TSG RAN Meeting #25 **RP-040306**
Palm Springs, USA, 07 - 09 September 2004

Title **CR (REL-6 category B) to TS 25.453 on introduction of the requested accuracy and an indication of achieved accuracy in Position Calculation procedure over Iupc**
Source **TSG RAN WG3**
Agenda Item **8.8**

RAN3 Tdoc	Spec	curr. Vers.	new Vers.	CR	Rev	Cat	Rel	Title	Work item
R3-041218	25.453	6.5.0	6.6.0	74	1	B	Rel-6	Introduction of the requested accuracy and an indication of achieved accuracy in Position Calculation procedure over Iupc interface	TEI6

3GPP TSG-RAN WG3 Meeting #43 **Tdoc ⌘R3-041218**
Prague, Czech Republic, 16th – 20th August 2004

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.453** **CR** **74** ⌘ **rev** **1** ⌘ Current version: **6.5.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☐

Title:	⌘	Introduction of the requested accuracy and an indication of achieved accuracy in Position Calculation procedure over I_{upc} interface
Source:	⌘	RAN3
Work item code:	⌘	TEI-6
Date:	⌘	21/07/2004
Category:	⌘	**B**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
Ph2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*
Rel-7 *(Release 7)*

Reason for change:	⌘	As confirmed by SA2 LS (R3-040638/S2-040907) and the approval of CR186rev7 at SA#23 (SP-040207) against TS 23.271 v6.6.0, GMLC may not be able to evaluate what is the exact accuracy, uncertainty and potential confidence of the position estimate returned by RAN. This is because the GMLC is unaware of the radio access technology that was used to position the UE. Thus, as the RAN always try to return a best-effort position estimate, if the requested accuracy cannot be fulfilled, the GMLC do not know whether the returned position estimate fulfils or not the requested accuracy.
Summary of change:	⌘	Insertion of the *Horizontal Accuracy Code* IE and the *Vertical Accuracy Code* IE in the POSITION CALCULATION REQUEST message. If the RNC has requested an accuracy for the position estimate, the POSITION CALCULATION RESPONSE message shall include an indication whether or not the returned position estimate satisfies the requested accuracy.
Consequences if not approved:	⌘	Misalignment between PCAP, RANAP and TS 23.271. GMLC cannot know if the returned position estimate fulfils or not the accuracy the GMLC asked for in the location request.

Clauses affected:	⌘	8.2.2, 8.2.4, 9.1.3, 9.1.4, 9.3.3, 9.3.4, 9.3.6 new: 9.2.2.xx, 9.2.2.yy, 9.2.2.zz

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	

	X	O&M Specifications

Other comments: ⌘

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8.2 Position Calculation

8.2.1 General

The purpose of the Position Calculation procedure is to enable an SRNC to query an SAS for a position estimate of a UE. The procedure uses connectionless signalling.

8.2.2 Successful Operation

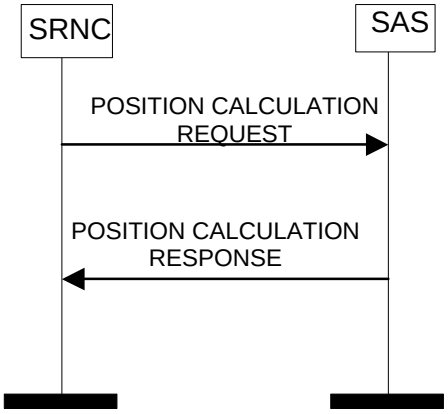

Figure 1: Position Calculation procedure, Successful Operation

The procedure is initiated with a POSITION CALCULATION REQUEST message sent from the SRNC to the SAS. When the SAS receives the POSITION CALCULATION REQUEST message, it shall calculate the UE position based on the provided measurement data.

If the *Initial UE Position Estimate* IE is included in the POSITION CALCULATION REQUEST message, the SAS shall use this value for the calculation of the UE Position Estimate in case of A-GPS positioning methods are used. The SAS may use this value for the calculation of the UE Position when any other methods are used.

If the *Horizontal Accuracy Code* IE and possibly the *Vertical Accuracy Code* IE are included in the POSITION CALCULATION REQUEST message, the SAS shall use these values in order to assess whether the resulting position estimation fulfills the requested accuracy.

Response Message:

If the SAS was able to calculate the position estimate, it shall respond with a POSITION CALCULATION RESPONSE message.

If at least the *Horizontal Accuracy Code* IE was included in the POSITION CALCULATION REQUEST message and the calculated position estimate fulfils the requested accuracy, the *Accuracy Fulfilment Indicator* IE with the value "requested accuracy fulfilled" shall be included in the POSITION CALCULATION RESPONSE message. If the calculated position estimate does not fulfil the requested accuracy, the *Accuracy Fulfilment Indicator* IE with the value "requested accuracy not fulfilled" shall be included in the POSITION CALCULATION RESPONSE message.

