TSG-RAN Meeting #6
Nice, France, 13 – 15 December 1999

TSGRP#6(99)624

Title: **Agreed CRs of category "C" (Modification) and "F" (Correction) to TS 25.302**

Source: **TSG-RAN WG2**

Agenda item: **5.2.3**

Doc #	Status-	Spec	CR	Rev	Subject	Cat	Versio	Versio
R2-99g20	agreed	25.302	015		Alignment of measurement names	F	3.1.0	3.2.0
R2-99h77	agreed	25.302	022		Alignment with TDD layer 1	F	3.1.0	3.2.0
R2-99j30	agreed	25.302	023	1	Physical Channel Parameters	C	3.1.0	3.2.0
R2-99h91	agreed	25.302	025		Addition of PICH and Corrections for	F	3.1.0	3.2.0
R2-99i50	agreed	25.302	026		Removal of compressed mode	F	3.1.0	3.2.0
R2-99k06	agreed	25.302	028	1	Measurement of Transmitted carrier	C	3.1.0	3.2.0
R2-99k86	agreed	25.302	031		Measurement of Physical Channel	C	3.1.0	3.2.0

3GPP TSG-RAN Meeting #6
Nice, France, 13-15 December 1999

***Document* (R2-99g20)**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

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25.302	CR	015	Current Version:	3.1.0

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

For submission to:	TSG-RAN #6	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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

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

Source:	TSG-RAN WG2		**Date:**	04.11.1999	
Subject:	Alignment of measurement names with RAN decision				
Work item:					

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

Reason for change:	The names and partially the definition of measurements are changed according to the decision in RAN meeting #5 (see Tdoc RAN (99) 564).
Clauses affected:	Chapter 9 Measurements provided by the physical layer

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

Other comments:	

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8	One or more PDSCH + one or more CCPCH + one or more DPCH	BCH and/or PCH and/or one or more FACH and one or more DSCH coded onto one or more CCTrCH and one or more DCH coded into one or more CCTrCH	Service dependent	BCH can map to multiple CCPCH in a frame. Each FACH can map to multiple CCPCH in a frame. The maximum number of DCHs and the maximum channel bit rate are dependent on UE Service Capability It is assumed here that a DSCH transport channel may map to one or more PDSCH physical channels based on system configuration. See note 2.

Notes:

1. Reference: TS25.221: Physical Channels and Mapping of Transport Channels Onto Physical Channels (TDD).

2. The possibility to multiplex PCH and one or more FACH on one or more CCTrCHs is FFS

3. The PSCH synchronization channel can co-exist with all listed combinations

9 Measurements provided by the physical layer

One of the key services provided by the physical layer is the measurement of various quantities which are used to trigger or perform a multitude of functions. Both the UE and the UTRAN are required to perform a variety of measurements. The standard will not specify the method to perform these measurements or stipulate that the list of measurements provided in this section must all be performed. While some of the measurements are critical to the functioning of the network and are mandatory for delivering the basic functionality (e.g., handover measurements, power control measurements), others may be used by the network operators in optimising the network (e.g., radio environment).

Measurements may be made periodically and reported to the upper layers or may be event-triggered (e.g., primary CCPCH becomes better than the previous best primary CCPCH). Another reporting strategy may combine the event triggered and the periodical approach (e.g. falling of link quality below a certain threshold initiates periodical reporting). The measurements are tightly coupled with the service primitives in that the primitives' parameters may constitute some of the measurements.

The list and frequency of measurements which the physical layer reports to higher layers is described in this section. The precision requirements of the measurements are specified in TS25.103. The detailled definition of the measurements together with the range and mapping is contained in TS25.215 and TS25.225

The measurement quantities measured by the physical layer shall be such that the following principles are applied:

For handover measurements, the decoding of parameters on the BCCH logical channel of monitored neighbouring cells, should not, in general, be needed for calculating the measurement result. If there is a need to adjust the measurement result with parameters broadcast on the PCCPCH, these parameters shall be provided by the UTRAN in inband measurement control messages. There may be some exceptions to this rule. *For example, it may be necessary to decode the SFN of the measured neighbouring cell for time difference measurements. [Note: It should be decided whether the SFN is a L3 or L1 parameter. WG1 has approved that SFN is a L1 parameter.In a LS sent to WG2, they also indicate that the SFN is encoded together with the BCH transport blocks, with a joint CRC. However WG2 had questions regarding the advantage of this method, compared to having the SFN as a L3 parameter, and have sent back a LS to WG1.]*

In idle mode or in RRC connected mode using common Transport Channels, the UE shall be able to monitor cells for cell reselection, without being required to frequently decode parameters on the BCCH logical channel of the monitored neighbouring cells. The decoding frequency of these parameters, set by the cell reselection algorithm, should be such that UE standby times are not significantly decreased.

9.1 UE Measurements ~~of downlink channels~~

9.1.1 CFN-SFN ~~O~~observed time difference ~~to UTRA cell~~

This measure is mandatory for the UE.

Measurement	~~Measured~~ CFN-SFN observed time difference ~~to UTRA cell~~
Source	L1 (UE)
Destination	RRC (RNC) for handover
Reporting Trigger	On-demand, Event-triggered
Definition	***~~For FDD:~~ The '~~CFN-SFN O~~observed time difference ~~to UTRA cell~~' indicates the time difference which is measured by the UE between CFN in the UE and the SFN of the target neighbouring cell. ~~It is notified to SRNC by Measurement Report message or Measurement Information Element in other RRC messages.~~ This measurement is applicable for FDD cells only.*** ***~~For TDD: This is the relative time difference in the frame timing between the serving and the target cell measured at the UE.~~***

9.1.2 Observed time difference to GSM cell

This measure is mandatory for the UE if the handover to GSM service is to be supported.

Measurement	~~Measured~~ Observed time difference to GSM cell
Source	L1 (UE)
Destination	RRC (RNC) for maintenance and handover to GSM
Reporting Trigger	On-demand, Event-triggered
Definition	***~~-~~Time difference between a specific UTRA ~~the Primary CCPCH of the current~~ cell and the timing of the GSMcell.***

9.1.3 CPICH ~~RX~~ E_c/~~I~~N_0

This measure is mandatory for the UE.

Measurement	CPICH~~Rx~~ Ec/~~I~~No
Source	L1(UE)
Destination	RRC (UE, RNC),
Reporting Trigger	Periodic, on demand and event triggered
Definition	The received energy per chip of the CPICH divided by the power density in the frequency band. The Ec/No is identical to RSCP /RSSI. ~~$-20\log_{10}(E_c/I_o)$ where E_c is the energy per chip of the CPICH (for FDD: measured in the searcher) and I_o is the received spectral density.~~

9.1.4 CPICH ~~Rx~~ SIR

Note : WG1 has not yet come to any agreement on the impact on terminal complexity if L1 should support measurement of RX CPICH SIR. Therefore, this measurement is currently not supported by L1. However, it is too early to rule out the possibility that it will eventually be included also in the WG1 specifications.

This measure is mandatory for the UE.

Measurement	CPICH ~~Rx~~ SIR
Source	L1 (UE)
Destination	RRC (UE, RNC)
Reporting Trigger	periodic or event triggered
Definition	***This quantity is a ratio of the CPICH Received Signal Code Power (RSCP) to the Interference Signal Code Power (ISCP).*** ~~***The RSCP is the measured symbol power of the CPICH at the demodulator output and the ISCP is the measured interference symbol power.***~~

9.1.5 CPICH ~~Rx~~ RSCP

This measure is mandatory for the UE.

Measurement	CPICH ~~Rx~~ RSCP
Source	L1(UE)
Destination	RRC (UE, RNC)
Reporting Trigger	periodic or event triggered
Definition	***Received Signal Code Power~~,~~ is the received power on the CPICH ~~on one code, defined on the pilot symbols~~ after despreading. ~~for FDD and on the midamble for TDD.~~***

9.1.6 P-CCPCH RSCP

This measure is mandatory for the UE.

Measurement	P-CCPCH RSCP
Source	L1(UE)
Destination	RRC (UE, RNC)
Reporting Trigger	periodic or event triggered
Definition	Received Signal Code Power of the P-CCPCH is the received power after despreading. This measurement is applicable for TDD cells only.

9.1.7 Timeslot ISCP

This measure is mandatory for the UE.

Measurement	Timeslot ISCP
Source	L1(UE)
Destination	RRC (UE, RNC)
Reporting Trigger	periodic or event triggered
Definition	Interference Signal Code Power is the interference on the received signal after despreading. Only the non-orthogonal part of the interference is included. This measurement is applicable for TDD only. It is measured in specified timeslots.

~~9.1.6~~9.1.8 CPICH ~~Rx~~ ISCP

Note : WG1 has not yet come to any agreement on the impact on terminal complexity if L1 should support measurement of RX CPICH ISCP. Therefore, this measurement is currently not supported by L1. However, it is too early to rule out the possibility that it will eventually be included also in the WG1 specifications.

This measure is mandatory for the UE.

Measurement	CPICH ~~Rx~~ ISCP
Source	L1(UE)
Destination	RRC (UE, RNC)
Reporting Trigger	periodic or event triggered
Definition	***Interference ~~on~~ Signal Code Power~~,~~ is the interference on the received signal after despreading. Thereby only the non-orthogonal part of the interference is included. ~~For FDD this is measured on the Primary CCPCH. For TDD this is measured in specified timeslots.~~***

~~9.1.7~~9.1.9 ~~DPCH~~ SIR

This measure is mandatory for the UE.

Measurement	~~DPCH~~ SIR
Source	L1(UE)
Destination	RRC(UE,RNC)
Reporting Trigger	Periodic, once every power control cycle , event triggered
Definition	Signal to Interference Ratio is defined as RSCP divided by ISCP. ~~The ratio of the measured symbol power at the demodulator output to the measured interference power at the demodulator output.~~ For FDD this is measured on the DPCCH. For TDD this is measured on the DPCH or PDSCH.

~~9.1.8~~9.1.10 UTRA carrier RSSI~~Cell Signal strength (RSSI)~~

This measure is mandatory for the UE.

