

TSG-RAN Meeting #27
Tokyo, Japan, 09-11 March 2005

RP-050076
Agenda item 9.4

Source: TSG-RAN WG2

Title: 25.302 CR to Rel-6 on the introduction of MBMS

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Doc-2nd-Level	Workitem
25.302	150	1	Rel-6	Introduction of MBMS	B	6.2.0	6.3.0	R2-050719	MBMS-RAN

CHANGE REQUEST

25.302 CR 150 # rev 1 # Current version: 6.2.0

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the # symbols.

Proposed change affects: UICC apps# ME Radio Access Network Core Network

Title:	# Introduction of MBMS		
Source:	# RAN WG2		
Work item code:	# MBMS-RAN	Date:	# 24/02/2005
Category:	# B	Release:	# Rel-6
	<p>Use <u>one</u> of the following categories:</p> <p>F (correction)</p> <p>A (corresponds to a correction in an earlier release)</p> <p>B (addition of feature),</p> <p>C (functional modification of feature)</p> <p>D (editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>		<p>Use <u>one</u> of the following releases:</p> <p><i>Ph2</i> (GSM Phase 2)</p> <p><i>R96</i> (Release 1996)</p> <p><i>R97</i> (Release 1997)</p> <p><i>R98</i> (Release 1998)</p> <p><i>R99</i> (Release 1999)</p> <p><i>Rel-4</i> (Release 4)</p> <p><i>Rel-5</i> (Release 5)</p> <p><i>Rel-6</i> (Release 6)</p> <p><i>Rel-7</i> (Release 7)</p>

Reason for change:	# Introduction of MBMS		
Summary of change:	# The use of layer 1 combining on FACH is indicated in sub-clause 6.2. A brief description of MBMS control primitives is included in clause 10. Sub-clause 8.2 contains a proposed description of MBMS UE simultaneous physical channel combinations for FDD downlink. The corresponding description for TDD is in sub-clause 8.4.		
Consequences if not approved:	# (Category B)		

Clauses affected:	# 2, 3.2, 6.2, 8.2, 8.4.1, 8.4.2, 10.2.2, 10.2.2.18 (new), 10.2.2.19 (new), 10.3.5.4, 10.3.5.27 (editorial), 10.3.5.28 (editorial), 10.3.5.29 (new) and 10.3.11 (new).						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	#
Y	N						
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
		Test specifications	#				
		O&M Specifications	#				
Other comments:	#						

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. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TS 23.110: "UMTS Access Stratum; Services and Functions".
- [2] 3GPP TS 25.301: "Radio Interface Protocol Architecture".
- [3] 3GPP TS 25.212: "Multiplexing and channel coding (FDD)".
- [4] 3GPP TS 25.222: "Multiplexing and channel coding (TDD)".
- [5] 3GPP TS 25.224: "Physical Layer Procedures (TDD)".
- [6] 3GPP TS 25.215: "Physical Layer – Measurements (FDD)".
- [7] 3GPP TS 25.213: "Spreading and modulation (FDD)".
- [8] 3GPP TS 25.214: "Physical layer procedures (FDD)".
- [9] 3GPP TS 25.123: "Requirements for Support of Radio Resource Management (TDD)".
- [10] 3GPP TS 25.133: "Requirements for Support of Radio Resource Management (FDD)".
- [11] 3GPP TS 25.225: "Physical Layer – Measurements (TDD)".
- [12] 3GPP TS 25.221: "Physical channels and mapping of transport channels onto physical channels (TDD)".
- [13] 3GPP TS 25.331: "Radio Resource Control (RRC); protocol specification".
- [14] [3GPP TS 25.346: "Introduction of the Multimedia Broadcast Multicast Service \(MBMS\) in the Radio Access Network \(RAN\); Stage 2"](#).

