS (UL TX) causes interference to TDD MS (RX of DL)

The reason for the adjacent channel interference is the non-ideal rise of transmit and receive filter flanks so that a leakage of transmitted power is the adjacent frequency band and a reception from adjacent frequency bands can not entirely be prevented.

To limit this interaction between different frequency bands ACLR (adjacent channel leakage power ratio) requirements for the transmitter and ACS (adjacent channel selectivity) requirements for the receiver are specified (see section before).

In the simulation for the 1.28Mcps TDD mode spectrum emission masks are used fulfilling the ACLR requirements given in the section before.

Due to the adjacent channel interference superimposing with the co-channel interference contributions received both in the used frequency band it might happen that at the considered receiver station the C/I ratio is below a minimum C/I ratio (see section before) which is necessary for the considered service.

The percentage of these users is called ‘outage’.

The used Monte-Carlo based snapshot simulator determines at first for a given outage or noise raise the mean maximum number of mobiles per cell which can be active without adjacent channel interference (single operator case).

Usually an outage of 5% or a noise raise of 6dB (especially for FDD BS as victim, i.e. UL in FDD) is considered for a realistic maximum load of the cell.

Afterwards the mean number of users for the same outage/noise raise (as in the single operator case) is calculated taking into account the co-channel and the additional adjacent interference of the interferer system (multi operator case).

9.3 Methodology for coexistence studies 1.28Mcps TDD / 3.84Mcps TDD

9.3.1 Overview of Simulation

Same as subsection 9.2.1

9.3.2 Simulation parameters

This section compares the different simulation parameters for 3.84Mcps TDD and 1.28Mcps TDD which are used to describe the ‚victim system‘ and the ‚interferer system‘ in the coexistence simulation scenarios.

General Parameters

No.	Parameter		a. 3.84Mcps TDD		b. 1.28Mcps TDD	
			MS	BS	MS	BS
P1	Chip rate	Mcps	3.84		1.28	
P2	Frame length	ms; chip	10ms; 38400		10ms; 12800	
P3	Slot length	ms;chip	666.666µs; 2560		675µs; 864	
P4	Slots per frame	1	15		14 (+ pilots and guard period)	
P5	Chip length	Ms	260.41666ns		781.25ns	
P6	Sfmax	1	16		16	
P7	Sfmin	1	1		1	
P8	Size of data symbol alphabet	1	4 (QPSK)		4 (QPSK)	
P9	No. of codes per TS	1	12		16	
P10	No. of codes used for an 8kbps speech service	1	UL: 1x SF=16 DL: 1x SF=16		UL: 1x SF=16 DL: 1x SF=16	
P11	User bandwidth	MHz	3.84		1.28	
P12	Channel spacing	MHz	5		1.6	

P13	Antenna position over ground	M	MS: 1.5m BS: antenna height (15m) + average roof top level (12m) =27m			
P14	Considered coverage area	Cell radius in m	Macro: 500m			
P15	Considered cluster size	1	-	1	-	1
P16	Minimum coupling loss (MCL)	DB	BS-MS: 70, MS-MS: 35		BS-MS: 70, MS-MS: 35	

Receiver Parameters

No.	Parameter		a. 3.84Mcps TDD		b. 1.28Mcps TDD	
			MS	**BS**	**MS**	**BS**
RX1	Sensitivity	DBm	-105	-109	-108	-110
RX2	Noise figure	DB	9	5	9	7
RX3	Antenna gain (incl. losses)	DBi	0	11	0	11
RX4	ACS	DB	33	45	33	45
RX5	Min. CIR for 8kbps speech	DB	-5.6	-8.1	-1.5	-6.7

Transmitter Parameters

No.	Parameter		a. 3.84Mcps TDD		b. 1.28Mcps TDD	
			MS	**BS**	**MS**	**BS**
TX1	Max. TX power	DBm	30	43 (36 per user)	30	43 (33 per user)
TX2	Min.Tx power per user	DBm	-44	36-30=6	-44	33-30=3
TX3	Antenna gain	DB	See RX3			
TX4	PC dynamic range (1 code considered)	DB	Max –(-44) = 74	30	Max –(-44) = 74	30
TX5	ACLR	DB	33 (43)	45 (50)	33 (43)	40 (50)

As a first step concerning the minimum C/I ratio values of the 1.28Mcps TDD system for the 8kbps speech service the results of R4-00TDD054 and R4-00TDD055 for a 12.2kbps service for case 3 were taken:

UL (i.e. receiving BS): C/Imin = -4.9dB

DL (i.e. receiving MS): C/Imin = 0.3dB.

Considering the mapping of the information data bits for the 12.2kbps service in UL and DL (see R4-00TDD051): 244 bits are mapped on 536 bits.

For an 8kbps speech service we assumed in a first approach that

244 x (8kbps / 12.2kbps) bits are mapped on 536bits

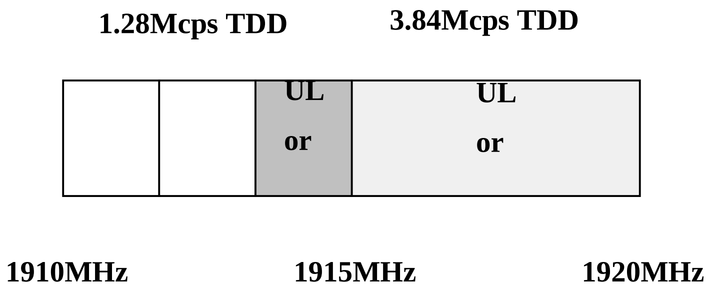
which results in a subtraction of 1.83dB for the both C/Imin values mentioned before which finally lead to the values in the table.

For the 3.84Mcps TDD system the minimum C/I requirements were taken from [8].

The ACLR and ACS values were taken from the specifications 25.102, 25.105 for 3.84Mcps TDD and the report 25.945 for 1.28Mcps TDD.

The cluster size of the 1.28Mcps TDD, i.e. the reuse of a frequency channel, may be chosen to be 1 (like for 3.84Mcps TDD) or 3 (since the 1.28Mcps TDD has one third of the bandwidth of the 3.84Mcps TDD). In our investigations we take cluster=1 as a first approach.

9.3.3 Scenarios



The scenarios considered in this section refer to the frequency 1915MHz where 1.28Mcps TDD and 3.84Mcps TDD may be allocated in adjacent frequency bands.

In a first step the 1.28Mcps TDD system is assumed to be a victim for ajacent channel interference of a 3.84Mcps TDD system.

Since the TDD band may be used for uplink (UL) or downlink (DL) communication 3 different scenarios are of interest depending on which station (MS or BS) is receiving (RX) or transmitting (TX):

3.84Mcps TDD MS (UL TX) causes interference to 1.28Mcps TDD BS (RX of UL)

3.84Mcps TDD MS (UL TX) causes interference to 1.28Mcps TDD MS (RX of DL)

3.84Mcps TDD BS (DL TX) causes interference to 1.28Mcps TDD MS (RX of DL)

In a second step the 3.84Mcps TDD system is the victim system suffering from adjacent channel interference of the 1.28Mcps TDD system. Here 3 further cases need to be investigated:

1.28Mcps TDD MS (UL TX) causes interference to 3.84Mcps TDD BS (RX of UL)

1.28Mcps TDD MS (UL TX) causes interference to 3.84Mcps TDD MS (RX of DL)

1.28Mcps TDD BS (DL TX) causes interference to 3.84Mcps TDD MS (RX of DL)

9.4 Methodology for coexistence studies 1.28Mcps TDD / 1.28Mcps TDD

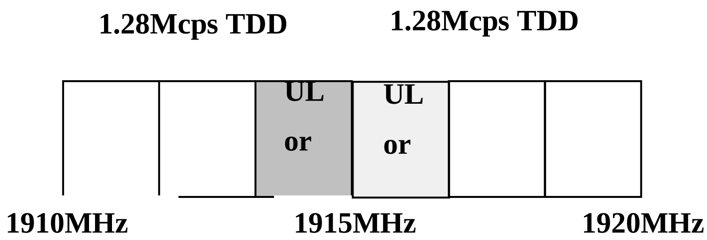
9.4.1 Overview of Simulation

Same as subsection 9.2.1

9.4.2 Simulation parameters

Same as subsection 9.3.2

9.4.3 Scenarios



In this section a scenario of two 1.28Mcps TDD operators in the same geographic area is investigated. For both systems apart from the frequency bands the same rf parameters and again no synchronisation or coordination is assumed.

Since the TDD band may be used for uplink (UL) or downlink (DL) communication 3 different scenarios are of interest depending on which station (MS or BS) is receiving (RX) or transmitting (TX):

1.28Mcps TDD MS (UL TX) causes interference to 1.28Mcps TDD BS (RX of UL)

1.28Mcps TDD MS (UL TX) causes interference to 1.28Mcps TDD MS (RX of DL)

1.28Mcps TDD BS (DL TX) causes interference to 1.28Mcps TDD MS (RX of DL)

9.5 Results, implementation issues and recommendations

9.5.1 1.28Mcps TDD /FDD

9.5.1.1 Simulation results

The results for the relative capacity loss are summarized in the table below.

victim (receiver)	interferer (transmitter)	rel. capacity loss
FDD BS	1.28Mcps TDD MS (cluster=1)	<2%

1.28Mcps TDD BS (cluster=1)	FDD MS	<2%
1.28Mcps TDD MS (cluster=1)	FDD MS	<2%
1.28Mcps TDD MS (cluster=3)	FDD MS	<3%

9.5.1.2 Conclusion

The focus of these investigations is on speech users in macro cells for a vehicular propagation environment.

