**TSG RAN Meeting #21** **RP-030439**
**Frankfurt, Germany, 16 - 19 September 2003**

**Title** **CRs (Rel-5 only) to TS 25.413**
**Source** **TSG RAN WG3**
**Agenda Item** **7.4.5**

| RAN3 Tdoc | Spec | curr. Vers. | new Vers. | REL | CR | Rev | Cat | Title | Work item |
|---|---|---|---|---|---|---|---|---|---|
| R3-031150 | 25.413 | 5.5.0 | 5.6.0 | REL-5 | 594 | - | F | RNC use of IMSI within Relocation Resource Allocation | TEI5 |
| R3-031166 | 25.413 | 5.5.0 | 5.6.0 | REL-5 | 590 | 1 | F | Alignment of RANAP and RNSAP CRRM solutions | RANimp-RRM1 |
| R3-031234 | 25.413 | 5.5.0 | 5.6.0 | REL-5 | 586 | 2 | B | Introduction of positioning methods over Iu | TEI5 |

**Note: R3-031234 CR586r2 to 25.413 REL-5 is related to the RAN3 action item from RAN #20 to provide a RANAP CR related to CR089 to 25.305 v5.5.0 in RP-030300. CR089 to 25.305 REL-5 was already agreed at RAN #20.**

**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:*** | ⌘ | RAN3 |
| ***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*** | ⌘ | **X** | | Other core specifications | ⌘ CR089 to 25.305 v5.5.0 in RP-030300 approved at RAN #20 |
| ***affected:*** | | | **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.<br>The positioning data discriminator (bits 4-1 of the octet) defines the type of data provided for each positioning method:<br>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.<br>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):<br><br>00000 Reserved (NOTE)<br>00001 Reserved (NOTE)<br>00010 Reserved (NOTE)<br>00011 Reserved (NOTE)<br>00100 Reserved (NOTE)<br>00101 Mobile Assisted GPS<br>00110 Mobile Based GPS<br>00111 Conventional GPS<br>01000 Cell ID<br>01001 OTDOA<br>01010 IPDL<br>01011 RTT<br><br>01100 to 01111 reserved for other location technologies<br><br>10000 to 11111 reserved for network specific positioning methods<br><br>Coding of usage (bits 3-1)<br><br>000 Attempted unsuccessfully due to failure or interruption - not used.<br>001 Attempted successfully: results not used to generate location - not used.<br>010 Attempted successfully: results used to verify but not generate location – not used.<br>011 Attempted successfully: results used to generate location<br>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<br><br>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
```

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

***Tdoc* ⌘R3-031166**

*CR-Form-v7*

# CHANGE REQUEST

⌘ **25.413** **CR** **590** ⌘ **rev** **1** ⌘ 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:*** ⌘ | Alignment of RANAP and RNSAP CRRM solutions | |
| ***Source:*** ⌘ | RAN3 | |
| ***Work item code:*** ⌘ | RANimp-RRM1 | ***Date:*** ⌘ 20/08/03 |
| ***Category:*** ⌘ | **F** | ***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:*** ⌘ | Currently, it is clear that the definitions of the CRRM elements in both RANAP and RNSAP are not aligned with each other. These inconsistencies could potentially cause confusion. |
| ***Summary of change:*** ⌘ | It was decided at RAN3 #36 to allign RANAP to RNSAP. Definitions of CRRM IEs of RANAP are aligned with RNSAP, this includes types and ranges of the IEs (with important impact on the ASN.1), and other definition text (for removing ambiguity in the semantics). The names of the IEs have also been aligned for clarity. |
| ***Consequences if not approved:*** ⌘ | If these alignments are not made, future CRRM alterations will have to be applied to the different formats of both 25.413 and 25.423. This increases the opportunity for errors in CRRM, as misalignment in the ASN.1 types and ranges of the IEs would remain, and as a misalignment in the definitions of the IEs would remain. Referencing of the CRRM IEs between RANAP and RNSAP would be not so straight-forward.<br><br>Impact Analysis:<br>Impact assessment towards the previous version of the specification (same release):<br>This CR has isolated impact with the previous version of the specification (same release) because it only alignes the definitions of IE's of RANAP to RNSAP.<br>This CR has an impact on the functional point of view. |

| | |
|---|---|
| ***Clauses affected:*** ⌘ | 3.1, 9.2.1.49, 9.2.1.50, 9.2.1.51, 9.2.1.52, 9.2.1.53, 9.3.4 |
| | Y N |

| | | | | | |
|---|---|---|---|---|---|
| ***Other specs affected:*** | ⌘ | | 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.