Measurement	~~signal strength~~UTRA carrier RSSI
Source	L1(UE)
Destination	RRC (RNC),
Reporting Trigger	Periodic, event triggered, on demand
Definition	Received Signal Strength Indicator, the wideband received power within the channel bandwidth ~~averaged over [1 s] interval~~. For TDD this is measured in specified timeslots.

~~9.1.9Alternate mode Signal strength~~

~~9.1.9.1~~9.1.11 GSM carrier RSSI~~Signal Strength~~

This measure is mandatory for the UE if the service handover to GSM is to be supported.

Measurement	GSM carrier RSSI~~signal strength~~
Source	L1(UE)
Destination	RRC (RNC)
Reporting Trigger	~~-~~Periodic, event triggered, on demand
Definition	Received Signal Strength Indicator, the wide-band received power within the relevant channel bandwidth. ~~Reference~~Details are specified in the GSM specification~~document~~ 05.08.

~~9.1.10~~9.1.12 Transport channel~~CH~~ BLER

This measure is mandatory for the UE.

Measurement	~~t~~Transport channel BLER (BLock Error Rate)
Source	L1(UE)
Destination	**RRC(RNC,UE)**
Reporting Trigger	~~-~~Periodic, on demand
Definition	Estimation of the transport channel block error rate (BLER).~~The error detection mechanism will determine whether or not a block error occurred.~~

~~9.1.11~~9.1.13 Physical channel~~CH~~ BER

This measure is mandatory for the UE.

Measurement	~~p~~Physical channel BER
Source	L1(UE)
Destination	**RRC(UE,RNC)**
Reporting Trigger	**On-demand, Event-triggered**
Definition	The estimate of the physical channel~~raw~~ BER of ~~the physical channel calculated only on~~ the data part before channel decoding.

9.1.14 UE transmitted power

This measure is mandatory for the UE.

Measurement	UE transmitted power
Source	L1(UE)
Destination	RRC (UE,RNC)
Reporting Trigger	On-demand, periodic, Event-triggered
Definition	RRC (UE): the total transmitted power of the UE measured at the antenna connector. RRC (RNC): indication of Tx power reaching threshold (for example, upper or lower power limits). For TDD this is measured in specified timeslots.

~~9.1.12Total Tx Power~~

~~Measurement~~	~~total Tx power~~
~~Source~~	~~L1(Node B)~~
~~Destination~~	~~**RRC(RNC)**~~
~~Reporting Trigger~~	~~**On-demand, periodic, Event-triggered**~~
~~Definition~~	~~The total power emitted by the Node B within the channel bandwidth averaged over an interval of [1 s]. For TDD this is measured in specified timeslots.~~

~~9.1.13Code Tx Power~~

~~Measurement~~	~~Code Tx power~~
~~Source~~	~~L1(Node B)~~
~~Destination~~	~~**RRC (RNC)**~~
~~Reporting Trigger~~	~~**On-demand, periodic, Event-triggered**~~
~~Definition~~	~~The total power emitted by the Node B on one channelisation code for one UE averaged over [100 ms] . For TDD this is measured in specified timeslots.~~

9.1.15 UE Rx-Tx time difference

Measurement	UE Rx-Tx time difference
Source	L1 (UE)
Destination	RRC (RNC)
Reporting Trigger	On-demand, periodic, event-triggered
Definition	Time difference between the UE uplink DPCCH/DPDCH frame transmission and the first significant path of the downlink DPCH frame from the measured radio link. Measurement shall be made for each cell included in the active set. This measurement is applicable for FDD cells only. (Note: The use for TDD in case of LCS is ffs.)

9.1.16 SFN-SFN Observed time difference

The SFN-SFN observed time difference at the UE of a group of Node-B may be used for location calculation. The applicability of this measure is LCS method dependent. For TDD, this measure is mandatory for the UE

Measurement	SFN-SFN observed time difference
Source	L1 (UE)
Destination	RRC (RNC)
Reporting Trigger	On-demand, Event-triggered
Definition	Time difference between a specific reference UTRA cell and a target UTRA cell. There are two types of this measurement: Type 1 measures by means of the P-CCPCH and type 2 by means of CPICH.

9.2 UTRAN Measurements ~~on uplink channels~~

9.2.1 RSSI ~~UL load~~

Measurement	RSSI~~UL load~~
Source	**L1 (Node B)**
Destination	**RRC(RNC)**
Reporting Trigger	**On-demand, Event-triggered, Periodic**
Definition	**Received Signal Strength Indicator, the wide-band received power within the UTRAN UL channel bandwidth at a UTRAN access point.~~the total received signal power for a carrier within the cell.~~ For TDD this is measured in specified timeslots.**

9.2.2 Transmitted carrier power

Measurement	Transmitted carrier power
Source	L1(Node-B)
Destination	RRC(RNC)
Reporting Trigger	On-demand, periodic, Event-triggered
Definition	Transmitted carrier power is the total transmitted power on one DL carrier from one UTRAN access point. For TDD this is measured in specified timeslots.

9.2.3 Transmitted code power

Measurement	Transmitted code power
Source	L1(Node-B)
Destination	RRC (RNC)
Reporting Trigger	On-demand, periodic, Event-triggered
Definition	Tranmitted Code Power is the transmitted power on one carrier, one scrambling and one channelisation code. For TDD this is measured in specified timeslots.

~~9.2.2 UE Tx Power~~

~~This measure is mandatory for the UE.~~

~~Measurement~~	~~UE Tx power~~
~~Source~~	~~L1(UE)~~
~~Destination~~	~~**RRC (UE,RNC)**~~
~~Reporting Trigger~~	~~**On-demand, periodic, Event-triggered**~~
~~Definition~~	~~RRC (UE) – the total Tx power, measured at the antenna connector, averaged over [100 ms] . For TDD this is measured in specified timeslots.RRC (RNC) – indication of Tx power reaching threshold (for example, upper or lower power limits)~~

~~9.2.3~~9.2.4 Transport channel~~CH~~ BLER

Measurement	T~~t~~ransport channel BLER (BLock Error Rate)
Source	L1(Node-B)
Destination	**RRC(RNC)**
Reporting Trigger	periodic, event triggered, on demand
Definition	Estimation of the transport channel block error rate (BLER).~~The error detection mechanism will determine whether or not a block error occurred.~~

~~9.2.4~~9.2.5 Physical channel~~CH~~ BER

Measurement	P~~p~~hysical channel BER
Source	L1(Node-B)
Destination	**RRC(RNC)**
Reporting Trigger	**On-demand, Event-triggered, periodic**
Definition	The estimate of the physical channel~~raw~~ BER of ~~the physical channel calculated only on~~ the data part before channel decoding.

~~9.2.5~~9.2.6 RX ~~T~~timing deviation ~~(TDD only)~~

Measurement	RX timing deviation ~~(TDD only)~~
Source	L1 (Node B)
Destination	RRC (RNC)
Reporting Trigger	Periodic, event triggered
Definition	The difference of the time of arrival of the UL transmissions in relation to the arrival time of a signal with zero propagation delay. This measurement is applicable for TDD cells only.

~~9.2.6~~9.2.7 ~~Rx~~ Timeslot ISCP ~~(TDD only)~~

Measurement	TimeslotRx ISCP
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	Periodic or event triggered
Definition	Interference on Signal Code Power, is the interference after despreading in specified timeslots. Thereby oOnly the non-orthogonal part of the interference is included. This measurement is applicable for TDD cells only.

9.2.79.2.8 Rx RSCP (TDD only)

Measurement	Rx RSCP
Source	L1(Node B)
Destination	RRC (RNC)
Reporting Trigger	periodic or event triggered
Definition	Received Signal Code Power, is the received power on DPCH or PRACH or PUSCH after despreading. This measurement is applicable for TDD cells only.

9.3Miscellaneous measurements

9.3.19.2.9 Time of Arrival (TOA)

The Time of Arrival (TOA) measurement at a single nNode-B may provide an estimate of the round trip time of signals between the Node-B and the UE and this may be used to calculate a radial distance to the UE within the sector. A group of simultaneous TOA measurements made from a number of Node-B or LMU may be used to estimate the location of the UE. Theis support for this measurement is LCS positioning method dependeant..

Measurement	Time of arrival (TOA)
Source	L1(Node-B or LMU)
Destination	RRC (RNC-LCS)
Reporting Trigger	on demand, event triggered
Definition	tThe time of arrival of the uplink transmissions in relation to a specificthe CCPCH timing reference..

9.3.2SFN-SFN Observed time difference

The SFN-SFN observed time difference at the UE of a group of Node-B may be used for location calculation. . The applicability of this measure is LCS method dependent. This support for this measurement is LCS positioning method dependant.

~~Measurement~~	~~SFN-SFN observed time difference~~
~~Source~~	~~L1 (UE)~~
~~Destination~~	~~RRC (RNC) for handover, maintenance and LCS~~
~~Reporting Trigger~~	~~On-demand, Event-triggered~~
~~Definition~~	~~***Time difference between the Primary CCPCH of the current cell and the Primary CCPCH of a neighboring cell.***~~

~~9.3.3~~9.2.10 Frequency Offset ~~(FO)~~

The Frequency Offset ~~(FO)~~ measures the rate of change (drift) of the Relative Time Difference and may be used to estimate the RTD at the time the UE location measurements are made. ~~.~~ The~~is~~ support for this measurement is LCS positioning method depend~~ea~~nt.

Measurement	Frequency Offset ~~(FO)~~
Source	L1(LMU)
Destination	RRC (RNC-LCS)
Reporting Trigger	On demand, event triggered, periodic
Definition	The Frequency Offset (FO) measures the rate of change (drift) of the Relative Time Difference of the ~~CCPCH~~ transmissions of two Node-B.

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Document (R2-99h77)
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or for SMG, use the format P-99-xxx

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25.302	CR	022	Current Version:	3.1.0

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

For submission to:	TSG-RAN #6	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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

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

Source: TSG-RAN WG2 **Date:** 19.11.1999

Subject: Alignments with TDD layer 1

Work item:

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

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change:
Descriptions of physical channels were modified in WG1 specifications.
These modifications are aligned.
TFCI is included for appropriate CCTrCHs according to TDD L1. Clarifications on TFCI usage are added.
Term Burst type replaces Midamble type. Term Superframe offset is replaced by Offset.

