TSG RAN Meeting #28 **RP-050248**
Quebec, Canada, 1 - 3 June 2005

Title	**CRs (Rel-5 & Rel-6) to TS25.211, TS25.212, TS25.213 & TS25.214 for Feature clean up: Removal of DSCH (FDD mode)**
Source	**TSG RAN WG1**
Agenda Item	**7.7.6**

RAN1 Tdoc	Spec	CR	Rev	Rel	Cat	Current Version	Subject	Work item	Remarks
R1-050548	25.211	206	-	Rel-5	C	5.6.0	Feature clean up: Removal of DSCH (FDD mode)	TEI5	
R1-050548	25.211	207	-	Rel-6	C	6.4.0	Feature clean up: Removal of DSCH (FDD mode)	TEI6	
R1-050548	25.212	209	-	Rel-5	C	5.9.0	Feature clean up: Removal of DSCH (FDD mode)	TEI5	
R1-050548	25.212	210	-	Rel-6	C	6.4.0	Feature clean up: Removal of DSCH (FDD mode)	TEI6	
R1-050548	25.213	078	-	Rel-5	C	5.5.0	Feature clean up: Removal of DSCH (FDD mode)	TEI5	
R1-050548	25.213	079	-	Rel-6	C	6.2.0	Feature clean up: Removal of DSCH (FDD mode)	TEI6	
R1-050548	25.214	376	1	Rel-5	C	5.10.0	Feature clean up: Removal of DSCH (FDD mode)	TEI5	
R1-050548	25.214	377	1	Rel-6	C	6.5.0	Feature clean up: Removal of DSCH (FDD mode)	TEI6	

3GPP TSG-RAN1 Meeting #41
Athens, Greece, 9th – 13th May 2005

Tdoc ⌘R1-050548

CR-Form-v7.1

CHANGE REQUEST

⌘	25.211	CR	206	⌘ rev	-	⌘	Current version:	5.6.0	⌘

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Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Feature Clean Up: Removal of DSCH (FDD mode)
Source:	⌘	RAN WG1
Work item code:	⌘	TEI5
Date:	⌘	20/04/2005
Category:	⌘	**C**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
Ph2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)
Rel-7 (Release 7)

Reason for change:	⌘	In RAN#27 removal of DSCH (FDD mode) was agreed in order to simplify the specifications. This feature is optional and not used in real networks. Furthermore, the introduction of HSDPA will diminish the benefits that DSCH could provide.This CR shows how this proposal affect to TS25.211.
Summary of change:	⌘	The text related to DSCH feature is removed from the specification.
Consequences if not approved:	⌘	Contrary to the RAN#27decision the DSCH for FDD mode will remain specified

Clauses affected:	⌘	3.2, 4.1.2, 4.1.2.6, 5.3.1, 5.3.1.1.1, 5.3.3.1.1, 5.3.3.2, 5.3.3.6, 6.1, 7.1, 7.5				
		Y	**N**			
Other specs affected:	⌘	**X**		Other core specifications	⌘	25.212, 25.213, 25.214, 25.301, 25.302, 25.303, 25.306, 25.321, 25.331, 25.401, 25.402, 25.420, 25.423, 25.424, 25.425, 25.427, 25.430, 25.433, 25.434, 25.435 34.108, 34.123
		X		Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

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3.2 Abbreviations

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

16QAM	16 Quadrature Amplitude Modulation
AI	Acquisition Indicator
AICH	Acquisition Indicator Channel
AP	Access Preamble
AP-AICH	Access Preamble Acquisition Indicator Channel
API	Access Preamble Indicator
BCH	Broadcast Channel
CA	Channel Assignment
CAI	Channel Assignment Indicator
CCC	CPCH Control Command
CCPCH	Common Control Physical Channel
CCTrCH	Coded Composite Transport Channel
CD	Collision Detection
CD/CA-ICH	Collision Detection/Channel Assignment Indicator Channel
CDI	Collision Detection Indicator
CPCH	Common Packet Channel
CPICH	Common Pilot Channel
CQI	Channel Quality Indicator
CSICH	CPCH Status Indicator Channel
DCH	Dedicated Channel
DPCCH	Dedicated Physical Control Channel
DPCH	Dedicated Physical Channel
DPDCH	Dedicated Physical Data Channel
~~DSCH~~	~~Downlink Shared Channel~~
DSMA-CD	Digital Sense Multiple Access - Collison Detection
DTX	Discontinuous Transmission
FACH	Forward Access Channel
FBI	Feedback Information
FSW	Frame Synchronization Word
HS-DPCCH	Dedicated Physical Control Channel (uplink) for HS-DSCH
HS-DSCH	High Speed Downlink Shared Channel
HS-PDSCH	High Speed Physical Downlink Shared Channel
HS-SCCH	Shared Control Channel for HS-DSCH
ICH	Indicator Channel
MUI	Mobile User Identifier
PCH	Paging Channel
P-CCPCH	Primary Common Control Physical Channel
PCPCH	Physical Common Packet Channel
~~PDSCH~~	~~Physical Downlink Shared Channel~~
PICH	Page Indicator Channel
PRACH	Physical Random Access Channel
PSC	Primary Synchronisation Code
RACH	Random Access Channel
RNC	Radio Network Controller
S-CCPCH	Secondary Common Control Physical Channel
SCH	Synchronisation Channel
SF	Spreading Factor
SFN	System Frame Number
SI	Status Indicator
SSC	Secondary Synchronisation Code
STTD	Space Time Transmit Diversity
TFCI	Transport Format Combination Indicator
TSTD	Time Switched Transmit Diversity
TPC	Transmit Power Control
UE	User Equipment
UTRAN	UMTS Terrestrial Radio Access Network

*****************NEXT MODIFIED SECTIONS*****************

4.1.2 Common transport channels

There are seven types of common transport channels: BCH, FACH, PCH, RACH, CPCH, ~~DSCH~~ and HS-DSCH.

*****************NEXT MODIFIED SECTIONS*****************

4.1.2.6 ~~DSCH – Downlink Shared Channel~~Void

~~The Downlink Shared Channel (DSCH) is a downlink transport channel shared by several Ues. The DSCH is associated with one or several downlink DCH. The DSCH is transmitted over the entire cell or over only a part of the cell using e.g. beam-forming antennas.~~

*****************NEXT MODIFIED SECTIONS*****************

5.3.1 Downlink transmit diversity

Table 10 summarises the possible application of open and closed loop transmit diversity modes on different downlink physical channel types. Simultaneous use of STTD and closed loop modes on the same physical channel is not allowed. In addition, if Tx diversity is applied on any of the downlink physical channels it shall also be applied on P-CCPCH and SCH. Regarding CPICH transmission in case of transmit diversity, see subclause 5.3.3.1.

With respect to the usage of Tx diversity for DPCH on different radio links within an active set, the following rules apply:

- Different Tx diversity modes (STTD and closed loop) shall not be used on the radio links within one active set.
- No Tx diversity on one or more radio links shall not prevent UTRAN to use Tx diversity on other radio links within the same active set.
- If STTD is activated on one or several radio links in the active set, the UE shall operate STTD on only those radio links where STTD has been activated. Higher layers inform the UE about the usage of STTD on the individual radio links in the active set.
- If closed loop TX diversity is activated on one or several radio links in the active set, the UE shall operate closed loop TX diversity on only those radio links where closed loop TX diversity has been activated. Higher layers inform the UE about the usage of closed loop TX diversity on the individual radio links in the active set.

Furthermore, ~~the transmit diversity mode used for a PDSCH frame shall be the same as the transmit diversity mode used for the DPCH associated with this PDSCH frame. The transmit diversity mode on the associated DPCH may not change during a PDSCH frame and within the slot prior to the PDSCH frame. This includes any change between no Tx diversity, open loop, closed loop mode 1 or closed loop mode 2.~~

~~Also,~~ the transmit diversity mode used for a HS-PDSCH subframe shall be the same as the transmit diversity mode used for the DPCH associated with this HS-PDSCH subframe. If the DPCH associated with an HS-SCCH subframe is using either open or closed loop transmit diversity on the radio link transmitted from the HS-DSCH serving cell, the HS-SCCH subframe from this cell shall be transmitted using STTD, otherwise no transmit diversity shall be used for this HS-SCCH subframe. The transmit diversity mode on the associated DPCH may not change during a HS-SCCH and or HS-PDSCH subframe and within the slot prior to the HS-SCCH subframe. This includes any change between no Tx diversity and either open loop or closed loop mode.

*****************NEXT MODIFIED SECTIONS*****************

5.3.1.1.1 Space time block coding based transmit antenna diversity (STTD)

The open loop downlink transmit diversity employs a space time block coding based transmit diversity (STTD).

The STTD encoding is optional in UTRAN. STTD support is mandatory at the UE.

If higher layers signal that neither P-CPICH nor S-CPICH can be used as phase reference for the downlink DPCH for a radio link in a cell, the UE shall assume that STTD is not used for the downlink DPCH ~~(and the associated PDSCH if applicable)~~ in that cell.

A block diagram of a generic STTD encoder is shown in the figure 8 and figure 8A below. Channel coding, rate matching and interleaving are done as in the non-diversity mode. For QPSK, the STTD encoder operates on 4 symbols b_0, b_1, b_2, b_3 as shown in figure 8. For AICH, AP-AICH and CD/CA-ICH, the b_i are real valued signals, and $\overline{b_i}$ is defined as $-b_i$. For channels other than AICH, AP-AICH and CD/CA-ICH, the b_i are 3-valued digits, taking the values 0, 1, "DTX", and $\overline{b_i}$ is defined as follows: if b_i = 0 then $\overline{b_i}$ = 1, if b_i = 1 then $\overline{b_i}$ = 0, otherwise $\overline{b_i}$ = b_i.

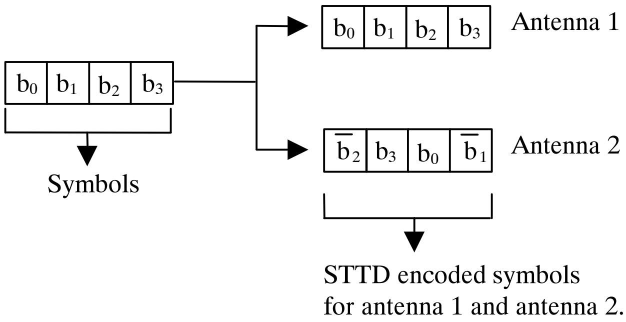


Figure 8: Generic block diagram of the STTD encoder for QPSK

For 16QAM, STTD operates on blocks of 8 consecutive symbols b_0, b_1, b_2, b_3, b_4, b_5, b_6, b_7 as shown in figure 8A below.

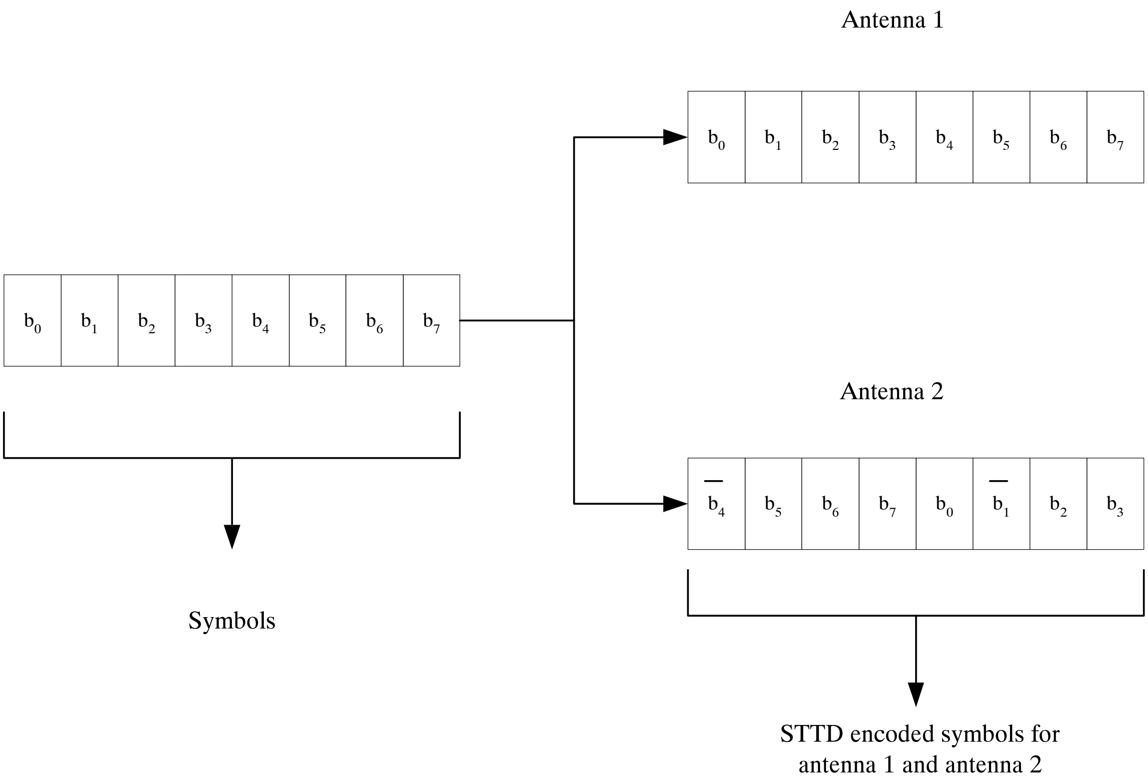


Figure 8A: Generic block diagram of the STTD encoder for 16QAM

*****************NEXT MODIFIED SECTIONS*****************

5.3.3.1.1 Primary Common Pilot Channel (P-CPICH)

The Primary Common Pilot Channel (P-CPICH) has the following characteristics:

- The same channelization code is always used for the P-CPICH, see [4];
- The P-CPICH is scrambled by the primary scrambling code, see [4];
- There is one and only one P-CPICH per cell;
- The P-CPICH is broadcast over the entire cell.

The Primary CPICH is a phase reference for the following downlink channels: SCH, Primary CCPCH, AICH, PICH AP-AICH, CD/CA-ICH, CSICH, DL-DPCCH for CPCH and the S-CCPCH. By default, the Primary CPICH is also a phase reference for downlink DPCH and any associated ~~PDSCH,~~ HS-PDSCH and HS-SCCH. The UE is informed by higher layer signalling if the P-CPICH is not a phase reference for a downlink DPCH and any associated ~~PDSCH,~~ HS-PDSCH and HS-SCCH.

The Primary CPICH is always a phase reference for a downlink physical channel using closed loop TX diversity.

*****************NEXT MODIFIED SECTIONS*****************

5.3.3.2 Downlink phase reference

Table 17 summarizes the possible phase references usable on different downlink physical channel types.

Table 17: Application of phase references on downlink physical channel types "X" – can be applied, "–" – not applied

Physical channel type	Primary-CPICH	Secondary-CPICH	Dedicated pilot
P-CCPCH	X	–	–
SCH	X	–	–
S-CCPCH	X	–	–
DPCH	X	X	X
PICH	X	–	–
~~PDSCH*~~	~~X~~	~~X~~	~~X~~
HS-PDSCH*	X	X	X
HS-SCCH*	X	X	X
AICH	X	–	–
CSICH	X	–	–
DL-DPCCH for CPCH	X	–	–

Note *: The same phase reference as with the associated DPCH shall be used. The support for dedicated pilots as phase reference for HS-PDSCH and HS-SCCH is optional for the UE.

Furthermore, during ~~a PDSCH frame, and within the slot prior to that PDSCH frame, the phase reference on the associated DPCH shall not change. During~~ a DPCH frame overlapping with any part of an associated HS-DSCH or HS-SCCH subframe, the phase reference on this DPCH shall not change.

*****************NEXT MODIFIED SECTIONS*****************

5.3.3.6 ~~Physical Downlink Shared Channel (PDSCH)~~Void

~~Slot format #i~~	~~Channel Bit Rate (kbps)~~	~~Channel Symbol Rate (ksps)~~	~~SF~~	~~Bits/ Frame~~	~~Bits/ Slot~~	~~N_{data1}~~
~~0~~	~~30~~	~~15~~	~~256~~	~~300~~	~~20~~	~~20~~
~~1~~	~~60~~	~~30~~	~~128~~	~~600~~	~~40~~	~~40~~
~~2~~	~~120~~	~~60~~	~~64~~	~~1200~~	~~80~~	~~80~~
~~3~~	~~240~~	~~120~~	~~32~~	~~2400~~	~~160~~	~~160~~
~~4~~	~~480~~	~~240~~	~~16~~	~~4800~~	~~320~~	~~320~~
~~5~~	~~960~~	~~480~~	~~8~~	~~9600~~	~~640~~	~~640~~
~~6~~	~~1920~~	~~960~~	~~4~~	~~19200~~	~~1280~~	~~1280~~

~~When open loop transmit diversity is employed for the PDSCH, STTD encoding is used on the data bits as described in subclause 5.3.1.1.1.~~

~~When closed loop transmit diversity is employed on the associated DPCH, it shall be used also on the PDSCH as described in [5].~~

*****************NEXT MODIFIED SECTIONS*****************

6.1 Mapping of transport channels onto physical channels

Figure 27 summarises the mapping of transport channels onto physical channels.

Transport Channels	Physical Channels
DCH	Dedicated Physical Data Channel (DPDCH)
	Dedicated Physical Control Channel (DPCCH)
RACH	Physical Random Access Channel (PRACH)
CPCH	Physical Common Packet Channel (PCPCH)
	Common Pilot Channel (CPICH)
BCH	Primary Common Control Physical Channel (P-CCPCH)
FACH	Secondary Common Control Physical Channel (S-CCPCH)
PCH	
	Synchronisation Channel (SCH)
DSCH	Physical Downlink Shared Channel (PDSCH)
	Acquisition Indicator Channel (AICH)
	Access Preamble Acquisition Indicator Channel (AP-AICH)
	Paging Indicator Channel (PICH)
	CPCH Status Indicator Channel (CSICH)
	Collision-Detection/Channel-Assignment Indicator Channel (CD/CA-ICH)
HS-DSCH	High Speed Physical Downlink Shared Channel (HS-PDSCH)
	HS-DSCH-related Shared Control Channel (HS-SCCH)
	Dedicated Physical Control Channel (uplink) for HS-DSCH (HS-DPCCH)

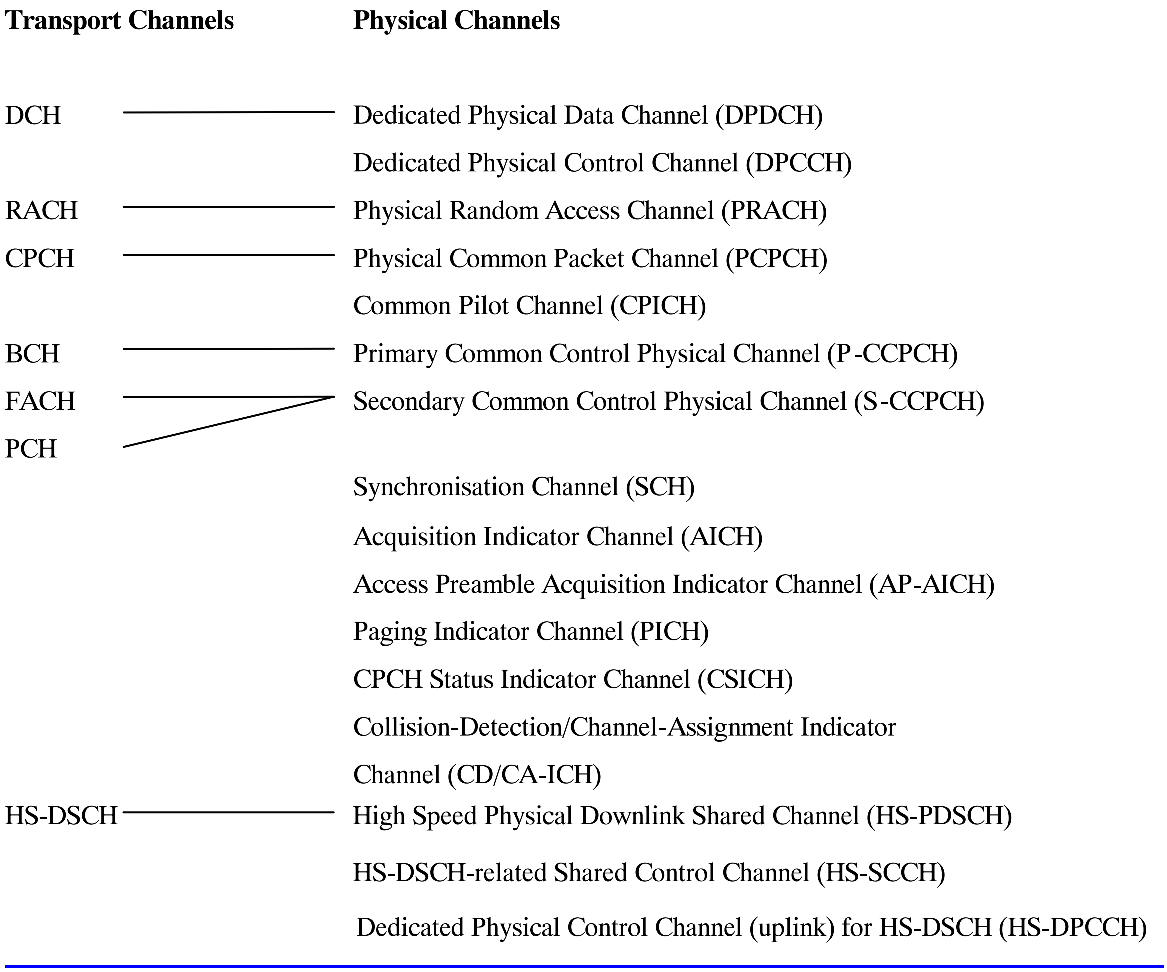


Figure 27: Transport-channel to physical-channel mapping

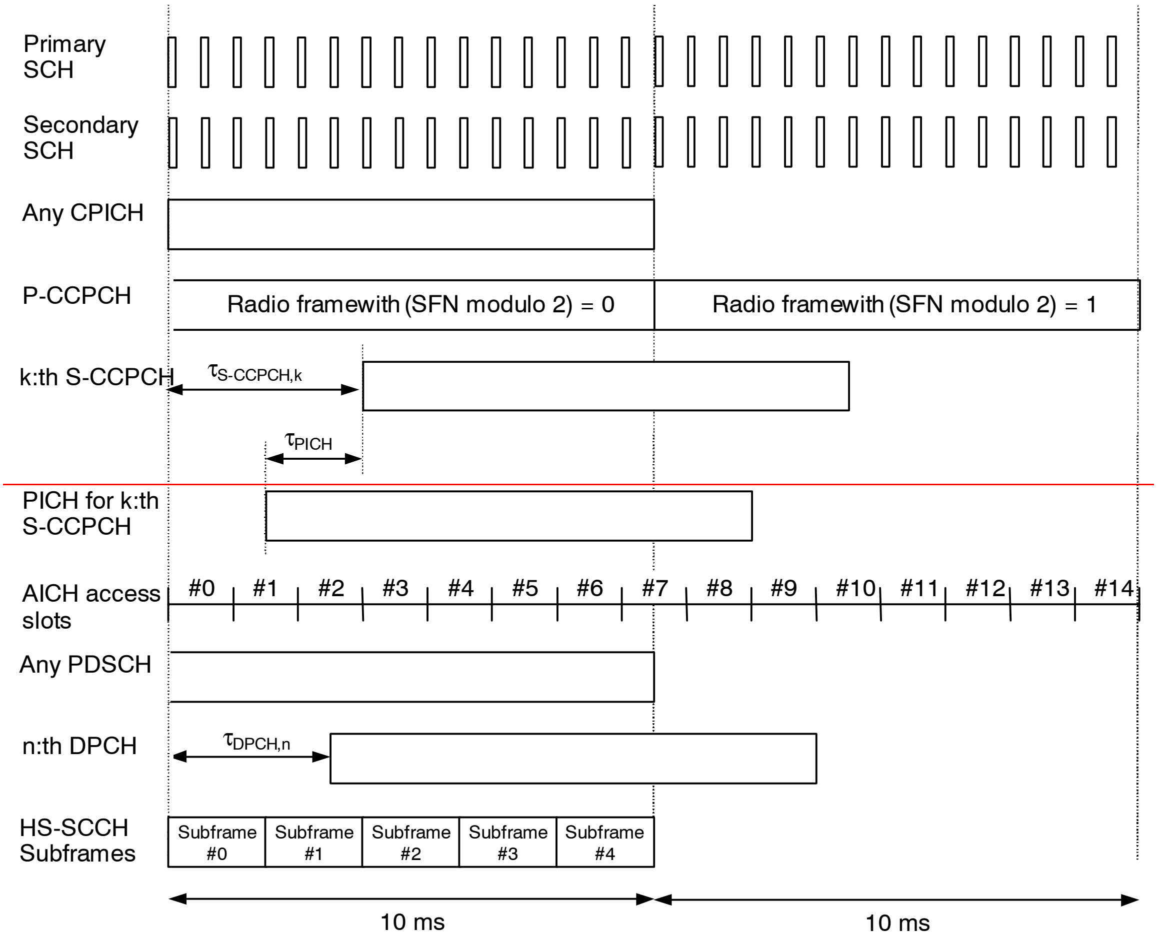
The DCHs are coded and multiplexed as described in [3], and the resulting data stream is mapped sequentially (first-in-first-mapped) directly to the physical channel(s). The mapping of BCH and FACH/PCH is equally straightforward, where the data stream after coding and interleaving is mapped sequentially to the Primary and Secondary CCPCH respectively. Also for the RACH, the coded and interleaved bits are sequentially mapped to the physical channel, in this case the message part of the PRACH.