The results show reasonable capacity loss values, even without coordination or time alignment between the victim and the interferer system.

9.5.2 1.28Mcps TDD / 3.84Mcps TDD

9.5.2.1 Simulation results

The results for the relative capacity loss are summarized in the tables below.

1. For the case that the 1.28Mcps TDD system suffers from adjacent channel, and interference from a 3.84Mcps TDD system:

Victim (receiver)	interferer (transmitter)	Relative capacity loss
1.28Mcps TDD BS (cluster=1)	3.84Mcps TDD MS	< 1%
1.28Mcps TDD MS (cluster=1)	3.84Mcps TDD MS	< 2%
1.28Mcps TDD MS (cluster=1)	3.84Mcps TDD BS	< 2%

2. For the case that the 3.84Mcps TDD system suffers from adjacent channel, and interference from a 1.28Mcps TDD system:

Victim (receiver)	interferer (transmitter)	Relative capacity loss
3.84Mcps TDD BS	1.28Mcps TDD MS (cluster=1)	<2%
3.84Mcps TDD MS	1.28Mcps TDD MS (cluster=1)	< 1%
3.84Mcps TDD MS	1.28Mcps TDD BS (cluster=1)	< 2%

9.5.2.2 Conclusion

The focus of these investigations is on speech users in macro cells for a vehicular propagation environment.

The results show reasonable capacity loss values, even without coordination or time alignment between the victim and the interferer system.

9.5.3 1.28Mcps TDD / 1.28Mcps TDD

9.5.3.1 Simulation results

The results for the relative capacity loss are summarized in the tables below.

Victim (receiver)	interferer (transmitter)	relative capacity loss
1.28Mcps TDD BS of operator A (cluster=1)	1.28Mcps TDD MS of operator B (cluster=1)	< 2%
1.28Mcps TDD MS of operator A (cluster=1)	1.28Mcps TDD MS of operator B (cluster=1)	< 2%
1.28Mcps TDD MS of operator A (cluster=1)	1.28Mcps TDD BS of operator B (cluster=1)	< 1%

9.5.3.2 Conclusion

The focus of these investigations is on speech users in macro cells for a vehicular propagation environment.

The results show reasonable capacity loss values, even without coordination or time alignment between the victim and the interferer system.

9.6 Information and General purpose materials

9.6.1 CDMA Definitions and Equations

9.6.1.1 CDMA-related definitions

The following CDMA-related abbreviations and definitions are used in various 3GPP WG4 documents.

Chip Rate	1.28M chips per second.
$DwPTS\_E_c$	Average energy per PN chip for DwPTS.
$DwPTS\frac{E_c}{I_o}$	The ratio of the received energy per PN chip for DwPTS to the total received power spectral density at the UE antenna connector.
$\frac{DwPTS\_E_c}{I_{or}}$	The ratio of the average transmit energy per PN chip for DwPTS to the total transmit power spectral density.

[Explanation difference:]

For 1.28Mcps chip rate TDD option, the frame length is 10ms and the 10ms is divided into 2 sub-frames of 5 ms. Each subframe is composed of 7 normal traffic time slots and two special pilot slots, i.e., DwPTS for downlink and UpPTS for uplink.

For 1.28Mcps chip rate TDD option, the other CDMA related definitions have the same meaning as for 3.84Mcps TDD.

9.6.1.2 CDMA equations

The equations listed below describe the relationship between various parameters under different conditions.

9.6.1.2.1 BS Transmission Power

Transmit power of the Base Station is normalized to 1 and can be presented as

$$\frac{\sum_{i=1}^{n} DPCH_i\_E_c}{I_{or}} + \frac{\sum_{j=1}^{m} DPCH_{0j}\_E_c}{I_{or}} = 1 \text{ . } \textit{(Normal downlink timeslots)}$$

$$\frac{PCCPCH\_E_c}{I_{or}} = 1 \quad \textit{(Timeslot 0)}$$

$$\frac{DwPTS\_E_c}{I_{or}} = 1 \quad \textit{(DwPTS)}$$

Explanations:

1.28 Mcps TDD option has special frame structure; its TS0 is only used for downlink so the position of P-CCPCH is fixed. DwPTS and UpPTS are unique slots so separate equations are need for them.

9.7 Link Level performances

9.7.1 Simulation results for 1,28Mcps TDD performace

9.7.1.1 Simulation assumptions

9.7.1.1.1 Simulation chain

9.7.1.1.1.1 Downlink

Because joint detection is considered for the low chip rate TDD option, the simulation has to differ from the wideband TDD simulation. An orthogonal channel noise simulator (OCNS) can not be used, instead all intracell interferer have to be modelled individually. The simulation chain is shown in the figure below.

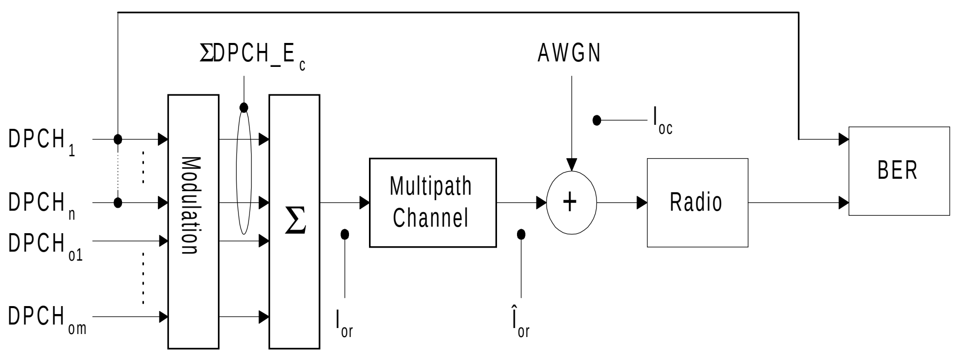


Figure 1: Downlink simulation chain

I_{oc} represents the intercell interference and other noise contributions, and $DPCH_{oi}$ for i=1 to m are the individual intracell interferer. Each intracell interferer $DPCH_{oi}$ is modelled by one code with Q=16. $DPCH_1$ to $DPCH_n$ are the DPCH for the service under investigation. All $DPCH_i$ for i=1 to n and $DPCH_{oj}$ for j=1 to m have the same chip energy $DPCH\_E_c$. Note that in the downlink all codes have a spreading factor of 16 for all reference measurement channels.

The ratio of $\hat{I}_{or}$ to I_{oc} is varied until the BLER target is reached, and

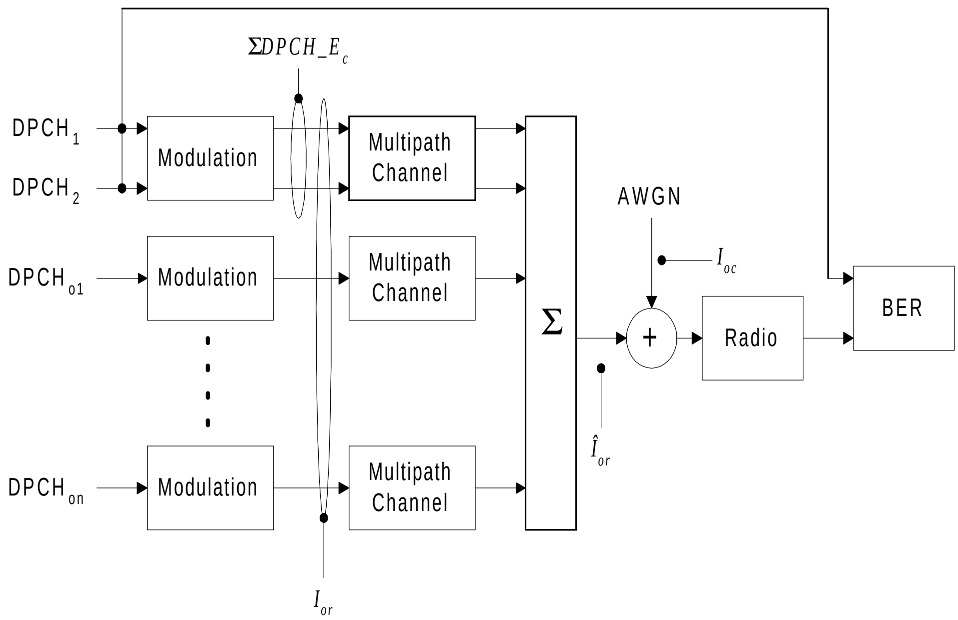
$$\Sigma DPCH\_E_c = n \cdot DPCH\_E_c .$$

For the performance requirement test, the ratio of $\hat{I}_{or}$ to I_{oc} is increased by the implementation margin.

