3GPP TSG RAN Meeting #21 **RP-030473**
Frankfurt, Germany, 16 - 19 September 2003

3GPP TSG RAN WG3 Meeting #37 ***R3-031254***
Budapest, Hungary, 25th – 29th August 2003

Title: Liaison on "Introduction of Positioning Methods over Iu"
Response to:

Source: TSG RAN3
To: TSG GERAN, TSG RAN, TSG CN4, TSG RAN2
Cc: TSG SA2

Contact Person:
Name: Philippe GODIN
Tel. Number: +33 (1)39443940
E-mail Address: godinp@nortelnetworks.com

Attachments: R3-031234 CR586r2 to TS 25.413 v5.5.0

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1. Overall Description:

RAN3 would like to inform TSG-GERAN, RAN2, CN4 and RAN that it has introduced in the location report function of the Iu interface the positioning methods used to obtain the location estimate as requested during RAN#20.

RANAP has been enhanced by the release 5 CR586 and this enhancement has been done in line with CR089 on TS25.305 and CR154 on TS23.271.

The methods have been introduced in RANAP in two separate information elements (IE), one dedicated to UTRAN, one dedicated to GERAN-Iu, in order to meet ARIB concern of independent GERAN and UTRAN software.

However, even if transported over Iu in two separate IE, it has been felt as an optimisation to allow the possibility of coordination of the code points allocated by the two groups. Thus, for the UTRAN specific IE, RAN3 has allocated code points for the methods common with GERAN which are the ones already defined in TS49.031. Thus, for the methods applicable to UTRAN only, RAN3 has allocated code points currently unused by GERAN in TS49.031.

RAN3 would like to continue this cooperation for the code points allocation with GERAN in the future i.e. whenever new methods are introduced in one or the other group. The benefit foreseen through this coordination is twofolds:

- Reuse the existing container in MAP TS29.002 to carry indifferently the value of the Positioning Data GERAN A/Gb IE, of the Position Data UTRAN IE or of the Position Data Specific to GERAN Iu IE in a backwards compatible manner and with no need to introduce a new container.
- allow a generic software in the GMLC to handle the received container regardless of the originating RAT.

RAN3 would like to ask GERAN:

- if they agree to continue with this coordination of code points allocation which needs to be done in the two directions,
- if they could explain the rationale and benefit foreseen behind the 'usage of methods' encoding which permits to indicate the methods unsuccessfully attempted in addition to the successful one(s). CR586 has actually been based only the latter ones in line with the stage 2.

- RAN3 could not understand the rationale and history behind the positioning data discriminator IE. RAN3 would like to know why it has currently only one value and what is the future use expected from this IE.

RAN3 would like to ask RAN2 to comment also, if they desire, on this potential benefit of indicating these unsuccessfully attempted methods in addition to the one used successfully to obtain the location estimate.

RAN3 would like to inform CN4 of CR586 as well so that they can evaluate if this RANAP CR impacts their specification or not, in particular whether a new container over MAP is necessary or not due to the principle followed in RANAP CR586.

RAN3 would finally like to report to TSG RAN that by approving the CR586 on RANAP, RAN3 considers as fulfilled the action requested by RAN at RAN#20.

2. Actions:

RAN3 kindly asks TSG GERAN:

- if they agree to continue with this coordination of code points allocation which needs to be done in the two directions
- if they could explain the rationale and benefit foreseen by reporting the methods unsuccessfully attempted in addition to the successful one(s).
- the history behind the protocol data discriminator and its future usage.

RAN3 kindly ask RAN2 to comment also, if they desire, on this potential benefit of indicating these unsuccessfully attempted methods in addition to the one used successfully to obtain the location estimate.

RAN3 kindly ask CN4 to take into account the RANAP CR586 when evaluating the impact on MAP.

RAN3 kindly ask TSG-RAN to note that the action to introduce the positioning methods over the Iu has been completed through the approval of the release 5 RANAP CR586.

3. Date of Next RAN3 Meetings:

RAN3#38	06th – 10th October 2003 Sophia, France
RAN3#39	17th – 21th November 2003 San Diego, USA

3GPP TSG-RAN3 Meeting #37
Budapest, Hungary, 25th-29th August 2003

Tdoc ⌘R3-031234

CR-Form-v7

CHANGE REQUEST

⌘ **25.413** **CR** **586** ⌘ **rev** **2** ⌘ Current version: **5.5.0** ⌘

*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 positioning methods
Source:	⌘	Nortel Networks, AWS
Work item code:	⌘	TEI5
Date:	⌘	25/08/2003
Category:	⌘	**B**
Release:	⌘	REL-5

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:

2	*(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)*

Reason for change: ⌘ When reporting location information for emergency and other calls, there is no way for the location services client to know what type of positioning method was used to obtain the longtitude and latitude that has been returned. This information would be useful as it would give an indication as to the relative accuracy of that information to the emergency and other location client services, should they have to rely on it.

