TSG-RAN Meeting #10
Bangkok, Thailand, 6 - 8 December 2000

TSGRP#10(00)0609

Title: **Agreed CRs to TS 25.410**

Source: **TSG-RAN WG3**

Agenda item: **5.3.3**

Tdoc_Num	Specification	CR_Num	Revision_Nu	CR_Subject	CR_Categor	WG_Status	Cur_Ver_Nu	New_Ver_Nu
R3-002564	25.410	005		Editorial Modifications for 25.410	D	agreed	3.2.0	3.3.0
R3-003250	25.410	007	1	Editorial corrections to 25.410	F	agreed	3.2.0	3.3.0
R3-003290	25.410	008	1	Removal of CN Information Broadcast procedure from Iu	F	agreed	3.2.0	3.3.0

3GPP/SMG Meeting #16
Windsor, England, 16-20 October 2000

Document R3-002564
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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

25.410	**CR**	**005**	Current Version:	3.2.0

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

For submission to:	TSG RAN#10	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	X

Source: R-WG3 **Date:** October 6, 2000

Subject: Editorial Modifications for 25.410

Work item:

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

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

Reason for change: There is a spelling mistake that is corrected.

Clauses affected: 4.4

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.

4.4 I_u Interface Capabilities

The following capabilities are derived from the requirements described in [2].

The I_u interface supports:

- procedures to establish, maintain and release Radio Access Bearers;
- procedures to perform intra-system handover, inter-system handover and SRNS relocation;
- procedures to support the Cell Broadcast service;
- a set of general procedures, not related to a specific UE;
- the separation of each UE on the protocol level for user specific signalling management;
- the transfer of NAS signalling messages between UE and CN;
- location services by transferring requests from the CN to UTRAN, and location information from UTRAN to CN. The location information may comprise a geographical area identifier or global co-ordinates with uncertainty parameters;
- simultaneous access to multiple CN domains for a single UE;
- mechanisms for resource reservation for packet data streams.

3GPP TSG-RAN WG3 Meeting #17
Chicago, USA, 20 – 24 November 2000

Tdoc R3-003250

CR-Form-v3

CHANGE REQUEST

⌘ **25.410** **CR** **007** ⌘ rev **R1** ⌘ Current version: **3.2.0** ⌘

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Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title:	⌘	Corrections to 25.410
Source:	⌘	R-WG3
Work item code:	⌘	***Date:*** ⌘ 2000-11-22
Category:	⌘	F ***Release:*** ⌘ R99

Use one of the following categories:
F *(essential 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:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	There is a need for some editorial modifications and clarifications and also removal of some subscription related information that should not be mentioned in this Iu related document.
Summary of change:	⌘	Editorial modifications and removal of subscription related information.
Consequences if not approved:	⌘	Some information not related to the Iu interface will be included in 25.410.

Clauses affected:	⌘	5.2.1, 5.2.3, 5.3.1, 5.6.1, 5.6.2.3, 5.8.1, 5.8.4, 6.4, 7.7
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ 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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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

5.2 RAB management Functions

5.2.1 RAB establishment, modification and release function

The RAB, Radio Access Bearer, is defined to be set-up between UE and CN. Depending on subscription, service, requested QoS etc. different types of RABs will be used. It is the CN that controls towards the UTRAN the establishment , modification or release of a RAB.

The RAB identity is allocated by CN by mapping the value for the NAS Binding information (from the actual protocol IE for the respective CN domain) to the RAB ID as specified in [15]. The RAB identity is globally significant on both the radio bearer and on the Iu bearer for a given UE in a particular CN domain.

RAB establishment, modification and release is a CN initiated function.

RAB establishment, modification and release is a UTRAN executed function.

RAB release request is a UTRAN initiated function, triggered when UTRAN e.g. fails to keep the RAB established with the UE.

5.2.2 RAB characteristics mapping to Uu bearers function

The RAB characteristics mapping function is used to map the radio access bearers to the Uu bearers. The mapping is performed during the establishment of the RAB. UTRAN shall perform the mapping between the bearers.