3 Definitions and abbreviations

3.2 Abbreviations

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

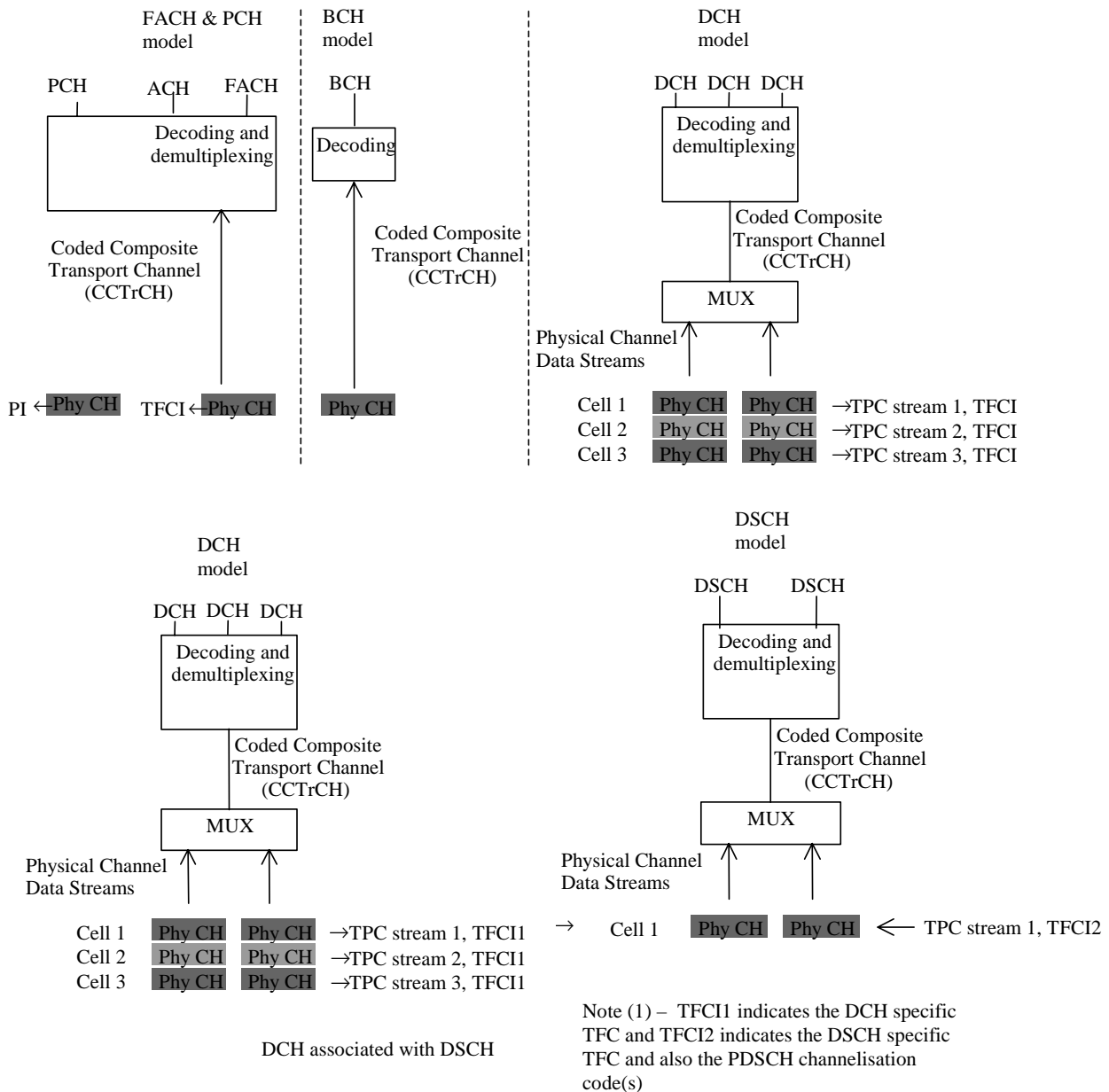
ARQ	Automatic Repeat Request
BCCH	Broadcast Control Channel
BCH	Broadcast Channel
C-	Control-
CC	Call Control
CCC	CPCH Control Command
CCCH	Common Control Channel
CCH	Control Channel
CCTrCH	Coded Composite Transport Channel
CN	Core Network
CQI	Channel Quality Indicator
CRC	Cyclic Redundancy Check
DC	Dedicated Control (SAP)
DCA	Dynamic Channel Allocation
DCCH	Dedicated Control Channel
DCH	Dedicated Channel
DL	Downlink
DRNC	Drift Radio Network Controller
DSCH	Downlink Shared Channel
DTCH	Dedicated Traffic Channel
E-AGCH	E-DCH Absolute Grant Channel
E-DCH	Enhanced DCH
E-DPCCH	E-DCH Dedicated Physical Control Channel
E-DPDCH	E-DCH Dedicated Physical Data Channel
E-HICH	E-DCH HARQ Acknowledgement Indicator Channel
E-RGCH	E-DCH Relative Grant Channel
E-TFC	E-DCH Transport Format Combination
FACH	Forward Link Access Channel
FCS	Fame Check Sequence
FDD	Frequency Division Duplex
GC	General Control (SAP)
HARQ	Hybrid Automatic Repeat Request
HS-DPCCH	High Speed Dedicated Physical Control Channel
HS-DSCH	High Speed Downlink Shared Channel
HS-SCCH	High Speed Shared Control Channel
HS-SICH	High Speed Shared Information Channel
HO	Handover
ITU	International Telecommunication Union
kbps	kilo-bits per second
L1	Layer 1 (physical layer)
L2	Layer 2 (data link layer)
L3	Layer 3 (network layer)
LAC	Link Access Control
LAI	Location Area Identity
MAC	Medium Access Control
MBMS	Multimedia Broadcast Multicast Service
MCCH	MBMS point-to-multipoint Control Channel
MICH	MBMS notification Indicator Channel
MM	Mobility Management
MSCH	MBMS point-to-multipoint Scheduling Channel
MTCH	MBMS point-to-multipoint Traffic Channel
Nt	Notification (SAP)

PCCH	Paging Control Channel
PCH	Paging Channel
PDU	Protocol Data Unit
PHY	Physical layer
PhyCH	Physical Channels
RACH	Random Access Channel
RLC	Radio Link Control
RNC	Radio Network Controller
RNS	Radio Network Subsystem
RNTI	Radio Network Temporary Identity
RRC	Radio Resource Control
SAP	Service Access Point
SDU	Service Data Unit
SRNC	Serving Radio Network Controller
SRNS	Serving Radio Network Subsystem
SS	Synchronisation Shift
TCH	Traffic Channel
TDD	Time Division Duplex
TFCI	Transport Format Combination Indicator
TFI	Transport Format Indicator
TFRI	Transport Format and Resource Indicator
TMSI	Temporary Mobile Subscriber Identity
TPC	Transmit Power Control
TSN	Transmission Sequence Number
U-	User-
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunications System
URA	UTRAN Registration Area
UTRA	UMTS Terrestrial Radio Access
UTRAN	UMTS Terrestrial Radio Access Network

