TSG-RAN Meeting #7 ***TSGRP#7(00)0073***
Madrid, Spain, 13 - 15 March 2000

Title: **Agreed CRs to TS 25.401**

Source: **TSG-RAN WG3**

Agenda item: **6.4.3**

Tdoc_Num	Specification	CR_Num	Revision_Num	CR_Subject	CR_Category	WG_Status	Cur_Ver_Num	New_Ver_Num
R3-000528	25.401	001	1	Generalisation of the combining/splitting functionality in UTRAN	F	agreed	3.1.0	3.2.0
R3-000601	25.401	005		UTRAN Cell-Id not visible over Iu	F	agreed	3.1.0	3.2.0
R3-000888	25.401	007		Transport layer in Iub U-Plane.	F	agreed	3.1.0	3.2.0
R3-000977	25.401	004	2	Corrections to 25.401	F	agreed	3.1.0	3.2.0
R3-000880	25.401	003	1	Extension with CBS Topic	B	agreed	3.1.0	3.2.0
R3-000962	25.401	006	2	Changes for CPCH	B	agreed	3.1.0	3.2.0

3GPP TSG-RAN Working Group 3, Meeting #10
Sophia Antipolis, France, February 28-March 3, 2000

***Document* R3-000528**
Resubmission of R3-000389

CHANGE REQUEST

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25.401	**CR**	**001r1**	Current Version:	3.0.0

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

For submission to:	RAN #7	for approval	X	strategic	
list expected approval meeting # here ↑		for information		non-strategic	*(for SMG use only)*

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

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

Source: TSG-RAN WG3   **Date:** Feb 22, 2000

Subject: Generalisation of the combining/splitting functionality in UTRAN

Work item:

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

Reason for change: This functionality is currently described in such a way that only FDD macrodiversity is covered. A similar functionality is used to support hard handover. The new text proposes a general description for this functionality.

Clauses affected: 7.1, 7.2.4.3

Other specs affected:				
	Other 3G core specifications	X	→ List of CRs:	R3-000540 CR 3 rev2 TS 25.420 R3-000542 CR 5 rev2 TS 25.430
	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:

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7.1 List of functions

NOTE: This list of functions, their classification and definitions is an initial list, classification and definitions that will be further refined.

- Functions related to overall system access control
  - Admission Control
  - Congestion Control
  - System information broadcasting
- Radio channel ciphering and deciphering
- Functions related to mobility
  - Handover
  - SRNS Relocation
- Functions related to radio resource management and control
  - Radio resource configuration and operation
  - Radio environment survey
  - combining/splitting control
  - Radio bearer connection set-up and release (Radio Bearer Control)
  - Allocation and deallocation of Radio Bearers
  - [TDD - Dynamic Channel Allocation (DCA)]
  - Radio protocols function
  - RF power control
  - RF power setting
  - [TDD - Timing Advance]
  - Radio channel coding
  - Radio channel decoding
  - Channel coding control
  - Initial (random) access detection and handling
  - CN Distribution function for Non Access Stratum messages

7.2.4.3 combining/splitting control

This function controls the combining/splitting of information streams to receive/ transmit the same information through multiple physical channels (possibly in different cells) from/ towards a single mobile terminal.

The UL combining of information streams may be performed using any suitable algorithm, for example:

- [FDD - based on maximum ratio algorithm (maximum ratio combining)];
- [FDD - based on quality information associated to each TBS (selection-combining)];
- [TDD - based on the presence/absence of the signal (selection)].

[FDD - combining/splitting control should interact with channel coding control in order to reduce the bit error ratio when combining the different information streams].

In some cases, depending on physical network configuration, there may be several entities which combine the different information streams, i.e there may be combining/splitting at the SRNC, DRNC or Node B level.

This function is located in the UTRAN.

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25.401 CR 005 Current Version: 3.1.0

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

For submission to: RAN #7
list expected approval meeting # here ↑

for approval	X	strategic		*(for SMG use only)*
for information		non-strategic		

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

Source: TSG-RAN WG3 **Date:** 2000-02-22

Subject: UTRAN Cell-Id not visible over Iu

Work item:

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

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

Release:

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

Reason for change: UTRAN Cell-Id shall not be visible over Iu, but Iu interface is mentioned in the definition of Cell Identifier.

Clauses affected: 6.1.5

Other specs affected:

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

Other comments:

help.doc

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

6.1.5 Cell Identifier

The Cell identifer (C-Id) is used to uniquely identify a cell within an RNS. The Cell-Id together with the identifier of the controlling RNC (CRNC-Id) constitutes the UTRAN Cell Identity (UC-Id) and is used to identify the cell uniquely within UTRAN. UC-Id or C-Id is used to identify a cell in UTRAN Iub, and Iur and Iu interfaces.

- **UC-Id = RNC-Id + C-Id**

The C-Id is defined by the operator, and set in the RNC via O&M. The C-Id is set in a Node B by its C-RNC.

3GPP TSG RAN WG3 Meeting #11
Nice, France, 28th Jan-3rd Mar 2000

Document R3-000888
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

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25.401	**CR**	**007**	Current Version: 3.1.0

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

For submission to:	TSG RAN #7	for approval	X	strategic		*(for SMG Use only)*
list expected approval meeting # here ↑		for information		non-strategic		

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

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

Source:	TSG-RAN WG3	**Date:**	Feb 2000
Subject:	Transport layer in Iub U-Plane.		
Work item:			

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

Reason for change:	In R99, AAL2 is used for Iub U-Plane data. References to AAL5 are therefore removed.
Clauses affected:	11.2

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

Other comments:	

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

11.2 Protocol Model (Informative)

The following section is a informative section which aim is to provide an overall picture of how the MAC layer is distributed over Uu, Iub and Iur for the RACH, FACH and DCH.

11.2.1 RACH Transport Channel

Figure 11 shows the protocol stack model for the RACH transport channel when the Controlling and Serving RNC are co-incident.

For the RACH transport channel, Dedicated MAC (MAC-d) uses the services of Common MAC (MAC-c).

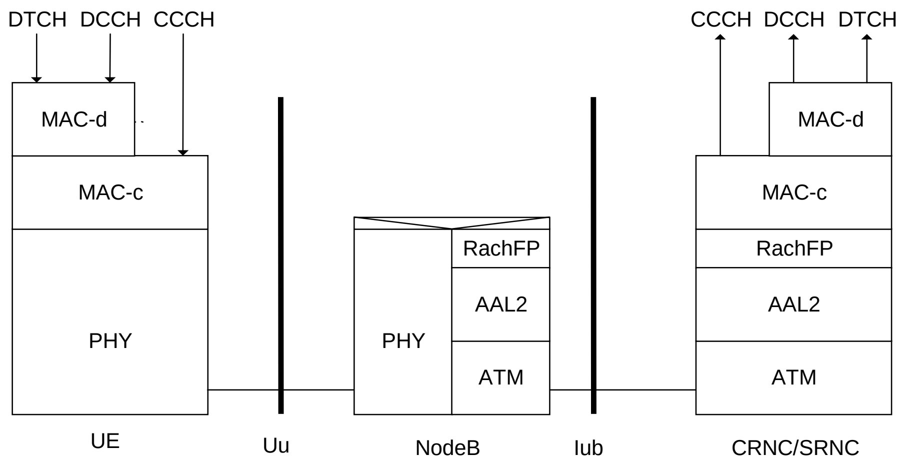

Figure 11: RACH: Coincident Controlling and Serving RNC

The Common MAC (MAC-c) entity in the UE transfers MAC-c PDU to the peer MAC-c entity in the RNC using the services of the Physical Layer.

An Interworking Function (IWF) in the NodeB interworks the RACH frame received by the PHY entity into the RACH Frame Protocol (RACH FP) entity.

The RACH Frame Protocol entity adds header information to form a RACH FP PDU which is transported to the RNC over an AAL2 ~~(or AAL5)~~ connection.

At the RNC, the RACH FP entity delivers the MAC-c PDU to the MAC-c entity.

Figure 12 shows the protocol model for the RACH transport channel with separate Controlling and Serving RNC. In this case, Iur RACH Frame Protocol (DchFP) is used to interwork the Common MAC (MAC-c) at the Controlling RNC with the Dedicated MAC (MAC-d) at the Serving RNC (The exact Iur FACH Frame Protocol is FFS)

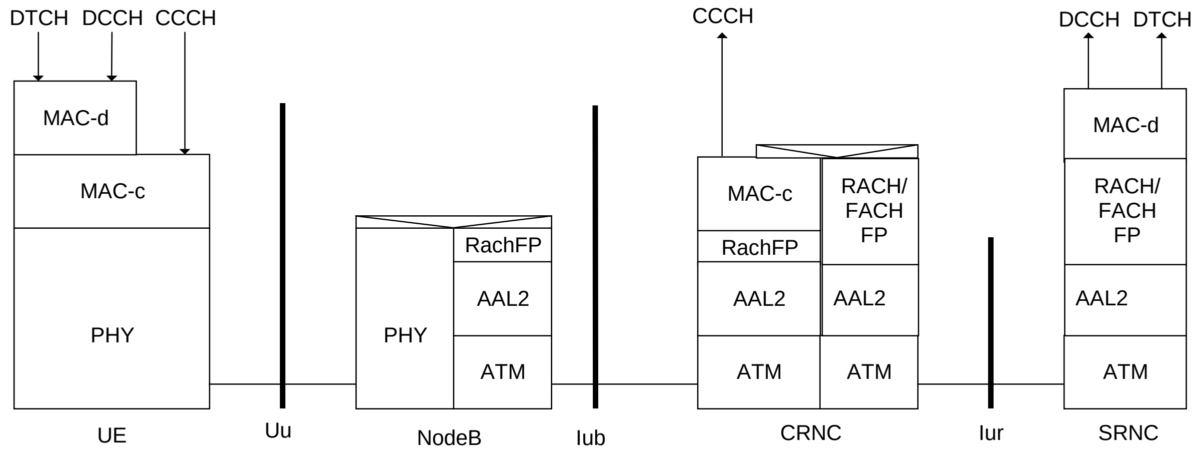

Figure 12: RACH: Separate Controlling and Serving RNC

11.2.2 FACH Transport Channel

Figure 13 shows the protocol model for the FACH transport channel when the Controlling and Serving RNC are co-incident.

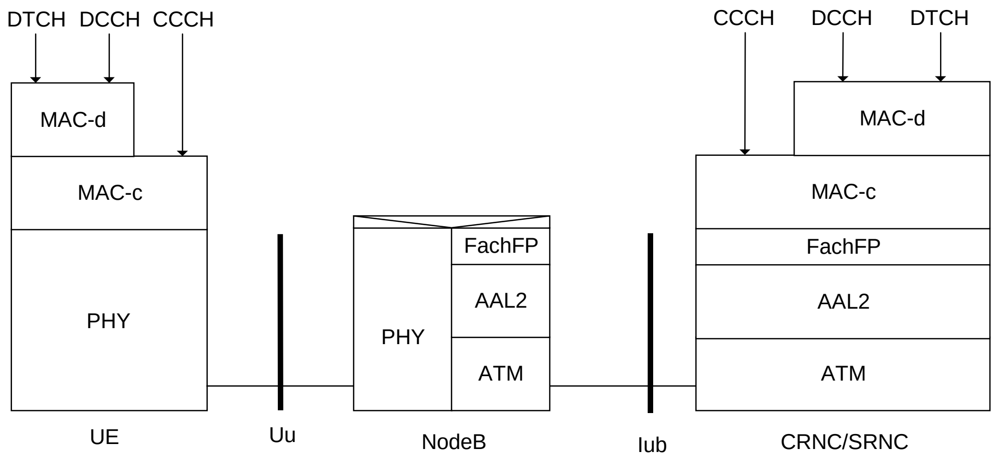

Figure 13: FACH Co-incident Controlling and Serving RNC

The Common MAC (MAC-c) entity in the RNC transfers MAC-c PDU to the peer MAC-c entity in the UE using the services of the FACH Frame Protocol (FACH FP) entity.

The FACH Frame Protocol entity adds header information to form a FACH FP PDU which is transported to the NodeB over an AAL2 ~~(or AAL5)~~ connection.

An Interworking Function (IWF) in the NodeB interworks the FACH frame received by FACH Frame Protocol (FACH FP) entity into the PHY entity.

FACH scheduling is performed by MAC-c in the CRNC.

Figure 14 shows the protocol model for the FACH transport channel with separate Controlling and Serving RNC. In this case, Iur FACH Frame Protocol is used to interwork the Common MAC (MAC-c) at the Controlling RNC with the Dedicated MAC (MAC-d) at the Serving RNC (The exact Iur RACH Frame Protocol is FFS)

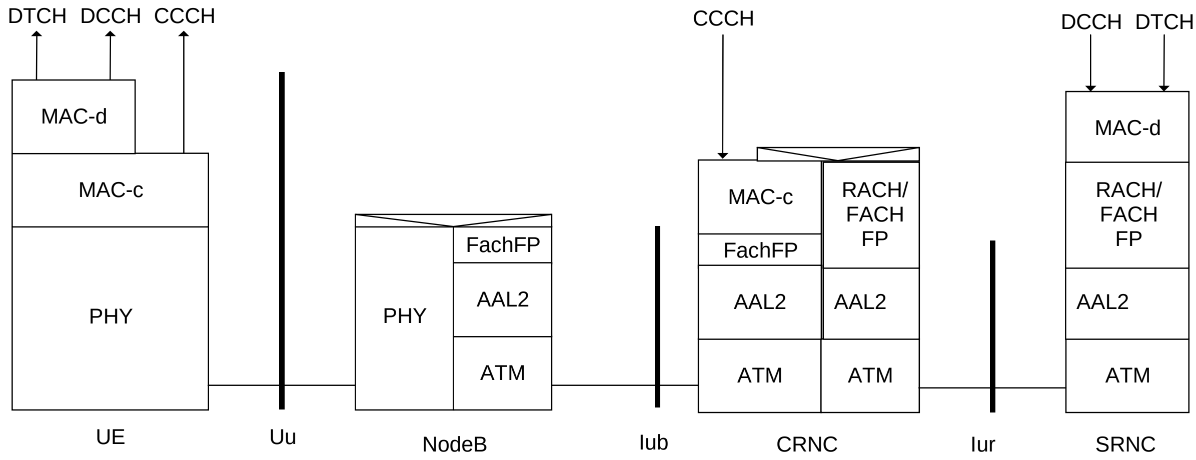

Figure 14: FACH: Separate Controlling and Serving RNC

11.2.3 DCH Transport Channel

Figure 15 shows the protocol model for the DCH transport channel when the Controlling and Serving RNC are co-incident.

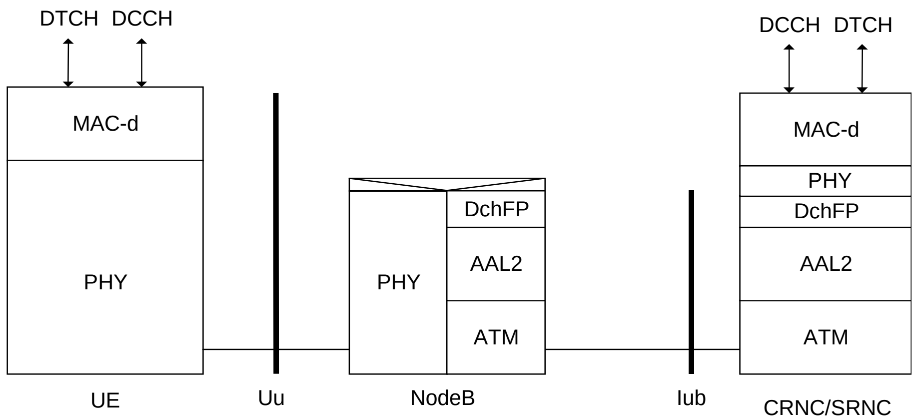

Figure 15: DCH: Co-incident Controlling and Serving RNC

The DCH transport channel introduces the concept of distributed PHY layer.

