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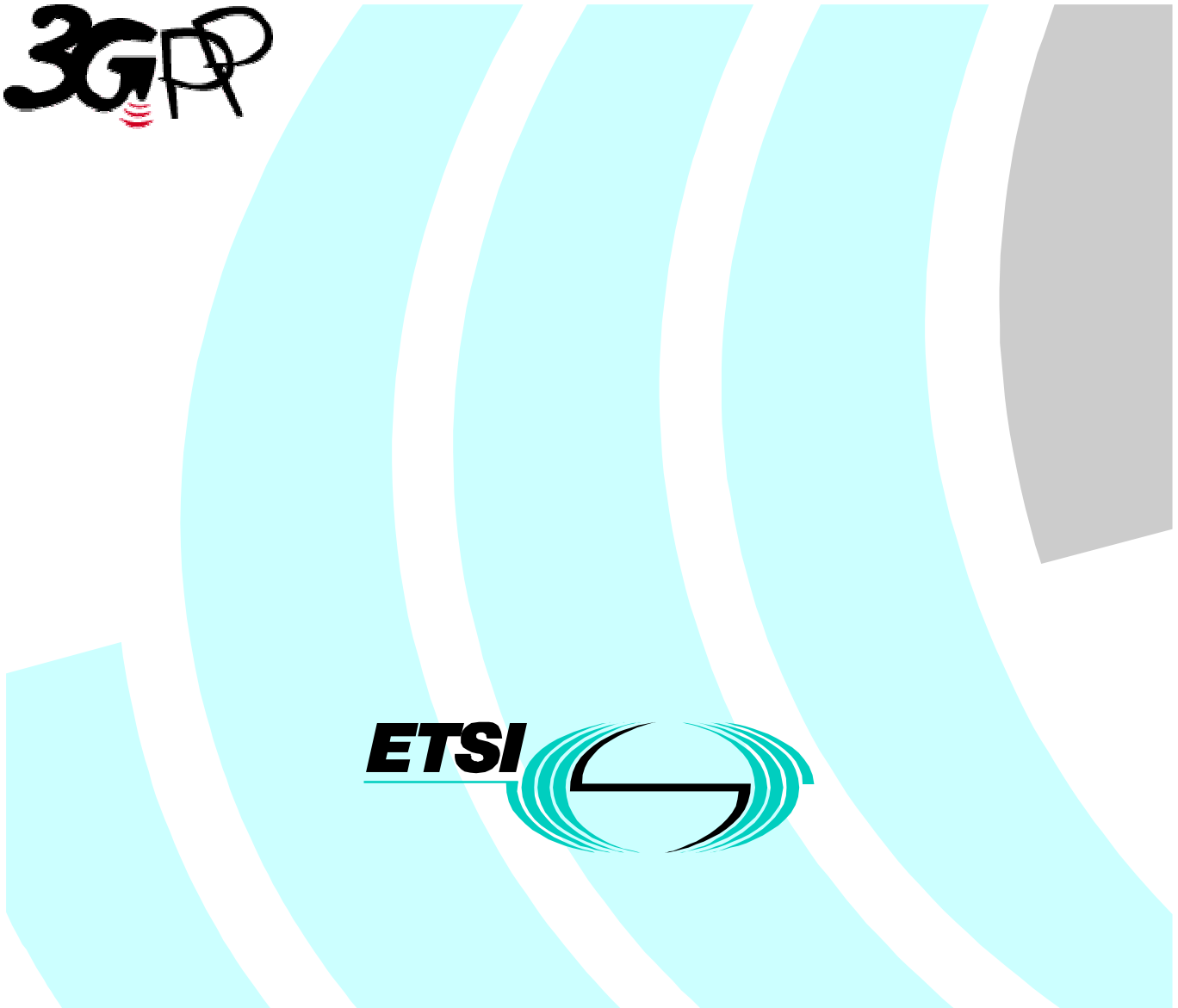
Technical Specification

Universal Mobile Telecommunications System (UMTS);
UTRAN Iu Interface Signalling Transport
(3GPP TS 25.412 version 3.6.0 Release 1999)



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Foreword

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Contents

Foreword

This Technical Specification (TS) has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies the standards for Signalling Transport to be used across Iu Interface. Iu Interface is a logical interface between the RNC and the UTRAN Core Network. The present document describes how the RANAP signalling messages are transported over Iu.

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.

[1] ITU-T Recommendation Q.2100 (07/1994): "B-ISDN Signalling ATM Adaptation Layer (SAAL) - overview description".

[2] ITU-T Recommendation Q.2110 (07/1994): "B-ISDN ATM Adaptation Layer – Service Specific Connection Oriented Protocol (SSCOP)".

[3] ITU-T Recommendation Q.2140 (02/1995): "B-ISDN ATM adaptation layer – Service Specific Co-ordination Function for signalling at the Network Node Interface (SSCF AT NNI)".