9.7.1.1.1.2 Uplink

In the uplink the same simulation chain as for wide-band TDD is used. The uplink simulation chain is shown in figure 2.

Figure 2: Uplink simulation chain



$DPCH_1$ and $DPCH_2$ are the DPCH for the service under investigation. $DPCH_{oi}$ for i=1 to n is one code with the spreading factor 8. The ratio of $\hat{I}_{or}$ to I_{oc} is varied until the BLER target is reached.

For the reference measurement channel one or two codes with different spreading factors are used. The following equations apply for the chip energy:

$$\frac{DPCH_1\_E_c}{DPCH_2\_E_c} = \frac{Q_2}{Q_1} \quad \text{and} \quad \frac{DPCH_{oi}\_E_c}{\Sigma DPCH\_E_c} = \frac{\frac{Q_1 Q_2}{(Q_1+Q_2)}}{8},$$

where Q_1 and Q_2 refer to the spreading factors of $DPCH_1$ and $DPCH_2$ and

$$\Sigma DPCH\_E_c = DPCH_1\_E_c + DPCH_2\_E_c .$$

If only a single code is used for the service under investigation, $DPCH_2\_E_c$ is null. In this case the following formula applies:

$$\frac{DPCH_1\_E_c}{DPCH_{oi}\_E_c} = \frac{8}{Q_1}$$

The implementation margin is encountered in the intercell interference ratio $\hat{I}_{or}/I_{oc}$.

9.7.1.1.2 Simulation Assumptions

9.7.1.1.2.1 General

Parameter	Explanation/Assumption
Chip Rate	1.28 Mcps
Duration of TDMA sub-frame	5 ms
Number of time slots per sub-frame	7
Closed loop power control	OFF
AGC	OFF
Number of samples per chip	1 sample per chip
Propagation Conditions	See Tdoc R400TDD051
Numerical precision	Floating point simulations
BLER target	10E-1; 10E-2; 10E-3
BLER calculation	BLER will be calculated by comparing with transmitted and received bits.
DCCH model	Random symbols transmitted, not evaluated in the receiver
TPC and SS model	Random symbols transmitted, not evaluated in the receiver
TFCI model	Random symbols, not evaluated in the receiver but it is assumed that receiver gets error free reception of TFCI information
Turbo decoding	Max Log Map with 4 iterations
Measurement Channels	See Tdoc R400TDD052
Other L1 parameters	As Specified in latest L1 specifications
Cell parameter	0 (this determines the scrambling and basic midamble code)

9.7.1.1.2.2 Additional downlink parameters

$\hat{I}_{or}/I_{oc}$	Ratio to meet the required BLER target				
# of $DPCH_{oi}$	Bit rate	Static	Case 1	Case 2	Case 3
	12.2 kbps	8	8	8	8
	64 kbps	2	2	2	2
	144 kbps	2	2	2	2
	384 kbps	0	0	0	0
Number of timeslots per sub-frame per user	12.2 kbps: TS=1 64 kbps: TS=1 144 kbps: TS=2 384 kbps: TS=4				
Transmit diversity, “TxAA”, “TSTD”	OFF				
Receiver antenna diversity	OFF				
Midamble	Common midamble (See TR25.928v1.1.0 chapter 7.2.5)				

Channelisation codes C(k; Q) (see TR25.928v1.1.0 chapter 9.2.2)		12.2 kbps	64 kbps	144 kbps	384 kbps
	$DPCH_i$	C(i; 16)	C(i; 16)	C(i; 16)	C(i; 16)
	$DPCH_{oj}$	C(j+2; 16)	C(j+8; 16)	C(j+8; 16)	-
Receiver	Joint Detector (ZF-BLE)				
Channel Estimation	Ideal multipath delay estimation and joint channel estimator according to article from Steiner and Baier in Freq., vol. 47, 1993, pp.292-298, based on correlation to obtain the complex amplitudes for the path.				

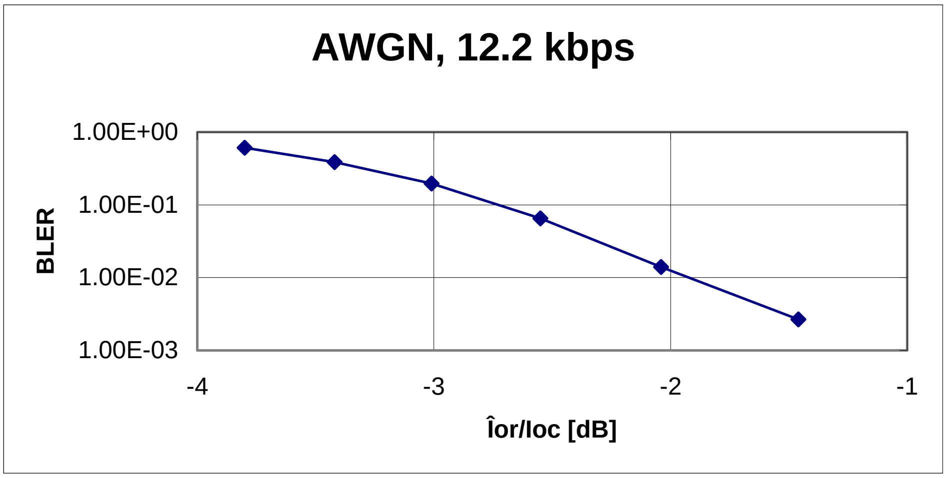
9.7.1.1.2.3 Additional uplink parameters

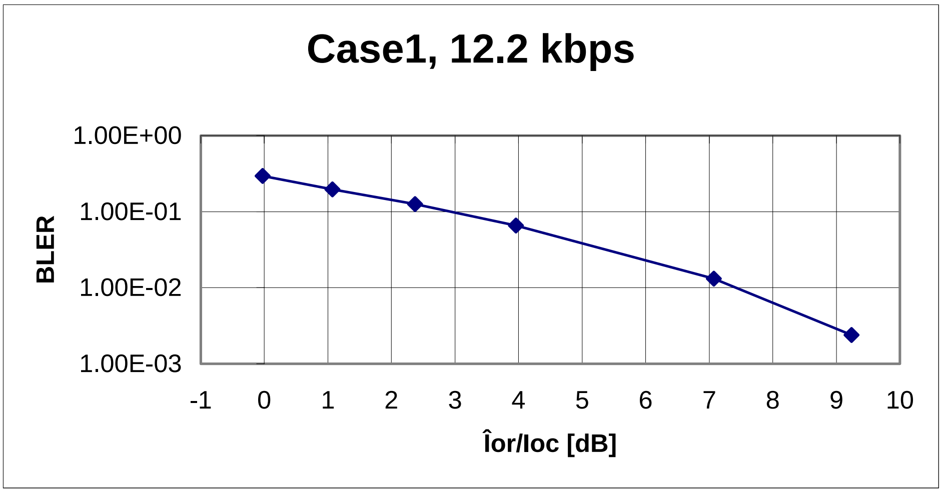
Channel Estimation	Ideal multipath delay estimation and joint channel estimator according to article from Steiner and Baier in Freq., vol. 47, 1993, pp.292-298, based on correlation to obtain the complex amplitudes for the path.				
Receiver antenna diversity	ON (2 antennas)				
$\hat{I}_{or}/I_{oc}$ [dB]	Parameter to meet the required BLER				
# of $DPCH_{oi}$	Bit rate	Static	Case 1	Case 2	Case 3
	12.2 kbps	4	4	4	4
	64 kbps	1	1	1	1
	144 kbps	1	1	1	1
	384 kbps	0	0	0	0
Number of timeslots per frame per user	12.2 kbps: TS=1 64 kbps: TS=1 144 kbps: TS=2 384 kbps: TS=4				
Channelisation codes C(k; Q) (see TR25.928v1.1.0 chapter 9.2.2)		12.2 kbps	64 kbps	144 kbps	384 kbps
	$DPCH_1$	C(1; 8)	C(1; 2)	C(1; 2)	C(1; 2)
	$DPCH_2$	-	-	-	C(5; 8)
	$DPCH_{oi}$	C(i+1; 8)	C(i+4; 8)	C(i+4; 8)	-
Midamble	UE specific (See TR25.928v1.1.0 chapter 7.2.5)				
Receiver	Multi-User Detection (ZF-BLE)				

