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Technical Specification

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Contents

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 x.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 document.

1 Scope

The present document is an introduction to the TSG RAN TS 25.45z series of UMTS Technical Specifications that define the Iupc Interface. The Iupc interface is a logical interface for the interconnection of Standalone A-GPS SMLC (SAS) and Radio Network Controller (RNC) components of the Universal Terrestrial Radio Access Network (UTRAN) for the UMTS system.

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] 3G TS 24.401: "UTRAN Overall Description".

[2] 3G TS 24.451: "UTRAN Iupc Interface: Layer 1".

[3] 3G TS 24.452: "UTRAN Iupc Interface: Signalling Transport".

[4] 3G TS 24.453: "UTRAN Iupc Interface PCAP Signalling".

[5] ITU-T Recommendation Q.711 (7/96): "Functional description of the signalling connection control part".

[6] ITU-T Recommendation Q.712 (7/96): "Definition and function of signalling connection control part messages".

[7] ITU-T Recommendation Q.713 (7/96): "Signalling connection control part formats and codes".

[8] ITU-T Recommendation Q.714 (7/96): "Signalling connection control part procedures".

[9] 3GPP TS 23.003: "Numbering, Addressing and Identification".

[10] 3GPP TS 23.110: "UMTS Access Stratum; Services and Functions".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

Standalone A-GPS SMLC (SAS): A logical node that interconnects to the RNC over the Iupc interface via the PCAP protocol. This node provides GPS related data to the RNC and may perform the position calculation function.

3.2 Abbreviations

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

AAL5	ATM Adaptation Layer type 5
A-GPS	Assisted GPS
ATM	Asynchronous Transfer Mode
CRNC	Controlling Radio Network Controller
GPS	Global Positioning System
GT	Global Title
IP	Internet Protocol
M3UA	SS7 MTP3 User Adaptation Layer
MTP	Message Transfer Part
PCAP	Position Calculation Application Part
RNC	Radio Network Controller
SAS	Standalone A-GPS SMLC
SCCP	Signalling Connection Control Part
SCTP	Stream Control Transmission Protocol
SMLC	Serving Mobile Location Centre
SPC	Signalling Point Code
SRNC	Serving Radio Network Controller
SS7	Signalling System N^{o} 7
SSCF-NNI	Service Specific Co-ordination Function – Network Node Interface
SSCOP	Service Specific Connection Oriented Protocol
SSN	Sub-System Number
UE	User Equipment
UMTS	Universal Mobile Telecommunication System
UTRAN	Universal Terrestrial Radio Access Network

4 General Aspects

4.1 Introduction

The logical interface between a RNC and a SAS within the UTRAN is referred to the Iupc interface.

4.2 Iupc Interface General Principles

The general principles for the specification of the Iupc interface are as follows:

- The Iupc interface should be open;
- Complex functionality shall as far as possible be avoided over Iupc. Advanced optimisation solutions may be added in later versions of the standard;
- From a logical standpoint, the Iupc is a point-to-point signalling interface between an RNC and SAS within the UTRAN, even though there may not be a direct physical connection between these two nodes;
- One RNC may connect to one SAS. One SAS may provide services to one RNC;
- Neither the physical structure nor any internal protocols of the RNC or SAS shall be visible over Iupc and are thus not limiting factors, e.g., when introducing future technology.

4.3 Iupc Interface Specification Objectives

The Iupc interface specifications shall facilitate the following:

- Inter-connection of RNCs and SASs from different manufacturers.

- Separation of Iupc interface Application functionality and Transport Network functionality to facilitate introduction of future technology.

4.4 Iupc Interface Capabilities

4.4.1 General

The Iupc interface connects a RNC and a SAS.

4.4.2 Position Calculation Services

The Iupc interface enables an SRNC and a SAS to exchange information that is related to the positioning of a single UE. These exchanges involve the transfer of GPS measurement data or UE position estimate data.

4.4.3 Information Exchange Services

The Iupc interface enables an RNC to request specific GPS related data from an SAS on demand, on modification, or at regular intervals.