*****************NEXT MODIFIED SECTIONS*****************

7.1 General

The P-CCPCH, on which the cell SFN is transmitted, is used as timing reference for all the physical channels, directly for downlink and indirectly for uplink.

Figure 29 below describes the frame timing of the downlink physical channels. For the AICH the access slot timing is included. Transmission timing for uplink physical channels is given by the received timing of downlink physical channels, as described in the following subclauses.


Primary SCH
Secondary SCH
Any CPICH
P-CCPCH
Radio framewith (SFN modulo 2) = 0
Radio framewith (SFN modulo 2) = 1
k:th S-CCPCH
τS-CCPCH,k
τPICH
PICH for k:th S-CCPCH
AICH access slots
#0 #1 #2 #3 #4 #5 #6 #7 #8 #9 #10 #11 #12 #13 #14
Any PDSCH
n:th DPCH
τDPCH,n
HS-SCCH Subframes
Subframe #0
Subframe #1
Subframe #2
Subframe #3
Subframe #4
10 ms
10 ms

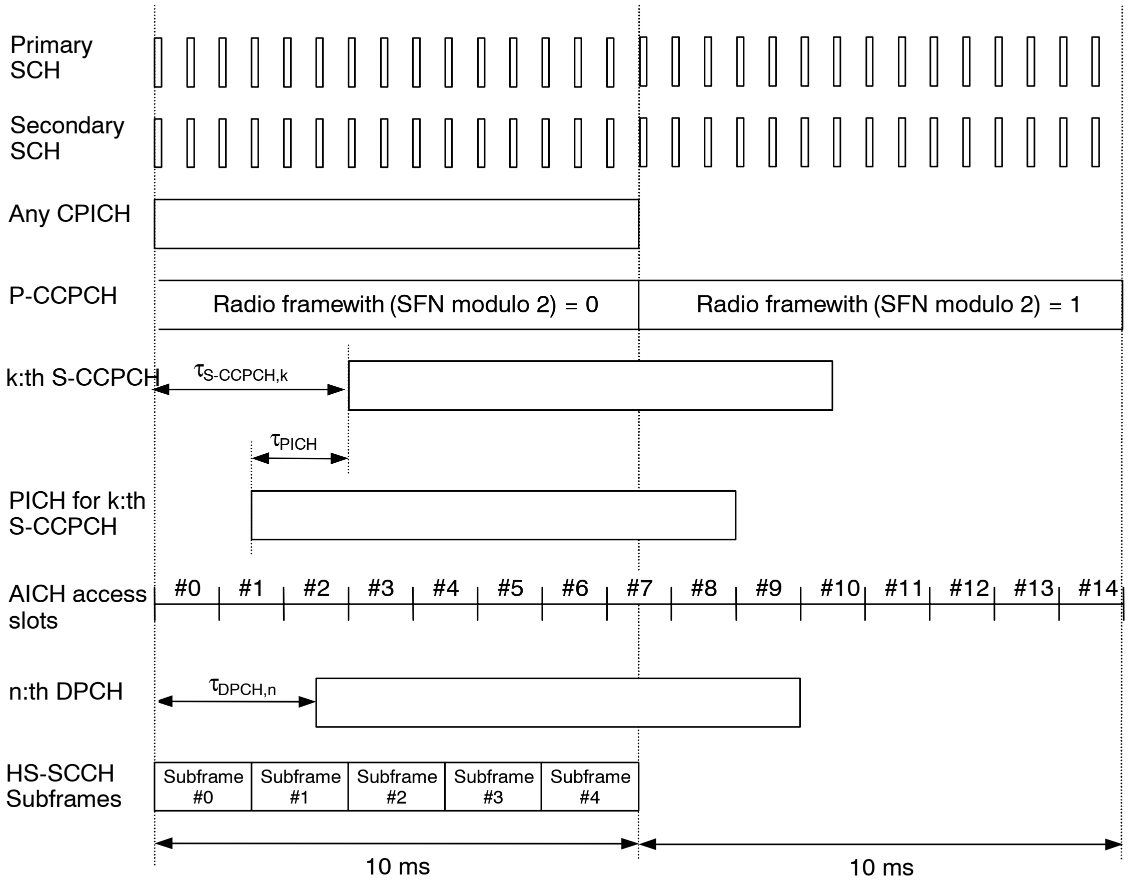

Primary SCH
Secondary SCH
Any CPICH
P-CCPCH
Radio framewith (SFN modulo 2) = 0
Radio framewith (SFN modulo 2) = 1
k:th S-CCPCH
τS-CCPCH,k
τPICH
PICH for k:th S-CCPCH
AICH access slots
#0 #1 #2 #3 #4 #5 #6 #7 #8 #9 #10 #11 #12 #13 #14
n:th DPCH
τDPCH,n
HS-SCCH Subframes
Subframe #0
Subframe #1
Subframe #2
Subframe #3
Subframe #4
10 ms
10 ms

Figure 29: Radio frame timing and access slot timing of downlink physical channels

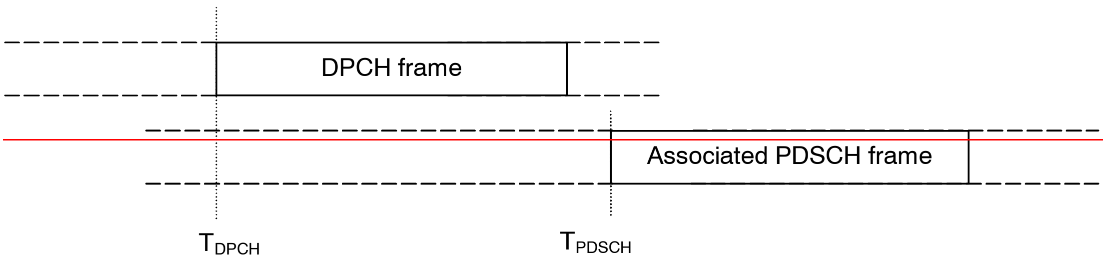
The following applies:

- SCH (primary and secondary), CPICH (primary and secondary)~~,~~ and P-CCPCH, ~~and PDSCH~~ have identical frame timings.
- The S-CCPCH timing may be different for different S-CCPCHs, but the offset from the P-CCPCH frame timing is a multiple of 256 chips, i.e. $\tau_{S\text{-}CCPCH,k} = T_k \times 256$ chip, $T_k \in \{0, 1, \ldots, 149\}$.
- The PICH timing is $\tau_{PICH} = 7680$ chips prior to its corresponding S-CCPCH frame timing, i.e. the timing of the S-CCPCH carrying the PCH transport channel with the corresponding paging information, see also subclause 7.2.
- AICH access slots #0 starts the same time as P-CCPCH frames with (SFN modulo 2) = 0. The AICH/PRACH and AICH/PCPCH timing is described in subclauses 7.3 and 7.4 respectively.
- ~~The relative timing of associated PDSCH and DPCH is described in subclause 7.5.~~
- The DPCH timing may be different for different DPCHs, but the offset from the P-CCPCH frame timing is a multiple of 256 chips, i.e. $\tau_{DPCH,n} = T_n \times 256$ chip, $T_n \in \{0, 1, \ldots, 149\}$. The DPCH (DPCCH/DPDCH) timing relation with uplink DPCCH/DPDCHs is described in subclause 7.6.
- The start of HS-SCCH subframe #0 is aligned with the start of the P-CCPCH frames. The relative timing between a HS-PDSCH and the corresponding HS-SCCH is described in subclause 7.8.

*****************NEXT MODIFIED SECTIONS*****************

7.5 ~~DPCH/PDSCH timing~~Void

~~The relative timing between a DPCH frame and the associated PDSCH frame is shown in figure 33.~~



~~**Figure 33: Timing relation between DPCH frame and associated PDSCH frame**~~

~~The start of a DPCH frame is denoted T_{DPCH} and the start of the associated PDSCH frame is denoted T_{PDSCH}. Any DPCH frame is associated to one PDSCH frame through the relation 46080 chips $\leq T_{PDSCH} - T_{DPCH} < 84480$ chips, i.e., the associated PDSCH frame starts between three slots after the end of the DPCH frame and 18 slots after the end of the DPCH frame, as described in subclause 7.1.~~

3GPP TSG-RAN1 Meeting #41 **Tdoc ⌘R1-050548**
Athens, Greece, 9th – 13th May 2005

CR-Form-v7.1

CHANGE REQUEST

⌘	25.211	CR	207	⌘ rev	-	⌘	Current version:	6.4.0	⌘

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Source: ⌘	RAN WG1		
Work item code: ⌘	TEI6	***Date:*** ⌘	20/04/2005
Category: ⌘	**C**	***Release:*** ⌘	Rel-6
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	Y	**N**			
Other specs affected: ⌘	**X**		Other core specifications	⌘	25.212, 25.213, 25.214, 25.301, 25.302, 25.303, 25.306, 25.321, 25.331, 25.401, 25.402, 25.420, 25.423, 25.424, 25.425, 25.427, 25.430, 25.433, 25.434, 25.435 34.108, 34.123
	X		Test specifications		
		X	O&M Specifications		
Other comments: ⌘					

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DPCH	Dedicated Physical Channel
DPDCH	Dedicated Physical Data Channel
~~DSCH~~	~~Downlink Shared Channel~~
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DTX	Discontinuous Transmission
E-AGCH	E-DCH Absolute Grant Channel
E-DCH	Enhanced Dedicated Channel
E-DPCCH	E-DCH Dedicated Physical Control Channel
E-DPDCH	E-DCH Dedicated Physical Data Channel
E-HICH	E-DCH Hybrid ARQ Indicator Channel
E-RGCH	E-DCH Relative Grant Channel
FACH	Forward Access Channel
FBI	Feedback Information
F-DPCH	Fractional Dedicated Physical Channel
FSW	Frame Synchronization Word
HS-DPCCH	Dedicated Physical Control Channel (uplink) for HS-DSCH
HS-DSCH	High Speed Downlink Shared Channel
HS-PDSCH	High Speed Physical Downlink Shared Channel
HS-SCCH	Shared Control Channel for HS-DSCH
ICH	Indicator Channel
MICH	MBMS Indicator Channel
MUI	Mobile User Identifier
NI	MBMS Notification Indicator
PCH	Paging Channel
P-CCPCH	Primary Common Control Physical Channel
PCPCH	Physical Common Packet Channel
~~PDSCH~~	~~Physical Downlink Shared Channel~~
PICH	Page Indicator Channel
PRACH	Physical Random Access Channel
PSC	Primary Synchronisation Code
RACH	Random Access Channel
RNC	Radio Network Controller
S-CCPCH	Secondary Common Control Physical Channel
SCH	Synchronisation Channel
SF	Spreading Factor
SFN	System Frame Number

SI	Status Indicator
SSC	Secondary Synchronisation Code
STTD	Space Time Transmit Diversity
TFCI	Transport Format Combination Indicator
TSTD	Time Switched Transmit Diversity
TPC	Transmit Power Control
UE	User Equipment
UTRAN	UMTS Terrestrial Radio Access Network

*****************NEXT MODIFIED SECTIONS*****************

4.1.2 Common transport channels

There are seven types of common transport channels: BCH, FACH, PCH, RACH, CPCH, ~~DSCH~~ and HS-DSCH.

*****************NEXT MODIFIED SECTIONS*****************

4.1.2.6 ~~DSCH - Downlink Shared Channel~~Void

~~The Downlink Shared Channel (DSCH) is a downlink transport channel shared by several Ues. The DSCH is associated with one or several downlink DCH. The DSCH is transmitted over the entire cell or over only a part of the cell using e.g. beam-forming antennas.~~

*****************NEXT MODIFIED SECTIONS*****************

5.3.1 Downlink transmit diversity

Table 10 summarises the possible application of open and closed loop transmit diversity modes on different downlink physical channel types. Simultaneous use of STTD and closed loop modes on the same physical channel is not allowed. In addition, if Tx diversity is applied on any of the downlink physical channels it shall also be applied on P-CCPCH and SCH. Regarding CPICH transmission in case of transmit diversity, see subclause 5.3.3.1.

With respect to the usage of Tx diversity for DPCH on different radio links within an active set, the following rules apply:

- Different Tx diversity modes (STTD and closed loop) shall not be used on the radio links within one active set.
- No Tx diversity on one or more radio links shall not prevent UTRAN to use Tx diversity on other radio links within the same active set.
- If STTD is activated on one or several radio links in the active set, the UE shall operate STTD on only those radio links where STTD has been activated. Higher layers inform the UE about the usage of STTD on the individual radio links in the active set.
- If closed loop TX diversity is activated on one or several radio links in the active set, the UE shall operate closed loop TX diversity on only those radio links where closed loop TX diversity has been activated. Higher layers inform the UE about the usage of closed loop TX diversity on the individual radio links in the active set.

Furthermore, ~~the transmit diversity mode used for a PDSCH frame shall be the same as the transmit diversity mode used for the DPCH associated with this PDSCH frame. The transmit diversity mode on the associated DPCH may not change during a PDSCH frame and within the slot prior to the PDSCH frame. This includes any change between no Tx diversity, open loop, closed loop mode 1 or closed loop mode 2.~~

~~Also,~~ if a DPCH is associated with an HS-PDSCH subframe, the transmit diversity mode used for the HS-PDSCH subframe shall be the same as the transmit diversity mode used for the DPCH associated with this HS-PDSCH subframe. If a F-DPCH is associated with an HS-PDSCH subframe, the transmit diversity mode used for the HS-PDSCH subframe shall be the same as the transmit diversity mode signalled for the F-DPCH associated with this HS-PDSCH subframe. If the DPCH associated with an HS-SCCH subframe is using either open or closed loop transmit diversity on the radio link transmitted from the HS-DSCH serving cell, the HS-SCCH subframe from this cell shall be transmitted using STTD, otherwise no transmit diversity shall be used for this HS-SCCH subframe. If a F-DPCH for which STTD is signalled is associated with an HS-SCCH subframe, the HS-SCCH subframe shall be transmitted using STTD, otherwise no transmit diversity shall be used for this HS-SCCH subframe. The transmit diversity mode on the associated DPCH or F-DPCH may not change during a HS-SCCH and or HS-PDSCH subframe and within the slot prior to the HS-SCCH subframe. This includes any change between no Tx diversity and either open loop or closed loop mode.

If the UE is receiving a DPCH on which transmit diversity is used from a cell, or if the UE is receiving a F-DPCH for which STTD is signalled from a cell, the UE shall assume that the E-AGCH, E-RGCH, and E-HICH from the same cell are transmitted using STTD.

Table 10: Application of Tx diversity modes on downlink physical channel types "X" – can be applied, "–" – not applied

Physical channel type	Open loop mode		Closed loop mode	
	TSTD	STTD	Mode 1	Mode 2
P-CCPCH	–	X	–	–
SCH	X	–	–	–
S-CCPCH	–	X	–	–
DPCH	–	X	X	X
F-DPCH	–	X	–	–
PICH	–	X	–	–
MICH	–	X	–	–
~~PDSCH~~	~~–~~	~~X~~	~~X~~	~~X~~
HS-PDSCH	–	X	X	–
HS-SCCH	–	X	–	–
E-AGCH	–	X	–	–
E_RGCH	–	X	–	–
E-HICH	–	X	–	–
AICH	–	X	–	–
CSICH	–	X	–	–
AP-AICH	–	X	–	–
CD/CA-ICH	–	X	–	–
DL-DPCCH for CPCH	–	X	X	X

*****************NEXT MODIFIED SECTIONS*****************

5.3.1.1.1 Space time block coding based transmit antenna diversity (STTD)

The open loop downlink transmit diversity employs a space time block coding based transmit diversity (STTD).

The STTD encoding is optional in UTRAN. STTD support is mandatory at the UE.

If higher layers signal that neither P-CPICH nor S-CPICH can be used as phase reference for the downlink DPCH for a radio link in a cell, the UE shall assume that STTD is not used for the downlink DPCH ~~(and the associated PDSCH if applicable)~~ in that cell.

A block diagram of a generic STTD encoder is shown in the figure 8 and figure 8A below. Channel coding, rate matching and interleaving are done as in the non-diversity mode. For QPSK, the STTD encoder operates on 4 symbols b_0, b_1, b_2, b_3 as shown in figure 8. For AICH, E-RGCH, E-HICH, AP-AICH and CD/CA-ICH, the b_i are real valued signals, and $\bar{b}_i$ is defined as $-b_i$. For channels other than AICH, E-RGCH, E-HICH, AP-AICH and CD/CA-ICH, the b_i are 3-valued digits, taking the values 0, 1, "DTX", and $\bar{b}_i$ is defined as follows: if b_i = 0 then $\bar{b}_i$ = 1, if b_i = 1 then $\bar{b}_i$ = 0, otherwise $\bar{b}_i$ = b_i.

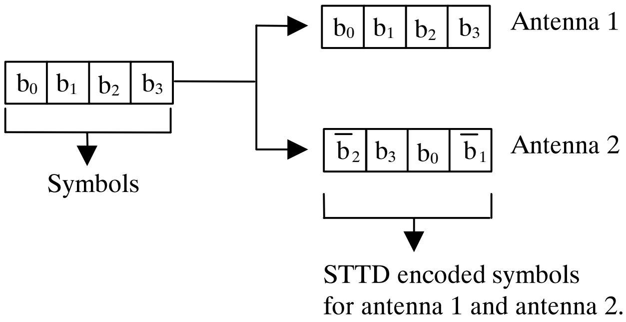


Figure 8: Generic block diagram of the STTD encoder for QPSK

For 16QAM, STTD operates on blocks of 8 consecutive symbols b_0, b_1, b_2, b_3, b_4, b_5, b_6, b_7 as shown in figure 8A below.