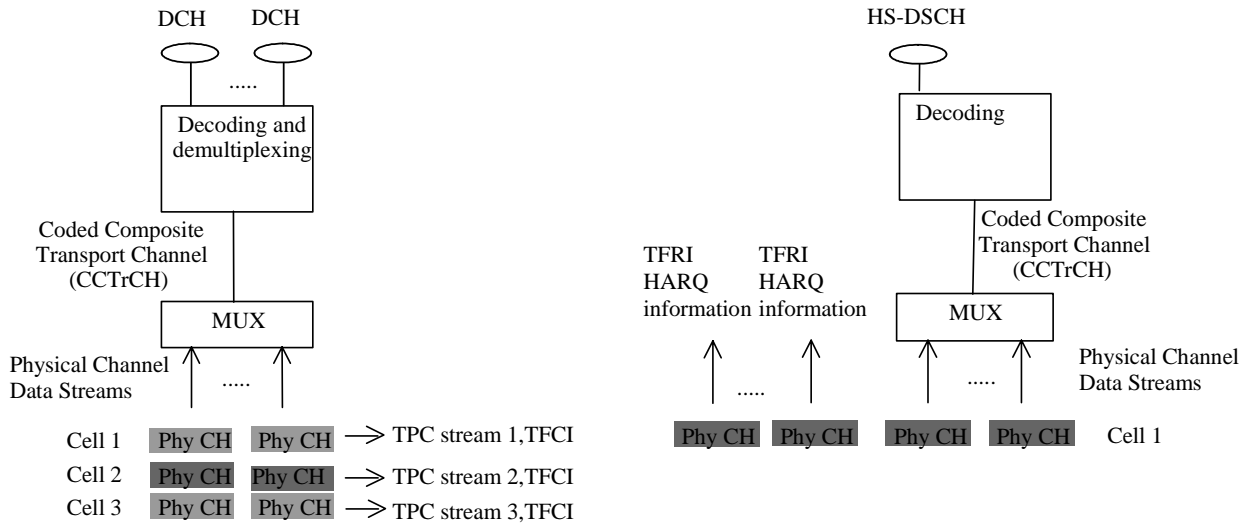
6 Model of physical layer of the UE

6.2 Downlink models

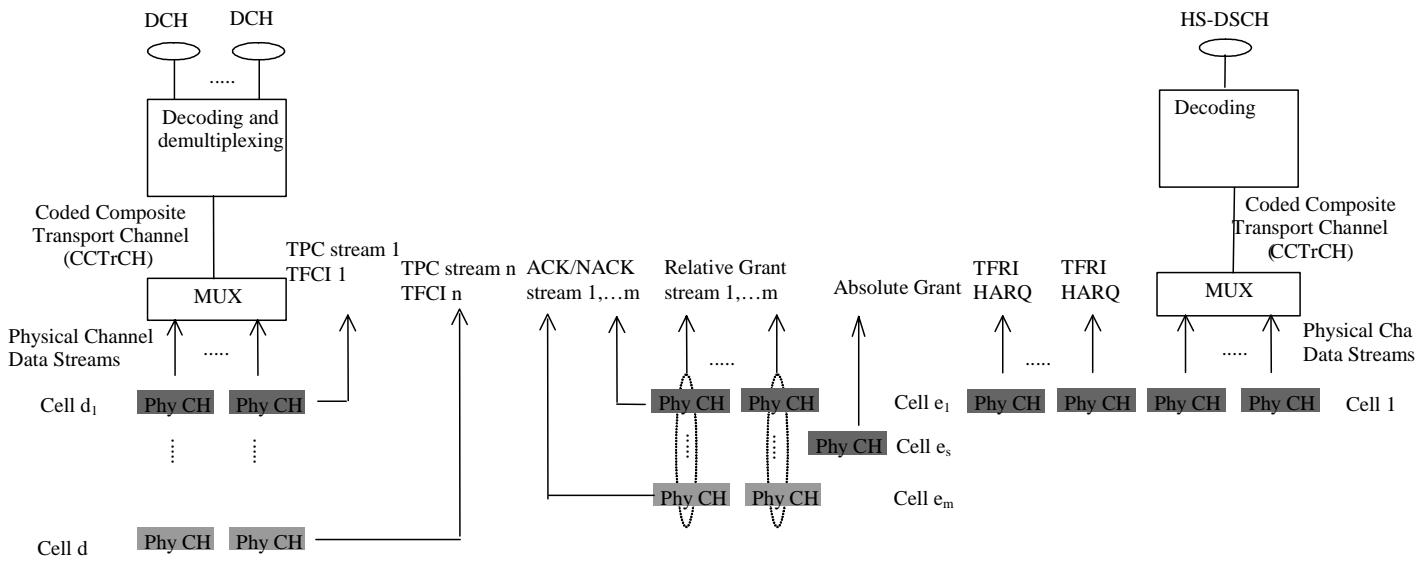
Figure 3 and figure 4 show the model of the UE's physical layer for the downlink in FDD and TDD mode, respectively. Note that there is a different model for each transport channel type.



DCH model with HS-DSCH(s)