RAB mapping to Uu transmission bearers is a UTRAN function.

5.2.3 RAB characteristics mapping to Iu transport bearers

The RAB characteristics mapping function is used to map the radio access bearers to the Iu interface transport bearers. The mapping is performed during the establishment of the RAB.

UTRAN shall perform this mapping between the bearers if AAL2 is used, since it is the UTRAN that establishes the AAL2 connections.

In case of RAB towards the ~~IP~~ PS domain, UTRAN shall perform the mapping between the radio access bearers and the IP layer.

RAB characteristics mapping to Iu transport bearers is a UTRAN function.

5.2.4 RAB queuing, pre-emption and priority function

The allocation/retention priority level of a RAB is determined by the CN based on e.g. subscription information , QoS information etc. Accordingly, the CN shall request RAB establishment or modification with an indication of the priority level and the pre-emption capability of that RAB and the queuing vulnerability. Queuing and resource pre-emption shall be performed by UTRAN accordingly.

RAB queuing, pre-emption and allocation/retention priority handling is a UTRAN controlled function.

RAB queuing, pre-emption and allocation/retention priority setting is a CN function.

5.3 Radio Resource Management over Iu

5.3.1 Radio resource admission control

When UTRAN receives a request to establish or modify a radio access bearer from the CN, the current radio resource situation is analysed and the admission control either accepts or rejects the request. This is called "Radio resource

admission control" and is handled by the UTRAN. If the request is queued, it is handled by the RAB queuing, pre-emption and priority function.

~~This function is used at radio access bearer establishment and it is divided in two parts:~~

~~a) Subscription based admission control~~

~~When CN receives a request to establish or modify a radio access bearer, the CN verifies if the subscriber is allowed to use a radio access bearer with the requested parameters. Based on the verification the CN will accept or reject the request. This part is called "Subscription based admission control" and it is handled by the CN.~~

~~b) Radio resource admission control~~

~~When UTRAN receives a request to establish or modify a radio access bearer from the CN, the current radio resource situation is analysed and the admission control either accepts or rejects the request. This part is called "Radio resource admission control" and it handled by the UTRAN. If the request is queued, this part is handled by the RAB queuing, pre-emption and priority function.~~

~~Part b) is only performed if CN accept the request to establish a radio access bearer.~~

5.3.2 Broadcast information management

This function consists in the broadcast from network toward UE of some information in the coverage area of the whole network or different parts of the network.

There are three kinds of Broadcast information management. UTRAN broadcast information, CN broadcast information and Cell Broadcast information management. All UTRAN broadcast information management shall be handled locally within UTRAN. All CN related broadcast information and Cell Broadcast information is controlled by CN. UTRAN executes the broadcast of CN information and Cell Broadcast information.

5.4 I_u link Management functions

5.4.1 I_u Signalling Link Management function

The I_u signalling link management function provides a reliable transfer of the radio network signalling between UTRAN and CN. Both CN and UTRAN manage the function.

This function is in particular responsible for Iu signalling connection establishment, which can be established either by the CN or the RNC and for I_u signalling connection release, which is controlled by CN possibly upon UTRAN request.

5.4.2 ATM Virtual Connection Management function

This function refers to handling of ATM Virtual Connections (VCs) between CN and UTRAN.

This function shall be used to establish, maintain and release the ATM VCs. For permanent VCs, it is regarded to be an O&M function.

This function also includes the selection of a Virtual Circuit to be used for a particular RAB. The selection of ATM VC upon an Iu radio access bearer service request, shall be done by UTRAN. The selected VC shall fulfil the requirements of the request. The VC may consist of several sublinks: such as SCCP connections, AAL2 connections or IP flows.