*** Unchanged text is omitted ***

## 3.1 Definitions

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

**Cell Load-Based Inter-System Handover:** This mechanism, which is contained within a UTRAN RNC, consists of three primary functions:

1. The RNC has the capability to generate and send Cell Load Information towards the target/source system.
2. The RNC has the capability to receive Cell Load Information from the target/source system, and is able to interpret this information.
3. The ability of the RNC to make a handover decision by comparing the Cell Load Information that it has received from the target system with the Cell Load Information it has about its own cells.

**Integrity Protection Alternative:** defines both the Integrity Protection Status (started/not started) together with the Integrity Protection Algorithm considered altogether**.**

**Ciphering Alternative:** defines both the Ciphering Status (started/not started) together with the Ciphering Algorithm considered altogether**.**

**Default CN node**: An RNC with an inactive or not implemented NAS Node Selection Function [26] has one single permanent default CN node per CN domain. It always initiates the Initial UE Message procedure towards its default CN node. If the NAS Node Selection Function is active, then no Default CN node exists.

**GERAN BSC in Iu mode:** In the context of this specification no distinction between an UTRAN RNC and a GERAN BSC in Iu mode is made. The GERAN BSC in Iu mode will behave as a RNC unless explicitely stated (see [27]).

**PUESBINE feature:** as defined in [33].

**Relocation of SRNS:** relocation of SRNS is a UMTS functionality used to relocate the serving RNS role from one RNS to another RNS. This UMTS functionality is realised by several elementary procedures executed in several interfaces and by several protocols and it may involve a change in the radio resources used between UTRAN and UE

It is also possible to relocate the serving RNS role from:

- one RNS within UMTS to another relocation target external to UMTS;
- functionality equivalent to the serving RNS role from another relocation source external to UMTS to another RNS.

**Serving RNS (SRNS):** role an RNS can take with respect to a specific connection between an UE and UTRAN. There is one serving RNS for each UE that has a connection to UTRAN. The serving RNS is in charge of the radio connection between a UE and the UTRAN. The serving RNS terminates the Iu for this UE

**Serving RNC (SRNC):** SRNC is the RNC belonging to SRNS

**SRNC-ID:** see [3] for definition

**S-RNTI:** see [3] for definition

**Source RNS:** role, with respect to a specific connection between UTRAN and CN, that RNS takes when it decides to initiate a relocation of SRNS

**Source RNC:** source RNC is the RNC belonging to source RNS

**Target RNS:** role an RNS gets with respect to a specific connection between UTRAN and CN when it is being a subject of a relocation of SRNS which is being made towards that RNS

**Target RNC:** target RNC is the RNC belonging to target RNS

**Real Time (RT):** Real time bearer services are those services associated with RABs whose traffic class is defined as *Conversational* or *Streaming.*

**Non Real Time (NRT):** Non Real time bearer services are those services associated with RABs whose traffic class is defined as *Interactive* or *Background.*

**UE Specific Behaviour Information – Iu (UESBI-Iu):** as defined in [33].

**Directed retry**: Directed retry is the process of assigning a User Equipment to a radio resource that does not belong to the serving RNC e.g. in situations of congestion. It is triggered by the RAB Assignment procedure and employs relocation procedures.

**Elementary Procedure:** RANAP protocol consists of Elementary Procedures (EPs). An Elementary Procedure is a unit of interaction between the RNS and the CN. These Elementary Procedures are defined separately and are intended to be used to build up complete sequences in a flexible manner. If the independence between some EPs is restricted, it is described under the relevant EP description. Unless otherwise stated by the restrictions, the EPs may be invoked independently of each other as stand alone procedures, which can be active in parallel. Examples on using several RANAP EPs together with each other and EPs from other interfaces can be found in reference [4].

An EP consists of an initiating message and possibly a response message. Three kinds of EPs are used:

- **Class 1:** Elementary Procedures with response (success and/or failure).
- **Class 2:** Elementary Procedures without response.
- **Class 3:** Elementary Procedures with possibility of multiple responses.

For Class 1 EPs, the types of responses can be as follows:

Successful:

- A signalling message explicitly indicates that the elementary procedure successfully completed with the receipt of the response.