DCH and HS-DSCH model with E-DCH support



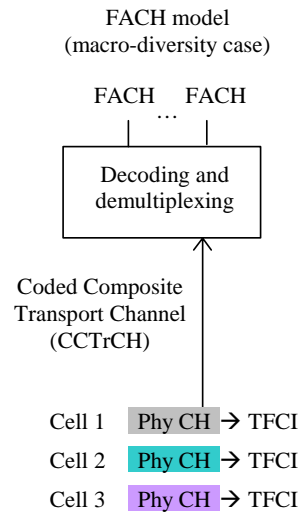
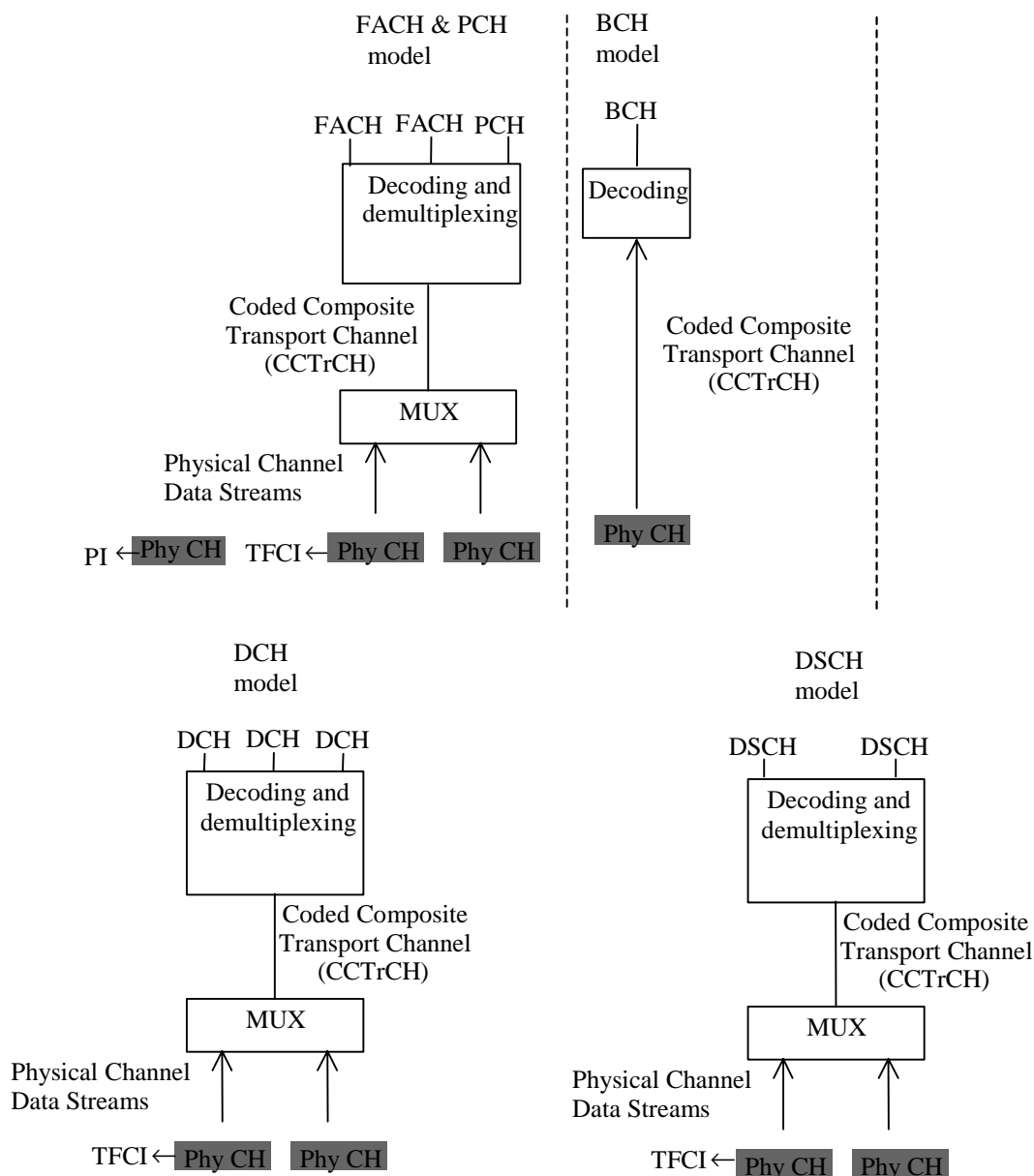
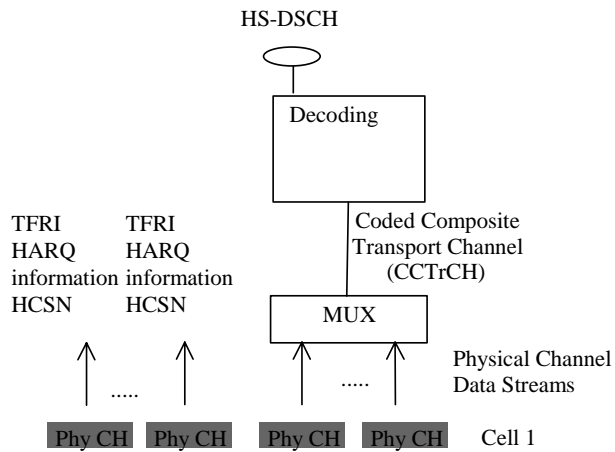
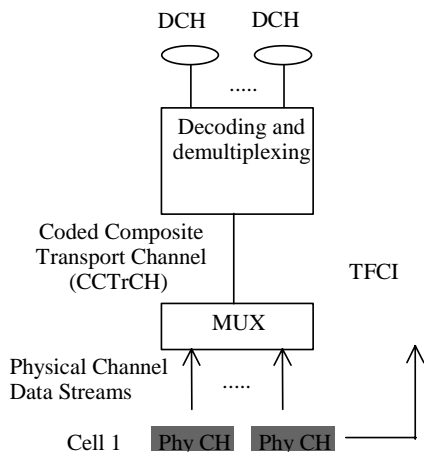


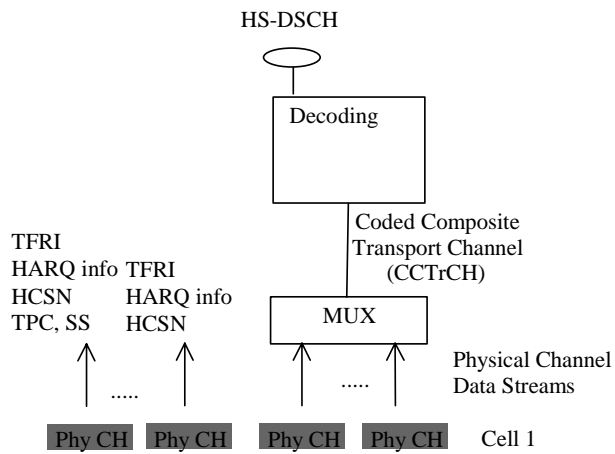
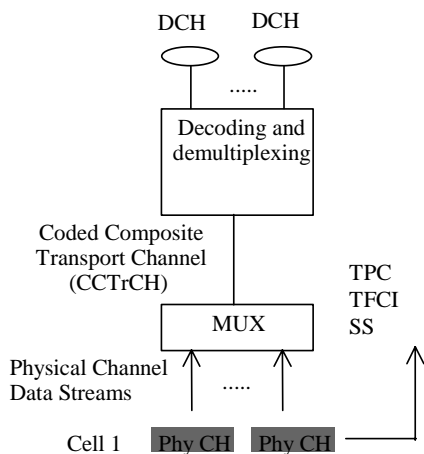
Figure 3: Model of the UE's physical layer - downlink FDD mode



