

CHANGE REQUEST

⌘ 29.060 CR 557 ⌘ rev - ⌘ Current version: 6.8.0 ⌘

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:	⌘ PS handover procedure in GERAN A/Gb mode		
Source:	⌘ Nokia		
Work item code:	⌘ TEI6	Date:	⌘ 25/05/2005
Category:	⌘ F	Release:	⌘ Rel-6
<i>Use <u>one</u> of the following categories:</i>		<i>Use <u>one</u> of the following releases:</i>	
F (correction)		Ph2 (GSM Phase 2)	
A (corresponds to a correction in an earlier release)		R96 (Release 1996)	
B (addition of feature),		R97 (Release 1997)	
C (functional modification of feature)		R98 (Release 1998)	
D (editorial modification)		R99 (Release 1999)	
Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-4 (Release 4)	
		Rel-5 (Release 5)	
		Rel-6 (Release 6)	
		Rel-7 (Release 7)	

Reason for change:	⌘ Introducing the PS handover procedure in GERAN A/Gb mode described in TS43.129.
Summary of change:	⌘ The introduction of the PS handover procedure has the following impacts on the 29.060: <i>Section 2:</i> Reference to specifications 3GPP TS 43.129 and 3GPP TS 44.065 added. <i>Section 3.1:</i> Definitions of the PS Handover procedure and the PS handover Request Context added. <i>Sections 7.5.6:</i> New IEs added to the Forward Relocation Request procedures in order to perform the PS handover procedure between new SGSN and Target BSS. <i>Sections 7.5.7:</i> New IEs added to the Forward Relocation Response procedures in order to perform the PS handover procedure in the Inter-SGSN cases. <i>Sections 7.5.8:</i> Changes added to Forward Relocation Complete procedure in order to be used when performing PS Handover procedures. <i>Section 7.5.9:</i> Changes added to Forward Cancel Request procedure in order to be used when performing PS Handover procedures. The old SGSN terminates the PS Handover to the target cell by sending a Relocation Cancel Request

message to the new SGSN.

Section 7.5.10: Changes to the Relocation Cancel Response procedure to support PS handover procedure. Relocation Cancel Response message is sent also from the old SGSN to the new SGSN also when PS handover procedure has been cancelled in the old SGSN.

Section 7.5.13: Changes are added to the Forward SRNS Context procedures in order to be applicable for PS Handover is performed. When the old SGSN received a BSSGP message PS Handover Required and the acknowledged peer-to-peer LLC operation is used for the PDP context and/or when “delivery order” is set in the PDP Context QoS profile, the old SGSN shall send a Forward SRNS Context message with the PDU numbers to the new SGSN. The new SGSN shall forward the message to the target RNC / target BSS using the corresponding RANAP message only for lu mode target cell. Editorial change in this section “in case of” has been replaced with “for”.

Section 7.7: New IEs added to the Information Element table.

Section 7.7.68: New IE defined - PS Handover Request Context. The PS Handover Request Context contains for a particular packet flow the PS handover specific information that needs to be transferred between SGSNs during the PS handover procedure.

Section 7.7.69: New IE defined - BSS Container. The BSS Container information element contains the radio-related information in the source cell to target cell direction and radio-related and core network information in the target cell to source cell direction.

Section 7.7.70: New IE defined - Cell Identification. The Cell Identification information element contains the identification of a source cell (Cell Id 1) and the identification of the target cell (Cell ID 2) as defined in 3GPP TS 48.018.

Section 7.7.71: New IE defined - PDU Numbers. The PDU Numbers information element contains the sequence number status corresponding to a PDP context in the old SGSN. This information element shall be sent only when acknowledged peer-to-peer LLC operation is used for the PDP context and/or when the “delivery order” QoS attribute is set in the PDP context QoS profile.

Section 8.2: Corrections to GTP-C headers added.

Note: SRNS relocation related IEs (RANAP Cause, UTRAN Transparent Container, Target Cell Identification, RAB Context) will not be available for PS handover in GERAN A/Gb mode. However the change of the *Presence Requirement* from the “Mandatory” to “Conditional” for these IEs for PS handover is not preferable due to the backward compatibility issues. The proposal in this case is to set set the RANAP Cause to cause #43 "Relocation desirable for radio reasons" as defined in 3GPP TS25.413 and leaving the UTRAN Transparent Container, Target Cell Identification, RAB Context IEs as empty , according to their defined minimum length that will not lead to the rejection of the signalling message due to incorrect mandatory IE.

