TSG-RAN meeting #17 **RP-020531**
Biarritz, France, 3-6 September 2002

3GPP TSG RAN WG3 Meeting #31 **R3-022152**
Arlanda, Sweden, 19th-23rd August 2002

Title: Response to "Liaison Statement on Iur-g"
Source: TSG-RAN WG3
To: TSG-GERAN WG2
Cc: TSG RAN
Response to:

Contact Person:
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E-mail Address: woonhee.hwang@nokia.com

Attachments: R3-022038, R3-022147, R3-022079, R3-022148, R3-022081, R3-022082

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1. Overall Description:

TSG-RAN WG3 thank for the LS (R3-021705_GP-020685) on Iur-g and CRs(GP-020652, GP-020669). TSG-RAN WG3 has reviewed the CRs by email and by offline discussion during RAN3 #31 meeting.

2. Discussion

The CRs have been investigated and revised based on the comments. During the discussion on these CRs, it was pointed out the scope of the specifications don't reflect the inclusion of Iur-g. The same comment is applicable to TS25.421 and TS25.422. To solve this issue, there was a proposal to include the reference table in GERAN specification to point out all the UTRAN specifications related to Iur-g. This would mean that an update to the scope of the UTRAN specifications would not be necessary. However, there was also a second proposal that the scope of these specifications should be updated to incorporate the Iur-g interface.
These 2 solutions are outlined below. TSG-RAN WG3 also prepared 2 sets of CRs for each case.

1. TSG-GERAN includes the reference table in TR43.930 and raises it to Iur-g stage 2 TS.

Spec. No	Spec. Name
TS 25.401	UTRAN Overall Description
TS 25.420	UTRAN Iur Interface: General Aspects and Principles
TS 25.421	UTRAN Iur interface Layer 1
TS 25.422	UTRAN Iur Interface Signalling Transport
TS 25.423	UTRAN Iur Interface RNSAP Signalling

If this proposal is accepted by TSG-GERAN, R3-022038 (CR056) on TS25.401 and R3-022147 (CR028) on TS25.420 should be approved by TSG-RAN.

2. TSG-GERAN doesn't include reference table and TSG-RAN WG3 changes the scope of TS25.401, TS25.420, TS25.421, TS25.422. In this case, R3-022079 (CR060) on TS25.401, R3-022148 (CR029) on TS25.420, R3-022081 (CR002) on TS25.421, R3-022082 (CR014) on TS25.422 should be approved by TSG-RAN.

During the discussion on Iur-g, there was also a concern that UE behaviour hasn't been described in UTRAN specification. Since this is not TSG-RAN WG3 area, TSG-RAN WG3 kindly asks TSG-GERAN to discuss the issue and to take a proper action.

3. Actions:

To TSG GERAN WG2 group.

ACTION: TSG-GERAN kindly considers the 2 solutions above, decides one and informs to TSG-RAN on the decision so that TSG-RAN can approve the correct set of CRs.

4. Date of Next RAN3 Meetings:

RAN_17	03 – 06 September 2002	Biarritz, France
RAN3_32	23 – 27 September 2002	Xian, China
RAN3_33	11 – 15 November 2002	Sophia Antipolis

3GPP TSG-RAN WG3 Meeting #31
Arlanda, Sweden, 19th-23rd August 2002

Tdoc R3-022038

CR-Form-v7

CHANGE REQUEST

⌘ **25.401** **CR** **056** ⌘ **rev** **1** ⌘ Current version: **5.3.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Introduction of Iur-g
Source:	⌘	Nokia
Work item code:	⌘	TEI
Date:	⌘	08/2002
Category:	⌘	**F**
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:

2	*(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)*

Reason for change:	⌘	Iur-g has been defined between Iu mode BSS and RNC/Iu mode BSS and is described in the RNSAP specification. To explain Iur-g further, some explanation was added.
Summary of change:	⌘	- Iur-g related explanations were added
Consequences if not approved:	⌘	If this CR is not approved, this specification will not be up-to-date to describe the Iur-g and will be lack of information. Impact Analysis: Impact assessment towards the previous version of the specification (same release): This CR does not impact on the previous version of the specification (same release) because this introduces new function.
Clauses affected:	⌘	2, 3.1, 3.2, 6, 6.1.3, 6.1.5, 6.1.7, 6.1.7.1, 7.2.3.2, 7.2.3.3, 8.2

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			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.

1 Scope

The present document describes the overall architecture of the UTRAN, including internal interfaces and assumptions on the radio and Iu interfaces.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] 3GPP TR 25.990: "Vocabulary".

[2] 3GPP TS 23.110: "UMTS Access Stratum Services and Functions".

[3] 3GPP TS 25.211: "Physical channels and mapping of transport channels onto physical channels (FDD)".

[4] 3GPP TS 25.442: "UTRAN Implementation Specific O&M Transport".

[5] 3GPP TS 25.402: "Synchronisation in UTRAN, Stage 2".

[6] 3GPP TS 23.003: "Numbering, Addressing and Identification".

[7] 3GPP TS 25.331: "RRC Protocol Specification".

[8] 3GPP TS 23.101: "General UMTS Architecture".

[9] 3GPP TS 25.414: " UTRAN Iu Interface Data Transport & Transport Signalling".

[10] 3GPP TS 25.424: "UTRAN Iur Interface Data Transport & Transport Signalling for Common Transport Channel Data Streams".

[11] 3GPP TS 25.434: "UTRAN Iub Interface Data Transport & Transport Signalling for Common Transport Channel Data Streams".

[12] IETF RFC 2460: "Internet Protocol, Version 6 (Ipv6) Specification".

[13] IETF RFC 2474: "Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers " December 1998

[14] IETF RFC 768: "User Datagram Protocol", (8/1980)

[15] "Information technology – Open Systems Interconnection – Network service definition", X.213, ISO/IEC 8348.

[16] "Information technology – Open Systems Interconnection – Network service definition Amendment 1: Addition of the Internet protocol address format identifier", X.213/Amd.1, ISO/IEC 8348.

[17] IETF RFC 791 (1981): "Internet Protocol".

[18] 3GPP TS 25.426: "UTRAN Iur and Iub Interface Data Transport & Transport Signalling for DCH Data Streams".

[19] TBD.

[20] 3GPP TS 23.236: "Intra-domain connection of Radio Access Network (RAN) nodes to multiple Core Network (CN) nodes".

[21] 3GPP TR 43.930: "Iur-g interface; Stage 2".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

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

Cell: Radio Network object that can be uniquely identified by a User Equipment from a (cell) identification that is broadcasted over a geographical area from one *UTRAN Access Point*
A Cell is either FDD or TDD mode.

Iu: interface between an RNC and an MSC, SGSN or CBC, providing an 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: logical interface between two RNCs
Whilst logically representing a point to point link between RNCs, the physical realisation need not be a point to point link.

Iur-g: logical interface between RNC/BSS and BSS
Whilst logically representing a point to point link between RNC/BSS and BSS, the physical realisation need not be a point to point link.

Logical Model: 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: logical node in the RNS responsible for radio transmission / reception in one or more cells to/from the UE
The logical node terminates the Iub interface towards the RNC.

Radio Resources: resources that constitute the radio interface in UTRAN, e.g. frequencies, scrambling codes, spreading factors, power for common and dedicated channels

Node B Application Part: Radio Network Signalling over the Iub

Radio Network Controller: logical node in the RNS in charge of controlling the use and the integrity of the radio resources

Controlling RNC: 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: RNS can be either a full UTRAN or only a part of a UTRAN
An RNS offers the allocation and 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: 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: 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: 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.

Standalone A-GPS SMLC: logical node that interconnects to the RNC over the Iupc interface via the PCAP protocol
This node provides GPS related data to the RNC and may perform the position calculation function.

User Equipment: Mobile Equipment with one or several UMTS Subscriber Identity Module(s)
A device allowing a user access to network services via the Uu interface. The UE is defined in ref. [8]. If this term is used in the context of Iur-g, it means MS in case it uses radio resources of a DBSS.

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

Radio Link Set: set of one or more Radio Links that has a common generation of Transmit Power Control (TPC) commands in the DL

Uu: Radio interface between UTRAN and the User Equipment

RAB sub-flows: Radio Access Bearer can be realised by UTRAN through 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 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 transport bearer.
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 responsibility.

Set of co-ordinated DCHs: set of co-ordinated DCHs is a set of dedicated transport channels that are always established and released in combination
Individual DCHs within a set of co-ordinated DCHs cannot be operated on individually e.g. if the establishment of one DCH fails, the establishment of all other DCHs in the set of co-ordinated DCHs shall be terminated unsuccessfully. A set of coordinated DCHs is transferred over one transport bearer. All DCHs in a set of co-ordinated DCHs shall have the same TTI.

3.2 Abbreviations

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

AAL	ATM Adaptation Layer
AAL2	ATM Adaptation Layer 2
ALCAP	Access Link Control Application Part
ATM	Asynchronous Transfer Mode
BM-IWF	Broadcast Multicast Interworking Function
BMC	Broadcast/Multicast Control
BSS	Base Station Subsystem
CBC	Cell Broadcast Centre
CBS	Cell Broadcast Service
CN	Core Network
CPCH	Common Packet Channel
CRNC	Controlling Radio Network Controller
DCH	Dedicated Channel
DL	Downlink
DRNS	Drift RNS
EDGE	Enhanced Data rates for Global Evolution
FACH	Forward Access Channel
FFS	For Further Study
GERAN	GSM EDGE Radio Access Network
GSM	Global System for Mobile Communications
GTP	GPRS Tunnelling Protocol
IPv4	Internet Protocol, version 4
IPv6	Internet Protocol, version 6
MAC	Medium Access Control
NAS	Non Access Stratum
NBAP	Node B Application Part
NNSF	NAS Node Selection Fuction
NSAP	Network Service Access Point
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
RNL	Radio Network Layer
RNS	Radio Network Subsystem
RNSAP	Radio Network Subsystem Application Part
RNTI	Radio Network Temporary Identity
SAB	Service Area Broadcast
SAS	Standalone A-GPS SMLC
SMLC	Serving Mobile Location Centre
SRNC	Serving Radio Network Controller
SRNS	Serving RNS
TEID	Tunnel Endpoint Identifier
TNL	Transport Network Layer
TTI	Transmission Time Interval
UDP	User Datagram Protocol
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunication System
USIM	UMTS Subscriber Identity Module
UTRAN	Universal Terrestrial Radio Access Network

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 one or more Node Bs and optionally one SAS. 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.