Unsuccessful:

- A signalling message explicitly indicates that the EP failed.
- On time supervision expiry (i.e. absence of expected response).

Successful and Unsuccessful:

- One signalling message reports both successful and unsuccessful outcome for the different included requests. The response message used is the one defined for successful outcome.

Class 2 EPs are considered always successful.

Class 3 EPs have one or several response messages reporting both successful, unsuccessful outcome of the requests and temporary status information about the requests. This type of EP only terminates through response(s) or EP timer expiry.

*** Unchanged text is omitted ***

### 9.2.1.49 Cell Load Information

The *Cell Load Information* IE contains the load information of a specific (serving or target) cell for either the Downlink or the Uplink.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|---|---|---|---|
| **Cell Load Information** | | | | |
| > Cell Capacity Class Value | M | | 9.2.1.50 | |
| > ~~Cell~~ Load Value | M | | 9.2.1.51 | |
| > R~~eal~~ T~~ime~~ Load Value | O | | 9.2.1.52 | |
| > N~~on~~ R~~eal~~ T~~ime~~ Load Information Value | O | | 9.2.1.53 | |

### 9.2.1.50 Cell Capacity Class Value

*Cell Capacity Class Value* IE is the value that classifies the cell capacity with regards to the other cells. *Cell Capacity Class Value* IE only indicates resources that are configured for traffic purposes. ~~The *Cell Capacity Class IE* indicates the maximum cell capacity of the cell. This is defined by the operator.~~

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|---|---|---|---|
| Cell Capacity Class Value | M | | INTEGER (1..100,...) | Value 1 shall indicate the minimum cell capacity, and 100 shall indicate the maximum cell capacity. There should be linear relation between cell capacity and Cell Capacity Class Value. ~~Value 1 shall indicate the minimum capacity class, and 100 shall indicate the maximum capacity class. Capacity class should be measured on a linear scale.~~ |

### 9.2.1.51 ~~Cell~~ Load Value

The *Load Value* IE contains the total cell load relative to the maximum planned load. It is defined as the load percentage of the Cell Capacity Class. ~~The *Cell Load IE* is the total cell load relative to the maximum planned capacity of the cell.~~

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|---|---|---|---|
| ~~Cell~~ Load Value | M | | INTEGER (0..100) | Value 0 shall indicate the minimum load, and 100 shall indicate the maximum load. ~~Cell~~ Load Value should be measured on a linear scale. |

### 9.2.1.52 ~~Real~~ ~~Time~~ Load Value

The *~~Real~~ ~~Time~~ Load Value* IE indicates the ratio of the load generated by Real Time traffic relative to the measured ~~Cell~~ Load Value. Real Time traffic corresponds to the Conversational and Streaming traffic classes.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|---|---|---|---|
| ~~Real~~ ~~Time~~ Load Value | M | | INTEGER (0..100) | Value 0 shall indicate the minimum RT load, and 100 shall indicate the maximum RT load. ~~Real~~ ~~Time~~ Load Value should be measured on a linear scale. |

### 9.2.1.53 ~~Non~~ ~~Real~~ ~~Time~~ Load Information Value

The *~~Non~~ ~~Real~~ ~~Time~~ Load Information Value* IE indicates the load situation on the cell for the Non Real-Time traffic. Non Real Time traffic corresponds to the Interactive and Background traffic classes.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|---|---|---|---|
| Non Real Time Load Information Value | M | | INTEGER(0..3)ENUMERATED (Low, Medium, High, Overloaded, ...) | Mapping of the status:<br>0: low: The NRT load is low.<br>1: medium: The NRT load is medium.<br>2: high: NRT load is high. Probability to admit a new user is low.<br>3: overloaded: NRT overload. The probability to admit a new user is low, packets are discarded and the source is recommended to reduce the data flow. |

*** Unchanged text is omitted ***

## 9.3.4 Information Element Definitions

*** Unchanged text is omitted ***

```
Cell-Capacity-Class-Value ::= INTEGER (1..100,...)

CellLoadValue   ::= INTEGER (0..100)

CellLoadInformation ::= SEQUENCE {
    cell-Capacity-Class-Value           Cell-Capacity-Class-Value,
    cellLoadValue                   CellLoadValue,
    realTimeLoadValue               RealTimeLoadValue                       OPTIONAL,
    nonRealTimeLoadInformationValue NonRealTimeLoadInformationValue         OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { { CellLoadInformation-ExtIEs } }
    OPTIONAL,
    ...