Clauses affected:

Other specs affected:

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

Other comments: Figure 1: TFCI reference for USCH added


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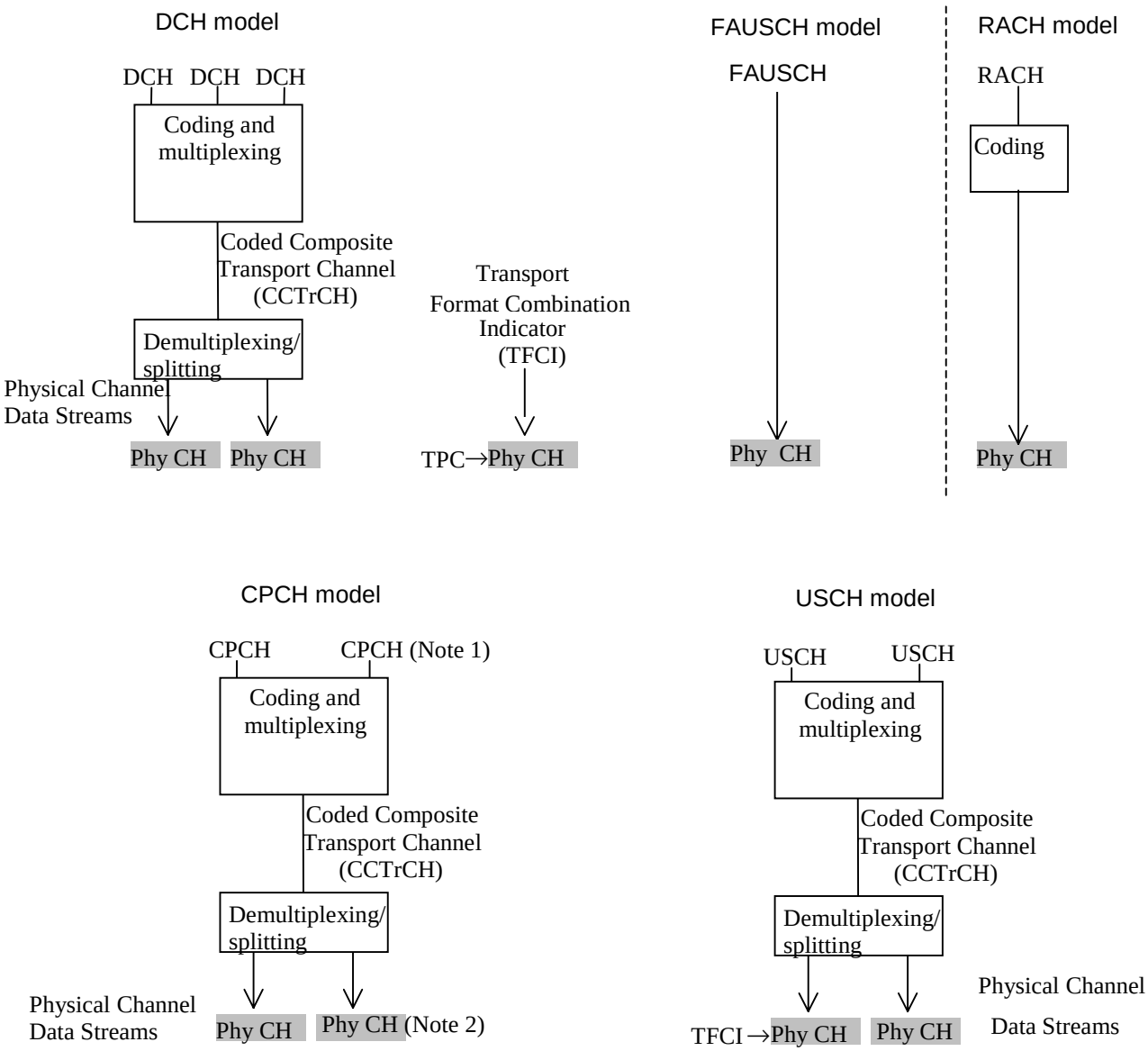
6 Model of physical layer of the UE

6.1 Uplink models

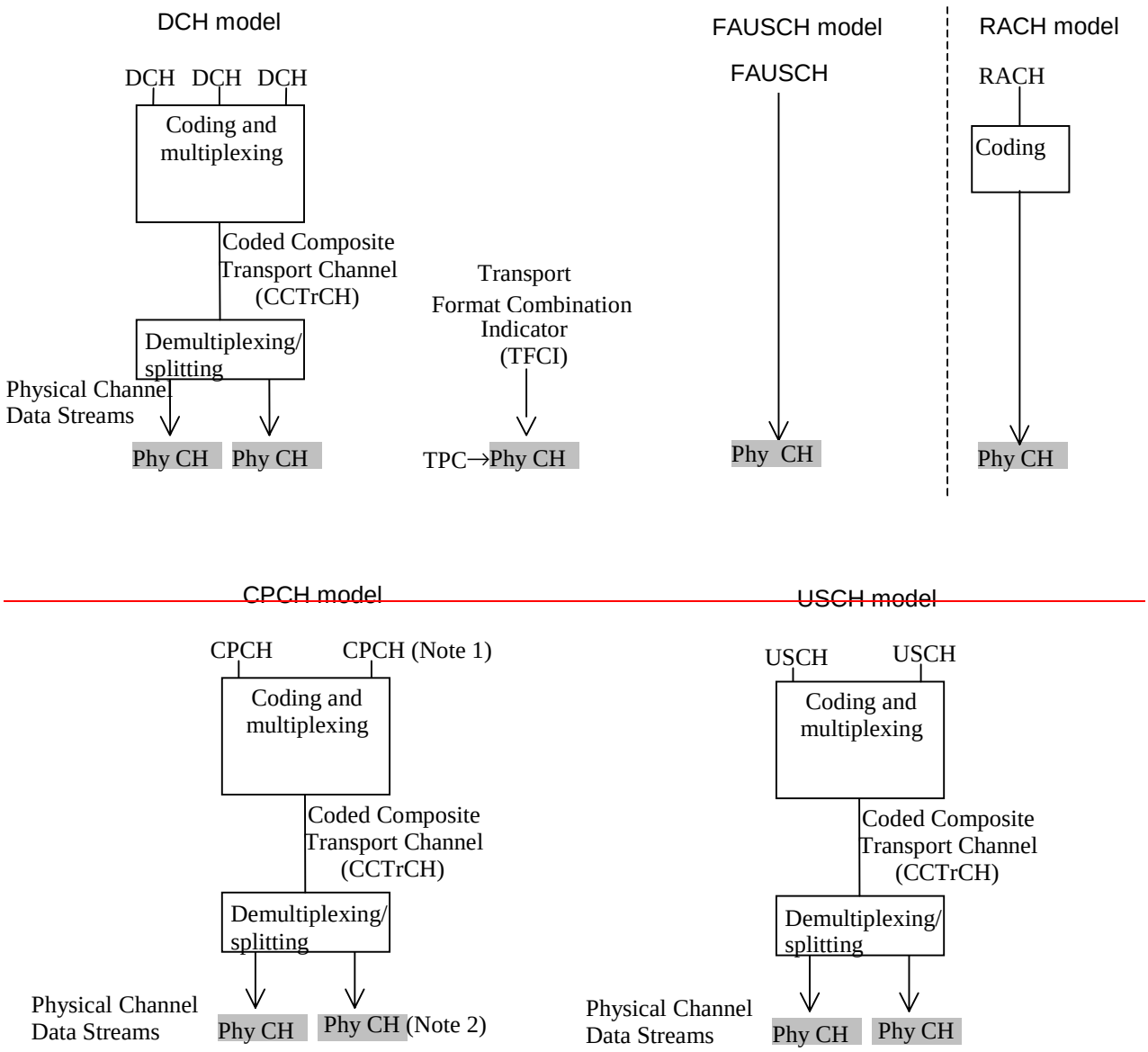
EMBED

Figure 1 shows models of the UE's physical layer in the uplink for both FDD and TDD mode. It shows two models: DCH model and RACH model. Some restriction exist for the use of different types of transport channel at the same time, these restrictions are described in the chapter "UE Simultaneous Physical Channel combinations". More details can be found in [3] and [4].

Note: Models for uplink transport channels currently marked ffs will be necessary if these channels are included in the description.



Note 1: The need to multiplex several CPCH transport channels is FFS
Note 2: Only the data part of the CPCH can be mapped on multiple physical channels
Note 3: FAUSCH and CPCH are for FDD only.
Note 4: USCH is for TDD only.



Note 1: The need to multiplex several CPCH transport channels is FFS
Note 2: Only the data part of the CPCH can be mapped on multiple physical channels
Note 3: FAUSCH and CPCH are for FDD only.
Note 4: USCH is for TDD only.

Figure 1: Model of the UE's physical layer – uplink

The DCH model shows that one or several DCHs can be processed and multiplexed together by the same coding and multiplexing unit. The detailed functions of the coding and multiplexing unit are not defined in this document but in [3] and [4]. The single output data stream from the coding and multiplexing unit is denoted *Coded Composite Transport Channel (CCTrCH).*

The bits on a CCTrCH Data Stream can be mapped on the same Physical Channel and should have the same C/I requirement.

On the downlink, multiple CCTrCH can be used simultaneously with one UE. In the case of FDD, only one fast power control loop is necessary for these different CCtrCH, but the different CCtrCH can have different C/I requirements to provide different QoS on the mapped Transport Channels. In the case of TDD, different power control loops can be applied for different CCTrCH. One physical channel can only have bits coming from the same CCTrCH.

On the uplink and in the case of FDD, only one CCTrCH can be used simultaneously. On the uplink and in the case of TDD, multiple CCTrCH can be used simultaneously.

When multiple CCTrCH are used by one UE, one or several TFCI can be used, but each CCTrCH has only zero or one corresponding TFCI. In the case of FDD, these different words are mapped on the same DPCCH. In the case of TDD, these different TFCI can be mapped on different DPCH.