Consequences if not approved:

⌘ PS Handover procedures will not be possible in the following scenarios: either Inter-SGSN PS Handover from GERAN A/Gb mode to GERAN A/Gb mode or inter-mode / inter-RAT Inter-SGSN PS Handover from/to GERAN A/Gb mode to/from GERAN lu mode/UTRAN.

Clauses affected:

⌘ 2; 3.1; 7.5.6; 7.5.7; 7.5.8; 7.5.13; 7.7; 7.7.68; 7.7.69; 7.7.70; 7.7.71; 8.2

Other specs

⌘

Y	N
	X

 Other core specifications

⌘

affected:

<input checked="" type="checkbox"/>	Test specifications
<input checked="" type="checkbox"/>	O&M Specifications

Other comments:

The contents of this CR is identical to the revision of CR#552 sent to the CT4 mailing list 24 May 2005, with the exception that the deletions of revised text, not currently in the specification, are not shown. ("In case of" was changed to "for" in several places.)

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.

<Modified Section>

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.003: "Numbering, addressing and identification".
- [3] 3GPP TS 23.007: "Restoration procedures".
- [4] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".
- [5] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".
- [6] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [7] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".
- [8] 3GPP TS 33.102: "3G security; Security architecture".

- [9] 3GPP TS 43.020: " Security related network functions".
- [10] 3GPP TS 43.064: "Overall description of the GPRS radio interface; Stage 2".
- [11] 3GPP TS 44.064: "Mobile Station - Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) layer specification".
- [12] IETF RFC 791 (STD 0005): "Internet Protocol", J. Postel.
- [13] IETF RFC 768 (STD 0006): "User Datagram Protocol", J. Postel.
- [14] IETF RFC 1700: "Assigned numbers", J. Reynolds and J. Postel.
- [15] IETF RFC 2181: "Clarifications to the DNS specification", R. Elz and R. Bush.
- [16] Void.
- [17] 3GPP TS 23.121: "Architectural requirements for Release 1999".
- [18] 3GPP TS 32.251: "Telecommunication management; Charging management; Packet Switched (PS) domain charging".
- [19] 3GPP TS 23.236: "Intra domain connection of Radio Access Network (RAN) nodes to multiple Core Network (CN) nodes".
- [20] 3GPP TS 48.018: "General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS protocol".
- [21] 3GPP TR 44.901 (Release 5): "External Network Assisted Cell Change (NACC)".
- [22] 3GPP TS 33.210: "3G security; Network Domain Security (NDS); IP network layer security".
- [23] 3GPP TS 25.414: "UTRAN Iu interface data transport and transport signalling".
- [24] 3GPP TS 23.271: " Technical Specification Group Services and System Aspects; Functional stage 2 description of LCS".
- [25] 3GPP TS 23.195: "Provision of User Equipment Specific Behaviour Information (UESBI) to network entities".
- [26] 3GPP TS 23.246: "Multimedia Broadcast/Multicast Service (MBMS) Architecture and Functional Description".
- [27] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based Services and Packet Data Networks (PDN) "
- [28] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".
- [29] 3GPP TS 22.101: "Service Principles".
- [30] 3GPP TS 32.421: "Subscriber and equipment trace: Trace concepts and requirements".
- [31] 3GPP TS 32.422: "Subscriber and equipment trace: Trace Control and Configuration Management".
- [32] 3GPP TS 32.423: "Subscriber and equipment trace: Trace data definition and management".
- [33] 3GPP TS 32.295: "Telecommunication management; Charging management; Charging Data Record (CDR) transfer".
- [34] 3GPP TS 32.298: "Telecommunication management; Charging management; Charging Data Record (CDR) parameter description".
- [35] 3GPP TS 23.251: "Network Sharing; Architecture and Functional Description".
- [xx] [3GPP TS 43.129: " Packet-switched handover for GERAN A/Gb mode; Stage 2".](#)

<END OF MODIFICATION>

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3 Definitions and abbreviations

3.1 Definitions

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

Enhanced Network Service Access Point Identifier (Enhanced NSAPI): integer value in the range [128; 255], identifying a certain Multimedia Broadcast/Multicast Service (MBMS) UE Context. **G-PDU:** is a user data message, It consists of a T-PDU plus a GTP header

GTP Tunnel: in the GTP-U plane is defined for each PDP Context or each MBMS service in the GSNs and/or each RAB in the RNC. A GTP tunnel in the GTP-C plane is defined for all PDP Contexts with the same PDP address and APN (for Tunnel Management messages and UE Specific MBMS message), for each MBMS service (for Service Specific MBMS messages) or for each MS (for other types of messages). A GTP tunnel is identified in each node with a TEID, an IP address and a UDP port number. A GTP tunnel is necessary to forward packets between an external packet data network and an MS user.