8.2.3 Unsuccessful Operation

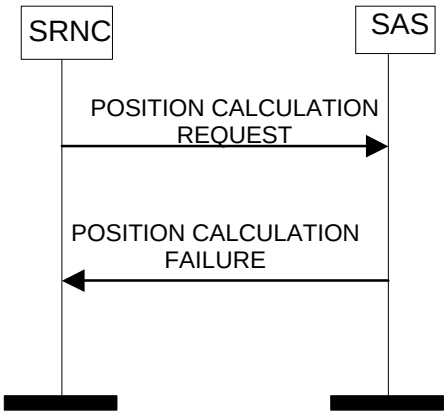

Figure 2: Position Calculation procedure, Unsuccessful Operation

If the SAS is unable to perform the position estimate for any reason, it shall return a POSITION CALCULATION FAILURE message to the SRNC.

Typical cause values are:

- Invalid reference information;
- Position calculation error: invalid GPS measured results;
- Initial UE Position Estimate missing;
- Processing Overload;
- Hardware Failure;
- O&M Intervention.

8.2.4 Abnormal Conditions

If the *Vertical Accuracy Code* IE is included and the *Horizontal Accuracy Code* IE is not included in the POSITION CALCULATION REQUEST message, the SAS shall reject the procedure.

/* Partly omitted */

9.1.3 POSITION CALCULATION REQUEST

Table 6

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	reject
Transaction ID	M		9.2.2.28		–	
Initial UE Position Estimate	O		Geographical Area 9.2.2.6		YES	reject
GPS Measured Results		*0..<maxNoOfSets>*			GLOBAL	reject
>GPS Measured Results	M		9.2.2.12		–	
Cell-ID Measured Results Sets		*0..<maxNoOfMeasurements>*			GLOBAL	reject
>Cell-ID Measured Results Info List	M		9.2.2.31		–	
OTDOA Measurement Group		*0..1*			YES	reject
>OTDOA Reference Cell Info	M		9.2.2.34		–	
>OTDOA Neighbour Cell Info List		*1..< maxNoOfMeasNCell >*			–	
>>OTDOA Neighbour Cell Info	M		9.2.2.33		–	
>OTDOA Measured Results Sets		*1..<maxNoOfMeasurements>*			–	
>>OTDOA Measured Results Info List	M		9.2.2.32		–	
Horizontal Accuracy Code	O		9.2.2.xx		YES	ignore
Vertical Accuracy Code	O		9.2.2.yy		YES	ignore

Table 7

Range bound	Explanation
MaxNoOfMeasNCell	Maximum number of neighbouring cells on which information can be reported. The value of MaxNoOfMeasCell is 32.
MaxNoOfSets	Maximum number of sets of Measured Results included in the Position Calculation Request message. The value for maxNoOfSets is 3.
maxNoOfMeasurements	Maximum number of Measurements of Cell-ID Measured Results Info List and OTDOA Measured Results Info List included in the Position Calculation Request message. The value for maxNoOfMeasurements is 16.

9.1.4 POSITION CALCULATION RESPONSE

Table 8

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.2.24		YES	reject
Transaction ID	M		9.2.2.28		–	
UE Position Estimate	M		Geographical Area 9.2.2.6		YES	ignore
Criticality Diagnostics	O		9.2.2.4		YES	ignore
Accuracy Fulfilment Indicator	O		9.2.2.zz		YES	ignore

/* Partly omitted */

9.2.2.xx Horizontal Accuracy Code

Table x1

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Horizontal Accuracy Code	M		INTEGER(0..127)	The requested accuracy "r" is derived from the "Horizontal Accuracy Code" k by $r = 10x(1.1^k-1)$

9.2.2.yy Vertical Accuracy Code

Table x2

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Vertical Accuracy Code	M		INTEGER(0..127)	The requested accuracy "v" is derived from the "Vertical Accuracy Code" k by $v = 45x(1.025^k-1)$.

9.2.2.zz Accuracy Fulfilment Indicator

This IE indicates whether the returned position estimate satisfies the requested accuracy or not.