The data stream of the CCTrCH is fed to a data demultiplexing/splitting unit that demultiplexes/splits the CCTrCH's data stream onto one or several *Physical Channel Data Streams*.

Note: The term "splitting" used for above function in FDD mode has been replaced by "demultiplexing/splitting". The intention of using the term splitting is to express that this function is performed on bit level not on some block level. The term demultiplexing/splitting shall cover both cases, block or bit level demultiplexing, where block lengths larger than 1 bit may be applied in the TDD mode. This needs to be confirmed by the L1 group

The current configuration of the coding and multiplexing unit is either signalled to, or optionally blindly detected by, the network for each 10 ms frame. If the configuration is signalled, it is represented by the *Transport Format Combination Indicator (TFCI)* bits. Note that the TFCI signalling only consists of pointing out the current transport format combination within the already configured transport format combination set. In the uplink there is only one TFCI representing the current transport formats on all DCHs of one CCTrCH simultaneously. In FDD mode, the physical channel data stream carrying the TFCI is mapped onto the physical channel carrying the power control bits and the pilot. In TDD mode the TFCI is time multiplexed onto the same physical channel(s) as the DCHs. The exact locations and coding of the TFCI are signalled by higher layers.

The DCH and USCH have the possibility to perform Timing Advance in TDD mode.

For the FAUSCH, there is no coding, since the FAUSCH is only used for the transmission of a reservation request by sending an up-link signalling code (USC) at the time-offset allocated for the specific UE during the 10 ms frame. Due to the fixed time-offset allotted to a specific UE, the FAUSCH is a dedicated control channel.

The model for the RACH case shows that RACH is a common type transport channel in the uplink. RACHs are always mapped one-to-one onto physical channels, i.e. there is no physical layer multiplexing of RACH. Service multiplexing is handled by the MAC layer. The CPCH which is another common type transport channel has a physical layer model as shown in the above figure.

6.2 Downlink models

Figure 2 and Figure 3 show the model of the UE's physical layer for the downlink in FDD and TDD mode, respectively. Note that there is a different model for each transport channel type.

Note: Models for downlink transport channels currently marked ffs will be necessary if these channels are included in the description.

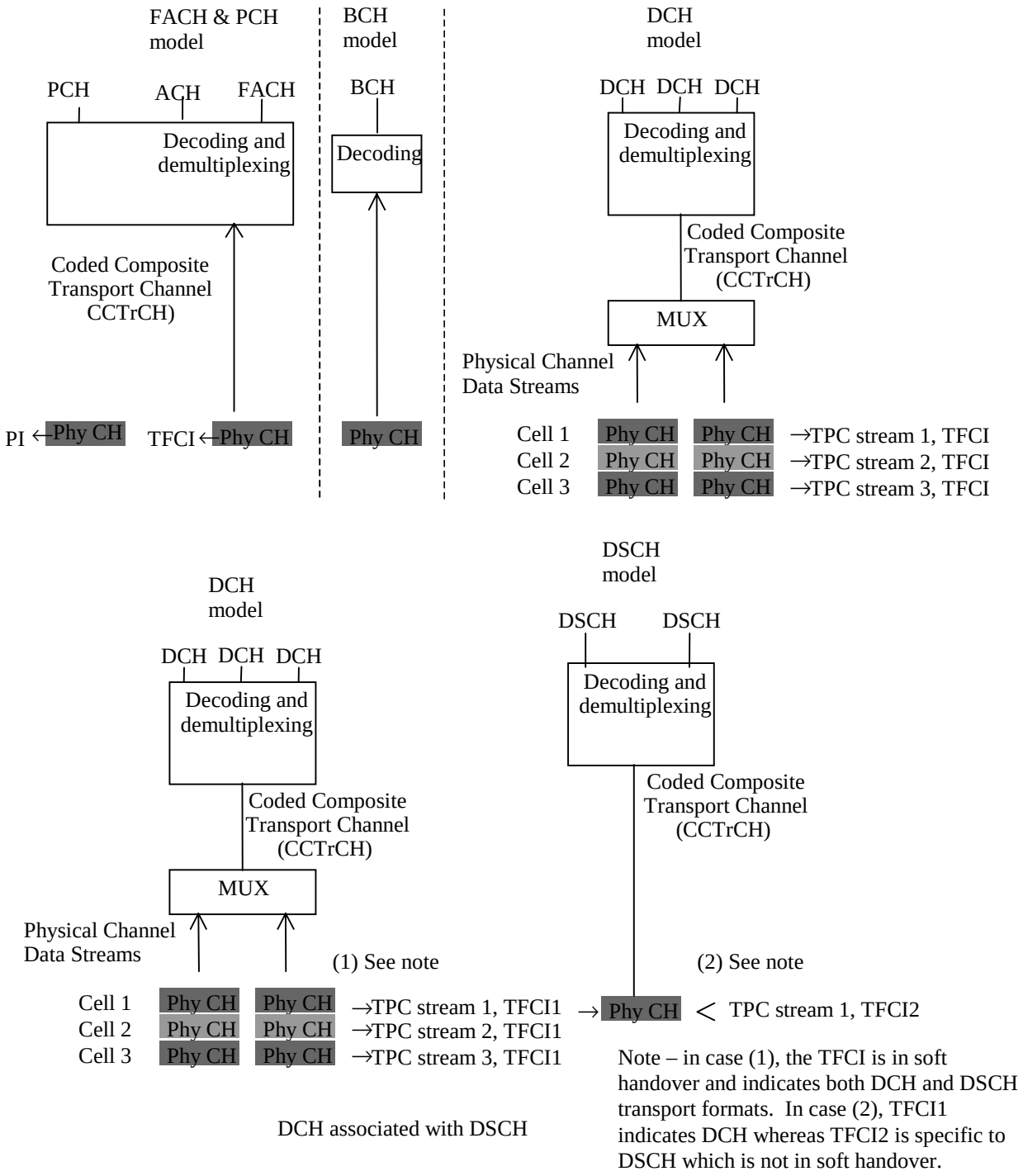
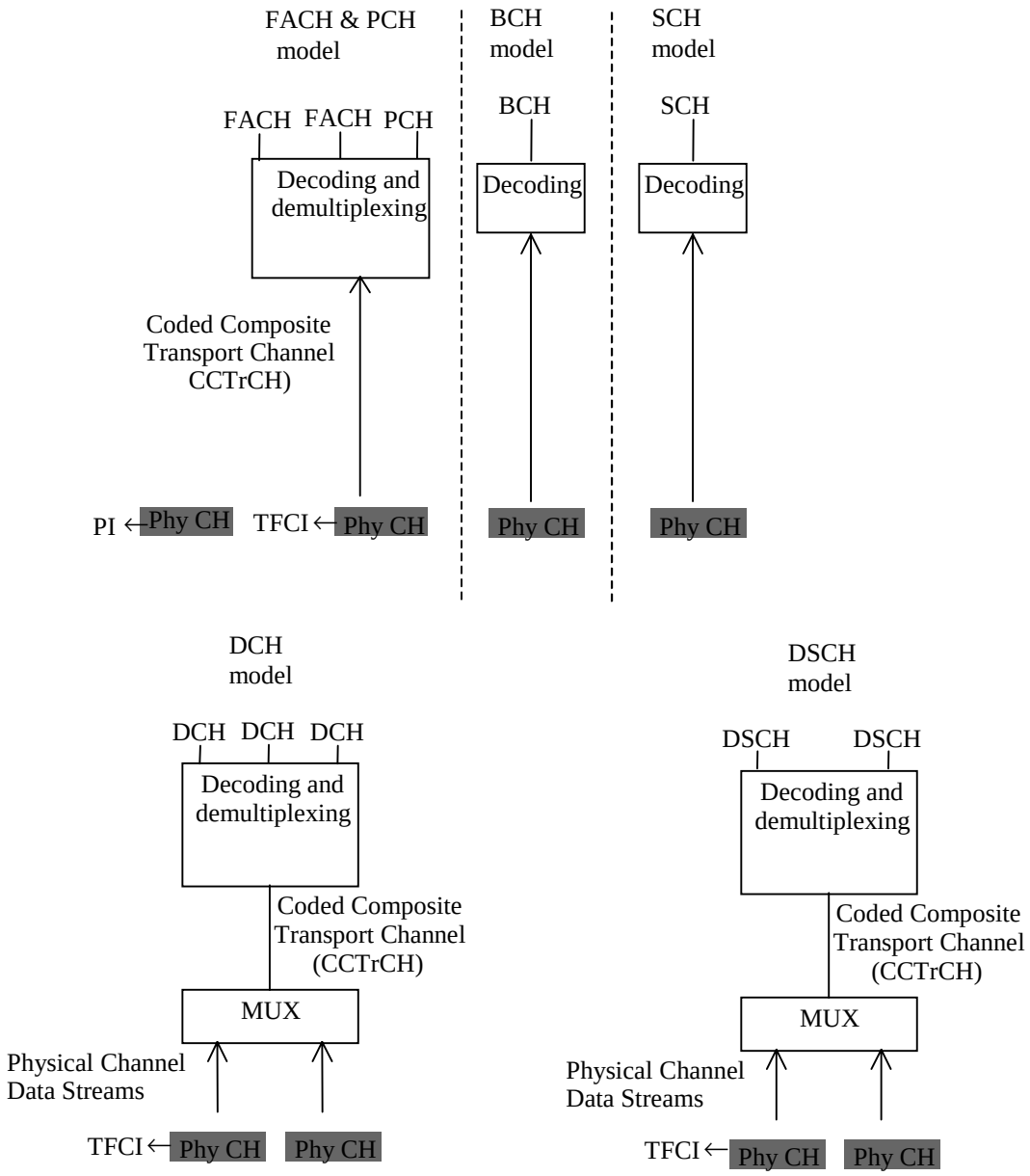


Figure 2: Model of the UE's physical layer – downlink FDD mode


FACH & PCH model
BCH model
SCH model
FACH FACH PCH
BCH
SCH
Decoding and demultiplexing
Decoding
Decoding
Coded Composite Transport Channel CCTrCH)
PI
Phy CH
TFCI
Phy CH
Phy CH
Phy CH
DCH model
DSCH model
DCH DCH DCH
DSCH DSCH
Decoding and demultiplexing
Decoding and demultiplexing
Coded Composite Transport Channel (CCTrCH)
Coded Composite Transport Channel (CCTrCH)
MUX
MUX
Physical Channel Data Streams
Physical Channel Data Streams
TFCI
Phy CH
Phy CH
TFCI
Phy CH
Phy CH