MBMS Bearer Context: contains all information describing a particular MBMS bearer service.

MBMS UE Context: contains UE-specific information related to a particular MBMS service that the UE has joined.

MM Context: information sets held in MS and GSNs for a GPRS subscriber related to Mobility Management (MM) (please refer to the MM Context Information Element)

Network Service Access Point Identifier (NSAPI): integer value in the range [0; 15], identifying a certain PDP Context. It identifies a PDP context belonging to a specific MM Context ID

path: UDP/IP path is used to multiplex GTP tunnels

Path Protocol: protocol used as a bearer of GTP between GSNs or between a GSN and a RNC

Packet Data Protocol (PDP): network protocol used by an external packet data network interfacing to GPRS

PDP Context: information sets held in MS and GSNs for a PDP address (please refer to the PDP Context Information Element)

PS Handover procedure: used to enable MS with one or more packet flows to be moved between two cells with minimal service interruption through allocation of radio resources in the target cell while the MS is still in the source cell.

PS Handover Request Context: contains packet flow specific information that needs to be transferred between SGSNs during the PS handover procedure.

Quality of Service (QoS): may be applicable for the GPRS backbone and the Iu interface if the path media supports it. Separate paths with different priorities may be defined between a GSN pair or between a GSN and an RNC.

GTP-C Message: GTP-C or control plane messages are exchanged between GSN/RNC pairs in a path. The control plane messages are used to transfer GSN capability information between GSN pairs, to create, update and delete GTP tunnels and for path management.

GTP-U Message: GTP-U or user plane messages are exchanged between GSN pairs or GSN/RNC pairs in a path. The user plane messages are used to carry user data packets, and signalling messages for path management and error indication.

GTP-PDU: GTP Protocol Data Unit is either a GTP-C message or a GTP-U message

Signalling Message: any GTP-PDU except the G-PDU

T-PDU: original packet, for example an IP datagram, from an MS or a network node in an external packet data network
A T-PDU is the payload that is tunnelled in the GTP-U tunnel.

Traffic Flow Template (TFTs): used by GGSN to distinguish between different user payload packets and transmit packets with different QoS requirements via different PDP context but to the same PDP address

Tunnel Endpoint Identifier (TEID): unambiguously identifies a tunnel endpoint in the receiving GTP-U or GTP-C protocol entity

The receiving end side of a GTP tunnel locally assigns the TEID value the transmitting side has to use. The TEID values are exchanged between tunnel endpoints using GTP-C (or RANAP, over the Iu) messages.

UDP/IP Path: connection-less unidirectional or bidirectional path defined by two end-points

An IP address and a UDP port number define an end-point. A UDP/IP path carries GTP messages between GSN nodes, and between GSN and RNC nodes related to one or more GTP tunnels.

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7.5.6 Forward Relocation Request

The old SGSN shall send a Forward Relocation Request to the new SGSN to convey necessary information to perform the SRNS Relocation procedure between new SGSN and Target RNC [or to perform the PS handover procedure between new SGSN and Target BSS](#).

All information elements are mandatory, except Selected PLMN ID, PDP Context, MBMS UE Context and Private Extension.

The IMSI information element contains the IMSI of the target MS for SRNS Relocation [or PS handover](#) procedure.

The old SGSN shall include a SGSN Address for control plane. The new SGSN shall store this SGSN Address and use it when sending control plane messages for the MS to the old SGSN in the SRNS Relocation procedure. If the new SGSN is IPv6 capable, an IPv4/IPv6 capable old SGSN shall include an IPv6 address in the field SGSN Address for Control Plane, otherwise it shall include an IPv4 address in this field.

The Tunnel Endpoint Identifier Control Plane field specifies a tunnel endpoint identifier, which is chosen by the old SGSN. The new SGSN shall include this Tunnel Endpoint Identifier Control Plane in the GTP header of all subsequent control plane messages, which are sent from the new SGSN to the old SGSN.