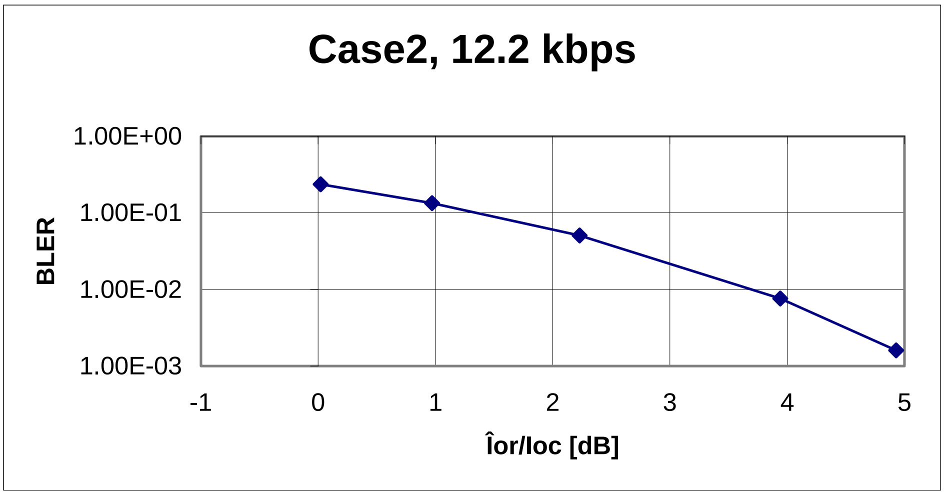
9.7.1.2 Simulation results

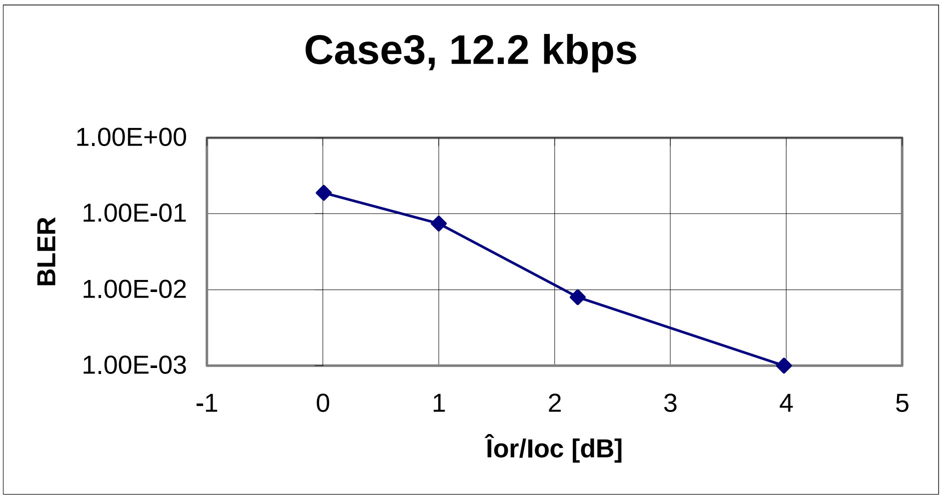
9.7.1.2.1 12.2kps service

9.7.1.2.1.1 Graphical Presentation of 12.2 kbps service UL Simulation Results

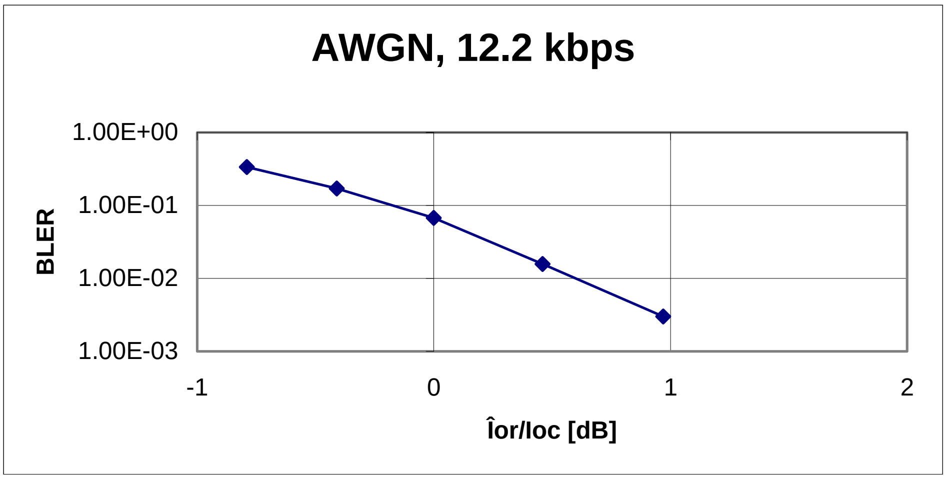

AWGN, 12.2 kbps
BLER
1.00E+00
1.00E-01
1.00E-02
1.00E-03
-4
-3
-2
-1
Îor/Ioc [dB]

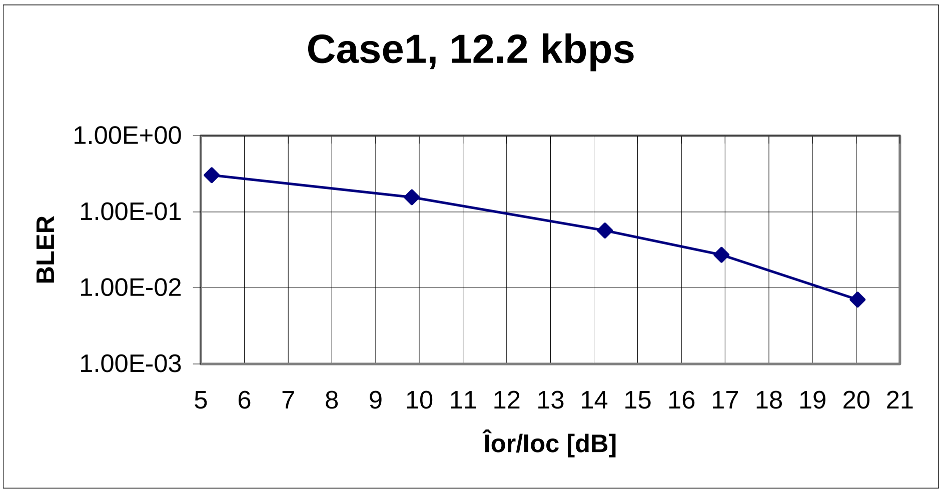

Case1, 12.2 kbps
BLER
1.00E+00
1.00E-01
1.00E-02
1.00E-03
-1
0
1
2
3
4
5
6
7
8
9
10
Îor/Ioc [dB]


Case2, 12.2 kbps
BLER
1.00E+00
1.00E-01
1.00E-02
1.00E-03
-1
0
1
2
3
4
5
Îor/Ioc [dB]



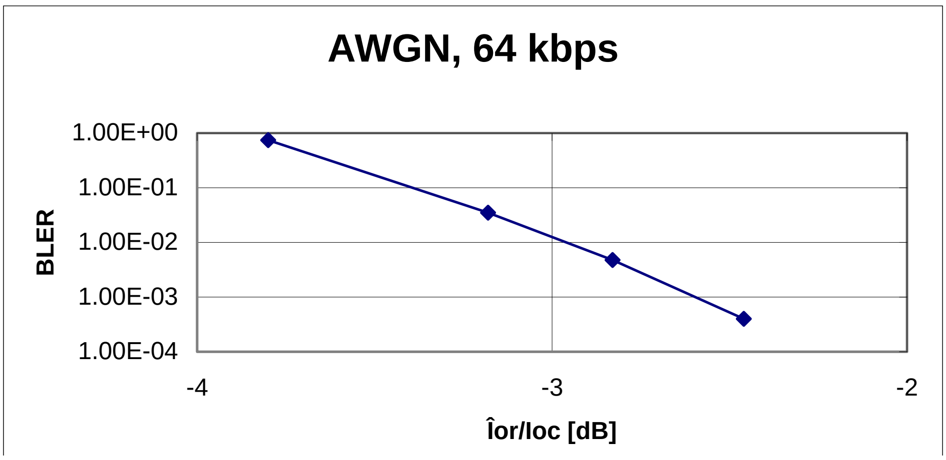
9.7.1.2.1.2 Graphical Presentation of 12.2 kbps service DL Simulation Results