5.4.3 AAL2 connection establish and release function

This function is used to establish and release the AAL type 2 connections between CN and UTRAN upon an Iu radio access bearer service request. Both UTRAN and CN are taking part in the establishment of AAL2 connection. UTRAN shall initiate both establishment and release of AAL2 connections. The use of AAL2 for Iu transmission bearers depends on type of CN.

5.4.4 AAL5 management function

AAL5 connections between CN and UTRAN shall be pre-configured at system initialisation. Basic configuration is PVCs. For user data, SVC is possible.

The AAL5 management is a function handled by both the CN and the UTRAN.

5.4.5 GTP-U tunnels management function

This function is used to establish and release GTP-U tunnels between CN and UTRAN upon a radio access bearer service request. This involves assigning a tunnel identifier for each direction and the creation of a context containing the tunnel information. The tunnel identifier for the downlink is allocated by the UTRAN, and the tunnel identifier for the uplink is allocated by the CN. Both CN and UTRAN should maintain the context. The use of GTP-U for I_u transport bearers depends on type of CN.

5.4.6 TCP Management Function

This function is used to establish and release the TCP connections between CN and UTRAN over I_u-BC.

The TCP management function exists in both UTRAN and CN.

5.4.7 Buffer Management

Congestion control shall be performed over the Iu user plane using buffer management and no flow control.

This function includes buffers to store received packet data units that at reception can not be processed due to e.g. congestion. In UTRAN, there must be a buffer management function handling received packets from the peer CN node.

The used mechanism is not in the scope of this document and not relevant to be standardised.

Buffer management is a UTRAN function.

5.5 I_u U-plane (RNL)Management Functions

5.5.1 I_u U-plane frame protocol mode selection function

The I_u UP in the Radio Network Layer provides modes of operation that can be activated on RAB basis. For a given RAB, the I_u UP operates either in a Transparent or in Support mode. I_u U-plane frame protocol mode is selected by the CN.

This function is a CN function.

5.5.2 I_u U-plane frame protocol initialisation

I_u U-plane frame protocol is initialised by the UTRAN.

5.6 Mobility Management Functions

5.6.1 Location information update function

Some functionality within the CN, needs information about the present location of an active UE, i.e. a UE with established signalling connection. The Location information update function is used to transfer this information from the UTRAN to the CN. It is the UTRAN responsibility to send this information initially at the signalling connection establishment for a~~n~~ UE and at any change of the UE location as long as the signalling connection exists. For this function, the location information shall be at Location and Routing Area level.

5.6.2 Handover and Relocation functions

5.6.2.1 Inter RNC hard HO function, Iur not used or not available

This functionality includes procedures for handover from one RNC to other RNC when Iur interface is not used or is not available, i.e. soft handover is not possible. The connection is switched in the CN, so both UTRAN and CN are involved. Both intra and inter CN entity cases are applicable.

5.6.2.2 Serving RNS Relocation function

This functionality allows moving the Serving RNS functionality from one RNC to an other RNC, e.g. closer to where the UE has moved during the communication. The Serving RNS Relocation procedure may be applied when active cell management functionality has created a suitable situation for it. Both UTRAN and CN are involved.

5.6.2.3 Inter system Handover (e.g. GSM-UMTS) function

Inter system handover is performed when a mobile hands over between cells belonging to different systems such as GSM and UMTS. This may imply also a change of radio access type. For intersystem handover between UMTS and GSM, the GSM procedures are used within the GSM network. Both UTRAN and CN are involved.

NOTE: The GSM BSSMAP procedures are outside the scope of this specification.

5.6.3 Paging Triggering

The Core Network shall, when considered necessary, trigger the Location/Routing/RNC Area paging in the UTRAN system.

5.7 Security Functions

5.7.1 Data Confidentiality

5.7.1.1 Radio interface ciphering function

The radio interface shall be ciphered upon request of the Core Network. Both Signalling and user data may be subject to ciphering. The ciphering shall be done within UTRAN.

5.7.1.2 Ciphering key management function

The ciphering key and the permitted algorithm shall be supplied by the CN. UTRAN selects the used algorithm.