Summary of change: ⌘ The positioning methods that were used to obtain the location estimate are also returned from RNC to CN.

Impact assessment towards the previous version of the specification (same release):

This CR has isolated impact towards the previous version of the specification (same release).

This CR has an impact under functional point of view.

The impact can be considered isolated because it only affects the Location Report function.

Consequences if not approved:	⌘	There would be no indication of the positioning method used to obtain a location estimate. Location clients would not be able to accurately and fully interpret the significance of the *Uncertaintly* and *Confidence* information available in the network, resulting in misinterpretation of the reported location, as has been observed in actual field trials.

Clauses affected:	⌘	2, 8.20, 9.1.30, 9.2.3.xx, 9.2.3.xy, 9.3.3, 9.3.4, 9.3.6			
		Y	**N**		
Other specs affected:	⌘	**X**		Other core specifications	⌘ TS
			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.

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".

[1] 3GPP TR 23.930: "Iu Principles".

[2] 3GPP TS 25.410: "UTRAN Iu Interface: General Aspects and Principles".

[3] 3GPP TS 25.401: "UTRAN Overall Description".

[4] 3GPP TR 25.931: "UTRAN Functions, Examples on Signalling Procedures".

[5] 3GPP TS 25.412: "UTRAN Iu interface signalling transport".

[6] 3GPP TS 25.415: "UTRAN Iu interface user plane protocols".

[7] 3GPP TS 23.107: "Quality of Service (QoS) concept and architecture".

[8] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core network protocols; Stage 3".

[9] 3GPP TS 25.414: "UTRAN Iu interface data transport and transport signalling".

[10] 3GPP TS 25.331: Radio Ressource Control (RRC) protocol specification".

[11] 3GPP TS 48.008: "3rd Generation Partnership Project (3GPP) Technical Specification Group GSM EDGE Radio Access Network; Mobile-services Switching Centre – Base Station System (MSC - BSS) interface; Layer 3 specification".

[12] 3GPP TS 12.08: "Subscriber and equipment trace".

[13] ITU-T Recommendation X.691 (1997): "Information technology - ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)".

[14] ITU-T Recommendation X.680 (1997): "Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation".

[15] ITU-T Recommendation X.681 (1997): "Information technology - Abstract Syntax Notation One (ASN.1): Information object specification".

[16] 3GPP TS 23.110: "UMTS Access Stratum, Services and Functions".

[17] 3GPP TS 25.323: "Packet Data Convergence Protocol (PDCP) specification".

[18] 3GPP TR 25.921: "Guidelines and principles for protocol description and error handling".

[19] 3GPP TS 23.003: "Numbering, addressing and identification".

[20] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[21] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[22] 3GPP TS 24.080: "Mobile radio Layer 3 supplementary services specification; Formats and coding".

[23] 3GPP TS 29.108: "Application of the Radio Access Network Application Part (RANAP) on the E-interface".

[24] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[25] 3GPP TS 12.20: "Base Station System (BSS) management information".

[26] 3GPP TS 23.236: "Intra-domain connection of Radio Access Network (RAN) nodes to multiple Core Network (CN) nodes".

[27] 3GPP TS 43.051: "3rd Generation Partnership Project; Technical Specification Group GSM/EDGE Radio Access Network; Overall description - Stage 2".

[28] 3GPP TS 25.305: "Stage 2 Functional Specification of Location Services (LCS) in UTRAN".

[29] 3GPP TS 43.059: "Functional stage 2 description of Location Services (LCS) in GERAN".

[30] 3GPP TS 22.071: "Location Services (LCS); Service description - Stage 1".

[31] 3GPP TR 25.994: "Measures employed by the UMTS Radio Access Network (UTRAN) to overcome early User Equipment (UE) implementation faults".

[32] 3GPP TR 25.995: "Measures employed by the UMTS Radio Access Network (UTRAN) to cater for legacy User Equipment (UE) which conforms to superseded versions of the RAN interface specification".

[33] 3GPP TS 23.195: "Provision of UE Specific Behaviour Information to Network Entities".

[34] 3GPP TS 49.031: "3rd Generation Partnership Project; Technical Specification Group GSM/EDGE Radio Access Network; Location Services (LCS) – Base Station System Application Part LCS Extension – (BSSAP-LE) (release5)".

8.20 Location Report

8.20.1 General

The purpose of the Location Report procedure is to provide the UE's location information to the CN. The procedure uses connection oriented signalling.

8.20.2 Successful Operation

Figure 22: Location Report procedure. Successful operation.