[4] ITU-T Recommendation Q.2210 (07/1996): "Message transfer part level 3 functions and messages using the services of ITU-T Recommendation Q.2140".

[5] ITU-T Recommendation I.361 (11/1995): "B-ISDN ATM layer specification".

[6] ITU-T Recommendation I.363.5 (08/1996): "B-ISDN ATM Adaptation Layer Type 5".

[7] ITU-T Recommendation Q.711 (07/1996): "Functional description of the signalling connection control part".

[8] ITU-T Recommendation Q.712 (07/1996): "Definition and function of Signalling connection control part messages".

[9] ITU-T Recommendation Q.713 (07/1996): "Signalling connection control part formats and codes".

[10] ITU-T Recommendation Q.714 (07/1996): "Signalling connection control part procedures".

[11] ITU-T Recommendation Q.715 (07/1996): "Signalling connection control part user guide".

[12] ITU-T Recommendation Q.716 (03/1993): "Signalling Connection Control Part (SCCP) performance".

[13] IETF RFC 791 (09/1981): "Internet Protocol".

[14] IETF RFC 2684 (09/1999): "Multiprotocol Encapsulation over ATM Adaptation Layer 5".

[15] IETF RFC 2225 (04/1998): "Classical IP and ARP over ATM".

[16] IETF RFC 2960 (10/2000): "Stream Control Transmission Protocol".

[17] G. Sidebottom et al, "SS7 MTP3 – User Adaptation Layer", draft-ietf-sigtran-m3ua-04.txt (Work In Progress), IETF, September 2000.

[18] 3GPP TS 25.410: "UTRAN Iu Interface: General Aspects and Principles".

3 Abbreviations

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

AAL	ATM Adaptation Layer
AAL5	ATM Adaptation Layer 5
ATM	Asynchronous Transfer Mode
CS	Circuit Switched
IP	Internet Protocol
M3UA	SS7 MTP3 User Adaptation Layer
MTP3-B	Message Transfer Part
PS	Packet Switched
RANAP	Radio Access Network Application Part
RNC	Radio Network Controller
SAAL-NNI	Signalling ATM Adaptation Layer – Network Node Interface
SCCP	Signalling Connection Control Part
SCTP	Stream Control Transmission Protocol
SSCF	Service Specific Co-ordination Function
SSCOP	Service Specific Connection Oriented Protocol

4 ATM Layer

4.1 General

ATM shall be used in the radio network control plane according to I.361 [5]. The structure of the cell header used in the UTRAN Iu interface is the cell header format and encoding at NNI (see Figure 3/I.361).

5 RANAP Signalling Bearer

5.1 Introduction

This subclause specifies the Signalling Bearer protocol stack that supports the RANAP signalling protocol.

The following requirements on the Signalling Bearer can be stated:

- provide reliable transfer of control plane signalling messages in both connectionless mode and connection-oriented mode;
- provide separate independent connections for distinguishing transactions with individual UE's;
- supervise the 'UE connections' and provide connection status information to the Upper Layers for individual UE's;
- provide networking and routing functions;
- provide redundancy in the signalling network;
- provide load sharing.

5.2 Signalling Bearer for Circuit Switched Domain

5.2.1 Protocol Stack for the CS Domain

The following figure 1 illustrates the protocol model having Broadband Signalling System No.7 as the signalling bearer for RANAP over the Iu interface that fulfils the requirements. Figure 1 shows, for the CS domain, the point at which the service primitives are invoked. The SAP provides the SCCP primitives.

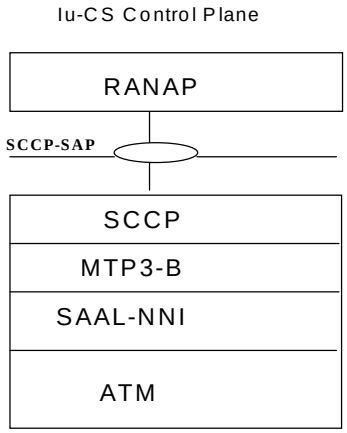

Figure 1: SAP between RANAP and its transport for Iu - CS Domain

1. **SCCP** [7] provides connectionless service, class 0, connection oriented service, class 2, separation of the connections mobile by mobile basis on the connection oriented link and establishment of a connection oriented link mobile by mobile basis.

2. **MTP3-B** [4] provides message routing, discrimination and distribution (for point-to-point link only), signalling link management load sharing and changeover/back between link within one link-set. The need for multiple link-sets is precluded.

3. **SAAL-NNI** [1] consists of the following sub-layers: - **SSCF** [3], - **SSCOP** [2] and – **AAL5** [6]. The SSCF maps the requirements of the layer above to the requirements of SSCOP. Also SAAL connection management, link status and remote processor status mechanisms are provided. SSCOP provides mechanisms for the establishment and release of connections and the reliable exchange of signalling information between signalling entities. Adapts the upper layer protocol to the requirements of the Lower ATM cells.