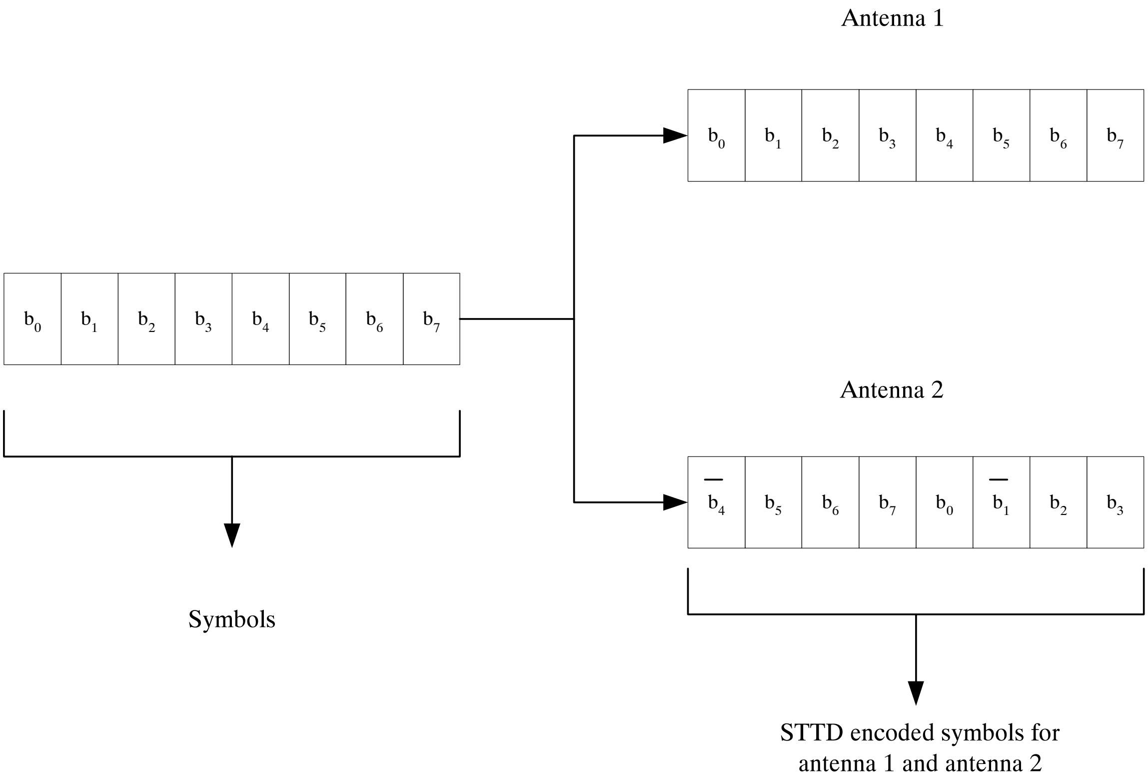


Figure 8A: Generic block diagram of the STTD encoder for 16QAM

*****************NEXT MODIFIED SECTIONS*****************

5.3.3.1.1 Primary Common Pilot Channel (P-CPICH)

The Primary Common Pilot Channel (P-CPICH) has the following characteristics:

- The same channelization code is always used for the P-CPICH, see [4];
- The P-CPICH is scrambled by the primary scrambling code, see [4];
- There is one and only one P-CPICH per cell;
- The P-CPICH is broadcast over the entire cell.

The Primary CPICH is a phase reference for the following downlink channels: SCH, Primary CCPCH, AICH, PICH AP-AICH, CD/CA-ICH, CSICH, DL-DPCCH for CPCH and the S-CCPCH. By default, the Primary CPICH is also a phase reference for downlink DPCH or F-DPCH and any associated ~~PDSCH,~~ HS-PDSCH and HS-SCCH. The UE is informed by higher layer signalling if the P-CPICH is not a phase reference for a downlink DPCH or F-DPCH and any associated ~~PDSCH,~~ HS-PDSCH and HS-SCCH.

*****************NEXT MODIFIED SECTIONS*****************

5.3.3.2 Downlink phase reference

Table 17 summarizes the possible phase references usable on different downlink physical channel types.

Table 17: Application of phase references on downlink physical channel types "X" – can be applied, "–" – not applied

Physical channel type	Primary-CPICH	Secondary-CPICH	Dedicated pilot
P-CCPCH	X	–	–
SCH	X	–	–
S-CCPCH	X	–	–
DPCH	X	X	X
F-DPCH	X	X	–
PICH	X	–	–
MICH	X	–	–
~~PDSCH*~~	~~X~~	~~X~~	~~X~~
HS-PDSCH*	X	X	X
HS-SCCH*	X	X	X
E-AGCH*	X	X	X
E-RGCH*	X	X	X
E-HICH*	X	X	X
AICH	X	–	–
CSICH	X	–	–
DL-DPCCH for CPCH	X	–	–

Note *: The same phase reference as with the associated DPCH or F-DPCH shall be used. The support for dedicated pilots as phase reference for HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH and E-HICH is optional for the UE.

Furthermore, during ~~a PDSCH frame, and within the slot prior to that PDSCH frame, the phase reference on the associated DPCH shall not change. During~~ a DPCH or F-DPCH frame overlapping with any part of an associated HS-DSCH or HS-SCCH subframe, the phase reference on this DPCH or F-DPCH shall not change.

*****************NEXT MODIFIED SECTIONS*****************

5.3.3.6 ~~Physical Downlink Shared Channel (PDSCH)~~Void

~~The Physical Downlink Shared Channel (PDSCH) is used to carry the Downlink Shared Channel (DSCH).~~

~~A PDSCH corresponds to a channelisation code below or at a PDSCH root channelisation code. A PDSCH is allocated on a radio frame basis to a single UE. Within one radio frame, UTRAN may allocate different PDSCHs under the same PDSCH root channelisation code to different UEs based on code multiplexing. Within the same radio frame, multiple parallel PDSCHs, with the same spreading factor, may be allocated to a single UE. This is a special case of multicode transmission. All the PDSCHs are operated with radio frame synchronisation.~~

~~The notion of PDSCH root channelisation code is defined in [4].~~

~~PDSCHs allocated to the same UE on different radio frames may have different spreading factors.~~

The frame and slot structure of the PDSCH are shown on figure 20.

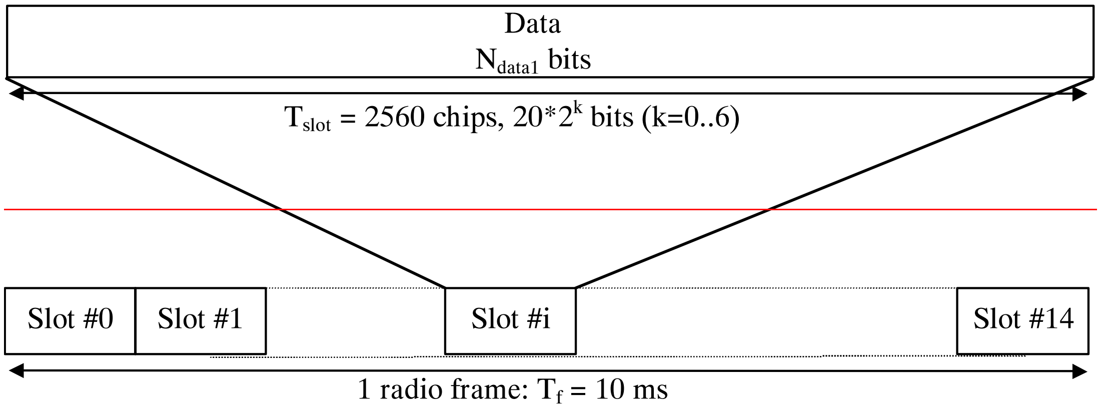


Figure 20: Frame structure for the PDSCH

For each radio frame, each PDSCH is associated with one downlink DPCH. The PDSCH and associated DPCH do not necessarily have the same spreading factors and are not necessarily frame aligned.

All relevant Layer 1 control information is transmitted on the DPCCH part of the associated DPCH, i.e. the PDSCH does not carry Layer 1 information. To indicate for UE that there is data to decode on the DSCH, the TFCI field of the associated DPCH shall be used.

The TFCI informs the UE of the instantaneous transport format parameters related to the PDSCH as well as the channelisation code of the PDSCH.

The channel bit rates and symbol rates for PDSCH are given in Table 21.

For PDSCH the allowed spreading factors may vary from 256 to 4.

Table 21: PDSCH fields

Slot format #i	Channel Bit Rate (kbps)	Channel Symbol Rate (ksps)	SF	Bits/ Frame	Bits/ Slot	N_{data1}
0	30	15	256	300	20	20
1	60	30	128	600	40	40
2	120	60	64	1200	80	80
3	240	120	32	2400	160	160
4	480	240	16	4800	320	320
5	960	480	8	9600	640	640
6	1920	960	4	19200	1280	1280

When open loop transmit diversity is employed for the PDSCH, STTD encoding is used on the data bits as described in subclause 5.3.1.1.1.

When closed loop transmit diversity is employed on the associated DPCH, it shall be used also on the PDSCH as described in [5].

*****************NEXT MODIFIED SECTIONS*****************

6.1 Mapping of transport channels onto physical channels

Figure 27 summarises the mapping of transport channels onto physical channels.

Transport Channels	**Physical Channels**
DCH	Dedicated Physical Data Channel (DPDCH)
	Dedicated Physical Control Channel (DPCCH)
	Fractional Dedicated Physical Channel (F-DPCH)
E-DCH	E-DCH Dedicated Physical Data Channel (E-DPDCH)
	E-DCH Dedicated Physical Control Channel (E-DPCCH)
	E-DCH Absolute Grant Channel (E-AGCH)
	E-DCH Relative Grant Channel (E-RGCH)
	E-DCH Hybrid ARQ Indicator Channel (E-HICH)
RACH	Physical Random Access Channel (PRACH)
CPCH	Physical Common Packet Channel (PCPCH)
	Common Pilot Channel (CPICH)
BCH	Primary Common Control Physical Channel (P-CCPCH)
FACH	Secondary Common Control Physical Channel (S-CCPCH)
PCH	
	Synchronisation Channel (SCH)
DSCH	Physical Downlink Shared Channel (PDSCH)
	Acquisition Indicator Channel (AICH)
	Access Preamble Acquisition Indicator Channel (AP-AICH)
	Paging Indicator Channel (PICH)
	MBMS Notification Indicator Channel (MICH)
	CPCH Status Indicator Channel (CSICH)
	Collision-Detection/Channel-Assignment Indicator Channel (CD/CA-ICH)
HS-DSCH	High Speed Physical Downlink Shared Channel (HS-PDSCH)
	HS-DSCH-related Shared Control Channel (HS-SCCH)
	Dedicated Physical Control Channel (uplink) for HS-DSCH (HS-DPCCH)

Transport Channels	Physical Channels
DCH	Dedicated Physical Data Channel (DPDCH)
	Dedicated Physical Control Channel (DPCCH)
	Fractional Dedicated Physical Channel (F-DPCH)
E-DCH	E-DCH Dedicated Physical Data Channel (E-DPDCH)
	E-DCH Dedicated Physical Control Channel (E-DPCCH)
	E-DCH Absolute Grant Channel (E-AGCH)
	E-DCH Relative Grant Channel (E-RGCH)
	E-DCH Hybrid ARQ Indicator Channel (E-HICH)
RACH	Physical Random Access Channel (PRACH)
CPCH	Physical Common Packet Channel (PCPCH)
	Common Pilot Channel (CPICH)
BCH	Primary Common Control Physical Channel (P-CCPCH)
FACH	Secondary Common Control Physical Channel (S-CCPCH)
PCH	(mapped to S-CCPCH)
	Synchronisation Channel (SCH)
	Acquisition Indicator Channel (AICH)
	Access Preamble Acquisition Indicator Channel (AP-AICH)
	Paging Indicator Channel (PICH)
	MBMS Notification Indicator Channel (MICH)
	CPCH Status Indicator Channel (CSICH)
	Collision-Detection/Channel-Assignment Indicator Channel (CD/CA-ICH)
	High Speed Physical Downlink Shared Channel (HS-PDSCH)
HS-DSCH	HS-DSCH-related Shared Control Channel (HS-SCCH)
	Dedicated Physical Control Channel (uplink) for HS-DSCH (HS-DPCCH)

Figure 27: Transport-channel to physical-channel mapping

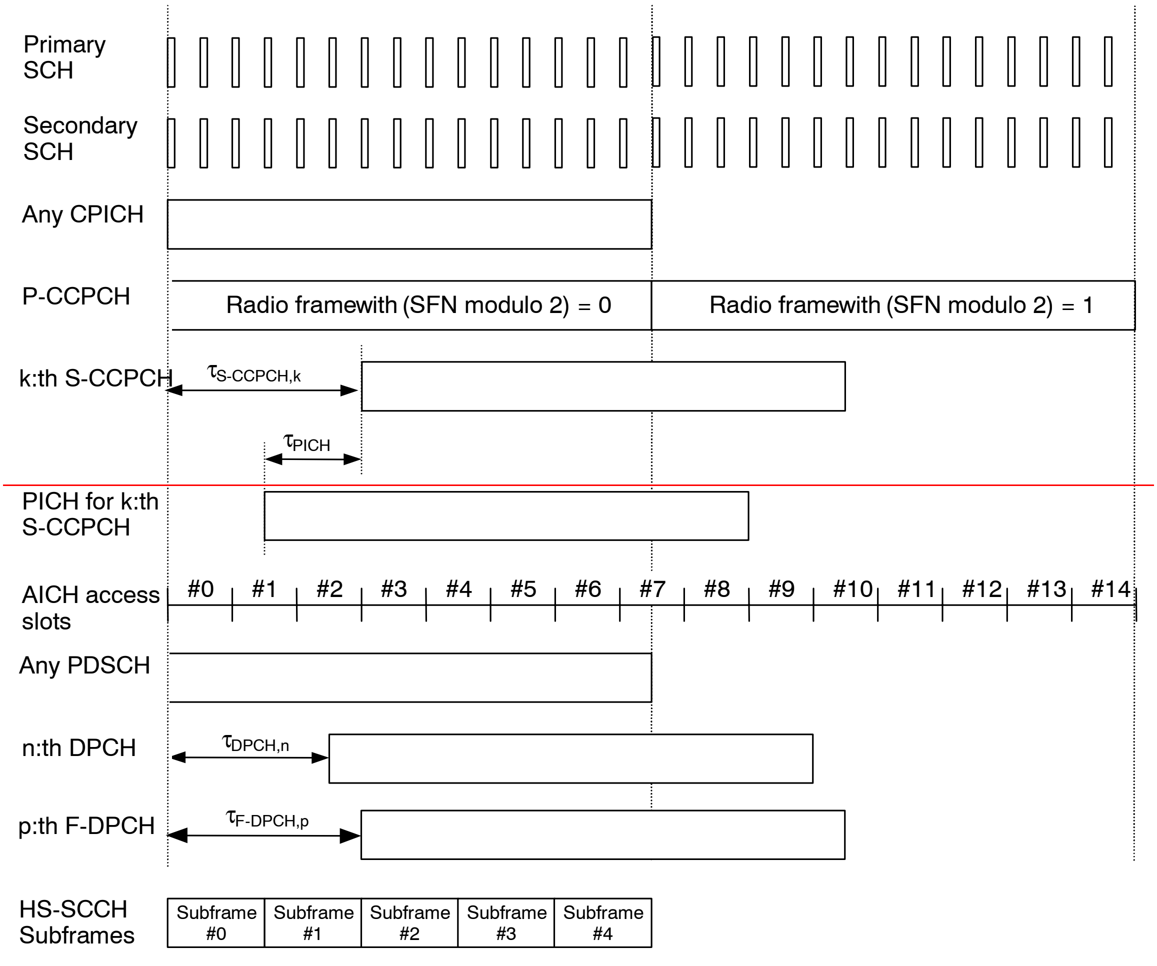
The DCHs are coded and multiplexed as described in [3], and the resulting data stream is mapped sequentially (first-in-first-mapped) directly to the physical channel(s). The mapping of BCH and FACH/PCH is equally straightforward, where the data stream after coding and interleaving is mapped sequentially to the Primary and Secondary CCPCH respectively. Also for the RACH, the coded and interleaved bits are sequentially mapped to the physical channel, in this case the message part of the PRACH. The E-DCH is coded as described in [3], and the resulting data stream is mapped sequentially (first-in-first-mapped) directly to the physical channel(s).

*****************NEXT MODIFIED SECTIONS*****************

7.1 General

The P-CCPCH, on which the cell SFN is transmitted, is used as timing reference for all the physical channels, directly for downlink and indirectly for uplink.

Figure 29 below describes the frame timing of the downlink physical channels. For the AICH the access slot timing is included. Transmission timing for uplink physical channels is given by the received timing of downlink physical channels, as described in the following subclauses.



Primary SCH
Secondary SCH
Any CPICH
P-CCPCH
Radio framewith (SFN modulo 2) = 0
Radio framewith (SFN modulo 2) = 1
k:th S-CCPCH
τS-CCPCH,k
τPICH
PICH for k:th S-CCPCH
AICH access slots
#0
#1
#2
#3
#4
#5
#6
#7
#8
#9
#10
#11
#12
#13
#14
Any PDSCH
n:th DPCH
τDPCH,n
p:th F-DPCH
τF-DPCH,p
HS-SCCH Subframes
Subframe #0
Subframe #1
Subframe #2
Subframe #3
Subframe #4

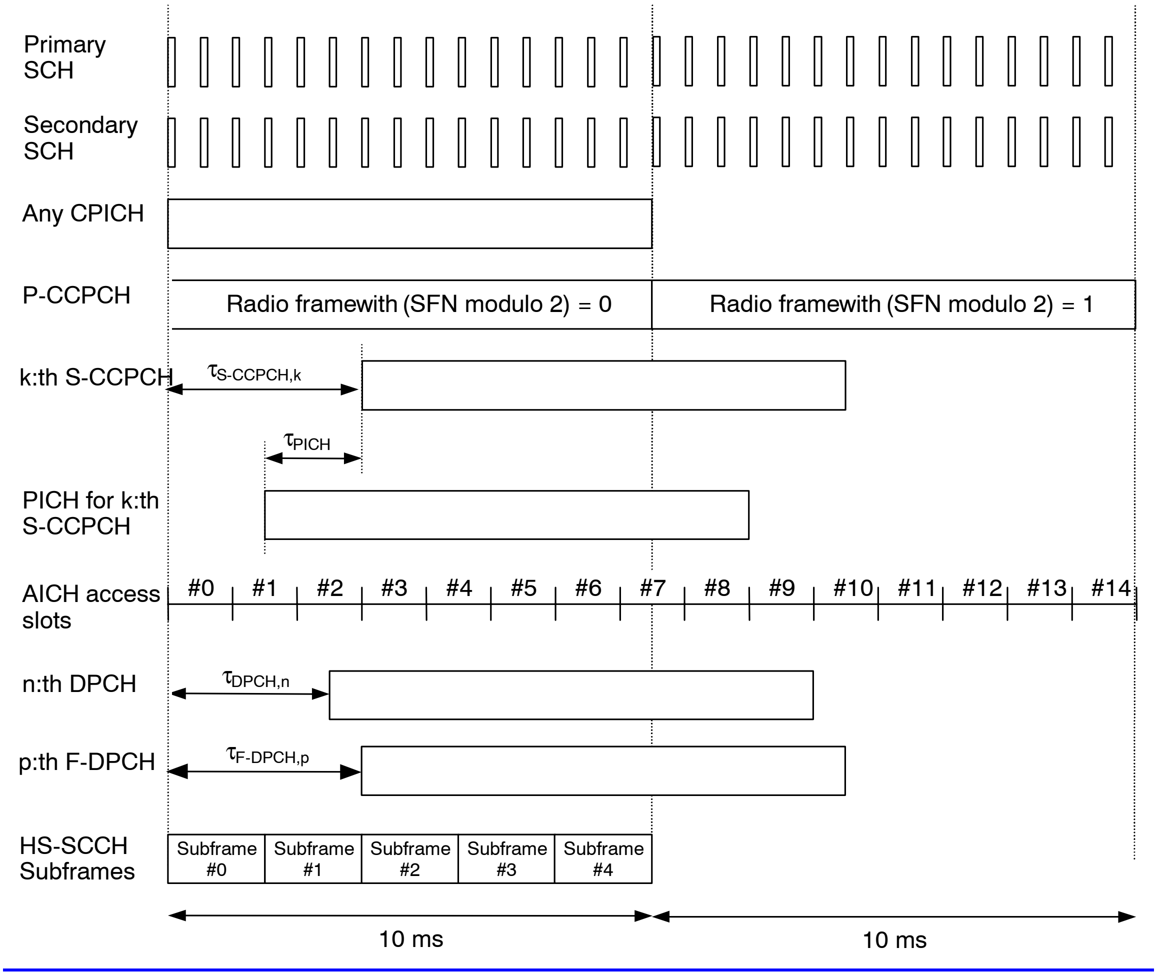


Figure 29: Radio frame timing and access slot timing of downlink physical channels

The following applies:

- SCH (primary and secondary), CPICH (primary and secondary), and P-CCPCH, and PDSCH have identical frame timings.
- The S-CCPCH timing may be different for different S-CCPCHs, but the offset from the P-CCPCH frame timing is a multiple of 256 chips, i.e. $\tau_{S\text{-}CCPCH,k} = T_k \times 256$ chip, $T_k \in \{0, 1, \ldots, 149\}$.
- The PICH timing is τ_{PICH} = 7680 chips prior to its corresponding S-CCPCH frame timing, i.e. the timing of the S-CCPCH carrying the PCH transport channel with the corresponding paging information, see also subclause 7.2.
- AICH access slots #0 starts the same time as P-CCPCH frames with (SFN modulo 2) = 0. The AICH/PRACH and AICH/PCPCH timing is described in subclauses 7.3 and 7.4 respectively.
- ~~The relative timing of associated PDSCH and DPCH is described in subclause 7.5.~~
- The DPCH timing may be different for different DPCHs, but the offset from the P-CCPCH frame timing is a multiple of 256 chips, i.e. $\tau_{DPCH,n} = T_n \times 256$ chip, $T_n \in \{0, 1, \ldots, 149\}$. The DPCH (DPCCH/DPDCH) timing relation with uplink DPCCH/DPDCHs is described in subclause 7.6.
- The F-DPCH timing may be different for different F-DPCHs, but the offset from the P-CCPCH frame timing is a multiple of 256 chips, i.e. $\tau_{F\text{-}DPCH,p} = T_p \times 256$ chip, $T_p \in \{0, 1, \ldots, 149\}$. The F-DPCH timing relation with uplink DPCCH/DPDCHs is described in subclause 7.6.
- The start of HS-SCCH subframe #0 is aligned with the start of the P-CCPCH frames. The relative timing between a HS-PDSCH and the corresponding HS-SCCH is described in subclause 7.8.

- The E-DPCCH and all E-DPDCHs transmitted from one UE have the same frame timing as the DPCCH.

*****************NEXT MODIFIED SECTIONS*****************

7.5 DPCH/PDSCH timingVoid

The relative timing between a DPCH frame and the associated PDSCH frame is shown in figure 33.