The MM Context contains necessary mobility management and security parameters. The IMEISV shall, if available, be included in the MM Context from the old SGSN to the new SGSN .

All active PDP contexts in the old SGSN shall be included as PDP Context information elements. The PDP contexts are included in an implementation dependant prioritized order, and the most important PDP context is placed first. When the PDP Context Prioritization IE is included, it informs the new SGSN that the PDP contexts are sent prioritized. If the new SGSN is not able to maintain active all the PDP contexts received from the old SGSN when it is indicated that prioritization of the PDP contexts is applied, the new SGSN should use the prioritisation sent by old SGSN as input when deciding which PDP contexts to maintain active and which ones to delete. In case no PDP context is active, neither of these IEs shall be included.

[The old SGSN shall include in the Forward Relocation Request message the PS Handover Request Context IE, BSS Container IE and Cell Identification IE when this message is used for PS handover from A/Gb mode to A/Gb mode and from Iu mode to A/Gb mode.](#)

[The new SGSN receiving the PS Handover Request Context IE shall proceed with the PS Handover procedure. The PS Handover Request Context IE shall be included for each PDP context included in the Forward Relocation Request.](#)

[BSS Container IE and Cell Identification IE](#) are the IEs sent from the source BSS/RNC to the old SGSN. These IEs will be included in the Forward Relocation Request message to the new SGSN only if the PS Handover Request Context IE is present. [BSS Container IE](#) contains the radio-related network information for the PS handover procedure. [Cell Identification IE](#) contains the identification of a source cell (for PS handover from A/Gb mode to A/Gb mode) or an RNC-ID (for PS handover from Iu mode to A/Gb mode) and the identification of the target cell.

All MBMS UE Contexts in the old SGSN shall be included as MBMS UE Context information elements.

UTRAN transparent container, Target identification and RANAP Cause are information from the source RNC/BSS in the old SGSN. [The old SGSN shall include in the Forward Relocation Request message the RANAP Cause IE, UTRAN transparent container IE and Target Identification IE when this message is used for the SRNS relocation procedure. For PS handover from A/Gb mode to A/Gb mode, the old SGSN shall set the value part of UTRAN transparent container IE and Target Identification IE to empty, according to their defined minimum length and set the RANAP Cause to cause #43 "Relocation desirable for radio reasons" as defined in 3GPP TS25.413. For PS handover from A/Gb mode to Iu mode, the old SGSN shall set the RANAP Cause to cause #43 "Relocation desirable for radio reasons" as defined in 3GPP TS25.413. For PS handover from Iu mode to A/Gb mode, the old SGSN shall set the value part of UTRAN transparent container IE and Target Identification IE to empty, according to their defined minimum length.](#)

Charging Characteristics IE contains the charging characteristics which apply for a PDP context; see 3GPP TS 32.251 [18] and 3GPP TS 32.298 [34]. One Charging Characteristics IE shall be included per PDP context IE. If no PDP context is active, this IE shall not be included. The mapping of a Charging Characteristics IE to a PDP Context IE is done according to the sequence of their appearance, e.g. the first Charging Characteristics IE is mapped to the first PDP Context IE.

The Selected PLMN ID IE indicates the core network operator selected for the MS in a shared network. The old SGSN shall include this IE if the selected PLMN identity is available; see 3GPP TS 23.251 [xx] and 3GPP TS 25.413 [7] for details.

The optional Private Extension contains vendor or operator specific information.

Table 29: Information Elements in a Forward Relocation Request

Information element	Presence requirement	Reference
IMSI	Mandatory	7.7.2
Tunnel Endpoint Identifier Control Plane	Mandatory	7.7.14
RANAP Cause	Mandatory	7.7.18
Charging Characteristics	Optional	7.7.23
MM Context	Mandatory	7.7.28
PDP Context	Conditional	7.7.29
SGSN Address for Control plane	Mandatory	7.7.32
Target Identification	Mandatory	7.7.37
UTRAN transparent container	Mandatory	7.7.38
PDP Context Prioritization	Optional	7.7.45
MBMS UE Context	Optional	7.7.55
Selected PLMN ID	Optional	7.7.64
PS Handover Request Context	Optional	7.7.yy1
BSS Container	Optional	7.7.yy2
Cell Identification	Optional	7.7.yy3
Private Extension	Optional	7.7.46

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7.5.7 Forward Relocation Response

The new SGSN shall send a Forward Relocation Response to the old SGSN as a response to a previous Forward Relocation Request.