There are two chip-rate options in the TDD mode: 3.84 Mcps TDD and 1.28 Mcps TDD. Each TDD cell supports either of these options.

A Node B which supports TDD cells can support one chip-rate option only, or both options.

A RNC which supports TDD cells can support one chip-rate option only, or both options.

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

A RNC may include a combining/splitting function to support combination/splitting of information streams (see subclause 7.2.4.3).

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 connection between RNCs or virtual networks using any suitable transport network.

The UTRAN architecture is shown in figure 4.

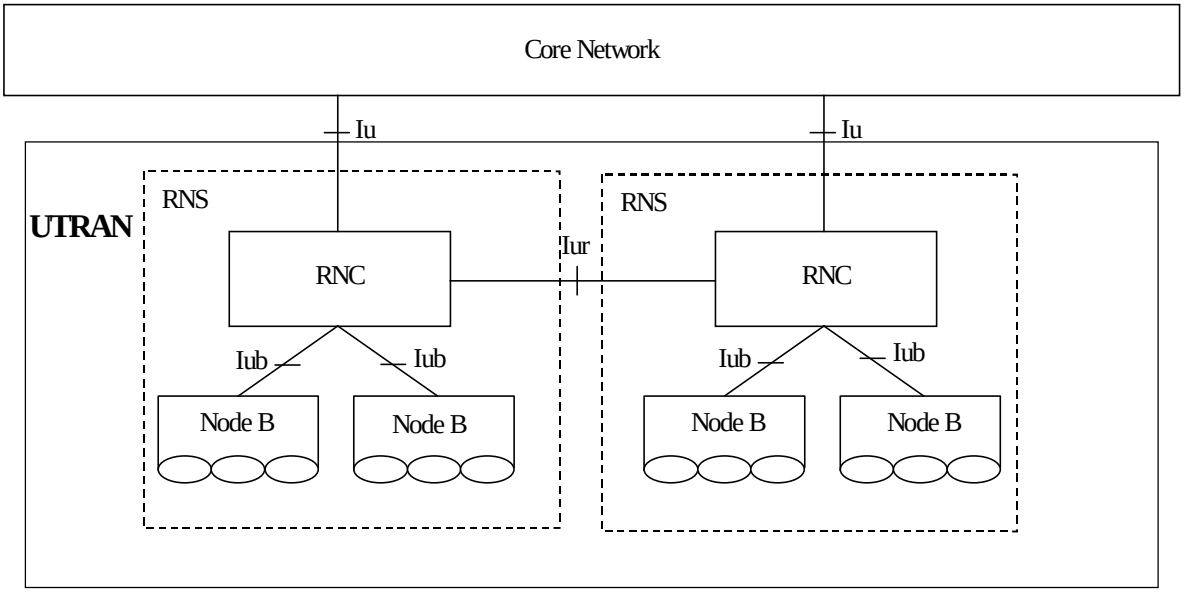

Figure 4: UTRAN Architecture

Regarding the A-GPS positioning method, the RNC may have full internal support for this function and/or may be connected to one SAS via the Iupc interface. The following picture illustrates the resulting UTRAN architecture when the Iupc interface is adopted.

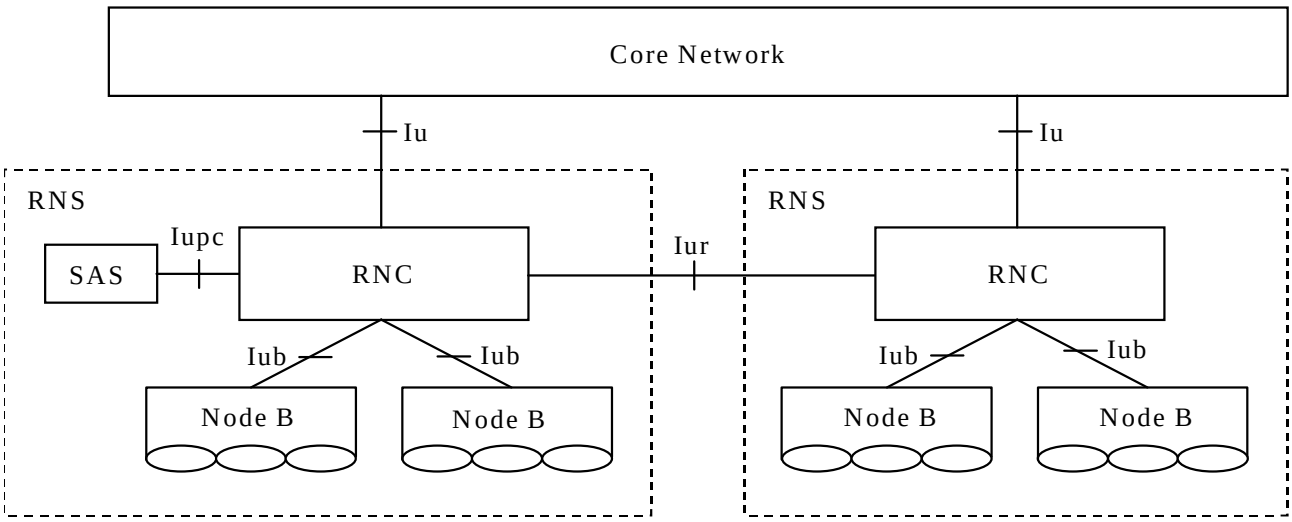

Figure 4a: UTRAN Architecture with the Iupc option

The RNC may be connected to BSS supporting GERAN Iu mode via the Iur-g interface. The following picture illustrates the UTRAN and GERAN Iu mode connection when the Iur-g interface is adopted.

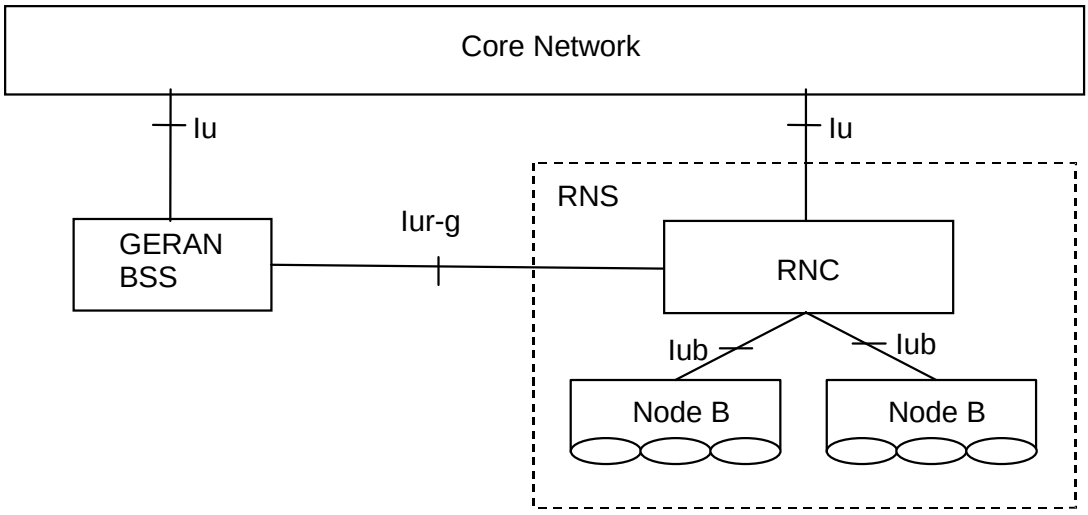

Figure 4x: UTRAN and GERAN Iu mode connection with Iur-g

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

For each connection between 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.

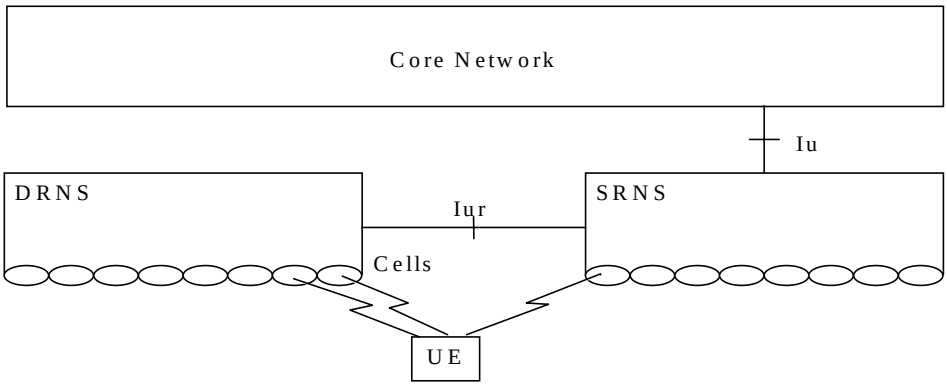

Figure 5: Serving and Drift RNS

To support UE mobility between UTRAN and GERAN Iu mode, the Serving RNS may be connected to the DBSS and vice versa as illustrated in figures 5x and 5y. The role of an RNS or BSS (Serving or Drift) is on a per connection basis between an UE and the UTRAN/GERAN Iu mode.