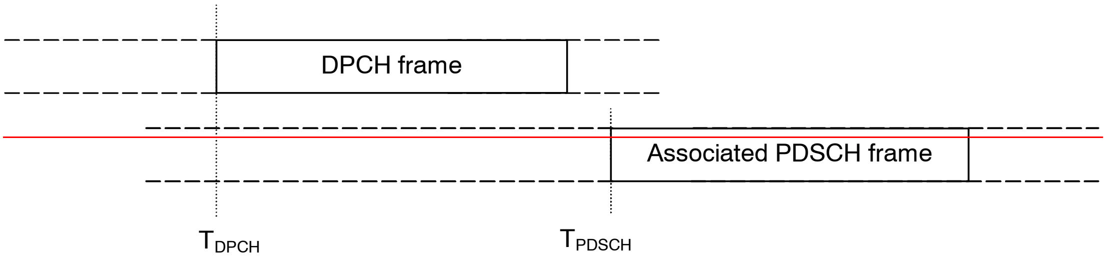


Figure 33: Timing relation between DPCH frame and associated PDSCH frame

The start of a DPCH frame is denoted T_{DPCH} and the start of the associated PDSCH frame is denoted T_{PDSCH}. Any DPCH frame is associated to one PDSCH frame through the relation 46080 chips $\leq T_{PDSCH} - T_{DPCH} < 84480$ chips, i.e., the associated PDSCH frame starts between three slots after the end of the DPCH frame and 18 slots after the end of the DPCH frame, as described in subclause 7.1.

CR-Form-v7.1

CHANGE REQUEST

⌘	**25.212**	**CR**	**209**	⌘ **rev**	**-**	⌘ Current version: **5.9.0** ⌘

*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 [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Feature Clean Up: Removal of DSCH (FDD mode)		
Source:	⌘	RAN WG1		
Work item code:	⌘	TEI5	***Date:*** ⌘	20/04/2005
Category:	⌘	**C** *Use one of the following categories:* ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.	***Release:*** ⌘	Rel-5 *Use one of the following releases:* *Ph2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *Rel-4 (Release 4)* *Rel-5 (Release 5)* *Rel-6 (Release 6)* *Rel-7 (Release 7)*

Reason for change:	⌘	In RAN#27 removal of DSCH (FDD mode) was agreed in order to simplify the specifications. This feature is optional and not used in real networks. Furthermore, the introduction of HSDPA will diminish the benefits that DSCH could provide.This CR shows how this proposal affect to TS25.212.
Summary of change:	⌘	The text related to DSCH feature is removed from the specification.
Consequences if not approved:	⌘	Contrary to the RAN#27decision the DSCH for FDD mode will remain specified

Clauses affected:	⌘	3.3, 4.2, 4.2.3, 4.2.7.2, 4.2.13.5, 4.2.14, 4.2.14.1.2, 4.3, 4.3.4				
		Y	**N**			
Other specs affected:	⌘	X		Other core specifications	⌘	25.211, 25.213, 25.214, 25.301, 25.302, 25.303, 25.306, 25.321, 25.331, 25.401, 25.402, 25.420, 25.423, 25.424, 25.425, 25.427, 25.430, 25.433, 25.434, 25.435 34.108, 34.123
		X		Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3.3 Abbreviations

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

ARQ	Automatic Repeat Request
BCH	Broadcast Channel
BER	Bit Error Rate
BLER	Block Error Rate
BS	Base Station
CCPCH	Common Control Physical Channel
CCTrCH	Coded Composite Transport Channel
CFN	Connection Frame Number
CRC	Cyclic Redundancy Check
DCH	Dedicated Channel
DL	Downlink (Forward link)
DPCCH	Dedicated Physical Control Channel
DPCH	Dedicated Physical Channel
DPDCH	Dedicated Physical Data Channel
DS-CDMA	Direct-Sequence Code Division Multiple Access
~~DSCH~~	~~Downlink Shared Channel~~
DTX	Discontinuous Transmission
FACH	Forward Access Channel
FDD	Frequency Division Duplex
FER	Frame Error Rate
GF	Galois Field
HARQ	Hybrid Automatic Repeat reQuest
HS-DPCCH	Dedicated Physical Control Channel (uplink) for HS-DSCH
HS-DSCH	High Speed Downlink Shared Channel
HS-PDSCH	High Speed Physical Downlink Shared Channel
HS-SCCH	Shared Control Channel for HS-DSCH
MAC	Medium Access Control
Mcps	Mega Chip Per Second
MS	Mobile Station
OVSF	Orthogonal Variable Spreading Factor (codes)
PCCC	Parallel Concatenated Convolutional Code
PCH	Paging Channel
PhCH	Physical Channel
PRACH	Physical Random Access Channel
RACH	Random Access Channel
RSC	Recursive Systematic Convolutional Coder
RV	Redundancy Version
RX	Receive
SCH	Synchronisation Channel
SF	Spreading Factor
SFN	System Frame Number
SIR	Signal-to-Interference Ratio
SNR	Signal to Noise Ratio
TF	Transport Format
TFC	Transport Format Combination
TFCI	Transport Format Combination Indicator
TPC	Transmit Power Control
TrCH	Transport Channel
TTI	Transmission Time Interval
TX	Transmit
UL	Uplink (Reverse link)

****************NEXT MODIFIED SECTIONS****************

4.2 General coding/multiplexing of TrCHs

This section only applies to the transport channels: DCH, RACH, CPCH, DSCH, BCH, FACH and PCH. Other transport channels which do not use the general method are described separately below.

Data arrives to the coding/multiplexing unit in form of transport block sets once every transmission time interval. The transmission time interval is transport-channel specific from the set {10 ms, 20 ms, 40 ms, 80 ms}.

The following coding/multiplexing steps can be identified:

- add CRC to each transport block (see subclause 4.2.1);
- transport block concatenation and code block segmentation (see subclause 4.2.2);
- channel coding (see subclause 4.2.3);
- radio frame equalisation (see subclause 4.2.4);
- rate matching (see subclause 4.2.7);
- insertion of discontinuous transmission (DTX) indication bits (see subclause 4.2.9);
- interleaving (two steps, see subclauses 4.2.5 and 4.2.11);
- radio frame segmentation (see subclause 4.2.6);
- multiplexing of transport channels (see subclause 4.2.8);
- physical channel segmentation (see subclause 4.2.10);
- mapping to physical channels (see subclause 4.2.12).

The coding/multiplexing steps for uplink and downlink are shown in figure 1 and figure 2 respectively.

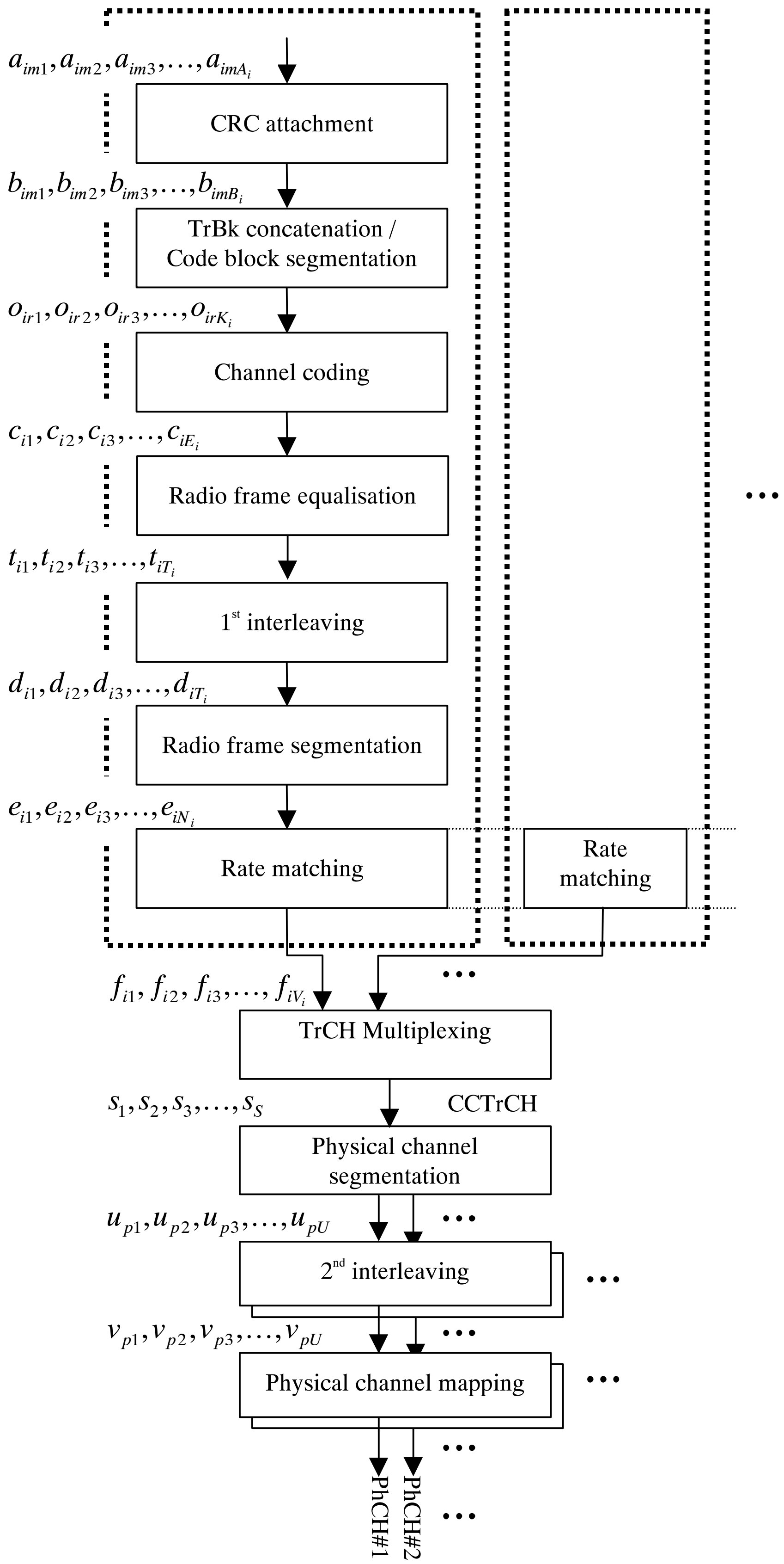


Figure 1: Transport channel multiplexing structure for uplink

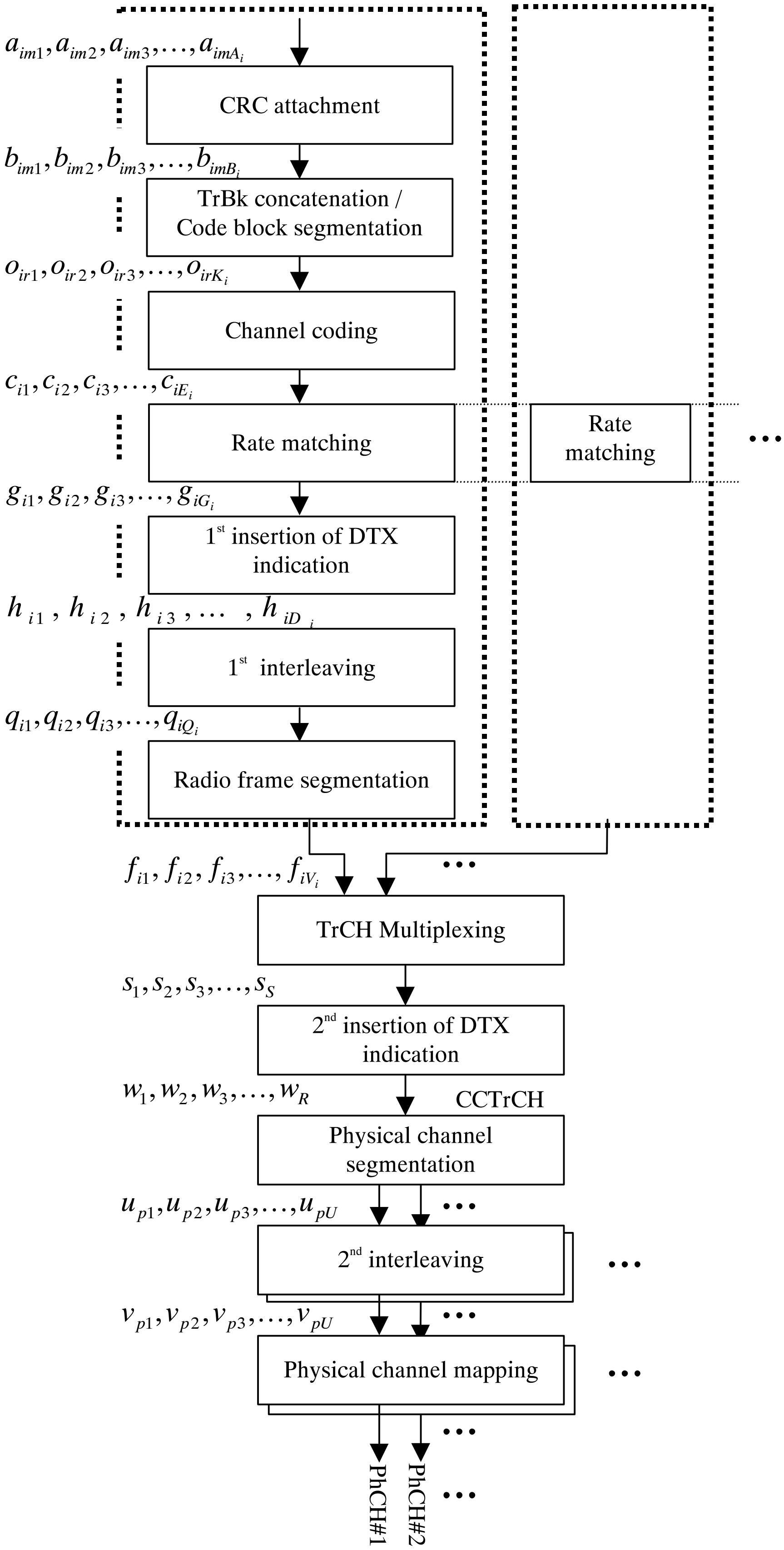


Figure 2: Transport channel multiplexing structure for downlink

The single output data stream from the TrCH multiplexing, including DTX indication bits in downlink, is denoted *Coded Composite Transport Channel (CCTrCH)*. A CCTrCH can be mapped to one or several physical channels.

*****************NEXT MODIFIED SECTIONS*****************

4.2.3 Channel coding

Code blocks are delivered to the channel coding block. They are denoted by $o_{ir1}, o_{ir2}, o_{ir3}, \ldots, o_{irK_i}$, where i is the TrCH number, r is the code block number, and K_i is the number of bits in each code block. The number of code blocks on TrCH i is denoted by C_i. After encoding the bits are denoted by $y_{ir1}, y_{ir2}, y_{ir3}, \ldots, y_{irY_i}$, where Y_i is the number of encoded bits. The relation between o_{irk} and y_{irk} and between K_i and Y_i is dependent on the channel coding scheme.

The following channel coding schemes can be applied to TrCHs:

- convolutional coding;
- turbo coding.

Usage of coding scheme and coding rate for the different types of TrCH is shown in table 1.

The values of Y_i in connection with each coding scheme:

- convolutional coding with rate 1/2: $Y_i = 2*K_i + 16$; rate 1/3: $Y_i = 3*K_i + 24$;
- turbo coding with rate 1/3: $Y_i = 3*K_i + 12$.

Table 1: Usage of channel coding scheme and coding rate

Type of TrCH	Coding scheme	Coding rate
BCH	Convolutional coding	1/2
PCH		
RACH		
CPCH, DCH, ~~DSCH,~~ FACH		1/3, 1/2
	Turbo coding	1/3

*****************NEXT MODIFIED SECTIONS*****************

4.2.7.2 Determination of rate matching parameters in downlink

For downlink channels ~~other than the downlink shared channel(s) (DSCH)~~, $N_{data,j}$ does not depend on the transport format combination j. $N_{data,*}$ is given by the channelization code(s) assigned by higher layers.

Denote the number of physical channels used for the CCTrCH by P. $N_{data,*}$ is the number of bits available to the CCTrCH in one radio frame and defined as $N_{data,*}=P\times15\times(N_{data1}+N_{data2})$, where N_{data1} and N_{data2} are defined in [2]. Note that contrary to the uplink, the same rate matching patterns are used in TTIs containing no compressed radio frames and in TTIs containing radio frames compressed by spreading factor reduction or higher layer scheduling.

~~For a DSCH CCTrCH , different sets of channelisation codes may be configured by higher layers resulting in possibly multiple $N_{data,*}$ values, where $N_{data,*}$ is the number of bits available to the CCTrCH in one radio frame and is given by $N_{data,*}=P\times15\times(N_{data1}+N_{data2})$, where N_{data1} and N_{data2} are defined in [2]. Each $N_{data,*}$ corresponds to a sub-set of the Transport format combinations configured as part of the TFCS. For a DSCH CCTrCH only flexible positions apply. The rate matching calculations as specified in section 4.2.7.2.2 shall be performed for each $N_{data,*}$, where the TFCS taken into account in the calculations is restricted to the set of TFCs associated with $N_{data,*}$, as configured by higher layers. Therefore the amount of rate matching for a transport channel i for a TTI interval is a function of the $N_{data,*}$ value which shall be constant over the entire TTI as specified in section 4.2.14.~~

In the following, the total amount of puncturing or repetition for the TTI is calculated.

Additional calculations for TTIs containing radio frames compressed by puncturing in case fixed positions are used, are performed to determine this total amount of rate matching needed.

For compressed mode by puncturing, in TTIs where some compressed radio frames occur, the puncturing is increased or the repetition is decreased compared to what is calculated according to the rate matching parameters provided by higher layers. This allows to cope with reduction of available data bits on the physical channel(s) if the slot format for the compressed frame(s) contains fewer data bits than for the normal frames(s), and to create room for later insertion of marked bits, noted p-bits, which will identify the positions of the gaps in the compressed radio frames.

The amount of additional puncturing corresponds to the number of bits to create the gap in the TTI for TrCH *i*, plus the difference between the number of data bits available in normal frames and in compressed frames, due to slot format change. In case of fixed positions, it is calculated in addition to the amount of rate matching indicated by higher layers. It is noted $Np_{i,\max}^{TTI,m}$.

In fixed positions case, to obtain the total rate matching $\Delta N_{i,\max}^{TTI,cm,m}$ to be performed on the TTI *m*, $Np_{i,\max}^{TTI,m}$ is subtracted from $\Delta N_{i,\max}^{TTI,m}$ (calculated based on higher layers RM parameters as for normal rate matching). This allows to create room for the $Np_{i,\max}^{TTI,m}$ bits p to be inserted later. If the result is null, i.e. the amount of repetition matches exactly the amount of additional puncturing needed, then no rate matching is necessary.

In case of compressed mode by puncturing and fixed positions, for some calculations, $N'_{data,*}$ is used for radio frames with gap instead of $N_{data,*}$, where $N'_{data,*} = P \times 15 \times (N'_{data1} + N'_{data2})$. N'_{data1} and N'_{data2} are the number of bits in the data fields of the slot format used for the frames compressed by puncturing.

*****************NEXT MODIFIED SECTIONS******************

4.2.13.5 ~~Downlink Shared Channel (DSCH) associated with a DCH~~Void

- ~~The spreading factor is indicated with the TFCI of the associated DPCH.~~
- ~~The maximum value of the number of TrCHs *I* in a CCTrCH, the maximum value of the number of transport blocks M_i on the transport channel and the maximum value of the number of PDSCHs *P* are given from the UE capability class.~~

*****************NEXT MODIFIED SECTIONS******************

4.2.14 Multiplexing of different transport channels into one CCTrCH, and mapping of one CCTrCH onto physical channels

The following rules shall apply to the different transport channels which are part of the same CCTrCH:

1) Transport channels multiplexed into one CCTrCh shall have co-ordinated timings. When the TFCS of a CCTrCH is changed because one or more transport channels are added to the CCTrCH or reconfigured within the CCTrCH, or removed from the CCTrCH, the change may only be made at the start of a radio frame with CFN fulfilling the relation

   CFN mod F_{max} = 0,

   where F_{max} denotes the maximum number of radio frames within the transmission time intervals of all transport channels which are multiplexed into the same CCTrCH, including any transport channels *i* which are added, reconfigured or have been removed, and CFN denotes the connection frame number of the first radio frame of the changed CCTrCH.

   After addition or reconfiguration of a transport channel *i* within a CCTrCH, the TTI of transport channel *i* may only start in radio frames with CFN fulfilling the relation:

   CFN mod F_i = 0.

   ~~For a CCTrCH of DSCH type, a modification of number of bits $N_{data,*}$ allocated on a radio frame is allowed if the CFN verifies CFN mod F_{max} = 0, where F_{max} denotes the maximum number of radio frames within the transmission time intervals of all the transport channels with a non zero transport block transport format multiplexed into the CCTrCH in the previous radio frame.~~

2) Only transport channels with the same active set can be mapped onto the same CCTrCH.

3) Different CCTrCHs cannot be mapped onto the same PhCH.

4) One CCTrCH shall be mapped onto one or several PhCHs. These physical channels shall all have the same SF.

5) Dedicated Transport channels and common transport channels cannot be multiplexed into the same CCTrCH.

6) For the common transport channels, only the FACH and PCH may belong to the same CCTrCH.

There are hence two types of CCTrCH:

1) CCTrCH of dedicated type, corresponding to the result of coding and multiplexing of one or several DCHs.

2) CCTrCH of common type, corresponding to the result of the coding and multiplexing of a common channel, RACH in the uplink, ~~DSCH,~~ HS-DSCH, BCH, or FACH/PCH for the downlink.

*****************NEXT MODIFIED SECTIONS*****************

4.2.14.1.2 Allowed CCTrCH combinations on the downlink

The following CCTrCH combinations for one UE are allowed:

- x CCTrCH of dedicated type + y CCTrCH of common type. The allowed combination of CCTrCHs of dedicated and common type are given from UE radio access capabilities. There can be a maximum of one CCTrCH of common type for ~~DSCH or~~ HS-DSCH and a maximum of one CCTrCH of common type for FACH. With one CCTrCH of common type for ~~DSCH or~~ HS-DSCH, there shall be only one CCTrCH of dedicated type.

NOTE 1: There is only one DPCCH in the uplink, hence one TPC bits flow on the uplink to control possibly the different DPDCHs on the downlink, part of the same or several CCTrCHs.

NOTE 2: There is only one DPCCH in the downlink, even with multiple CCTrCHs. With multiple CCTrCHs, the DPCCH is transmitted on one of the physical channels of that CCTrCH which has the smallest SF among the multiple CCTrCHs. Thus there is only one TPC command flow and only one TFCI word in downlink even with multiple CCTrCHs.

NOTE 3: in the current release, only 1 CCTrCH of dedicated type is supported.