Possible Cause values is:

- 'Request Accepted'.
- 'System failure'.
- 'Mandatory IE incorrect'.
- 'Mandatory IE missing'.
- 'Optional IE incorrect'.
- 'No resources available'.
- 'Invalid message format'.
- 'Relocation failure'.

RANAP Cause is mandatory if cause value is contained in RANAP message.

RAB Setup Information, UTRAN transparent container and RANAP Cause are information from the target RNC in the new SGSN.

One or more RAB Setup Information parameters may be sent in this message. This information element shall be included if the Cause contains the value 'Request accepted' and there is at least one RAB assigned in the new SGSN.

The new SGSN shall include a SGSN Address for control plane. The old SGSN shall store this SGSN Address and use it when sending control plane messages for the MS to the new SGSN in the SRNS Relocation Procedure. If the Forward Relocation Request received from the old SGSN includes an IPv6 SGSN address, an IPv4/IPv6 capable SGSN shall include an IPv6 address in the field SGSN Address for Control Plane, otherwise, it shall include an IPv4 address in this field.

The Tunnel Endpoint Identifier Control Plane field specifies a Tunnel Endpoint Identifier that is chosen by the new SGSN. The old SGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent signalling messages that are sent from the old SGSN to the new SGSN. This information element shall be included if the Cause contains the value 'Request accepted'.

One or more Additional RAB Setup Information parameters may be sent in this message for IPv6. This information element shall be included if the Cause contains the value 'Request accepted' and there is at least one RAB assigned in the new SGSN.

The new SGSN may include its SGSN number. If the old SGSN receives the SGSN number of the new SGSN it shall include this number when informing interworking core network nodes that there is a need to re-route previously sent requests against the new SGSN, e.g. in LCS the GMLC will use this SGSN number to re-activate the Location Request to the new SGSN (3GPP TS 23.271 [24]).

The optional Private Extension contains vendor or operator specific information.

If the new SGSN has received the Cell Identification IE in the Forward Relocation Request message and the PS handover continues for at least one PDP Context, the NSAPI for each of the active PDP Contexts received in the Forward Relocation Request for which the PS handover continues are indicated in their priority order, highest priority first. One instance of the NSAPI IE will be inserted for each of these PDP Contexts.

The BSS Container information element contains the radio-related and core network information for the PS handover procedure. This information element shall be included if the Cause contains the value 'Request accepted'.

The Tunnel Endpoint Identifier Data II IE, one information for each PDP context, contains the tunnel endpoint of the new SGSN. Forward Relocation Response contains the IP address of the new SGSN for data forwarding to the new SGSN during the PS handover procedure.

The new SGSN receiving a Forward Relocation Request with the optional PS Handover Request Context, BSS Container, Cell Identification IEs mandatory UTRAN transparent container, Target identification IEs having their value part empty according to their minimum defined length and RANAP Cause IEs set to cause #43 shall not reject this message if it supports the PS handover.

Table 30: Information Elements in a Forward Relocation Response

Information element	Presence requirement	Reference
Cause	Mandatory	7.7.1
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
Tunnel Endpoint Identifier Data II	Optional	7.7.15
RANAP Cause	Conditional	7.7.18
SGSN Address for Control plane	Conditional	7.7.32
UTRAN transparent container	Optional	7.7.38
RAB Setup Information	Conditional	7.7.39
Additional RAB Setup Information	Conditional	7.7.45A
SGSN Number	Optional	7.7.47
BSS Container	Optional	7.7.yy2
Private Extension	Optional	7.7.46
SGSN Number	Optional	7.7.47

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7.5.8 Forward Relocation Complete

The new SGSN shall send a Forward Relocation Complete to the old SGSN to indicate that the SRNS relocation procedure [or the PS Handover procedure](#) has been successfully finished.

The optional Private Extension contains vendor or operator specific information.

Table 31: Information Elements in a Forward Relocation Complete

Information element	Presence requirement	Reference
Private Extension	Optional	7.7.46

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7.5.9 Relocation Cancel Request

The Relocation Cancel Request message is sent from the old SGSN to the new SGSN [either](#) when the old SGSN is requested to cancel the relocation procedure by the source RNC by means of a RANAP message [or is requested to cancel the PS Handover procedure by the source BSS by means of a BSSGP message](#).