An Interworking Function (IWF) in the NodeB interworks between the DCH Frame Protocol (DCH FP) entity and the PHY entity.

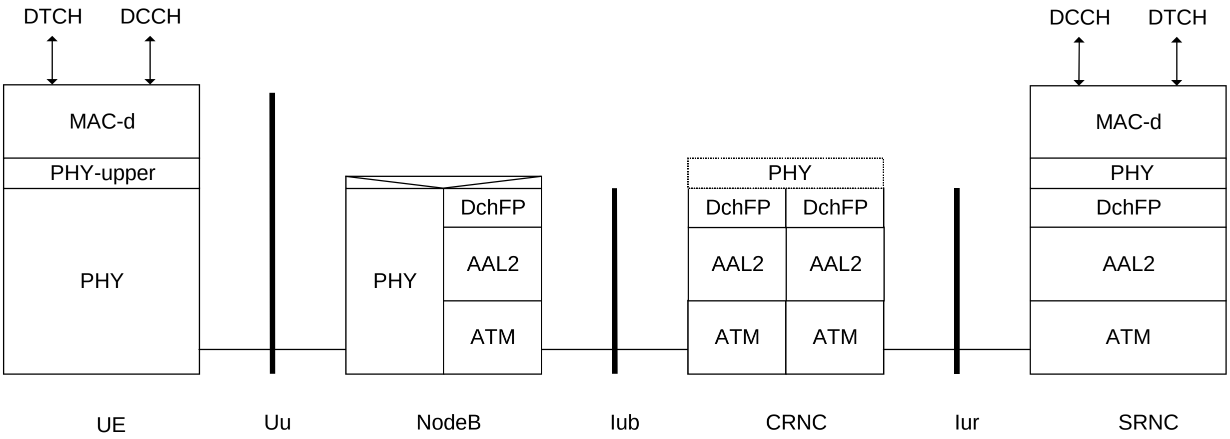

Figure 16: DCH: Separate Controlling and Serving RNC

Figure 16 shows the protocol model for the DCH transport channel with separate Controlling and Serving RNC. In this case, the Iub DCH FP is terminated in the CRNC and interworked with the Iur DCH FP through a PHY function. This function performs optional soft handover or can be a null function.

11.2.4 DSCH Transport Channel

Figure 17 shows the protocol model for the DSCH transport channel when the Controlling and Serving RNC are co-incident.

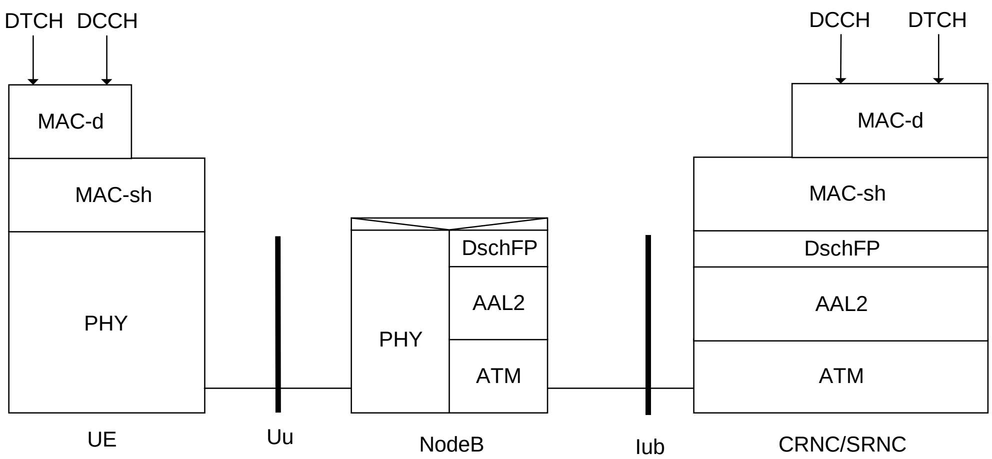

Figure 17: DSCH Co-incident Controlling and Serving RNC

The Shared MAC (MAC-sh) entity in the RNC transfers MAC-sh PDU to the peer MAC-sh entity in the UE using the services of the DSCH Frame Protocol (DSCH FP) entity. The DSCH FP entity adds header information to form a DSCH FP PDU which is transported to the Node B over an AAL2 ~~(or AAL5)~~ connection.

An Interworking Function (IWF) in the Node B interworks the DSCH frame received by DSCH FP entity into the PHY entity. DSCH scheduling is performed by MAC-sh in the CRNC.

Figure 18 shows the protocol model for the DSCH transport channel with separate Controlling and Serving RNC. In this case, Iur DSCH Frame Protocol is used to interwork the MAC-sh at the Controlling RNC with the MAC-d at the Serving RNC.

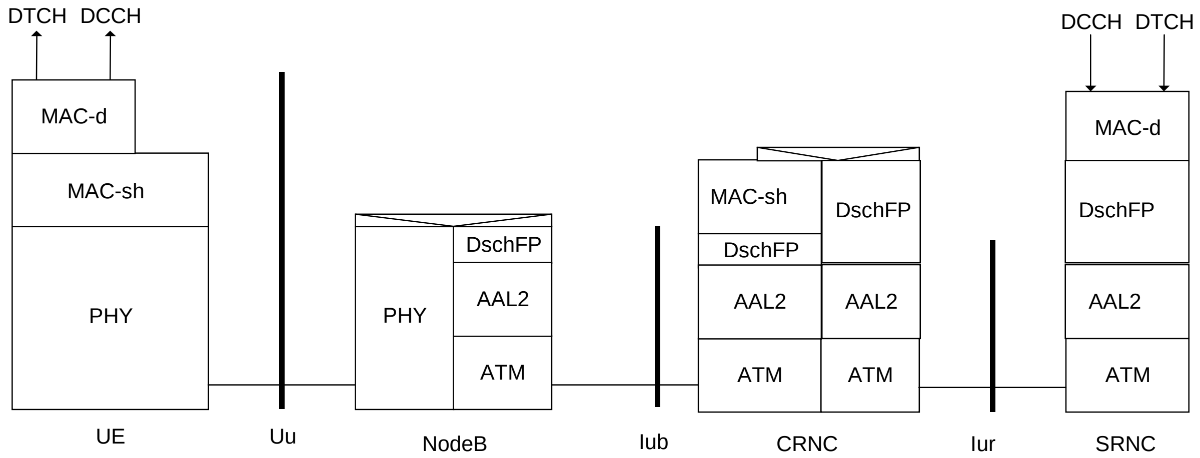

Figure 18: DSCH: Separate Controlling and Serving RNC

11.2.5 USCH Transport Channel

Figure 19 shows the protocol model for the USCH transport channel when the Controlling and Serving RNC are co-incident.

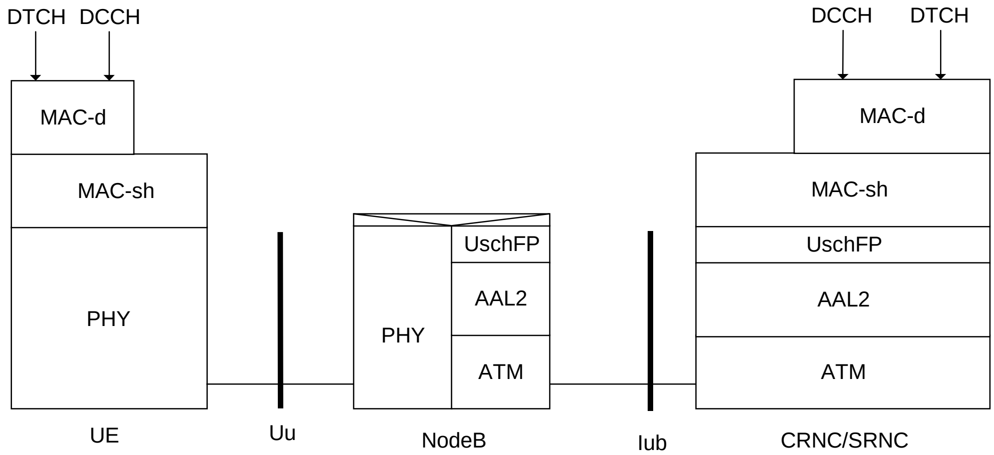

Figure 19: USCH Co-incident Controlling and Serving RNC

The Shared MAC (MAC-sh) entity in the RNC *receives* MAC-sh PDU *from* the peer MAC-sh entity in the UE using the services of the Interworking Function in the NodeB, and the USCH Frame Protocol (USCH FP) entity. The USCH FP entity *in the NodeB* adds header information to form a USCH FP PDU which is transported to the *RNC* over an AAL2 ~~(or AAL5)~~ connection.

An Interworking Function (IWF) in the Node B interworks *the received USCH PHY entity into an USCH frame to be transmitted by the USCH FP entity over the Iub interface*. USCH scheduling is performed by MAC-sh in UE and by C-RRC in the CRNC.

Figure 20 shows the protocol model for the USCH transport channel with separate Controlling and Serving RNC. In this case, Iur USCH Frame Protocol is used to interwork the MAC-sh at the Controlling RNC with the MAC-d at the Serving RNC.

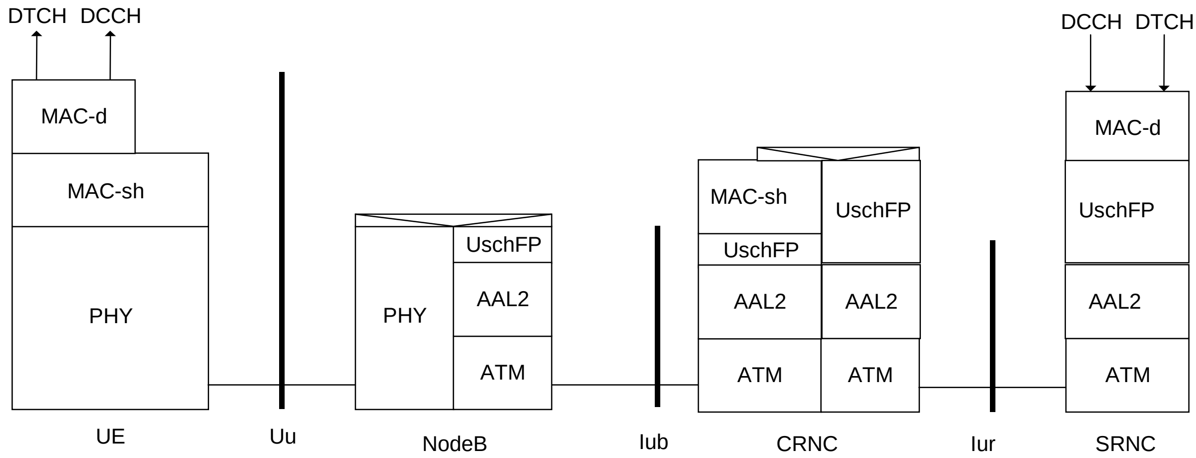

Figure 20: USCH: Separate Controlling and Serving RNC

3GPP TSG-RAN Working Group 3, Meeting #11
Sophia Antipolis, France, 28 February – 3 March, 2000

Document ***R3-000977***
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

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25.401	**CR**	**004r2**	Current Version:	3.0.0

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

For submission to:	RAN #7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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

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

Source: TSG-RAN WG3 **Date:** Feb 22, 2000

Subject: Corrections to TS25.401

Work item:

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

Reason for change: Incorrect grammar/spelling; change MAC-c and MAC-sh to MAC-c/sh; TDD tagging; Addition of Shared Channel Identifiers since currently no identifiers exist within 401 for the [TDD USCH] and DSCH

Clauses affected: 3.1, 4, 5.2.1, 5.2.2, 6, 6.1.7.1, 6.1.8.3, 6.2, 7.2.4.7, 8.1, 8.2, All 11.2

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

Other comments: Textual changes to CR4 (R3-000529) are shown with yellow background. In addition the strike-out of figures in the attachment have been made visible.

3.1 Definitions

NOTE: Cleaned version of section 5.1 from [1] with a reference to a more general vocabulary document

ALCAP: Generic name for the transport signalling protocols used to set-up and tear-down transport bearers.

Cell: A cell is a geographical area that can be identified by a User Equipment from a (cell) identification that is- broadcast from one *UTRAN Access Point*
A Cell is either FDD or TDD mode.

Iu: Interconnection point between the RNS and the Core Network. It is also considered as a reference point.

Iub: Interface between the RNC and the Node B.

Iur: A logical interface between two RNCs. Whilst logically representing a point to point link between RNCs, the physical realisation may not be a point to point link.

Logical Model: A Logical Model defines an abstract view of a network or network element by means of information objects representing network element, aggregations of network elements, the topological relationship between the elements, endpoints of connections (termination points), and transport entities (such as connections) that transport information between two or more termination points.
The information objects defined in the Logical Model are used, among others, by connection management functions. In this way, a physical implementation independent management is achieved.

Node B: A logical node responsible for radio transmission / reception in one or more cells to/from the UE. The logical ~~model~~node terminates the Iub interface towards the RNC.

Radio Network Controller: This equipment in the RNS is in charge of controlling the use and the integrity of the radio resources.

Controlling RNC: A role an RNC can take with respect to a specific set of Node B's. There is only one Controlling RNC for any Node B. The Controlling RNC has the overall control of the logical resources of its node B's.

Radio Network Subsystem: Either a full network or only the access part of a UMTS network offering the allocation and the release of specific radio resources to establish means of connection in between an UE and the UTRAN.
A Radio Network Subsystem contains one RNC and is responsible for the resources and transmission/reception in a set of cells.

Serving RNS: A role an RNS can take with respect to a specific connection between an UE and UTRAN. There is one Serving RNS for each UE that has a connection to UTRAN. The Serving RNS is in charge of the radio connection between a UE and the UTRAN. The Serving RNS terminates the Iu for this UE.

Drift RNS: The role an RNS can take with respect to a specific connection between an UE and UTRAN. An RNS that supports the Serving RNS with radio resources when the connection between the UTRAN and the UE need to use cell(s) controlled by this RNS is referred to as Drift RNS

Radio Access Network Application Part: Radio Network Signalling over the Iu.

Radio Network Subsystem Application Part: Radio Network Signalling over the Iur.

RRC Connection: A point-to-point bi-directional connection between RRC peer entities on the UE and the UTRAN sides, respectively. An UE has either zero or one RRC connection.

User Equipment: A Mobile Equipment with one or several UMTS Subscriber Identity Module(s).

UMTS Terrestrial Radio Access Network: UTRAN is a conceptual term identifying that part of the network which consists of RNCs and Node Bs between Iu an Uu. The concept of UTRAN instantiation is currently undefined.

UTRAN Access Point: A conceptual point within the UTRAN performing radio transmission and reception. A UTRAN access point is associated with one specific *cell*, i.e. there exists one UTRAN access point for each cell. It is the UTRAN-side end point of a *radio link*.

Radio Link: A "radio link" is a logical association between a single User Equipment and a single UTRAN access point. Its physical ~~realization~~realisation comprises one or more radio bearer transmissions.

Uu: The Radio interface between UTRAN and the User Equipment.

RAB sub-flows: A Radio Access Bearer can be realised by UTRAN through ~~sev-eral~~several sub-flows. These sub-flows correspond to the NAS service data streams that have QoS characteristics that differ in a predefined manner within a RAB e.g. different reliability classes.

RAB sub-flows have the following characteristics:

1) The sub-flows of a RAB are established and released at the RAB establishment and ~~re-lease~~release, respectively

2) The sub-flows of a RAB are submitted and delivered together at the RAB SAP

3) The sub-flows of a RAB are carried over the same Iu transmission connection

4) The sub-flows of a RAB are organised in a predefined manner at the SAP and over the Iu interface. The organisation is imposed by the NAS as part of its co-ordination ~~respon-sibility~~responsibility.