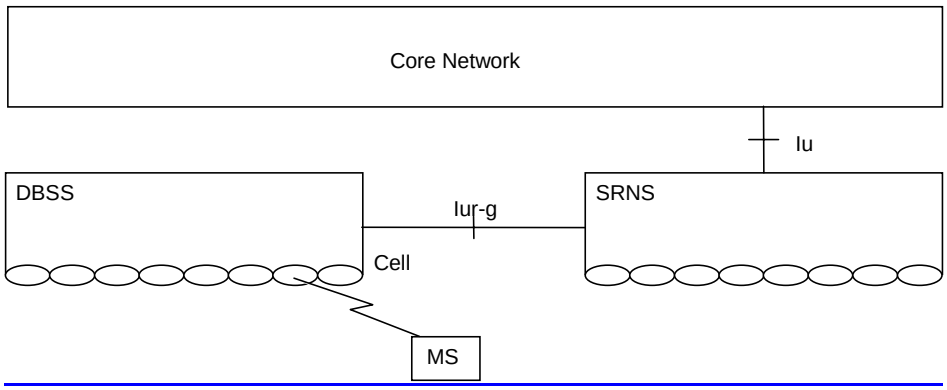

Figure 5x: Serving RNS and Drift BSS

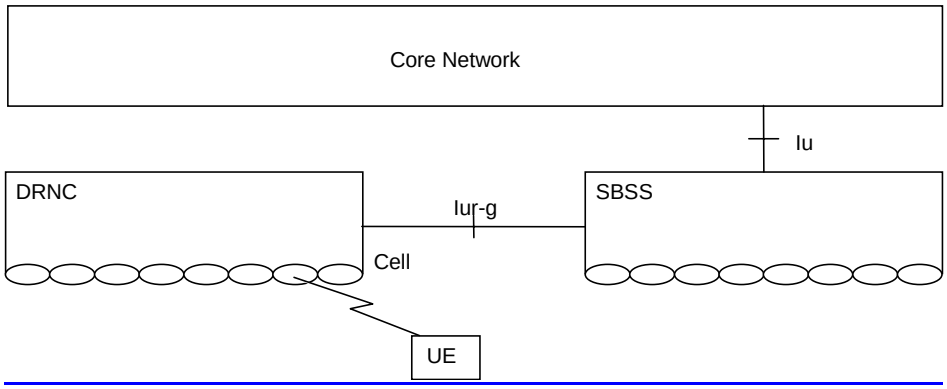

Figure 5y: Serving BSS and Drift RNS

The UTRAN is layered into a Radio Network Layer and a Transport Network Layer.

The UTRAN architecture, i.e. the UTRAN logical nodes and interfaces between them, are defined as part of the Radio Network Layer.

For each UTRAN interface (Iu, Iur, Iub, Iupc) the related transport network layer protocol and functionality is specified. The transport network layer provides services for user plane transport, signalling transport and transport of implementation specific O&M.

An implementation of equipment compliant with the specifications of a certain interface shall support the Radio Network Layer protocols specified for that interface. It shall also as a minimum, for interoperability, support the transport network layer protocols according to the transport network layer specifications for that interface.

The network architecture of the transport network layer is not specified by 3GPP and is left as an operator issue.

The equipment compliant to 3GPP standards shall at least be able to act as endpoints in the transport network layer, and may also act as a switch/router within the transport network layer.

For implementation specific O&M signalling to the Node B, only the transport network layer protocols are in the scope of UTRAN specifications.

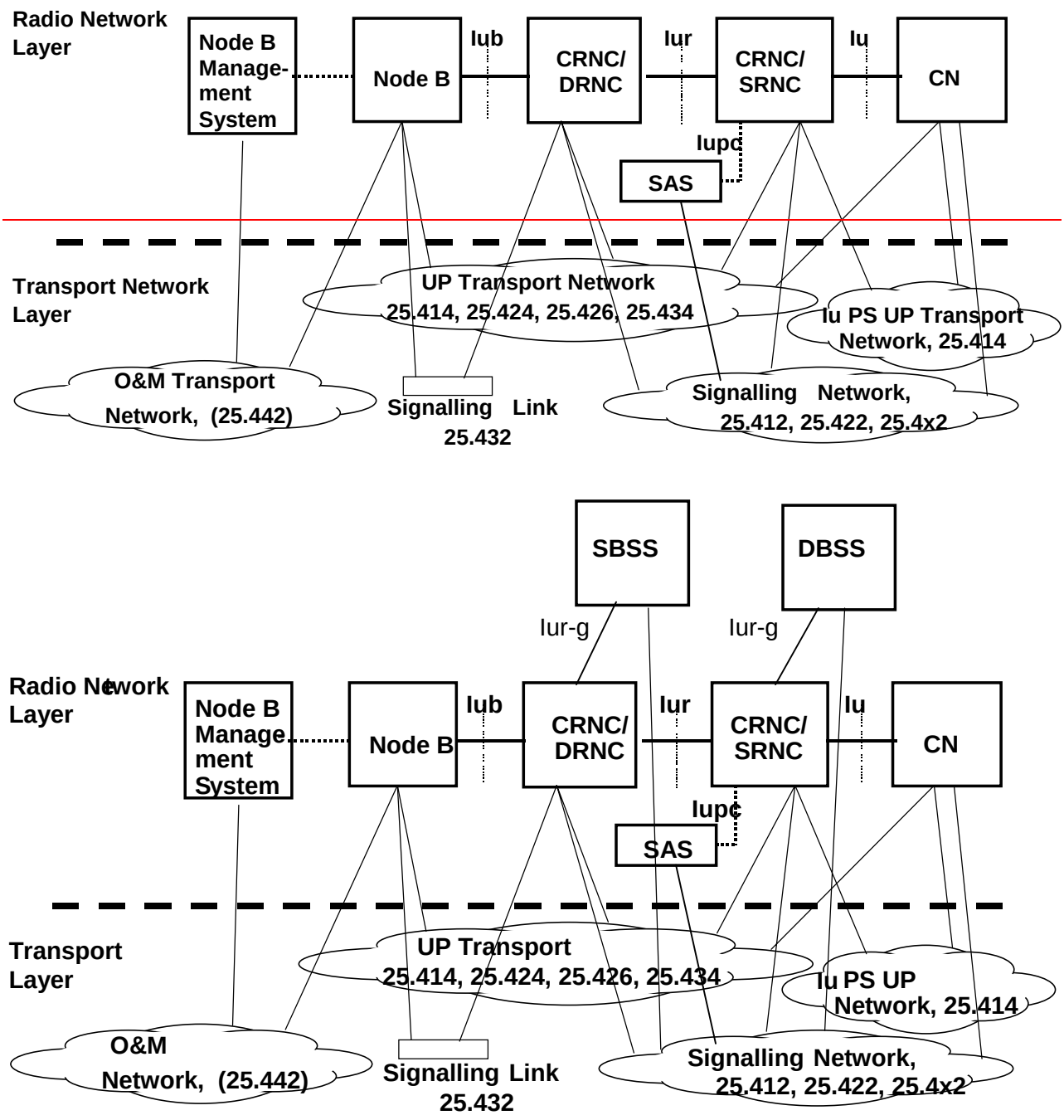

Figure 6: Protocol layering

Figure 6 illustrates which parts of the transport network layer that may be (but are not mandated to be) configured by the operator as transport networks, i.e. the radio network layer provides a destination address, namely:

- Transport network for implementation specific O&M traffic;
- Signalling network for Iu ~~and~~, Iur, Iur-g and Iupc;
- Transport network for Iub, Iur and Iu CS user plane connections;
- Transport network for Iu PS user plane connections.

The signalling link for Iub signalling as seen by the radio network layer cannot be configured as a network (no address provided).

A transport network for UTRAN may be configured by the operator to be used also for other traffic than UTRAN traffic.

6.1.3 RNC Identifier

An RNC node is uniquely identified by its RNC Identifier among the nodes ~~with~~in UTRAN and GERAN Iu mode as defined in [6] sub-clause 12.3. A BSS node in GERAN Iu mode is uniquely identified by its RNC Identifier among the nodes in GERAN Iu mode and UTRAN.

6.1.4 Service Area Identifier

The Service Area Identifier (SAI) is defined in [6] sub-clause 12.4.

6.1.5 Cell Identifier

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

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

The C-Id is defined by the operator, and set in the RNC/BSS via O&M. The C-Id is set in a Node B by its C-RNC or in the GERAN Iu mode cell.

6.1.6 Local Cell Identifier

The Local Cell identifier is used to uniquely identify the set of resources within a Node B required to support a cell (as identified by a C-Id). As a minimum it shall be unique within the Node B, but it is also capable of supporting uniqueness within the UTRAN for management system purposes.

The Local Cell Identifier is used for the initial configuration of a Node B when no C-Id is defined. The Local Cell identifier is defined by the operator, and set in both the Node B and its C-RNC via O&M. The relationship between the Local Cell Identifier and C-Id is set in the C-RNC via O&M.

6.1.7 UE Identifiers

Radio Network Temporary Identities (RNTI) are used as UE identifiers within UTRAN/GERAN Iu mode and in signalling messages between UE and UTRAN/GERAN Iu mode.

Four types of RNTI exist:

1) Serving RNC/BSS RNTI (s-RNTI);
2) Drift RNC/BSS RNTI (d-RNTI);
3) Cell RNTI (c-RNTI);
4) UTRAN/GERAN RNTI (u-RNTI);
5) DSCH RNTI (DSCH-RNTI);]

s-RNTI is used:

- by UE to identify itself to the Serving RNC/BSS;
- by SRNC/SBSS to address the UE/MS;
- by DRNC/DBSS to identify the UE to Serving RNC.

s-RNTI is allocated for all UEs having a RRC connection, it is allocated by the Serving RNC/BSS and it is unique within the Serving RNC/BSS. s-RNTI is reallocated always when the Serving RNC/BSS for the RRC connection is changed.

d-RNTI is used:

- by serving RNC/BSS to identify the UE to Drift RNC/BSS.

NOTE: The d-RNTI is never used on Uu.

d-RNTI is allocated by drift RNC/BSS upon drift UE contexts establishment and it shall be unique within the drift RNC/BSS. Serving RNC/BSS shall know the mapping between s-RNTI and the d-RNTIs allocated in Drift RNCs/BSSs for the same UE. Drift RNC/BSS shall know the s-RNTI and SRNC-ID related to existing d-RNTI within the drift RNC/BSS.

c-RNTI is used:

- by UE to identify itself to the controlling RNC;
- by controlling RNC to address the UE.

c-RNTI is allocated by controlling RNC upon UE accessing a new cell. C-RNTI shall be unique within the accessed cell. Controlling RNC shall know the d-RNTI associated to the c-RNTI within the same logical RNC (if any).

u-RNTI

The u-RNTI is allocated to an UE having a RRC connection and identifies the UE within UTRAN/GERAN Iu mode.

u-RNTI is composed of:

- SRNC identity;
- s-RNTI.

DSCH-RNTI is used:

- by controlling RNC to address the UE on the DSCH [TDD- and USCH].