[The old SGSN terminates the PS Handover towards the target cell by sending a Relocation Cancel Request message to the new SGSN.](#)

The optional Private Extension contains vendor or operator specific information.

Table 32: Information Elements in a Relocation Cancel Request

Information element	Presence requirement	Reference
IMSI	Mandatory	7.7.2
Private Extension	Optional	7.7.46

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7.5.10 Relocation Cancel Response

The Relocation Cancel Response message is sent from the new SGSN to the old SGSN either when the relocation procedure has been cancelled in the old SGSN or when the PS handover procedure has been cancelled in the old SGSN. This message is used as the response to the Relocation Cancel Request message.

Possible Cause values are:

- 'Request Accepted'.
- 'IMSI not known'.
- 'Mandatory IE incorrect'.
- 'Mandatory IE missing'.
- 'Optional IE incorrect'.
- 'Invalid message format'.

The optional Private Extension contains vendor or operator specific information.

Table 33: Information Elements in a Relocation Cancel Response

Information element	Presence requirement	Reference
Cause	Mandatory	7.7.1
Private Extension	Optional	7.7.46

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7.5.13 Forward SRNS Context

The Forward SRNS Context message is used ~~in case of~~for hard handover with switch in CN. When the old SGSN receives the RANAP message Forward SRNS Context, the old SGSN shall send a Forward SRNS Context message to the new SGSN. The new SGSN shall forward the message to the target RNC using the corresponding RANAP message.

When the old SGSN receives a BSSGP message PS Handover Required and the acknowledged peer-to-peer LLC operation is used for the PDP context or when “delivery order” is set in the PDP Context QoS profile, the old SGSN shall send a Forward SRNS Context message with the PDU Numbers IE to the new SGSN. The new SGSN shall

[forward the Forward SRNS Context message to the target RNC / target BSS using the corresponding RANAP message only for PS handover to *Iu mode*.](#)

For each RAB context in the received RANAP message, the old SGSN shall include a RAB Context IE in the GTP-C Forward SRNS Context message.

If available, the old SGSN shall include a Source RNC PDCP context info in the Forward SRNS Context message.

[When the old SGSN receives a BSSGP message PS Handover Required from source BSS/RNC for PS handover to A/Gb mode, the value part of RAB Context IE shall be empty according to its defined minimum length.](#)

Table 36: Information Elements in a Forward SRNS Context

Information element	Presence requirement	Reference
RAB Context	Mandatory	7.7.19
Source RNC PDCP context info	Optional	7.7.61
PDU Numbers	Optional	7.7.yy4
Private Extension	Optional	7.7.46

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7.7 Information Elements

A GTP Signalling message may contain several information elements. The TLV (Type, Length, Value) or TV (Type, Value) encoding format shall be used for the GTP information elements. The information elements shall be sorted, with the Type fields in ascending order, in the signalling messages. The Length field contains the length of the information element excluding the Type and Length field.

For all the length fields, bit 8 of the lowest numbered octet is the most significant bit and bit 1 of the highest numbered octet is the least significant bit.

Within information elements, certain fields may be described as spare. These bits shall be transmitted with the value defined for them. To allow for future features, the receiver shall not evaluate these bits.

The most significant bit in the Type field is set to 0 when the TV format is used and set to 1 for the TLV format.