}
```

*** Unchanged text is omitted ***

```
NonRealTimeLoadInformationValue ::= INTEGER (0..3)ENUMERATED {
    low,
    medium,
    high,
    overloaded,
    ...
}
```

*** Unchanged text is omitted ***

```
RealTimeLoadValue   ::= INTEGER (0..100)
```

*** Unchanged text is omitted ***

**3GPP TSG-RAN WG3 Meeting #37** ***Tdoc ⌘ R3-031150***
**Budapest, Hungary, 25th – 29th of August 2003**

*CR-Form-v7*

# CHANGE REQUEST

⌘ **25.413** **CR** **594** ⌘ **rev** **-** ⌘ 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 **X** Core Network **X**

| | | |
|---|---|---|
| ***Title:*** | ⌘ | RNC use of IMSI within Relocation Resource Allocation |
| ***Source:*** | ⌘ | RAN3 |
| ***Work item code:*** | ⌘ | TEI5 |
| ***Date:*** | ⌘ | 25/08/2003 |
| ***Category:*** | ⌘ | **F** |
| ***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:*** | ⌘ | IMSI (Permanent NAS UE Identity) is included in RELOCATION REQUEST message to enable UTRAN paging co-ordination also after SRNS relocation. In RELOCATION REQUEST message IMSI is an optional IE and is included if it is available.<br><br>It is however not defined in 3GPP TS 25.413 that if the IMSI is included in RELOCATION REQUEST message, the RNC shall associate, as if received in COMMON ID message, this permanent identity to the RRC Connection of that user and shall save it for the duration of the RRC connection.. |
| ***Summary of change:*** | ⌘ | RNC behavior, when receiving the permanent identity in the RELOCATION REQUEST message, is completely described.<br><br>Impact assessment towards the previous version of the specification (same release):<br><br>This CR has isolated impact towards the previous version of the specification (same release).<br><br>This CR has an impact under functional point of view.<br><br>The impact can be considered isolated because it only affects the Relocation Resource Allocation system function. |
| ***Consequences if not approved:*** | ⌘ | UTRAN paging co-ordination is not possible after relocation in the described situation. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 8.7.2 |

| | | Y | N | | | |
|---|---|---|---|---|---|---|
| ***Other specs affected:*** | ⌘ | | X | Other core specifications | ⌘ | |
| | | | X | Test specifications | | |
| | | | X | O&M Specifications | | |
| ***Other comments:*** | ⌘ | | | | | |

**How to create CRs using this form:**

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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.

# 8.7 Relocation Resource Allocation

## 8.7.1 General

The purpose of the Relocation Resource Allocation procedure is to allocate resources from target RNS for a relocation of SRNS. Procedure shall be co-ordinated in all Iu signalling connections existing for the UE. The procedure uses connection oriented signalling.

## 8.7.2 Successful Operation

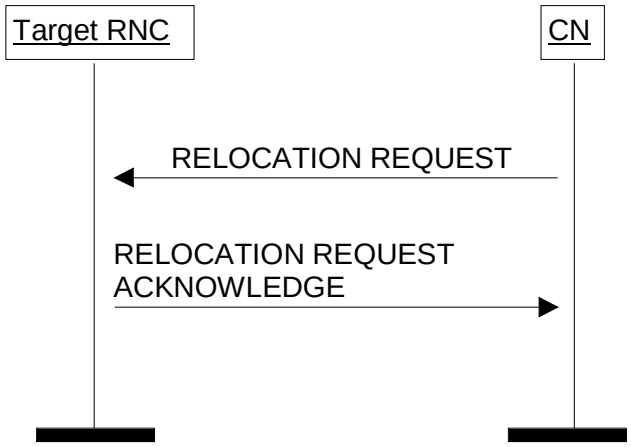


**Figure 7: Relocation Resource Allocation procedure. Successful operation.**

The CN shall initiate the procedure by generating RELOCATION REQUEST message. In a UTRAN to UTRAN relocation, this message shall contain the information (if any) required by the UTRAN to build the same set of RABs as existing for the UE before the relocation. The CN may indicate that RAB QoS negotiation is allowed for certain RAB parameters and in some cases also which alternative values to be used in the negotiation.