4.5 Iupc Interface Characteristics

4.5.1 Uses of SCCP

4.5.1.1 General

The SCCP, [5], [6], [7], [8], is used to transport messages between the RNC and SAS. One user function of the SCCP, called Positioning Calculation Application Part (PCAP), is defined [4].

Both connectionless and connection-oriented procedures are used to support PCAP. TS 25.453 explain whether connection oriented or connectionless services should be used for a layer 3 procedure.

4.5.1.2 SCCP Addressing

The inclusion of caller party address in SCCP message is mandatory. PCAP may use SSN, SPC and/or GT and any combination of them as addressing schemes for the SCCP. When GT addressing is utilised, the following settings shall be used:

- SSN Indicator = 1 (PCAP SSN as defined in [9]).
- Global Title Indicator = 0100 (GT includes translation type, numbering plan, encoding scheme and nature of address indicator).
- Translation Type = 0000 0000 (not used).
- Numbering Plan = 0001 (E.163/4).
- Nature of Address Indicator = 000 0100 (International Significant Number).
- Encoding Scheme = 0001 or 0010 (BCD, odd or even).
- Routing indicator = 0 or 1 (route on GT or PC/SSN).

When used, the GT shall be the E.164 address of the relevant node.

4.5.1.3 SCCP connection establishment

Information Exchange services

A new SCCP connection is established when the RNC initiates a class-1 elementary procedure for Information Exchange services, unless there is an existing SCCP connection associated with Information Exchange services: in this case, the RNC may rely on the existing SCCP connection to initiate the class-1 elementary procedure.

An SCCP connection is always established by the RNC.

Initiation

The RNC sends SCCP connection request message to the SAS. A PCAP message is included in the user data field of the SCCP connection request message.

Termination

- **successful outcome**

- The SCCP connection confirm message, which may optionally contain a PCAP message in the user data field, is returned to the RNC.

- **unsuccessful outcome**

- If the SCCP signalling connection establishment fails, an SCCP connection refusal message will be sent back to the RNC. This message may contain a PCAP message.

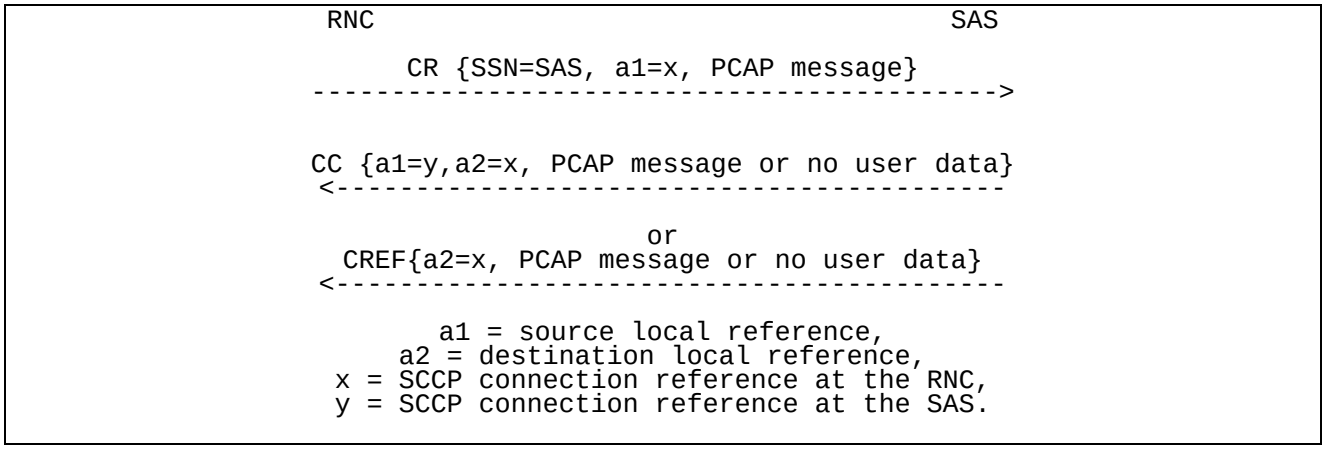

Figure 1: Setting-up of RNC Initiated SCCP Signalling Connection with SAS

4.5.1.4 SCCP connection release

This procedure is always initiated by the RNC. An SCCP connection is released when the RNC realises that a given signalling connection is no longer required. This is accomplished by the RNC sending a SCCP Released message.