Coordinated DCHs: Dedicated transport channels transporting information for ~~differ-ent~~different RAB subflows belonging to one and the same RAB. ~~Coord-inated~~Coordinated DCHs are always established and released in combination. Coordinated DCHs cannot be operated on individually e.g . if the establishment of one DCH fails, the establishment of all other coordinated DCHs shall be terminated ~~unsuccesfully~~unsuccessfully and the ~~es-tablishment~~establishment of the RAB fails.

4 General principles

The general principles guiding the definition of UTRAN Architecture as well as the UTRAN interfaces are the following:

- Logical separation of signalling and data transport networks

- UTRAN and CN functions are fully separated from transports functions. Addressing scheme used in UTRAN and CN shall not be tied to the addressing schemes of ~~Transport~~transport functions. The fact that some UTRAN or CN function resides in the same equipment as some transport functions does not make the transport functions part of the UTRAN or the CN.

- Macro diversity (FDD only) is fully handled in the UTRAN

- Mobility for RRC connection is fully controlled by the UTRAN.
  Note : Handover to other ~~Access Networks~~access networks- is FFS.

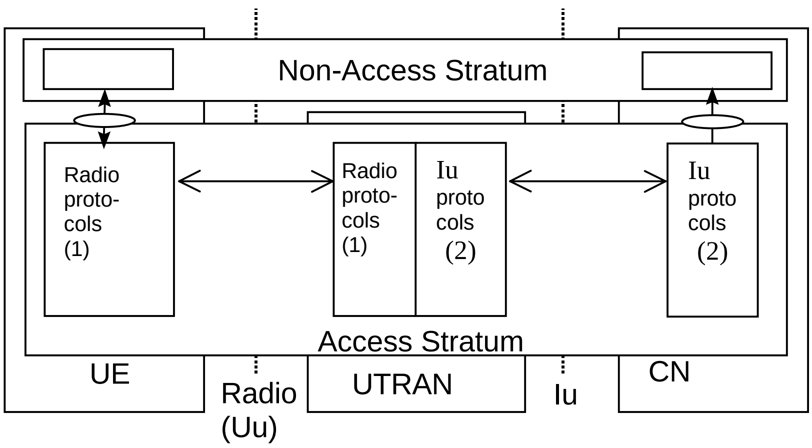
- When defining the UTRAN interfaces the following principles were followed-: The functional division across the interfaces shall have as few options as possible.

- Interfaces should be based on a logical model of the entity controlled through this interface

Transport Network Control Plane is a functional plane in the interfaces protocol structure that is used for the transport bearer management. The actual signalling protocol that is in use within the Transport Network Control Plane depends on the underlying transport layer technology. The intention is not to specify a new UTRAN specific Application Part for the Transport Network Control Plane but to use signalling protocols standardised in other groups (if needed) for the applied transport layer technology.

5.2.1 User plane

The radio access bearer service is offered from SAP to SAP by the Access Stratum. The figure below shows the protocols on the Uu and Iu interfaces that linked together provide this radio access bearer service.



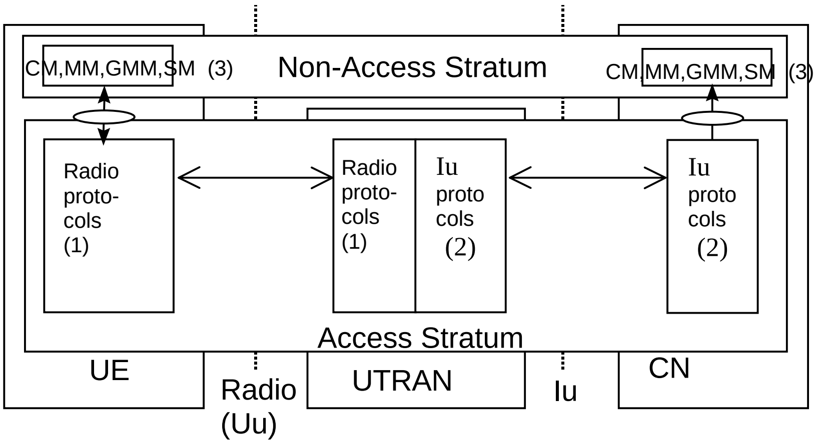
(1) The radio interface protocols are defined in documents ~~To be defined by TSG RAN WG2~~ TS 25.2xx and TS25.3xx.

(2) The Iu interface protocols are defined in documents TS25.41x~~S3.1x (description of Iu interface)~~.

Figure 2: Iu and Uu User plane

5.2.2 Control plane

The figure below shows the control plane (signalling) protocol stacks on Iu and Uu interfaces.



(1) The radio interface protocols are defined in documents TS 25.2xx and TS25.3xx.~~To be defined by TSG RAN WG2 group~~

(2) The protocol is defined in documents ~~S3.1~~TS25.41x. (Description of Iu interface).

(3) **CM,MM,GMM,SM:** This ~~examplifies~~exemplifies a set of NAS control protocols between UE and CN. There may be different NAS protocol stacks in parallel. The evolution of the protocol architecture for these protocols is FFS.

Figure 3: Iu and Uu Control plane

NOTE: Both the Radio protocols and the Iu protocols contain a mechanism to transparently transfer NAS messages.

6 UTRAN Architecture

The UTRAN consists of a set of Radio Network Subsystems connected to the Core Network through the Iu.

A RNS consists of a Radio Network Controller and one or more Node Bs. A Node B is connected to the RNC through the Iub interface.

A Node B can support FDD mode, TDD mode or dual-mode operation.

The RNC is responsible for the Handover decisions that require signalling to the UE.

~~The RNC comprises a combining/splitting function to support macro diversity between different Node B.~~

A RNC ~~supporting the FDD mode~~ may include a combining/splitting function to support combination/splitting of information streams (see chapter 7.2.4.3)~~macro diversity between different Node B~~.

Inside the UTRAN, the RNCs of the Radio Network Subsystems can be interconnected together through the Iur. Iu(s) and Iur are logical interfaces. Iur can be conveyed over direct physical ~~direct~~ connection between RNCs or virtual networks using~~via~~ any suitable transport network.

The UTRAN architecture is shown in figure 4.

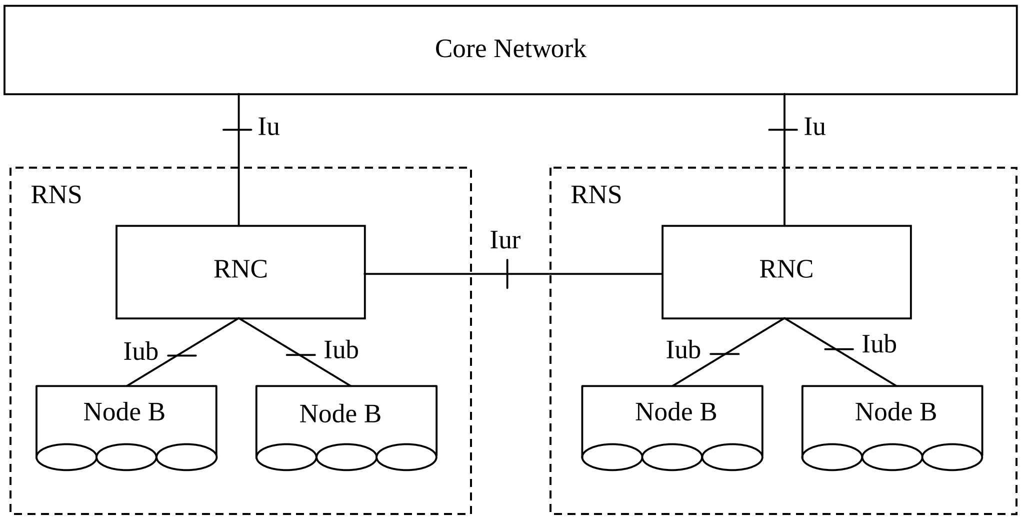


Figure 4: UTRAN Architecture

Each RNS is responsible for the resources of its set of cells.

For each connection between ~~a User~~User Equipment and the UTRAN, One RNS is the Serving RNS. When required, Drift RNSs support the Serving RNS by providing radio resources as shown in figure 5. The role of an RNS (Serving or Drift) is on a per connection basis between a UE and the UTRAN.

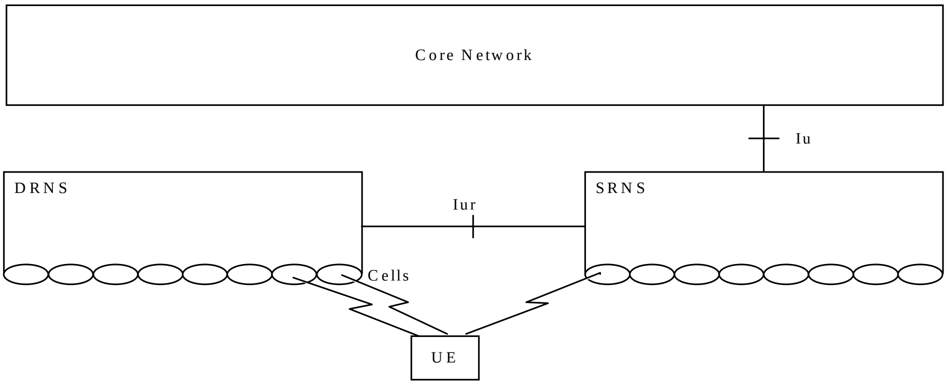


Figure 5: Serving and Drift RNS

6.1.7.1 Usage of RNTI

~~S-RNTI together with the RNC-ID~~ u-RNTI is used as a UE identifier for the first cell access (at cell change) when a RRC connection exists for this UE and for UTRAN originated paging including associated response messages ~~on the air interface~~. RNC-ID is used by Controlling RNC to route the received uplink messages towards the Serving RNC.

NOTE: For the initial access two different methods of identification, a random number and a unique core network UE identifier are under consideration.

~~C~~c-RNTI is used as a UE identifier in all other DCCH/DTCH common channel messages on air interface.

6.1.8.1 Radio Network Control Plane identifiers

Each addressable object in each reference point has an application part level identifier. This identifier is allocated autonomously by the entity responsible for initiation of the setup of the object. This application part identifier will be used as a reference to the object that is setup. Both ends of the reference point shall memorise the AP Identifier during the lifetime of the object. Application part identifier can be related to a specific ALCAP identifier and that relationship shall also be memorised by both ends.

Table below lists the basic AP level identifiers in each reference point.

Object	Identifier	Abbreviation	Valid for
Radio Access Bearer	Radio Access Bearer ID	RAB-ID	Iu
Dedicated Transport channel	DCH-ID	DCH-ID	Iur, Iub
Downlink Shared Channel	DSCH-ID	DSCH-ID	Iur, Iub
[TDD Uplink Shared Channel]	USCH-ID	USCH-ID	Iur, Iub

6.1.8.3 Binding identifier

Binding Identifier is used to initialise the linkage between ALCAP and Application Part (RANAP, RNSAP, NBAP) identifiers. Binding identifier can be used both in Radio Network Control plane Application Part protocols and in Transport Network Control Plane's ALCAP protocol.

Binding ID binds the Radio and Transport Network Control plane identifiers together. To ensure maximal independence of those two planes, the binding ID should be used only when necessary: Binding ID shall thus be used only in Radio Network Control plane Application Part messages in which a new association between the planes is created and in ALCAP messages creating new transmission links.

Binding ID for each transmission link shall be allocated before the setup of that transmission link. Reserved Binding IDs and the associated transport link shall be memorised by both peers of each reference point.

The Binding ID is sent on one direction using the Application Part protocol and is return in the other direction by the ALCAP protocol.

The binding identity shall already be assigned and tied to a radio application procedure when the first ALCAP message is received in a node.

Figure 6 illustrates how application instances of the Radio Network Control Plane and instances of the Transport Network Plane are linked together through the Binding Identifier in the set-up phase:

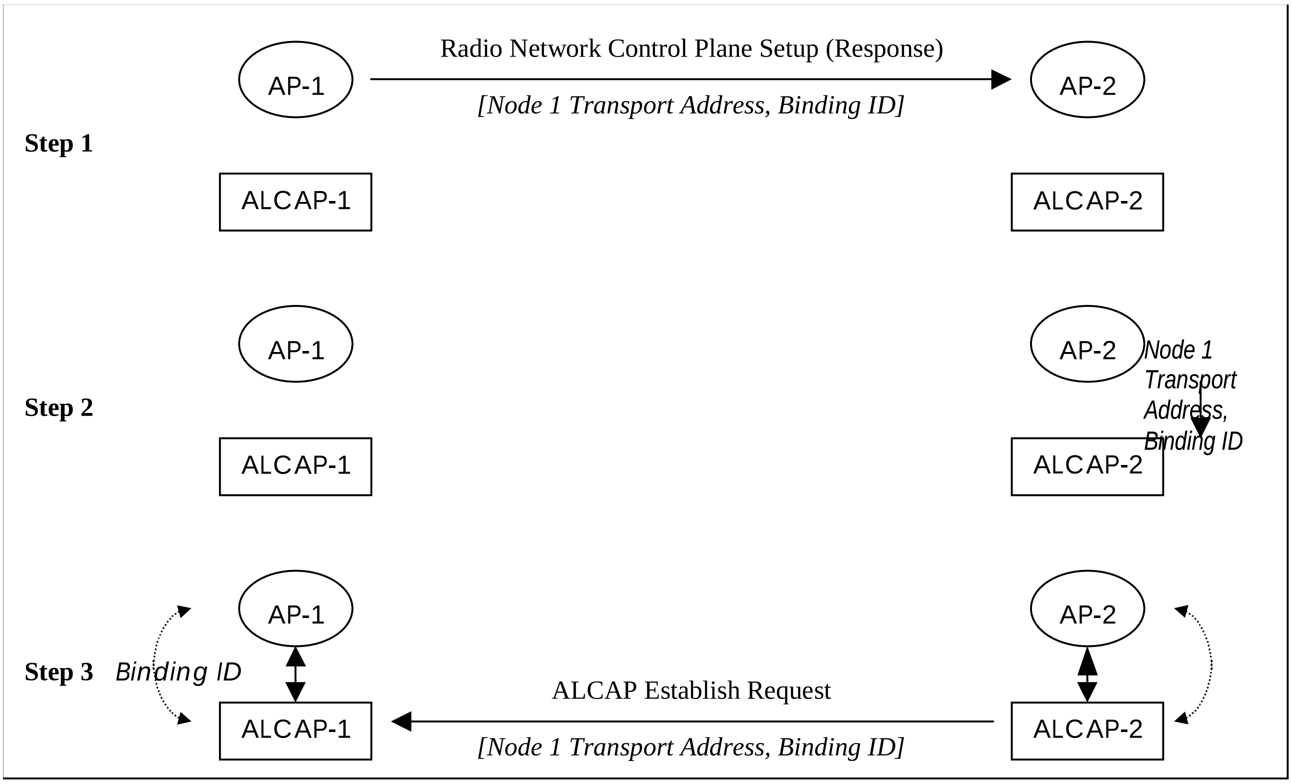


Figure 6: Usage of Binding ID

Step 1: Application Part AP-1 assigns the Binding Identifier and sends a Radio Network Control Plane Set-up (Response) message (which of the two messages depends on the involved interface - Iu/Iur or Iub). The message contains the originating node Transport layer address and the Binding Identifier.

Step 2: Among reception of the Radio Network Control Plane Set-up message, the peer entity AP-2 requests ~~to~~ ALCAP-2 to establish a transmission link. The Binding Identifier is passed to ALCAP-2

Step 3: ALCAP-2 sends an ALCAP Establish Request to the peer entity ALCAP-1. The message contains the Binding Identifier. The Binding Identifier allows correlating the ~~incomming~~incoming transport connection with the Application Part transaction in step 1.

The following table indicates the binding identifier allocating entity in each interface.