The CN shall transmit the RELOCATION REQUEST message to target RNC and the CN shall start the timer $T_{RELOCalloc.}$

When a RELOCATION REQUEST message is sent from a CN node towards an RNC for which the sending CN node is not the default CN node, the *Global CN-ID* IE shall be included.

Upon reception of the RELOCATION REQUEST message, the target RNC shall initiate allocation of requested resources.

The RELOCATION REQUEST message shall contain following IEs:

- *Permanent NAS UE Identity* IE (if available)
- *Cause*
- *CN Domain Indicator*
- *Source RNC To Target RNC Transparent Container*
- *Iu Signalling Connection Identifier*
- *Integrity Protection Information* IE (if available)
- *SNA Access Information* IE (if available)
- *UESBI-Iu* (if available)

For each RAB requested to relocate (or to be created e.g. in the case of inter-system handover), the message shall contain following IEs:

- *RAB-ID*
- *NAS Synchronisation Indicator* IE (if the relevant NAS information is provided by the CN)
- *RAB parameters*
- *User Plane Information*
- *Transport Layer Address*
- *Iu Transport Association*
- *Data Volume Reporting Indication* (only for PS)
- *PDP Type Information* (only for PS)

The RELOCATION REQUEST message may include following IEs:

- *Encryption Information* (shall not be included if the *Integrity Protection Information* IE is not included)

For each RAB requested to relocate the message may include following IEs:

- *Service Handover*.
- *Alternative RAB Parameter Values*.

The following information elements received in RELOCATION REQUEST message require the same special actions in the RNC as specified for the same IEs in the RAB Assignment procedure:

- *RAB-ID*
- *User plane Information*(i.e. required User Plane Mode and required User Plane Versions)
- *Priority level, queuing and pre-emption indication*
- *Service Handover*

The *SDU Format Information Parameter* IE in the *RAB Parameters* IE shall be present only if the *User Plane Mode* IE is set to “support mode for pre-defined SDU sizes” and the *Traffic Class* IE is set to either “Conversational” or “Streaming”.

For a RAB setup, the *RAB Parameters* IE may contain the *Signalling Indication* IE. The *Signalling Indication* IE shall not be present if the *Traffic Class* IE is not set to "Interactive" or if the *CN Domain Indicator* IE is not set to "PS domain".

If the RELOCATION REQUEST message includes the Permanent NAS UE identity (i.e. IMSI), the RNC shall associate the permanent identity to the RRC Connection of that user and shall save it for the duration of the RRC connection.

If the RELOCATION REQUEST message includes the *PDP Type Information* IE, the UTRAN may use this IE to configure any compression algorithms.

The *Cause* IE shall contain the same value as the one received in the related RELOCATION REQUIRED message.

The *Iu Signalling Connection Identifier* IE contains an Iu signalling connection identifier which is allocated by the CN. The value for the *Iu Signalling Connection Identifier* IE shall be allocated so as to uniquely identify an Iu signalling connection for the CN node involved. The RNC shall store and remember this identifier for the duration of the Iu connection.

The RNC shall, if supported, use the *UESBI-Iu* IE when included in the RELOCATION REQUEST message.

The algorithms within the *Integrity Protection Information* IE and the *Encryption Information* IE shall be ordered in preferred order with the most preferred first in the list.

The *Permitted Encryption Algorithms* IE within the *Encryption Information IE* may contain “no encryption” within an element of its list in order to allow the RNC not to cipher the respective connection. This can be done either by not

starting ciphering or by using the UEA0 algorithm. In the absence of the *Encryption Information* IE, the RNC shall not start ciphering.

In case of intra-system relocation, if no *Integrity Protection Key* IE (*Ciphering Key* IE respectively) is provided within the *Source RNC-to-Target RNC transparent container* IE, the target RNC shall not start integrity protection (ciphering respectively).

In case of intra-system relocation, when an *Ciphering Key* IE is provided within the *Source RNC-to-Target RNC transparent container* IE, the target RNC may select to use a ciphering alternative where an algorithm is used. It shall in this case make use of this key to cipher its signalling data whatever the selected algorithm. The *Encryption Key* IE that is contained within the *Encryption Information* IE of the RELOCATION REQUEST message shall never be considered for ciphering of signalling data.