5.7.2 Data integrity

5.7.2.1 Integrity checking

The purpose of the integrity check is to make sure that the signalling continues between the same elements as by authentication. The integrity check shall be done within the UTRAN.

5.7.2.2 Integrity key management

The integrity key and the permitted algorithm shall be supplied by the CN. UTRAN selects the used algorithm.

5.8 Service and Network Access Functions

5.8.1 Core Network signalling data transfer function

The NAS CN signalling data such as Call Control (CC), Session Management (SM), Mobility Management (MM), Short Message Services Point to Point and Supplementary Services (SS) shall be transparently conveyed ~~over the I_u interface. The signalling information shall be conveyed transparently over~~between the CN and the UE. Over the Iu interface, the same Iu interface channel that is used for the UTRAN-CN signalling shall be used.

5.8.2 Data Volume Reporting

The data volume reporting function is used to report the volume of unacknowledged data to the CN. The function shall be in the UTRAN and is triggered from the CN.

5.8.3 UE Tracing

This feature allows tracing of various events related to the UE and its activities. This is an O&M functionality.

5.8.4 Location reporting function

The positioning function performs the determination of the geographical position for an UE. The location reporting function transfers the positioning information between the UTRAN and the CN according to CN commands. This function involves UTRAN and CN.

5.9 Co-ordination Functions

5.9.1 Paging Co-ordination function

The two CN domain architecture implies need for a page co-ordination, i.e. handling of page triggered by one CN node when UE has a signalling connection to the other CN node. The paging co-ordination is performed by UTRAN and/or optionally by CN. The Common ID is used for UTRAN paging co-ordination. The CN provides the UTRAN with the Common ID.

The paging co-ordination is a UTRAN function. Optionally the paging co-ordination may be performed in the CN.

6 I_u Interface Protocol Structure

6.1 General

The Radio Network signalling over Iu consists of the Radio Access Network Application Part (RANAP). The RANAP protocol consists of mechanisms to handle all procedures between the CN and UTRAN. It is also capable of conveying messages transparently between the CN and the UE without interpretation or processing by the UTRAN.

Over the I_u interface the RANAP protocol is, e.g. used for:

- Facilitate a set of general UTRAN procedures from the Core Network such as paging -notification as defined by the notification SAP in [3].
- Separate each User Equipment (UE) on the protocol level for mobile specific signalling management as defined by the dedicated SAP in [3].
- Transfer of transparent non-access signalling as defined in the dedicated SAP in [3].
- Request of various types of UTRAN Radio Access Bearers through the dedicated SAP in [3].

- Perform the SRNS Relocation function.

The Radio Access Bearers are provided by the Access Stratum.

Over Iu-BC, a datagram mechanism is used, so there is no clear separation of control and user planes, and the SABP protocol is used for data transfer and signalling.

6.2 Iu-CS

Figure 6.1 shows the protocol structure for I_u-CS, following the structure described in [1].