Reference point	Allocating entity	Application part message including Binding-ID
Iu	CN	Request from CN
Iur	DRNC	Response to the request from SRNC
Iub	Node-B	Response to the request from DRNC

6.2 Transport Addresses

The transport layer address parameter is transported in the radio network application signalling procedures that result in establishment of transport bearer connections.

The transport layer address parameter shall not be interpreted in the radio network application protocols and reveal the addressing format used in the transport layer.

7.2.4.7 Radio protocols function

This function provides user data and signalling transfer capability across the UMTS radio interface by adapting the services (according ~~the~~to the QoS of the Radio Access Bearer) to the Radio transmission. This function includes amongst other:

- Multiplexing of services and multiplexing of UEs on Radio bearers
- Segmentation and reassembly
- Acknowledged/Unacknowledged delivery according to the Radio Access Bearer QoS

.

8.1 Signalling connection

Based on [2], the UE may either have or not have a signalling connection:

1) ~~There exists~~ When a signalling connection exists that is established over the Dedicated Control Service Access Point (DC-SAP) from the Access Stratum.
~~In this case~~Therefore, the CN can reach the UE by the dedicated connection SAP on the CN side, and the UTRAN has a context with the UE and CN for this particular connection. This context is erased when the connection is released. The *dedicated connection* can be initiated from the UE only.

NOTE: A dedicated connection is currently defined as Signalling Connection in [2]. Note that in the radio interface, dedicated or common channels can be used.

Depending on the activity of a UE, the location of the UE is known either on cell level (higher activity) or in a larger area consisting of several cells (lower activity). This will (i) minimise the number of location update messages for moving UEs with low activity and (ii) remove the need for paging for UEs known on cell level.

2) ~~There does not exist~~ When a dedicated connection does not exist~~. In this case~~, the CN must reach the UE via the Notification SAP. The message sent to the UE can be a request to the UE to establish a dedicated connection. The UE is addressed with a user/terminal identity and a "geographical area".

8.2 Consequences for Mobility Handling

It is generally agreed [1] to contain radio access specific procedures within UTRAN. This means that all cell level mobility should be handled within UTRAN. Also the cell structure of the radio network should not necessarily be known outside the UTRAN.

When there exists a dedicated connection to the UE, the UTRAN shall handle the radio interface mobility of the UE. This includes procedures such as soft handover, and procedures for handling mobility in the RACH/PCH substate.

NOTE: Some reference will be necessary to a 3GPP TSG RAN WG2 document that defines that substate.

When a dedicated connection~~there~~ between the UTRAN and the UE does not exist, ~~a dedicated connection to the UE,~~ no UE information is needed in UTRAN. ~~is needed. In this case~~Therefore, the mobility is handled directly between UE and CN outside access stratum (e.g. by means of registration procedures). When paging the UE, the CN indicates a 'geographical area' that is translated within UTRAN to the actual cells that shall be paged. A 'geographical area' shall be identified in a cell-structure independent way. One possibility is the use of 'Location Area identities'.

During the lifetime of the dedicated connection, the registrations to the CN are suppressed by the UE. When a dedicated connection is released, the UE performs a new registration to the CN, whenif needed.

Thus, the UTRAN does not contain any permanent 'location registers' for the UE, but only temporary contexts for the duration of the dedicated connection. This context may typically contain location information (e.g. current cell(s) of the UE) and information about allocated radio resources and related connection references.

11.1.1 General

The general protocol model for UTRAN Interfaces is depicted in figure 10, and described in detail in the following sub-sections. The structure is based on the principle that the layers and planes are logically independent of each other. , and if needed, protocol layers, or the whole protocol stack in a plane may be changed in the future by decisions in the standardisation. Therefore, as and when required, the standardisation body can easily alter protocol stacks and planes to fit future requirements.

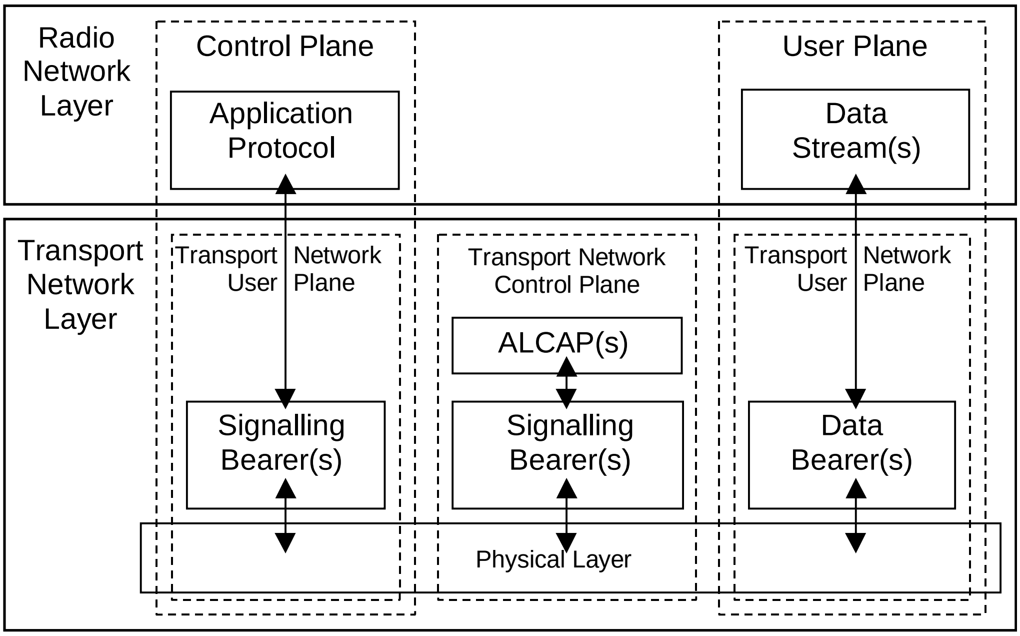


Figure 10: General Protocol Model for UTRAN Interfaces

11.2 Protocol Model (Informative)

The following section is a informative section which aim is to provide an overall picture of how the MAC layer is distributed over Uu, Iub and Iur for the RACH, FACH, and DCH, DSCH and [TDD USCH].

11.2.1 RACH Transport Channel

Figure 11 shows the protocol stack model for the RACH transport channel when the Controlling and Serving RNC are co-incident.

For the RACH transport channel, Dedicated MAC (MAC-d) uses the services of Common MAC (MAC-c/sh).

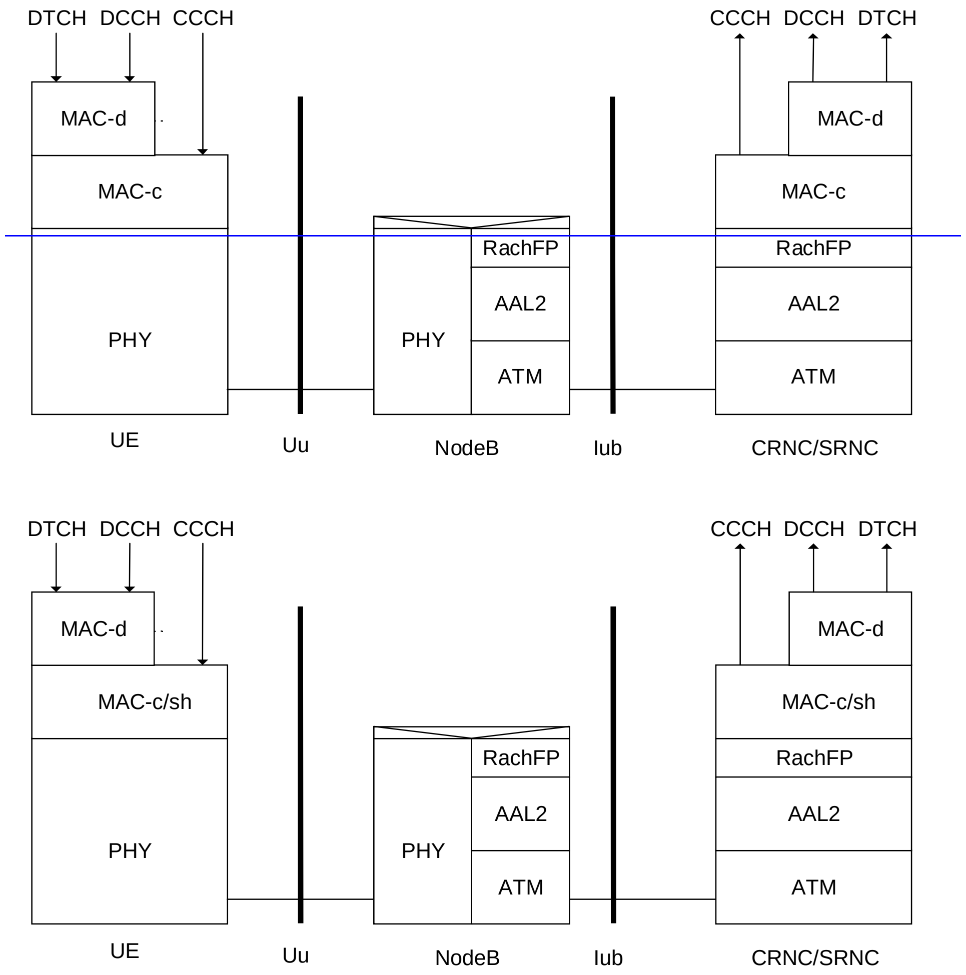


Figure 11: RACH: Coincident Controlling and Serving RNC

The Common MAC (MAC-c/sh) entity in the UE transfers MAC-c/sh PDU to the peer MAC-c/sh entity in the RNC using the services of the Physical Layer.

An Interworking Function (IWF) in the NodeB interworks the RACH frame received by the PHY entity into the RACH Frame Protocol (RACH FP) entity.

The RACH Frame Protocol entity adds header information to form a RACH FP ~~PDU which~~PDU that is transported to the RNC over an AAL2 (or AAL5) connection.

At the RNC, the RACH FP entity delivers the MAC-c/sh PDU to the MAC-c/sh entity.

Figure 12 shows the protocol model for the RACH transport channel with separate Controlling and Serving RNC. In this case, Iur RACH Frame Protocol (DchFP) is used to interwork the Common MAC (MAC-c/sh) at the Controlling RNC with the Dedicated MAC (MAC-d) at the Serving RNC (The exact Iur FACH Frame Protocol is FFS)

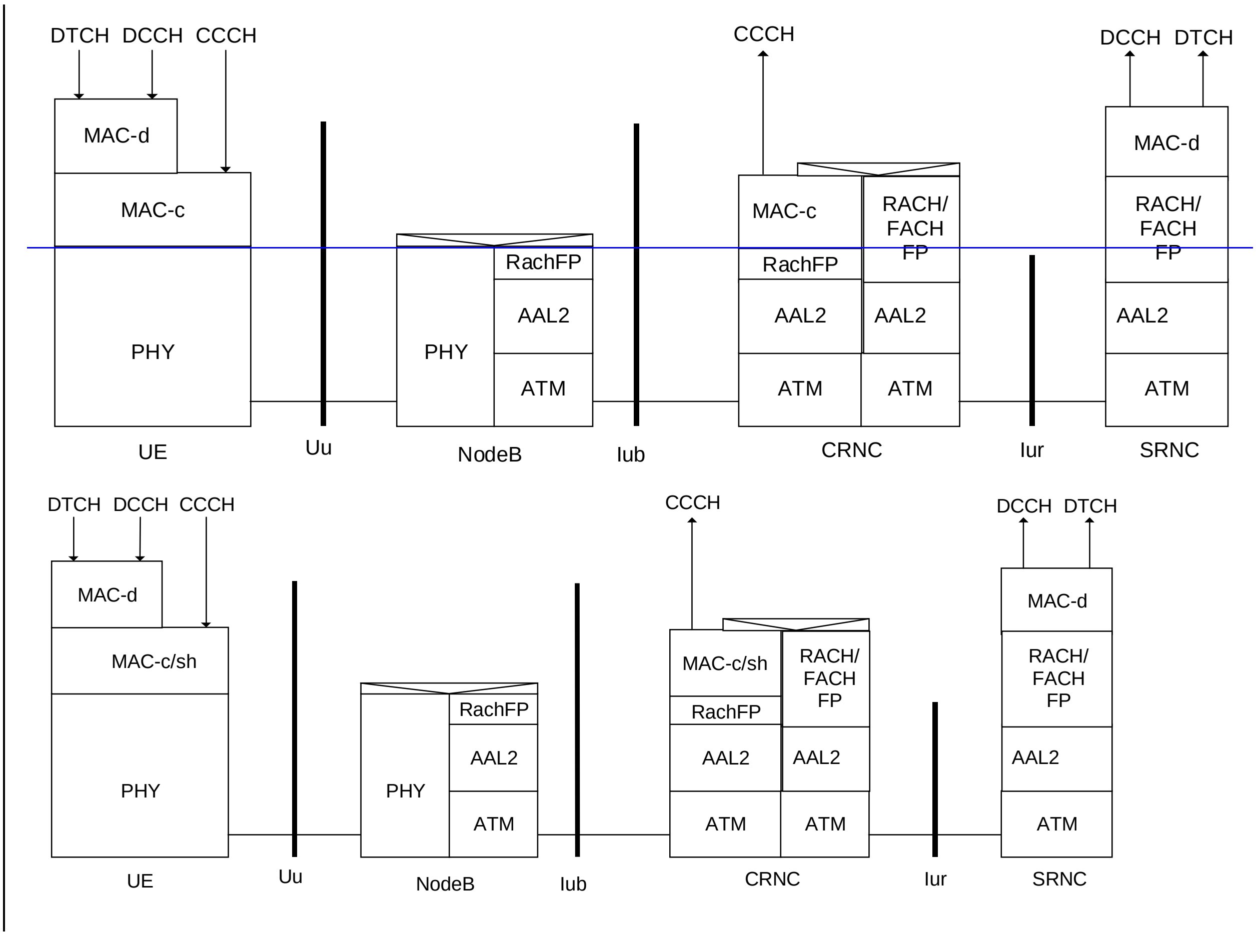


Figure 12: RACH: Separate Controlling and Serving RNC

11.2.2 FACH Transport Channel

Figure 13 shows the protocol model for the FACH transport channel when the Controlling and Serving RNC are co-incident.