In case of intra-system relocation, when an *Integrity Protection Key* IE is provided within the *Source RNC-to-Target RNC transparent container* IE, the target RNC shall select one integrity algorithm to start integrity and shall in this case make use of this key whatever the selected algorithm. The integrity protection key that is contained within the *Integrity Protection Information* IE of the RELOCATION REQUEST message shall never be considered.

In case of inter-system relocation, the integrity protection and ciphering information to be considered shall be the ones received in the *Integrity Protection Information* IE and *Encryption Information* IE from the RELOCATION REQUEST messages over the Iu interface.

The *Global CN-ID* IE contains the identity of the CN node that sent the RELOCATION REQUEST message, and it shall, if included, be stored together with the Iu signalling connection identifier. If the *Global CN-ID* IE is not included, the RELOCATION REQUEST message shall be considered as coming from the default CN node for the indicated CN domain.

Following additional actions shall be executed in the target RNC during Relocation Resource Allocation procedure:

If the *Relocation Type* IE is set to "UE involved in relocation of SRNS":

- The target RNC may accept a requested RAB only if the RAB can be supported by the target RNC.
- Other RABs shall be rejected by the target RNC in the RELOCATION REQUEST ACKNOWLEDGE message with an appropriate value for *Cause* IE, e.g. "Unable to Establish During Relocation".
- The target RNC shall include information adapted to the resulting RAB configuration in the target to source RNC transparent container to be included in the RELOCATION REQUEST ACKNOWLEDGE message sent to the CN. If the target RNC supports triggering of the Relocation Detect procedure via the Iur interface, the RNC shall assign a d-RNTI for the context of the relocation and include it in the container. If two CNs are involved in the relocation of SRNS, the target RNC may, however, decide to send the container to only one CN.
- If any alternative RAB parameter values have been used when allocating the resources, these RAB parameter values shall be included in the RELOCATION REQUEST ACKNOWLEDGE message within the *Assigned RAB Parameter Values* IE.

If the *Relocation Type* IE is set to "UE not involved in relocation of SRNS":

- The target RNC may accept a RAB only if the radio bearer(s) for the RAB either exist(s) already, and can be used for the RAB by the target RNC, or does not exist before the relocation but can be established in order to support the RAB in the target RNC.
- If existing radio bearers are not related to any RAB that is accepted by target RNC, the radio bearers shall be ignored during the relocation of SRNS and the radio bearers shall be released by radio interface protocols after completion of relocation of SRNS.
- If any alternative RAB parameter values have been used when allocating the resources, these RAB parameter values shall be included in the RELOCATION REQUEST ACKNOWLEDGE message within the *Assigned RAB Parameter Values* IE. It should be noted that the usage of alternative RAB parameter values is not applicable to the UTRAN initiated relocation of type "UE not involved in relocation of SRNS".

After all necessary resources for accepted RABs including the initialised Iu user plane, are successfully allocated, the target RNC shall send RELOCATION REQUEST ACKNOWLEDGE message to the CN.

For each RAB successfully setup the RNC shall include following IEs:

- *RAB ID*
- *Transport Layer Address* (when no ALCAP has been used)
- *Iu Transport Association* (when no ALCAP has been used)

Two pairs of *Transport Layer Address* IE and *Iu Transport Association* IE may be included for RABs established towards the PS domain.

For each RAB the RNC is not able to setup during Relocation Resource Allocation the RNC shall include the *RAB ID* IE and the *Cause* IE within the *RABs Failed To Setup* IE. The resources associated with the RABs indicated as failed to set up shall not be released in the CN until the relocation is completed. This is in order to make a return to the old configuration possible in case of a failed or cancelled relocation.

The RELOCATION REQUEST ACKNOWLEDGE message sent to the CN shall, if applicable and if not sent via the other CN domain, include the *Target RNC To Source RNC Transparent Container* IE. This container shall be transferred by CN to the source RNC or the external relocation source while completing the Relocation Preparation procedure.

If the target RNC supports cell load-based inter-system handover, then in the case of inter-system handover, the *New BSS to Old BSS Information* IE may be included in the RELOCATION REQUEST ACKNOWLEDGE message. This information shall include, if available, the current traffic load in the target cell assuming a successful completion of the handover in progress.

The RNC shall include the *Chosen Integrity Protection Algorithm* IE (*Chosen Encryption Algorithm* IE respectively) within the RELOCATION REQUEST ACKNOWLEDGE message, if, and only if the *Integrity Protection Information* IE (*Encryption Information* IE respectively) was included in the RELOCATION REQUEST message.