The serving RNC shall initiate the procedure by generating a LOCATION REPORT message. The LOCATION REPORT message may be used as a response for the LOCATION REPORTING CONTROL message. Also, when a user enters or leaves a classified zone set by O&M, e.g. zone where a disaster occurred, a LOCATION REPORT message shall be sent to the CN including the Service Area of the UE in the *Area Identity* IE. The *Cause* IE shall indicate the appropriate cause value to CN, e.g. "User Restriction Start Indication" and "User Restriction End Indication". The CN shall react to the LOCATION REPORT message with CN vendor specific actions.

For this procedure, only Service Areas that are defined for the PS and CS domains shall be considered.

In case reporting at change of Service Area is requested by the CN, then the RNC shall issue a LOCATION REPORT message.

- whenever the information given in the previous LOCATION REPORT message or INITIAL UE MESSAGE message is not anymore valid.

- upon receipt of the first LOCATION REPORTING CONTROL message following a Relocation Resource Allocation procedure, with the *Event* IE included in the *Request Type* IE set to "Change of Service Area", as soon as SAI becomes available in the new SRNC and the relocation procedure has been successfully completed.

In the case when Service Area is reported, the RNC shall include to the LOCATION REPORT message in the *Area Identity* IE the Service Area, which includes at least one of the cells from which the UE is consuming radio resources.

In the case when the LOCATION REPORT message is sent as an answer to a request for a direct report or at a change of Service Area, the *Request Type* IE from the LOCATION REPORTING CONTROL message shall be included.

If the LOCATION REPORT message is sent as an answer to a request for a direct report of Service Area and the current Service Area can not be determined by the RNC, then the *Area Identity* IE shall be omitted and a cause value shall be included to indicate that the request could not be fulfilled, e.g. "Requested Information Not Available" or "Location Reporting Congestion". The RNC may also include the *Last Known Service Area* IE.

If the RNC can not deliver the location information as requested by the CN, due to either the non-support of the requested event or the non-support of the requested report area or if RNC is currently not able to reach the UE, the RNC shall indicate the UE location to be "Undetermined" by omitting the *Area Identity* IE. A cause value shall instead be added to indicate the reason for the undetermined location, e.g. "Requested Request Type not supported" or "Location Reporting Congestion" or "No Resource Available".

If the Location Report procedure was triggered by a LOCATION REPORTING CONTROL message, which included a request to report a geographical area with a specific accuracy, the LOCATION REPORT message shall include the *Geographical Area* IE within the *Area Identity* IE containing either a point with indicated uncertainty or a polygon or an other type, which fulfils the requested accuracy as accurately as possible. If, on the other hand, no specific accuracy level was requested in the LOCATION REPORTING CONTROL message, the LOCATION REPORT message shall include the *Geographical Area* IE within the *Area Identity* IE, the reported *Geographical Area* IE may include an accuracy.

The LOCATION REPORT message shall also include, if available, the *Position Data* IE containing the positioning method (or list of positioning methods) used successfully to obtain the location estimate, together with the usage information.

8.20.3 Abnormal Conditions

Not applicable.

9.1.30 LOCATION REPORT

This message is sent by the RNC to the CN with information about the UE location.

Direction: RNC → CN.

Signalling bearer mode: Connection oriented.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.1		YES	ignore
Area Identity	O		9.2.3.10		YES	ignore
Cause	O		9.2.1.4		YES	ignore
Request Type	O		9.2.1.16		YES	ignore
Last Known Service Area	O		9.2.3.22		YES	ignore
Position Data	O		9.2.3.xx	Optional for UTRAN only.	YES	ignore
Position Data Specific to GERAN Iu Mode	O		9.2.3.xy	Coded as the value part of the *Positioning Data* IE defined in [34]. Optional for GERAN Iu mode only. Not applicable for UTRAN.	YES	ignore

9.2.3.xx Position Data

This IE provides data related to the positioning methods in relation with location report procedure.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Position Data				
> Positioning Data Discriminator	M		OCTET STRING (1)	Bits 8-5 set to 0. The positioning data discriminator (bits 4-1 of the octet) defines the type of data provided for each positioning method: 0000 indicate usage of each positioning method that was successfully used to obtain the location estimate; 1 octet of data is provided for each positioning method included. all other values are reserved.
> Positioning Data Set	C-ifDiscriminator=0			

>> Positioning Method and Usage		*1 to* <maxSet>	OCTET STRING (1)	Coding of positioning method (bits 8-4): 00000 Reserved (NOTE) 00001 Reserved (NOTE) 00010 Reserved (NOTE) 00011 Reserved (NOTE) 00100 Reserved (NOTE) 00101 Mobile Assisted GPS 00110 Mobile Based GPS 00111 Conventional GPS 01000 Cell ID 01001 OTDOA 01010 IPDL 01011 RTT 01100 to 01111 reserved for other location technologies 10000 to 11111 reserved for network specific positioning methods Coding of usage (bits 3-1) 000 Attempted unsuccessfully due to failure or interruption - not used. 001 Attempted successfully: results not used to generate location - not used. 010 Attempted successfully: results used to verify but not generate location – not used. 011 Attempted successfully: results used to generate location 100 Attempted successfully: case where MS supports multiple mobile based positioning methods and the actual method or methods used by the MS cannot be determined NOTE: Reserved because of GERAN use only.