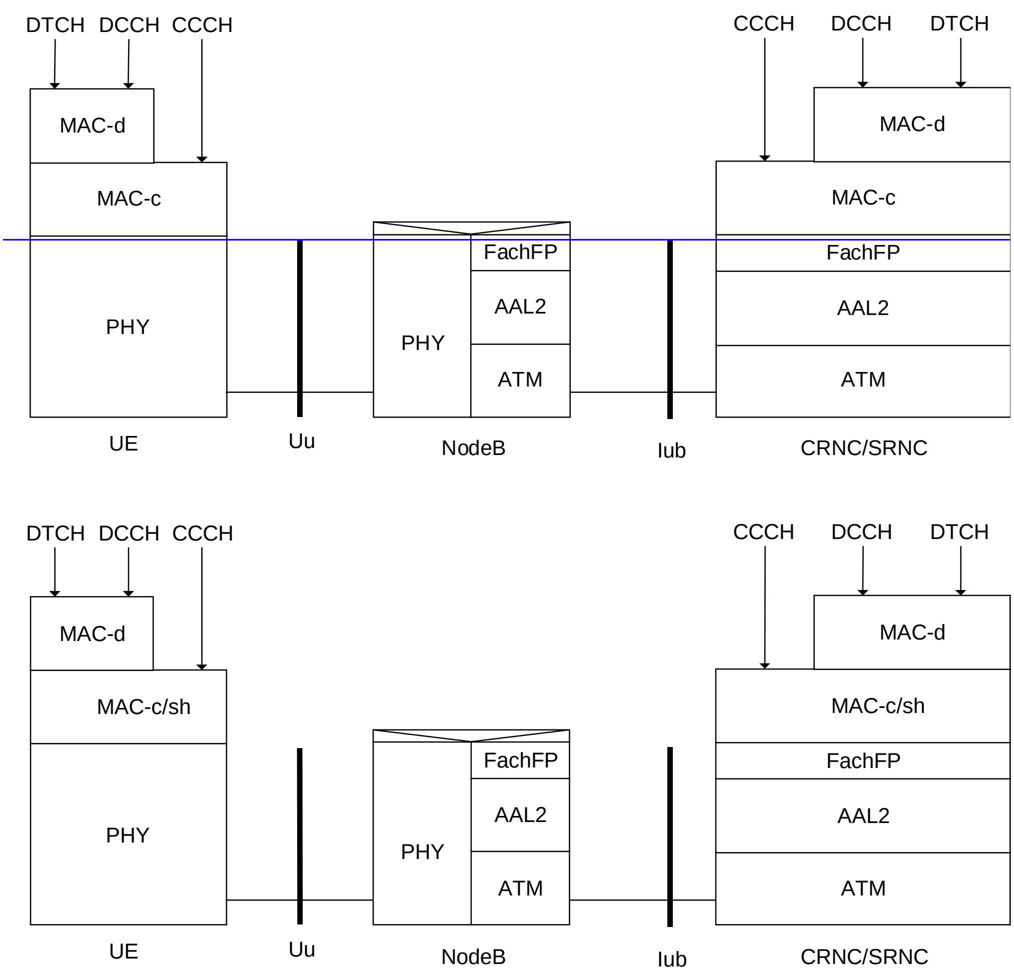


Figure 13: FACH Co-incident Controlling and Serving RNC

The Common MAC (MAC-c/sh) entity in the RNC transfers MAC-c PDU to the peer MAC-c entity in the UE using the services of the FACH Frame Protocol (FACH FP) entity.

The FACH Frame Protocol entity adds header information to form a FACH FP ~~PDU which~~PDU that is transported to the NodeB over an AAL2 (or AAL5) connection.

An Interworking Function (IWF) in the NodeB interworks the FACH frame received by FACH Frame Protocol (FACH FP) entity into the PHY entity.

FACH scheduling is performed by MAC-c/sh in the CRNC.

Figure 14 shows the protocol model for the FACH transport channel with separate Controlling and Serving RNC. In this case, Iur FACH Frame Protocol is used to interwork the Common MAC (MAC-c) at the Controlling RNC with the Dedicated MAC (MAC-d) at the Serving RNC (The exact Iur RACH Frame Protocol is FFS)

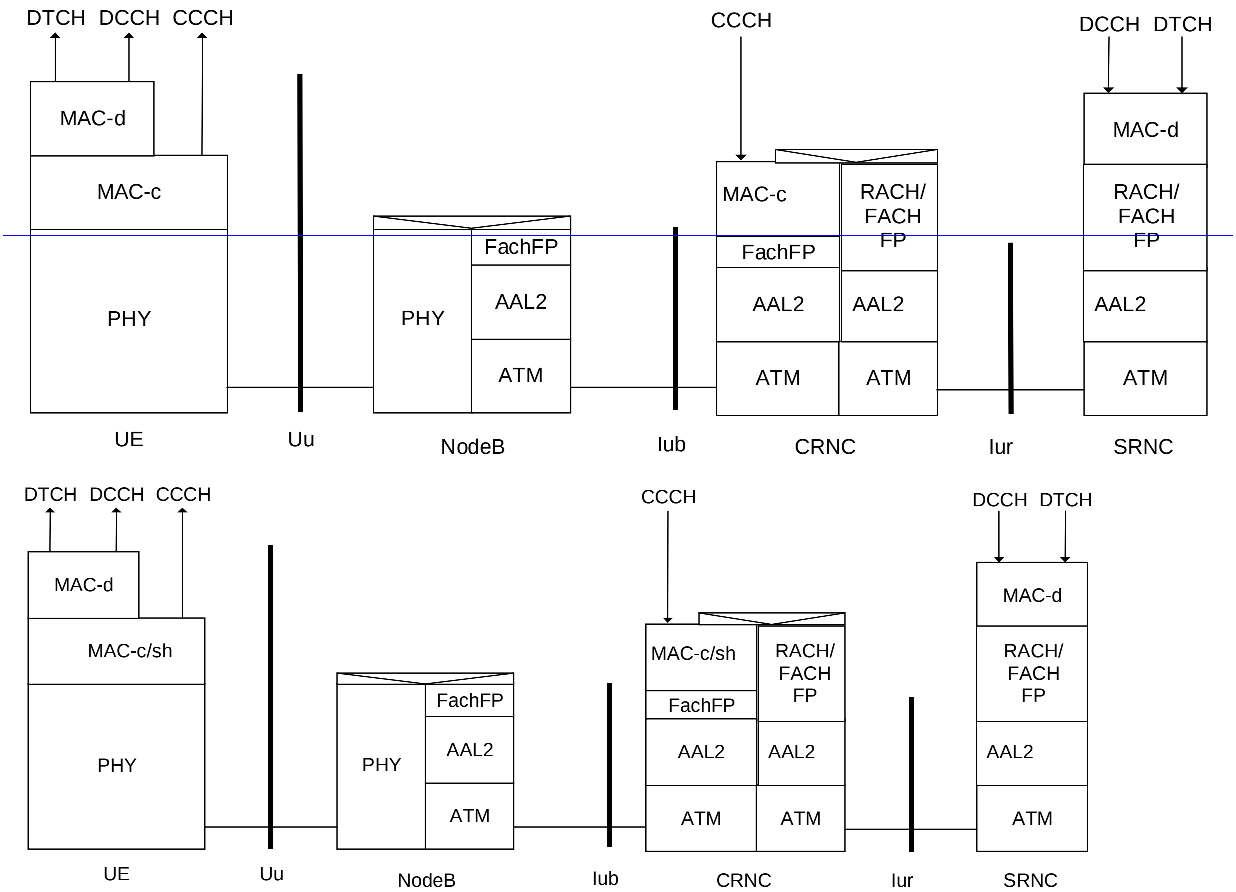


Figure 14: FACH: Separate Controlling and Serving RNC

11.2.3 DCH Transport Channel

Figure 15 shows the protocol model for the DCH transport channel when the Controlling and Serving RNC are co-incident.

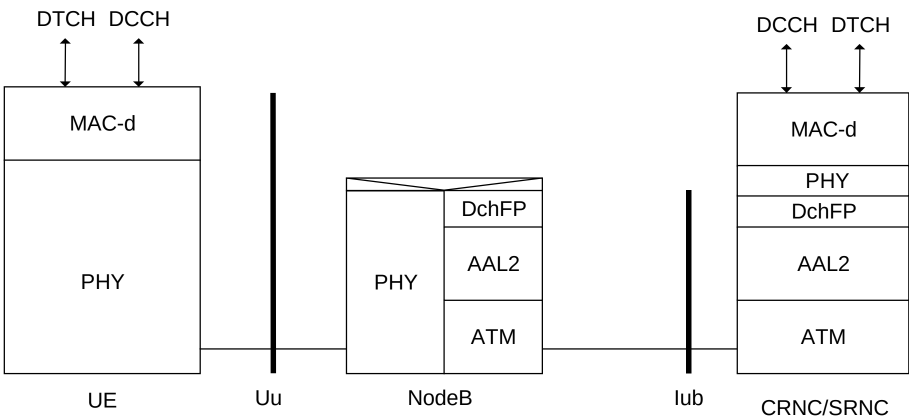


Figure 15: DCH: Co-incident Controlling and Serving RNC

The DCH transport channel introduces the concept of distributed PHY layer.

An Interworking Function (IWF) in the NodeB interworks- between the DCH Frame Protocol (DCH FP) entity and the PHY entity.

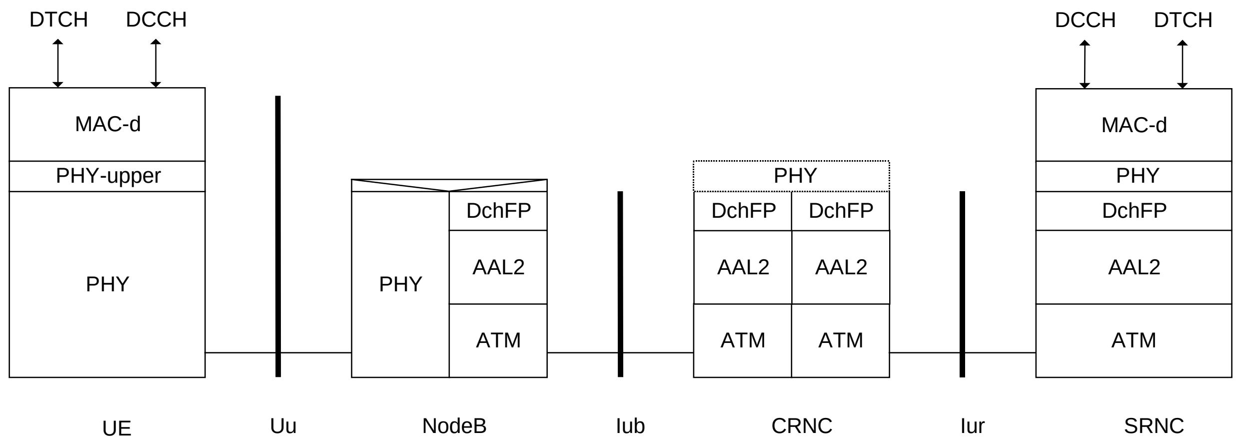


Figure 16: DCH: Separate Controlling and Serving RNC

Figure 16 shows the protocol model for the DCH transport channel with separate Controlling and Serving RNC. In this case, the Iub DCH FP is terminated in the CRNC and interworked with the Iur DCH FP through a PHY function. This function performs optional soft handover or can be a null function.

11.2.4 DSCH Transport Channel

Figure 17 shows the protocol model for the DSCH transport channel when the Controlling and Serving RNC are co-incident.

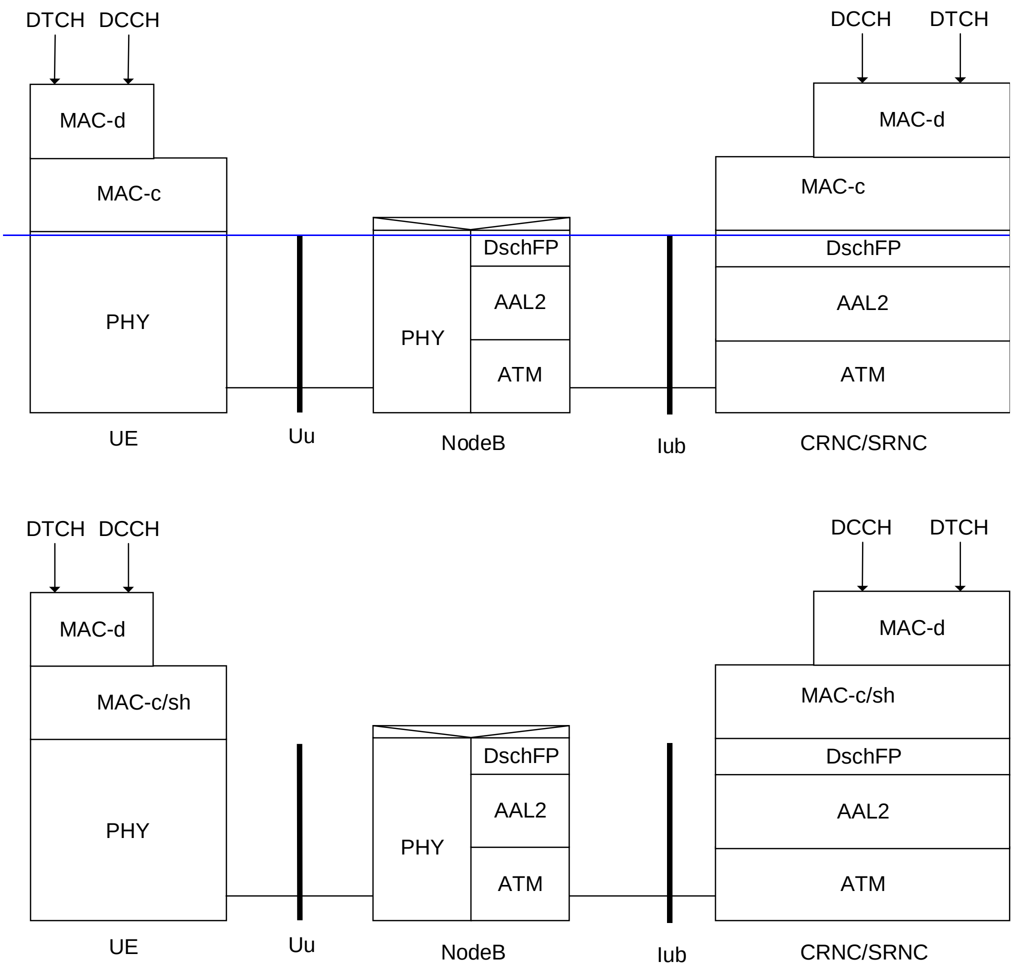


Figure 17: DSCH Co-incident Controlling and Serving RNC

The Shared MAC (MAC-c/sh) entity in the RNC transfers MAC-c/sh PDU to the peer MAC-c/sh entity in the UE using the services of the DSCH Frame Protocol (DSCH FP) entity. The DSCH FP entity adds header information to form a DSCH FP ~~PDU which~~PDU that is -transported to the Node B over an AAL2 (or AAL5) connection.

An Interworking Function (IWF) in the Node B interworks the DSCH frame received by DSCH FP entity into the PHY entity. DSCH scheduling is performed by MAC-c/sh in the CRNC.

Figure 18 shows the protocol model for the DSCH transport channel with separate Controlling and Serving RNC. In this case, Iur DSCH Frame Protocol is used to interwork the MAC-c/sh at the Controlling RNC with the MAC-d at the Serving RNC.

