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Technical Specification

Universal Mobile Telecommunications System (UMTS); UTRAN Iur and Iub interface data transport & transport signalling for DCH data streams (3GPP TS 25.426 version 5.2.0 Release 5)

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Contents

Foreword

This Technical Specification 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:

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x   the first digit:

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2   presented to TSG for approval;

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y   the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

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1 Scope

The present document specifies the transport bearers for the DCH data streams on UTRAN Iur and Iub interfaces. The corresponding Transport Network Control plane is also specified. The physical layer for the transport bearers is outside the scope of the present document.

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 Iur and Iub User interface plane protocols for DCH data streams".

[2]   ITU-T Recommendation I.361 (11/95): "B-ISDN ATM layer specification".

[3]   ITU-T Recommendation I.363.2 (11/2000): "B-ISDN ATM Adaptation Layer specification; Type 2 AAL".

[4]   ITU-T Recommendation I.366.1 (6/98): "Segmentation and Reassembly Service Specific Convergence Sublayer for the AAL type 2".

[5]   ITU-T Recommendation Q.2630.1 (12/99): "AAL type 2 signalling protocol (Capability Set 1)".

[6]   ITU-T Recommendation E.191 (03/00): "B-ISDN addressing".

[7]   ITU-T Recommendation X.213 (11/95): "Information Technology - Open Systems Interconnection - Systems Interconnection - Network Service Definition".

[8]   ITU-T Recommendation Q.2110 (7/94): "B-ISDN ATM adaptation layer - Service Specific Connection Oriented Protocol (SSCOP)".

[9]   ITU-T Recommendation Q.2130 (7/94): "B-ISDN signalling ATM adaptation layer - Service Specific Coordination Function for Support of Signalling at the User-Network Interface (SSCF at UNI)".

[10]   ITU-T Recommendation Q.2150.2 (12/99): "AAL type 2 signalling transport converter on SSCOP)".

[11]   ITU-T Recommendation Q.2210 (7/96): Message transfer part level 3 functions and messages using the services of the ITU-T Recommendation Q.2140".

[12]   ITU-T Recommendation Q.2140 (2/95): "B-ISDN ATM adaptation layer - Service Specific Coordination Function for Support of Signalling at the Network Node Interface (SSCF at NNI)".

[13]   ITU-T Recommendation Q.2150.1 (12/99): "AAL type 2 signalling transport converter on broadband MTP".

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

[15]   IETF RFC 1483 (July 1993): "Multiprotocol Encapsulation over ATM Adaptation Layer 5".

[16]   IETF RFC 2225 (April 1998): "Classical IP and ARP over ATM".

[17]   IETF RFC 768 (August 1980): "User Datagram Protocol".

[18]   IETF RFC 2960 (October 2000): "Stream Control Transmission Protocol".

[19]   G. Sidebottom et al, "SS7 MTP3 - User Adaptation Layer", draft-ietf-sigtran-m3ua-12.txt (Work In Progress), IETF, February 2002.

[20]   ITU-T Recommendation I.630 (2/99): "ATM protection switching".

[21]   ITU-T Recommendation Q.Imp2210: "Implementor's guide (03/99) for Recommendation Q.2210 (07/96)".

[22]   ITU-T Recommendation Q.2630.2 (12/2000): "AAL type 2 signalling protocol (Capability Set 2)".

[23]   IETF STD 51, RFC 1661 (July 1994): "The Point-To-Point Protocol (PPP)".

[24]   IETF STD 51, RFC 1662 (July 1994): "PPP in HDLC-like Framing".

[25]   IETF RFC 2507, (February 1999): "IP header compression".

[26]   IETF RFC 1990 "The PPP Multilink Protocol (MP)".

[27]   IETF RFC 2686 "The Multi-Class Extension to Multi-Link PPP".

[28]   IETF RFC 2509, (February 1999):"IP Header Compression over PPP".

[29]   IETF RFC 2460 "Internet Protocol, Version 6 (IPv6) Specification".