DCH model with HS-DSCH(s)
for 3.84 Mcps TDD



DCH model with HS-DSCH(s)
for 1.28 Mcps TDD



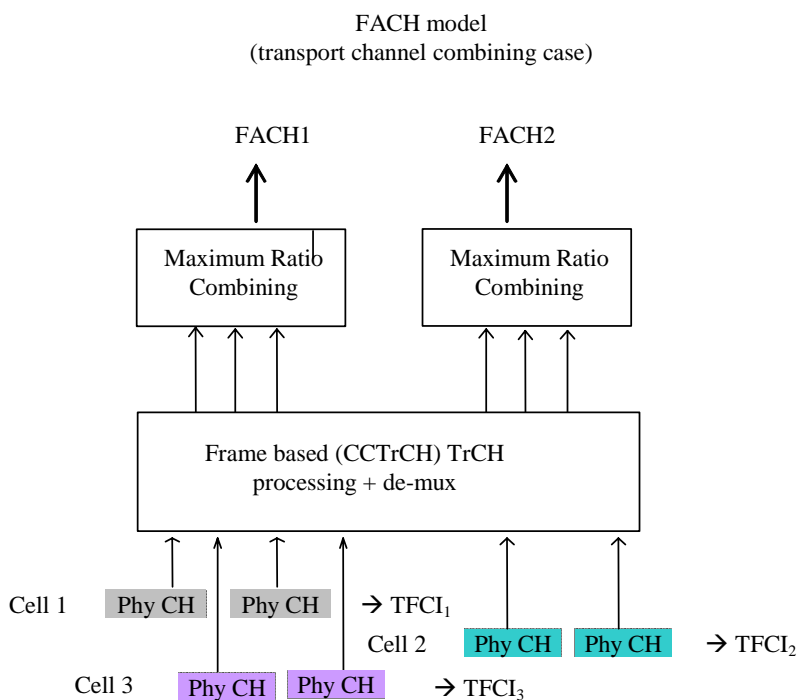


Figure 4: Model of the UE's physical layer – downlink TDD mode

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.

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 always mapped onto one physical channel without any multiplexing with other transport channels, and there can only be one BCH TrCH and no other TrCH in a BCH CCTrCH.

For point-to-multipoint transmission [14], FACH can be distributed on a set of physical layer combinable CCTrCHs, i.e., for macro-diversity combining: soft combining (FDD and TDD) or transport channel combining (TDD only). The physical layer combinable CCTrCHs shall have the same TFC during the TTIs in which soft combining can be used. The physical layer combinable CCTrCHs need not have the same TFC during the TTIs in which transport channel combining can be used. The possibility of performing macro-diversity combining (either soft combining or transport channel combining) shall be signalled to the UE.

In the TDD mode a CCTrCh carrying PCH and one or several FACH can be multiplexed onto one or several physical channel data streams.

For each HS-DSCH TTI, each HS-SCCH carries HS-DSCH-related downlink signalling for one UE. The following information is carried on the HS-SCCH:

- Transport Format and Resource Indicator (TFRI);
- Hybrid-ARQ-related Information (HARQ information);
- UE Identity via a UE specific CRC;
- HS-SCCH Cyclic Sequence Number (HCSN) for TDD.

In addition, for the case of 1.28 Mcps TDD, the HS-SCCH also carries Transmit Power Control and Synchronisation Shift symbols.

In FDD mode, the E-DCH active set can be identical or a subset of the DCH active set.

The E-DCH ACK/NACKs are transmitted by each cell of the E-DCH active set on a physical channel called E-HICH. The E-HICHs of the cells belonging to the same RLS (same MAC-e entity i.e. same Node B) shall have the same content and be combined by the UE. The set of cells transmitting identical ACK/NACK information is the same as the set of cells sending identical TPC bits (excluding the cells which are not in the E-DCH active set).

The E-DCH Absolute Grant is transmitted by a single cell, the Serving E-DCH cell (Cell e_s on figure 4) on a physical channel called E-AGCH. The relationship between the Serving E-DCH cell and the HS-DSCH Serving cell is FFS.

The E-DCH Relative Grants are transmitted by each cell of the E-DCH active set on a physical channel called E-RGCH. The E-RGCHs of the cells belonging to the same RLS shall have the same content and be combined by the UE. There is one Serving E-DCH RLS (containing the Serving E-DCH cell) and optionally one or several Non-serving E-DCH RLS.

8 UE Simultaneous Physical Channels combinations

8.2 FDD Downlink

The table describes the possible combinations of FDD physical channels that can be supported in the downlink on the same frequency by one UE simultaneously.

Table 2: FDD Downlink

	Physical Channel Combination	Transport Channel Combination	Mandatory dependent on UE radio access capabilities	Comment
1	PCCPCH	BCH	Mandatory	
2	SCCPCH	One or more FACH Or PCH Or one or more FACH + PCH	Mandatory	The maximum channel bit rate that can be supported is dependent on the UE radio access capabilities. The PCH is included when the UE needs to receive paging on the SCCPCH. The reception of (one or more FACH + PCH) is to enable the reception of broadcast services on the CTCH, mapped to one of the FACH.
3	PCCPCH + SCCPCH	BCH + (one or more FACH or PCH or (one or more FACH + PCH))	Mandatory	Simultaneous reception of PCCPCH and SCCPCH is only needed at occurrences when the UE needs to read system information on BCH while being in CELL_FACH state, i.e. continuous reception of both PCCPCH and SCCPCH at the same time is not required. The requirement holds for PCCPCH and SCCPCH sent in different cells or in the same cell. The PCH is included when the UE needs to receive paging on the SCCPCH. The reception of (one or more FACH + PCH) is to enable the reception of broadcast services on the CTCH, mapped to one of the FACH.
4	SCCPCH + AICH	(One or more FACH or PCH or (one or more FACH + PCH))+ RACH in uplink Or (one or more FACH or PCH or (one or more FACH + PCH))+ CPCH in uplink	Mandatory	The maximum channel bit rate that can be supported is dependent on the UE radio access capabilities. The PCH is included when the UE needs to receive paging on the SCCPCH. The reception of (one or more FACH + PCH) is to enable the reception of broadcast services on the CTCH, mapped to one of the FACH. This physical channel combination facilitates the preamble portion of the CPCH in the uplink
5	SCCPCH + DPCCH	(One or more FACH or PCH or (one or more FACH + PCH))+ CPCH in uplink	Depending on UE radio access capabilities	This physical channel combination facilitates the message portion of the CPCH in the uplink The PCH is included when the UE needs to receive paging on the SCCPCH. The reception of (one or more FACH + PCH) is to enable the reception of broadcast services on the CTCH, mapped to one of the FACH.
6	More than one SCCPCH	More than one (one or more FACH or PCH or (one or more FACH + PCH))	Depending on UE radio access capabilities	The PCH is included when the UE needs to receive paging on the SCCPCH. The reception of (one or more FACH + PCH) is to enable the reception of broadcast services on the CTCH, mapped to one of the FACH. One or more FACHs are used to enable the reception of MBMS (i.e., MCCH, MSCH and MTCH). The maximum number of SCCPCHs and the maximum bit rate depend on the UE implementation. The combination includes the case where one or more MBMS FACHs are transmitted on the same SCCPCH as used for non-MBMS FACH or PCH.
7	PICH	N/A	Mandatory	
8	DPCCH + DPDCH	One or more DCH coded into a single CCTrCH	Mandatory	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities.