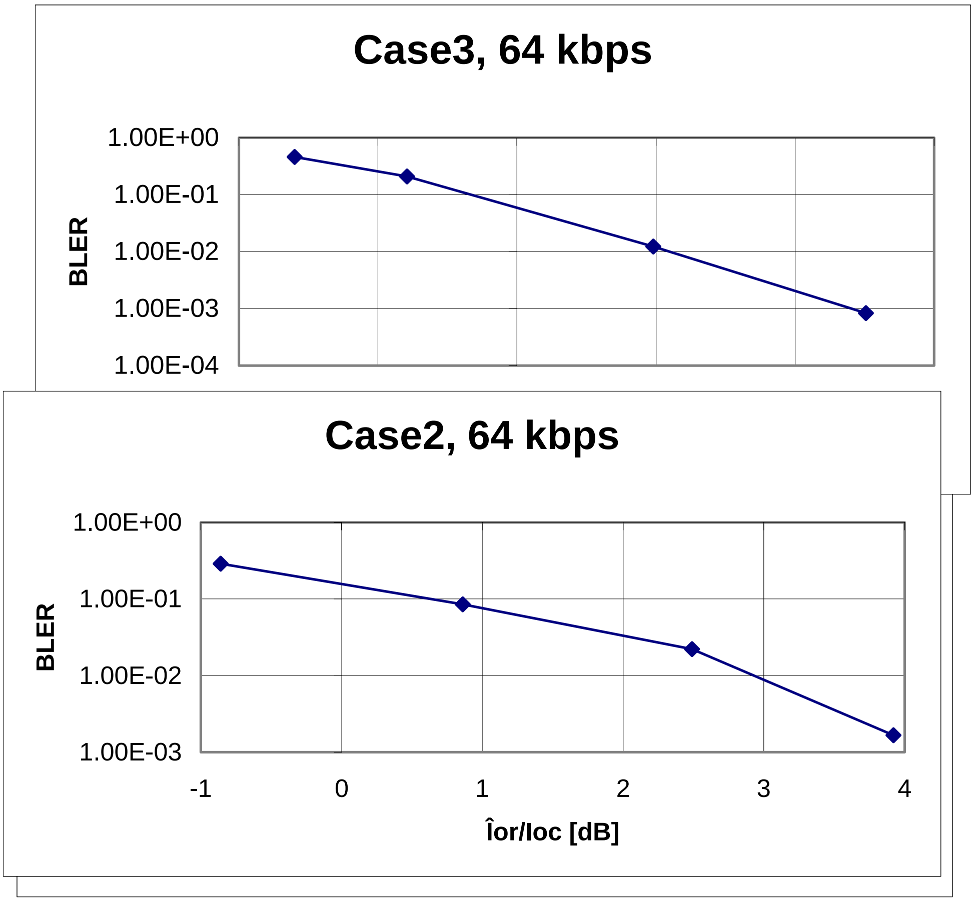




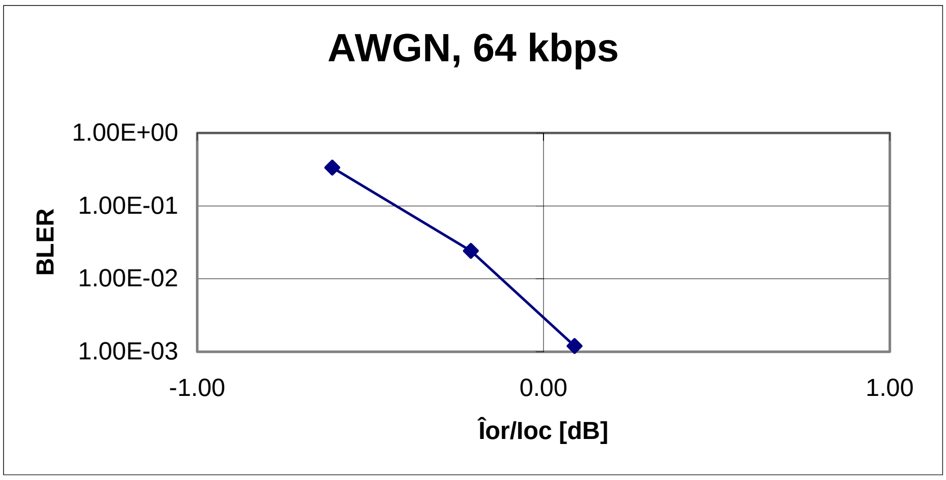
9.7.1.2.2 64kps Service

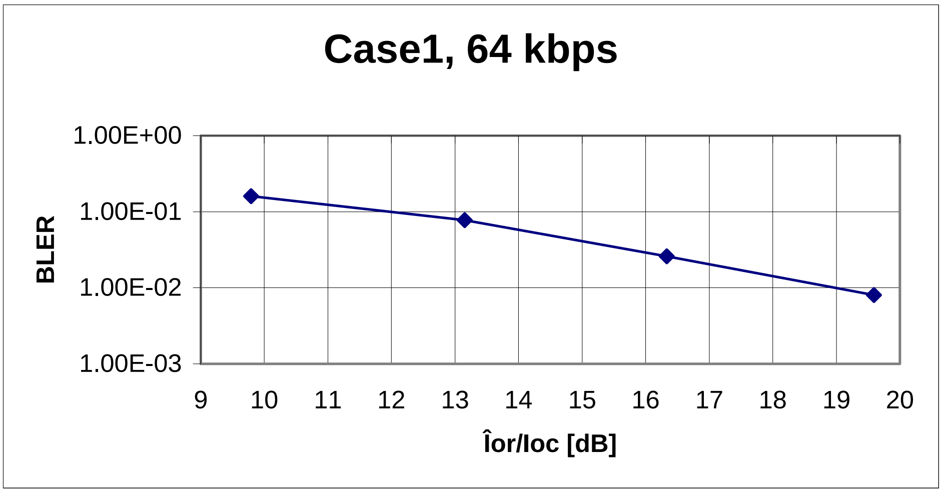
9.7.1.2.2.1 Graphical Presentation of 64 kbps service UL Simulation Results

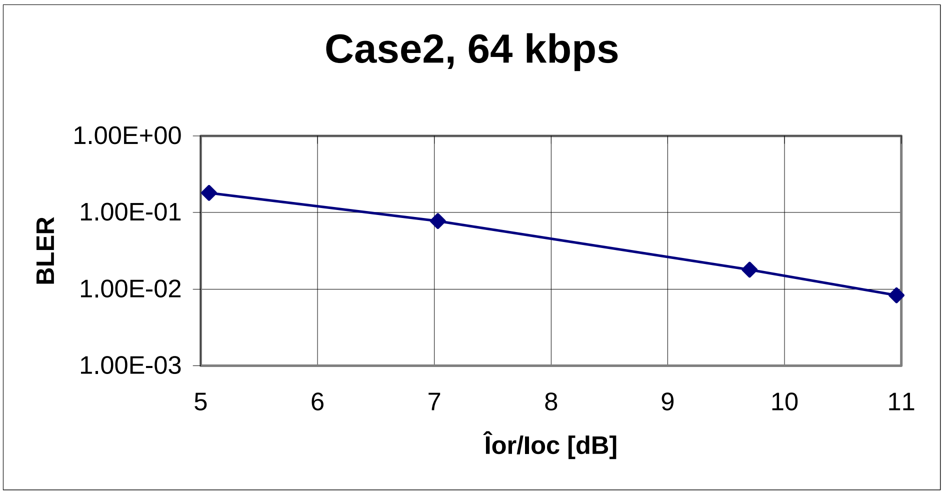


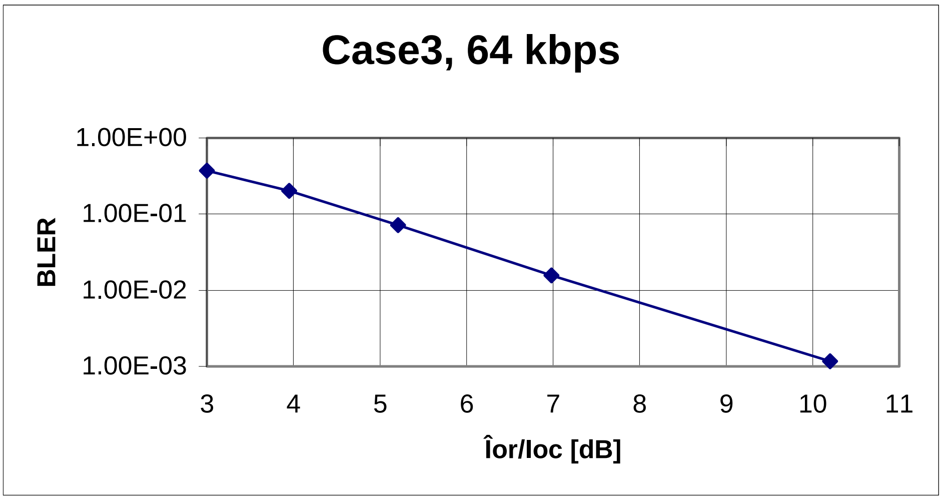


9.7.1.2.2.2 Graphical Presentation of 64 kbps service DL Simulation Results



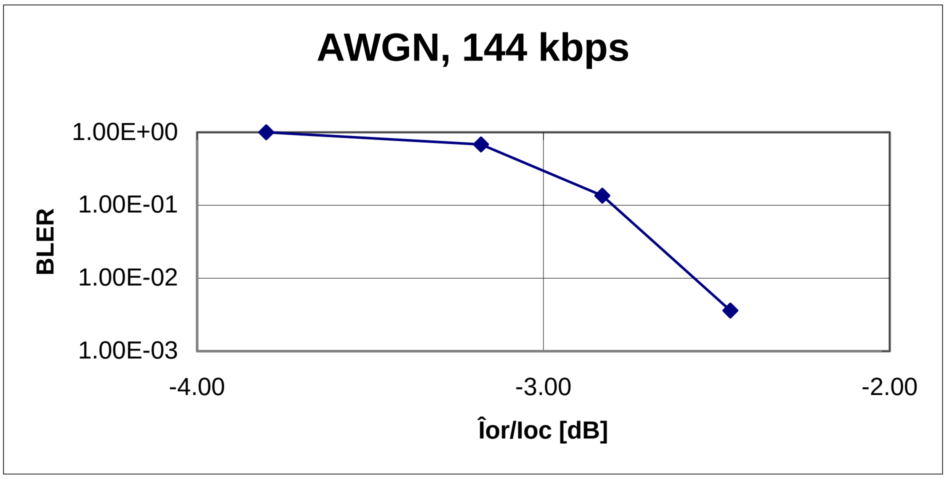

Case1, 64 kbps
BLER
1.00E+00
1.00E-01
1.00E-02
1.00E-03
9
10
11
12
13
14
15
16
17
18
19
20
Îor/Ioc [dB]

