

UMTS 23.30 V1.0.0 (1999-02)

Technical Report

Universal Mobile Telecommunications System (UMTS); Iu Principles (UMTS 23.30 version 1.0.0)



UMTS

Universal Mobile
Telecommunications System



Reference
<WORKITEM> (lko00i04.PDF)
Keywords
<keyword[, keyword]>

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Foreword

This draft Technical Report (TR) has been produced by the Special Mobile Group (SMG) of the European Telecommunications Standards Institute (ETSI).

This document is to analyze the basic issues related to the Iu before starting the actual standardisation of the related interface(s)

The contents of this TR are subject to continuing work within SMG and may change following formal SMG approval. Should SMG modify the contents of this TR it will then be republished by ETSI with an identifying change of release date and an increase in version number as follows:

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- x the second digit is incremented for all other types of changes, i.e. technical enhancements, corrections, updates, etc.
- y the third digit is incremented when editorial only changes have been incorporated in the specification.

Introduction

The Iu reference point of UMTS is defined to be at the boundary of the UTRAN and the IWU [1]. In case the IWU is null, the Iu is between UTRAN and CN. The purpose of this document is to analyze the basic issues related to the Iu before starting the actual standardisation of the related interface(s).

1 Scope

This report identifies the requirements on the Iu and studies relevant principles to guide further standardisation of the related interface(s).

The different instances of the UMTS radio access and core networks currently identified are the following:

UMTS radio access network (URAN)

| | |
|---|--------------|
| UMTS Terrestrial Radio Access Network (UTRAN) | SMG2 |
| Broadband Radio Access Network (BRAN) | BRAN project |
| UMTS satellite radio access network | SES |

UMTS core network (CN)

| | |
|------------------|------|
| GSM/UMTS CN | SMG3 |
| N/B-ISDN/UMTS CN | NA |

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] UMTS 23.01: "Universal Mobile Telecommunications System (UMTS): General Architecture".

[2] UMTS 23.10: "UMTS Access Stratum, Services and Functions"

3 Definitions, symbols and abbreviations

3.1 Definitions

Terms introduced in this document:

TBD

3.2 Symbols

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

TBD

3.3 Abbreviations

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

TBD

4 Iu requirements

4.1 General Requirements

1) The Iu shall support all service capabilities offered to UMTS users

Iu shall particularly cater for a variety of services e.g. classical telephony, internet-based services (www, e-mail etc.), and multimedia services. This implies that Iu supports efficiently:

- dedicated circuits, especially for voice
- best-effort packet services (e.g. Internet/IP)
- real-time multimedia services requiring a higher degree of QoS. These real time services may be based on real-time packet data or circuit-switched data.
- UMTS signalling and backward compatibility towards GSM signalling scheme.

2) The Iu shall support separate evolution of O&M facilities

3) The Iu shall support separation of each User Equipment (UE) on the protocol level for mobile specific signalling management.

4) The Iu shall support transfer of transparent non-access signalling between UE and CN.

5) The Iu shall support procedures to establish, maintain and release various types of Iu bearers.

6) The Iu shall support procedures for Intersystem handover, and the CN shall support corresponding switching capability.

7) The Iu shall support mechanisms for resource reservation for packet data streams (e.g. IP)8) The specifications, for the Control and User planes, of the I_U shall be such that the Radio Network Layer and the Transport Layer are independent, allowing either layer to change without impacting the other layer.

9) The Transport Layer Protocols and the Radio Network Layer Protocols, for the Control and User planes, of the I_U shall be specified in separate documents, allowing for either document to change without impacting the other document.

4.2 UMTS Terrestrial Radio Access Network (UTRAN)

1) (Not used)

2) The design of Iu shall support connection of UTRAN via IWF to A and Gb interfaces of GSM.

3) The Iu shall support connection of various manufacturers' URANs to various manufacturers' IWF/CN

4) The Iu shall support separate evolution of URAN and IWF/CN

5) "The specification of the Iu shall cater for both the circuit switched (GSM) and packet (GPRS) domains. In order to enable each domain to develop according to their specific characteristics, Iu shall allow different protocol stacks towards the PSTN/ISDN domain and the IP domain.6) The Iu shall support the combined process of relocating the SRNS role to another RNS and changing the Iu connection point for a specific UE (streamlining) and the CN shall support switching capability.

- 7) As long as the Iu connection point is not modified, the UTRAN can be requested by the CN to prevent all loss of data (i.e. independently of the handovers on the radio interface).
 - 8) In case the Iu connection point is changed (e.g. SRNS relocation, streamlining), the prevention of the loss of data may not be guaranteed autonomously by the UTRAN but would rely on some functions in the CN.
 - 9) A single set of radio access bearer services shall be offered by the UTRAN to the Core Network.
 - 10) There shall be a single functional split between the UTRAN and the Core Network.
 - 11) A single Access Stratum signalling protocol between the UTRAN and the Core Network over Iu shall be defined to access the services provided by UTRAN.
- Note: The statements 9, 10 and 11 apply regardless of the scenario applied for the Core Network.
- 12) If the GSM/UMTS Core Network consists of different core network node types, UTRAN shall support simultaneous access to these node types for one UE.