4. **ATM** [5].

5.2.1 Protocol Services

5.2.1.1 SCCP Services

SCCP shall be used as specified in [18].

5.2.1.2 MTP3-B Services

MTB3-B shall comply with [4].

5.2.1.3 SAAL-NNI Services

It shall be possible to use SAAL-NNI connections pre-configured as PVCs for signalling transport on the Iu-Interface.

5.3 Signalling Bearer for Packet Switched Domain

5.3.1 Protocol Stack for the PS Domain

The protocol stacks for the PS Domain is shown in figure 2. The standard allows operators to choose one out of two standardised protocol to suites for transport of SCCP messages.

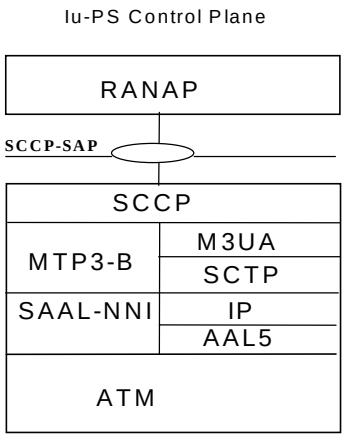

Figure 2: SAP between RANAP and its transport for the Iu –IP domain

Figure 2 shows, for the Iu IP domain, the point at which the service primitives are invoked. A single SAP is defined independently of the signalling bearer. The SAP provides the SCCP primitives. The figure is not intended to constrain the architecture.

1. **SCCP** [7] provides connectionless service, class 0, connection oriented service, class 2, separation of the connections mobile by mobile basis on the connection oriented link and establishment of a connection oriented link mobile by mobile basis.

2. **MTP3-B** [4] provides message routing, discrimination and distribution (for point-to-point link only), signalling link management load sharing and changeover/back between link within one link-set. The need for multiple link-sets is precluded.

3. **SAAL-NNI** [1] consists of the following sub-layers: - **SSCF-NNI** [3], - **SSCOP** [2] and – **AAL5** [6]. The SSCF maps the requirements of the layer above to the requirements of SSCOP. Also SAAL connection management, link status and remote processor status mechanisms are provided. SSCOP provides mechanisms for the establishment and release of connections and the reliable exchange of signalling information between signalling entities. Adapts the upper layer protocol to the requirements of the Lower ATM cells.

4. **ATM** [5].

5. **SCTP** [16] refers to the Stream Control Transmission Protocol [16] developed by the Sigtran working group of the IETF for the purpose of transporting various signalling protocols over IP networks. **M3UA** refers to the SCCP adaptation layer "SS7 MTP3 – User Adaptation Layer " [17] also developed by the Sigtran working group of the IETF.

6. **IP** [13] over ATM is defined in [14] and [15].

5.3.2 Protocol Services

5.3.2.1 SCCP Services

SCCP shall be used as specified in [18].

5.3.2.2 MTP3-B Services

MTB3-B shall comply with [4].

5.3.2.3 SAAL-NNI Services

It shall be possible to use SAAL-NNI connections pre-configured as PVCs for signalling transport on the Iu-Interface.

5.3.2.4 M3UA Services

An RNC equipped with the M3UA stack option shall have client functionality. This enables the RNC to report to the SGSN when it is a newly introduced entity in the network.

5.3.2.5 SCTP Services

The multi-homing services of SCTP shall be required at both ends of an SCTP-association to enable transport redundancy and reliability.

5.3.2.6 AAL5 Services

It shall be possible to use AAL5 connections pre-configured as PVCs for slgnalling transport on the Iu-Interface.

5.4 Services Provided by the Signalling Bearer

When considering the requirements that the upper layers, i.e. RANAP, have on the Signalling Bearer, there are a number of services it has to provide and a number of functions to perform. These numbers of services that the signalling bearer shall provide, to the upper layers, are stated in references [7] to [12].

Annex A (informative): Change History

Change history					
TSG RAN#	Version	CR	Tdoc RAN	New Version	Subject/Comment
RAN_04	-	-	-	3.0.0	Approved at TSG RAN #4 by correspondence and placed under Change Control
RAN_05	3.0.0	-	-	3.1.0	Approved at TSG RAN #5
RAN_06	3.1.0	001	RP-99744	3.2.0	Approved at TSG RAN #6
RAN_07	3.2.0	-	RP-000077	3.3.0	Approved at TSG RAN #7 (2 approved CRs)
RAN_07	3.3.0	-	RP-000233	3.4.0	Approved at TSG RAN #8
RAN_09	3.4.0	005	RP-000372	3.5.0	Approved at TSG RAN #9
RAN_10	3.5.0	006 007 008	RP-000611	3.6.0	Approved at TSG RAN #10

History

Document history		
V3.2.0	January 2000	Publication
V3.3.0	March 2000	Publication
V3.4.0	June 2000	Publication
V3.5.0	September 2000	Publication
V3.6.0	December 2000	Publication