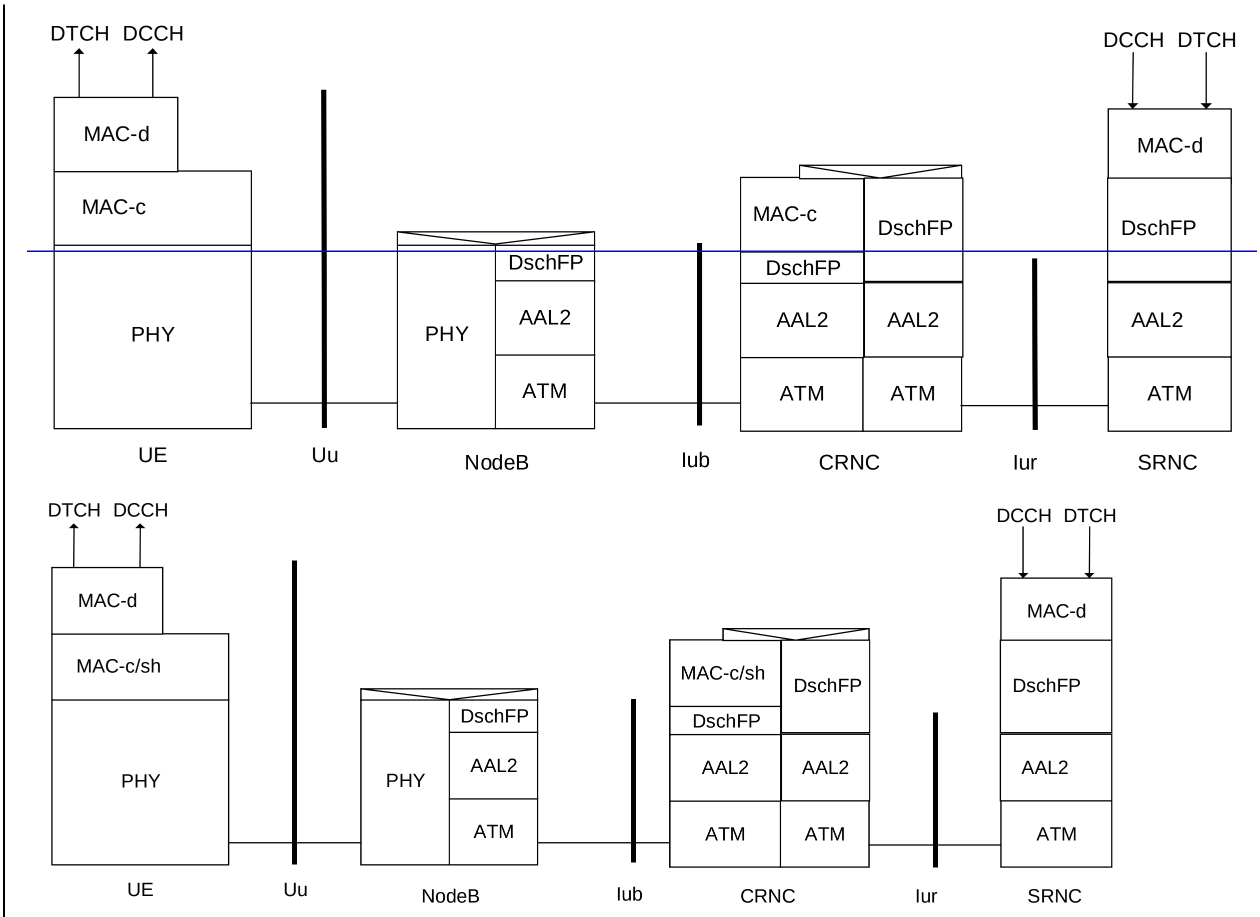


Figure 18: DSCH: Separate Controlling and Serving RNC

11.2.5 USCH Transport Channel [TDD]

Figure 19 shows the protocol model for the USCH transport channel when the Controlling and Serving RNC are co-incident.

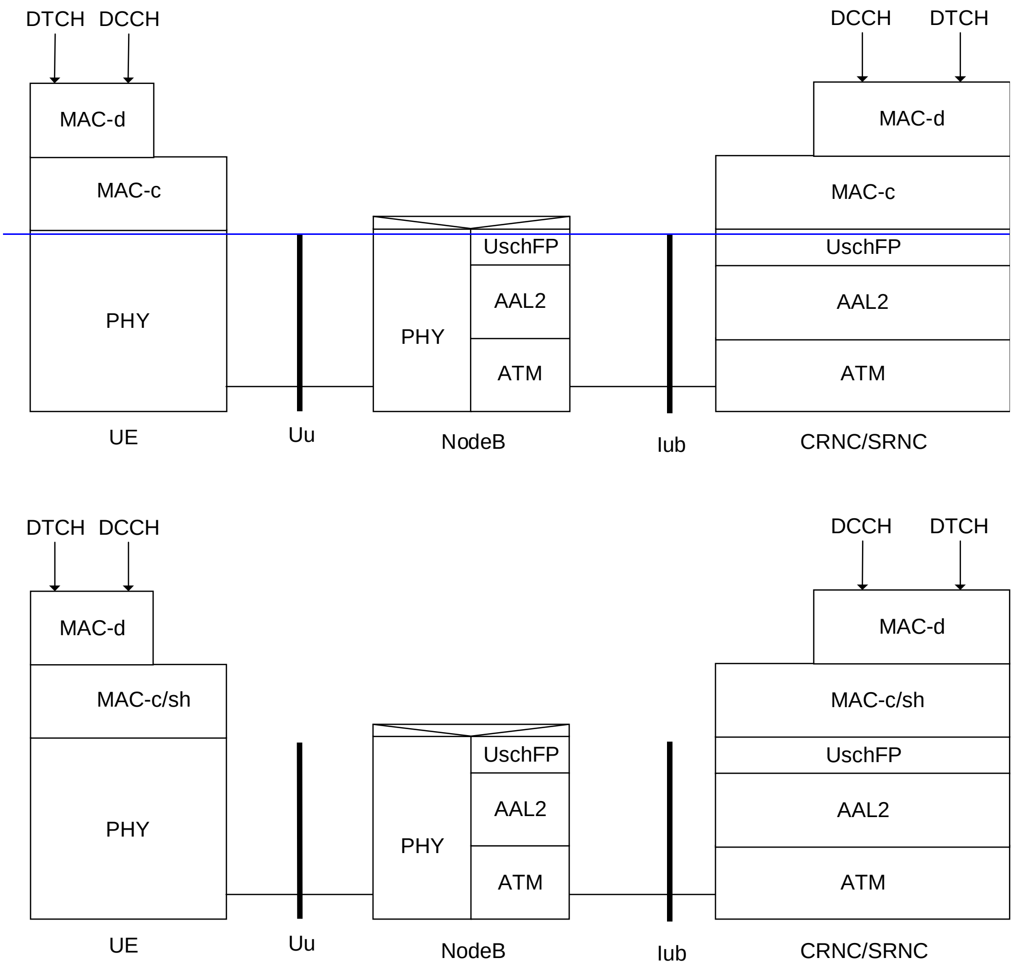


Figure 19: USCH Co-incident Controlling and Serving RNC

The Shared MAC (MAC-c/sh) entity in the RNC *receives* MAC-c/sh PDU *from* the peer MAC-c/sh entity in the UE using the services of the Interworking Function in the NodeB, and the USCH Frame Protocol (USCH FP) entity. The USCH FP entity *in the NodeB* adds header information to form a USCH FP ~~PDU which~~PDU that is transported to the *RNC* over an AAL2 (or AAL5) connection.

An Interworking Function (IWF) in the Node B interworks *the received USCH PHY entity into an USCH frame to be transmitted by the USCH FP entity over the Iub interface*. USCH scheduling is performed by MAC-c/sh in UE and by C-RRC in the CRNC.

Figure 20 shows the protocol model for the USCH transport channel with separate Controlling and Serving RNC. In this case, Iur USCH Frame Protocol is used to interwork the MAC-c/sh at the Controlling RNC with the MAC-d at the Serving RNC.

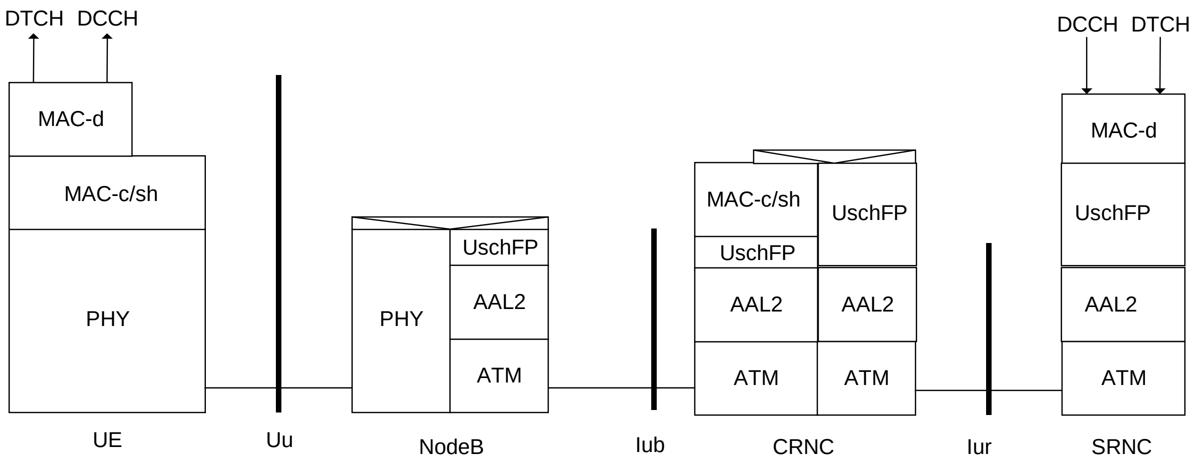


Figure 20: USCH: Separate Controlling and Serving RNC

3GPP TSG-RAN Working Group 3 meeting #11 ***Document*** ***R3-000880***
Sophia Antipolis, France, 28.02. – 03.03.2000

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.401	**CR**	**003r1**	Current Version:	3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submision to TSG: RAN#7 — for approval: **X** — for information: (blank)
list TSG meeting no. here ↑ *(only one box should be marked with an X)*

Form: 3G CR cover sheet, version 1.0 The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf

Proposed change affects: USIM [ ] ME [ ] UTRAN [X] Core Network [X]
(at least one should be marked with an X)

Source: TSG-RAN WG3 **Date:** 29h February 00

Subject: Extension with the CBS Topic

3G Work item:

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

F	Correction	
A	Corresponds to a correction in a 2G specification	
B	Addition of feature	X
C	Functional modification of feature	
D	Editorial modification	

Reason for change: The protocol model of the new specification of the CBC-RNC protocol should be included into the UTRAN overall description.

Clauses affected: § 3.2 / § 6.1.4 / § 7.1 / / § 7.2.5

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other 2G core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

3.2 Abbreviations

ALCAP	Access Link Control Application Part
BM-IWF	Broadcast Multicast Interworking Function
BMC	Broadcast/Multicast Control
BSS	Base Station Subsystem
SAB	Service Area Broadcast
CBC	Cell Broadcast Centre
CBS	Cell Broadcast Service
CN	Core Network
DCH	Dedicated Channel
DL	Downlink
DRNS	Drift RNS
FACH	Forward Access Channel
GTP	GPRS Tunnelling Protocol
MAC	Medium Access Control
NAS	Non Access Stratum
NBAP	Node B Application Protocol
PCH	Paging Channel
QoS	Quality of Service
RAB	Radio Access Bearer
RACH	Random Access Channel
RANAP	Radio Access Network Application Part
RNC	Radio Network Controller
RNS	Radio Network Subsystem
RNSAP	Radio Network Subsystem Application Part
RNTI	Radio Network Temporary Identity
SRNS	Serving RNS
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunication System
USIM	UMTS Subscriber Identity Module
UTRAN	UMTS Terrestrial Radio Access Network

6.1.4 Service Area Identifier

The Service Area Identifier (SAI) is used to uniquely identify an area consisting of one or more cells belonging to the same Location Area. Such an area is called a Service Area and can be used for indicating the location of a UE to the CN.
The Service Area Code (SAC) together with the PLMN-Id and the LAC will constitute the Service Area Identifier.

- **SAI = PLMN-Id + LAC + SAC**

The SAC is defined by the operator, and set in the RNC via O&M.

For Release 99 the BC-domain requires that Service Area consists of one cell. This does not limit the usage of Service Area for other domains.

7.1 List of functions

NOTE: This list of functions, their classification and definitions is an initial list, classification and definitions that will be further refined.

- Functions related to overall system access control
  - Admission Control

- Congestion Control
- System information broadcasting
- Radio channel ciphering and deciphering
- Functions related to mobility
  - Handover
  - SRNS Relocation
- Functions related to radio resource management and control
  - Radio resource configuration and operation
  - Radio environment survey
  - [FDD - Macro-diversity control]
  - Radio bearer connection set-up and release (Radio Bearer Control)
  - Allocation and deallocation of Radio Bearers
  - [TDD - Dynamic Channel Allocation (DCA)]
  - Radio protocols function
  - RF power control
  - RF power setting
  - [TDD – Timing Advance]
  - Radio channel coding
  - Radio channel decoding
  - Channel coding control
  - Initial (random) access detection and handling
  - CN Distribution function for Non Access Stratum messages
- Functions related to broadcast and multicast services[1] (broadcast/multicast interworking function BM-IWF)
  - Broadcast/Multicast Information Distribution
  - Broadcast/Multicast Flow Control
  - CBS Status Reporting

7.2.5 Functions related to broadcast and multicast services[1] (broadcast/multicast interworking function BM-IWF)

7.2.5.1 Broadcast/Multicast Information Distribution

The broadcast/multicast information distribution function distributes received CBS messages towards the BMC entities configured per cell for further processing.The distribution of broadcast/multicast information relate on the mapping between service area and cells controlled by the RNC. The provision of this mapping information is an O&M function.

---

[1] Only Broadcast is applicable for Release 99.

7.2.5.2 Broadcast/Multicast Flow Control

When processing units of the RNC becomes congested, the Broadcast/Multicast Flow Control function informs the data source about this congestion situation and takes means to resolve the congestion.

7.2.5.3 CBS Status Reporting

The RNC collects status data per cell (e.g. No-of-Broadcast-Completed-List, Radio-Resource-Loading-List), and matches these data to Service Areas. The status data is transmitted to the CBC, if a query has been made by the CBC.

R3-000962

3GPP TSG-RAN WG3 Meeting #11
Sophia-Antipolis, FR, 28 Feb-03 Mar, 2000

Document
e.g. for 3GPP use the format TP-99xxx or for SMG, use the format P-99-xxx

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25.401	**CR**	**006r2**	Current Version: 3.1.0

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

For submission to: TSG-RAN#7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑	for information		non-strategic		

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

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

Source: TSG-RAN WG3 **Date:** 28 Feb 2000

Subject: Changes for CPCH

Work item:

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

Reason for change: This CR adds changes to include specifications CPCH transport on the specified interfaces in the UTRAN architecture.

Clauses affected: 3.2, 11.2

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

Other comments:

3.2 Abbreviations

CN	Core Network
CPCH	Common Packet Channel
DCH	Dedicated Channel
DL	Downlink
DRNS	Drift RNS
FACH	Forward Access Channel
GTP	GPRS Tunnelling Protocol
MAC	Medium Access Control
NAS	Non Access Stratum
NBAP	Node B Application Protocol
PCH	Paging Channel
QoS	Quality of Service
RAB	Radio Access Bearer
RACH	Random Access Channel
RANAP	Radio Access Network Application Part
RNC	Radio Network Controller
RNS	Radio Network Subsystem
RNSAP	Radio Network Subsystem Application Part
RNTI	Radio Network Temporary Identity
SRNS	Serving RNS
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunication System
USIM	UMTS Subscriber Identity Module
UTRAN	UMTS Terrestrial Radio Access Network

11.2 Protocol Model (Informative)

The following section is a informative section which aim is to provide an overall picture of how the MAC layer is distributed over Uu, Iub and Iur for the RACH, CPCH[FDD], FACH and DCH.

11.2.1 RACH Transport Channel

Figure 11 shows the protocol stack model for the RACH transport channel when the Controlling and Serving RNC are co-incident.

For the RACH transport channel, Dedicated MAC (MAC-d) uses the services of Common MAC (MAC-c).

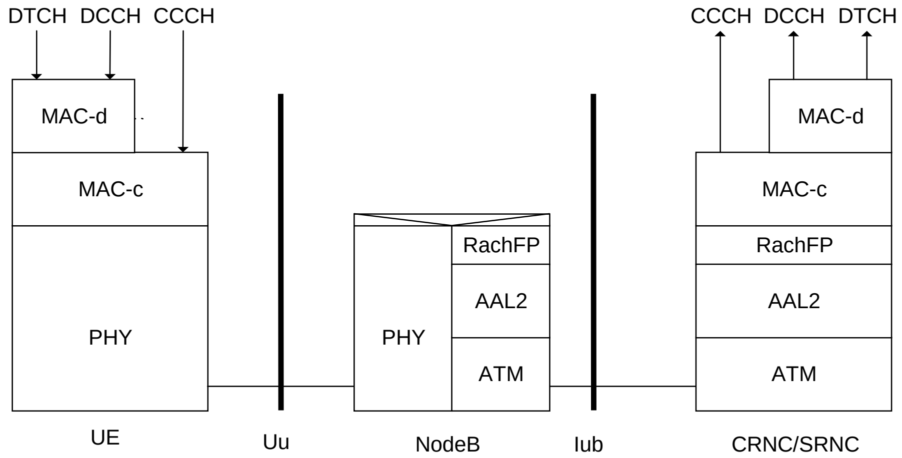

Figure 11: RACH: Coincident Controlling and Serving RNC

The Common MAC (MAC-c) entity in the UE transfers MAC-c PDU to the peer MAC-c entity in the RNC using the services of the Physical Layer.