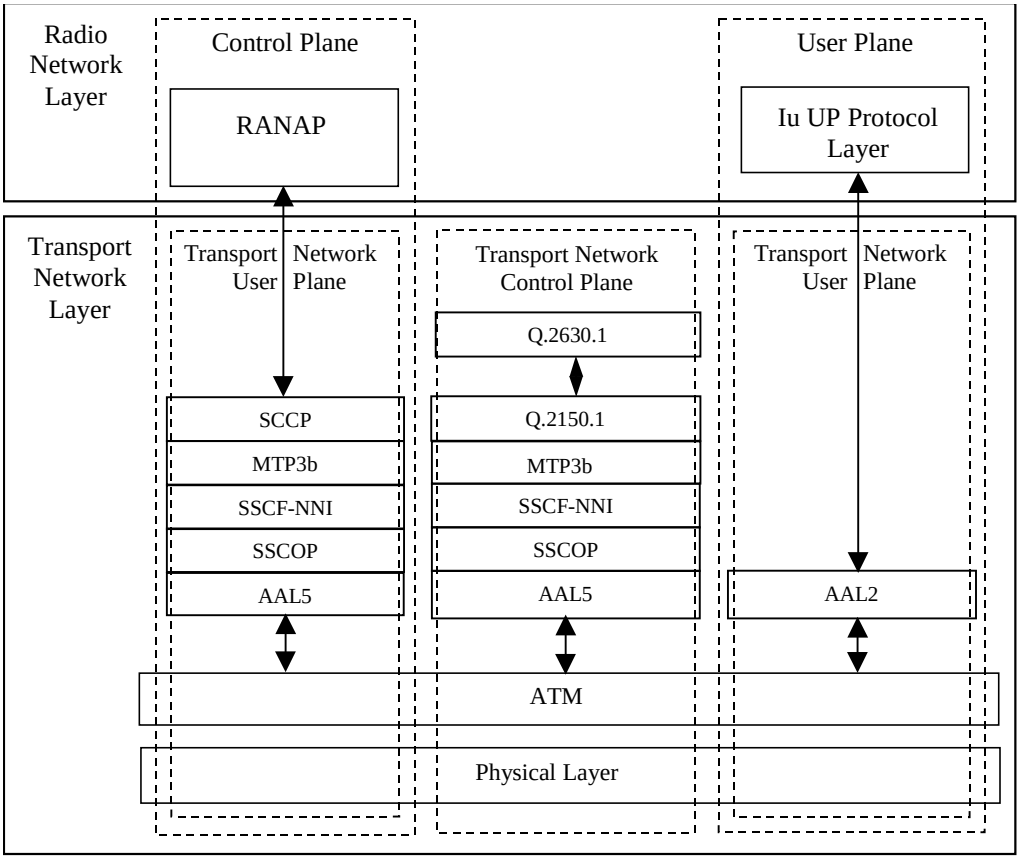

Figure 6.1: I_u –Interface Protocol Structure towards CS Domain

6.3 I_u-BC

Figure 6.2 shows the protocol structure for the I_u-BC.

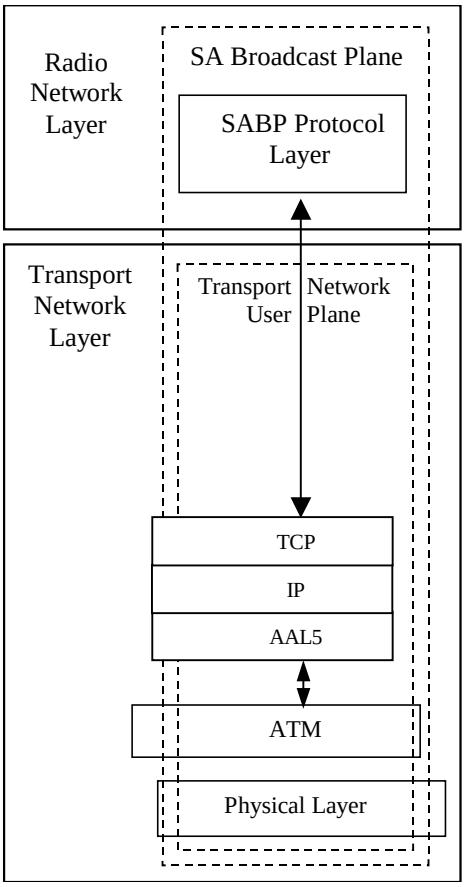

Figure 6.2: I_u Interface Protocol Structure towards Broadcast Domain

6.4 I_u-PS

Figure 6.3 shows the protocol structure for Iu-PS, following the structure described in [1].