Condition	Explanation
C-ifDiscriminator=0	This IE is present if the Positioning Data Discriminator IE is set to "00000000"

Range bound	Explanation
maxSet	Maximum size of the data set. Value is 9.

9.2.3.xy Position Data Specific to GERAN Iu Mode

This IE provides data related to the positioning methods which are supported only within GERAN Iu mode in relation with location report procedure. The coding of this element is described in [34].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Position Data Specific to GERAN Iu Mode	M		OCTET STRING	Coded as the value part of the *Positioning Data* IE defined in [34].

9.3.3 PDU Definitions

```
-- **************************************************************
--
-- PDU definitions for RANAP.
--
-- **************************************************************

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

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

IMPORTS
    BroadcastAssistanceDataDecipheringKeys,
    LocationRelatedDataRequestType,
    LocationRelatedDataRequestTypeSpecificToGERANIuMode,
    DataVolumeReference,
    CellLoadInformation,
    AreaIdentity,
    CN-DomainIndicator,
    Cause,
    ClientType,
    CriticalityDiagnostics,
    ChosenEncryptionAlgorithm,
    ChosenIntegrityProtectionAlgorithm,
    ClassmarkInformation2,
    ClassmarkInformation3,
    DL-GTP-PDU-SequenceNumber,
    DL-N-PDU-SequenceNumber,
    DataVolumeReportingIndication,
    DRX-CycleLengthCoefficient,
    EncryptionInformation,
    GERAN-BSC-Container,
    GERAN-Classmark,
    GlobalCN-ID,
    GlobalRNC-ID,
    InformationTransferID,
    IntegrityProtectionInformation,
    InterSystemInformation-TransparentContainer,
    IuSignallingConnectionIdentifier,
    IuTransportAssociation,
    KeyStatus,
    L3-Information,
    LAI,
    LastKnownServiceArea,
    NAS-PDU,
    NAS-SynchronisationIndicator,
    NewBSS-To-OldBSS-Information,
    NonSearchingIndication,
    NumberOfSteps,
    OMC-ID,
    OldBSS-ToNewBSS-Information,
    PagingAreaID,
    PagingCause,
    PDP-TypeInformation,
    PermanentNAS-UE-ID,
    PositionData,
    PositionDataSpecificToGERANIuMode,
    PositioningPriority,
    ProvidedData,
    RAB-ID,
    RAB-Parameters,
    RAC,
    RelocationType,
    RequestType,
    Requested-RAB-Parameter-Values,
    ResponseTime,
    RRC-Container,
    SAI,
    SAPI,
    Service-Handover,
```

```
    SNA-Access-Information,
    SourceID,
    SourceRNC-ToTargetRNC-TransparentContainer,
    TargetID,
    TargetRNC-ToSourceRNC-TransparentContainer,
    TemporaryUE-ID,
    TraceReference,
    TraceType,
    UnsuccessfullyTransmittedDataVolume,
    TransportLayerAddress,
    TriggerID,
    UE-ID,
    UESBI-Iu,
    UL-GTP-PDU-SequenceNumber,
    UL-N-PDU-SequenceNumber,
    UP-ModeVersions,
    UserPlaneMode,
    VerticalAccuracyCode,
    Alt-RAB-Parameters,
    Ass-RAB-Parameters
FROM RANAP-IEs


    PrivateIE-Container{},
    ProtocolExtensionContainer{},
    ProtocolIE-ContainerList{},
    ProtocolIE-ContainerPair{},
    ProtocolIE-ContainerPairList{},
    ProtocolIE-Container{},
    RANAP-PRIVATE-IES,
    RANAP-PROTOCOL-EXTENSION,
    RANAP-PROTOCOL-IES,
    RANAP-PROTOCOL-IES-PAIR
FROM RANAP-Containers

    maxNrOfDTs,
    maxNrOfErrors,
    maxNrOfIuSigConIds,
    maxNrOfRABs,
    maxNrOfVol,

    id-AreaIdentity,
    id-Alt-RAB-Parameters,
    id-Ass-RAB-Parameters,
    id-BroadcastAssistanceDataDecipheringKeys,
    id-LocationRelatedDataRequestType,
    id-CN-DomainIndicator,
    id-Cause,
    id-ChosenEncryptionAlgorithm,
    id-ChosenIntegrityProtectionAlgorithm,