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

[31]   IETF RFC 768 (8/1980): "User Datagram Protocol".

[32]   IETF RFC 3153 (August 2001): "PPP Multiplexing".

[33]   IETF RFC 2364 (July 1998): "PPP over AAL5".

[34]   IETF RFC 3031 (January 2001): "Multiprotocol Label Switching Architecture".

[35]   "IP-ALCAP" [ffs]

[36]   ITU-T Recommendation E.164 (5/97): " The international public telecommunication numbering plan ".

[37]   RFC 3309: "SCTP Checksum Change".

3   Definitions and abbreviations

3.1   Definitions

For the purposes of the present document, the following term and definition applies:

ALCAP: transport signalling protocol used to setup and tear down transport bearers

3.2   Abbreviations

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

AAL2	ATM Adaptation Layer type 2
AESA	ATM End System Address
ATM	Asynchronous Transfer Mode
CPCS	Common Part Convergence Sublayer

CPS	Common Part Sublayer
DCH	Dedicated Channel
HDLC	High level Data Link Control
IP	Internet Protocol
LC	Link Characteristics
M3UA	SS7 MTP3 User Adaptation layer
ML/MC	Multi-link / Multi-class
MPLS	Multiprotocol Label Switching
MTP	Message Transfer Part
NNI	Network-Node Interface
NSAP	Network Service Access Point
PPP	Point to Point Protocol
PT	Path Type
SAAL	Signalling ATM Adaptation Layer
SAR	Segmentation and Reassembly
SCTP	Stream Control Transmission Protocol
SSCF	Service Specific Co-ordination Function
SSCOP	Service Specific Connection Oriented Protocol
SSCS	Service Specific Convergence Sublayer
SSSAR	Service Specific Segmentation and Reassembly sublayer
STC	Signalling Transport Converter
TNL-IWU	Transport Network Layer Interworking Unit
UDP	User Datagram Protocol
UNI	User-Network Interface

4 Data Link Layer

4.1 ATM Transport Option

ATM shall be used in the transport network user plane and transport network control plane according to I.361 [2].

4.1.1 Protection Switching at ATM Layer

If redundancy of pathways at ATM Layer between RNC and Node B is supported, it shall be implemented using ATM Protection Switching according to I.630 [20].

4.2 IP Transport Option

A UTRAN node supporting IP transport option shall support PPP protocol [23] with HDLC framing [24].

NOTE: This does not preclude the single implementation and use of any other L2/L1 protocols (e.g. PPPMux/AAL5/ATM [32], [33], PPP/AAL2/ATM, Ethernet, MPLS/ATM [34], etc.) fulfilling the UTRAN requirements towards the upper layers.

A UTRAN node supporting IP transport option and having interfaces connected via slow bandwidth PPP links like E1/T1/J1 shall also support IP Header Compression [25] and the PPP extensions ML/MC-PPP [26], [27]. In this case the negotiation of header compression [20] over PPP shall be performed via [28].

5 I$_{ur}$ and I$_{ub}$ Data Transport for DCH Data Streams

5.1 Introduction

The Frame Protocol for DCH data streams [1] is the user of the transport layer specified in the present document.

There are two options for the transport layer of the DCH data streams in Iur and Iub:

1) ATM based transport (ATM Transport Option)

2) IP based transport (IP Transport Option)