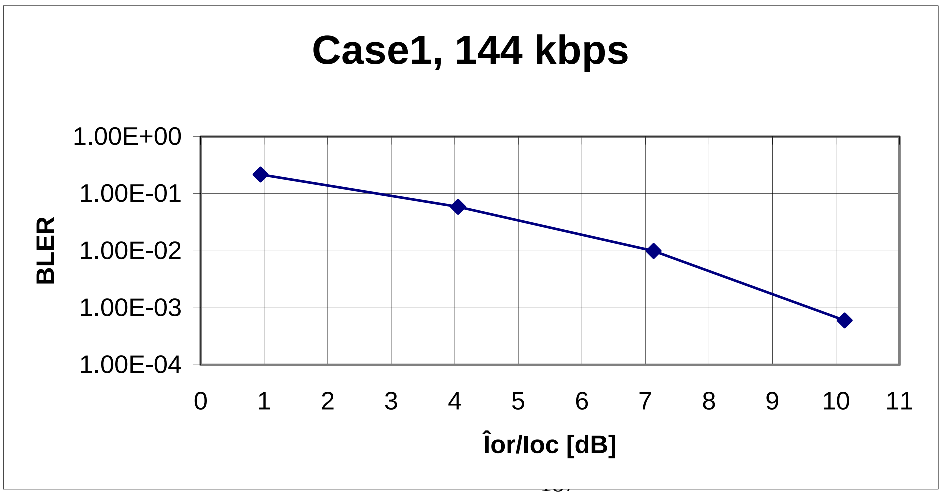

Case2, 64 kbps
BLER
1.00E+00
1.00E-01
1.00E-02
1.00E-03
5
6
7
8
9
10
11
Îor/Ioc [dB]