    id-ClassmarkInformation2,
    id-ClassmarkInformation3,
    id-ClientType,
    id-CriticalityDiagnostics,
    id-DRX-CycleLengthCoefficient,
    id-DirectTransferInformationItem-RANAP-RelocInf,
    id-DirectTransferInformationList-RANAP-RelocInf,
    id-DL-GTP-PDU-SequenceNumber,
    id-EncryptionInformation,
    id-GERAN-BSC-Container,
    id-GERAN-Classmark,
    id-GERAN-Iumode-RAB-Failed-RABAssgntResponse-Item,
    id-GERAN-Iumode-RAB-FailedList-RABAssgntResponse,
    id-GlobalCN-ID,
    id-GlobalRNC-ID,
    id-InformationTransferID,
    id-IntegrityProtectionInformation,
    id-InterSystemInformation-TransparentContainer,
    id-IuSigConId,
    id-IuSigConIdItem,
    id-IuSigConIdList,
    id-IuTransportAssociation,
    id-KeyStatus,
    id-L3-Information,
    id-LAI,
    id-LastKnownServiceArea,
    id-LocationRelatedDataRequestTypeSpecificToGERANIuMode,
    id-NAS-PDU,
    id-NewBSS-To-OldBSS-Information,
    id-NonSearchingIndication,
    id-NumberOfSteps,
    id-OMC-ID,
```

```
    id-OldBSS-ToNewBSS-Information,
    id-PagingAreaID,
    id-PagingCause,
    id-PermanentNAS-UE-ID,
    id-PositionData,
    id-PositionDataSpecificToGERANIuMode,
    id-PositioningPriority,
    id-ProvidedData,
    id-RAB-ContextItem,
    id-RAB-ContextList,
    id-RAB-ContextFailedtoTransferItem,
    id-RAB-ContextFailedtoTransferList,
    id-RAB-ContextItem-RANAP-RelocInf,
    id-RAB-ContextList-RANAP-RelocInf,
    id-RAB-DataForwardingItem,
    id-RAB-DataForwardingItem-SRNS-CtxReq,
    id-RAB-DataForwardingList,
    id-RAB-DataForwardingList-SRNS-CtxReq,
    id-RAB-DataVolumeReportItem,
    id-RAB-DataVolumeReportList,
    id-RAB-DataVolumeReportRequestItem,
    id-RAB-DataVolumeReportRequestList,
    id-RAB-FailedItem,
    id-RAB-FailedList,
    id-RAB-FailedtoReportItem,
    id-RAB-FailedtoReportList,
    id-RAB-ID,
    id-RAB-ModifyList,
    id-RAB-ModifyItem,
    id-RAB-QueuedItem,
    id-RAB-QueuedList,
    id-RAB-ReleaseFailedList,
    id-RAB-ReleaseItem,
    id-RAB-ReleasedItem-IuRelComp,
    id-RAB-ReleaseList,
    id-RAB-ReleasedItem,
    id-RAB-ReleasedList,
    id-RAB-ReleasedList-IuRelComp,
    id-RAB-RelocationReleaseItem,
    id-RAB-RelocationReleaseList,
    id-RAB-SetupItem-RelocReq,
    id-RAB-SetupItem-RelocReqAck,
    id-RAB-SetupList-RelocReq,
    id-RAB-SetupList-RelocReqAck,
    id-RAB-SetupOrModifiedItem,
    id-RAB-SetupOrModifiedList,
    id-RAB-SetupOrModifyItem,
    id-RAB-SetupOrModifyList,
    id-RAC,
    id-RelocationType,
    id-RequestType,
    id-ResponseTime,
    id-SAI,
    id-SAPI,
    id-SNA-Access-Information,
    id-SourceID,
    id-SourceRNC-ToTargetRNC-TransparentContainer,
    id-SourceRNC-PDCP-context-info,
    id-TargetID,
    id-TargetRNC-ToSourceRNC-TransparentContainer,
    id-TemporaryUE-ID,
    id-TraceReference,
    id-TraceType,
    id-TransportLayerAddress,
    id-TriggerID,
    id-UE-ID,
    id-UESBI-Iu,
    id-UL-GTP-PDU-SequenceNumber,
    id-VerticalAccuracyCode
FROM RANAP-Constants;
```

Lots of unaffected ASN1 in 9.3.3 not shown

```
-- **************************************************************
--
-- LOCATION REPORT ELEMENTARY PROCEDURE
--
-- **************************************************************

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

```
-- Location Report
--
-- **************************************************************

LocationReport ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {LocationReportIEs} },
    protocolExtensions      ProtocolExtensionContainer { {LocationReportExtensions} }
    OPTIONAL,
    ...
}