Table x3

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Accuracy Fulfilment Indicator	M		ENUMERATED (requested accuracy fulfilled, requested accuracy not fulfilled, …)	

/* Partly omitted */

9.3.3 PDU Definitions

```
-- **************************************************************
--
-- PDU definitions for PCAP.
--
-- **************************************************************

PCAP-PDU-Contents {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) pcap(4) version1 (1) pcap-PDU-Contents (1) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- **************************************************************
--
-- IE parameter types from other modules.
--
-- **************************************************************

IMPORTS
    Cause,
    CriticalityDiagnostics,
    GPS-UTRAN-TRU,
    InformationExchangeID,
    InformationReportCharacteristics,
    InformationType,
    MeasuredResultsList,
    RequestedDataValue,
    RequestedDataValueInformation,
    UE-PositionEstimate,
    CellId-MeasuredResultsSets,
    OTDOA-MeasurementGroup,
    AccuracyFulfilmentIndicator,
    HorizontalAccuracyCode,
    VerticalAccuracyCode
FROM PCAP-IEs

    TransactionID
FROM PCAP-CommonDataTypes

    ProtocolExtensionContainer{},
    ProtocolIE-ContainerList{},
    ProtocolIE-Container{},
    PrivateIE-Container{},
    PCAP-PRIVATE-IES,
    PCAP-PROTOCOL-EXTENSION,
    PCAP-PROTOCOL-IES
FROM PCAP-Containers

    id-Cause,
    id-CriticalityDiagnostics,
    id-GPS-UTRAN-TRU,
    id-InformationExchangeID,
    id-InformationExchangeObjectType-InfEx-Rprt,
    id-InformationExchangeObjectType-InfEx-Rqst,
    id-InformationExchangeObjectType-InfEx-Rsp,
    id-InformationReportCharacteristics,
    id-InformationType,
    id-GPS-MeasuredResultsList,
    id-RequestedDataValue,
    id-RequestedDataValueInformation,
    id-TransactionID,
    id-UE-PositionEstimate,
    id-CellId-MeasuredResultsSets,
    id-OTDOA-MeasurementGroup,
    id-AccuracyFulfilmentIndicator,
    id-HorizontalAccuracyCode,
    id-VerticalAccuracyCode
FROM PCAP-Constants;


-- **************************************************************
--
-- POSITION CALCULATION REQUEST
```

```
--
-- **************************************************************

PositionCalculationRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {PositionCalculationRequestIEs} },
    protocolExtensions  ProtocolExtensionContainer { {PositionCalculationRequestExtensions} }
    OPTIONAL,
    ...
}

PositionCalculationRequestIEs PCAP-PROTOCOL-IES ::= {
    { ID id-UE-PositionEstimate             CRITICALITY reject  TYPE UE-PositionEstimate
        PRESENCE optional } |
    { ID id-GPS-MeasuredResultsList             CRITICALITY reject  TYPE MeasuredResultsList
            PRESENCE optional },
    ...
}

PositionCalculationRequestExtensions PCAP-PROTOCOL-EXTENSION ::= {
    { ID id-CellId-MeasuredResultsSets      CRITICALITY reject  EXTENSION CellId-MeasuredResultsSets
        PRESENCE optional } |
    { ID id-OTDOA-MeasurementGroup          CRITICALITY reject  EXTENSION OTDOA-MeasurementGroup
        PRESENCE optional } |
    { ID id-HorizontalAccuracyCode          CRITICALITY ignore  EXTENSION HorizontalAccuracyCode
        PRESENCE optional } |
    { ID id-VerticalAccuracyCode            CRITICALITY ignore  EXTENSION VerticalAccuracyCode
        PRESENCE optional },
    ...
}

-- **************************************************************
--
-- POSITION CALCULATION RESPONSE
--
-- **************************************************************

PositionCalculationResponse ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {PositionCalculationResponseIEs} },
    protocolExtensions  ProtocolExtensionContainer { {PositionCalculationResponseExtensions} }
    OPTIONAL,
    ...
}

PositionCalculationResponseIEs PCAP-PROTOCOL-IES ::= {
    { ID id-UE-PositionEstimate         CRITICALITY ignore  TYPE UE-PositionEstimate        PRESENCE
mandatory } |
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics     PRESENCE
optional    },
    ...
}

PositionCalculationResponseExtensions PCAP-PROTOCOL-EXTENSION ::= {
    { ID id-AccuracyFulfilmentIndicator CRITICALITY ignore  EXTENSION AccuracyFulfilmentIndicator
        PRESENCE optional},
    ...
}
```

/* Partly omitted */

9.3.4 Information Element Definitions

```
-- **************************************************************
--
-- Information Element Definitions
--
-- **************************************************************

PCAP-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) pcap(4) version1 (1) pcap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    maxNrOfErrors,
```

```
    maxSat,
    maxSatAlmanac,
    maxNrOfLevels,
    maxNrOfMeasNCell,
    maxNrOfMeasurements,
    maxNrOfPoints,
    maxNrOfExpInfo,
    maxNrOfSets
FROM PCAP-Constants

    Criticality,
    ProcedureCode,
    ProtocolIE-ID,
    TransactionID,
    TriggeringMessage
FROM PCAP-CommonDataTypes

    ProtocolExtensionContainer{},
    PCAP-PROTOCOL-EXTENSION
FROM PCAP-Containers;


-- **************************************************************
--
-- Accuracy Fulfilment Indicator
--
-- **************************************************************

AccuracyFulfilmentIndicator ::= ENUMERATED{
    requested-Accuracy-Fulfilled,
    requested-Accuracy-Not-Fulfilled,
    ...
}


-- **************************************************************
--
-- Almanac and Satellite Health SIB
--
-- **************************************************************
```