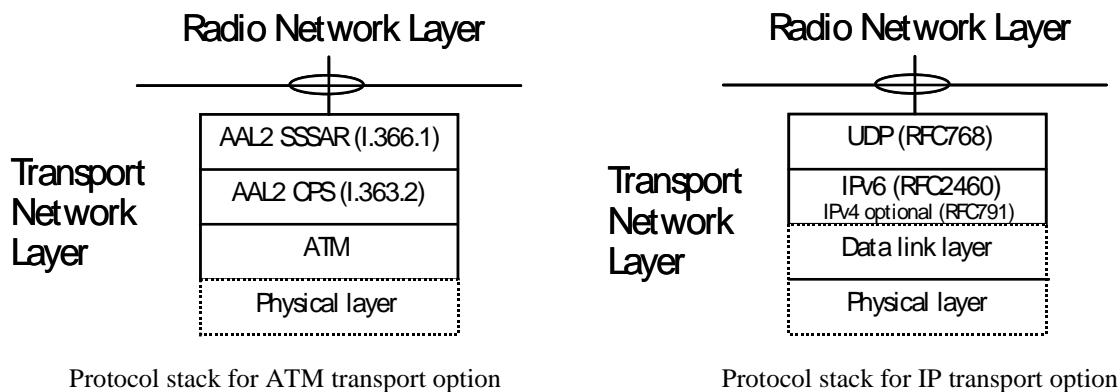The following figure shows the protocol stacks of the two options.

Protocol stack for ATM transport option   Protocol stack for IP transport option

Figure 1: Transport network layer for DCH data streams over Iur and Iub interfaces

5.2 ATM Transport Option

Asynchronous Transfer Mode (ATM) [2] and ATM Adaptation Layer type 2 (AAL2) [3, 4] are used as a transport layer for DCH data streams on Iur and Iub interfaces. Service Specific Segmentation and Reassembly (SSSAR) sublayer for AAL2 is used for the segmentation and reassembly of AAL2 SDUs.

5.3 IP Transport Option

UDP [17] over IP shall be supported as the transport for DCH data streams on Iub and Iur interfaces. The data link layer is as specified in chapter 4.2.

An IP UTRAN Node shall support IPv6. The support of IPv4 is optional.

NOTE: This does not preclude single implementation and use of IPv4.

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

The transport bearer is identified by the UDP port number and the IP address (source UDP port number, destination UDP port number, source IP address, destination IP address).

IP Differentiated Services code point marking [30] shall be supported. The Diffserv code point may be determined from the application parameters.

6 Transport Signalling Application for DCH Data Streams

6.1 Introduction

This chapter specifies the ALCAP protocol(s) to be used in Iur and Iub interfaces for DCH data streams.

6.2 ALCAP in ATM Transport Option

AAL2 signalling protocol Capability Set 2 [22] is the signalling protocol to control AAL2 connections on Iub and Iur interfaces. Q.2630.2 [22] adds new optional capabilities to Q.2630.1 [5].

Binding ID provided by the radio network layer shall be copied in SUGR parameter of ESTABLISH.request primitive of [22].

User Plane Transport bearers for Iur interface are established, in all normal cases released and optionally modified by the ALCAP in the Serving RNC. The binding identifier shall already be assigned and tied to a radio application procedure when the Establish Request message is received over the Iur interface in the Drift RNC.

User Plane Transport bearers for Iub interface are established, in all normal cases released and optionally modified by the ALCAP in the Controlling RNC. binding identifier shall already be assigned and tied to a radio application procedure when the Establish Request message is received over the Iub interface in the Node B. In case of a Reset initiated by the CRNC, the ALCAP in the Node B shall release the transport bearers involved in the impacted Node B Communication Contexts. The Node B shall also initiate release of the user plane transport bearers for the removed dedicated channels that were remaining within the cell when the cell is deleted.

AAL2 transport layer addressing is based on embedded E.164 or other AESA variants of the NSAP addressing format [6, 7]. Native E.164 addressing [36] shall not be used.

The Link Characteristics parameter (LC) shall be included in the Establish Request message and in the Modification Request message of AAL2 signalling protocol.

If there is an AAL2 switching function in the transport network layer of the interface, the Path Type parameter (PT) may be included in the Establish Request message of AAL2 signalling protocol for prioritisation at ATM level.

6.3 ALCAP in IP Transport Option

An ALCAP protocol is not required in case both UTRAN nodes are using the IP transport option.

Application of ALCAP in IP to ATM interworking case is defined in chapter 9 of this Technical Specification.