DSCH-RNTI is allocated by controlling RNC upon UE establishing a DSCH [TDD - or USCH] channel. DSCH-RNTI shall be unique within the cell carrying the DSCH [TDD – and/or USCH]. [FDD - DSCH-RNTI is used as UE identifier in the MAC-c/sh header over DSCH. It is used only in the downlink.] [TDD – DSCH-RNTI is used as UE identifier in RRC messages concerning DSCH and USCH allocations and is used in both the downlink and uplink].

Each RNC has a unique identifier within the UTRAN part of the PLMN, denoted by RNC identifier (RNC-ID). This identifier is used to route UTRAN interface messages to correct RNC. RNC-ID of the serving RNC together with the s-RNTI is a unique identifier of the UE in the UTRAN part of the PLMN.

6.1.7.1 Usage of RNTI

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. RNC-ID is used by Controlling RNC/BSS to route the received uplink messages towards the Serving RNC/BSS.

NOTE: For the initial access a unique core network UE identifier is used.

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

7.2.3.2 SRNS Relocation

The SRNS Relocation function coordinates the activities when the SRNS role is to be taken over by another RNS/BSS. The SRNS relocation function manages the Iu interface connection mobility from an RNS to another RNS/BSS.

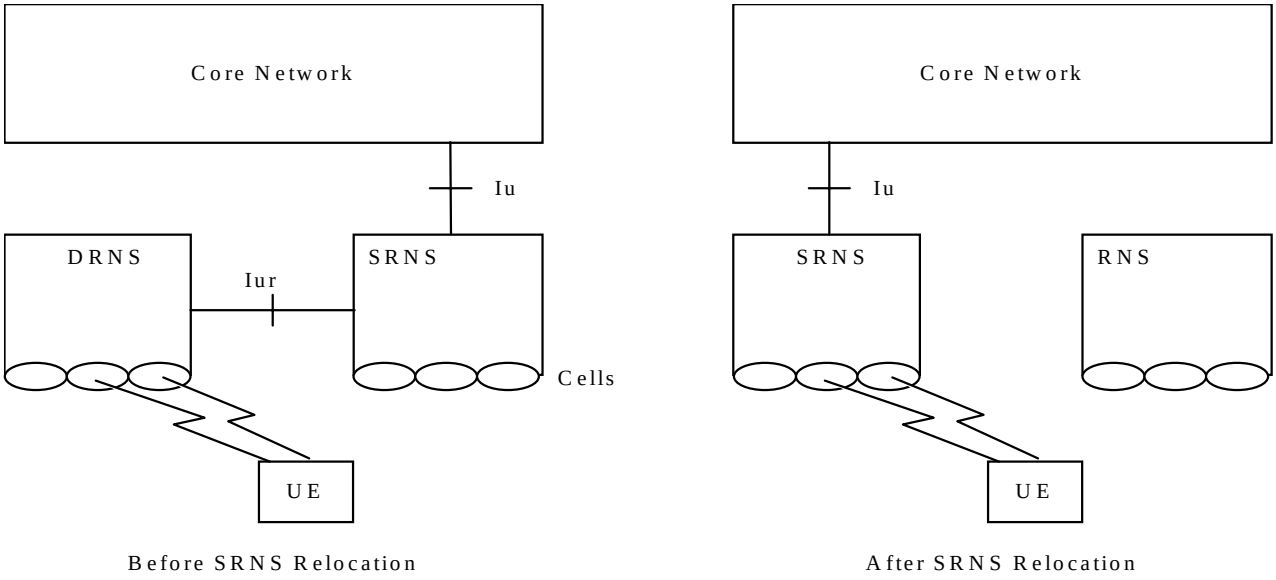

Figure 7: Serving RNS Relocation

The SRNS Relocation is initiated by the SRNC.

This function is located in the RNC and the CN.

7.2.3.3 Paging support

This function provides the capability to request a UE to contact the UTRAN/GERAN Iu mode when the UE is in Idle, CELL_PCH or ~~URA~~ URA_PCH/GRA_PCH states [6],[21]. This function also encompasses a coordination function between the different Core Network Domains onto a single RRC connection.

7.2.4.2 Radio environment survey

This function performs measurements on radio channels (current and surrounding cells) and translates these measurements into radio channel quality estimates. Measurements may include:

1) Received signal strengths (current and surrounding cells);
2) Estimated bit error ratios, (current and surrounding cells);
3) Estimation of propagation environments (e.g. high-speed, low-speed, satellite, etc.);
4) Transmission range (e.g. through timing information);
5) Doppler shift;
6) Synchronisation status;
7) Received interference level;
8) Total DL transmission power per cell.

This function is located in the UE and in the UTRAN.

8.2 Consequences for Mobility Handling

It is generally agreed 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 CELL_PCH and URA_PCH/GRA_PCH state [7].

When a dedicated connection between the UTRAN and the UE does not exist, no UE information is needed in UTRAN. 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, when 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.

3GPP TSG-RAN WG3 Meeting #31
Arlanda, Sweden, 19th-23rd August 2002

Tdoc R3-022079

CR-Form-v7

CHANGE REQUEST

⌘ **25.401** **CR** **060** ⌘ **rev** **-** ⌘ Current version: **5.3.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Introduction of Iur-g with scope modification
Source:	⌘	Nokia
Work item code:	⌘	TEI
Date:	⌘	08/2002
Category:	⌘	**F**
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:
2 (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)

Reason for change: ⌘ Iur-g has been defined between Iu mode BSS and RNC/Iu mode BSS and is described in the RNSAP specification. To explain Iur-g further, some explanation was added.

Summary of change: ⌘
- Iur-g related explanations were added
- The scope reflects Iur-g inclusion.

Consequences if not approved: ⌘ If this CR is not approved, this specification will not be up-to-date to describe the Iur-g and will be lack of information.

Impact Analysis:

Impact assessment towards the previous version of the specification (same release):

This CR does not impact on the previous version of the specification (same release) because this introduces new function.

Clauses affected: ⌘ 1, 2, 3.1, 3.2, 6, 6.1.3, 6.1.5, 6.1.7, 6.1.7.1, 7.2.3.2, 7.2.3.3, 8.2

Other specs affected: ⌘

Y	N	
	X	Other core specifications
	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.

1 Scope

The present document describes the overall architecture of the UTRAN, including internal interfaces and assumptions on the radio ~~and~~, Iu interfaces and Iur-g interface.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] 3GPP TR 25.990: "Vocabulary".

[2] 3GPP TS 23.110: "UMTS Access Stratum Services and Functions".

[3] 3GPP TS 25.211: "Physical channels and mapping of transport channels onto physical channels (FDD)".

[4] 3GPP TS 25.442: "UTRAN Implementation Specific O&M Transport".

[5] 3GPP TS 25.402: "Synchronisation in UTRAN, Stage 2".

[6] 3GPP TS 23.003: "Numbering, Addressing and Identification".

[7] 3GPP TS 25.331: "RRC Protocol Specification".

[8] 3GPP TS 23.101: "General UMTS Architecture".

[9] 3GPP TS 25.414: " UTRAN Iu Interface Data Transport & Transport Signalling".

[10] 3GPP TS 25.424: "UTRAN Iur Interface Data Transport & Transport Signalling for Common Transport Channel Data Streams".

[11] 3GPP TS 25.434: "UTRAN Iub Interface Data Transport & Transport Signalling for Common Transport Channel Data Streams".

[12] IETF RFC 2460: "Internet Protocol, Version 6 (Ipv6) Specification".

[13] IETF RFC 2474: "Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers " December 1998

[14] IETF RFC 768: "User Datagram Protocol", (8/1980)

[15] "Information technology – Open Systems Interconnection – Network service definition", X.213, ISO/IEC 8348.

[16] "Information technology – Open Systems Interconnection – Network service definition Amendment 1: Addition of the Internet protocol address format identifier", X.213/Amd.1, ISO/IEC 8348.

[17] IETF RFC 791 (1981): "Internet Protocol".

[18] 3GPP TS 25.426: "UTRAN Iur and Iub Interface Data Transport & Transport Signalling for DCH Data Streams".

[19] TBD.

[20] 3GPP TS 23.236: "Intra-domain connection of Radio Access Network (RAN) nodes to multiple Core Network (CN) nodes".

[21] 3GPP TR 43.930: "Iur-g interface; Stage 2".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

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

Cell: Radio Network object that can be uniquely identified by a User Equipment from a (cell) identification that is broadcasted over a geographical area from one *UTRAN Access Point*
A Cell is either FDD or TDD mode.

Iu: interface between an RNC and an MSC, SGSN or CBC, providing an 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: logical interface between two RNCs
Whilst logically representing a point to point link between RNCs, the physical realisation need not be a point to point link.

Iur-g: logical interface between RNC/BSS and BSS
Whilst logically representing a point to point link between RNC/BSS and BSS, the physical realisation need not be a point to point link.

Logical Model: 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: logical node in the RNS responsible for radio transmission / reception in one or more cells to/from the UE
The logical node terminates the Iub interface towards the RNC.

Radio Resources: resources that constitute the radio interface in UTRAN, e.g. frequencies, scrambling codes, spreading factors, power for common and dedicated channels

Node B Application Part: Radio Network Signalling over the Iub

Radio Network Controller: logical node in the RNS in charge of controlling the use and the integrity of the radio resources

Controlling RNC: 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: RNS can be either a full UTRAN or only a part of a UTRAN
An RNS offers the allocation and 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: 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: 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: 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.

Standalone A-GPS SMLC: logical node that interconnects to the RNC over the Iupc interface via the PCAP protocol
This node provides GPS related data to the RNC and may perform the position calculation function.

User Equipment: Mobile Equipment with one or several UMTS Subscriber Identity Module(s)
A device allowing a user access to network services via the Uu interface. The UE is defined in ref. [8]. If this term is used in the context of Iur-g, it means MS in case it uses radio resources of a DBSS.

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

Radio Link Set: set of one or more Radio Links that has a common generation of Transmit Power Control (TPC) commands in the DL

Uu: Radio interface between UTRAN and the User Equipment

RAB sub-flows: Radio Access Bearer can be realised by UTRAN through 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 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 transport bearer.
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 responsibility.