If one or more of the RABs that the target RNC has decided to support can not be supported by the CN, then these failed RABs shall not be released towards the target RNC until the relocation is completed.

If the *NAS Synchronisation Indicator* IE is contained in the RELOCATION REQUEST message, the target RNC shall pass it to the UE.

If the *SNA Access Information* IE is contained in the RELOCATION REQUEST message, the target RNC shall store this information and use it to determine whether the UE has access to radio resources in the UTRAN. The target RNC shall consider that the UE is authorised to access only the PLMNs identified by the *PLMN identity* IE in the *SNA Access Information* IE. If the *Authorised SNAs* IE is included for a given PLMN (identified by the *PLMN identity* IE), then the target RNC shall consider that the access to radio resources for the concerned UE is restricted to the LAs contained in the SNAs identified by the *SNAC* IEs.

Transmission and reception of RELOCATION REQUEST ACKNOWLEDGE message terminates the procedure in the UTRAN and the CN respectively.

Before reporting the successful outcome of the Relocation Resource allocation procedure, the RNC shall have executed the initialisation of the user plane mode as requested by the CN in the *User Plane Mode* IE. If the RNC can not initialise the requested user plane mode for any of the user plane mode versions in the *UP Mode Versions* IE according to the rules for initialisation of the respective user plane mode versions, as described in [6], the RAB Relocation shall fail with the cause value "RNC unable to establish all RFCs".

#### 8.7.2.1 Successful Operation for GERAN Iu-mode

The relocation between UTRAN and GERAN Iu-mode shall be considered in the Relocation Resource Allocation procedure as intra-system relocation from RANAP point of view.

For GERAN Iu-mode and to support Relocation towards a GERAN BSC in Iu mode the following shall apply in addition for the successful operation of the Relocation Resource Allocation procedure:

- In case of GERAN Iu-mode, for RAB requested to be relocated from the the CS domain, the RELOCATION REQUEST message may contain the *GERAN BSC Container* IE in order to provide GERAN specific information to the target BSC (see [27]).

## 8.7.3 Unsuccessful Operation

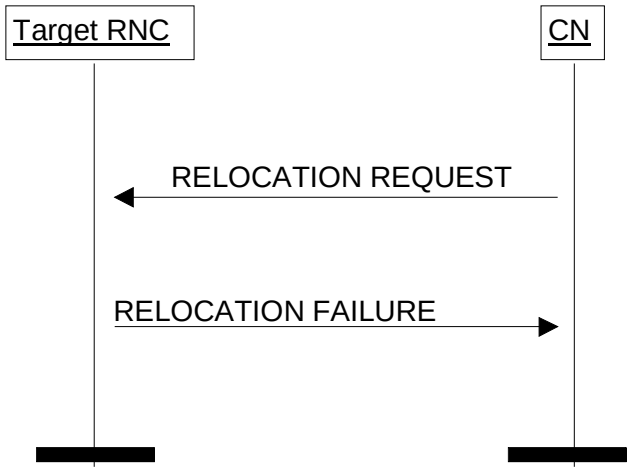


**Figure 8: Relocation Resource Allocation procedure: Unsuccessful operation.**

If the target RNC can not even partially accept the relocation of SRNS or a failure occurs during the Relocation Resource Allocation procedure in the target RNC, the target RNC shall send RELOCATION FAILURE message to the CN.

If the target RNC cannot support any of the integrity protection (ciphering respectively) alternatives provided in the *Integrity Protection Information* IE or *Encryption Information* IE, it shall return a RELOCATION FAILURE message with the cause “Requested Ciphering and/or Integrity Protection algorithms not supported”.

If the target RNC cannot support the relocation due to PUESBINE feature, it shall return a RELOCATION FAILURE message with the cause “Incoming Relocation Not Supported Due To PUESBINE Feature”.

Transmission and reception of RELOCATION FAILURE message terminates the procedure in the UTRAN and the CN respectively.

When CN has received RELOCATION FAILURE message from target RNC, CN shall stop timer $T_{RELOCalloc}$ and shall assume possibly allocated resources within target RNC completely released.

In the case of inter-system handover, and if the target RNC supports cell load-based inter-system handover, then

- the *NewBSS to Old BSS Information* IE may be included in the RELOCATION FAILURE message. This information shall include, if available, the current traffic load in the target cell.