7 Signalling Bearer for ALCAP on I$_{ub}$ Interface

7.1 Introduction

This clause specifies the signalling bearer for the ALCAP on Iub interface.

7.2 Signalling Bearer in ATM Transport Option

SAAL-UNI [8, 9] is used as the signalling bearer for the AAL Type 2 Signalling protocol on Iub interface. Signalling Transport Converter for SSCOP is applied [10]. The following figure shows the signalling bearer protocol stack for the ALCAP on Iub interface.
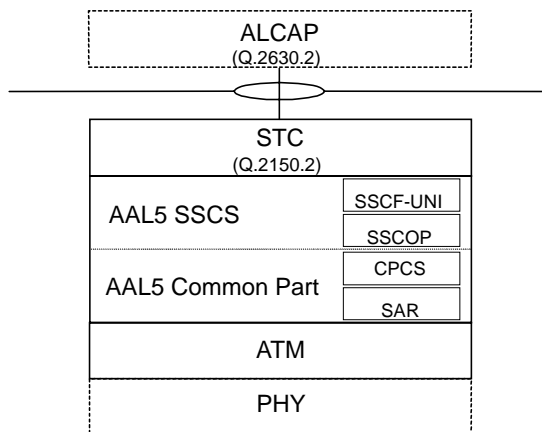
Figure 2: Signalling bearer for ALCAP on Iub interface

7.3 Signalling Bearer in IP Transport Option

An ALCAP protocol is not required in case both UTRAN nodes are using the IP transport option.

8 Signalling Bearer for ALCAP on I_{ur} Interface

8.1 Introduction

This clause specifies the signalling bearer for the ALCAP on the Iur interface.

8.2 Signalling Bearer in ATM Transport Option

There are two protocol stacks specified for Iur ALCAP Signalling Bearer in ATM option - one based on MTP-3B [11, 21] and SAAL-NNI [12, 8] and the other based on SCTP [18]. Signalling Transport Converter for MTP-3B is applied [13]. MTP-3 User Adaptation Layer (M3UA) for SCTP is applied [19]. Classical IP over ATM is specified in [16]. Multiprotocol Encapsulation over AAL5 is specified in [15].The checksum method specified in RFC 3309 [37] shall be used instead of the method specified in RFC 2960 [18]. The following figure shows the signalling bearer protocol stacks for the ALCAP on Iur interface.
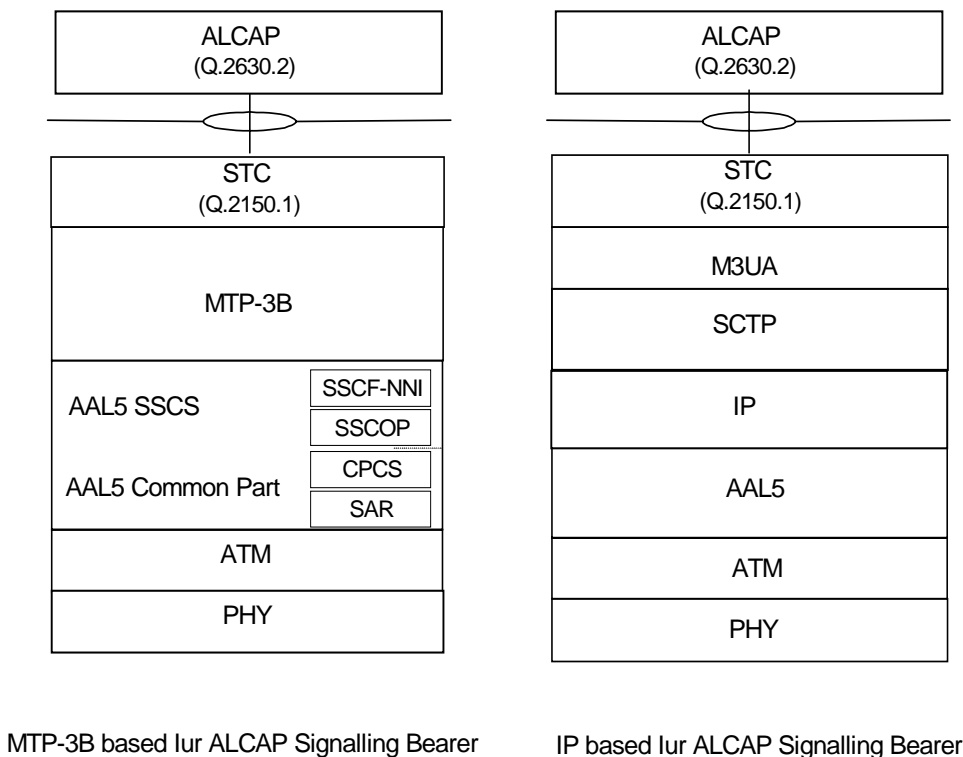
ALCAP (Q.2630.2)	ALCAP (Q.2630.2)
STC (Q.2150.1)	STC (Q.2150.1)
MTP-3B	M3UA
	SCTP
AAL5 SSCS — SSCF-NNI / SSCOP; AAL5 Common Part — CPCS / SAR	IP
	AAL5
ATM	ATM
PHY	PHY