	Physical Channel Combination	Transport Channel Combination	Mandatory dependent on UE radio access capabilities	Comment
9	DPCCH + more than one DPDCH	One or more DCH coded into a single CTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities.
10	One or more PDSCH + DPCCH + one or more DPDCH	One or more DSCH coded into a single CTrCH + one or more DCH coded into a single CTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities.
11	SCCPCH + DPCCH + one or more DPDCH	One or more FACH + one or more DCH coded into a single CTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination of physical channels is used for DRAC control of an uplink DCH and for receiving services such as cell broadcast or multicast whilst in connected mode. NOTE 1
12	SCCPCH + one or more PDSCH + DPCCH + one or more DPDCH	One or more FACH + one or more DSCH coded into a single CTrCH + one or more DCH coded into a single CTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination of physical channels is used for simultaneous DSCH and DRAC control of an uplink DCH. NOTE 1
13	One DPCCH + more than one DPDCH	More than one DCH coded into one or more CTrCH	Depending on UE radio access capabilities	
14	PCCPCH (neighbour cell) + DPCCH + one or more DPDCH + zero, one, or more PDSCH	BCH (neighbour cell) + one or more DCHs + zero, one or more DSCH	Mandatory	This combination is required by a UE in CELL_DCH state to be able to read the SFN of a neighbouring cell and support "SFN-CFN observed time difference" and "SFN-SFN observed time difference" measurements.
15	DPCCH + one or more DPDCH + one or more HS-SCCH + zero, one or more HS-PDSCH	One HS-DSCH coded into a single CTrCH + one or more DCH coded into a single CTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. NOTE 2
16	PCCPCH (neighbour cell) + DPCCH + one or more DPDCH + one or more HS-SCCH + zero, one or more HS-PDSCH	BCH (neighbour cell) + one or more DCHs + one HS-DSCH	Depending on UE radio access capabilities	This combination is required by a UE in CELL_DCH state to be able to read the SFN of a neighbouring cell and support "SFN-CFN observed time difference" and "SFN-SFN observed time difference" measurements while HS-DSCH(s) are configured. NOTE 2
17	DPCCH + one or more DPDCH + one or more E-HICH + one E-AGCH + one or more E-RGCH	One or more DCH coded into a single CTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. In this combination E-DCH is configured in uplink.

	Physical Channel Combination	Transport Channel Combination	Mandatory dependent on UE radio access capabilities	Comment
18	DPCCH + one or more DPDCH + one or more HS-SCCH + zero, one or more HS-PDSCH+ one or more E-HICH + one E-AGCH + one or more E-RGCH	One HS-DSCH coded into a single CCTrCH + one or more DCH coded into a single CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. In this combination E-DCH is configured in uplink. NOTE 2
19	PCCPCH (neighbour cell) + DPCCH + one or more DPDCH + one or more HS-SCCH + zero, one or more HS-PDSCH + one or more E-HICH + E-AGCH + one or more E-RGCH	BCH (neighbour cell) + one or more DCHs + one HS-DSCH	Depending on UE radio access capabilities	This combination is required by a UE in CELL_DCH state to be able to read the SFN of a neighbouring cell and support "SFN-CFN observed time difference" and "SFN-SFN observed time difference" measurements while HS-DSCH(s) are configured. In this combination E-DCH is configured in uplink. NOTE 2
X	MICH	N/A	Depending on UE radio access capabilities	
+1	MICH + PICH	N/A	Depending on UE radio access capabilities	
+2	MICH + one SCCPCH	More than one (one or more FACH or PCH or (one or more FACH + PCH))	Depending on UE radio access capabilities	Allowing MBMS notification indication during reception of non-MBMS FACH or PCH.
+3	PICH + one or more SCCPCH	One or more FACH	Depending on UE radio access capabilities	The maximum number of SCCPCHs and the maximum bit rate depend on the UE implementation.
<p>NOTE 1: When both DRAC and CTCH are configured in one cell, the UTRAN should transmit DRAC info and CTCH info on the same S-CCPCH in order to minimize the number of S-CCPCH to be read by the UE. A UE, which supports the simultaneous reception of S-CCPCH and DPCH, shall be capable of switching between different S-CCPCH in order to listen to DRAC info and CTCH info that are not scheduled in the same time intervals. If the UE is ordered to listen to CTCH and DRAC info on different S-CCPCH in the same time interval, it shall listen to DRAC info in priority.</p>				
<p>NOTE 2: When one or more HS-PDSCHs are received, it is sufficient for the UE to monitor only one HS-SCCH.</p>				

~~NOTE 1: When both DRAC and CTCH are configured in one cell, the UTRAN should transmit DRAC info and CTCH info on the same S-CCPCH in order to minimize the number of S-CCPCH to be read by the UE. A UE which supports the simultaneous reception of S-CCPCH and DPCH, shall be capable of switching between different S-CCPCH in order to listen to DRAC info and CTCH info that are not scheduled in the same time intervals. If the UE is ordered to listen to CTCH and DRAC info on different S-CCPCH in the same time interval, it shall listen to DRAC info in priority.~~

~~NOTE 2: When one or more HS-PDSCHs are received, it is sufficient for the UE to monitor only one HS-SCCH.~~

8.4 TDD Downlink

8.4.1 3.84 Mcps TDD Downlink

The table describes the possible combinations of 3.84 Mcps TDD physical channels that can be supported in the downlink by one UE simultaneously on the same frequency in any one 10ms frame, where a 3.84 Mcps TDD physical channel corresponds to one code, one timeslot and one frequency.