- the RELOCATION FAILURE message may contain the appropriate value in the *Cause* IE, e.g. "No Radio Resources Available in Target Cell".

### 8.7.3.1 Unsuccessful Operation for GERAN Iu-mode

For GERAN Iu-mode and to support Relocation towards a GERAN BSC in Iu mode the following shall apply in addition for the unsuccessful operation of the Relocation Resource Allocation procedure:

- In case a Relocation to GERAN Iu-mode fails (only for CS), because the Target BSC cannot provide an appropriate RAB corresponding to the content of the *GERAN BSC Container* IE (if received), the Target BSC shall report the unsuccessful Relocation Resource Allocation by indicating the cause value “GERAN Iu-mode Failure” within the RELOCATION FAILURE message and shall include the *GERAN Classmark* IE.

## 8.7.4 Abnormal Conditions

If after reception of the RELOCATION REQUEST message, the target RNC receives another RELOCATION REQUEST message on the same Iu connection, then the target RNC shall discard the latter message and the original Relocation Resource Allocation procedure shall continue normally.

If the target RNC receives a *Source RNC -to-Target RNC Transparent Container* IE containing *Chosen Integrity Protection* (*Encryption* respectively) *Algorithm* IE without *Integrity Protection* (*Ciphering* respectively) *Key* IE, it shall return RELOCATION FAILURE message with the cause "Conflict with already existing Integrity protection and/or Ciphering information".

**Interactions with Iu Release procedure:**

If the CN decides to not continue the Relocation Resource Allocation procedure (e.g. due to $T_{RELOCalloc}$ expiry) before the Relocation Resource Allocation procedure is completed, the CN shall stop timer $T_{RELOCalloc}$ (if timer $T_{RELOCalloc}$ has not already expired) and the CN shall, if the Iu signalling connection has been established or later becomes established, initiate the Iu Release procedure towards the target RNC with an appropriate value for the *Cause* IE, e.g. "Relocation Cancelled".

NOTE: In case two CN domains are involved in the SRNS Relocation Resource Allocation procedure, the Target RNC may check whether the content of the two *Source RNC to Target RNC Transparent Container* IEs or the two *SNA Access Information* IEs is the same. In case the Target RNC receives two different *Source RNC to Target RNC Transparent Container* IEs or two different *SNA Access Information* IEs, the RNC behaviour is left implementation specific.

## 8.7.5 Co-ordination of Two Iu Signalling Connections

Co-ordination of two Iu signalling connections during Relocation Resource Allocation procedure shall be executed by the target RNC when the *Number of Iu Instances* IE received in the *Source RNC to Target RNC Transparent Container* IE in the RELOCATION REQUEST message indicates that two CN domains are involved in relocation of SRNS.

When both the CS and PS user data *Chosen Encryption Algorithm* IE are received within the *Source RNC-to-Target RNC transparent container* IE and if these two received *Chosen Encryption Algorithm* IE are not the same, the target RNC shall fail the Relocation Resource Allocation procedure by sending back the RELOCATION FAILURE message.

The integrity protection (ciphering respectively) alternatives provided in the *Integrity Protection Information* IE (*Encryption Information* IE respectively) of the RELOCATION REQUEST messages received from both CN domains shall have at least one common alternative, otherwise the Relocation Resource Allocation shall be failed by sending back the RELOCATION FAILURE message.

If two CN domains are involved, the following actions shall be taken by the target RNC:

- The target RNC shall utilise the *Permanent NAS UE Identity* IE, received explicitly by each CN domain within RELOCATION REQUEST message, to co-ordinate both Iu signalling connections.

- The target RNC shall generate and send RELOCATION REQUEST ACKNOWLEDGE message only after all expected RELOCATION REQUEST messages are received and analysed.

- If the target RNC decides to send the *Target RNC to Source RNC Transparent Container* IE via the two CN domains, the target RNC shall ensure that the same *Target RNC to Source RNC Transparent Container* IE is included in RELOCATION REQUEST ACKNOWLEDGE messages transmitted via the two CN domains and related to the same relocation of SRNS.

If the target RNC receives the *UESBI-Iu* IE on the Iu-CS but not on the Iu-PS interface (or vice versa), the RNC shall, if supported, use the *UESBI-Iu* IE for both domains.