MTP-3B based Iur ALCAP Signalling Bearer   IP based Iur ALCAP Signalling Bearer

Figure 3: Signalling bearers for ALCAP on Iur interface

8.3 Signalling Bearer in IP Transport Option

An ALCAP protocol is not required in case both UTRAN nodes are using the IP transport option.

9 Interworking between ATM and IP Transport Options

9.1 Introduction

This clause specifies the interworking between IP and ATM transport options. A UTRAN node supporting IP transport option shall provide interworking to a UTRAN node supporting only ATM transport option.

9.2 Interworking Alternatives

For interworking with a UTRAN node supporting only ATM option, the UTRAN node supporting IP option shall additionally support at least one of the following interworking mechanisms:

1) ATM&IP dual stack. An ALCAP protocol is not required in this interworking solution

2) Interworking Function (IWF) as a logical part of the UTRAN node supporting IP option. AAL2 signalling protocol Capability Set 2 [22] shall be supported as ALCAP protocol between the Interworking Function and the UTRAN node supporting ATM transport option.

3) Interworking Unit (IWU) as a logically separate unit. An IP-ALCAP protocol shall be used in the interface between the UTRAN node supporting IP option and the Interworking Unit.

9.3   IP-ALCAP for the Interworking

In the third interworking alternative as introduced in chapter 9.2, IP-ALCAP protocol [35] is used as the IP-ALCAP protocol between the UTRAN node supporting IP option and the Transport Network Layer Interworking Unit.

[ffs]

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_07	3.1.0	-	-	3.2.0	Approved at TSG RAN #7
RAN_08	3.2.0	-	RP-000247	3.3.0	Approved at TSG RAN #8
RAN_09	3.3.0	003 004 006	RP-000383	3.4.0	Approved at TSG RAN #9
RAN_10	3.4.0	007 008 009	RP-000624	3.5.0	Approved at TSG RAN #10
RAN_11	3.5.0	010 011	RP-010121	3.6.0	Approved at TSG RAN #11

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
March 01	11	RP-010162	13		Approved at TSG RAN #11 and placed under Change Control	-	4.0.0
March 01	11	RP-010163	12		Approved at TSG RAN #11 and placed under Change Control	-	4.0.0
12/2001	14	RP-010859	015		Reference corrections	4.0.0	4.1.0
12/2001	14	RP-010859	017	1	Correction to Figure 3	4.0.0	4.1.0
03/2002	15	RP-020173	021		Correction to transport bearers release initiation	4.1.0	4.2.0
03/2002	15	RP-020189	022	2	Introduction of IP transport option in UTRAN	4.2.0	5.0.0
06/2002	16	RP-020410	025		Correction of Aesa formats	5.0.0	5.1.0
09/2002	17	RP-020611	026	1	Addition of new reference on SCTP checksum	5.1.0	5.2.0

History

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