*****************NEXT MODIFIED SECTIONS*****************

4.3 Transport format detection

If the transport format set of a TrCH *i* contains more than one transport format, the transport format can be detected according to one of the following methods:

- TFCI based detection: This method is applicable when the transport format combination is signalled using the TFCI field;
- explicit blind detection: This method typically consists of detecting the TF of TrCH *i* by use of channel decoding and CRC check;
- guided detection: This method is applicable when there is at least one other TrCH *i'*, hereafter called guiding TrCH, such that:
  - the guiding TrCH has the same TTI duration as the TrCH under consideration, i.e. $F_{i'} = F_i$;
  - different TFs of the TrCH under consideration correspond to different TFs of the guiding TrCH;
  - explicit blind detection is used on the guiding TrCH.

If the transport format set for a TrCH *i* does not contain more than one transport format with more than zero transport blocks, no explicit blind transport format detection needs to be performed for this TrCH. The UE can use guided detection for this TrCH or single transport format detection, where the UE always assumes the transport format corresponding to more than zero transport blocks for decoding.

For uplink, blind transport format detection is a network controlled option. For downlink, the UE shall be capable of performing blind transport format detection, if certain restrictions on the configured transport channels are fulfilled.

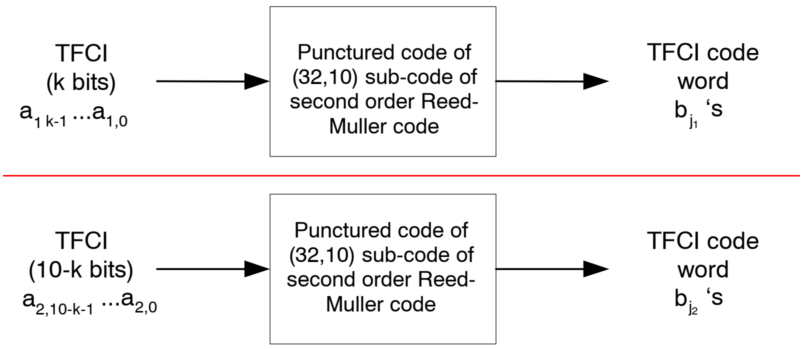
~~For a DPCH associated with a PDSCH, the DPCCH shall include TFCI.~~

*****************NEXT MODIFIED SECTIONS*****************

4.3.4 ~~Operation of TFCI in Hard Split Mode~~Void

~~If one of the DCH is associated with a DSCH, the TFCI code word may be split in such a way that the code word relevant for TFCI activity indication is not transmitted from every cell. The use of such a functionality shall be indicated by higher layer signalling.~~

~~The TFCI is encoded by using punctured code of (32,10) sub-code of second order Reed-Muller code. The coding procedure is as shown in figure 10.~~



~~**Figure 10: Channel coding of flexible hard split mode TFCI information bits**~~

~~The code words of the punctured code of (32,10) sub-code of second order Reed-Muller code are linear combinations of basis sequences generated by puncturing 10 basis sequences defined in table 8 in section 4.3.3.~~

~~The first set of TFCI information bits ($a_{1,0}$, $a_{1,1}$, $a_{1,2}$, $a_{1,3}$, …, $a_{1,k-1}$ where $a_{1,0}$ is LSB and $a_{1,k-1}$ is MSB) shall correspond to the TFC index (expressed in unsigned binary form) defined by the RRC layer to reference the TFC of the DCH CCTrCH in the associated DPCH radio frame.~~

~~The second set of TFCI information bits ($a_{2,0}$, $a_{2,1}$, $a_{2,2}$, $a_{2,3}$, .., $a_{2,10-k-1}$ where $a_{2,0}$ is LSB and $a_{2,10-k-1}$ is MSB) shall correspond to the TFC index (expressed in unsigned binary form) defined by the RRC layer to reference the TFC of the associated DSCH CCTrCH in the corresponding PDSCH radio frame.~~

~~The output code word bits are given by :~~

$$b_{j_1} = \sum_{n=0}^{k-1}(a_{1,n} \times M_{\pi_1(k,i_1),\pi_2(k,n)}) \bmod 2; \qquad b_{j_2} = \sum_{n=0}^{10-k-1}(a_{2,n} \times M_{\pi_1(10-k,i_2),\pi_2(10-k,n)}) \bmod 2$$

~~where i_1 = 0, …, 3×k and i_2 = 0, …, 30-3×k.~~

~~Then, the relation between j_1 (or j_2) and i_1 (or i_2) is as follows:~~

~~$j_1 = \left\lfloor \frac{32}{3 \times k + 1} \times \left(i_1 + 1 - \frac{1}{2}\left\lfloor \frac{k}{5} \right\rfloor\right) + \frac{1}{2} \right\rfloor - 1$; $j_2 = \left\lfloor \frac{32}{32 - (3 \times k + 1)} \times \left(i_2 + \frac{1}{2}\left(1 + \left\lfloor \frac{k}{5} \right\rfloor\right)\right) + \frac{1}{2} \right\rfloor - 1$.~~

~~The functions π_1, π_2 are defined as shown in the following table 9.~~

~~Table 9. π_1, π_2 functions~~

~~m~~	~~$\pi_1(m,i)$ for i = 0, …, 3×m~~	~~$\pi_2(m,n)$ for n = 0,…, m-1~~
~~3~~	~~0, 1, 2, 3, 4, 5, 6, 8, 9, 11~~	~~0, 1, 2~~
~~4~~	~~3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15~~	~~0, 1, 2, 3~~
~~5~~	~~0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 30~~	~~0, 1, 2, 3, 5~~
~~6~~	~~0, 1, 2, 3, 4, 5, 7, 8, 9, 12, 15, 18, 21, 23, 25, 27, 28, 29, 30~~	~~0, 1, 2, 3, 4, 5~~
~~7~~	~~0, 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 13, 14, 15, 17, 20, 21, 22, 24, 25, 28, 29~~	~~0, 1, 2, 3, 4, 6, 7~~

3GPP TSG-RAN1 Meeting #41
Athens, Greece, 9th – 13th May 2025

Tdoc ⌘R1-050548

CR-Form-v7.1

CHANGE REQUEST

⌘	**25.212**	**CR**	**210**	⌘ **rev**	**-**	⌘	Current version:	**6.4.0**	⌘

*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 [X] Radio Access Network [X] Core Network [ ]

Title: ⌘	Feature Clean Up: Removal of DSCH (FDD mode)		
Source: ⌘	RAN WG1		
Work item code: ⌘	TEI6	***Date:*** ⌘	20/04/2005
Category: ⌘	**C**	***Release:*** ⌘	Rel-6
	Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *Ph2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *Rel-4 (Release 4)* *Rel-5 (Release 5)* *Rel-6 (Release 6)* *Rel-7 (Release 7)*

Reason for change: ⌘	In RAN#27 removal of DSCH (FDD mode) was agreed in order to simplify the specifications. This feature is optional and not used in real networks. Furthermore, the introduction of HSDPA will diminish the benefits that DSCH could provide.This CR shows how this proposal affect to TS25.212.
Summary of change: ⌘	The text related to DSCH feature is removed from the specification.
Consequences if not approved: ⌘	Contrary to the RAN#27decision the DSCH for FDD mode will remain specified

	Y	N		
Clauses affected: ⌘			3.3, 4.2, 4.2.3, 4.2.7.2, 4.2.13.5, 4.2.14, 4.2.14.1.2, 4.3, 4.3.4	
Other specs affected: ⌘	X		Other core specifications ⌘	25.211, 25.213, 25.214, 25.301, 25.302, 25.303, 25.306, 25.321, 25.331, 25.401, 25.402, 25.420, 25.423, 25.424, 25.425, 25.427, 25.430, 25.433, 25.434, 25.435
	X		Test specifications	34.108, 34.123
		X	O&M Specifications	
Other comments: ⌘				

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3.3 Abbreviations

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

ARQ	Automatic Repeat Request
BCH	Broadcast Channel
BER	Bit Error Rate
BLER	Block Error Rate
BS	Base Station
CCPCH	Common Control Physical Channel
CCTrCH	Coded Composite Transport Channel
CFN	Connection Frame Number
CRC	Cyclic Redundancy Check
DCH	Dedicated Channel
DL	Downlink (Forward link)
DPCCH	Dedicated Physical Control Channel
DPCH	Dedicated Physical Channel
DPDCH	Dedicated Physical Data Channel
DS-CDMA	Direct-Sequence Code Division Multiple Access
~~DSCH~~	~~Downlink Shared Channel~~
DTX	Discontinuous Transmission
FACH	Forward Access Channel
E-AGCH	E-DCH Absolute Grant Channel
E-DCH	Enhanced Dedicated Channel
E-DPCCH	E-DCH Dedicated Physical Control Channel
E-DPDCH	E-DCH Dedicated Physical Data Channel
E-HICH	E-DCH Hybrid ARQ Indicator Channel
E-RGCH	E-DCH Relative Grant Channel
FDD	Frequency Division Duplex
F-DPCH	Fractional Dedicated Physical Channel
FER	Frame Error Rate
GF	Galois Field
HARQ	Hybrid Automatic Repeat reQuest
HS-DPCCH	Dedicated Physical Control Channel (uplink) for HS-DSCH
HS-DSCH	High Speed Downlink Shared Channel
HS-PDSCH	High Speed Physical Downlink Shared Channel
HS-SCCH	Shared Control Channel for HS-DSCH
MAC	Medium Access Control
Mcps	Mega Chip Per Second
MS	Mobile Station
OVSF	Orthogonal Variable Spreading Factor (codes)
PCCC	Parallel Concatenated Convolutional Code
PCH	Paging Channel
PhCH	Physical Channel
PRACH	Physical Random Access Channel
RACH	Random Access Channel
RSC	Recursive Systematic Convolutional Coder
RV	Redundancy Version
RX	Receive
SCH	Synchronisation Channel
SF	Spreading Factor
SFN	System Frame Number
SIR	Signal-to-Interference Ratio
SNR	Signal to Noise Ratio
TF	Transport Format
TFC	Transport Format Combination
TFCI	Transport Format Combination Indicator
TPC	Transmit Power Control
TrCH	Transport Channel
TTI	Transmission Time Interval
TX	Transmit

UL Uplink (Reverse link)

*****************NEXT MODIFIED SECTIONS*****************

4.2 General coding/multiplexing of TrCHs

This section only applies to the transport channels: DCH, RACH, CPCH, ~~DSCH,~~ BCH, FACH and PCH. Other transport channels which do not use the general method are described separately below.

Data arrives to the coding/multiplexing unit in form of transport block sets once every transmission time interval. The transmission time interval is transport-channel specific from the set {10 ms, 20 ms, 40 ms, 80 ms}.

The following coding/multiplexing steps can be identified:

- add CRC to each transport block (see subclause 4.2.1);
- transport block concatenation and code block segmentation (see subclause 4.2.2);
- channel coding (see subclause 4.2.3);
- radio frame equalisation (see subclause 4.2.4);
- rate matching (see subclause 4.2.7);
- insertion of discontinuous transmission (DTX) indication bits (see subclause 4.2.9);
- interleaving (two steps, see subclauses 4.2.5 and 4.2.11);
- radio frame segmentation (see subclause 4.2.6);
- multiplexing of transport channels (see subclause 4.2.8);
- physical channel segmentation (see subclause 4.2.10);
- mapping to physical channels (see subclause 4.2.12).

The coding/multiplexing steps for uplink and downlink are shown in figure 1 and figure 2 respectively.

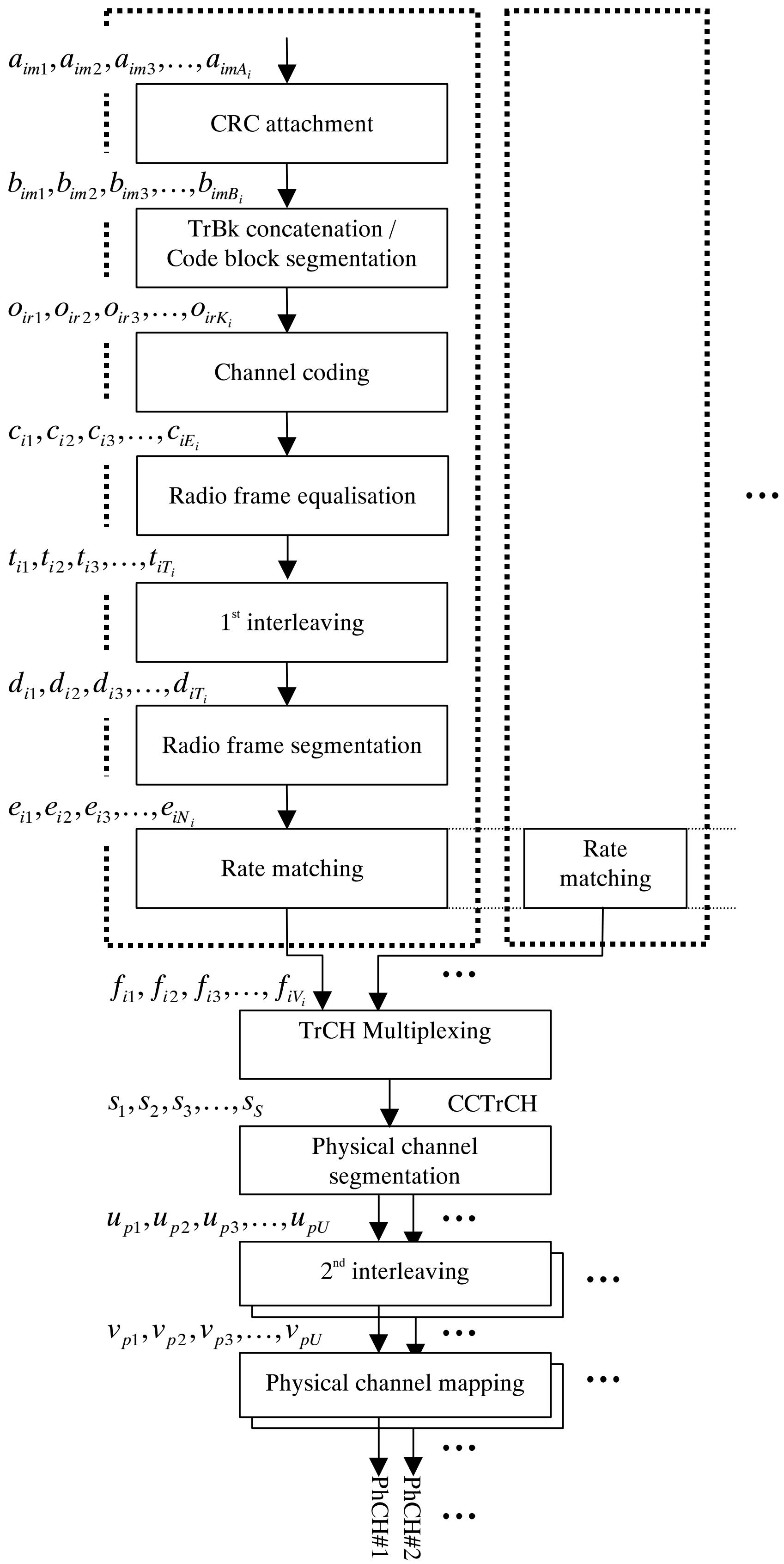


Figure 1: Transport channel multiplexing structure for uplink

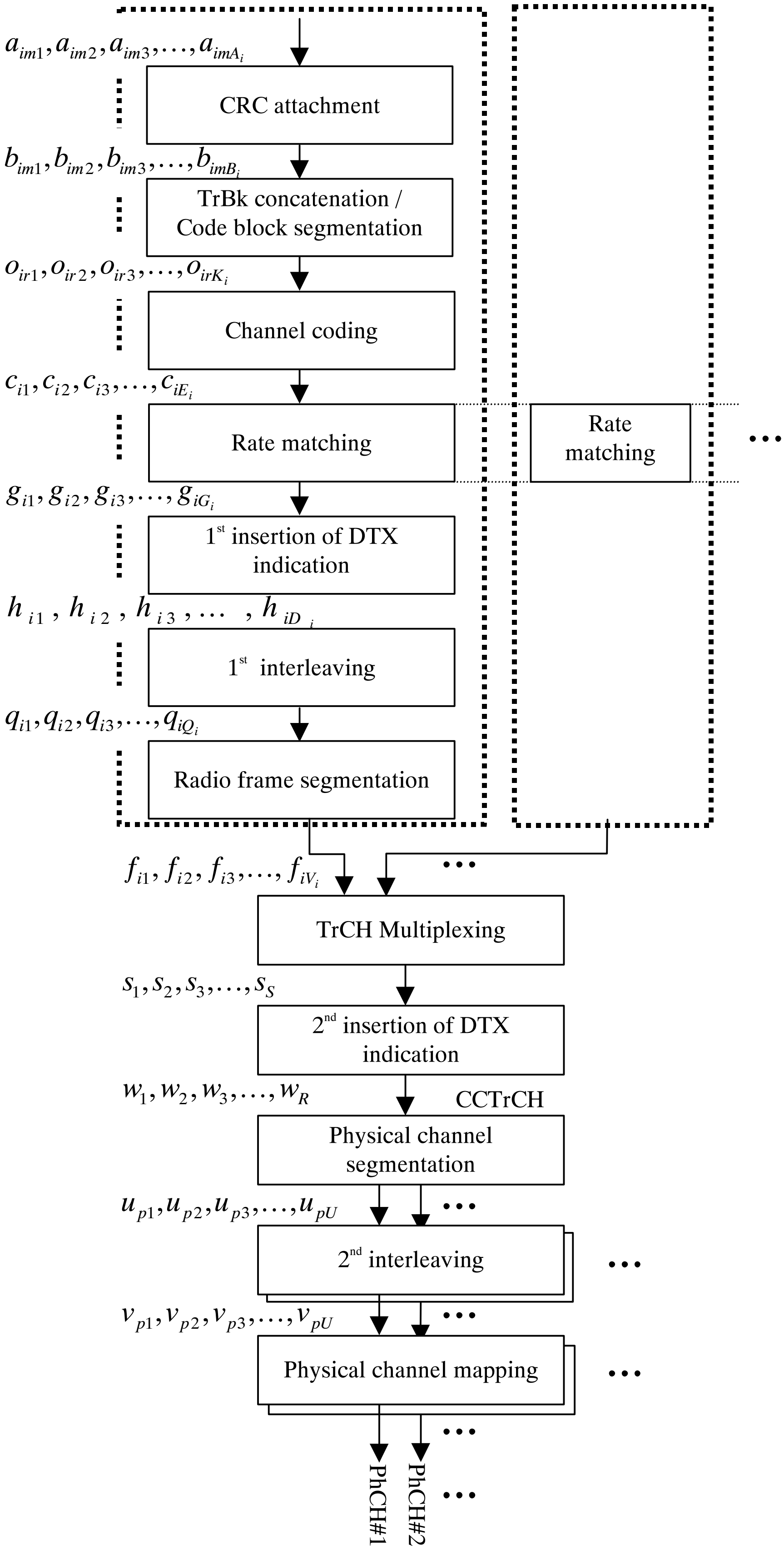


Figure 2: Transport channel multiplexing structure for downlink

The single output data stream from the TrCH multiplexing, including DTX indication bits in downlink, is denoted *Coded Composite Transport Channel (CCTrCH)*. A CCTrCH can be mapped to one or several physical channels.

*****************NEXT MODIFIED SECTIONS*****************

4.2.3 Channel coding

Code blocks are delivered to the channel coding block. They are denoted by $o_{ir1}, o_{ir2}, o_{ir3}, \ldots, o_{irK_i}$, where i is the TrCH number, r is the code block number, and K_i is the number of bits in each code block. The number of code blocks on TrCH i is denoted by C_i. After encoding the bits are denoted by $y_{ir1}, y_{ir2}, y_{ir3}, \ldots, y_{irY_i}$, where Y_i is the number of encoded bits. The relation between o_{irk} and y_{irk} and between K_i and Y_i is dependent on the channel coding scheme.

The following channel coding schemes can be applied to TrCHs:

- convolutional coding;
- turbo coding.

Usage of coding scheme and coding rate for the different types of TrCH is shown in table 1.

The values of Y_i in connection with each coding scheme:

- convolutional coding with rate 1/2: $Y_i = 2*K_i + 16$; rate 1/3: $Y_i = 3*K_i + 24$;
- turbo coding with rate 1/3: $Y_i = 3*K_i + 12$.

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For downlink channels ~~other than the downlink shared channel(s) (DSCH)~~, $N_{data,j}$ does not depend on the transport format combination j. $N_{data,*}$ is given by the channelization code(s) assigned by higher layers.

Denote the number of physical channels used for the CCTrCH by P. $N_{data,*}$ is the number of bits available to the CCTrCH in one radio frame and defined as $N_{data,*}=P\times15\times(N_{data1}+N_{data2})$, where N_{data1} and N_{data2} are defined in [2]. Note that contrary to the uplink, the same rate matching patterns are used in TTIs containing no compressed radio frames and in TTIs containing radio frames compressed by spreading factor reduction or higher layer scheduling.

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*****************NEXT MODIFIED SECTIONS*****************

4.2.13.5 ~~Downlink Shared Channel (DSCH) associated with a DCH~~Void

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- ~~The maximum value of the number of TrCHs *I* in a CCTrCH, the maximum value of the number of transport blocks M_i on the transport channel and the maximum value of the number of PDSCHs *P* are given from the UE capability class.~~

*****************NEXT MODIFIED SECTIONS*****************

4.2.14 Multiplexing of different transport channels into one CCTrCH, and mapping of one CCTrCH onto physical channels

The following rules shall apply to the different transport channels which are part of the same CCTrCH:

1) Transport channels multiplexed into one CCTrCh shall have co-ordinated timings. When the TFCS of a CCTrCH is changed because one or more transport channels are added to the CCTrCH or reconfigured within the CCTrCH, or removed from the CCTrCH, the change may only be made at the start of a radio frame with CFN fulfilling the relation

   CFN mod F_{max} = 0,

   where F_{max} denotes the maximum number of radio frames within the transmission time intervals of all transport channels which are multiplexed into the same CCTrCH, including any transport channels *i* which are added, reconfigured or have been removed, and CFN denotes the connection frame number of the first radio frame of the changed CCTrCH.

   After addition or reconfiguration of a transport channel *i* within a CCTrCH, the TTI of transport channel *i* may only start in radio frames with CFN fulfilling the relation:

   CFN mod F_i = 0.

For a CCTrCH of DSCH type, a modification of number of bits $N_{data,*}$ allocated on a radio frame is allowed if the CFN verifies CFN mod F_{max} = 0, where F_{max} denotes the maximum number of radio frames within the transmission time intervals of all the transport channels with a non zero transport block transport format multiplexed into the CCTrCH in the previous radio frame.