Set of co-ordinated DCHs: set of co-ordinated DCHs is a set of dedicated transport channels that are always established and released in combination
Individual DCHs within a set of co-ordinated DCHs cannot be operated on individually e.g. if the establishment of one DCH fails, the establishment of all other DCHs in the set of co-ordinated DCHs shall be terminated unsuccessfully. A set of coordinated DCHs is transferred over one transport bearer. All DCHs in a set of co-ordinated DCHs shall have the same TTI.

3.2 Abbreviations

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

AAL	ATM Adaptation Layer
AAL2	ATM Adaptation Layer 2
ALCAP	Access Link Control Application Part
ATM	Asynchronous Transfer Mode
BM-IWF	Broadcast Multicast Interworking Function
BMC	Broadcast/Multicast Control
BSS	Base Station Subsystem
CBC	Cell Broadcast Centre
CBS	Cell Broadcast Service
CN	Core Network
CPCH	Common Packet Channel
CRNC	Controlling Radio Network Controller
DCH	Dedicated Channel
DL	Downlink
DRNS	Drift RNS
EDGE	Enhanced Data rates for Global Evolution
FACH	Forward Access Channel
FFS	For Further Study
GERAN	GSM EDGE Radio Access Network
GSM	Global System for Mobile Communications
GTP	GPRS Tunnelling Protocol
IPv4	Internet Protocol, version 4
IPv6	Internet Protocol, version 6
MAC	Medium Access Control
NAS	Non Access Stratum
NBAP	Node B Application Part
NNSF	NAS Node Selection Fuction
NSAP	Network Service Access Point
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
RNL	Radio Network Layer
RNS	Radio Network Subsystem
RNSAP	Radio Network Subsystem Application Part
RNTI	Radio Network Temporary Identity
SAB	Service Area Broadcast
SAS	Standalone A-GPS SMLC
SMLC	Serving Mobile Location Centre
SRNC	Serving Radio Network Controller
SRNS	Serving RNS
TEID	Tunnel Endpoint Identifier
TNL	Transport Network Layer
TTI	Transmission Time Interval
UDP	User Datagram Protocol
UE	User Equipment
UL	Uplink
UMTS	Universal Mobile Telecommunication System
USIM	UMTS Subscriber Identity Module
UTRAN	Universal Terrestrial Radio Access Network

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 one or more Node Bs and optionally one SAS. 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.

There are two chip-rate options in the TDD mode: 3.84 Mcps TDD and 1.28 Mcps TDD. Each TDD cell supports either of these options.

A Node B which supports TDD cells can support one chip-rate option only, or both options.

A RNC which supports TDD cells can support one chip-rate option only, or both options.

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

A RNC may include a combining/splitting function to support combination/splitting of information streams (see subclause 7.2.4.3).

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 connection between RNCs or virtual networks using any suitable transport network.

The UTRAN architecture is shown in figure 4.

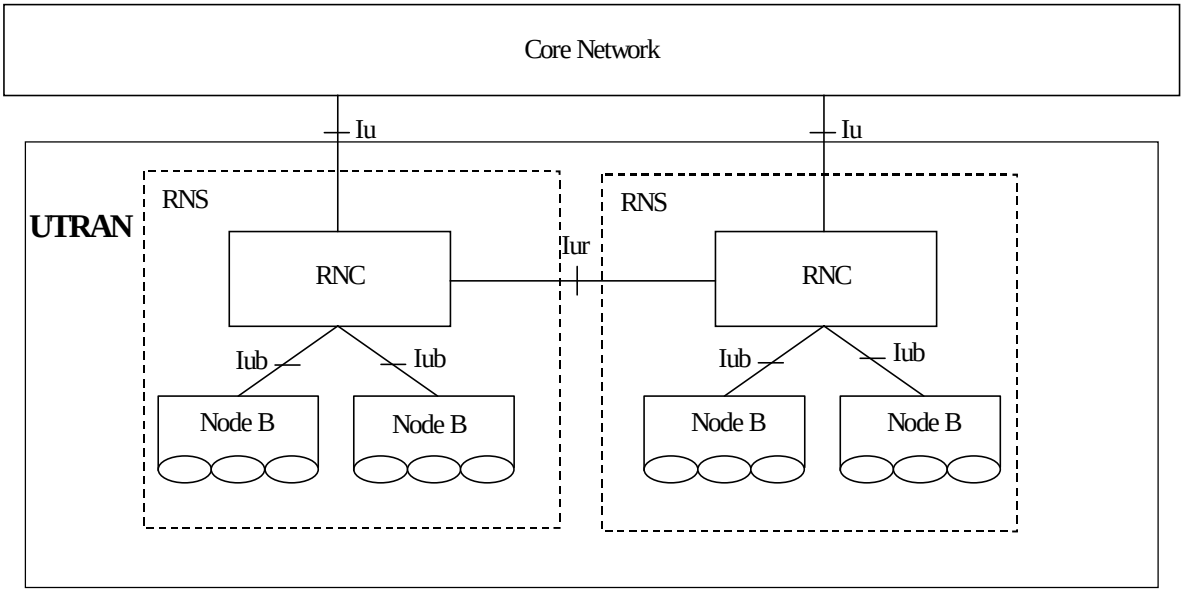

Figure 4: UTRAN Architecture

Regarding the A-GPS positioning method, the RNC may have full internal support for this function and/or may be connected to one SAS via the Iupc interface. The following picture illustrates the resulting UTRAN architecture when the Iupc interface is adopted.

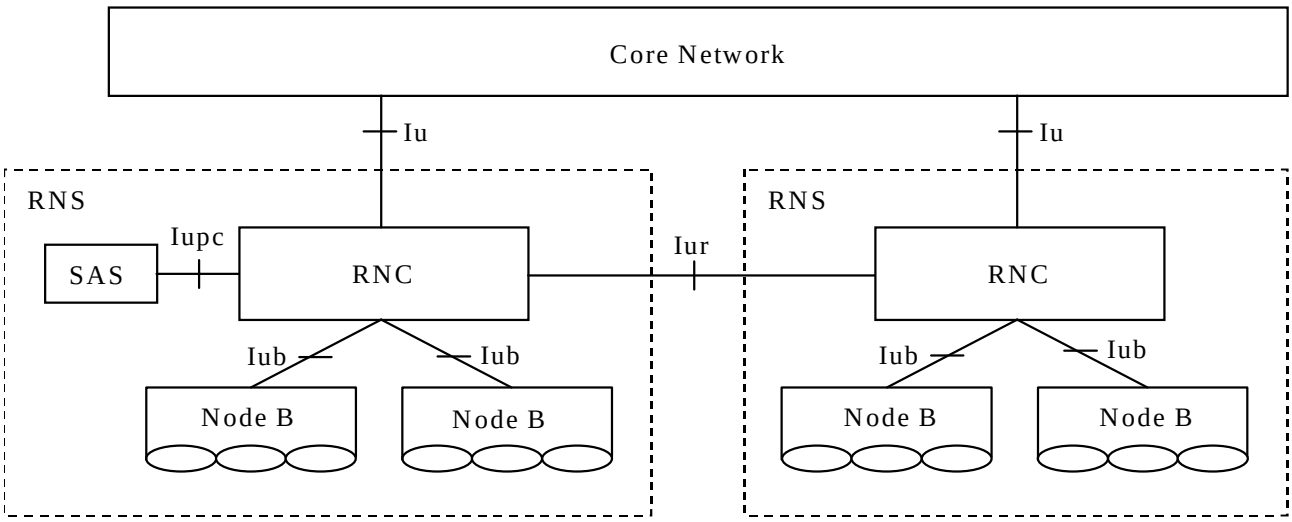

Figure 4a: UTRAN Architecture with the Iupc option

The RNC may be connected to BSS supporting GERAN Iu mode via the Iur-g interface. The following picture illustrates the UTRAN and GERAN Iu mode connection when the Iur-g interface is adopted.

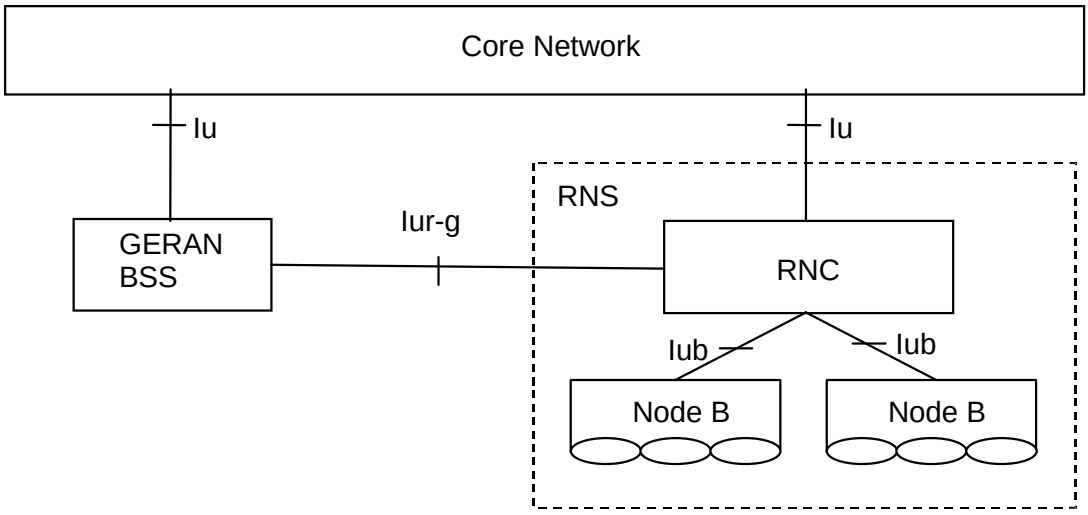

Figure 4x: UTRAN and GERAN Iu mode connection with Iur-g

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

For each connection between 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.