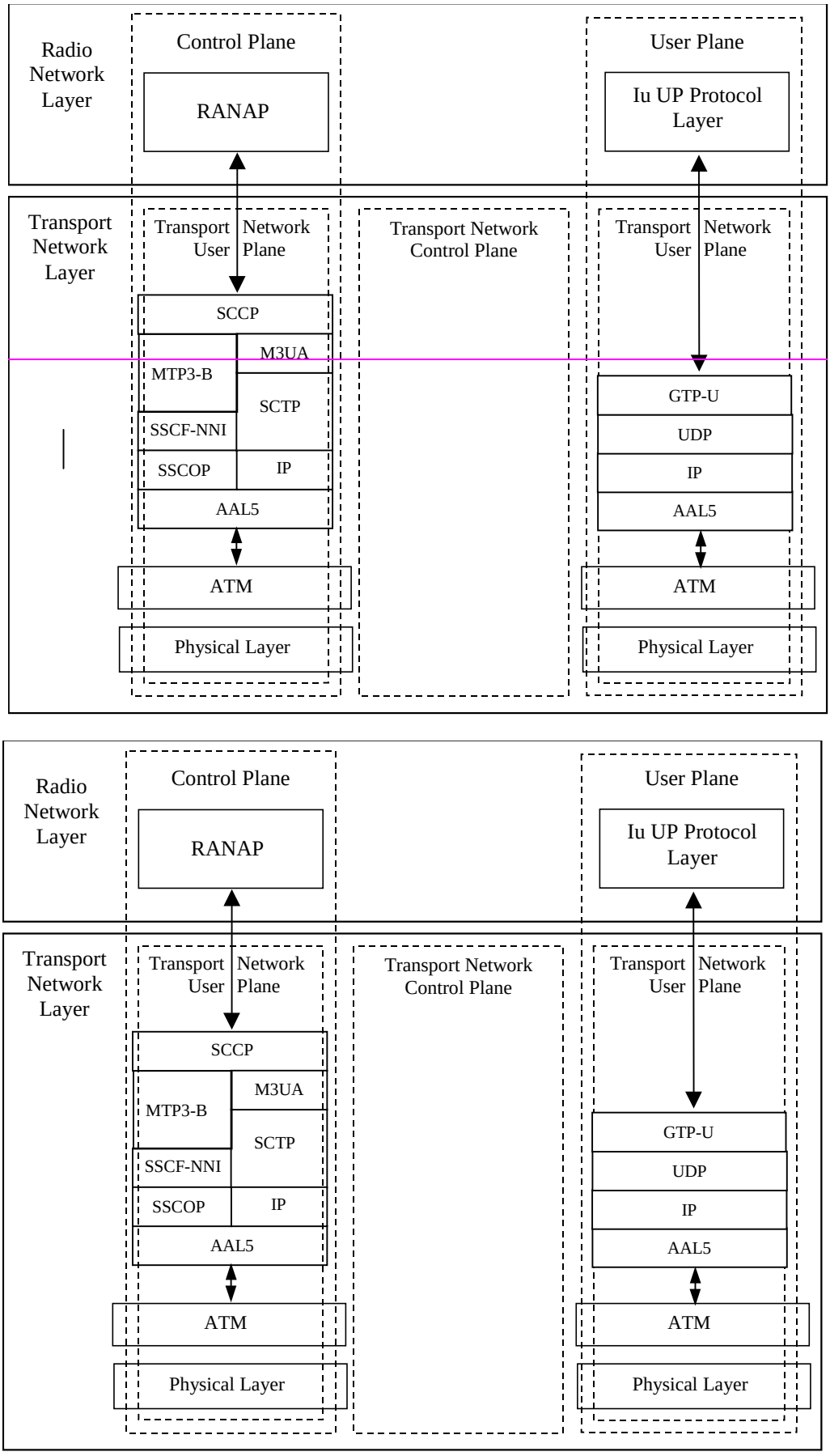

Figure 6.3: I_u Interface Protocol Structure towards PS Domain

7 Other I_u Interface Specifications

7.1 UTRAN I_u Interface: Layer 1 (UMTS 25.411)

UMTS 25.411 [4] specifies the range of physical layer technologies that may be used to support the Iu interface.