2) Only transport channels with the same active set can be mapped onto the same CCTrCH.

3) Different CCTrCHs cannot be mapped onto the same PhCH.

4) One CCTrCH shall be mapped onto one or several PhCHs. These physical channels shall all have the same SF.

5) Dedicated Transport channels and common transport channels cannot be multiplexed into the same CCTrCH.

6) For the common transport channels, only the FACH and PCH may belong to the same CCTrCH.

There are hence two types of CCTrCH:

1) CCTrCH of dedicated type, corresponding to the result of coding and multiplexing of one or several DCHs or one E-DCH.

2) CCTrCH of common type, corresponding to the result of the coding and multiplexing of a common channel, RACH in the uplink, DSCH, HS-DSCH, BCH, or FACH/PCH for the downlink.

*****************NEXT MODIFIED SECTIONS*****************

4.2.14.1.2 Allowed CCTrCH combinations on the downlink

The following CCTrCH combinations for one UE are allowed:

- x CCTrCH of dedicated type + y CCTrCH of common type. The allowed combination of CCTrCHs of dedicated and common type are given from UE radio access capabilities. There can be a maximum of one CCTrCH of common type for DSCH HS-DSCH. The maximum number of CCTrCHs of common type for FACH is determined from UE capabilities. With one CCTrCH of common type for DSCH HS-DSCH, there shall be only one CCTrCH of dedicated type.

NOTE 1: There is only one DPCCH in the uplink, hence one TPC bits flow on the uplink to control possibly the different DPDCHs on the downlink, part of the same or several CCTrCHs.

NOTE 2: There is only one DPCCH in the downlink, even with multiple CCTrCHs. With multiple CCTrCHs, the DPCCH is transmitted on one of the physical channels of that CCTrCH which has the smallest SF among the multiple CCTrCHs. Thus there is only one TPC command flow and only one TFCI word in downlink even with multiple CCTrCHs.

NOTE 3: in the current release, only 1 CCTrCH of dedicated type is supported.

*****************NEXT MODIFIED SECTIONS*****************

4.3 Transport format detection

If the transport format set of a TrCH *i* contains more than one transport format, the transport format can be detected according to one of the following methods:

- TFCI based detection: This method is applicable when the transport format combination is signalled using the TFCI field;
- explicit blind detection: This method typically consists of detecting the TF of TrCH *i* by use of channel decoding and CRC check;
- guided detection: This method is applicable when there is at least one other TrCH *i'*, hereafter called guiding TrCH, such that:

- the guiding TrCH has the same TTI duration as the TrCH under consideration, i.e. $F_{i'} = F_i$;
- different TFs of the TrCH under consideration correspond to different TFs of the guiding TrCH;
- explicit blind detection is used on the guiding TrCH.

If the transport format set for a TrCH *i* does not contain more than one transport format with more than zero transport blocks, no explicit blind transport format detection needs to be performed for this TrCH. The UE can use guided detection for this TrCH or single transport format detection, where the UE always assumes the transport format corresponding to more than zero transport blocks for decoding.

For uplink, blind transport format detection is a network controlled option. For downlink, the UE shall be capable of performing blind transport format detection, if certain restrictions on the configured transport channels are fulfilled.

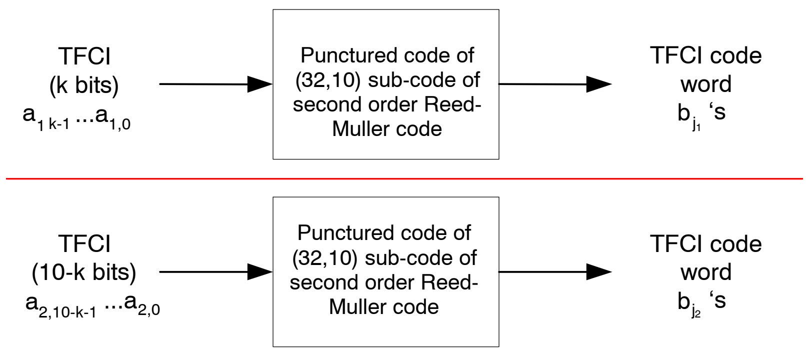
~~For a DPCH associated with a PDSCH, the DPCCH shall include TFCI.~~

*****************NEXT MODIFIED SECTIONS*****************

4.3.4 ~~Operation of TFCI in Hard Split Mode~~Void

~~If one of the DCH is associated with a DSCH, the TFCI code word may be split in such a way that the code word relevant for TFCI activity indication is not transmitted from every cell. The use of such a functionality shall be indicated by higher layer signalling.~~

~~The TFCI is encoded by using punctured code of (32,10) sub-code of second order Reed-Muller code. The coding procedure is as shown in figure 10.~~



~~Figure 10: Channel coding of flexible hard split mode TFCI information bits~~

~~The code words of the punctured code of (32,10) sub-code of second order Reed-Muller code are linear combinations of basis sequences generated by puncturing 10 basis sequences defined in table 8 in section 4.3.3.~~

~~The first set of TFCI information bits ($a_{1,0}$, $a_{1,1}$, $a_{1,2}$, $a_{1,3}$, …, $a_{1,k-1}$ where $a_{1,0}$ is LSB and $a_{1,k-1}$ is MSB) shall correspond to the TFC index (expressed in unsigned binary form) defined by the RRC layer to reference the TFC of the DCH CCTrCH in the associated DPCH radio frame.~~

~~The second set of TFCI information bits ($a_{2,0}$, $a_{2,1}$, $a_{2,2}$, $a_{2,3}$, .., $a_{2,10-k-1}$ where $a_{2,0}$ is LSB and $a_{2,10-k-1}$ is MSB) shall correspond to the TFC index (expressed in unsigned binary form) defined by the RRC layer to reference the TFC of the associated DSCH CCTrCH in the corresponding PDSCH radio frame.~~

~~The output code word bits are given by :~~

$$b_{j_1} = \sum_{n=0}^{k-1}(a_{1,n} \times M_{\pi_1(k,i_1),\pi_2(k,n)}) \bmod 2; \qquad b_{j_2} = \sum_{n=0}^{10-k-1}(a_{2,n} \times M_{\pi_1(10-k,i_2),\pi_2(10-k,n)}) \bmod 2$$

~~where i_1 = 0, …, 3×k and i_2 = 0, …, 30-3×k.~~

Then, the relation between j_1 (or j_2) and i_1 (or i_2) is as follows:

$$j_1 = \left\lfloor \frac{32}{3 \times k + 1} \times \left(i_1 + 1 - \frac{1}{2}\left\lfloor \frac{k}{5} \right\rfloor\right) + \frac{1}{2} \right\rfloor - 1 \ ; \quad j_2 = \left\lfloor \frac{32}{32 - (3 \times k + 1)} \times \left(i_2 + \frac{1}{2}\left(1 + \left\lfloor \frac{k}{5} \right\rfloor\right)\right) + \frac{1}{2} \right\rfloor - 1.$$

The functions π_1, π_2 are defined as shown in the following table 9.

Table 9. π_1, π_2 functions

m	$\pi_1(m,i)$ for i = 0, …, 3×m	$\pi_2(m,n)$ for n = 0,…, m-1
3	0, 1, 2, 3, 4, 5, 6, 8, 9, 11	0, 1, 2
4	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	0, 1, 2, 3
5	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 30	0, 1, 2, 3, 5
6	0, 1, 2, 3, 4, 5, 7, 8, 9, 12, 15, 18, 21, 23, 25, 27, 28, 29, 30	0, 1, 2, 3, 4, 5
7	0, 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 13, 14, 15, 17, 20, 21, 22, 24, 25, 28, 29	0, 1, 2, 3, 4, 6, 7

3GPP TSG-RAN1 Meeting #41 ***Tdoc ⌘R1-050548***
Athens, Greece, 9th – 13th May 2005

CR-Form-v7.1

CHANGE REQUEST

⌘	**25.213**	**CR**	**078**	⌘ **rev**	**-**	⌘	Current version:	**5.5.0**	⌘

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	X	Radio Access Network	X	Core Network	

Title:	⌘	Feature Clean Up: Removal of DSCH (FDD mode)		
Source:	⌘	RAN WG1		
Work item code:	⌘	TEI5	***Date:*** ⌘	20/04/2005
Category:	⌘	**C**	***Release:*** ⌘	Rel-5
		Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *Ph2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *Rel-4 (Release 4)* *Rel-5 (Release 5)* *Rel-6 (Release 6)* *Rel-7 (Release 7)*

Reason for change:	⌘	In RAN#27 removal of DSCH (FDD mode) was agreed in order to simplify the specifications. This feature is optional and not used in real networks. Furthermore, the introduction of HSDPA will diminish the benefits that DSCH could provide.This CR shows how this proposal affect to TS25.211.
Summary of change:	⌘	The text related to DSCH feature is removed from the specification.
Consequences if not approved:	⌘	Contrary to the RAN#27decision the DSCH for FDD mode will remain specified

Clauses affected:	⌘	3.2, 5.1, 5.2.1, 5.2.2,				
		Y	**N**			
Other specs affected:	⌘	**X**		Other core specifications	⌘	25.211, 25.212, 25.214, 25.301, 25.302, 25.303, 25.306, 25.321, 25.331, 25.401, 25.402, 25.420, 25.423, 25.424, 25.425, 25.427, 25.430, 25.433, 25.434, 25.435 34.108, 34.123
		X		Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3.2 Abbreviations

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

16QAM	16 Quadrature Amplitude Modulation
AICH	Acquisition Indicator Channel
AP	Access Preamble
BCH	Broadcast Control Channel
CCPCH	Common Control Physical Channel
CD	Collision Detection
CPCH	Common Packet Channel
CPICH	Common Pilot Channel
DCH	Dedicated Channel
DPCH	Dedicated Physical Channel
DPCCH	Dedicated Physical Control Channel
DPDCH	Dedicated Physical Data Channel
FDD	Frequency Division Duplex
HS-DPCCH	Dedicated Physical Control Channel (uplink) for HS-DSCH
HS-DSCH	High Speed Downlink Shared Channel
HS-PDSCH	High Speed Physical Downlink Shared Channel
HS-SCCH	Shared Control Physical Channel for HS-DSCH
Mcps	Mega Chip Per Second
OVSF	Orthogonal Variable Spreading Factor (codes)
~~PDSCH~~	~~Physical Dedicated Shared Channel~~
PICH	Page Indication Channel
PRACH	Physical Random Access Channel
PSC	Primary Synchronisation Code
RACH	Random Access Channel
SCH	Synchronisation Channel
SSC	Secondary Synchronisation Code
SF	Spreading Factor
UE	User Equipment

*****************NEXT MODIFIED SECTIONS*****************

5.1 Spreading

Figure 8 illustrates the spreading operation for the physical channel except SCH. The behaviour of the modulation mapper is different between QPSK and 16QAM. The downlink physical channels using QPSK are P-CCPCH, S-CCPCH, CPICH, AICH, AP-AICH, CSICH, CD/CA-ICH, PICH, ~~PDSCH,~~ HS-SCCH and downlink DPCH. The downlink physical channel using either QPSK or 16 QAM is HS-PDSCH. The non-spread downlink physical channels, except SCH, AICH, AP-ICH and CD/CA-ICH, consist of a sequence of 3-valued digits taking the values 0, 1 and "DTX". Note that "DTX" is only applicable to those downlink physical channels that support DTX transmission. In case of QPSK, these digits are mapped to real-valued symbols as follows: the binary value "0" is mapped to the real value +1, the binary value "1" is mapped to the real value –1 and "DTX" is mapped to the real value 0. For the indicator channels using signatures (AICH, AP-AICH and CD/CA-ICH), the real-valued symbols depend on the exact combination of the indicators to be transmitted, compare [2] sections 5.3.3.7, 5.3.3.8 and 5.3.3.9.

In case of QPSK, each pair of two consecutive real-valued symbols is first serial-to-parallel converted and mapped to an I and Q branch. The definition of the modulation mapper is such that even and odd numbered symbols are mapped to the I and Q branch respectively. In case of QPSK, for all channels except the indicator channels using signatures, symbol number zero is defined as the first symbol in each frame. For the indicator channels using signatures, symbol number zero is defined as the first symbol in each access slot. The I and Q branches are then both spread to the chip rate by the same real-valued channelisation code $C_{ch,SF,m}$. The channelisation code sequence shall be aligned in time with the symbol boundary. The sequences of real-valued chips on the I and Q branch are then treated as a single complex-valued sequence of chips. This sequence of chips is scrambled (complex chip-wise multiplication) by a complex-valued scrambling code $S_{dl,n}$. In case of P-CCPCH, the scrambling code is applied aligned with the P-CCPCH frame boundary, i.e. the first complex chip of the spread P-CCPCH frame is multiplied with chip number zero of the scrambling code. In case of other downlink channels, the scrambling code is applied aligned with the scrambling code applied to the P-CCPCH. In this case, the scrambling code is thus not necessarily applied aligned with the frame boundary of the physical channel to be scrambled.

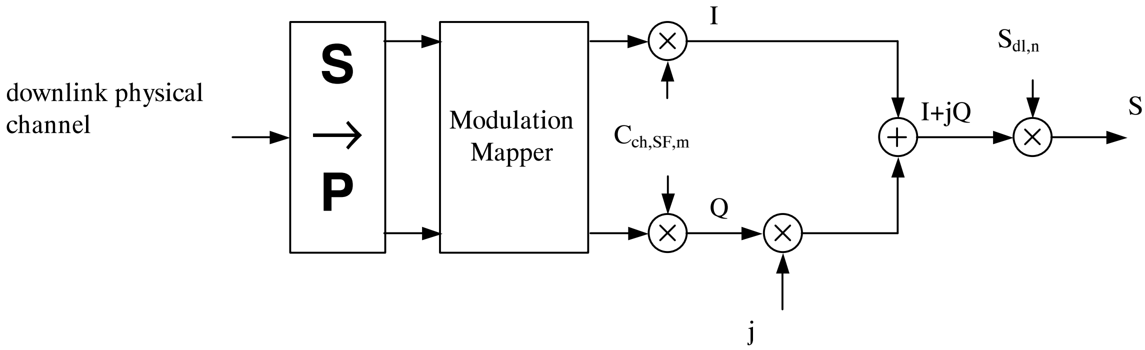

Figure 8: Spreading for all downlink physical channels except SCH

In case of 16QAM, a set of four consecutive binary symbols n_k, n_{k+1}, n_{k+2}, n_{k+3} (with k mod 4 = 0) is serial-to-parallel converted to two consecutive binary symbols ($i_1 = n_k$, $i_2 = n_{k+2}$) on the I branch and two consecutive binary symbols ($q_1 = n_{k+1}$, $q_2 = n_{k+3}$) on the Q branch and then mapped to 16QAM by the modulation mapper as defined in table 3A. The I and Q branches are then both spread to the chip rate by the same real-valued channelisation code $C_{ch,16,m}$. The channelisation code sequence shall be aligned in time with the symbol boundary. The sequences of real-valued chips on the I and Q branch are then treated as a single complex-valued sequence of chips. This sequence of chips from all multi-codes is summed and then scrambled (complex chip-wise multiplication) by a complex-valued scrambling code $S_{dl,n}$. The scrambling code is applied aligned with the scrambling code applied to the P-CCPCH.

Table 3A: 16 QAM modulation mapping

$i_1q_1i_2q_2$	I branch	Q branch
0000	0.4472	0.4472
0001	0.4472	1.3416
0010	1.3416	0.4472
0011	1.3416	1.3416
0100	0.4472	-0.4472
0101	0.4472	-1.3416
0110	1.3416	-0.4472
0111	1.3416	-1.3416
1000	-0.4472	0.4472
1001	-0.4472	1.3416
1010	-1.3416	0.4472
1011	-1.3416	1.3416
1100	-0.4472	-0.4472
1101	-0.4472	-1.3416
1110	-1.3416	-0.4472
1111	-1.3416	-1.3416

Figure 9 illustrates how different downlink channels are combined. Each complex-valued spread channel, corresponding to point S in Figure 8, is separately weighted by a weight factor G_i. The complex-valued P-SCH and S-SCH, as described in [2], section 5.3.3.5, are separately weighted by weight factors G_p and G_s. All downlink physical channels are then combined using complex addition.

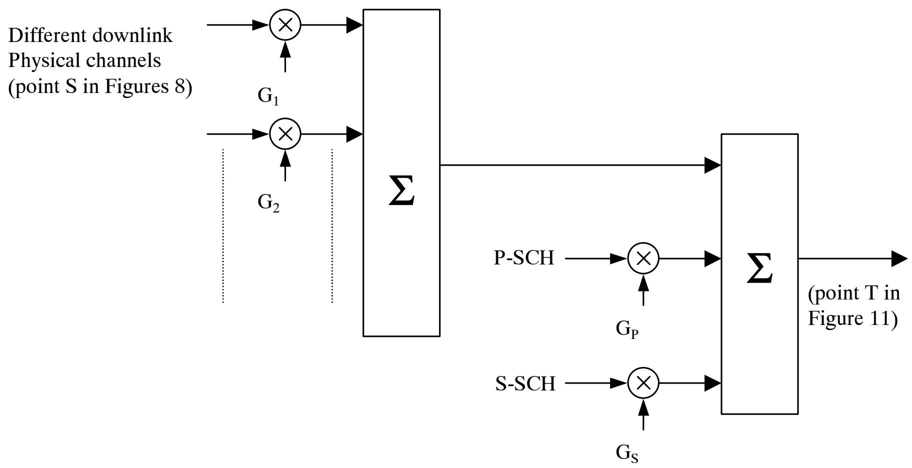

Figure 9: Combining of downlink physical channels

*****************NEXT MODIFIED SECTIONS*****************

5.2.1 Channelisation codes

The channelisation codes of figure 8 are the same codes as used in the uplink, namely Orthogonal Variable Spreading Factor (OVSF) codes that preserve the orthogonality between downlink channels of different rates and spreading factors. The OVSF codes are defined in figure 4 in section 4.3.1.

The channelisation code for the Primary CPICH is fixed to $C_{ch,256,0}$ and the channelisation code for the Primary CCPCH is fixed to $C_{ch,256,1}$.The channelisation codes for all other physical channels are assigned by UTRAN.

With the spreading factor 512 a specific restriction is applied. When the code word $C_{ch,512,n}$, with n=0,2,4….510, is used in soft handover, then the code word $C_{ch,512,n+1}$ is not allocated in the cells where timing adjustment is to be used. Respectively if $C_{ch,512,n}$, with n=1,3,5….511 is used, then the code word $C_{ch,512,n-1}$ is not allocated in the cells where timing adjustment is to be used. This restriction shall not apply in cases where timing adjustments in soft handover are not used with spreading factor 512.

When compressed mode is implemented by reducing the spreading factor by 2, the OVSF code used for compressed frames is:

- $C_{ch,SF/2,\lfloor n/2 \rfloor}$ if ordinary scrambling code is used.
- $C_{ch,SF/2,n \bmod SF/2}$ if alternative scrambling code is used (see section 5.2.2);

where $C_{ch,SF,n}$ is the channelisation code used for non-compressed frames.

~~In case the OVSF code on the PDSCH varies from frame to frame, the OVSF codes shall be allocated in such a way that the OVSF code(s) below the smallest spreading factor will be from the branch of the code tree pointed by the code with smallest spreading factor used for the connection which is called PDSCH root channelisation code. This means that all the codes for this UE for the PDSCH connection can be generated according to the OVSF code generation principle from the PDSCH root channelisation code i.e. the code with smallest spreading factor used by the UE on PDSCH.~~

~~In case of mapping the DSCH to multiple parallel PDSCHs, the same rule applies, but all of the branches identified by the multiple codes, corresponding to the smallest spreading factor, may be used for higher spreading factor allocation i.e. the multiple codes with smallest spreading factor can be considered as PDSCH root channelisation codes.~~

For HS-PDSCH, the spreading factor is always 16.

For HS-SCCH, the spreading factor is always 128.

Channelisation-code-set information over HS-SCCH is mapped in following manner: the OVSF codes shall be allocated in such a way that they are positioned in sequence in the code tree. That is, for P multicodes at offset O the following codes are allocated:

$C_{ch,16,O} \ldots C_{ch,16,O+P-1}$

The number of multicodes and the corresponding offset for HS-PDSCHs mapped from a given HS-DSCH is signalled by HS-SCCH.

*****************NEXT MODIFIED SECTIONS*****************

5.2.2 Scrambling code

A total of 2^{18}-1 = 262,143 scrambling codes, numbered 0…262,142 can be generated. However not all the scrambling codes are used. The scrambling codes are divided into 512 sets each of a primary scrambling code and 15 secondary scrambling codes.

The primary scrambling codes consist of scrambling codes n=16*i where i=0…511. The i:th set of secondary scrambling codes consists of scrambling codes 16*i+k, where k=1…15.

There is a one-to-one mapping between each primary scrambling code and 15 secondary scrambling codes in a set such that i:th primary scrambling code corresponds to i:th set of secondary scrambling codes.

Hence, according to the above, scrambling codes k = 0, 1, …, 8191 are used. Each of these codes are associated with a left alternative scrambling code and a right alternative scrambling code, that may be used for compressed frames. The left alternative scrambling code corresponding to scrambling code k is scrambling code number k + 8192, while the right alternative scrambling code corresponding to scrambling code k is scrambling code number k + 16384. The alternative scrambling codes can be used for compressed frames. In this case, the left alternative scrambling code is used if n<SF/2 and the right alternative scrambling code is used if n≥SF/2, where $c_{ch,SF,n}$ is the channelisation code used for non-compressed frames. The usage of alternative scrambling code for compressed frames is signalled by higher layers for each physical channel respectively.

The set of primary scrambling codes is further divided into 64 scrambling code groups, each consisting of 8 primary scrambling codes. The j:th scrambling code group consists of primary scrambling codes 16*8*j+16*k, where j=0..63 and k=0..7.

Each cell is allocated one and only one primary scrambling code. The primary CCPCH, primary CPICH, PICH, AICH, AP-AICH, CD/CA-ICH, CSICH and S-CCPCH carrying PCH are always transmitted using the primary scrambling code. The other downlink physical channels can be transmitted with either the primary scrambling code or a secondary scrambling code from the set associated with the primary scrambling code of the cell.

The mixture of primary scrambling code and no more than one secondary scrambling code for one CCTrCH is allowable. In compressed mode during compressed frames, these can be changed to the associated left or right scrambling codes as described above, i.e. in these frames, the total number of different scrambling codes may exceed two.