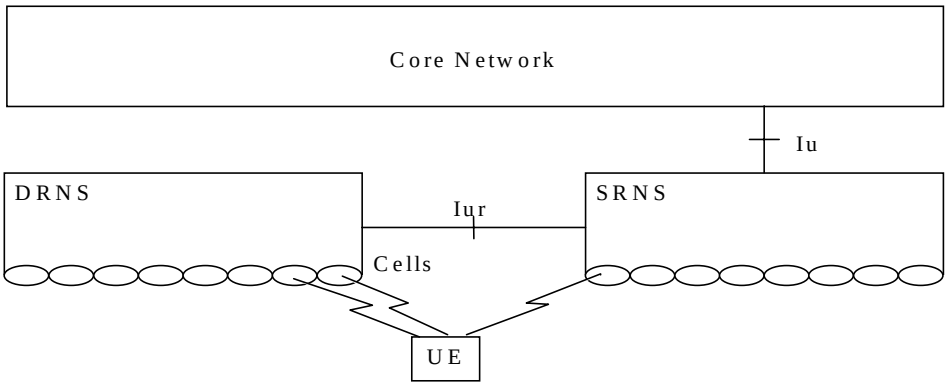

Figure 5: Serving and Drift RNS

To support UE mobility between UTRAN and GERAN Iu mode, the Serving RNS may be connected to the DBSS and vice versa as illustrated in figures 5x and 5y. The role of an RNS or BSS (Serving or Drift) is on a per connection basis between an UE and the UTRAN/GERAN Iu mode.

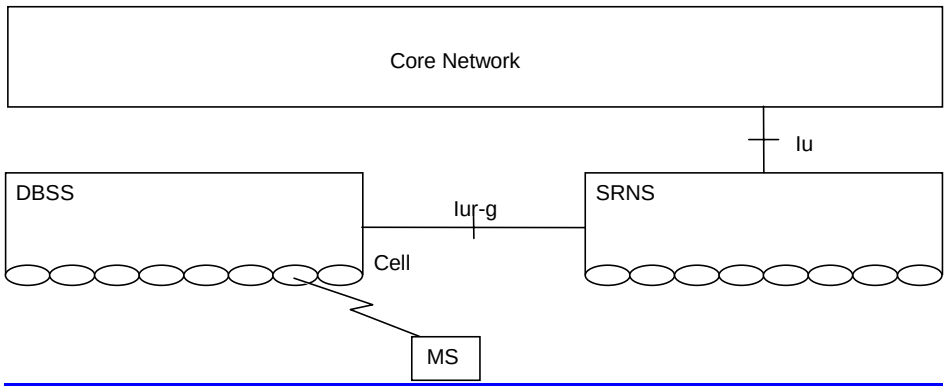

Figure 5x: Serving RNS and Drift BSS

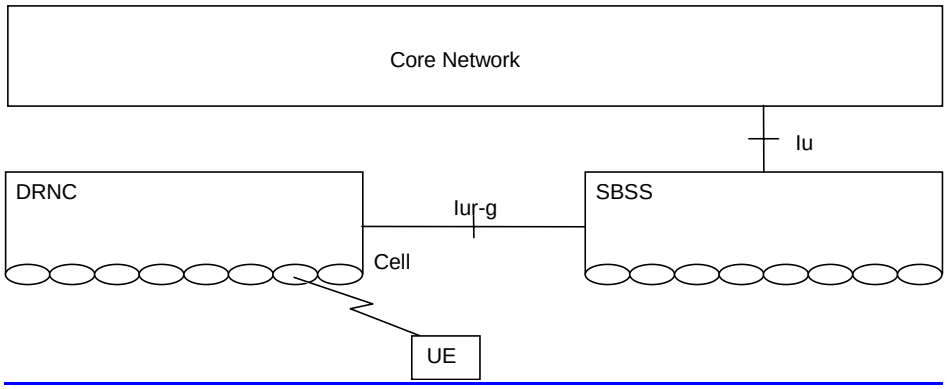

Figure 5y: Serving BSS and Drift RNS

The UTRAN is layered into a Radio Network Layer and a Transport Network Layer.

The UTRAN architecture, i.e. the UTRAN logical nodes and interfaces between them, are defined as part of the Radio Network Layer.

For each UTRAN interface (Iu, Iur, Iub, Iupc) the related transport network layer protocol and functionality is specified. The transport network layer provides services for user plane transport, signalling transport and transport of implementation specific O&M.

An implementation of equipment compliant with the specifications of a certain interface shall support the Radio Network Layer protocols specified for that interface. It shall also as a minimum, for interoperability, support the transport network layer protocols according to the transport network layer specifications for that interface.

The network architecture of the transport network layer is not specified by 3GPP and is left as an operator issue.

The equipment compliant to 3GPP standards shall at least be able to act as endpoints in the transport network layer, and may also act as a switch/router within the transport network layer.

For implementation specific O&M signalling to the Node B, only the transport network layer protocols are in the scope of UTRAN specifications.

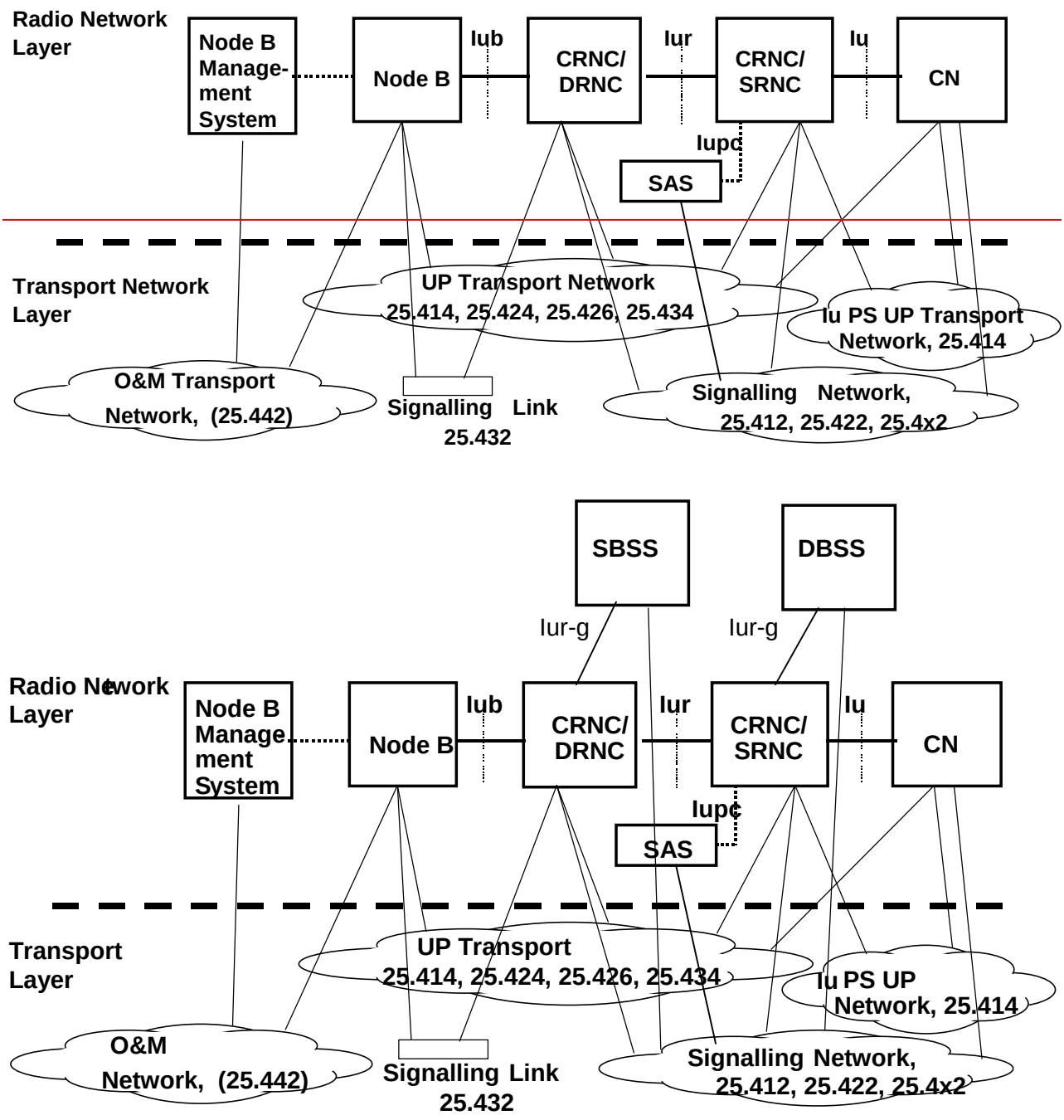

Figure 6: Protocol layering

Figure 6 illustrates which parts of the transport network layer that may be (but are not mandated to be) configured by the operator as transport networks, i.e. the radio network layer provides a destination address, namely:

- Transport network for implementation specific O&M traffic;
- Signalling network for Iu ~~and~~, Iur, Iur-g and Iupc;
- Transport network for Iub, Iur and Iu CS user plane connections;
- Transport network for Iu PS user plane connections.

The signalling link for Iub signalling as seen by the radio network layer cannot be configured as a network (no address provided).

A transport network for UTRAN may be configured by the operator to be used also for other traffic than UTRAN traffic.

6.1.3 RNC Identifier

An RNC node is uniquely identified by its RNC Identifier among the nodes ~~with~~in UTRAN and GERAN Iu mode as defined in [6] sub-clause 12.3. A BSS node in GERAN Iu mode is uniquely identified by its RNC Identifier among the nodes in GERAN Iu mode and UTRAN.

6.1.4 Service Area Identifier

The Service Area Identifier (SAI) is defined in [6] sub-clause 12.4.

6.1.5 Cell Identifier

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

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

The C-Id is defined by the operator, and set in the RNC/BSS via O&M. The C-Id is set in a Node B by its C-RNC or in the GERAN Iu mode cell.

6.1.6 Local Cell Identifier

The Local Cell identifier is used to uniquely identify the set of resources within a Node B required to support a cell (as identified by a C-Id). As a minimum it shall be unique within the Node B, but it is also capable of supporting uniqueness within the UTRAN for management system purposes.

The Local Cell Identifier is used for the initial configuration of a Node B when no C-Id is defined. The Local Cell identifier is defined by the operator, and set in both the Node B and its C-RNC via O&M. The relationship between the Local Cell Identifier and C-Id is set in the C-RNC via O&M.

6.1.7 UE Identifiers

Radio Network Temporary Identities (RNTI) are used as UE identifiers within UTRAN/GERAN Iu mode and in signalling messages between UE and UTRAN/GERAN Iu mode.