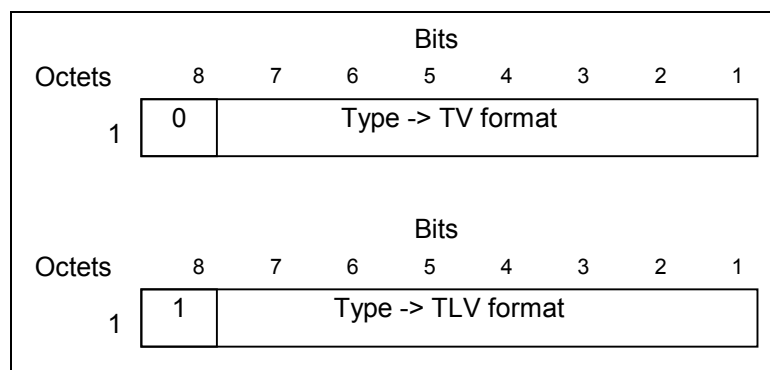


Figure 8: Type field for TV and TLV format

Table 37: Information Elements

IE Type Value	Format	Information Element	Reference
1	TV	Cause	7.7.1

IE Type Value	Format	Information Element	Reference
2	TV	International Mobile Subscriber Identity (IMSI)	7.7.2
3	TV	Routeing Area Identity (RAI)	7.7.3
4	TV	Temporary Logical Link Identity (TLLI)	7.7.4
5	TV	Packet TMSI (P-TMSI)	7.7.5
6-7	Spare		
8	TV	Reordering Required	7.7.6
9	TV	Authentication Triplet	7.7.7
10	Spare		
11	TV	MAP Cause	7.7.8
12	TV	P-TMSI Signature	7.7.9
13	TV	MS Validated	7.7.10
14	TV	Recovery	7.7.11
15	TV	Selection Mode	7.7.12
16	TV	Tunnel Endpoint Identifier Data I	7.7.13
17	TV	Tunnel Endpoint Identifier Control Plane	7.7.14
18	TV	Tunnel Endpoint Identifier Data II	7.7.15
19	TV	Teardown Ind	7.7.16
20	TV	NSAPI	7.7.17
21	TV	RANAP Cause	7.7.18
22	TV	RAB Context	7.7.19
23	TV	Radio Priority SMS	7.7.20
24	TV	Radio Priority	7.7.21
25	TV	Packet Flow Id	7.7.22
26	TV	Charging Characteristics	7.7.23
27	TV	Trace Reference	7.7.24
28	TV	Trace Type	7.7.25
29	TV	MS Not Reachable Reason	7.7.25A
117-126	Reserved for the GPRS charging protocol (see GTP' in 3GPP TS 32.295 [33])		
127	TV	Charging ID	7.7.26
128	TLV	End User Address	7.7.27
129	TLV	MM Context	7.7.28
130	TLV	PDP Context	7.7.29
131	TLV	Access Point Name	7.7.30
132	TLV	Protocol Configuration Options	7.7.31
133	TLV	GSN Address	7.7.32
134	TLV	MS International PSTN/ISDN Number (MSISDN)	7.7.33
135	TLV	Quality of Service Profile	7.7.34
136	TLV	Authentication Quintuplet	7.7.35
137	TLV	Traffic Flow Template	7.7.36
138	TLV	Target Identification	7.7.37
139	TLV	UTRAN Transparent Container	7.7.38
140	TLV	RAB Setup Information	7.7.39
141	TLV	Extension Header Type List	7.7.40
142	TLV	Trigger Id	7.7.41
143	TLV	OMC Identity	7.7.42
144	TLV	RAN Transparent Container	7.7.43
145	TLV	PDP Context Prioritization	7.7.45
146	TLV	Additional RAB Setup Information	7.7.45A
147	TLV	SGSN Number	7.7.47
148	TLV	Common Flags	7.7.48
149	TLV	APN Restriction	7.7.49
150	TLV	Radio Priority LCS	7.7.25B
151	TLV	RAT Type	7.7.50
152	TLV	User Location Information	7.7.51
153	TLV	MS Time Zone	7.7.52
154	TLV	IMEI(SV)	7.7.53
155	TLV	CAMEL Charging Information Container	7.7.54
156	TLV	MBMS UE Context	7.7.55
157	TLV	Temporary Mobile Group Identity (TMGI)	7.7.56
158	TLV	RIM Routing Address	7.7.57

IE Type Value	Format	Information Element	Reference
159	TLV	MBMS Protocol Configuration Options	7.7.58
160	TLV	MBMS Service Area	7.7.60
161	TLV	Source RNC PDCP context info	7.7.61
162	TLV	Additional Trace Info	7.7.62
163	TLV	Hop Counter	7.7.63
164	TLV	Selected PLMN ID	7.7.64
165	TLV	MBMS Session Identifier	7.7.65
166	TLV	MBMS 2G/3G Indicator	7.7.66
167	TLV	Enhanced NSAPI	7.7.67
168	TLV	MBMS Session Duration	7.7.59
zz1	TLV	PS Handover Request Context	7.7.yy1
zz2	TLV	BSS Container	7.7.yy2
zz3	TLV	Cell Identification	7.7.yy3
zz4	TLV	PDU Numbers	7.7.yy4
239-250		Reserved for the GPRS charging protocol (see GTP' in 3GPP TS 32.295 [33])	
251	TLV	Charging Gateway Address	7.7.44
252-254		Reserved for the GPRS charging protocol (see GTP' in 3GPP TS 32.295 [33])	
255	TLV	Private Extension	7.7.46