~~In the case of the CCTrCH of type DSCH, all the PDSCH channelisation codes that a single UE may receive shall be under a single scrambling code (either the primary or a secondary scrambling code).~~ In the case of CCTrCH of type of HS-DSCH then all the HS-PDSCH channelisation codes and HS-SCCH that a single UE may receive shall be under a single scrambling code (either the primary or a secondary scrambling code).

The scrambling code sequences are constructed by combining two real sequences into a complex sequence. Each of the two real sequences are constructed as the position wise modulo 2 sum of 38400 chip segments of two binary *m*-sequences generated by means of two generator polynomials of degree 18. The resulting sequences thus constitute segments of a set of Gold sequences. The scrambling codes are repeated for every 10 ms radio frame. Let *x* and *y* be the two sequences respectively. The *x* sequence is constructed using the primitive (over GF(2)) polynomial $1+X^7+X^{18}$. The y sequence is constructed using the polynomial $1+X^5+X^7+X^{10}+X^{18}$.

The sequence depending on the chosen scrambling code number *n* is denoted z_n, in the sequel. Furthermore, let $x(i)$, $y(i)$ and $z_n(i)$ denote the *i*:th symbol of the sequence *x*, *y*, and z_n, respectively.

The *m*-sequences *x*and *y* are constructed as:

Initial conditions:

- x is constructed with x (0)=1, x(1)= x(2)=...= x (16)= x (17)=0.
- y(0)=y(1)= … =y(16)= y(17)=1.

Recursive definition of subsequent symbols:

- x(i+18) =x(i+7) + x(i) modulo 2, i=0,…,2^{18}-20.
- y(i+18) = y(i+10)+y(i+7)+y(i+5)+y(i) modulo 2, i=0,…, 2^{18}-20.

The n:th Gold code sequence z_n, $n=0,1,2,\ldots,2^{18}-2$, is then defined as:

- z_n(i) = x((i+n) modulo (2^{18} - 1)) + y(i) modulo 2, i=0,…, 2^{18}-2.

These binary sequences are converted to real valued sequences Z_n by the following transformation:

$$Z_n(i) = \begin{cases} +1 & if\ z_n(i) = 0 \\ -1 & if\ z_n(i) = 1 \end{cases} \quad for \quad i = 0,1,\ldots,2^{18}-2.$$

Finally, the n:th complex scrambling code sequence $S_{dl,n}$ is defined as:

- $S_{dl,n}$(i) = Z_n(i) + j Z_n((i+131072) modulo (2^{18}-1)), i=0,1,…,38399.

Note that the pattern from phase 0 up to the phase of 38399 is repeated.

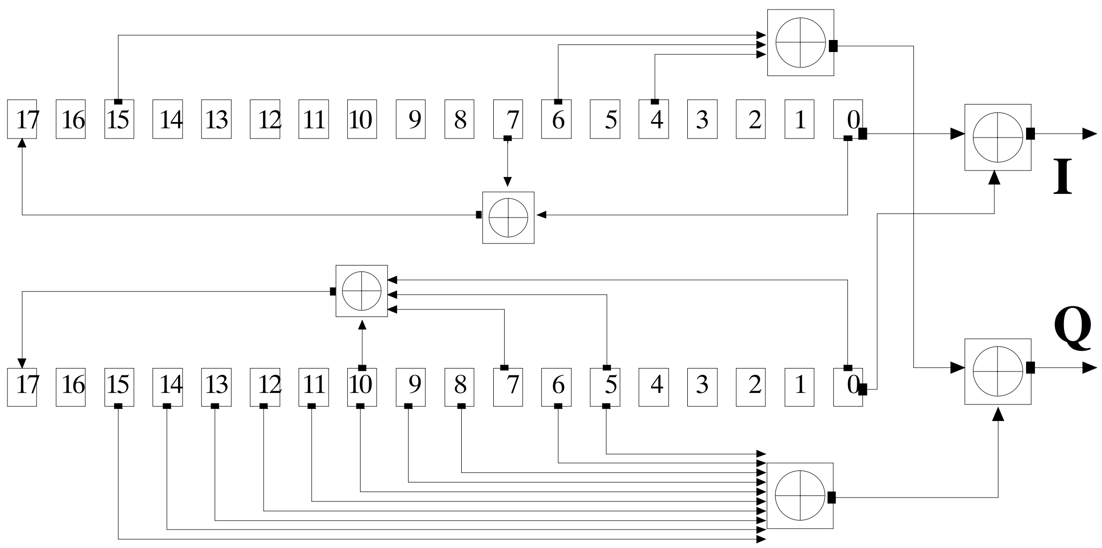

Figure 10: Configuration of downlink scrambling code generator

3GPP TSG-RAN1 Meeting #41
Athens, Greece, 9th – 13th May 2005

Tdoc ⌘R1-050548

CR-Form-v7.1

CHANGE REQUEST

⌘	25.213	CR	079	⌘ rev	-	⌘	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 [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Feature Clean Up: Removal of DSCH (FDD mode)
Source:	⌘	RAN WG1
Work item code:	⌘	TEI6 — ***Date:*** ⌘ 20/04/2005
Category:	⌘	**C** — ***Release:*** ⌘ Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
Ph2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)
Rel-7 (Release 7)

Reason for change:	⌘	In RAN#27 removal of DSCH (FDD mode) was agreed in order to simplify the specifications. This feature is optional and not used in real networks. Furthermore, the introduction of HSDPA will diminish the benefits that DSCH could provide.This CR shows how this proposal affect to TS25.213.
Summary of change:	⌘	The text related to DSCH feature is removed from the specification.
Consequences if not approved:	⌘	Contrary to the RAN#27decision the DSCH for FDD mode will remain specified

		Y	N			
Clauses affected:	⌘			3.2, 5.2.1, 5.2.2,		
Other specs affected:	⌘	X		Other core specifications	⌘	25.211, 25.212, 25.214, 25.301, 25.302, 25.303, 25.306, 25.321, 25.331, 25.401, 25.402, 25.420, 25.423, 25.424, 25.425, 25.427, 25.430, 25.433, 25.434, 25.435 34.108, 34.123
		X		Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm.
Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3.2 Abbreviations

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

16QAM	16 Quadrature Amplitude Modulation
AICH	Acquisition Indicator Channel
AP	Access Preamble
BCH	Broadcast Control Channel
CCPCH	Common Control Physical Channel
CD	Collision Detection
CPCH	Common Packet Channel
CPICH	Common Pilot Channel
DCH	Dedicated Channel
DPCH	Dedicated Physical Channel
DPCCH	Dedicated Physical Control Channel
DPDCH	Dedicated Physical Data Channel
E-AGCH	E-DCH Absolute Grant Channel
E-DPCCH	E-DCH Dedicated Physical Control Channel
E-DPDCH	E-DCH Dedicated Physical Data Channel
E-HICH	E-DCH Hybrid ARQ Indicator Channel
E-RGCH	E-DCH Relative Grant Channel
FDD	Frequency Division Duplex
F-DPCH	Fractional Dedicated Physical Channel
HS-DPCCH	Dedicated Physical Control Channel (uplink) for HS-DSCH
HS-DSCH	High Speed Downlink Shared Channel
HS-PDSCH	High Speed Physical Downlink Shared Channel
HS-SCCH	Shared Control Physical Channel for HS-DSCH
Mcps	Mega Chip Per Second
MICH	MBMS Indication Channel
OVSF	Orthogonal Variable Spreading Factor (codes)
~~PDSCH~~	~~Physical Dedicated Shared Channel~~
PICH	Page Indication Channel
PRACH	Physical Random Access Channel
PSC	Primary Synchronisation Code
RACH	Random Access Channel
SCH	Synchronisation Channel
SSC	Secondary Synchronisation Code
SF	Spreading Factor
UE	User Equipment

*****************NEXT MODIFIED SECTIONS*****************

5.2.1 Channelisation codes

The channelisation codes of figure 8 are the same codes as used in the uplink, namely Orthogonal Variable Spreading Factor (OVSF) codes that preserve the orthogonality between downlink channels of different rates and spreading factors. The OVSF codes are defined in figure 4 in subclause 4.3.1.

The channelisation code for the Primary CPICH is fixed to $C_{ch,256,0}$ and the channelisation code for the Primary CCPCH is fixed to $C_{ch,256,1}$.The channelisation codes for all other physical channels are assigned by UTRAN.

With the spreading factor 512 a specific restriction is applied. When the code word $C_{ch,512,n}$, with n=0,2,4….510, is used in soft handover, then the code word $C_{ch,512,n+1}$ is not allocated in the cells where timing adjustment is to be used. Respectively if $C_{ch,512,n}$, with n=1,3,5….511 is used, then the code word $C_{ch,512,n-1}$ is not allocated in the cells where timing adjustment is to be used. This restriction shall not apply in cases where timing adjustments in soft handover are not used with spreading factor 512.

When compressed mode is implemented by reducing the spreading factor by 2, the OVSF code used for compressed frames is:

- $C_{ch,SF/2,\lfloor n/2 \rfloor}$ if ordinary scrambling code is used.
- $C_{ch,SF/2,n \bmod SF/2}$ if alternative scrambling code is used (see subclause 5.2.2);

where $C_{ch,SF,n}$ is the channelisation code used for non-compressed frames.

For F-DPCH, the spreading factor is always 256.

~~In case the OVSF code on the PDSCH varies from frame to frame, the OVSF codes shall be allocated in such a way that the OVSF code(s) below the smallest spreading factor will be from the branch of the code tree pointed by the code with smallest spreading factor used for the connection which is called PDSCH root channelisation code. This means that all the codes for this UE for the PDSCH connection can be generated according to the OVSF code generation principle from the PDSCH root channelisation code i.e. the code with smallest spreading factor used by the UE on PDSCH.~~

~~In case of mapping the DSCH to multiple parallel PDSCHs, the same rule applies, but all of the branches identified by the multiple codes, corresponding to the smallest spreading factor, may be used for higher spreading factor allocation i.e. the multiple codes with smallest spreading factor can be considered as PDSCH root channelisation codes.~~

For HS-PDSCH, the spreading factor is always 16.

For HS-SCCH, the spreading factor is always 128.

Channelisation-code-set information over HS-SCCH is mapped in following manner: the OVSF codes shall be allocated in such a way that they are positioned in sequence in the code tree. That is, for P multicodes at offset O the following codes are allocated:

$C_{ch,16,O} \ldots C_{ch,16,O+P-1}$

The number of multicodes and the corresponding offset for HS-PDSCHs mapped from a given HS-DSCH is signalled by HS-SCCH.

For E-HICH and for E-RGCH, the spreading factor shall always be 128. In each cell, the E-RGCH and E-HICH assigned to a UE shall be configured with the same channelisation code.

For E-AGCH, the spreading factor shall always be 256.

5.2.2 Scrambling code

A total of 2^{18}-1 = 262,143 scrambling codes, numbered 0…262,142 can be generated. However not all the scrambling codes are used. The scrambling codes are divided into 512 sets each of a primary scrambling code and 15 secondary scrambling codes.

The primary scrambling codes consist of scrambling codes n=16*i where i=0…511. The i:th set of secondary scrambling codes consists of scrambling codes 16*i+k, where k=1…15.

There is a one-to-one mapping between each primary scrambling code and 15 secondary scrambling codes in a set such that i:th primary scrambling code corresponds to i:th set of secondary scrambling codes.

Hence, according to the above, scrambling codes k = 0, 1, …, 8191 are used. Each of these codes are associated with a left alternative scrambling code and a right alternative scrambling code, that may be used for compressed frames. The left alternative scrambling code corresponding to scrambling code k is scrambling code number k + 8192, while the right alternative scrambling code corresponding to scrambling code k is scrambling code number k + 16384. The alternative scrambling codes can be used for compressed frames. In this case, the left alternative scrambling code is used if n<SF/2 and the right alternative scrambling code is used if n≥SF/2, where $c_{ch,SF,n}$ is the channelisation code used for non-compressed frames. The usage of alternative scrambling code for compressed frames is signalled by higher layers for each physical channel respectively.

In case F-DPCH is configured in the downlink, the same scrambling code and OVSF code shall be used in F-DPCH compressed frames and normal frames.

The set of primary scrambling codes is further divided into 64 scrambling code groups, each consisting of 8 primary scrambling codes. The j:th scrambling code group consists of primary scrambling codes 16*8*j+16*k, where j=0..63 and k=0..7.

Each cell is allocated one and only one primary scrambling code. The primary CCPCH, primary CPICH, PICH, MICH, AICH, AP-AICH, CD/CA-ICH, CSICH and S-CCPCH carrying PCH shall always be transmitted using the primary scrambling code. The other downlink physical channels may be transmitted with either the primary scrambling code or a secondary scrambling code from the set associated with the primary scrambling code of the cell.

The mixture of primary scrambling code and no more than one secondary scrambling code for one CCTrCH is allowable. In compressed mode during compressed frames, these can be changed to the associated left or right scrambling codes as described above, i.e. in these frames, the total number of different scrambling codes may exceed two.

~~In the case of the CCTrCH of type DSCH, all the PDSCH channelisation codes that a single UE may receive shall be under a single scrambling code (either the primary or a secondary scrambling code).~~ In the case of CCTrCH of type of HS-DSCH then all the HS-PDSCH channelisation codes and HS-SCCH that a single UE may receive shall be under a single scrambling code (either the primary or a secondary scrambling code).

In each cell, the E-RGCH, E-HICH and E-AGCH assigned to a UE shall be configured with same scrambling code.

The scrambling code sequences are constructed by combining two real sequences into a complex sequence. Each of the two real sequences are constructed as the position wise modulo 2 sum of 38400 chip segments of two binary *m*-sequences generated by means of two generator polynomials of degree 18. The resulting sequences thus constitute segments of a set of Gold sequences. The scrambling codes are repeated for every 10 ms radio frame. Let *x* and *y* be the two sequences respectively. The *x* sequence is constructed using the primitive (over GF(2)) polynomial $1+X^7+X^{18}$. The y sequence is constructed using the polynomial $1+X^5+X^7+X^{10}+X^{18}$.

The sequence depending on the chosen scrambling code number *n* is denoted z_n, in the sequel. Furthermore, let $x(i)$, $y(i)$ and $z_n(i)$ denote the *i*:th symbol of the sequence *x*, *y*, and z_n, respectively.

The *m*-sequences *x*and *y* are constructed as:

Initial conditions:

- x is constructed with x (0)=1, x(1)= x(2)=...= x (16)= x (17)=0.
- y(0)=y(1)= … =y(16)= y(17)=1.

Recursive definition of subsequent symbols:

- x(i+18) =x(i+7) + x(i) modulo 2, i=0,…,2^{18}-20.
- y(i+18) = y(i+10)+y(i+7)+y(i+5)+y(i) modulo 2, i=0,…, 2^{18}-20.

The n:th Gold code sequence z_n, $n=0,1,2,\ldots,2^{18}-2$, is then defined as:

- $z_n(i)$ = x((i+n) modulo (2^{18} - 1)) + y(i) modulo 2, i=0,…, 2^{18}-2.

These binary sequences are converted to real valued sequences Z_n by the following transformation:

$$Z_n(i) = \begin{cases} +1 & if \ z_n(i) = 0 \\ -1 & if \ z_n(i) = 1 \end{cases} \quad for \quad i = 0,1,\ldots,2^{18}-2.$$

Finally, the n:th complex scrambling code sequence $S_{dl,n}$ is defined as:

- $S_{dl,n}(i) = Z_n(i) + j\, Z_n((i+131072) \text{ modulo } (2^{18}-1))$, i=0,1,…,38399.

Note that the pattern from phase 0 up to the phase of 38399 is repeated.

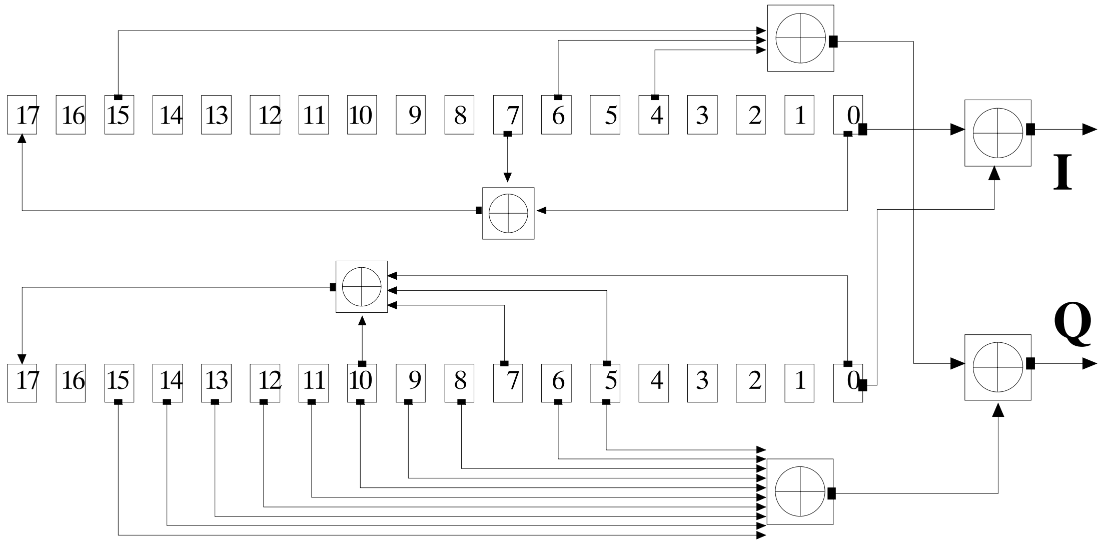

Figure 10: Configuration of downlink scrambling code generator

53GPP TSG-RAN1 Meeting #41
Athens, Greece, 9th – 13th May 2005

Tdoc ⌘R1-050548

CR-Form-v7.1

CHANGE REQUEST

⌘	25.214	CR	376	⌘rev	1	⌘	Current version:	5.10.0	⌘

*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 [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Feature Clean Up: Removal of DSCH (FDD mode)
Source:	⌘	RAN WG1
Work item code:	⌘	TEI5 — ***Date:*** ⌘ 12/052005
Category:	⌘	**C** — ***Release:*** ⌘ Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
Ph2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)
Rel-7 (Release 7)

Reason for change:	⌘	In RAN#27 removal of DSCH (FDD mode) was agreed in order to simplify the specifications. This feature is optional and not used in real networks. Furthermore, the introduction of HSDPA will diminish the benefits that DSCH could provide.This CR shows how this proposal affect to TS25.214.
Summary of change:	⌘	The text related to DSCH feature is removed from the specification.
Consequences if not approved:	⌘	Contrary to the RAN#27decision the DSCH for FDD mode will remain specified

Clauses affected:	⌘	3, 5.2.1.1, 5.2.1.4.1, 5.2.2, 7.1, A2			
		Y	**N**		
Other specs	⌘	X		Other core specifications	⌘ 25.211, 25.212, 25.213, 25.301, 25.302, 25.303, 25.306, 25.321, 25.331, 25.401, 25.402, 25.420, 25.423, 25.424, 25.425, 25.427, 25.430, 25.433, 25.434, 25.435 34.108, 34.123
affected:		X		Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3 Abbreviations

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

ACK	Acknowledgement
AICH	Acquisition Indicator Channel
ASC	Access Service Class
AP	Access Preamble
BCH	Broadcast Channel
CA	Channel Assignment
CCC	CPCH Control Command
CCPCH	Common Control Physical Channel
CCTrCH	Coded Composite Transport Channel
CD	Collision Detection
CPCH	Common Packet Channel
CPICH	Common Pilot Channel
CQI	Channel Quality Indicator
CRC	Cyclic Redundancy Check
CSICH	CPCH Status Indicator Channel
DCH	Dedicated Channel
DL	Downlink
DPCCH	Dedicated Physical Control Channel
DPCH	Dedicated Physical Channel
DPDCH	Dedicated Physical Data Channel
DTX	Discontinuous Transmission
HSDPA	High Speed Downlink Packet Access
HS-DSCH	High Speed Downlink Shared Channel
HS-PDSCH	High Speed Physical Downlink Shared Channel
HS-SCCH	High Speed Physical Downlink Shared Control Channel
NACK	Negative Acknowledgement
P-CCPCH	Primary Common Control Physical Channel
PCA	Power Control Algorithm
PCPCH	Physical Common Packet Channel
~~PDSCH~~	~~Physical Downlink Shared Channel~~
PICH	Paging Indicator Channel
PRACH	Physical Random Access Channel
RACH	Random Access Channel
RL	Radio Link
RPL	Recovery Period Length
RSCP	Received Signal Code Power
S-CCPCH	Secondary Common Control Physical Channel
SCH	Synchronisation Channel
SFN	System Frame Number
SIR	Signal-to-Interference Ratio
SNIR	Signal to Noise Interference Ratio
SSDT	Site Selection Diversity TPC
TFC	Transport Format Combination
TPC	Transmit Power Control
TrCH	Transport Channel
TTI	Transmission Time Interval
UE	User Equipment
UL	Uplink
UTRAN	UMTS Terrestrial Radio Access Network

****************NEXT MODIFIED SECTIONS****************

5.2.1.1 General

The downlink transmit power control procedure controls simultaneously the power of a DPCCH and its corresponding DPDCHs. The power control loop adjusts the power of the DPCCH and DPDCHs with the same amount, i.e. the relative power difference between the DPCCH and DPDCHs is not changed.

The relative transmit power offset between DPCCH fields and DPDCHs is determined by the network The TFCI, TPC and pilot fields of the DPCCH are offset relative to the DPDCHs power by PO1, PO2 and PO3 dB respectively. The power offsets may vary in time. ~~UTRAN may use the SSDT operation as specified in section 5.2.2 to determine what power offset to use for TFCI in hard split mode with respect to the associated downlink DPDCH.~~ The method for controlling the power offsets within UTRAN is specified in [6].

*****************NEXT MODIFIED SECTIONS*****************

5.2.1.4.1 General

Site selection diversity transmit power control (SSDT) is another macro diversity method in soft handover mode. This method is optional in UTRAN.

Operation is summarised as follows. The UE selects one of the cells from its active set to be 'primary', all other cells are classed as 'non primary'. The main objective is to transmit on the downlink from the primary cell, thus reducing the interference caused by multiple transmissions in a soft handover mode. A second objective is to achieve fast site selection without network intervention, thus maintaining the advantage of the soft handover. In order to select a primary cell, each cell is assigned a temporary identification (ID) and UE periodically informs a primary cell ID to the connecting cells. The non-primary cells selected by UE switch off the transmission power. The primary cell ID is delivered by UE to the active cells via uplink FBI field. SSDT activation, SSDT termination and ID assignment are all carried out by higher layer signalling.