7.2 UTRAN I_u Interface: Signalling Transport (UMTS 25.412)

UMTS 25.412 [5] specifies the signalling bearers for the RANAP and transport network control plane protocols for both Iu-PS and Iu-CS.

7.3 UTRAN I_u Interface: RANAP Specification (UMTS 25.413)

UMTS 25.413 [6] specifies the RANAP protocol for radio network control plane signalling over the Iu interface.

7.4 UTRAN I_u Interface: Data Transport and Transport Signalling (UMTS 25.414)

UMTS 25.414 [7] specifies the transport bearers for the user plane of the Iu interface. It also specifies the protocol used to control these transport bearers.

7.5 UTRAN I_u Interface: CN-UTRAN User Plane Protocol (UMTS 25.415)

UMTS 25.415 [8] specifies the user plane frame handling protocol for the Iu interface.

7.6 UTRAN I_u Interface: Service Area Broadcast Protocol SABP (UMTS 25.419)

UMTS 25.419 [14] specifies the communication requirements over the Iu interface towards the BC domain.

7.7 Summary

The present document, UMTS 25.410, specifies the general aspects and principles of the I_u interface as a whole.

The relationship between the other technical specifications that define the UTRAN Iu interface is shown in figure 7.1.

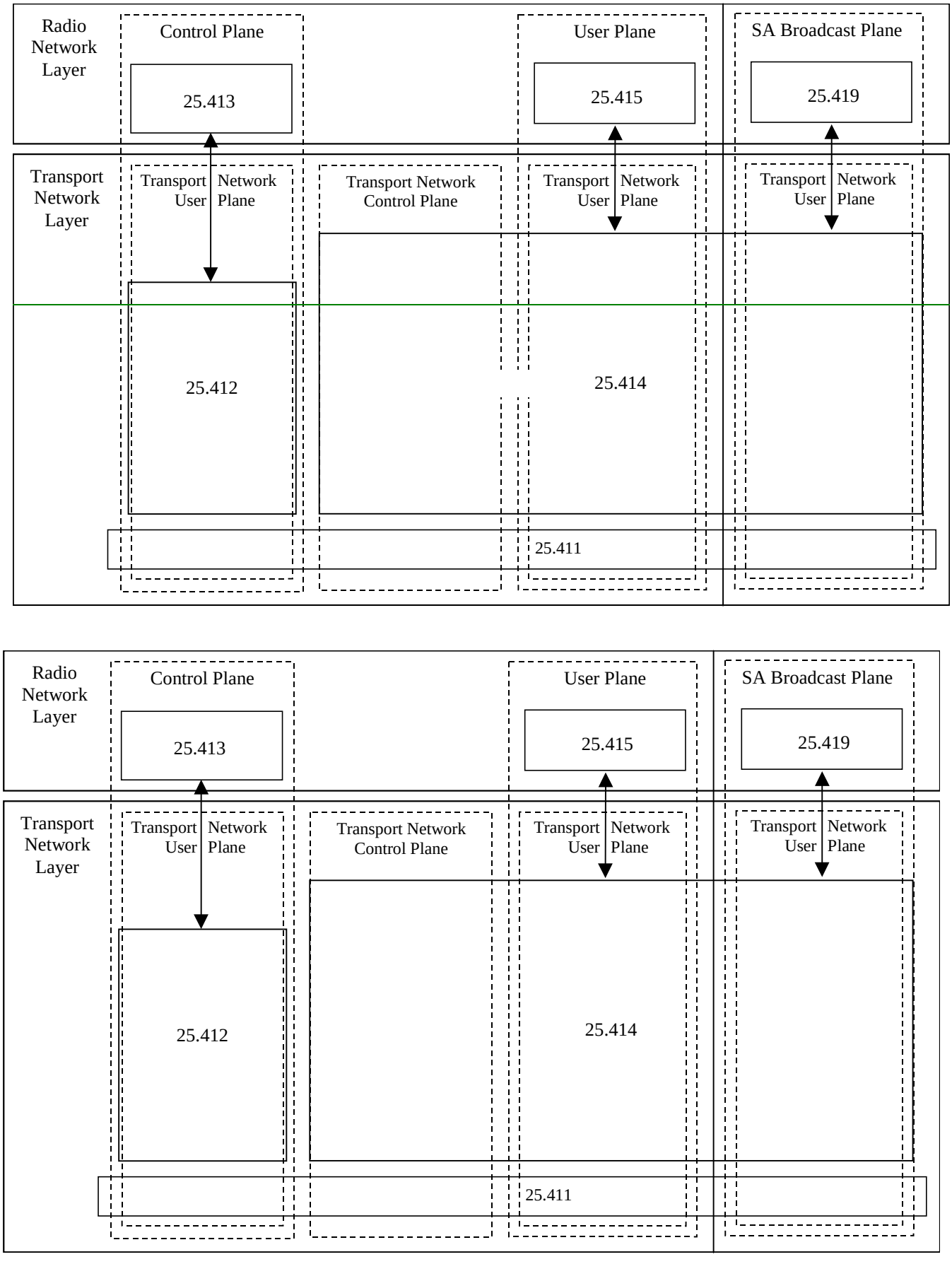

Figure 7.1: Summary of Iu Interface Specification Structure

3GPP TSG-RAN3 Meeting #17
Chicago, USA, 20-24 November 2000

Tdoc R3-003290

CR-Form-v3

CHANGE REQUEST

⌘ **25.410** **CR** **08** ⌘ rev **1** ⌘ Current version: **3.2.0** ⌘

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Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network **X** Core Network **X**

Title:	⌘	Removal of CN Information Broadcast procedure from Iu interface
Source:	⌘	R-WG3
Work item code:	⌘	***Date:*** ⌘ 23 November 2000
Category:	⌘ **F**	***Release:*** ⌘ R99

Use one of the following categories:
F *(essential 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:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	In communication with R2 and N1 it has become evident that CN Information Broadcast procedure is not needed in RANAP. In R3#16 it was agreed to remove this procedure from RANAP protocol and UTRAN Iu interface (TS 25.410) specification. The CR (R3-003135) to remove the procedure from RANAP has been already approved in Iu SWG in RAN3#17.