LocationReportIEs RANAP-PROTOCOL-IES ::= {
    { ID id-AreaIdentity               CRITICALITY ignore  TYPE AreaIdentity               PRESENCE
optional    } |
    { ID id-Cause                  CRITICALITY ignore  TYPE Cause                  PRESENCE
optional    } |
    { ID id-RequestType                CRITICALITY ignore  TYPE RequestType                PRESENCE
optional    }   ,
    ...
}

LocationReportExtensions RANAP-PROTOCOL-EXTENSION ::= {
-- Extension for Release 4 to enable report of Last Known Service Area with its Age over Iu --
    { ID id-LastKnownServiceArea    CRITICALITY ignore  EXTENSION LastKnownServiceArea  PRESENCE
optional}|
-- Extension for Release 5 to pass the positioning methods that have been used --
    { ID id-PositionData    CRITICALITY ignore      EXTENSION PositionData  PRESENCE optional}|
-- Extension for Release 5 to pass the positioning methods that have been used for GERAN Iu mode --
    { ID id-PositionDataSpecificToGERANIuMode       CRITICALITY ignore  EXTENSION
PositionDataSpecificToGERANIuMode       PRESENCE optional   },
    -- This extension is optional for GERAN Iu mode only, not applicable for UTRAN --

    ...
}
```

Lots of unaffected ASN1 in 9.3.3 not shown

9.3.4 Information Element Definitions

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

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

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    maxNrOfErrors,
    maxNrOfPDPDirections,
    maxNrOfPoints,
    maxNrOfRABs,
    maxNrOfSRBs,
    maxNrOfSeparateTrafficDirections,
    maxRAB-Subflows,
    maxRAB-SubflowCombination,
    maxNrOfLevels,
    maxNrOfAltValues,
    maxNrOfSNAs,
    maxNrOfLAs,
    maxNrOfPLMNsSN,
    maxSet,

    id-CN-DomainIndicator,
    id-MessageStructure,
    id-SRB-TrCH-Mapping,
    id-TypeOfError,

    id-DownlinkCellLoadInformation,
    id-UplinkCellLoadInformation,
    id-hS-DSCH-MAC-d-Flow-ID,
```

```
    id-SignallingIndication
FROM RANAP-Constants
```

```
                    Lots of unaffected ASN1 in 9.3.4 not shown
```

```
PLMNs-in-shared-network-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}


PositioningDataDiscriminator                ::= OCTET STRING (SIZE(1))

PositioningDataSet              ::= SEQUENCE(SIZE(1..maxSet)) OF PositioningMethodAndUsage

PositioningMethodAndUsage               ::= OCTET STRING (SIZE(1))


PositioningPriority ::= ENUMERATED {
    high-Priority,
    normal-Priority,
...
}
PositionData ::= SEQUENCE {
    positioningDataDiscriminator        PositioningDataDiscriminator,
    positioningDataSet                  PositioningDataSet          OPTIONAL,
-- This IE shall be present if the PositioningDataDiscriminator IE is set to "00000000"  --
    iE-Extensions       ProtocolExtensionContainer { {PositionData-ExtIEs} } OPTIONAL,

    ...
}

PositionData-ExtIEs RANAP-PROTOCOL-EXTENSION ::= {
    ...
}

PositionDataSpecificToGERANIuMode               ::= OCTET STRING
```

```
                    Lots of unaffected ASN1 in 9.3.4 not shown
```

```
                    ASN1 in 9.3.5 not shown
```

9.3.6 Constant Definitions

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

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

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

id-RAB-Assignment                   INTEGER ::= 0
id-Iu-Release                       INTEGER ::= 1
id-RelocationPreparation            INTEGER ::= 2
id-RelocationResourceAllocation     INTEGER ::= 3
id-RelocationCancel                 INTEGER ::= 4
id-SRNS-ContextTransfer             INTEGER ::= 5
id-SecurityModeControl              INTEGER ::= 6
id-DataVolumeReport                 INTEGER ::= 7
id-Reset                            INTEGER ::= 9
id-RAB-ReleaseRequest               INTEGER ::= 10
id-Iu-ReleaseRequest                INTEGER ::= 11
id-RelocationDetect                 INTEGER ::= 12
id-RelocationComplete               INTEGER ::= 13
```

```
id-Paging                           INTEGER ::= 14
id-CommonID                         INTEGER ::= 15
id-CN-InvokeTrace                   INTEGER ::= 16
id-LocationReportingControl         INTEGER ::= 17
id-LocationReport                   INTEGER ::= 18
id-InitialUE-Message                INTEGER ::= 19
id-DirectTransfer                   INTEGER ::= 20
id-OverloadControl                  INTEGER ::= 21
id-ErrorIndication                  INTEGER ::= 22
id-SRNS-DataForward                 INTEGER ::= 23
id-ForwardSRNS-Context              INTEGER ::= 24
id-privateMessage                   INTEGER ::= 25
id-CN-DeactivateTrace               INTEGER ::= 26
id-ResetResource                    INTEGER ::= 27
id-RANAP-Relocation                 INTEGER ::= 28
id-RAB-ModifyRequest                INTEGER ::= 29
id-LocationRelatedData              INTEGER ::= 30
id-InformationTransfer              INTEGER ::= 31
id-UESpecificInformation            INTEGER ::= 32