/* Partly omitted */

```
-- **************************************************************
--
-- Requested Data Value Information
--
-- **************************************************************

RequestedDataValueInformation ::= CHOICE {
    informationAvailable        InformationAvailable,
    informationNotAvailable     InformationNotAvailable
}

InformationAvailable::= SEQUENCE {
    requestedDataValue      RequestedDataValue,
    iE-Extensions           ProtocolExtensionContainer { { InformationAvailable-ExtIEs} }
    OPTIONAL,
    ...
}

InformationAvailable-ExtIEs PCAP-PROTOCOL-EXTENSION ::= {
    ...
}

InformationNotAvailable ::= NULL


-- **************************************************************
--
-- Horizontal Accuracy Code
--
-- **************************************************************

HorizontalAccuracyCode          ::= INTEGER (0..127)


-- **************************************************************
```

```
--
-- Vertical Accuracy Code
--
-- **************************************************************

VerticalAccuracyCode            ::= INTEGER (0..127)


END
```

/* Partly omitted */

9.3.6 Constant Definitions

```
-- **************************************************************
--
-- Constant definitions
--
-- **************************************************************

PCAP-Constants {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
umts-Access (20) modules (3) pcap(4) version1 (1) pcap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    ProcedureCode,
    ProtocolIE-ID
FROM PCAP-CommonDataTypes;


-- **************************************************************
--
-- Elementary Procedures
--
-- **************************************************************

id-PositionCalculation              ProcedureCode ::= 1
id-InformationExchangeInitiation    ProcedureCode ::= 2
id-InformationReporting             ProcedureCode ::= 3
id-InformationExchangeTermination   ProcedureCode ::= 4
id-InformationExchangeFailure       ProcedureCode ::= 5
id-ErrorIndication                  ProcedureCode ::= 6
id-privateMessage                   ProcedureCode ::= 7



-- **************************************************************
--
-- Lists
--
-- **************************************************************

maxNrOfErrors                       INTEGER ::= 256
maxSat                              INTEGER ::= 16
maxSatAlmanac                       INTEGER ::= 32
maxNrOfLevels                       INTEGER ::= 256
maxNrOfPoints                       INTEGER ::= 15
maxNrOfExpInfo                      INTEGER ::= 32
maxNrOfMeasNCell                    INTEGER ::= 32
maxNrOfMeasurements                 INTEGER ::= 16
maxNrOfSets                         INTEGER ::= 3

-- **************************************************************
--
-- IEs
--
-- **************************************************************

id-Cause                                        ProtocolIE-ID ::= 1
id-CriticalityDiagnostics                       ProtocolIE-ID ::= 2
id-GPS-UTRAN-TRU                                ProtocolIE-ID ::= 3
id-InformationExchangeID                        ProtocolIE-ID ::= 4
```

```
id-InformationExchangeObjectType-InfEx-Rprt     ProtocolIE-ID ::= 5
id-InformationExchangeObjectType-InfEx-Rqst     ProtocolIE-ID ::= 6
id-InformationExchangeObjectType-InfEx-Rsp      ProtocolIE-ID ::= 7
id-InformationReportCharacteristics             ProtocolIE-ID ::= 8
id-InformationType                              ProtocolIE-ID ::= 9
id-GPS-MeasuredResultsList                      ProtocolIE-ID ::= 10
id-MethodType                                   ProtocolIE-ID ::= 11
id-RefPosition-InfEx-Rqst                       ProtocolIE-ID ::= 12
id-RefPosition-InfEx-Rsp                        ProtocolIE-ID ::= 13
id-RefPosition-Inf-Rprt                         ProtocolIE-ID ::= 14
id-RequestedDataValue                           ProtocolIE-ID ::= 15
id-RequestedDataValueInformation                ProtocolIE-ID ::= 16
id-TransactionID                                ProtocolIE-ID ::= 17
id-UE-PositionEstimate                          ProtocolIE-ID ::= 18
id-CellId-MeasuredResultsSets                   ProtocolIE-ID ::= 20
id-OTDOA-MeasurementGroup                       ProtocolIE-ID ::= 22
id-AccuracyFulfilmentIndicator                  ProtocolIE-ID ::= 23
id-HorizontalAccuracyCode                       ProtocolIE-ID ::= 24
id-VerticalAccuracyCode                         ProtocolIE-ID ::= 25

END
```