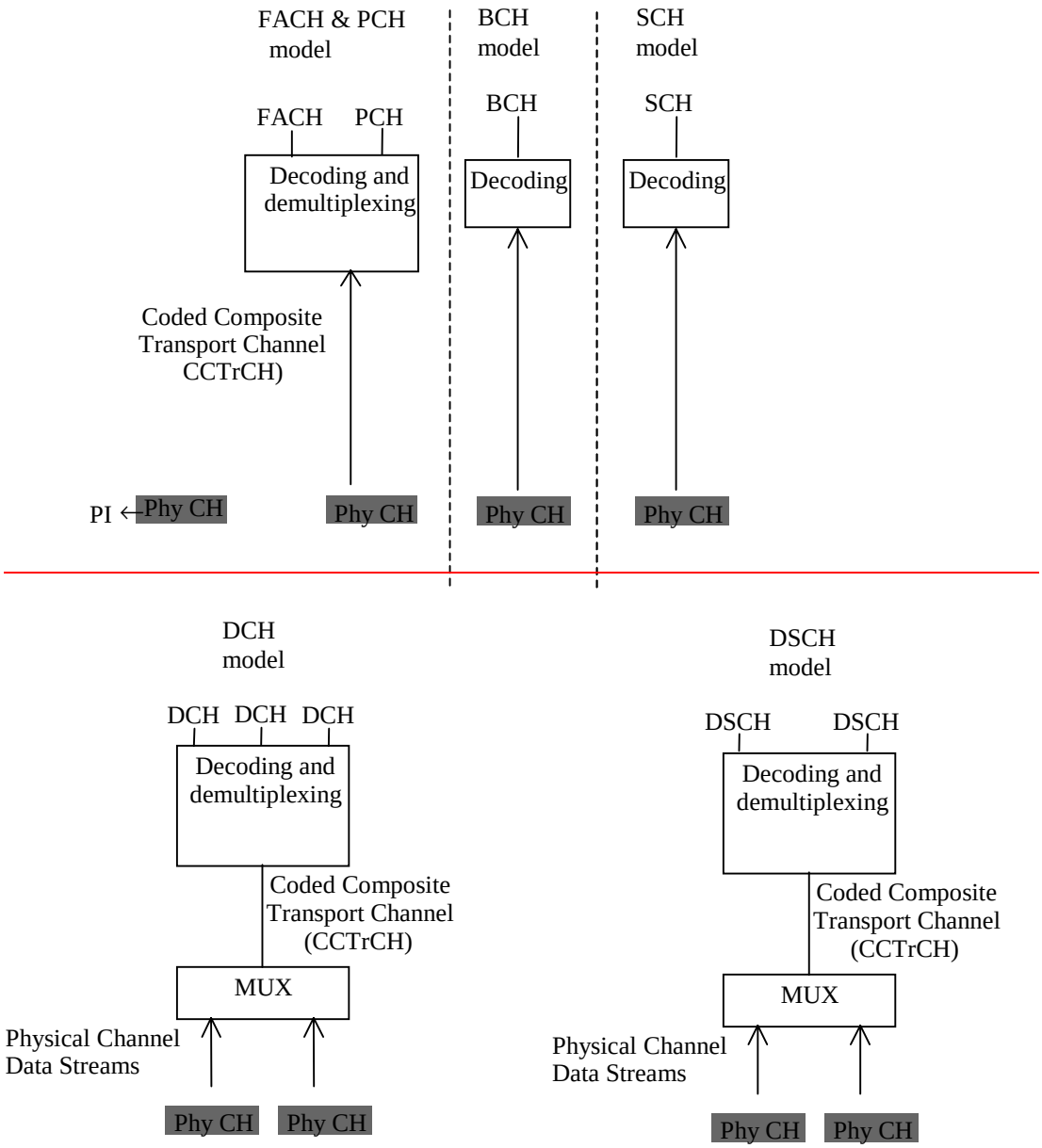


Figure 3: Model of the UE's physical layer – downlink TDD mode

For the DCH case, the mapping between DCHs and physical channel data streams works in the same way as for the uplink. Note however, that the number of DCHs, the coding and multiplexing etc. may be different in uplink and downlink.

In the FDD mode, the differences are mainly due to the soft and softer handover. Further, the pilot, TPC bits and TFCI are time multiplexed onto the same physical channel(s) as the DCHs. Further, the definition of physical channel data stream is somewhat different from the uplink. In TDD mode the TFCI is time multiplexed onto the same physical channel(s) as the DCHs. The exact locations and coding of the TFCI are signalled by higher layers.

Note that it is logically one and the same physical data stream in the active set of cells, even though physically there is one stream for each cell. The same processing and multiplexing is done in each cell. The only difference between the cells is the actual codes, and these codes correspond to the same spreading factor.

The physical channels carrying the same physical channel data stream are combined in the UE receiver, excluding the pilot, and in some cases the TPC bits. TPC bits received on certain physical channels may be combined provided that UTRAN has informed the UE that the TPC information on these channels is identical.

~~In the TDD mode, a PCH and a FACH can be encoded and multiplexed together forming a CCTrCH. The PCH is associated with a separate physical channel carrying page indicators (PIs) which are used to trigger UE reception of the physical channel that carries PCH. A FACH or a PCH can also be individually mapped onto separate physical channels. The BCH is always mapped onto one physical channel without any multiplexing with other transport channels.~~

~~Note, in the TDD mode there is the SCH in addition (not shown in Figure 3).~~

~~In the FDD mode, a~~ A PCH and one or several FACH can be encoded and multiplexed together forming a CCTrCH. Similarly as in the DCH model there is one TFCI for each CCTrCH for indication of the transport formats used on each PCH and FACH. The PCH is associated with a separate physical channel carrying page indicators (PIs) which are used to trigger UE reception of the physical channel that carries PCH. A FACH or a PCH can also be individually mapped onto a separate physical channel. The BCH is~~, as for TDD,~~ always mapped onto one physical channel without any multiplexing with other transport channels.

In the TDD mode there is the SCH in addition (not shown in Figure 3).

7 Formats and configurations for L1 data transfer

7.1 General concepts about Transport Channels

Layer 2 is responsible for the mapping of data onto L1 via the L1/L2 interface that is formed by the transport channels. In order to describe how the mapping is performed and how it is controlled, some definitions and terms are required. The required definitions are given in the following sections. Note that the definitions are generic for all transport channel types, i.e. not only for DCHs.

All Transport Channels are defined as unidirectional (i.e. uplink, downlink, or relay-link). This means that a UE can have simultaneously (depending on the services and the state of the UE) one or several transport channels in the downlink, and one or more Transport Channel in the uplink.

7.1.1 Transport Block

This is the basic unit exchanged between L1 and MAC, for L1 processing.

A Transport Block typically corresponds to an RLC PDU or corresponding unit. ~~In the TDD mode it may possibly also be formed by a MAC peer-to-peer message.~~ Layer 1 adds a CRC for each Transport Block.

7.1.2 Transport Block Set

This is defined as a set of Transport Blocks which are exchanged between L1 and MAC at the same time instance using the same transport channel.

7.1.3 Transport Block Size

This is defined as the number of bits in a Transport Block. The Transport Block Size is always fixed within a given Transport Block Set, i.e. all Transport Blocks within a Transport Block Set are equally sized.

7.1.4 Transport Block Set Size

This is defined as the number of bits in a Transport Block Set.

7.1.5 Transport Format

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

Attributes of the dynamic part are:

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

Attributes of the semi-static part are:

- Transmission Time Interval (mandatory for FDD, optional for the dynamic part of TDD NRT bearers)
- Error protection scheme to apply
  - Type of error protection, turbo code, convolution~~n~~al code or no channel coding

- coding rate
- Static rate matching parameter
- Puncturing limit ~~for uplink~~(FDD: for uplink only)

- Size of CRC

In the following example, the Transmission time Interval is seen as a semi-static part

Example:

- Dynamic part: {320 bits, 640 bits}, Semi-static part: {10ms, convolutional coding only, static rate matching parameter = 1}

7.1.6 Rate matching

Two levels of rate matching are defined on the radio interface:

- A static rate matching per Transport Channel. The static rate matching is part of the semi-static attributes of the Transport Channel
- A dynamic rate matching per CCTrCH. The dynamic rate matching adjusts the size of the physical layer data payload to the physical channel as requested by RRC.

The static rate matching and the dynamic rate matching to be applied by the physical layer are indicated by RRC to the physical layer.