An Interworking Function (IWF) in the NodeB interworks the RACH frame received by the PHY entity into the RACH Frame Protocol (RACH FP) entity.

The RACH Frame Protocol entity adds header information to form a RACH FP PDU which is transported to the RNC over an AAL2 (or AAL5) connection.

At the RNC, the RACH FP entity delivers the MAC-c PDU to the MAC-c entity.

Figure 12 shows the protocol model for the RACH transport channel with separate Controlling and Serving RNC. In this case, Iur RACH Frame Protocol (DchFP) is used to interwork the Common MAC (MAC-c) at the Controlling RNC with the Dedicated MAC (MAC-d) at the Serving RNC (The exact Iur FACH Frame Protocol is FFS)

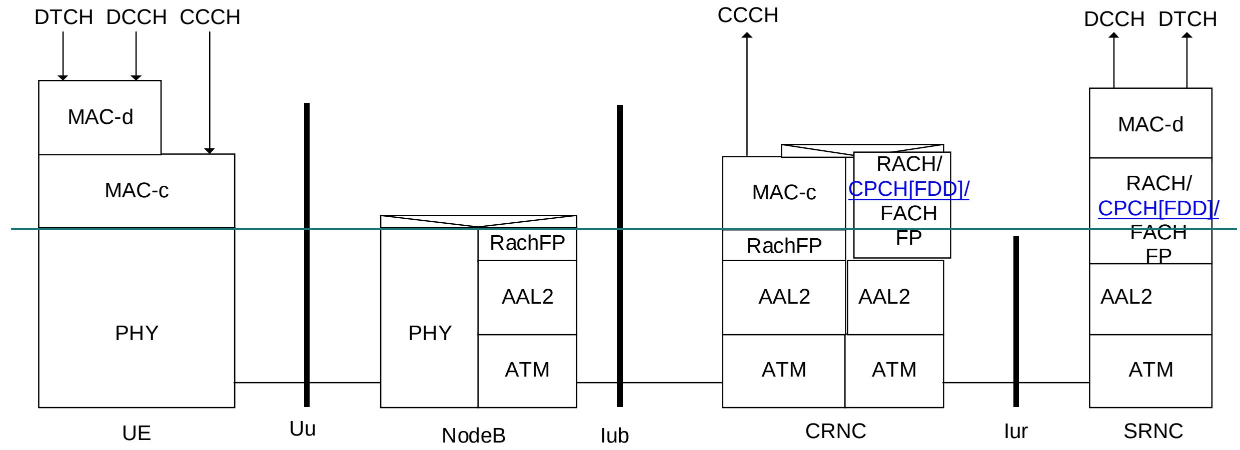

Figure 12: RACH: Separate Controlling and Serving RNC

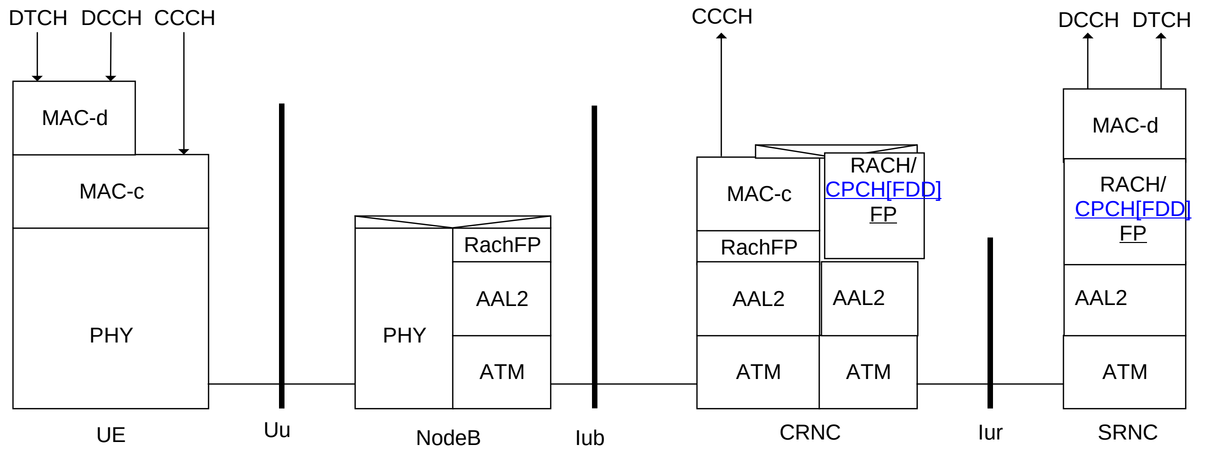

Figure 12: RACH: Separate Controlling and Serving RNC

11.2.2 CPCH [FDD] Transport Channel

Figure 13 shows the protocol model for the CPCH [FDD] transport channel when the controlling and serving RNC are co-incident.

For the CPCH [FDD] transport channel, Dedicated MAC (MAC-d) uses the services of Common MAC (MAC-c).

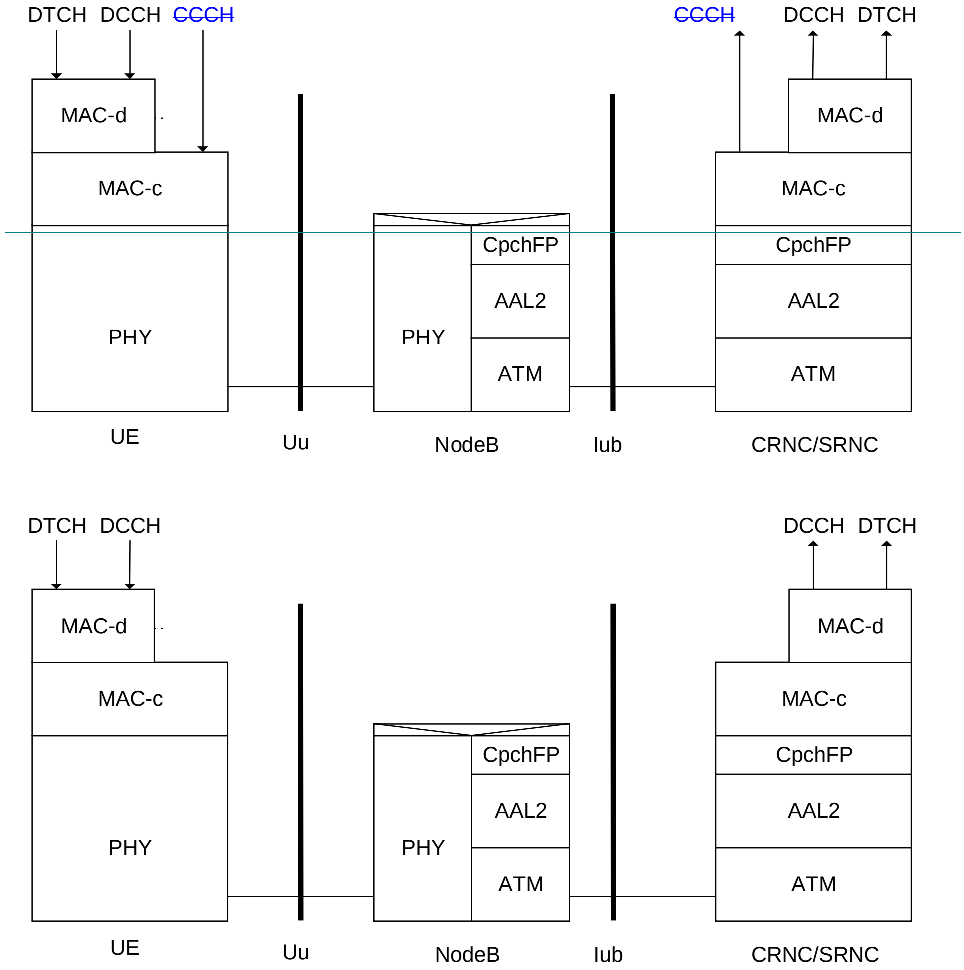

Figure 13: CPCH [FDD]: Coincident Controlling and Serving RNC

The Common MAC (MAC-c) entity in the UE transfers MAC-c PDU to the peer MAC-c entity in the RNC using the services of the Physical Layer.

An Interworking Function (IWF) in the NodeB interworks the CPCH[FDD] frame received by the PHY entity into the CPCH[FDD] Frame Protocol (CPCH FP) entity.

The CPCH[FDD] Frame Protocol entity adds header information to form a CPCH[FDD] FP PDU which is transported to the RNC over an AAL2 ~~(or AAL5)~~ connection.

At the RNC, the CPCH[FDD] FP entity delivers the MAC-c PDU to the MAC-c entity.

Figure 14 shows the protocol model for the CPCH[FDD] transport channel with separate Controlling and Serving RNC. In this case, Iur CPCH[FDD] Frame Protocol (CpchFP) is used to interwork the Common MAC (MAC-c) at the Controlling RNC with the Dedicated MAC (MAC-d) at the Serving RNC ~~(The exact Iur FACH Frame Protocol is FFS)~~

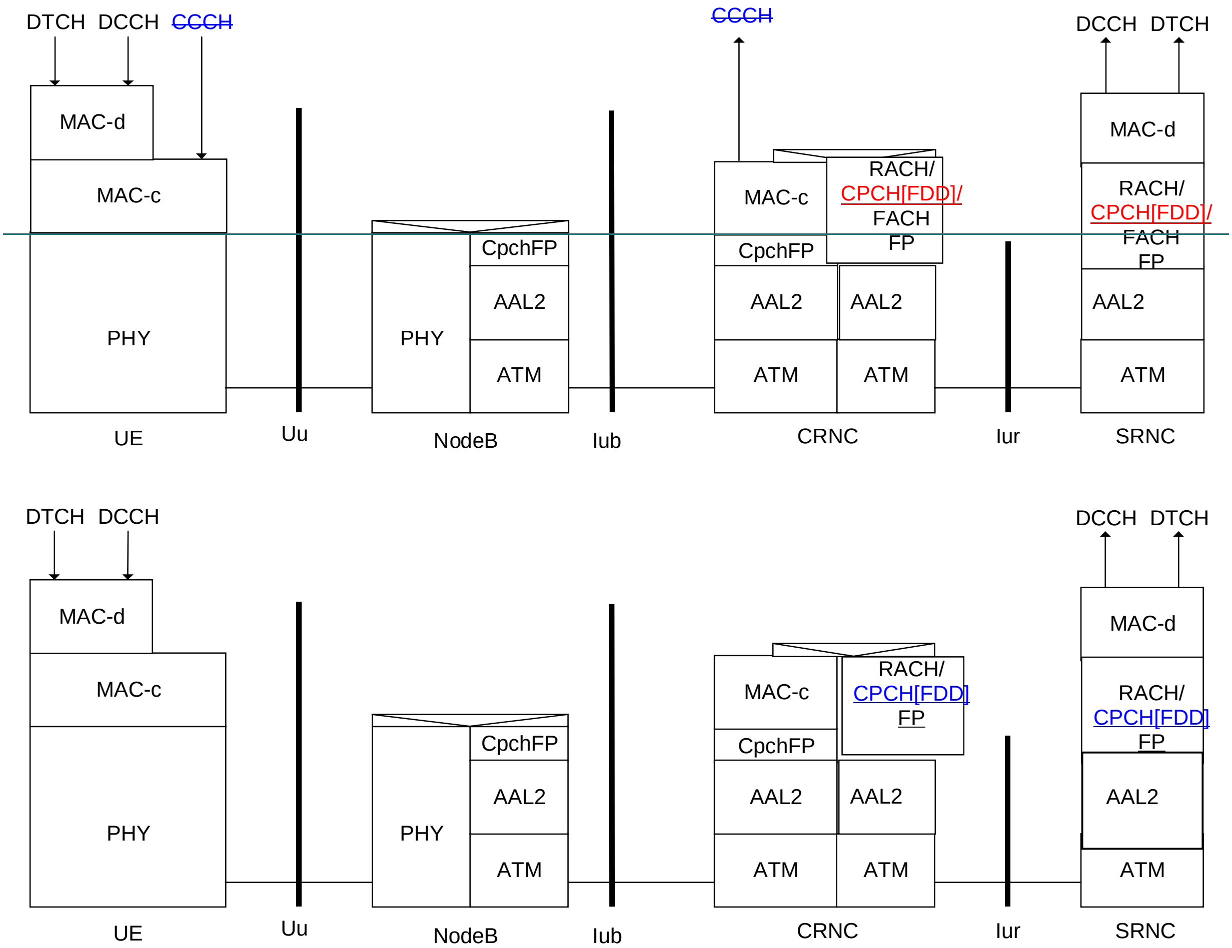

Figure 14: CPCH[FDD]: Separate Controlling and Serving RNC

11.2.23 FACH Transport Channel

Figure 13 shows the protocol model for the FACH transport channel when the Controlling and Serving RNC are co-incident.

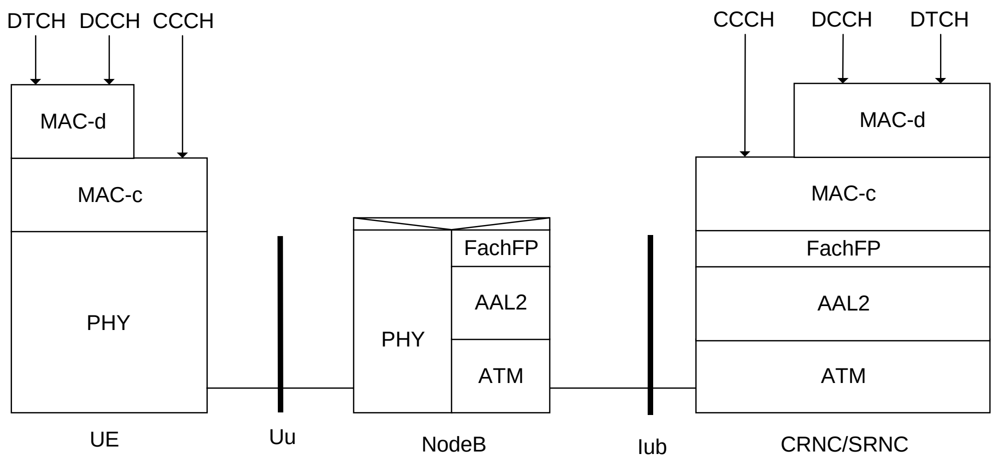

Figure 135: FACH Co-incident Controlling and Serving RNC

The Common MAC (MAC-c) entity in the RNC transfers MAC-c PDU to the peer MAC-c entity in the UE using the services of the FACH Frame Protocol (FACH FP) entity.

The FACH Frame Protocol entity adds header information to form a FACH FP PDU which is transported to the NodeB over an AAL2 (or AAL5) connection.

An Interworking Function (IWF) in the NodeB interworks the FACH frame received by FACH Frame Protocol (FACH FP) entity into the PHY entity.

FACH scheduling is performed by MAC-c in the CRNC.