Summary of change:	⌘	All the references to CN Information Broadcast procedure was removed.
Consequences if not approved:	⌘	The text in TS 25.410 will be incorrect.

Clauses affected:	⌘	5.3.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ 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.

5.3 Radio Resource Management over Iu

5.3.1 Radio resource admission control

This function is used at radio access bearer establishment and it is divided in two parts:

a) Subscription based admission control

When CN receives a request to establish or modify a radio access bearer, the CN verifies if the subscriber is allowed to use a radio access bearer with the requested parameters. Based on the verification the CN will accept or reject the request. This part is called "Subscription based admission control" and it is handled by the CN.

b) Radio resource admission control

When UTRAN receives a request to establish or modify a radio access bearer from the CN, the current radio resource situation is analysed and the admission control either accepts or rejects the request. This part is called "Radio resource admission control" and it handled by the UTRAN. If the request is queued, this part is handled by the RAB queuing, pre-emption and priority function.

Part b) is only performed if CN accept the request to establish a radio access bearer.

5.3.2 Broadcast information management

This function consists in the broadcast from network toward UE of some information in the coverage area of the whole network or different parts of the network.

There are ~~three~~two kinds of Broadcast information management. UTRAN broadcast information~~, CN broadcast information~~ and Cell Broadcast information management. All UTRAN broadcast information management shall be handled locally within UTRAN. All ~~CN related broadcast information and~~ Cell Broadcast information is controlled by CN and executed by ~~.~~ UTRAN ~~executes the broadcast of CN information and Cell Broadcast information~~.

5.4 I_u link Management functions