RRC is responsible for configurating the physical layer on whether:

- Blind Rate Detection or TFCI is used
- Dynamic rate matching is applied or not on the downlink

10.3.3.3 Primary CCPCH

- Frequency info
- DL scrambling code
- Tx diversity mode
- Timeslot (TDD only)
- ~~Midamble~~Burst type (TDD only)
- ~~Superframe o~~Offset (TDD only)
- Repetition period (TDD only)
- Repetition length (TDD only)

10.3.3.4 Secondary CCPCH

- DL scrambling code
- Channelisation code
- Tx diversity mode
- Timeslot (TDD only)
- ~~Midamble~~Burst type (TDD only)
- Midamble shift (TDD only)
- ~~Superframe o~~Offset (TDD only)
- Repetition period (TDD only)
- Repetition length (TDD only)
- TFCI presence (TDD only)

10.3.3.5 PRACH

Note: The PRACH can also be used to map the FAUSCH Transport Channel

- Access Slot
- Preamble spreading code (FDD only)
- Preamble signature (FDD only)
- Spreading factor for data part
- Power control info
  - UL target SIR
  - Primary CCPCH DL TX Power
  - UL interference

- Power offset (Power ramping) (FDD only)
- Access Service Class Selection
  - Preamble signature classification information
- AICH transmission timing parameter (FDD only)
- Persistence value
- Timeslots (TDD only)
- Spreading codes (TDD only)
- Midamble codes (TDD only)

10.3.3.6 Uplink DPDCH+DPCCH

- UL scrambling code
- DPCCH Gate rate
- DPCCH slot structure (N_{pilot}, N_{TPC}, N_{TFCI}, N_{FBI})
- Transmission Time offset value

~~10.3.3.6~~10.3.3.7 Uplink DPCH

- Timing Advance (TDD only)
- DPCH channelization code (TDD only)
- ~~Midamble~~Burst Type (TDD only)
- DPCH midamble shift (TDD only)
- Timeslot (TDD only)
- ~~Superframe o~~Offset (TDD only)
- Repetition Period (TDD only)
- Repetition length (TDD only)
- TFCI presence (TDD only)

~~10.3.3.7~~10.3.3.8 Downlink DPCH

- Transmission Time offset value
- DPCCH Gate rate (FDD only)
- DL scrambling code
  - DL Channelisation code
- Tx diversity mode
  - FB mode (FDD only)
- Slot structure ($N_{pilo,}$ N_{TPC}, N_{TFCI}, $N_{FBI,}$, N_{data1}, N_{data2}) (FDD only)

- ~~Midamble~~Burst Type (TDD only)
- DPCH midamble shift (TDD only)
- Timeslot (TDD only)
- ~~Superframe o~~Offset (TDD only)
- Repetition period (TDD only)
- Repetition length (TDD only)
- TFCI presence (TDD only)

~~10.3.3.8~~10.3.3.9 PICH

- Scrambling code
- Channelisation code
- Timeslot (TDD only)
- ~~Midamble~~Burst Type (TDD only)
- Midamble shift (TDD only)
- ~~Superframe o~~Offset (TDD only)
- Repetition period (TDD only)
- Repetition length (TDD only)

~~10.3.3.9~~10.3.3.10 AICH (FDD only)

- Scrambling code
- Channelisation code
- Tx diversity mode

[Note: the value for the parameters need to be consistent with the corresponding PRACH. This needs to be confirmed by WG1].

~~10.3.3.10~~10.3.3.11 PDSCH

- Scrambling code
- Channelisation code
- Tx diversity mode
  - FB mode (FDD only)
- DL channelisation code (TDD only)
- ~~Midamble~~Burst Type (TDD only)
- PDSCH Midamble shift (TDD only)
- Timeslot (TDD only)

- ~~Superframe o~~Offset (TDD only)
- Repetition period (TDD only)
- Repetition length (TDD only)
- TFCI presence (TDD only)

~~10.3.3.11~~10.3.3.12 PUSCH (TDD only)

- PUSCH channelisation code ~~(TDD only)~~
- ~~Midamble~~Burst Type (TDD only)
- PUSCH midamble shift (TDD only)
- Timeslot (TDD only)
- ~~Superframe o~~Offset (TDD only)
- Repetition period (TDD only)
- Repetition length (TDD only)
- TFCI presence (TDD only)
- Timing Advance (TDD only)

12 Annex B (Informative): Example of Transport format attributes for AMR speech codec

The support for the AMR speech codec is exemplified below. On the radio interface, one Transport Channel is established per class of bits i.e. DCH A for class A, DCH B for class B and DCH C for class C. Each DCH has a different transport format combination set which corresponds to the necessary protection for the corresponding class of bits as well as the size of these class of bits for the various AMR codec modes.

With this principle, the AMR codec mode which is used during a given TTI can be deduced from the format of the transport channels DCH A, DCH B and DCH C for that particular TTI.

Note that a similar principle can also be applied for other source codecs e.g. other speech codecs or video codecs.

An example of transport channel description for each class of bits is given below:

	Attribute	Value		
		Class A	Class B	Class C
Dynamic part	Transport Block Size	81 65 75 61 55 55 49 39	103 99 84 87 79 63 54 56	60 40 0 0 0 0 0 0
	Transport Block Set Size	Same as the transport block sizes		
	~~Transmission Time Interval (option for TDD only)~~			
Semi-static part	Transmission Time Interval ~~(FDD)~~	20 ms		
	Type of channel coding	Convolutional coding		
	code rates	1/2, 1/3 + class-specific rate matching	None, 1/2, 1/3 + class-specific rate matching	None, 1/2 , 1/3 + class-specific rate matching
	CRC size	8	0	0
	Resulting ratio after static rate matching	0.5 to 4(with no coding the rate matching ratio needs to be >1)		

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Document (R2-99j30)
e.g. for 3GPP use the format TP-99xxx
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CHANGE REQUEST

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25.302	CR	023r1	Current Version:	3.1.0

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

For submission to:	TSG-RAN #6	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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

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

Source: TSG-RAN WG2 **Date:** 29.11.1999

Subject: Physical Channel parameters

Work item:

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

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

Release:

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

Reason for change: This CR proposes to predefine the BCH configuration for TDD as for FDD. To be consistent with 25.301CR16r1, new columns for PCH, FACH, RACH DCH, CPCH and DSCH are added. Furthermore, a column for USCH was added and some TDD specific parameters were defined for PCH, DCH, DSCH, and USCH. The contents of the table in Annex A is aligned with the description in the latest TS25.212 and TS25.222 regarding TTI, CRC and channel coding.

Clauses affected: Annex A

Other specs Affected:

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

Other comments: This CR replaces 25.302CR016r1.

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Annex A: Description of Transport Formats

The following table describes the characterisation of a Transport Format. The possible values for the attributes will be defined by the L1 experts group based on the requirements identified by the L23 experts group. Note that the allowed Transport Format Combinations are not described here, and will need to be covered also.

		Attribute values	BCH	PCH	FACH	RACH
Dynamic part	Transport Block Size	1 to 5000 1 bit granularity	246	1 to 5000 1 bit granularity	1 to 5000 1 bit granularity	1 to 5000 1 bit granularity
	Transport Block Set Size	1 to 200000 1 bit granularity	246	1 to 200000 1 bit granularity	1 to 200000 1 bit granularity	1 to 200000 1 bit granularity
	Transmission Time Interval (option for TDD only)	10, 20 ms, 40 and 80 ms				
Semi-static part	Transmission Time Interval (FDD, option for TDD NRT bearers)	10, 20 ms, 40 and 80 ms	20ms	10ms for FDD, 10ms, 20ms, 40ms and 80ms for TDD	10, 20 ms, 40 and 80 ms	10ms and 20ms for FDD, 10ms for TDD
	Type of channel coding	Turbo Convolutional coding	Convolutional	Convolutional	Convolutional	Convolutional
	code rates	1/2, 1/3	1/2	1/2	1/2	1/2
	CRC size	0, 8, 12, 16, 24	16	0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24
	Resulting ratio after static rate matching	0.5 to 4				

		Attribute values	CPCH	DCH	DSCH	USCH
Dynamic part	Transport Block Size	1 to 5000 1 bit granularity	1 to 5000 1 bit granularity	1 to 5000 1 bit granularity	1 to 5000 1 bit granularity	1 to 5000 1 bit granularity
	Transport Block Set Size	1 to 200000 1 bit granularity	1 to 200000 1 bit granularity	1 to 200000 1 bit granularity	1 to 200000 1 bit granularity	1 to 200000 1 bit granularity
	Transmission Time Interval (option for TDD only)	10, 20 ms, 40 and 80 ms		10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms
Semi-static part	Transmission Time Interval (FDD, option for TDD NRT bearers)	10, 20 ms, 40 and 80 ms		10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms	10, 20 ms, 40 and 80 ms
	Type of channel coding	No coding Turbo coding Convolutional coding	No coding Turbo coding Convolutional coding	No coding Turbo coding Convolutional coding	No coding Turbo coding Convolutional coding	No coding Turbo coding Convolutional coding
	code rates (in case of convolutional coding)	1/2, 1/3	1/2, 1/3	1/2, 1/3	1/2, 1/3	1/2, 1/3
	CRC size	0, 8, 12, 16, 24		0, 8, 12, 16, 24	0, 8, 12, 16, 24	0, 8, 12, 16, 24
	Resulting ratio after static rate matching	0.5 to 4				

Note: The maximum size of the Transport Block has been chosen so as to avoid any need for segmentation in the physical layer into sub-blocks (segmentation should be avoided in the physical layer).

Note2: Code rate is fixed to 1/3 in case of Turbo coding.

Note3: All channels using the same resources as the BCH (i.e. the same timeslot and code, e.g. in a multiframe pattern) have to use different Transport Formats than the BCH to allow the identification of the BCH channel by physical layer parameters. Due to the differing parameters, decoding of other transport channels than BCH will result in an erroneous CRC.

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or for SMG, use the format P-99-xxx

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25.302	CR	025	Current Version:	3.1.0

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

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

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

Source: TSG-RAN WG2 **Date:** 22/11/99

Subject: Addition of PICH and Corrections for Primary CCPCH

Work item:

Category: *(only one category Shall be marked With an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	
				Release 00	

Reason for change:

The Primary Common Control Physical Channel (P-CCPCH) and the Page Indicator Physical Channel (PICH) should be identified in the UE simultaneous channels definition for TDD mode.

1. The BCH transport channel is carried by the P-CCPCH.
2. The P-CCPCH should also be indicated in UL & DL combinations when the P-CCPCH is used for reference power to determine path loss for determination of RACH and UL DPCH transmit power.
3. In TDD mode the Page Indicator Channel (PICH) substitutes one or more paging sub-channels that are mapped on a CCPCH assigned for the PCH transport channel.
4. Common Control Physical Channels other then the Primary-CCPCH are known as Secondary-CCPCH's and should be indicated as S-CCPCH's.
5. A P-CCPCH (BCH) only case should be added to DL tables

Clauses affected:

Other specs Affected:

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

Other comments:

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8.4 TDD Downlink

The table describes the possible combinations of TDD physical channels that can be supported in the downlink by one UE in any one 10ms frame, where a TDD physical channel corresponds to one code, one timeslot, one frequency and is mapped to one resource unit (RU). This table addresses combinations of downlink physical channels in the same 10ms frame.

