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*Technical Specification*

## **3<sup>rd</sup> Generation Partnership Project (3GPP); Technical Specification Group (TSG) RAN; UTRAN Iu Interface Data Transport and Transport Signalling**

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Reference

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# Foreword

This Technical Specification has been produced by the 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 this TS, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version 3.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 Indicates TSG approved document under change control.

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 specification.

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# 1 Scope

The present document specifies the standards for user data transport protocols and related signalling protocols to establish user plane transport bearers over the UTRAN Iu interface.

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## 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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] ITU-T Recommendation I.361 (2/1999): "B-ISDN ATM Layer Specification".
- [2] ITU-T Recommendation I.363.2 (9/1997): "B-ISDN ATM Adaptation Layer Type 2 Specification".
- [3] ITU-T Recommendation I.363.5 (8/1996): "B-ISDN ATM Adaptation Layer Type 5 Specification".
- [4] ITU-T Recommendation I.366.1 (6/1998): "Segmentation and Reassembly Service Specific Convergence Sublayer for the AAL Type 2".
- [5] ITU-T Recommendation E.164 (5/1997): "Numbering Plan for the ISDN Era".
- [6] ITU-T Recommendation Q.2110 (7/1994): "B-ISDN ATM Adaptation Layer-Service Specific Connection Oriented Protocol (SSCOP)".
- [7] ITU-T Recommendation Q.2140 (2/1995): "B-ISDN ATM Adaptation Layer-Service Specific Coordination Function for Support of Signalling at the Network Node Interface (SSCF-NNI)".
- [8] ITU-T Recommendation Q.2150.1 (1999): "B-ISDN ATM Adaptation Layer-Signalling Transport Converter for the MTP3b".
- [9] ITU-T Recommendation Q.2210 (7/1996): "Message Transfer Part level 3 functions and messages using the services of ITU-T Recommendation Q.2140".
- [10] ITU-T Recommendation Q.2630.1 (1999): "AAL type 2 Signalling Protocol (Capability Set 1)".
- [11] ITU-T Recommendation X.213 (8/1997): "Information Technology-Open Systems Interconnection-Network Service Definitions".
- [12] IETF RFC 768 (8/1980): "User Datagram Protocol".
- [13] IETF RFC 791 (9/1981): "Internet Protocol".
- [14] IETF RFC 1483 (7/1993): "Multiprotocol Encapsulation over ATM Adaptation Layer 5",
- [15] IETF RFC 2225 (4/1998): "Classical IP and ARP over ATM",
- [16] IETF RFC 2460 (12/1998): "Internet Protocol, Version 6 (Ipv6) Specification".
- [17] 3G TS 29.060: "3GPP; TSG CN; GPRS; GPRS Tunnelling Protocol (GTP)".
- [18] ITU-T Rec. **I.630** (2/99) ATM Protection Switching

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## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

ALCAP            Generic name for the transport signalling protocols used to set-up and teardown transport bearers.

### 3.2 Symbols

### 3.3 Abbreviations

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

AAL	ATM Adaptation Layer
AESA	ATM End System Address
ALCAP	Access Link Control Application Part
ARP	Address Resolution Protocol
ATM	Asynchronous Transfer Mode
RFC	Request For Comment
CN	Core Network
GTP	GPRS Tunnelling Protocol
IP	Internet Protocol
MTP3b	Message Transfer Part level 3 for Q.2140
NSAP	Network Service Access Point
PDU	Protocol Data Unit
RNC	Radio Network Controller
SAR	Segmentation and Reassembly
SCCF-NNI	Service Specific Coordination Function-Network Node Interface
SSCOP	Service Specific Connection Oriented Protocol
SSCS	Service Specific Convergence Sublayer
UDP	User Datagram Protocol
VC	Virtual Circuit

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## 4 ATM Layer

### 4.1 General

ATM shall be used in the transport network user plane and the transport network control plane according to I.361[1].

### 4.2 Protection Switching at ATM Layer

If redundancy of pathways at ATM layer between CN and RNC is supported, it shall be implemented using ATM Protection Switching according to I.630 [18].

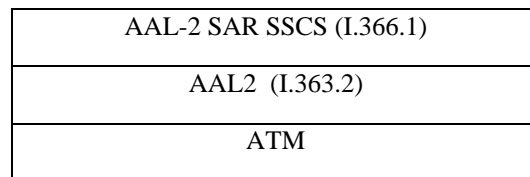
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## 5 Circuit switched domain

### 5.1 Transport network user plane

#### 5.1.1 General

The following figure shows the protocol stack for the transport network user plane on the Iu interface towards the circuit switched domain.



