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Universal Mobile Telecommunications System (UMTS); UTRAN Iur interface signalling transport (3GPP TS 25.422 version 7.1.0 Release 7)



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Foreword

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1 Scope

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

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] ITU-T Recommendation Q.2100 (7/94): "B-ISDN Signalling ATM Adaptation Layer (SAAL) - Overview description".
- [2] ITU-T Recommendation Q.2110 (7/94): "B-ISDN ATM adaptation layer - Service Specific Connection Oriented Protocol (SSCOP)".
- [3] ITU-T Recommendation Q.2140 (2/95): "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 (7/96): "Message transfer part level 3 functions and messages using the services of ITU-T Recommendation Q.2140".
- [5] ITU-T Recommendation I.361 (11/95): "B-ISDN ATM layer specification".
- [6] ITU-T Recommendation I.363.5 (8/96): "B-ISDN ATM Adaptation Layer specification: Type 5 AAL".
- [7] ITU-T Recommendation Q.711 (7/96): "Functional description of the signalling connection control part".
- [8] ITU-T Recommendation Q.712 (7/96): "Definition and function of Signalling connection control part messages".
- [9] ITU-T Recommendation Q.713 (7/96): Signalling connection control part formats and codes.
- [10] ITU-T Recommendation Q.714 (7/96): "Signalling connection control part procedures".
- [11] ITU-T Recommendation Q.715 (7/96): "Signalling connection control part user guide".
- [12] ITU-T Recommendation Q.716 (3/93): "Signalling System No. 7 - Signalling Connection Control Part (SCCP) performance".
- [13] IETF RFC 791 (September 1981): "Internet Protocol".
- [14] IETF RFC 1483 (July 1993): "Multi protocol Encapsulation over ATM Adaptation Layer 5".
- [15] IETF RFC 2225 (April 1998): "Classical IP and ARP over ATM".
- [16] IETF RFC 2960 (October 2000): "Stream Control Transmission Protocol".
- [17] IETF RFC 3332(09/2002): "Signalling System 7 (SS7) Message Transfer Part 3 (MTP3) – User Adaptation Layer (M3UA)"

- [18] IETF STD 51, RFC 1661 (July 1994): "The Point-To-Point Protocol (PPP)".
- [19] IETF STD 51, RFC 1662 (July 1994): "PPP in HDLC-like Framing".
- [20] IETF RFC 2507 (February 1999): "IP header compression".
- [21] IETF RFC 1990 "The PPP Multilink Protocol (MP)".
- [22] IETF RFC 2686 "The Multi-Class Extension to Multi-Link PPP".
- [23] IETF RFC 2509 (February 1999): "IP Header Compression over PPP".
- [24] IETF RFC 2460 "Internet Protocol, Version 6 (Ipv6) Specification".
- [25] IETF RFC 2474 (December 1998): "Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers".
- [26] IETF RFC 768 (8/1980): "User Datagram Protocol".
- [27] IETF RFC 3153 (8/2001): "PPP Multiplexing".
- [28] IETF RFC 2364 (7/1998): "PPP over AAL5".
- [29] IETF RFC 3031 (1/2001): "Multiprotocol Label Switching Architecture".
- [30] RFC 3309: "SCTP Checksum Change".
- [31] ANSI T1.111-2001: "Signalling System Number 7 (SS7) - Message Transfer Part (MTP)".
- [32] ANSI T1.112-2001: "Signaling System Number 7 (SS7) -- Signaling Connection Control Part (SCCP)".
- [33] ANSI T1.645-1995 (R2003): "B-ISDN Signaling ATM Adaptation Layer - Service Specific Coordination Function for Support of Signaling at the Network Node Interface (SSCF at the NNI)".

3 Abbreviations

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

AAL	ATM Adaptation Layer
AAL2	ATM Adaptation Layer 2
AAL5	ATM Adaptation Layer 5
ATM	Asynchronous Transfer Mode
DiffServ	Differentiated Services
HDLC	High level Data Link Control
IP	Internet Protocol
IPv4	Internet Protocol, version 4
IPv6	Internet Protocol, version 6
M3UA	SS7 MTP3 User Adaptation layer
ML/MC-PPP	Muti-Link/Multi-Class PPP
MPLS	Multiprotocol Label Switching
MTP3-B	Message Transfer Part level 3 for Q.2140
PLMN	Public Land Mobile Network
PPP	Point-to-Point protocol
PPPMux	PPP Multiplexing
QoS	Quality of Service
RNC	Radio Network Controller
RNSAP	Radio Network Subsystem Application Part
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
UDP	User Datagram Protocol
UE	User Equipment

4 Data Link Layer

4.1 ATM Transport Option

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

4.2 IP Transport Option

A UTRAN Node supporting IP transport option shall support PPP protocol with HDLC framing [18], [19].

Note: This does not preclude the single implementation and use of any other data link layer protocols (e.g. PPPMux/AAL5/ATM [27, 28], PPP/AAL2/ATM, Ethernet, MPLS/ATM [29], etc.) fulfilling the UTRAN requirements toward the upper layers.

An RNC using IP transport option having interfaces connected via slow bandwidth PPP links like E1/T1/J1 shall also support IP Header Compression [20] and the PPP extensions ML/MC-PPP [21], [22]. In this case, negotiation of header compression [20] over PPP shall be performed via [23].

5 RNSAP Signalling Bearer

5.1 Introduction

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

The following requirements on the RNSAP 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 UEs;
- supervise the "UE connections" and provide connection status information to the Upper Layers for individual UEs;
- provide networking and routing functions;
- provide redundancy in the signalling network;
- provide load sharing.