	Physical Channel Combination	Transport Channel Combination	Baseline Capability or Service dependent	Comment
1	One or two PSCH	SCH	Baseline	SCH can map to one or two PSCH in a frame depending on the synchronization case as defined in 25.221 (see note 1)
2	P-CCPCH and/or One or more S-CCPCH + PICH	BCH and/or PCH and/or one or more FACH	Baseline	BCH ~~can~~ maps to ~~multiple~~ the P-CCPCH ~~-~~in a frame. FACH can map to multiple S-CCPCH in a frame. PCH can map to multiple S-CCPCH in a frame. PICH substitutes one or more paging sub-channels that are mapped on a S-CCPCH assigned for the PCH transport channel. See note 2.
3	One or more DPCH	One or more DCH coded into one or more CCTrCH	Service dependent	The maximum number of DCHs and the maximum channel bit rate are dependent on UE Service Capability
4	P-CCPCH and/or One or more S-CCPCH + PICH + one or more DPCH	BCH and/or PCH and/or one or more FACH + one or more DCH coded into one or more CCTrCH	Service dependent	The number of DCHs and the maximum channel bit rate are dependent on the UE Service Capability. BCH ~~can~~ maps to ~~multiple~~ the P-CCPCH in a frame. FACH can map to multiple S-CCPCH in a frame. PICH substitutes one or more paging sub-channels that are mapped on a S-CCPCH assigned for the PCH transport channel. See note 2.
5	One or more PDSCH	One or more DSCH coded onto one or more CCTrCH	Service dependent	It is assumed here that a DSCH transport channel may map to one or more PDSCH physical channels based on system configuration. DSCH requires a control channel (FACH or DCH); however, it is not required to be in the same 10ms frame as the DSCH.
6	One or more PDSCH + P-CCPCH and/or one or more S-CCPCH+ PICH	BCH and/or PCH and/or one or more FACH + one or more DSCH coded onto one or more CCTrCH	Service dependent	BCH ~~can~~ maps to ~~multiple~~ the P-CCPCH ~~-~~in a frame. FACH can map to multiple S-CCPCH in a frame. PICH substitutes one or more paging sub-channels that are mapped on a S-CCPCH assigned for the PCH transport channel. It is assumed here that a DSCH transport channel may map to one or more PDSCH physical channels based on system configuration. For the case of DSCH + BCH, DSCH requires a control channel (FACH or DCH); however, it is not required to be in the same 10ms frame as the DSCH. See note 2.
7	One or more PDSCH + one or more DPCH	One or more DSCH coded onto one or more CCTrCH + one or more DCH coded into one or more CCTrCH	Service dependent	The maximum number of DCHs and the maximum channel bit rate are dependent on UE Service Capability It is assumed here that a DSCH transport channel may map to one or more PDSCH physical channels based on system configuration.

8	One or more PDSCH + P-CCPCH and/or one or more S-CCPCH + PICH + one or more DPCH	BCH and/or PCH and/or one or more FACH + one or more DSCH coded onto one or more CCTrCH + one or more DCH coded into one or more CCTrCH	Service dependent	BCH ~~can~~ maps to ~~multiple~~ the P-CCPCH ~~-~~in a frame. FACH can map to multiple S-CCPCH in a frame. PICH substitutes one or more paging sub-channels that are mapped on a S-CCPCH assigned for the PCH transport channel. The maximum number of DCHs and the maximum channel bit rate are dependent on UE Service Capability It is assumed here that a DSCH transport channel may map to one or more PDSCH physical channels based on system configuration. See note 2.

Notes:

1. Reference: TS25.221: Physical Channels and Mapping of Transport Channels Onto Physical Channels (TDD).
2. The possibility to multiplex PCH and one or more FACH on one or more CCTrCHs is FFS
3. The PSCH synchronization channel can co-exist with all listed combinations

8.5 TDD UE Uplink and Downlink Combinations (within 10 ms air frames)

This table describes the possible uplink and downlink physical channel combinations that can be supported by a UE in TDD mode.

	DL Physical Channel Combination	DL Transport Channel Combination	UL Physical Channel Combination	UL Transport Channel Combination	Baseline Capability or Service Dependent	Comment
1	P-CCPCH		PRACH	RACH	Baseline	One RACH transport channel maps to one PRACH physical channel P-CCPCH is used for reference power to determine path loss for RACH transmit power calculation.
2	P-CCPCH and/or ~~O~~one or more S-CCPCH + PICH	BCH and/or PCH and/or one or more FACH			Baseline	BCH maps to the P-CCPCH in a frame. ~~Or~~ FACH, or PCH can map to multiple S-CCPCH in a frame.
3	P-CCPCH and/or ~~O~~one or more S-CCPCH + PICH	BCH and/or PCH and/or one or more FACH	PRACH	RACH	Baseline	One RACH transport channel maps to one PRACH physical channel BCH maps to the P-CCPCH in a frame. ~~or~~ FACH, or PCH can map to multiple S-CCPCH in a frame. P-CCPCH is used for reference power to determine path loss for RACH transmit power calculation.
4	P-CCPCH and/or ~~O~~one or more S-CCPCH + PICH	BCH and/or PCH and/or one or more FACH	PRACH and one or more DPCH	RACH and one or more DCH coded into one or more CCTrCH	Service Dependent	The maximum number of DCHs and the maximum channel bit rate are dependent on UE Service Capability. BCH maps to P-CCPCH in a frame. ~~or~~ FACH, or PCH can map to multiple S-CCPCH in a frame. P-CCPCH is used for reference power to determine path loss for RACH and UL-DPCH transmit power calculations.

5	P-CCPCH and/or ~~O~~one or more S-CCPCH + PICH and one or more DPCH	BCH and/or PCH and/or one or more FACH and one or more DCH coded onto one or more CCTrCH	PRACH and one or more DPCH	RACH and one or more DCH coded into one or more CCTrCH	Service dependent	The maximum number of DCHs and the maximum channel bit rate are dependent on UE Service Capability. See Note 1. BCH maps to P-CCPCH in a frame. ~~or~~ FACH, or PCH can map to multiple S-CCPCH in a frame. P-CCPCH is used for reference power to determine path loss for RACH and UL-DPCH transmit power calculations.
6	P-CCPCH		One or more DPCH	One or more DCH coded into one or more CCTrCH	Service dependent	The maximum number of DCHs and the maximum channel bit rate are dependent on UE Service Capability. P-CCPCH is used for reference power to determine path loss for UL- DPCH transmit power calculations.
7	P-CCPCH and ~~O~~one or more DPCH	One or more DCH coded onto one or more CCTrCH	One or more DPCH	One or more DCH coded into one or more CCTrCH	Service dependent	The maximum number of DCHs and the maximum channel bit rate are dependent on UE Service Capability. P-CCPCH is used for reference power to determine path loss for UL- DPCH transmit power calculations. See Note 1.

Notes:

1. The requirement for an UL DCH to exist in every 10 ms frame for DL Power Control, Transmit Diversity, and Joint Pre-distortion is FFS.

2. The PSCH synchronization channel can co-exist with all listed combinations

3. USCH and DSCH combinations are FFS

8.7 TDD UE Downlink Timeslot Combinations

This table describes possible downlink physical channels that can be supported by a UE within a specific time slot.

	Physical Channel Combination	Transport Channel Combination	Baseline Capability or Service dependent	Comment
1	One PSCH	SCH	Baseline	SCH can map to one or two PSCH in a frame depending on the synchronization case as defined in 25.221 (see note 1)
2	P-CCPCH and/or ~~O~~one or more S-CCPCH+ PICH	BCH and/or PCH and/or one or more FACH	Baseline	BCH ~~can~~ maps to ~~multiple~~ the P-CCPCH ~~CCPCH~~ in a frame. FACH can map to multiple S-CCPCH in a frame. PCH can map to multiple S-CCPCH in a frame. PICH substitutes one or more paging sub-channels that are mapped on a S-CCPCH assigned for the PCH transport channel. See note 2.
3	One or more DPCH	One or more DCH coded into one or more CCTrCH	Service dependant	The maximum number of DCHs and the maximum channel bit rate are dependent on UE Service Capability
4	P-CCPCH and/or ~~O~~one or more S-CCPCH+ PICH + one or more DPCH	BCH and/or PCH and/or one or more FACH and one or more DCH coded into one or more CCTrCH	Service dependent	The number of DCHs and the maximum channel bit rate are dependent on the UE Service Capability. BCH ~~can~~ maps to ~~multiple~~ the P-CCPCH ~~CCPCH~~ in a frame. FACH can map to multiple S-CCPCH in a frame. PICH substitutes one or more paging sub-channels that are mapped on a S-CCPCH assigned for the PCH transport channel. See note 2.
5	One or more PDSCH	One or more DSCH coded onto one or more CCTrCH	Service dependent	It is assumed here that a DSCH transport channel may map to one or more PDSCH physical channels based on system configuration. DSCH requires a control channel (FACH or DCH); however, it is not required to be in the same 10ms frame as the DSCH.
6	P-CCPCH and/or ~~O~~one or more PDSCH + one or more S-CCPCH+ PICH	BCH and/or PCH and/or one or more FACH and one or more DSCH coded onto one or more CCTrCH	Service dependant	BCH ~~can~~ maps to ~~multiple~~ the P-CCPCH~~CCPCH~~ in a frame. FACH can map to multiple S-CCPCH in a frame. PICH substitutes one or more paging sub-channels that are mapped on a S-CCPCH assigned for the PCH transport channel. It is assumed here that a DSCH transport channel may map to one or more PDSCH physical channels based on system configuration. For the case of DSCH + BCH, DSCH requires a control channel (FACH or DCH); however, it is not required to be in the same 10ms frame as the DSCH. See note 2.
7	One or more PDSCH + one or more DPCH	One or more DSCH coded onto one or more CCTrCH + one or more DCH coded into one or more CCTrCH	Service dependent	The maximum number of DCHs and the maximum channel bit rate are dependent on UE Service Capability It is assumed here that a DSCH transport channel may map to one or more PDSCH physical channels based on system configuration.