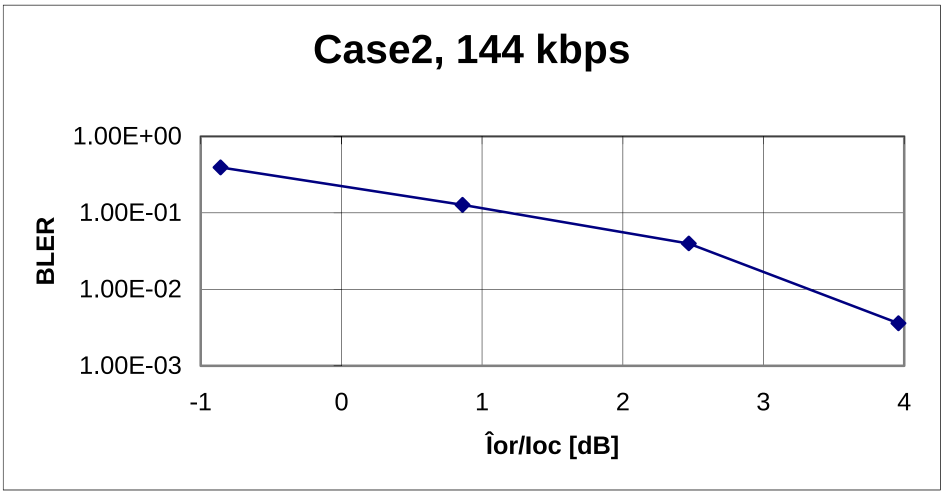


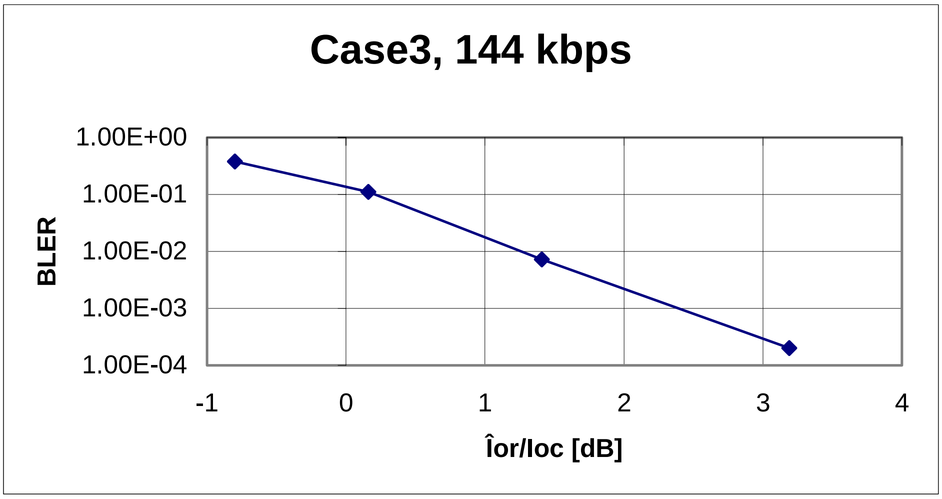
9.7.1.2.3 144kps Service

9.7.1.2.3.1 Graphical Presentation of 144 kbps service UL Simulation Results

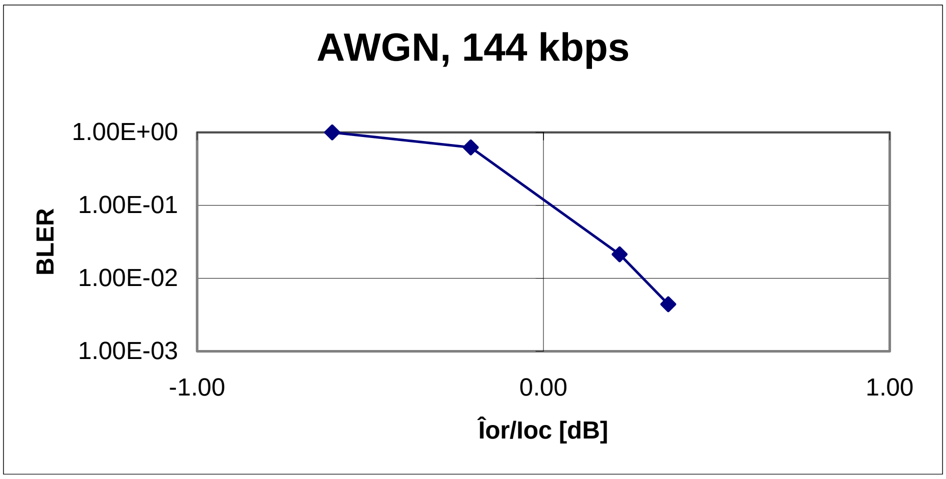


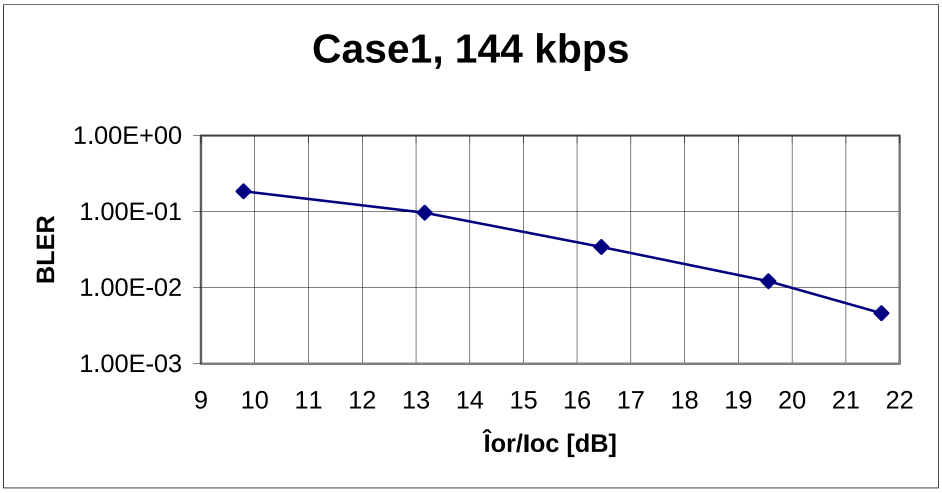


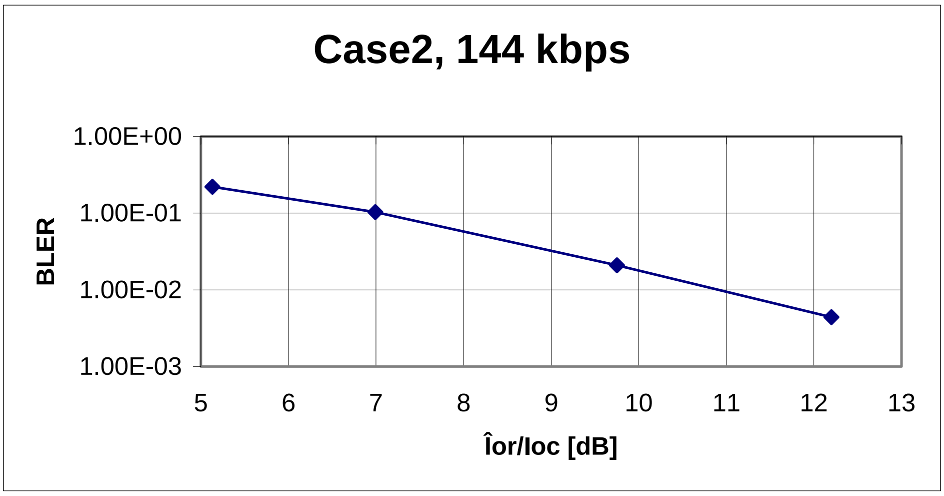


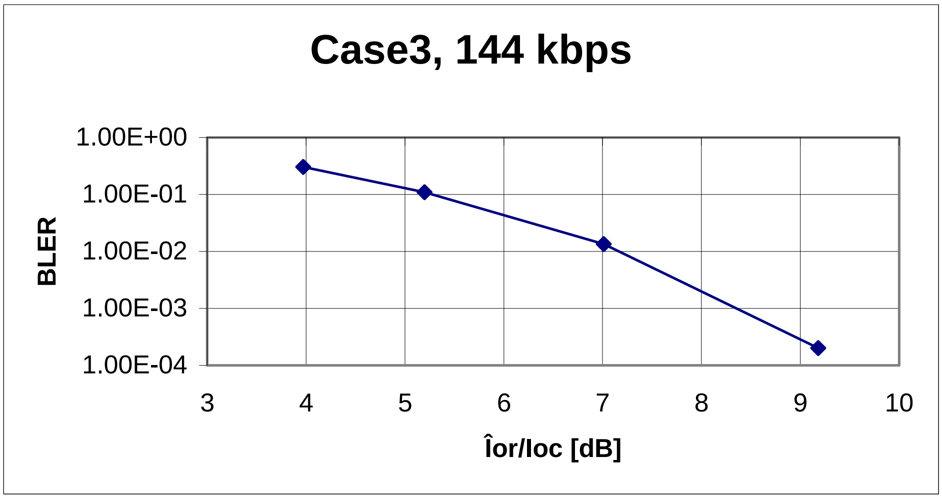


9.7.1.2.3.2 Graphical Presentation of 144 kbps service DL Simulation Results


AWGN, 144 kbps
BLER
1.00E+00
1.00E-01
1.00E-02
1.00E-03
-1.00
0.00
1.00
Îor/Ioc [dB]

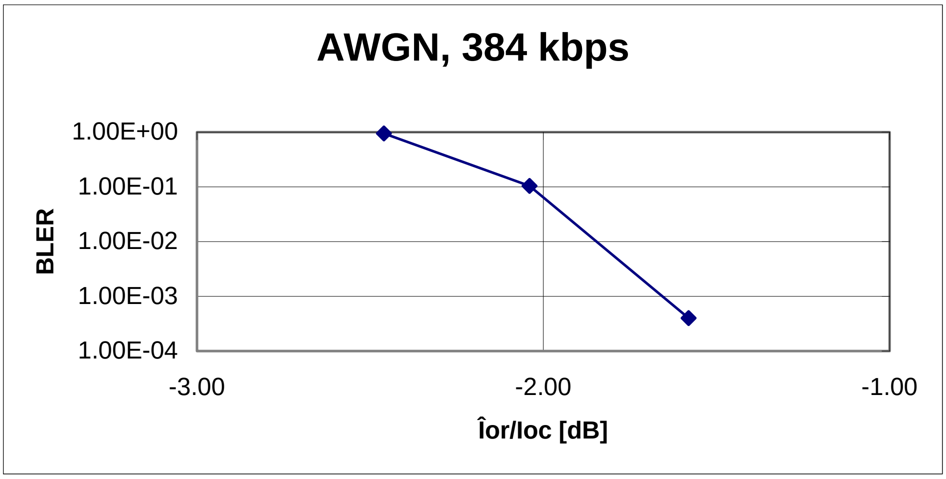

Case1, 144 kbps
BLER
1.00E+00
1.00E-01
1.00E-02
1.00E-03
9 10 11 12 13 14 15 16 17 18 19 20 21 22
Îor/Ioc [dB]

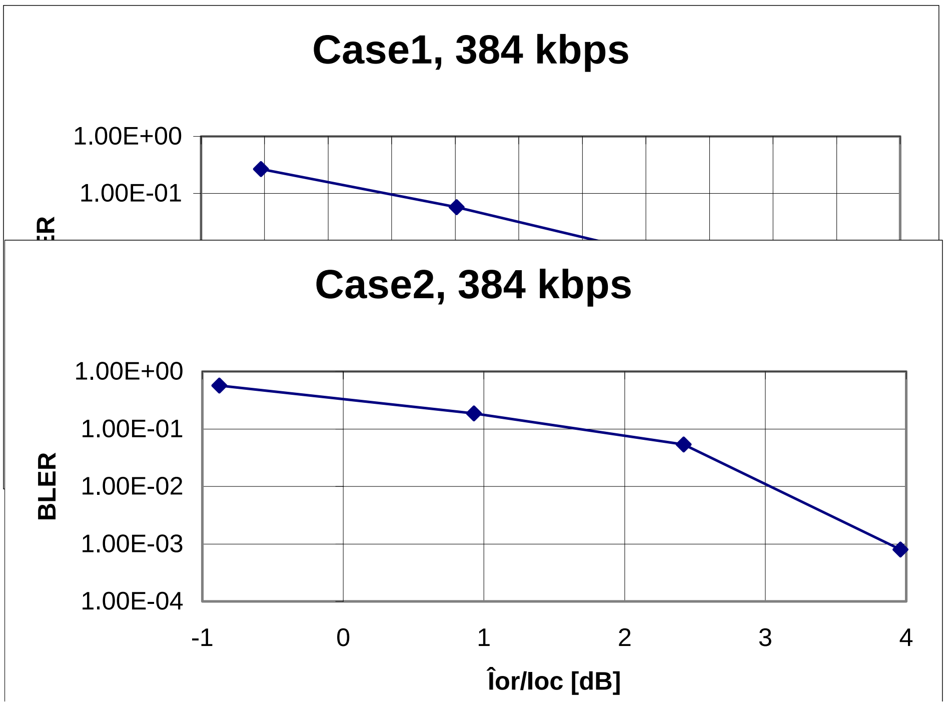

Case2, 144 kbps
BLER
1.00E+00
1.00E-01
1.00E-02
1.00E-03
5 6 7 8 9 10 11 12 13
Îor/Ioc [dB]

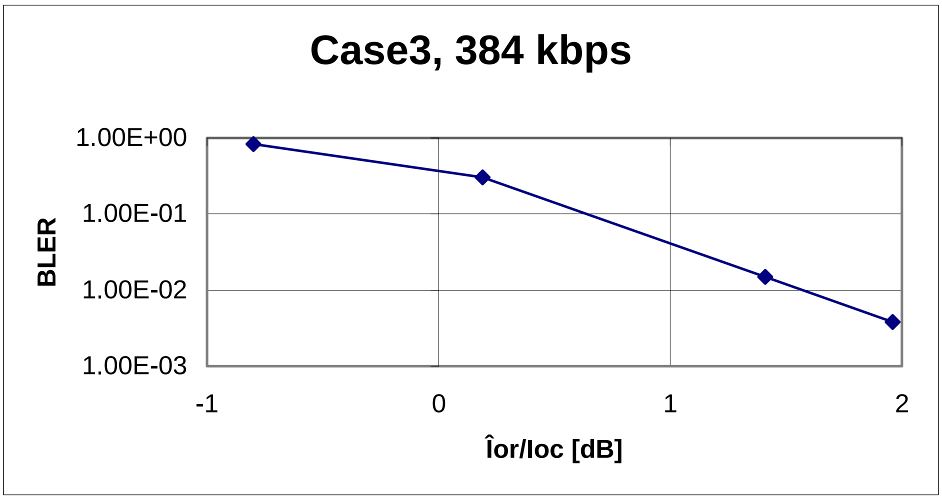


9.7.1.2.4 384kps Service

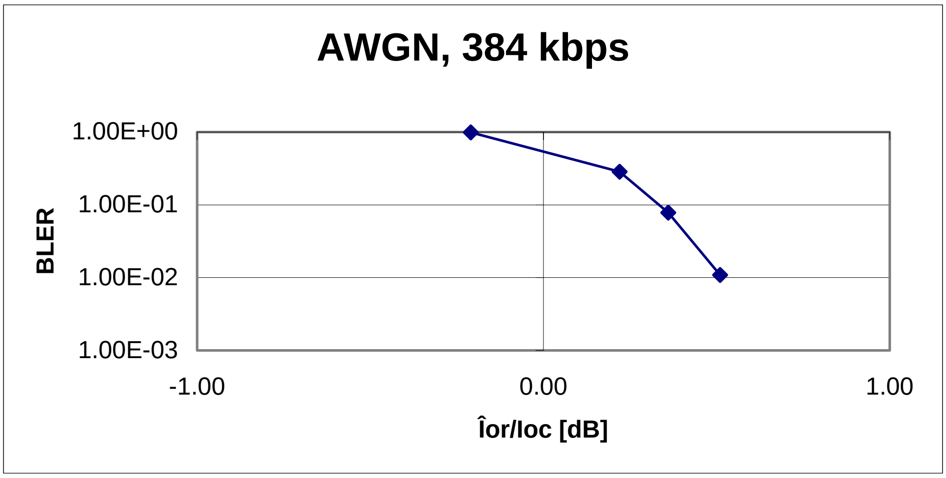
9.7.1.2.4.1 Graphical Presentation of 384 kbps service UL Simulation Results