5.2 Signalling Bearer

This subclause refers to specifications of the Signalling Bearer for the Radio Network Layer protocols. As shown in figure 1, the standard allows operators to choose one out of three protocol suites for transport of SCCP messages.

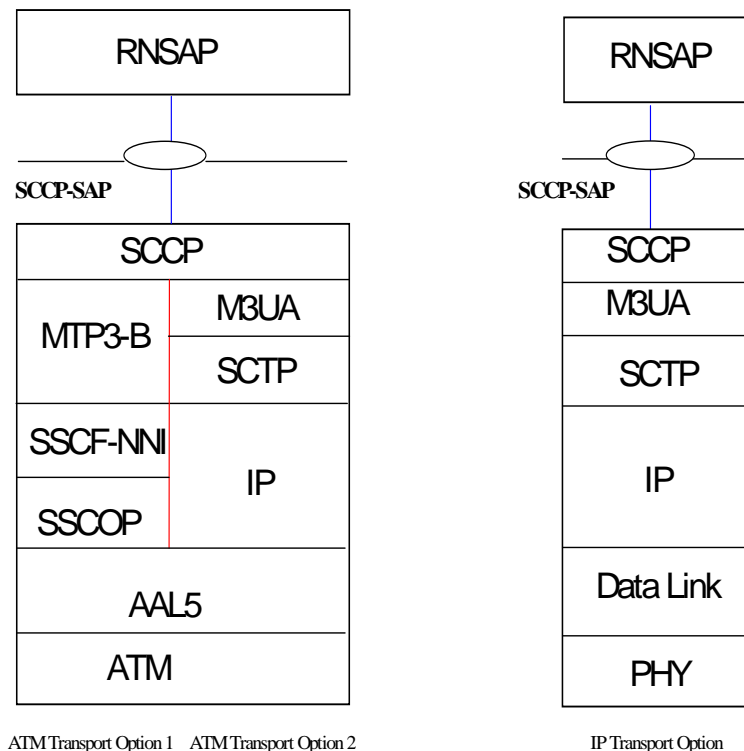


Figure 1: Signalling bearer for RNSAP

5.2.1 ATM Option 1

1. **SCCP** [7] or [32] 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] or [31] 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] or [33], - **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].

5.2.2 ATM Option 2

1. **SCCP**. See subclause 5.2.1
2. **M3UA** refers to the SCCP adaptation layer "SS7 MTP3 - User Adaptation Layer"[17] also developed by the Sigtran working group of the IETF. An RNC equipped with the M3UA stack option shall support both the client and the server functionality towards another RNC. This enables the RNC to report to another RNC when it is a newly introduced entity in the network.

3. **SCTP** refers to the Stream Control Transmission Protocol [16] developed by the Sigtran working group of the IETF for the purposes of transporting various signalling protocols over IP networks. The checksum method specified in RFC 3309 [30] shall be used instead of the method specified in RFC 2960 [16].
4. **IP** [13] over ATM is defined in [14] and [15].
5. **ATM** [5].

5.2.3 IP Transport Option

1. **SCCP**. See subclause 5.2.1.
2. **M3UA**: See subclause 5.2.2.
3. **SCTP**. See subclause 5.2.2. In addition, Multi-homing is a way to achieve redundancy with SCTP between two endpoints, of which one or both is assigned with multiple IP addresses. SCTP endpoints shall support a multi-homed remote SCTP endpoint.
4. **IP**. An IP UTRAN Node shall support IPv6 [23]. The support of IPv4 [13] is optional.

NOTE: This does not preclude single implementation of IPv4.

IP dual stack support is recommended for the potential transition period from IPv4 to IPv6 in the transport network

IP Differentiated Services code point marking [25] shall be supported. The Diffserv code point may be determined from the application parameters.

5. Data link layer is as specified in chapter 4.2.

5.3 Services Provided by the Signalling Bearer

When considering the requirements that the upper layers, i.e. RNSAP, 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 the references [7] to [12] or [32].

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 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-99753	3.2.0	Approved at TSG RAN #6
RAN_07	3.2.0	-	-	3.3.0	Approved at TSG RAN #7
RAN_08	3.3.0	-	RP-000240	3.4.0	Approved at TSG RAN #8
RAN_09	3.4.0	-	-	3.4.1	Updated rapporteur information
RAN_10	3.4.1	008	RP-000617	3.5.0	Approved at TSG RAN #10

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
March 01	11	-	-		Approved at TSG RAN #11 and placed under Change Control	-	4.0.0
12/2001	14	RP-010854	010		Reference corrections	4.0.0	4.1.0
03/2002	15	RP-020189	011	1	Introduction of IP transport in UTRAN.	4.1.1	5.0.0
09/2002	17	RP-020611	012	1	Addition of new reference on SCTP checksum	5.0.0	5.1.0
12/2003	22	-	-	-	Introduction of Release 6 specification	5.1.0	6.0.0
06/2005	28	RP-050234	016	-	Correction of M3UA references	6.0.0	6.1.0
12/2005	30	RP-050690	017	-	M3UA Client in IP Transport Option	6.1.0	6.2.0
12/2005	30	RP-050691	018	1	Addition of ANSI protocol options	6.1.0	6.2.0
03/2006	31	-	-	-	Introduction of Release 7 specification	6.2.0	7.0.0
09/2007	37	RP-070579	022	1	Multi-homing in IP Transport Option	7.0.0	7.1.0

History

Document history		
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