Figure 14 shows the protocol model for the FACH transport channel with separate Controlling and Serving RNC. In this case, Iur FACH Frame Protocol is used to interwork the Common MAC (MAC-c) at the Controlling RNC with the Dedicated MAC (MAC-d) at the Serving RNC (The exact Iur RACH Frame Protocol is FFS)

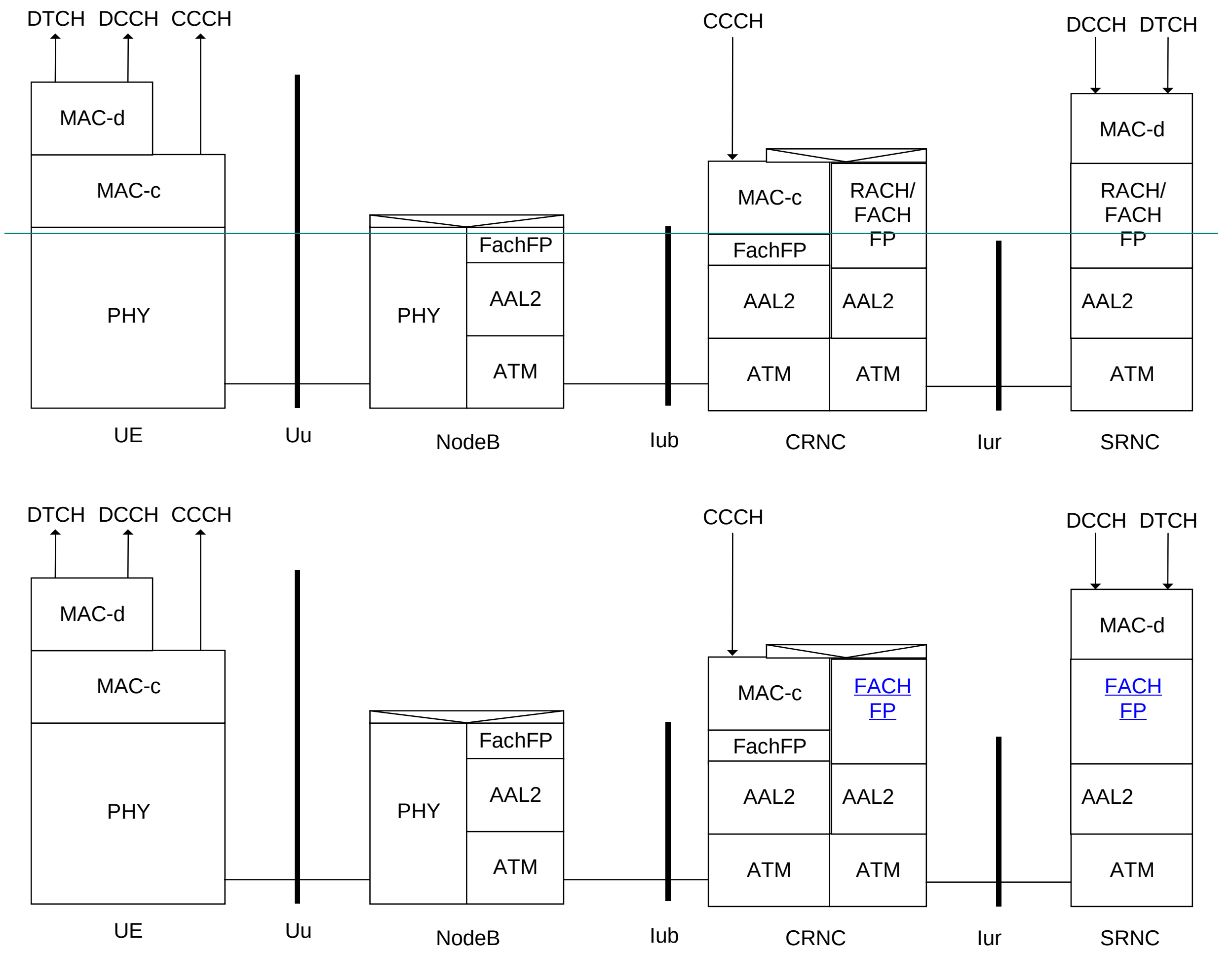

Figure 146: FACH: Separate Controlling and Serving RNC

11.2.34 DCH Transport Channel

Figure 15 shows the protocol model for the DCH transport channel when the Controlling and Serving RNC are co-incident.

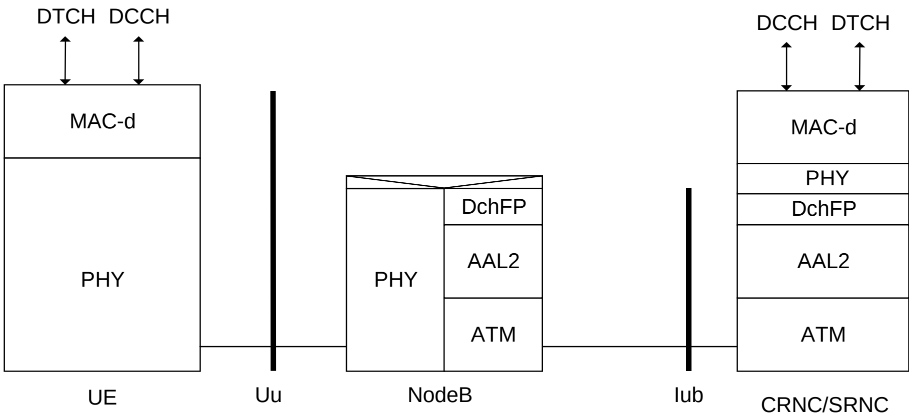

Figure 157: DCH: Co-incident Controlling and Serving RNC

The DCH transport channel introduces the concept of distributed PHY layer.

An Interworking Function (IWF) in the NodeB interworks between the DCH Frame Protocol (DCH FP) entity and the PHY entity.

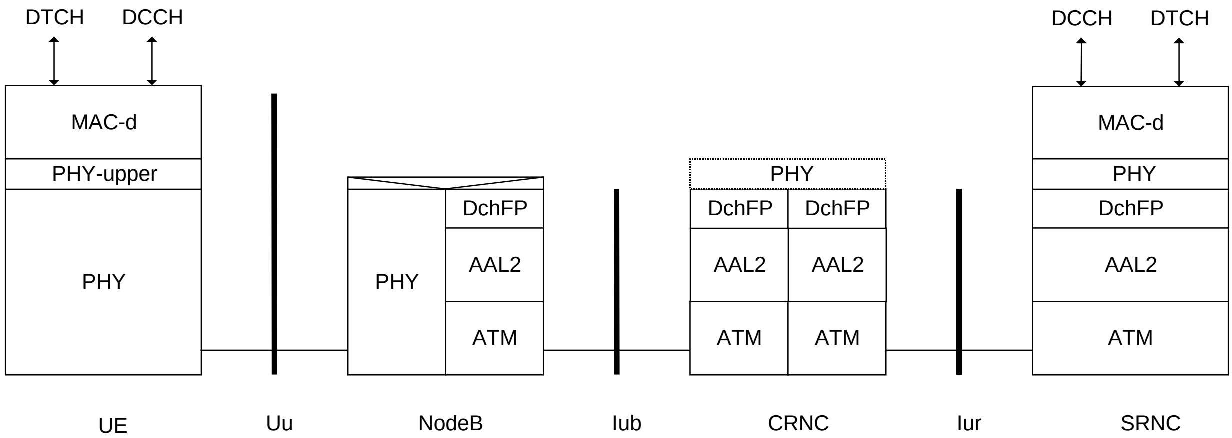

Figure 168: DCH: Separate Controlling and Serving RNC

Figure 16 shows the protocol model for the DCH transport channel with separate Controlling and Serving RNC. In this case, the Iub DCH FP is terminated in the CRNC and interworked with the Iur DCH FP through a PHY function. This function performs optional soft handover or can be a null function.

11.2.45 DSCH Transport Channel

Figure 17 shows the protocol model for the DSCH transport channel when the Controlling and Serving RNC are co-incident.

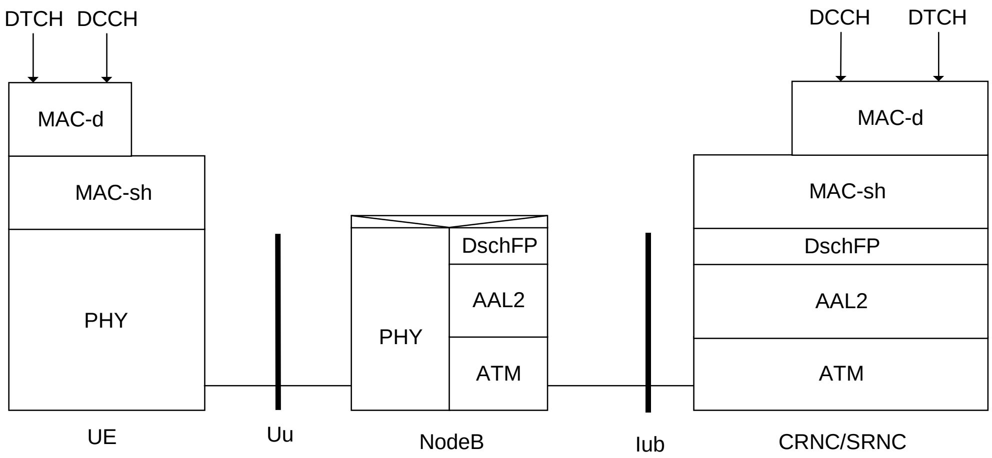

Figure 179: DSCH Co-incident Controlling and Serving RNC

The Shared MAC (MAC-sh) entity in the RNC transfers MAC-sh PDU to the peer MAC-sh entity in the UE using the services of the DSCH Frame Protocol (DSCH FP) entity. The DSCH FP entity adds header information to form a DSCH FP PDU which is transported to the Node B over an AAL2 (or AAL5) connection.

An Interworking Function (IWF) in the Node B interworks the DSCH frame received by DSCH FP entity into the PHY entity. DSCH scheduling is performed by MAC-sh in the CRNC.

Figure 18 shows the protocol model for the DSCH transport channel with separate Controlling and Serving RNC. In this case, Iur DSCH Frame Protocol is used to interwork the MAC-sh at the Controlling RNC with the MAC-d at the Serving RNC.

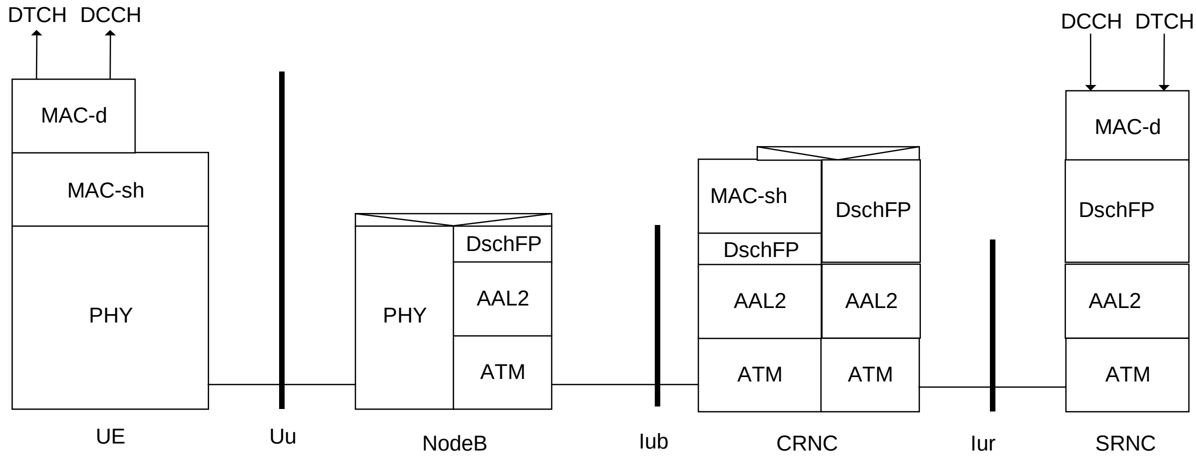

Figure 1820: DSCH: Separate Controlling and Serving RNC

11.2.56 USCH Transport Channel

Figure 19 shows the protocol model for the USCH transport channel when the Controlling and Serving RNC are co-incident.

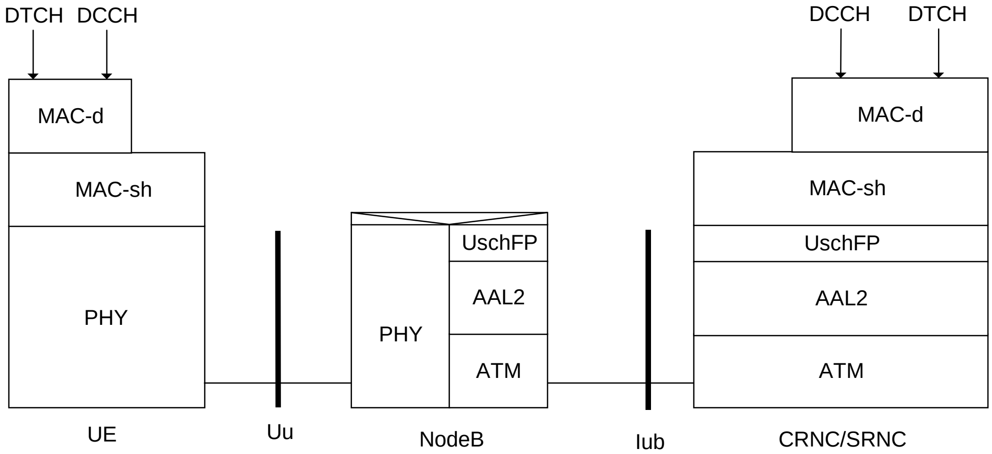

Figure 1921: USCH Co-incident Controlling and Serving RNC

The Shared MAC (MAC-sh) entity in the RNC *receives* MAC-sh PDU *from* the peer MAC-sh entity in the UE using the services of the Interworking Function in the NodeB, and the USCH Frame Protocol (USCH FP) entity. The USCH FP entity *in the NodeB* adds header information to form a USCH FP PDU which is transported to the *RNC* over an AAL2 (or AAL5) connection.

An Interworking Function (IWF) in the Node B interworks *the received USCH PHY entity into an USCH frame to be transmitted by the USCH FP entity over the Iub interface*. USCH scheduling is performed by MAC-sh in UE and by C-RRC in the CRNC.

Figure 20 shows the protocol model for the USCH transport channel with separate Controlling and Serving RNC. In this case, Iur USCH Frame Protocol is used to interwork the MAC-sh at the Controlling RNC with the MAC-d at the Serving RNC.

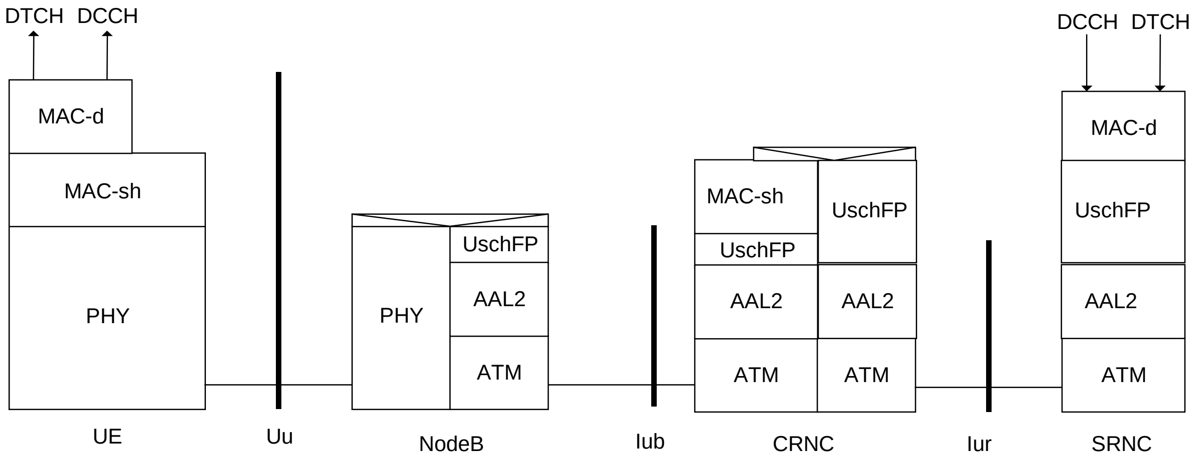

Figure 2022: USCH: Separate Controlling and Serving RNC