#### 5.1.2 ATM Adaptation Layer 2

##### 5.1.2.1 AAL2-Segmentation and Reassembly Service Specific Convergence Sublayer (I.366.1)

AAL2 segmentation and reassembly shall be used according to I.366.1[4].

##### 5.1.2.2 AAL2-specification (I.363.2)

AAL2 shall be used according to I.363.2 [2].

### 5.2 Transport network control plane

#### 5.2.1 General

The following figure shows the protocol stack for the transport network control plane on the Iu interface towards the circuit switched domain.

AAL2 connection signalling (Q.2630.1)
AAL2 Signalling Transport Converter for MTP3b (Q.2150.1)
MTP3b
SSCF-NNI
SSCOP
AAL5
ATM

## 5.2.2 Signalling protocol (ALCAP)

### 5.2.2.1 AAL2 Signalling Protocol (Q.2630.1)

Q.2630.1 [10] shall be used for establishing AAL2 connections towards the circuit switched domain. The AAL2 transport layer uses the embedded E.164 [5] or AESA variants of the NSAP addressing formats [11]. Native E.164 addressing shall not be used.

Binding ID provided by the radio network layer shall be copied in SUGR parameter of ESTABLISH.request primitive of [10]

## 5.2.3 Signalling transport converter

### 5.2.3.1 AAL2 MTP3B Signalling Transport Converter (Q.2150.1)

The AAL2 MTP3b Signalling Transport Converter shall be used according to Q.2150.1 [8].

## 5.2.4 MTP3b (Q.2210)

MTP3b shall be used according to Q.2210 [9].

## 5.2.5 SSCF-NNI (Q.2140)

SSCF-NNI shall be used according to Q.2140 [7].

## 5.2.6 SSCOP (Q.2110)

SSCOP shall be used according to Q.2110 [6].

## 5.2.7 ATM Adaptation Layer Type 5 (I.363.5)

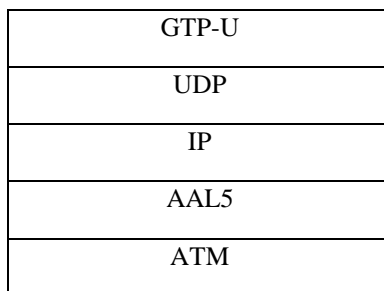
AAL5 shall be used according to I.363.5 [3].

## 6 Packet switched domain

### 6.1 Transport network user plane

#### 6.1.1 General

The following figure shows the protocol stack for the transport network user plane on the Iu interface towards the packet switched domain.



The protocol architecture for the User Plane of the Iu interface towards the packet switched domain shall be GTP-U [17] over UDP over IP over AAL5 over ATM. One or several AAL5/ATM permanent VC's may be used as the common layer 2 resources between the UTRAN and the packet switched domain of the CN.

One switched VC may be used per user flow. The standardisation of the procedures and protocols for use of Switched VC is outside the scope of 3GPP.

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

#### 6.1.2 GTP-U

The GTP-U [17] protocol shall be used over the Iu interface toward the packet switched domain.

#### 6.1.3 UDP /IP

The path protocol used shall be UDP [12], which is specified in RFC 768. Both the Ipv4 [13] and Ipv6 [16] IP protocols shall be supported which are specified in RFC 791 (Ipv4) or RFC 2460 (Ipv6).

The IP addresses for the CN and RNC nodes are exchanged using RANAP signalling. The packet processing function in the CN sends downstream packets to the RNC IP address received in the RANAP signaling. The packet processing function in the RNC sends upstream packets to the CN IP address received in the RANAP signaling.

The GTP UDP port number 3386 is used for the destination port for signalling request messages and T-PDUs. The sending node locally allocates the UDP source port number. For signalling response messages, the UDP destination port is the value of the UDP source port of the corresponding signalling request message. The UDP source port is the value of the UDP destination port of the corresponding signalling request message.

#### 6.1.4 ATM Adaptation Layer Type 5 (I.363.5)

AAL5 shall be used according to I.363.5 [3].

AAL5 virtual circuits are used to transport the IP packets across the Iu interface toward the packet switched domain. Multiple VCs can be used over the interface. There is a one-to-one relationship between the VC and the IP address as required by Classical IP over ATM. An association must be made between a peer node's IP address and a VC. This

association can be made using O&M or using ATM Inverse ARP according to Classical IP over ATM when PVCs are used.

### **6.1.5 IP/ATM**

Classical IP over ATM protocols are used to carry the IP packets over the ATM transport network when PVCs are used. Classical IP over ATM is specified in IETF RFC 2225 [15]. Multiprotocol Encapsulation over AAL5 is specified in IETF RFC 1483 [14].

## **6.2 Transport network control plane**

ALCAP is not required over the Iu interface towards the packet switched domain.

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## History

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