(Editorial: this requirement is moved to the working assumption section)

- 14) The Iu shall support general procedures that are not related to a specific UE. Such procedures may be used e.g. in failure situations, for flow control in procedure level, or in the initialisation phase (this does not refer to O&M procedures).
- 15) (Not used)
- 16) The Iu shall support a set of general UTRAN procedures from the Core Network such as paging -notification
- 17) (Not used)
- 18) The Iu shall support procedures to establish, maintain and release various types of UTRAN Radio Access Bearers.
- 19) The Iu shall enable the CN node to request UTRAN to obtain and send the location information for a specific UE located in the coverage of the present UTRAN. The location information consists of both a geographic area identity and a set of global co-ordinates with uncertainty parameters

4.3 UMTS Satellite Radio Access Network (USRAN)

- 1) The Iu shall support connection to UMTS Satellite Radio Access Network (USRAN)
- 2) The Iu shall support low rate source encoded speech;
- 3) [The Iu shall support radio access and link control protocols that are tolerant to changes in delay at handovers.]

(Editorial, Requirement 3 is currently put into brackets since Iu related requirements related to handover scenarios including Satellite based access are for further study)

- 4) The Iu shall ensure that location information wherever and whenever present, shall support global co-ordinate formats.
- 5) The Iu shall support connection establishment protocols working over radio resources of different power and penetration levels such as to request the user to move to a more favourable location to complete the establishment of the connection.
- 6) The Iu shall support low rate data services.

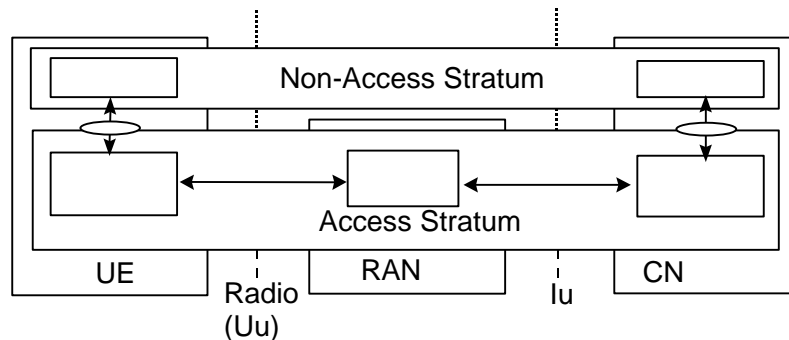
4.4 Broadband Radio Access Network (BRAN)

1. The Iu shall support connection of an EP BRAN HIPERLAN 2 radio access network.
2. The Iu shall support high data rates according to the capability of HIPERLAN2.

3. The Iu shall support UMTS QoS mechanisms also for high data rate services according to the capability of HIPERLAN2.
4. The Iu shall support handover within/between HIPERLAN2 radio access networks.
5. The Iu shall support handover between HIPERLAN 2 and UTRAN. Other systems are ffs.

5 Access stratum vs. Non-access stratum

The Access Stratum (AS) offers its services to the Nonaccess Stratum through SAPs in the UE and CN. These services are described in [2]. The Access Stratum contains a set of UE – RAN protocols and a set of RAN – CN protocols ref. [1].



6 Working Assumptions

6.1 General

- 1) The location of source dependent coding (e.g. video and voice) is ffs.
- 2) Transport protocol across the Iu interface for UTRAN shall be based on ATM.

6.2 Interface and protocols over Iu for UTRAN purposes

- 1) The UMTS standard shall allow for both separated and combined MSC/VLR and SGSN configurations
- 2) The UTRAN shall support two logically separate signalling flows via Iu to combined or separate network nodes of different types (MSC and SGSN)
- 3) The UE shall be able to handle separated or combined MSCs and SGSNs.
- 4) There can be several user planes to these CN nodes.

History

| Document History | | |
|------------------|-------|---|
| August 1997 | | Scope agreed |
| November 1997 | 0.1.0 | Version 0.1.0 mailed to SMG3 SA delegates prior to SMG3 SA meeting in Stockholm. |
| November 1997 | 0.1.1 | Version 0.1.1 presented at SMG3 SA in Stockholm |
| August 1998 | 0.2.0 | Version 0.2.0 with the changes agreed in the Sophia Antipolis meeting. |
| September 1998 | 0.3.0 | Version 0.3.0 with the changes agreed in the Rome meeting |
| October 1998 | 0.4.0 | Added req. due to Td 98S853. Added section "Access Stratum vs. Non-Access Stratum due to Td 98S864 |
| December 1998 | 0.5.0 | Restructured to handle different types of the UMTS radio access network |
| December 1998 | 0.6.0 | New USRAN and BRAN sections. New working assumptions. |
| February 1999 | 1.0.0 | Based on decisions in Walnut Creek and Kista meetings |
| | | (Editor : Bo Axerud, |