Four types of RNTI exist:

1) Serving RNC/BSS RNTI (s-RNTI);
2) Drift RNC/BSS RNTI (d-RNTI);
3) Cell RNTI (c-RNTI);
4) UTRAN/GERAN RNTI (u-RNTI);
5) DSCH RNTI (DSCH-RNTI);]

s-RNTI is used:

- by UE to identify itself to the Serving RNC/BSS;
- by SRNC/SBSS to address the UE/MS;
- by DRNC/DBSS to identify the UE to Serving RNC.

s-RNTI is allocated for all UEs having a RRC connection, it is allocated by the Serving RNC/BSS and it is unique within the Serving RNC/BSS. s-RNTI is reallocated always when the Serving RNC/BSS for the RRC connection is changed.

d-RNTI is used:

- by serving RNC/BSS to identify the UE to Drift RNC/BSS.

NOTE: The d-RNTI is never used on Uu.

d-RNTI is allocated by drift RNC/BSS upon drift UE contexts establishment and it shall be unique within the drift RNC/BSS. Serving RNC/BSS shall know the mapping between s-RNTI and the d-RNTIs allocated in Drift RNCs/BSSs for the same UE. Drift RNC/BSS shall know the s-RNTI and SRNC-ID related to existing d-RNTI within the drift RNC/BSS.

c-RNTI is used:

- by UE to identify itself to the controlling RNC;
- by controlling RNC to address the UE.

c-RNTI is allocated by controlling RNC upon UE accessing a new cell. C-RNTI shall be unique within the accessed cell. Controlling RNC shall know the d-RNTI associated to the c-RNTI within the same logical RNC (if any).

u-RNTI

The u-RNTI is allocated to an UE having a RRC connection and identifies the UE within UTRAN/GERAN Iu mode.

u-RNTI is composed of:

- SRNC identity;
- s-RNTI.

DSCH-RNTI is used:

- by controlling RNC to address the UE on the DSCH [TDD- and USCH].

DSCH-RNTI is allocated by controlling RNC upon UE establishing a DSCH [TDD - or USCH] channel. DSCH-RNTI shall be unique within the cell carrying the DSCH [TDD – and/or USCH]. [FDD - DSCH-RNTI is used as UE identifier in the MAC-c/sh header over DSCH. It is used only in the downlink.] [TDD – DSCH-RNTI is used as UE identifier in RRC messages concerning DSCH and USCH allocations and is used in both the downlink and uplink].

Each RNC has a unique identifier within the UTRAN part of the PLMN, denoted by RNC identifier (RNC-ID). This identifier is used to route UTRAN interface messages to correct RNC. RNC-ID of the serving RNC together with the s-RNTI is a unique identifier of the UE in the UTRAN part of the PLMN.

6.1.7.1 Usage of RNTI

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. RNC-ID is used by Controlling RNC/BSS to route the received uplink messages towards the Serving RNC/BSS.

NOTE: For the initial access a unique core network UE identifier is used.

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

7.2.3.2 SRNS Relocation

The SRNS Relocation function coordinates the activities when the SRNS role is to be taken over by another RNS/BSS. The SRNS relocation function manages the Iu interface connection mobility from an RNS to another RNS/BSS.

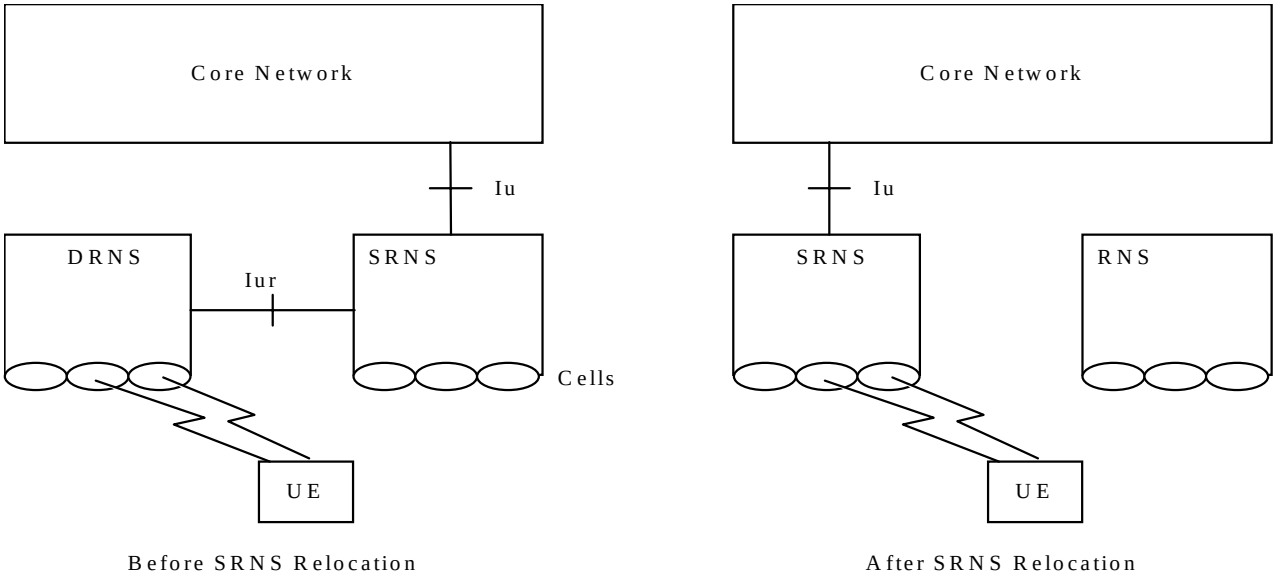

Figure 7: Serving RNS Relocation

The SRNS Relocation is initiated by the SRNC.

This function is located in the RNC and the CN.

7.2.3.3 Paging support

This function provides the capability to request a UE to contact the UTRAN/GERAN Iu mode when the UE is in Idle, CELL_PCH or ~~URA~~ URA_PCH/GRA_PCH states [6],[21]. This function also encompasses a coordination function between the different Core Network Domains onto a single RRC connection.

7.2.4.2 Radio environment survey

This function performs measurements on radio channels (current and surrounding cells) and translates these measurements into radio channel quality estimates. Measurements may include:

1) Received signal strengths (current and surrounding cells);
2) Estimated bit error ratios, (current and surrounding cells);
3) Estimation of propagation environments (e.g. high-speed, low-speed, satellite, etc.);
4) Transmission range (e.g. through timing information);
5) Doppler shift;
6) Synchronisation status;
7) Received interference level;
8) Total DL transmission power per cell.

This function is located in the UE and in the UTRAN.

8.2 Consequences for Mobility Handling

It is generally agreed 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 CELL_PCH and URA_PCH/GRA_PCH state [7].

When a dedicated connection between the UTRAN and the UE does not exist, no UE information is needed in UTRAN. 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, when 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.

3GPP TSG-RAN WG3 Meeting #31
Arlanda, Sweden, 19th-23rd August 2002

Tdoc R3-022081

CR-Form-v7

CHANGE REQUEST

⌘ **25.421** **CR** **002** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Introduction of Iur-g with scope modification
Source:	⌘	Nokia
Work item code:	⌘	TEI
Date:	⌘	08/2002
Category:	⌘	**F**
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:

2	*(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)*

Reason for change:	⌘	To show that this specification is applicable to Iur-g interface, the scope was changed.
Summary of change:	⌘	- The scope was changed.
Consequences if not approved:	⌘	If this CR is not approved, the information that this specification can is used for Iur-g interface, is missing. Impact Analysis: Impact assessment towards the previous version of the specification (same release): This CR does not impact on the previous version of the specification (same release) because this introduces new function.
Clauses affected:	⌘	1

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		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.

1 Scope

The present document specifies the standards allowed to implement Layer 1 on the I_{ur} or Iur-g interface. The specification of transmission delay requirements and O&M requirements are not in the scope of this document.

In the following 'Layer 1' and 'Physical Layer' are assumed to be synonymous.

3GPP TSG-RAN WG3 Meeting #31
Arlanda, Sweden, 19th-23rd August 2002

Tdoc R3-022082

CR-Form-v7

CHANGE REQUEST

⌘ **25.422** **CR** **014** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Introduction of Iur-g with scope modification
Source:	⌘	Nokia
Work item code:	⌘	TEI
Date:	⌘	08/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
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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:

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R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	To show that this specification is applicable to Iur-g interface, the scope was changed.
Summary of change:	⌘	- The scope was changed.
Consequences if not approved:	⌘	If this CR is not approved, the information that this specification can is used for Iur-g interface, is missing. Impact Analysis: Impact assessment towards the previous version of the specification (same release): This CR does not impact on the previous version of the specification (same release) because this introduces new function.
Clauses affected:	⌘	1

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		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.

1 Scope

The present document specifies the standards for Signalling Transport to be used across Iur Interface or Iur-g Interface. Iur Interface is a logical interface between the two RNC of the UMTS Terrestrial Radio Access Network (UTRAN) for the UMTS system. Iur-g Interface is a logical interface between RNC in UTRAN and BSS in GERAN Iu mode and between BSSs in GERAN Iu mode. The present document describes how the RNSAP signalling messages are transported between the two RNCs or between RNC in UTRAN and BSS in GERAN Iu mode and between BSSs in GERAN Iu mode..

3GPP TSG-RAN WG3 Meeting #31
Arlanda, Sweden, 19th-23rd August 2002

Tdoc R3-022147

CR-Form-v7

CHANGE REQUEST

⌘ **25.420** **CR** **028** ⌘ **rev** **1** ⌘ Current version: **5.0.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Introduction of Iur-g
Source:	⌘	Nokia
Work item code:	⌘	TEI
Date:	⌘	08/2002
Category:	⌘	**F**
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:

2	*(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)*

Reason for change:	⌘	Iur-g has been defined between Iu mode BSS and RNC/Iu mode BSS and is described in the RNSAP specification. To explain Iur-g further, some explanation was added.
Summary of change:	⌘	- Iur-g related explanations were added
Consequences if not approved:	⌘	If this CR is not approved, this specification will not be up-to-date to describe the Iur-g and will be lack of information. Impact Analysis: Impact assessment towards the previous version of the specification (same release): This CR does not impact on the previous version of the specification (same release) because this introduces new function.

Clauses affected:	⌘	2, 3.2, 6.2.1, 9.1, 9.2, 9.3			
Other specs affected:	⌘	**Y** / **N**	Other core specifications	⌘	CR056 TS25.401 v5.3.0
		X /	Other core specifications		
		/ **X**	Test specifications		
		/ **X**	O&M Specifications		
Other comments:	⌘				

How to create CRs using this form:
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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.