8	One or more PDSCH + P-CCPCH and/or one or more S-CCPCH+ PICH-+ one or more DPCH	BCH and/or PCH and/or one or more FACH and one or more DSCH coded onto one or more CCTrCH and one or more DCH coded into one or more CCTrCH	Service dependent	BCH ~~can~~ maps to ~~multiple~~ the P-CCPCH~~CCPCH~~ in a frame. FACH can map to multiple S-CCPCH in a frame. PICH substitutes one or more paging sub-channels that are mapped on a S-CCPCH assigned for the PCH transport channel. The maximum number of DCHs and the maximum channel bit rate are dependent on UE Service Capability It is assumed here that a DSCH transport channel may map to one or more PDSCH physical channels based on system configuration. See note 2.

Notes:

1. Reference: TS25.221: Physical Channels and Mapping of Transport Channels Onto Physical Channels (TDD).

2. The possibility to multiplex PCH and one or more FACH on one or more CCTrCHs is FFS

3. The PSCH synchronization channel can co-exist with all listed combinations

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Document* *(R2-99i50)
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25.302	**CR**	**026**	Current Version:	3.1.0

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

For submission to: TSG-RAN#6 *list expected approval meeting # here ↑*

for approval [X] for information [ ]

strategic [ ] non-strategic [ ] *(for SMG use only)*

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

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

Source: TSG-RAN WG2 **Date:** 29.11.1999

Subject: Removal of compressed mode inband signalling

Work item:

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

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

Release:

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

Reason for change: This CR removes the inband signalling to trigger compressed frames on the physical layer by L2. The CR is prepared with the assumption that RAN WG3 will not support this kind of inband signalling in release '99. If this assumption is changed, the CR is withdrawn.

Clauses affected: 7.3, 10.2

Other specs affected:

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

Other comments:


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7.3 Compressed Mode

Compressed Mode is defined as the mechanism whereby certain idle periods are created in radio frames so that the UE can perform measurements during these periods (more details can be found in [3]).

Compressed Mode is obtained by layer 2 using transport channels provided by the layer 1 as follows :

- Compressed Mode is controlled by the RRC layer which configures the layer 2 and the physical layer
- The number of occurrences of compressed frames is controlled by RRC, and can be modified by RRC signalling
- ~~Layer 2 instructs every Transmission Time Interval the Layer 1 on whether compressed mode should be applied for a given Transport Format Combination Set. The instruction may indicate also the type of compressed mode.~~
- The compression of frames can be either cyclic (typically for circuit services) in a compressed mode pattern (defined below) or a-periodic (typically for NRT services)
- It is under the responsibility of the layer 2 if necessary and if possible to either buffer some layer 2 PDUs (typically at the RLC layer for NRT services) or to rate adapt the data flow (similarly to GSM) so that there is no loss of data because of compressed mode. This will be service dependent and controlled by the RRC layer.

The following parameters characterize a transmission gap :

- TGL : Transmission Gap Length is the duration of no transmission, expressed in number of slots.
- CFN : The connection frame number when the transmission gap starts
- SN : The slot number when the transmission gap starts

With this definition, it is possible to have a flexible position of the transmission gap in the frame.

The following parameters characterize a compressed mode pattern (illustrated in Figure 1) :

- TGP : Transmission Gap Period is the period of repetition of a set of consecutive frames containing up to 2 transmission gaps (*).
- TGL : As defined above
- TGD : Transmission Gap Distance is the duration of transmission between two consecutive transmission gaps within a transmission gap period, expressed in number of frames. In case there is only one transmission gap in the transmission gap period, this parameter shall be set to zero.
- PD: Pattern duration is the total time of all TGPs expressed in number of frames.
- CFN : The connection frame number when the first transmission gap starts
- PCM: Power Control Mode specifies the uplink power control algorithm applied during recovery period after each transmission gap in compressed mode. PCM can take 2 values (0 or 1). The different power control modes are described in TS 25.214.

In a compressed mode pattern, the first transmission gap starts in the first frame of the pattern. The gaps have a fixed position in the frames, and start in the slot position defined in [3].

(*) : Optionally, the set of parameters may contain 2 values TGP1 and TGP2, where TGP1 is used for the 1st and the consecutive odd gap periods and TGP2 is used for the even ones. Note if TGP1=TGP2 this is equivalent to using only one TGP value.

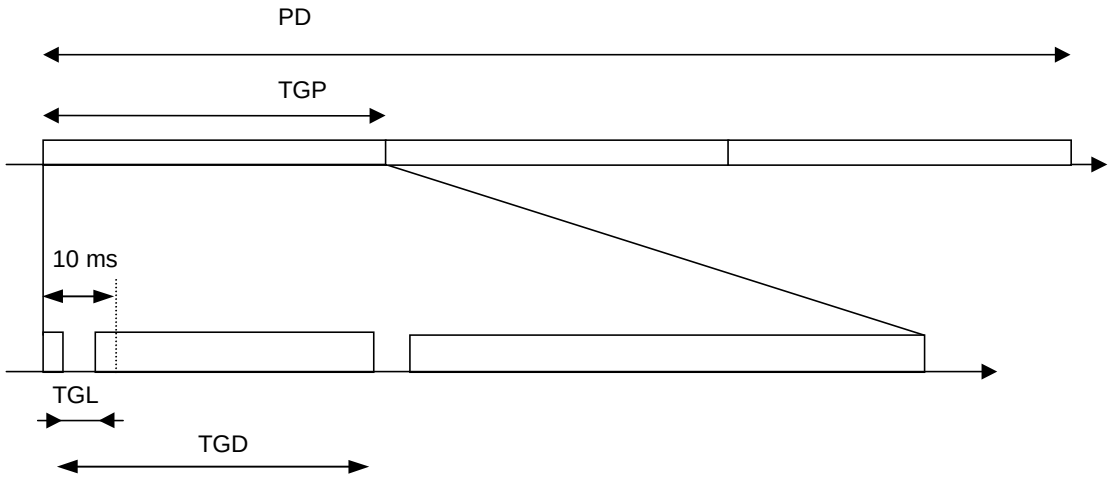

Figure 1. Illustration of compressed mode pattern parameters.

10.2 Generic names of primitives between layers 1 and 2

The primitives between layer 1 and layer 2 are shown in the Table 1.

Table 1. Primitives between layer 1 and 2

Generic Name	Parameters
PHY-DATA-REQ	TFI, ~~compressed mode type,~~ TBS
PHY-DATA-IND	TFI, TBS, CRC result, TD[1]
PHY-STATUS-IND	Event value

[1]: TDD only

PHY-Data-REQ

The PHY-DATA primitives are used to request SDUs used for communications passed to and from the physical layer. One PHY-DATA primitive is submitted every Transmission Time Interval for each Transport Channel.

Primitive Type: request.

Parameters:

- TFI
- ~~Type of compressed mode (e.g. uncompressed, compressed)~~
- Transport Block Set
- $\underline{FN_{CELL}}$
- Page indicators (PIs) (PCH only)

PHY- Data-IND

The PHY-DATA primitives are used to indicate SDUs used for Layer 2 passed to and from the physical layer. One PHY-DATA primitive is submitted every Transmission Time Interval for each Transport Channel.

Primitive Type: indicate

Parameters:

- TFI
- Transport Block Set
- CRC check result

- TD (RX Timing Deviation measurement) (optional, TDD only)

10.1.3 PHY-Status-IND

The PHY-STATUS primitive can be used by the layer 1 to notify higher layers of an event which has occurred.

Primitive Type: indication

Parameters

- Event value

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Document (R2-99k06)
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25.302	CR	028r1	Current Version:	3.1.0

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

For submission to:	TSG-RAN#6	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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

Proposed change affects: *(at least one should be marked with an X)*

(U)SIM		ME		UTRAN / Radio	X	Core Network	

Source: TSG-RAN WG2 **Date:** 30 Nov 1999

Subject: Measurement of Transmitted carrier power

Work item:

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

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature	X		Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: As a result of a Liaison statement (R2-99h75) received from RAN-WG4 Ad Hoc, RAN-WG2 agreed to change the description in 25.302 according to what was proposed in that LS.
The proposal in the LS was to have the measurement “Transmitted carrier power” as a relative measurement (compared to the output power) instead of as an absolute measurement in order to get better accuracy.

Clauses affected:

Other specs affected:

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

Other comments: In CR 015 “Alignment of measurement names with RAN decision” the name of former “Total Tx power” is changed to “Transmitted carrier power.


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9.1.12 ~~Total Tx~~Transmitted carrier Power

Measurement	~~total Tx~~Transmitted carrier power
Source	L1(Node-B)
Destination	**RRC(RNC)**
Reporting Trigger	**On-demand, periodic, Event-triggered**
Definition	Transmitted carrier~~The total~~ power ~~emitted by the Node-B within the channel bandwidth averaged over an interval of [1 s]~~is the ratio between the total transmitted power on one DL carrier from one UTRAN access point, compared to the maximum power possible to use on that DL carrier at this moment of time. For TDD this is measured in specified timeslots.

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25.302	CR	031	Current Version:	3.1.0

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

For submission to:	TSG-RAN#6	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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

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

Source: TSG-RAN WG2 **Date:** 6 Dec 1999

Subject: Measurement of Physical Channel BER

Work item:

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

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature	X		Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: As a result of a Liaison statement (R2-99k84) received from RAN-WG1, RAN-WG2 agreed to change the description in 25.302 according to what was agreed in RAN-WG1.
The proposal is to have two different types of the measurement “Physical channel BER”. Type 1 is measured on the DPDCH and Type 2 on the DPCCH.

Clauses affected:

Other specs affected:

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

Other comments: In CR 015 “Alignment of measurement names with RAN decision” the definition of physical channel BER was also changed. The changes in that CR is reflected here, also the changes according to the RAN-WG1 LS have been made.


help.doc

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

~~9.2.4~~9.2.5 Physical channel~~CH~~ BER

Measurement	~~p~~Physical channel BER
Source	L1(Node-B)
Destination	**RRC(RNC)**
Reporting Trigger	**On-demand, Event-triggered, periodic**
Definition	~~The estimate of the raw BER of the physical channel calculated only on~~ There are two types of this measurement. Type 1 calculates the physical channel BER on the data part before channel decoding and after RL combining. Type 2 calculates the physical channel BER on the control part after RL combining.