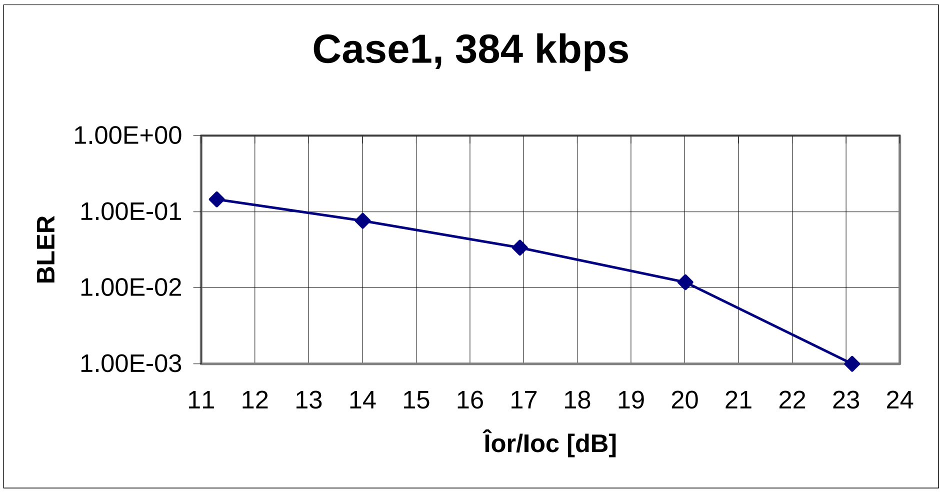


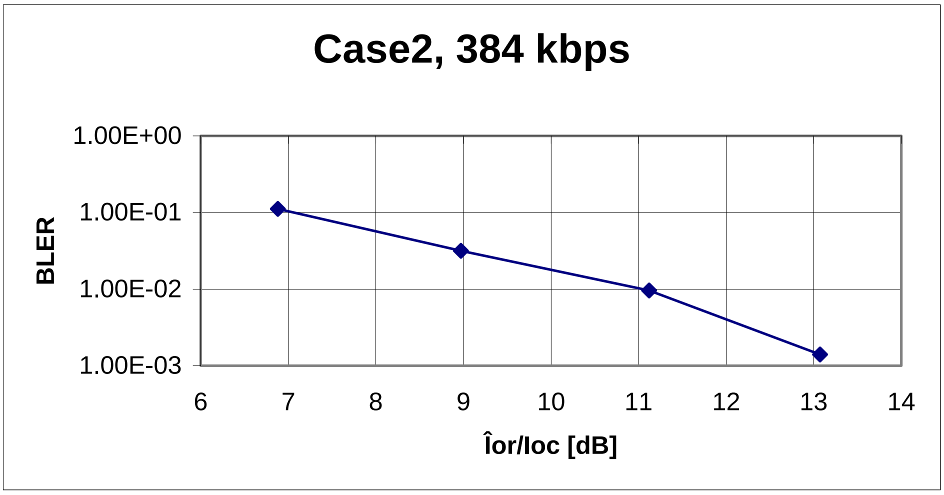




9.7.1.2.4.2 Graphical Presentation of 384 kbps service DL Simulation Results







9.7.2 1,28Mcps TDD and FDD link level simulation

Annex: The key physical layer parameters for low chip rate TDD option

Support of :	**Difference to high chiprate TDD option**	**Further details**
Support of different radio frame structure	1.Different frame structure to high chiprate TDD option 2.Different basic midamble sequences, maximum channel impulse response is scalable (W=8, 9, 12, 16, 21, 32, 64), depending on number of users and environment, including the association between midambles and channelisation codes 3.Use of only one burst type for physical channels except special bursts in DwPTS/UpPTS 4.Support of different timeslot formats due to different number of bits and L1 control signals and midamble length 5.Support of use of 8PSK for special timeslots/all timeslots per cell 6.Beacon function is provided by DwPTS and P-CCPCH	Segmentation of the radio frame into 2 subframes Each subframe consists of 7 traffic slots (864 chips length) and two special timeslots for synchronisation and initial access which are separated by an extra guard period 5. Including TFCI, SS, and TPC coding (8PSK)
Modified Power Control	1.Closed Loop PC in **uplink** and downlink 2.Open loop PC on the SYNC1 Code while initial access 3.P-CCPCH and DwPTS power can be used	1. TPC bits also in downlink 3. transmit power level reported on BCH

	as a beacon 4.number of TPC symbols can take 2 values	4. none, one symbol, 16/SF TPC symbols per radio frame, number of TPC symbols is always the same like number of SS symbols
Modified RACH procedure	1.Random Access carried out in 2 steps	1. Send SYNC1, Receive FPACH 2. Send power controlled, timing advanced PRACH in traffic timeslot (code associated to received FPACH. There is another association between the PRACH and the FACH. These associations are broadcast by the BCH.) Due to the two-step approach a collision most likely happens on the UpPTS. The RACH RUs are virtually collision free. There are no dedicated RACH time slots, the RACH resources share the time slot with dedicated resources, a two step procedure ensures that the actual RACH.
Cell search operation	1.One synchronisation channel only (DwPTS) and different frame duration	**Step 1:** Search for DwPTS **Step 2:** Scrambling- and basic midamble code identification **Step 3:** searches for the head of multi-frame indicated **Step 4:** Read the BCH
Uplink synchronisation	1.Special Layer1-SS symbols 2.Number of used SS symbols can take 2 values	1.SS symbols command an incremental change of timing 2.none, one symbol, 16/SF SS symbols per radio frame, number of SS symbols is always the same like number of TPC

	3.SS-symbols are transmitted once per subframe	symbols 3.Frequency and step size are configured by UTRAN (“k” and “M” parameters)
Beamforming	Beamforming applies to the dedicated channels and may also be used for some common channels like FPACH	
Physical channels	P-CCPCH and S-CCPCH require two channelisation codes; FPACH is a new physical channel which always uses one channelisation code at SF 16.	
Mapping of transport channels to physical channels	PCH; PICH and FACH can be time multiplexed with the BCH on the P-CCPCH. PCH, PICH and FACH can be time multiplexed on the S-CCPCH. Therefore these transport channels are using two channelisation codes of SF 16.	The PICH carries a different number of PIs than in the high chip rate option, because of the different burst structure.
Measurements	Ranges and accuracy have to be adapted for the low chip rate option.	
Service mapping	Due to the different payload size and subframe segmentation the service mapping for the low chip rate differs from that of the high chip rate option.	

History

Document history		
V0.0.0	Apr, 2000	Created based on the WG#11meeting approval
V0.0.1	May 22nd , 2000	Updated based on the email reflector discussion recommendations till now
V0.0.2	May 24th , 2000	The RRM in scope is added
V0.0.3	May 25th, 2000	The RF system scenarios in scope is added
V0.1.0	Jun 23th, 2000	Revised based on the input tdocs in the WG4#12 meeting in Turku, which have been approved as the start points with brackets for the value.
V0.1.1	Aug 24th,2000	Revised the RF system scenarios section contents, cancel the chapters that wouldn't have been affected by 1.28Mpcs TDD option
V0.2.0	Aug 31th,2000	Revised based on the input tdocs in the WG4 1.28Mpcs TDD option Ad-hoc meeting in London, which have been approved input to the TR25.945.
V0.3.0	Sep. 13th, 2000	Revised based on the input tdocs in the WG4#13 meeting in Turin, which have been approved input to the TR25.945.
V1.0.0	Sep. 20th, 2000	Presented to RAN#9 meeting for information in Oahu, HI, USA.
V1.1.0	Nov. 25th, 2000	Revised based on the input tdocs in the WG4 1.28Mpcs TDD coexistence Ad-hoc meeting in Berlin and the WG4#14 meeting in Sophia Antipolis, which have been approved input to the TR25.945.
V1.1.1	Jan. 23th , 2001	Just editor modification, the tdocs referred to WG4#15 meeting in Boston, America. Approved.
V2.1.0	Feb. 6th, 2001	Revised based on the tdocs approved in WG4#15 meeting in Boston, America.
V2.2.0	Feb. 20th, 2001	Revised based on the 7 tdocs approved in WG4#16 meeting in Vienna, Austria.
V2.3.0	Feb. 21th, 2001	Revised based on the another 2 tdocs approved in WG4#16 meeting in Vienna, Austria.
V2.4.0	Mar.15th, 2001	Revised based on the tdocs approved in WG4#16 meeting in Vienna, Austria, and Presented to RAN #11 for approval.

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