-- **************************************************************
--
-- Extension constants
--
-- **************************************************************

maxPrivateIEs                       INTEGER ::= 65535
maxProtocolExtensions               INTEGER ::= 65535
maxProtocolIEs                      INTEGER ::= 65535

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

maxNrOfDTs                          INTEGER ::= 15
maxNrOfErrors                       INTEGER ::= 256
maxNrOfIuSigConIds                  INTEGER ::= 250
maxNrOfPDPDirections                INTEGER ::= 2
maxNrOfPoints                       INTEGER ::= 15
maxNrOfRABs                         INTEGER ::= 256
maxNrOfSeparateTrafficDirections    INTEGER ::= 2
maxNrOfSRBs                         INTEGER ::= 8
maxNrOfVol                          INTEGER ::= 2
maxNrOfLevels                       INTEGER ::= 256
maxNrOfAltValues                    INTEGER ::= 16
maxNrOfPLMNsSN                      INTEGER ::= 32
maxNrOfLAs                          INTEGER ::= 65536
maxNrOfSNAs                         INTEGER ::= 65536


maxRAB-Subflows                     INTEGER ::= 7
maxRAB-SubflowCombination           INTEGER ::= 64
maxSet                              INTEGER ::= 9

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

id-AreaIdentity                                 INTEGER ::= 0
id-CN-DomainIndicator                           INTEGER ::= 3
id-Cause                                        INTEGER ::= 4
id-ChosenEncryptionAlgorithm                    INTEGER ::= 5
id-ChosenIntegrityProtectionAlgorithm           INTEGER ::= 6
id-ClassmarkInformation2                        INTEGER ::= 7
id-ClassmarkInformation3                        INTEGER ::= 8
id-CriticalityDiagnostics                       INTEGER ::= 9
id-DL-GTP-PDU-SequenceNumber                    INTEGER ::= 10
id-EncryptionInformation                        INTEGER ::= 11
id-IntegrityProtectionInformation               INTEGER ::= 12
id-IuTransportAssociation                       INTEGER ::= 13
id-L3-Information                               INTEGER ::= 14
id-LAI                                          INTEGER ::= 15
id-NAS-PDU                                      INTEGER ::= 16
id-NonSearchingIndication                       INTEGER ::= 17
id-NumberOfSteps                                INTEGER ::= 18
id-OMC-ID                                       INTEGER ::= 19
id-OldBSS-ToNewBSS-Information                  INTEGER ::= 20
id-PagingAreaID                                 INTEGER ::= 21
```