4.5.1.5 General SCCP Abnormal Conditions

If a user-out-of-service information or signalling-point-inaccessible information is received by the RNC, no new attempt to establish SCCP connections towards the affected point code will be started until the corresponding user-in-service information or signalling-point-accessible information is received.

When a user-out-of-service information or signalling-point-inaccessible is received by the RNC, an optional timer may be started. When the timer expires, all the SCCP connections towards the affected point code will be released. When the user-in-service or signalling-point-accessible is received, the timer is stopped.

If for any reason an SCCP connection is released, the optional timer expires or a connection refusal is received while any of the SAS procedures are being performed or while a dedicated resource is still allocated, the procedures associated to that SCCP connection shall be terminated (at both the RNC side and the SAS side).

5 Functions of the Iupc Interface Protocols

5.1 List of Functions

The list of functions on the Iupc interface is the following:

1. Management of GPS Related Data;
2. Management of Position Calculation Functions;

5.2 Management of GPS Related Data

An RNC may request GPS related data from an SAS in order to provide GPS assistance data to a single UE. Alternatively, an RNC may request GPS related data from an SAS in order to support the broadcast of GPS assistance data to multiple UEs in a particular area via system information messages. Each type of GPS related data may be requested on demand, on modification, or at regular intervals.

5.3 Management of Position Calculation Functions

To support a *UE-assisted* positioning attempt involving a single UE, an RNC provides an SAS with one or more sets of GPS measurement data. Subsequently, the SAS calculates the position estimate of the specific UE and returns this result to the RNC.

6. Other Iupc Interface Specifications

6.1 UTRAN Iupc Interface: Layer 1 (TSG RAN 25.451)

This document [2] specifies the standards allowed for implementation of Layer 1 (physical layer) on the Iupc interface.

6.2 UTRAN Iupc Interface: Signalling Transport (TSG RAN 25.452)

This document [3] specifies the signalling transport related to PCAP signalling to be used across the Iupc interface.

6.3 PCAP Specification (TSG RAN 25.453)

This document [4] specifies the standards for PCAP specification to be used over the Iupc interface.

6.4 Summary of UTRAN Iupc Interface Technical Specifications

The relationship between the technical specifications that define the UTRAN Iupc interface is shown in Figure 2.

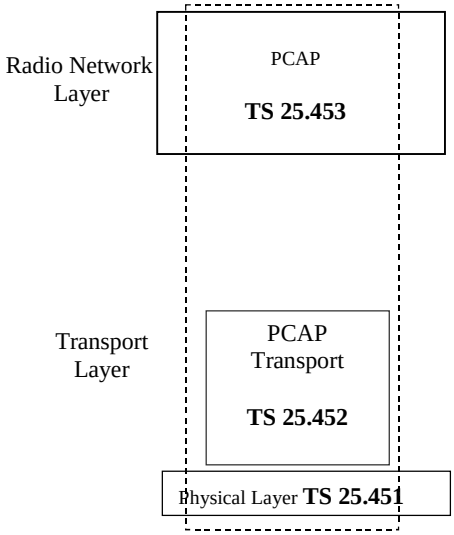

Figure 2: Iupc Interface Technical Specifications.

Annex A (informative): Change history

Change history					
TSG RAN#	Version	CR	Tdoc RAN	New Version	Subject/Comment

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**

Presentation of Specification to TSG or WG

Presentation to:	**TSG-RAN Meeting #12**
Document for presentation:	**TR 25.450 Version 2.0.0**
Presented for:	**Approval**

Abstract of document:

This TS represents the general aspect and principle specification for the Iupc interface

Changes since last presentation to TSG-RAN Meeting:

This is the first presentation of the TS

Outstanding Issues:

None

Contentious Issues:

None