1 Scope

The present document is an introduction to the TSG RAN TS 25.42x series of UMTS Technical Specifications that define the Iur Interface. It is a logical interface for the interconnection of two Radio Network Controller (RNC) components of the UMTS Terrestrial Radio Access Network (UTRAN) for the UMTS system.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 25.427: "UTRAN Iub/Iur Interface User Plane Protocol for DCH Data Streams".

[2] 3GPP TS 25.425: "UTRAN Iur Interface: User Plane Protocols for Common Transport Channel Data Streams".

[3] 3GPP TS 25.421: "UTRAN Iur Interface: Layer 1".

[4] 3GPP TS 25.422: "UTRAN Iur Interface: Signalling Transport".

[5] 3GPP TS 25.423: "UTRAN Iur Interface: RNSAP Signalling ".

[6] 3GPP TS 25.424: "UTRAN Iur Interface: Data Transport & Transport Signalling ".

[7] 3GPP TS 25.401: "UTRAN Overall Description".

[8] 3GPP TS 25.426: "UTRAN Iur & Iub Interface: Data Transport & Transport Signalling for DCH Data Streams".

[9] ITU-T Recommendation Q.711 (7/96): "Functional description of the signalling connection control part".

[10] ITU-T Recommendation Q.712 (7/96): "Definition and function of signalling connection control part messages".

[11] ITU-T Recommendation Q.713 (7/96): "Signalling connection control part formats and codes".

[12] ITU-T Recommendation Q.714 (7/96): "Signalling connection control part procedures".

[13] 3GPP TS 23.003: "Numbering, Addressing and Identification".

[14] ITU-T Recommendation Q.2630.1 (12/99): "AAL type 2 Signalling Protocol (Capability Set 1)".

[15] 3GPP TS 25.426: "UTRAN Iur and Iub Interface Data Transport & Transport Signalling for DCH Data Streams ".

[16] 3GPP TS 25.414: "UTRAN Iu Interface Data Transport and Transport Signalling".

[17] 3GPP TR 43.930: "Iur-g interface; Stage 2".

3.2 Abbreviations

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

AAL2	ATM Adaptation Layer type 2
AAL5	ATM Adaptation Layer type 5
ALCAP	Access Link Control Application Part
ATM	Asynchronous Transfer Mode
BSS	Base Station Subsystem
CPCH	Common Packet Channel
CRNC	Controlling RNC
CTP	Common Transport Protocol
DCH	Dedicated Transport Channel
DL	Downlink
DRNC	Drift Radio Network Controller
DRNS	Drift Radio Network Subsystem
DSCH	Downlink Shared Channel
EDGE	Enhanced Data rates for Global Evolution
FACH	Forward Access Channel
FFS	For Further Study
GERAN	GSM EDGE Radio Access Network
GSM	Global System for Mobile Communications
GT	Global Title
HS-DSCH	High Speed Downlink Shared Channel
IP	Internet Protocol
MAC	Medium Access Control
MTP3-B	Message Transfer Part level 3 (for Q.2140)
PLMN	Public Land Mobile Network
QoS	Quality of Service
RACH	Random Access Channel
RF	Radio Frequency
RNC	Radio Network Controller
RNS	Radio Network Subsystem
RNSAP	Radio Network Subsystem Application Part
RRC	Radio Resource Control
SCCP	Signalling Connection Control Part
SPC	Signalling Point Code
SRNC	Serving Radio Network Controller
SRNS	Serving Radio Network Subsystem
SS7	Signalling System N^{o} 7
SSCF-NNI	Service Specific Co-ordination Function – Network Node Interface
SSCOP	Service Specific Connection Oriented Protocol
SSN	Sub-System Number
STC	Signalling Transport Converter
UDP	User Datagram Protocol
UE	User Equipment
UL	Up-link
UMTS	Universal Mobile Telecommunication System
URA	UTRAN Registration Area
USCH	Uplink Shared Channel
UTRAN	UMTS Terrestrial Radio Access Network

6.2.1 RNSAP Protocol

The protocol responsible for providing signalling information across the Iur interface is called the Radio Network Subsystem Application Part (RNSAP). A subset of RNSAP is used over the Iur-g interface.

The RNSAP is terminated by the two RNCs inter-connected via the Iur interface RNSAP Procedure Modules. In addition, the RNSAP is terminated by a RNC and a BSS supporting Iu mode inter-connected via the Iur-g interface.

RNSAP procedures are divided into four modules as follows:

1. RNSAP Basic Mobility Procedures;
2. RNSAP DCH Procedures;
3. RNSAP Common Transport Channel Procedures;
4. RNSAP Global Procedures.

The Basic Mobility Procedures module contains procedures used to handle the mobility within UTRAN as well as to handle mobility in case of UTRAN/GERAN interworking.

The DCH Procedures module contains procedures that are used to handle DCHs, DSCH, HS-DSCH and [TDD - USCHs] between two RNSs. If procedures from this module are not used in a specific Iur, then the usage of DCH, DSCH, HS-DSCH and [TDD - USCH] traffic between corresponding RNSs is not possible.

The Common Transport Channel Procedures module contains procedures that are used to control common transport channel data streams (excluding the DSCH, HS-DSCH and USCH) over Iur interface.

The Global Procedures module contains procedures that are not related to a specific UE. The procedures in this module are in contrast to the above modules involving two peer CRNCs. The procedures in this module are also used in cases involving one RNC and one BSS.

9 Other I_{ur} Interface Specifications

9.1 UTRAN Iur Interface: Layer 1 (TS 25.421)

3GPP TS 25.421 specifies the range of physical layer technologies that may be used to support the Iur interface and the Iur-g interface.

9.2 UTRAN Iur Interface: Signalling Transport (TS 25.422)

3GPP TS 25.422 specifies the signalling bearers for the RNSAP for Iur Interface and for Iur-g interface.

9.3 UTRAN Iur Interface: RNSAP Specification (TS 25.423)

3GPP TS 25.423 specifies the RNSAP protocol for radio network control plane signalling over the Iur interface and over the Iur-g interface.

3GPP TSG-RAN WG3 Meeting #31
Arlanda, Sweden, 19th-23rd August 2002

Tdoc R3-022148

CR-Form-v7

CHANGE REQUEST

⌘ **25.420** **CR** **029** ⌘ **rev** **1** ⌘ Current version: **5.0.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Introduction of Iur-g with scope modification
Source:	⌘	Nokia
Work item code:	⌘	TEI
Date:	⌘	08/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
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A *(corresponds to a correction in an earlier release)*
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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)*
Rel-6 *(Release 6)*

Reason for change:	⌘	Iur-g has been defined between Iu mode BSS and RNC/Iu mode BSS and is described in the RNSAP specification. To explain Iur-g further, some explanation was added.
Summary of change:	⌘	- Iur-g related explanations were added - The scope reflects Iur-g inclusion.
Consequences if not approved:	⌘	If this CR is not approved, this specification will not be up-to-date to describe the Iur-g and will be lack of information. Impact Analysis: Impact assessment towards the previous version of the specification (same release): This CR does not impact on the previous version of the specification (same release) because this introduces new function.

Clauses affected:	⌘	1, 2, 3.2, 6.2.1, 9.1, 9.2, 9.3			
		Y	**N**		
Other specs affected:	⌘	**X**		Other core specifications	⌘ CR060 TS25.401 v5.3.0 CR002 TS25.421 v5.0.0 CR014 TS25.422 v5.0.0
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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1 Scope

The present document is an introduction to the TSG RAN TS 25.42x series of UMTS Technical Specifications that define the Iur Interface and the Iur-g Interface. It Iur Interface is a logical interface for the interconnection of two Radio Network Controller (RNC) components of the UMTS Terrestrial Radio Access Network (UTRAN) for the UMTS system. Iur-g Interface is a logical interface between RNC in UTRAN and BSS in GERAN Iu mode and between BSSs in GERAN Iu mode.

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[5] 3GPP TS 25.423: "UTRAN Iur Interface: RNSAP Signalling ".

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EDGE	Enhanced Data rates for Global Evolution
FACH	Forward Access Channel
FFS	For Further Study
GERAN	GSM EDGE Radio Access Network
GSM	Global System for Mobile Communications
GT	Global Title
HS-DSCH	High Speed Downlink Shared Channel
IP	Internet Protocol
MAC	Medium Access Control
MTP3-B	Message Transfer Part level 3 (for Q.2140)
PLMN	Public Land Mobile Network
QoS	Quality of Service
RACH	Random Access Channel
RF	Radio Frequency
RNC	Radio Network Controller
RNS	Radio Network Subsystem
RNSAP	Radio Network Subsystem Application Part
RRC	Radio Resource Control
SCCP	Signalling Connection Control Part
SPC	Signalling Point Code
SRNC	Serving Radio Network Controller
SRNS	Serving Radio Network Subsystem
SS7	Signalling System N^{o} 7
SSCF-NNI	Service Specific Co-ordination Function – Network Node Interface
SSCOP	Service Specific Connection Oriented Protocol
SSN	Sub-System Number
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6.2.1 RNSAP Protocol

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The RNSAP is terminated by the two RNCs inter-connected via the Iur interface RNSAP Procedure Modules. In addition, the RNSAP is terminated by a RNC and a BSS supporting Iu mode or by two BSSs supporting Iu mode inter-connected via the Iur-g interface.

RNSAP procedures are divided into four modules as follows:

1. RNSAP Basic Mobility Procedures;
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3. RNSAP Common Transport Channel Procedures;
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The Basic Mobility Procedures module contains procedures used to handle the mobility within UTRAN as well as to handle mobility in case of UTRAN/GERAN interworking.

The DCH Procedures module contains procedures that are used to handle DCHs, DSCH, HS-DSCH and [TDD - USCHs] between two RNSs. If procedures from this module are not used in a specific Iur, then the usage of DCH, DSCH, HS-DSCH and [TDD - USCH] traffic between corresponding RNSs is not possible.

The Common Transport Channel Procedures module contains procedures that are used to control common transport channel data streams (excluding the DSCH, HS-DSCH and USCH) over Iur interface.

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9 Other I_{ur} Interface Specifications

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