Depending on UE radio capabilities UEs may be required to decode occasionally P-CCPCH of its own cell in the following Physical Channel Combinations to maintain open loop power control and/or acquire parameters for RACH access: 4, 6, 7, 8, 9, 10, 11, 12, 13.

Depending on UE radio capabilities UEs may be required to decode occasionally one P-CCPCH of neighbour cells in the following Physical Channel Combinations for handover: 6, 8, 11, 12, 13.

Table 5: 3.84 Mcps TDD Downlink

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
1	P-CCPCH + One S-CCPCH	BCH and PCH and/or one or more FACH	Mandatory	
2	P-CCPCH	BCH	Mandatory	
3	S-CCPCH	FACH or/and PCH	Mandatory	
4	More than one S-CCPCH	one or more FACH+ one or more PCH	Depending on UE capabilities	One or more FACHs are used to enable the reception of MBMS (i.e., MCCH, MSCH and MTCH). The maximum number of SCCPCHs and the maximum bit rate depend on the UE implementation. The combination includes the case where one or more MBMS FACHs are transmitted on the same SCCPCH as used for non-MBMS FACH or PCH.
5	PICH	N/A	Mandatory	
6	Three or more DPCH	One or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities.
7	One or two DPCH	One or more DCH coded into a single CCTrCH	Mandatory	This combination is used for reference measurement channel.
8	One or more S-CCPCH + one or more DPCH	PCH and/or one or more FACH + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The number of DCHs and the maximum channel bit rate are dependent on the UE radio access capabilities. This combination is used for shared channel operation only.
9	One or more PDSCH	One or more DSCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This combination is used for shared channel operation.
10	One or more PDSCH + one or more S-CCPCH	PCH and/or one or more FACH + one or more DSCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This combination is used for shared channel operation.

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
11	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	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination is used for shared channel operation.

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
12	One or more PDSCH + one or more S-CCPCH + one or more DPCH	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	Depending on UE radio access capabilities	The maximum number of DCHs and the maximum channel bit rate are dependent on UE radio access capabilities. This combination is used for shared channel operation.
13	One or more DPCH + zero, one or more HS-PDSCH + one or more HS-SCCH	One or more DCH coded into one or more CCTrCH + one or more HS-DSCH coded into one CCTrCH	Depending on UE radio access capabilities	
X	MICH	N/A	Depending on UE radio access capabilities	
+1	MICH + PICH	N/A	Depending on UE radio access capabilities	
+2	MICH + one or more SCCPCH	One or more FACH + one or more PCH + (NOTE 2)	Depending on UE radio access capabilities	Allowing MBMS notification indication during reception of non-MBMS FACH or PCH.
+3	PICH + one or more SCCPCH	One or more FACH + (NOTE 2)	Depending on UE radio access capabilities	The maximum number of SCCPCHs and the maximum bit rate depend on the UE implementation.
+4	MICH + PICH + one or more SCCPCH	One or more FACH + (NOTE 2)	Depending on UE radio access capabilities	The maximum number of SCCPCHs and the maximum bit rate depend on the UE implementation.
NOTE 1: Reference: [12].				
NOTE 2: + (zero, one or more DCH coded onto one or more CCTrCh) + (zero, one or more DSCH coded onto one or more CCTrCH) + (zero, one or more HS-DSCH coded onto one or more CCTrCH).				

8.4.2 1.28 Mcps TDD Downlink

The table addresses the possible combinations of 1.28 Mcps TDD physical channels that can be supported in the downlink by one UE simultaneously on the same frequency in any one 5ms subframe. In 1.28 Mcps TDD a physical channel corresponds to one code, one timeslot, one frequency.

Depending on UE radio capabilities UEs may be required to decode occasionally P-CCPCH of its own cell in the following Physical Channel Combinations: 5, 11, 12, 13, 14, 15, 16, 17, 18.

To support handover it depends on UE capabilities if a UE can support the occasional decoding of neighbour cell P-CCPCH in the physical channel combinations 8, 9, 10, 11, 15,16, 17, 18.

Table 6: 1.28 Mcps TDD Downlink

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
1	FPACH	N/A	Mandatory	FPACH is used to answer the UE and to adjust the timing and synchronization shift of the UE
2	P-CCPCH	BCH	Mandatory	
3	S-CCPCH	FACH or/and PCH	Mandatory	
4	P-CCPCH +S-CCPCH	BCH + (FACH or/and PCH)	Mandatory	

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
5	More than one S-CCPCH	one or more FACH+ one or more PCH	Depending on UE capabilities	One or more FACHs are used to enable the reception of MBMS (i.e., MCCH, MSCH and MTCH). The maximum number of SCCPCHs and the maximum bit rate depend on the UE implementation. The combination includes the case where one or more MBMS FACHs are transmitted on the same SCCPCH as used for non-MBMS FACH or PCH.
6	PICH	N/A	Mandatory	
7	FPACH + P-CCPCH + none, one or more S-CCPCH	BCH + (none, one or more FACH+ none, one or more PCH)	Depending on UE capabilities	
8	2 DPCH	One or more DCH coded into a single CCTrCH	Mandatory	The maximum number of DCH and the maximum channel bit rate are dependent on UE radio access capabilities This channel is used as reference measurement channel
9	One or more DPCH	One or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs, the maximum number of CCTrCH and the maximum channel bit rate are dependent on UE radio access capabilities.
10	FPACH + one or more DPCH	One or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	FPACH is used to answer the UE and to adjust the timing and synchronization shift of the UE. The maximum number of DCHs, the maximum number of CCTrCH and the maximum channel bit rate are dependent on UE radio access capabilities. This configuration is required for UE that operate shared channels and dedicated channels simultaneously.
11	One or more S-CCPCH + one or more DPCH	(One or more FACH or/and PCH) + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities	The maximum number of DCHs, the maximum number of CCTrCH and the maximum channel bit rate are dependent on UE radio access capabilities. This configuration is required for UE that operate shared channels and dedicated channels simultaneously.
12	One or more PDSCH	One or more DSCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This configuration is required for UE that operate shared channels.
13	FPACH + one or more PDSCH	One or more DSCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This configuration is desirable but not essential for UE supporting shared channels.
14	One or more S-CCPCH + one or more PDSCH	(One or more FACH and/or PCH) + One or more DSCH coded onto one or more CCTrCH	Depending on UE radio access capabilities	This configuration is desirable but not essential for UE supporting shared channels.
15	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	Depending on UE radio access capabilities	This configuration is required for UE that operate shared channels and dedicated channels simultaneously.