SSDT is only supported when the P-CPICH is used as the downlink phase reference and closed loop mode transmit diversity is not used simultaneously. Simultaneous operation of SSDT and HS-SCCH reception is not supported.

~~UTRAN may also command UE to use SSDT signalling in the uplink although cells would transmit the downlink as without SSDT active. In case SSDT is used in the uplink direction only, the processing in the UE for the radio links received in the downlink is as with macro diversity in non-SSDT case. The downlink operation mode for SSDT is set by higher layers. UTRAN may use the SSDT information for the PDSCH power control as specified in section 5.2.2 and for the TFCI power control in hard split mode.~~ Simultaneous operation of SSDT signalling in the uplink and HS-SCCH reception is not supported.

~~NOTE: This feature of SSDT limited to uplink only applies to terminals that are DSCH capable.~~

*****************NEXT MODIFIED SECTIONS*****************

5.2.2 ~~PDSCH~~<u>Void</u>

~~The PDSCH power control can be based on any of the following solutions:~~

- ~~Inner-loop power control based on the power control commands sent by the UE on the uplink DPCCH.~~
- ~~Other power control procedures applied by the network.~~

~~UTRAN may use the SSDT signalling to determine what power offset to use for PDSCH with respect to the associated downlink DCH when more than one cell may be in the active set. The support for a combination where SSDT signaling is used in the uplink, but SSDT is not necessarily used in the downlink, is required only from the UEs that support the use of DSCH.~~

~~If the downlink direction uses SSDT for the DCH transmission, then the TPC procedure in the UE to generate TPC commands to control the network transmit power is as specified in 5.2.1.4.2.~~

~~If the downlink transmission does not use SSDT operation, then the TPC procedure in the UE to generate TPC commands to control the network transmit power is as specified in 5.2.1.2.1.~~

~~The PDSCH power offset to be used with respect to the associated DCH depends on whether the cell transmitting PDSCH is determined to be a primary one or not. Note that the condition on the received uplink signal quality in subclause 5.2.1.4.4 is not used for determining whether the cell status for PDSCH power control is primary or not.~~

~~The SSDT commands sent by the UE are averaged in UTRAN side over one or more frames. The averaging window length parameter as the number of frames to average over, *Enhanced DSCH PC Wnd*, and the parameter for the required number of received primary SSDT commands, *Enhanced DSCH PC Counter*, during the averaging window for declaring primary status for a cell are given by UTRAN [6].~~

~~If the number of primary ID codes in the uplink received during the averaging window is less than the parameter *Enhanced DSCH PC Counter*, then a cell shall consider itself as non-primary and uses the power offset given from UTRAN to the cell with the data for the PDSCH.~~

~~If the number of primary ID codes in the uplink received during the averaging window is equal or more than the parameter *Enhanced DSCH PC Counter* defines, the cell shall use the power control parameterisation for the primary case. When the cell considers itself as primary it uses both the power offset for the PDSCH frame for the given UE and the *Enhanced DSCH Power Offset* parameter given by the UTRAN for the primary case.~~

~~The cell status (primary/non-primary) obtained from the rules above may differ from the cell status for SSDT transmission in the downlink depending on the values given by UTRAN for the parameters for averaging window length and the required number of received primary SSDT commands for cell status determination.~~

*****************NEXT MODIFIED SECTIONS*****************

7.1 Determination of feedback information

The UE uses the CPICH to separately estimate the channels seen from each antenna.

Once every slot, the UE computes the phase adjustment, ϕ, and for mode 2 the amplitude adjustment that should be applied at the UTRAN access point to maximise the UE received power. During soft handover, the UE computes the phase adjustment and for mode 2 the amplitude adjustment to maximise the total UE received power from the cells in the active set. ~~-~~In the case that a ~~PDSCH or~~ HS-PDSCH is associated with a DPCH for which closed-loop transmit diversity is applied, the antenna weights applied to ~~the PDSCH and~~ HS-PDSCH, ~~respectively,~~ are the same as the antenna weights applied to the associated DPCH. In case a ~~PDSCH or~~ HS-PDSCH is associated with a DPCH during soft handover, the UE may emphasize the radio link transmitted from ~~DSCH or~~ HS-DSCH serving cell, respectively, when calculating the antenna weights. An example of how the computations can be accomplished is given in Annex A.2.

The UE feeds back to the UTRAN access point the information on which phase/power settings to use. Feedback Signalling Message (FSM) bits are transmitted in the portion of FBI field of uplink DPCCH slot(s) assigned to closed loop mode transmit diversity, the FBI D field (see [1]). Each message is of length $N_W = N_{po}+N_{ph}$ bits and its format is shown in the figure 4. The transmission order of bits is from MSB to LSB, i.e. MSB is transmitted first. FSM_{po} and FSM_{ph} subfields are used to transmit the power and phase settings, respectively.

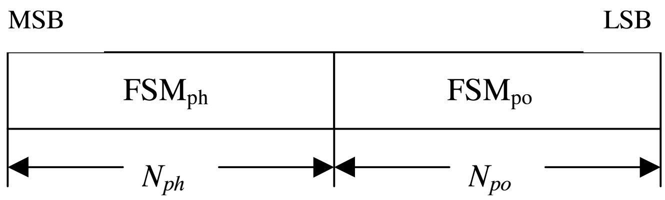

Figure 4: Format of feedback signalling message. FSM_{po} transmits the power setting and FSM_{ph} the phase setting

The adjustments are made by the UTRAN Access Point at the beginning of the downlink DPCCH pilot field. The downlink slot in which the adjustment is done is signalled to L1 of UE by higher layers. Two possibilities exist:

1) When feedback command is transmitted in uplink slot *i*, which is transmitted approximately 1024 chips in offset from the received downlink slot *j*, the adjustment is done at the beginning of the pilot field of the downlink slot (*j*+1) mod 15.

2) When feedback command is transmitted in uplink slot *i*, which is transmitted approximately 1024 chips in offset from the received downlink slot *j*, the adjustment is done at the beginning of the pilot field of the downlink slot (*j*+2) mod 15.

Thus, adjustment timing at UTRAN Access Point is either according to 1) or 2) as controlled by the higher layers.

In case of soft handover, Layer 1 shall support different adjustment timing values for different radio links in the same active set.

~~The timing of the weight adjustment of the PDSCH is such that the PDSCH weight adjustment is done at the PDSCH slot border, N chips after the adjustment of the associated DPCH, where $0 \leq N < 2560$.~~

The timing of the weight adjustment of the HS-PDSCH is such that the HS-PDSCH weight adjustment is done at the HS-PDSCH slot border, respectively, M chips after the adjustment of the associated DPCH, where $0 \leq M < 2560$.

*****************NEXT MODIFIED SECTIONS*****************

A.2 Computation of feedback information for closed loop transmit diversity

In non-soft handover case, the computation of feedback information can be accomplished by e.g. solving for weight vector, $\underline{w}$, that maximises.

$$P = \underline{w}^H H^H H \underline{w} \quad (1)$$

where

$H = [\underline{h}_1 \ \ \underline{h}_2]$ and $\underline{w} = [\, w_1, w_2 \,]^T$

and where the column vectors $\underline{h}_1$ and $\underline{h}_2$ represent the estimated channel impulse responses for the transmission antennas 1 and 2, of length equal to the length of the channel impulse response. The elements of $\underline{w}$ correspond to the adjustments computed by the UE.

During soft handover, the antenna weight vector, $\underline{w}$ can be, for example, determined so as to maximise the criteria function:

$$P = \underline{w}^H (H_1^H H_1 + H_2^H H_2 + \cdots) \underline{w} \quad (2)$$

where H_i is an estimated channel impulse response for BS#i. In regular SHO, the set of BS#i corresponds to the active set.

If HS-PDSCH is present, the UE may emphasize the HS-PDSCH serving cell. In this case the antenna weight vector, $\underline{w}$ can be, for example, determined so as to maximise the criteria function:

$$P = \underline{w}^H (\alpha (H_1^H H_1) + (1-\alpha)(H_2^H H_2 + \cdots)) \underline{w}$$

where BS#1 is the HS-PDSCH serving cell and coefficient α is less than or equal to 1. For example $\alpha = 0.7$ enhances HS-DSCH performance while ensuring that there is only a small degradation on the DPCH.

CR-Form-v7.1

CHANGE REQUEST

⌘	**25.214**	**CR**	**377**	⌘**rev**	**1**	⌘	Current version:	**6.5.0**	⌘

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	[X]	Radio Access Network	[X]	Core Network	[ ]

Title: ⌘	Feature Clean Up: Removal of DSCH (FDD mode)		
Source: ⌘	RAN WG1		
Work item code: ⌘	TEI6	***Date:*** ⌘	12/05/2005
Category: ⌘	**C**	***Release:*** ⌘	Rel-6
	Use one of the following categories: ***F*** *(correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.		*Use one of the following releases:* *Ph2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *Rel-4 (Release 4)* *Rel-5 (Release 5)* *Rel-6 (Release 6)* *Rel-7 (Release 7)*

Reason for change: ⌘	In RAN#27 removal of DSCH (FDD mode) was agreed in order to simplify the specifications. This feature is optional and not used in real networks. Furthermore, the introduction of HSDPA will diminish the benefits that DSCH could provide.This CR shows how this proposal affect to TS25.214.
Summary of change: ⌘	The text related to DSCH feature is removed from the specification.
Consequences if not approved: ⌘	Contrary to the RAN#27decision the DSCH for FDD mode will remain specified.

Clauses affected: ⌘	3.2, 5.2.1.1, 5.2.1.4.1, 5.2.2, 7.1, A.2			
	Y	**N**		
Other specs affected: ⌘	**X**		Other core specifications ⌘	25.211, 25.212, 25.213, 25.301, 25.302, 25.303, 25.306, 25.321, 25.331, 25.401, 25.402, 25.420, 25.423, 25.424, 25.425, 25.427, 25.430, 25.433, 25.434, 25.435 34.108, 34.123
	X		Test specifications	
		X	O&M Specifications	
Other comments: ⌘				

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3.2 Abbreviations

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

ACK	Acknowledgement
AICH	Acquisition Indicator Channel
ASC	Access Service Class
AP	Access Preamble
BCH	Broadcast Channel
CA	Channel Assignment
CCC	CPCH Control Command
CCPCH	Common Control Physical Channel
CCTrCH	Coded Composite Transport Channel
CD	Collision Detection
CPCH	Common Packet Channel
CPICH	Common Pilot Channel
CQI	Channel Quality Indicator
CRC	Cyclic Redundancy Check
CSICH	CPCH Status Indicator Channel
DCH	Dedicated Channel
DL	Downlink
DPCCH	Dedicated Physical Control Channel
DPCH	Dedicated Physical Channel
DPDCH	Dedicated Physical Data Channel
DTX	Discontinuous Transmission
E-DCH	Enhanced Dedicated Channel
E-DPCCH	E-DCH Dedicated Physical Control Channel
E-DPDCH	E-DCH Dedicated Physical Data Channel
E-AGCH	E-DCH Absolute Grant Channel
E-HICH	E-DCH HARQ Acknowledgement Indicator Channel
E-RGCH	E-DCH Relative Grant Channel
F-DPCH	Fractional Dedicated Physical Channel
HSDPA	High Speed Downlink Packet Access
HS-DSCH	High Speed Downlink Shared Channel
HS-PDSCH	High Speed Physical Downlink Shared Channel
HS-SCCH	High Speed Physical Downlink Shared Control Channel
MICH	MBMS Indicator Channel
NACK	Negative Acknowledgement
P-CCPCH	Primary Common Control Physical Channel
PCA	Power Control Algorithm
PCPCH	Physical Common Packet Channel
~~PDSCH~~	~~Physical Downlink Shared Channel~~
PICH	Paging Indicator Channel
PRACH	Physical Random Access Channel
RACH	Random Access Channel
RL	Radio Link
RPL	Recovery Period Length
RSCP	Received Signal Code Power
S-CCPCH	Secondary Common Control Physical Channel
SCH	Synchronisation Channel
SFN	System Frame Number
SIR	Signal-to-Interference Ratio
SNIR	Signal to Noise Interference Ratio
SSDT	Site Selection Diversity TPC
TFC	Transport Format Combination
TPC	Transmit Power Control
TrCH	Transport Channel
TTI	Transmission Time Interval
UE	User Equipment
UL	Uplink
UTRAN	UMTS Terrestrial Radio Access Network

*****************NEXT MODIFIED SECTIONS*****************

5.2.1.1 General

The downlink transmit power control procedure controls simultaneously the power of a DPCCH and its corresponding DPDCHs. The power control loop adjusts the power of the DPCCH and DPDCHs with the same amount, i.e. the relative power difference between the DPCCH and DPDCHs is not changed. In case of F-DPCH, the power control loop adjusts the F-DPCH power.

For DPCH, the relative transmit power offset between DPCCH fields and DPDCHs is determined by the network. The TFCI, TPC and pilot fields of the DPCCH are offset relative to the DPDCHs power by PO1, PO2 and PO3 dB respectively. The power offsets may vary in time. ~~UTRAN may use the SSDT operation as specified in section 5.2.2 to determine what power offset to use for TFCI in hard split mode with respect to the associated downlink DPDCH.~~ The method for controlling the power offsets within UTRAN is specified in [6]. The power offsets PO1, PO2 and PO3 do not apply to F-DPCH.

*****************NEXT MODIFIED SECTIONS*****************

5.2.1.4.1 General

Site selection diversity transmit power control (SSDT) is another macro diversity method in soft handover mode. This method is optional in UTRAN.

Operation is summarised as follows. The UE selects one of the cells from its active set to be 'primary', all other cells are classed as 'non primary'. The main objective is to transmit on the downlink from the primary cell, thus reducing the interference caused by multiple transmissions in a soft handover mode. A second objective is to achieve fast site selection without network intervention, thus maintaining the advantage of the soft handover. In order to select a primary cell, each cell is assigned a temporary identification (ID) and UE periodically informs a primary cell ID to the connecting cells. The non-primary cells selected by UE switch off the transmission power. The primary cell ID is delivered by UE to the active cells via uplink FBI field. SSDT activation, SSDT termination and ID assignment are all carried out by higher layer signalling.

SSDT is only supported when the P-CPICH is used as the downlink phase reference and closed loop mode transmit diversity is not used simultaneously. Simultaneous operation of SSDT and HS-SCCH or F-DPCH reception is not supported.

~~UTRAN may also command UE to use SSDT signalling in the uplink although cells would transmit the downlink as without SSDT active. In case SSDT is used in the uplink direction only, the processing in the UE for the radio links received in the downlink is as with macro diversity in non-SSDT case. The downlink operation mode for SSDT is set by higher layers. UTRAN may use the SSDT information for the PDSCH power control as specified in section 5.2.2 and for the TFCI power control in hard split mode. SSDT signaling in the uplink is only supported when the P-CPICH is used as the downlink phase reference and closed loop mode transmit diversity is not used simultaneously.~~ Simultaneous operation of SSDT signalling in the uplink and HS-SCCH or F-DPCH reception is not supported.

~~NOTE: This feature of SSDT limited to uplink only applies to terminals that are DSCH capable.~~

*****************NEXT MODIFIED SECTIONS*****************

5.2.2 ~~PDSCH~~<u>Void</u>

~~The PDSCH power control can be based on any of the following solutions:~~

- ~~Inner-loop power control based on the power control commands sent by the UE on the uplink DPCCH.~~
- ~~Other power control procedures applied by the network.~~

~~UTRAN may use the SSDT signalling to determine what power offset to use for PDSCH with respect to the associated downlink DCH when more than one cell may be in the active set. The support for a combination where SSDT signaling~~

is used in the uplink, but SSDT is not necessarily used in the downlink, is required only from the UEs that support the use of DSCH.

If the downlink direction uses SSDT for the DCH transmission, then the TPC procedure in the UE to generate TPC commands to control the network transmit power is as specified in 5.2.1.4.2.

If the downlink transmission does not use SSDT operation, then the TPC procedure in the UE to generate TPC commands to control the network transmit power is as specified in 5.2.1.2.1.

The PDSCH power offset to be used with respect to the associated DCH depends on whether the cell transmitting PDSCH is determined to be a primary one or not. Note that the condition on the received uplink signal quality in subclause 5.2.1.4.4 is not used for determining whether the cell status for PDSCH power control is primary or not.

The SSDT commands sent by the UE are averaged in UTRAN side over one or more frames. The averaging window length parameter as the number of frames to average over, *Enhanced DSCH PC Wnd*, and the parameter for the required number of received primary SSDT commands, *Enhanced DSCH PC Counter*, during the averaging window for declaring primary status for a cell are given by UTRAN [6].

If the number of primary ID codes in the uplink received during the averaging window is less than the parameter *Enhanced DSCH PC Counter*, then a cell shall consider itself as non-primary and uses the power offset given from UTRAN to the cell with the data for the PDSCH.

If the number of primary ID codes in the uplink received during the averaging window is equal or more than the parameter *Enhanced DSCH PC Counter* defines, the cell shall use the power control parameterisation for the primary case. When the cell considers itself as primary it uses both the power offset for the PDSCH frame for the given UE and the *Enhanced DSCH Power Offset* parameter given by the UTRAN for the primary case.

The cell status (primary/non-primary) obtained from the rules above may differ from the cell status for SSDT transmission in the downlink depending on the values given by UTRAN for the parameters for averaging window length and the required number of received primary SSDT commands for cell status determination.

*****************NEXT MODIFIED SECTIONS*****************

7.1 Determination of feedback information

The UE uses the CPICH to separately estimate the channels seen from each antenna.

Once every slot, the UE computes the phase adjustment, ϕ, and for mode 2 the amplitude adjustment that should be applied at the UTRAN access point to maximise the UE received power. During soft handover, the UE computes the phase adjustment and for mode 2 the amplitude adjustment to maximise the total UE received power from the cells in the active set. In the case that a PDSCH or HS-PDSCH is associated with a DPCH for which closed-loop transmit diversity is applied, the antenna weights applied to the PDSCH and HS-PDSCH, respectively, are the same as the antenna weights applied to the associated DPCH. In case a PDSCH or HS-PDSCH is associated with a DPCH during soft handover, the UE may emphasize the radio link transmitted from DSCH or HS-DSCH serving cell, respectively, when calculating the antenna weights. An example of how the computations can be accomplished is given in Annex A.2.

The UE feeds back to the UTRAN access point the information on which phase/power settings to use. Feedback Signalling Message (FSM) bits are transmitted in the portion of FBI field of uplink DPCCH slot(s) assigned to closed loop mode transmit diversity, the FBI D field (see [1]). Each message is of length $N_W = N_{po}+N_{ph}$ bits and its format is shown in the figure 4. The transmission order of bits is from MSB to LSB, i.e. MSB is transmitted first. FSM_{po} and FSM_{ph} subfields are used to transmit the power and phase settings, respectively.

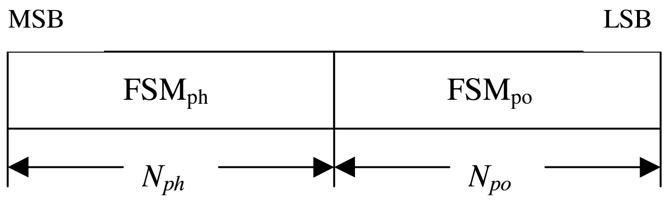

Figure 4: Format of feedback signalling message. FSM_{po} transmits the power setting and FSM_{ph} the phase setting

The adjustments are made by the UTRAN Access Point at the beginning of the downlink DPCCH pilot field. The downlink slot in which the adjustment is done is signalled to L1 of UE by higher layers. Two possibilities exist:

1) When feedback command is transmitted in uplink slot *i*, which is transmitted approximately 1024 chips in offset from the received downlink slot *j*, the adjustment is done at the beginning of the pilot field of the downlink slot (*j*+1) mod 15.

2) When feedback command is transmitted in uplink slot *i*, which is transmitted approximately 1024 chips in offset from the received downlink slot *j*, the adjustment is done at the beginning of the pilot field of the downlink slot (*j*+2) mod 15.

Thus, adjustment timing at UTRAN Access Point is either according to 1) or 2) as controlled by the higher layers.

In case of soft handover, Layer 1 shall support different adjustment timing values for different radio links in the same active set.

~~The timing of the weight adjustment of the PDSCH is such that the PDSCH weight adjustment is done at the PDSCH slot border, N chips after the adjustment of the associated DPCH, where $0 \le N < 2560$.~~

The timing of the weight adjustment of the HS-PDSCH is such that the HS-PDSCH weight adjustment is done at the HS-PDSCH slot border, respectively, M chips after the adjustment of the associated DPCH, where $0 \le M < 2560$.

*****************NEXT MODIFIED SECTIONS*****************

A.2 Computation of feedback information for closed loop transmit diversity

In non-soft handover case, the computation of feedback information can be accomplished by e.g. solving for weight vector, $\underline{w}$, that maximises.

$$P = \underline{w}^H H^H H \underline{w} \qquad (1)$$

where

$H = [\underline{h}_1 \ \ \underline{h}_2]$ and $\underline{w} = [\, w_1, w_2 \,]^T$

and where the column vectors $\underline{h}_1$ and $\underline{h}_2$ represent the estimated channel impulse responses for the transmission antennas 1 and 2, of length equal to the length of the channel impulse response. The elements of $\underline{w}$ correspond to the adjustments computed by the UE.

During soft handover, the antenna weight vector, $\underline{w}$ can be, for example, determined so as to maximise the criteria function:

$$P = \underline{w}^H (H_1^H H_1 + H_2^H H_2 + \cdots) \underline{w} \qquad (2)$$

where H_i is an estimated channel impulse response for BS#i. In regular SHO, the set of BS#i corresponds to the active set.

If HS-PDSCH is present, the UE may emphasize the HS-PDSCH serving cell. In this case the antenna weight vector, $\underline{w}$ can be, for example, determined so as to maximise the criteria function:

$$P = \underline{w}^H(\alpha(H_1^H H_1) + (1-\alpha)(H_2^H H_2 + \cdots))\underline{w}$$

where BS#1 is the HS-PDSCH serving cell and coefficient α is less than or equal to 1. For example $\alpha = 0.7$ enhances HS-DSCH performance while ensuring that there is only a small degradation on the DPCH.