```
id-PagingCause                                  INTEGER ::= 22
id-PermanentNAS-UE-ID                           INTEGER ::= 23
id-RAB-ContextItem                              INTEGER ::= 24
id-RAB-ContextList                              INTEGER ::= 25
id-RAB-DataForwardingItem                       INTEGER ::= 26
id-RAB-DataForwardingItem-SRNS-CtxReq           INTEGER ::= 27
id-RAB-DataForwardingList                       INTEGER ::= 28
id-RAB-DataForwardingList-SRNS-CtxReq           INTEGER ::= 29
id-RAB-DataVolumeReportItem                     INTEGER ::= 30
id-RAB-DataVolumeReportList                     INTEGER ::= 31
id-RAB-DataVolumeReportRequestItem              INTEGER ::= 32
id-RAB-DataVolumeReportRequestList              INTEGER ::= 33
id-RAB-FailedItem                               INTEGER ::= 34
id-RAB-FailedList                               INTEGER ::= 35
id-RAB-ID                                       INTEGER ::= 36
id-RAB-QueuedItem                               INTEGER ::= 37
id-RAB-QueuedList                               INTEGER ::= 38
id-RAB-ReleaseFailedList                        INTEGER ::= 39
id-RAB-ReleaseItem                              INTEGER ::= 40
id-RAB-ReleaseList                              INTEGER ::= 41
id-RAB-ReleasedItem                             INTEGER ::= 42
id-RAB-ReleasedList                             INTEGER ::= 43
id-RAB-ReleasedList-IuRelComp                   INTEGER ::= 44
id-RAB-RelocationReleaseItem                    INTEGER ::= 45
id-RAB-RelocationReleaseList                    INTEGER ::= 46
id-RAB-SetupItem-RelocReq                       INTEGER ::= 47
id-RAB-SetupItem-RelocReqAck                    INTEGER ::= 48
id-RAB-SetupList-RelocReq                       INTEGER ::= 49
id-RAB-SetupList-RelocReqAck                    INTEGER ::= 50
id-RAB-SetupOrModifiedItem                      INTEGER ::= 51
id-RAB-SetupOrModifiedList                      INTEGER ::= 52
id-RAB-SetupOrModifyItem                        INTEGER ::= 53
id-RAB-SetupOrModifyList                        INTEGER ::= 54
id-RAC                                          INTEGER ::= 55
id-RelocationType                               INTEGER ::= 56
id-RequestType                                  INTEGER ::= 57
id-SAI                                          INTEGER ::= 58
id-SAPI                                         INTEGER ::= 59
id-SourceID                                     INTEGER ::= 60
id-SourceRNC-ToTargetRNC-TransparentContainer   INTEGER ::= 61
id-TargetID                                     INTEGER ::= 62
id-TargetRNC-ToSourceRNC-TransparentContainer   INTEGER ::= 63
id-TemporaryUE-ID                               INTEGER ::= 64
id-TraceReference                               INTEGER ::= 65
id-TraceType                                    INTEGER ::= 66
id-TransportLayerAddress                        INTEGER ::= 67
id-TriggerID                                    INTEGER ::= 68
id-UE-ID                                        INTEGER ::= 69
id-UL-GTP-PDU-SequenceNumber                    INTEGER ::= 70
id-RAB-FailedtoReportItem                       INTEGER ::= 71
id-RAB-FailedtoReportList                       INTEGER ::= 72
id-KeyStatus                                    INTEGER ::= 75
id-DRX-CycleLengthCoefficient                   INTEGER ::= 76
id-IuSigConIdList                               INTEGER ::= 77
id-IuSigConIdItem                               INTEGER ::= 78
id-IuSigConId                                   INTEGER ::= 79
id-DirectTransferInformationItem-RANAP-RelocInf INTEGER ::= 80
id-DirectTransferInformationList-RANAP-RelocInf INTEGER ::= 81
id-RAB-ContextItem-RANAP-RelocInf               INTEGER ::= 82
id-RAB-ContextList-RANAP-RelocInf               INTEGER ::= 83
id-RAB-ContextFailedtoTransferItem              INTEGER ::= 84
id-RAB-ContextFailedtoTransferList              INTEGER ::= 85
id-GlobalRNC-ID                                 INTEGER ::= 86
id-RAB-ReleasedItem-IuRelComp                   INTEGER ::= 87
id-MessageStructure                             INTEGER ::= 88
id-Alt-RAB-Parameters                           INTEGER ::= 89
id-Ass-RAB-Parameters                           INTEGER ::= 90
id-RAB-ModifyList                               INTEGER ::= 91
id-RAB-ModifyItem                               INTEGER ::= 92
id-TypeOfError                                  INTEGER ::= 93
id-BroadcastAssistanceDataDecipheringKeys       INTEGER ::= 94
id-LocationRelatedDataRequestType               INTEGER ::= 95
id-GlobalCN-ID                                  INTEGER ::= 96
id-LastKnownServiceArea                         INTEGER ::= 97
id-SRB-TrCH-Mapping                             INTEGER ::= 98
id-InterSystemInformation-TransparentContainer  INTEGER ::= 99
id-NewBSS-To-OldBSS-Information                         INTEGER ::= 100
id-DownlinkCellLoadInformation                          INTEGER ::= 101
id-UplinkCellLoadInformation                            INTEGER ::= 102
id-SourceRNC-PDCP-context-info                          INTEGER ::= 103
id-InformationTransferID                                INTEGER ::= 104
id-SNA-Access-Information                               INTEGER ::= 105
```

```
id-ProvidedData                                          INTEGER ::= 106
id-GERAN-BSC-Container                                   INTEGER ::= 107
id-GERAN-Classmark                                       INTEGER ::= 108
id-GERAN-Iumode-RAB-Failed-RABAssgntResponse-Item        INTEGER ::= 109
id-GERAN-Iumode-RAB-FailedList-RABAssgntResponse         INTEGER ::= 110
id-VerticalAccuracyCode                                  INTEGER ::= 111
id-ResponseTime                                          INTEGER ::= 112
id-PositioningPriority                                   INTEGER ::= 113
id-ClientType                                            INTEGER ::= 114
id-LocationRelatedDataRequestTypeSpecificToGERANIuMode   INTEGER ::= 115
id-SignallingIndication                                  INTEGER ::= 116
id-hS-DSCH-MAC-d-Flow-ID                                 INTEGER ::= 117
id-UESBI-Iu                                              INTEGER ::= 118
id-PositionData                                          INTEGER ::= 119
id-PositionDataSpecificToGERANIuMode                     INTEGER ::= 120


END
```