	Physical Channel Combination	Transport Channel Combination	Mandatory or dependent on UE radio access capabilities	Comment
16	FPACH + 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	Depending on UE radio access capabilities.	FPACH is used to answer the UE and to adjust the timing and synchronization shift of the UE. This configuration is desirable but not essential for UE supporting shared channels and dedicated channels simultaneously.
17	One or more S-CCPCH + one or more PDSCH + one or more DPCH	(One or more FACH and/or PCH) + one or more DSCH coded onto one or more CCTrCH + one or more DCH coded into one or more CCTrCH	Depending on UE radio access capabilities.	This configuration is desirable but not essential for UE supporting shared channels and dedicated channels simultaneously.
18	One or more DPCH + zero, one or more HS-PDSCH + one or more HS-SCCH	One or more DCH coded into one or more CCTrCH + one or more HS-DSCH coded into one CCTrCH	Depending on UE radio access capabilities	
X	MICH	N/A	Depending on UE radio access capabilities	
+1	MICH + PICH	N/A	Depending on UE radio access capabilities	
+2	MICH + one or more SCCPCH	One or more FACH + one or more PCH + (NOTE 1)	Depending on UE radio access capabilities	Allowing MBMS notification indication during reception of non-MBMS FACH or PCH.
+3	PICH + one or more SCCPCH	One or more FACH + (NOTE 1)	Depending on UE radio access capabilities	The maximum number of SCCPCHs and the maximum bit rate depend on the UE implementation.
+4	MICH + PICH + one or more SCCPCH	One or more FACH + (NOTE 1)	Depending on UE radio access capabilities	The maximum number of SCCPCHs and the maximum bit rate depend on the UE implementation.
NOTE 1: + (zero, one or more DCH coded onto one or more CCTrCh) + (zero, one or more DSCH coded onto one or more CCTrCH) + (zero, one or more HS-DSCH coded onto one or more CCTrCH).				

10 Primitives of the physical layer

10.2 Generic names of primitives between layers 1 and 3

10.2.2 CONTROL PRIMITIVES

The control primitives between layer 1 and 3 are shown in table 9.

Table 9: Control primitives between layer 1 and 3

Generic Name	Parameter			
	REQ	IND	RESP	CNF
CPHY-TrCH-Config	transport channel description	Not Defined	Not Defined	No Parameter
CPHY-TrCH-Release	No Parameter	Not Defined	Not Defined	No Parameter
CPHY-RL-Setup	physical channel description	Not Defined	Not Defined	No Parameter
CPHY-RL-Release	No Parameter	Not Defined	Not Defined	No Parameter
CPHY-RL-Modify	physical channel description	Not Defined	Not Defined	No Parameter
CPHY-Commit	activation time	Not Defined	Not Defined	Not Defined
CPHY-CPCH-Estop	No Parameter (1)	No Parameter (1)	No Parameter (1)	No Parameter (1)
CPHY-Out-of-Sync-Config	Out of Sync detection parameters	Not Defined	Not Defined	No Parameter
<u>CPHY-MBMS-Config</u>	<u>MBMS information</u>	<u>Not Defined</u>	<u>Not Defined</u>	<u>No Parameter</u>
NOTE (1): FDD only.				

10.2.2.18 CPHY-MBMS-Config-REQ

This primitive is sent from UE RRC to L1 for the configuration of the MBMS information.

Parameters:

- MBMS information.

10.2.2.19 CPHY-MBMS-Config-CNF

This primitive is used to confirm the configuration of the MBMS information.

Parameters:

- No Parameter.

10.3 Parameter definition

10.3.5 Physical channel description

10.3.5.4 Secondary CCPCH

- DL scrambling code.
- Channelisation code.
- Tx diversity mode.
- Timeslot (TDD only).
- Burst type (3.84 Mcps TDD only).
- Midamble shift (TDD only).
- Offset (TDD only).
- Repetition period (TDD only).
- Repetition length (TDD only).
- TFCI presence (TDD only).
- [MCCH modification period \(only S-CCPCH carrying MCCH\).](#)
- [MCCH repetition period \(only S-CCPCH carrying MCCH\).](#)
- [MCCH access info period \(only S-CCPCH carrying MCCH\).](#)
- [MSCH scheduling period/offset \(only S-CCPCH carrying MSCH\).](#)

10.3.5.27 E-HICH (FDD only)

- Scrambling code.
- Channelisation code.
- Hadamard sequence
- Transmission Time offset value (FFS –transmission time offset may be UE specific if slot ~~alignement~~[alignment](#) rather than sub-frame alignment is agreed).
- I or Q mapping (if BPSK modulation applies) (FFS)

10.3.5.28 E-RGCH (FDD only)

- Scrambling code.
- Channelisation code.
- Hadamard sequence
- Transmission Time offset value (FFS –transmission time offset may be UE specific if slot ~~alignement~~[alignment](#) rather than sub-frame alignment is agreed).
- I or Q mapping (if BPSK modulation applies) (FFS)

10.3.5.28 MICH

- Scrambling code.
- Channelisation code.
- Timeslot (TDD only).
- Burst Type (3.84 Mcps TDD only).
- Midamble shift (TDD only).
- Offset (TDD only).
- Repetition period (TDD only).
- Repetition length (TDD only).

10.3.11 MBMS information

- MBMS L1 combining schedule.
- MBMS service transmission schedule.