<END OF MODIFICATION>

<NEXT SECTION MODIFIED>

7.7.yy1 PS Handover Request Context

The PS Handover Request Context contains for a particular packet flow the PS handover specific information that needs to be transferred between SGSNs during the PS handover procedure (see 3GPP TS 43.129 [xx]).

The PS Handover Request Context shall contain an NSAPI, Packet Flow Id and XiD parameters for each of the PDP Contexts included in the Forward Relocation Request message.

The NSAPI is an integer value in the range [0; 15].

The Packet Flow Id information element contains the packet flow identifier assigned to a PDP context as identified by NSAPI as defined in 7.7.22.

The XiD parameters IE contains the SMDCP / LLC XiD parameter between peer SMDCP /LLC entities in the MS and old SGSN as defined in 3GPP TS44.064 [11], 3GPP TS44.065 [36].

The XiD parameters Length represents the length of the XiD parameters field, excluding the XiD parameter Length octet.

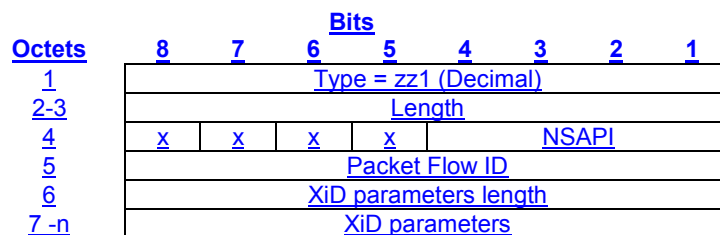


Figure 7.7.yy1.1: PS Handover Request Context Information Element

7.7.yy2 BSS Container

The BSS Container information element contains the radio-related information in the source cell to target cell direction and radio-related and core network information in the target cell to source cell direction. The content of this container is defined in 3GPP TS 48.018 [20].

Octets	8	7	6	5	4	3	2	1
1	Type = zz2 (Decimal)							
2-3	Length							
4-n	BSS Container							

Figure 7.7.yy2.1: BSS Container Information Element

7.7.yy3 Cell Identification

The Cell Identification information element contains

- for PS handover from A/Gb mode, the identification of a target cell (Cell ID 1) and the identification of the source cell (Cell ID 2) as defined in 3GPP TS 48.018 [20].
- for PS handover from Iu mode, the identification of a target cell (Cell ID 1)) and the identification of the source RNC (RNC-ID) as defined in 3GPP TS 48.018 [20].

Octets	8	7	6	5	4	3	2	1
1	Type = zz3 (Decimal)							
2-3	Length							
4-5	Cell ID 1							
6-7	Cell ID 2 (Note 1)							
8-12	RNC-ID (Note 1)							

Note 1: Only one of these IEs shall be present at the same time.

Figure 7.7.yy3.1: Cell Identification Information Element

7.7.yy4 PDU Numbers

The PDU Numbers information element contains the sequence number status corresponding to a PDP context in the old SGSN. This information element shall be sent only when acknowledged peer-to-peer LLC operation is used for the PDP context or when the “delivery order” QoS attribute is set in the PDP context QoS profile.

NSAPI identifies the PDP context for which the PDU Number IE is intended.

DL GTP-U Sequence Number is the number for the next downlink GTP-U T-PDU to be sent to the MS when “delivery order” is set.

UL GTP-U Sequence Number is the number for the next uplink GTP-U T-PDU to be tunnelled to the GGSN when “delivery order” is set.

The Send N-PDU Number is used only when acknowledged peer-to-peer LLC operation is used for the PDP context. Send N-PDU Number is the N-PDU number to be assigned by SNDCP to the next down link N-PDU received from the GGSN.

The Receive N-PDU Number is used only when acknowledged peer-to-peer LLC operation is used for the PDP context. The Receive N-PDU Number is the N-PDU number expected by SNDCP from the next up link N-PDU to be received from the MS.

The PDU Number IE will be repeated for each PDP Context for which this IE is required.

Octets	Bits							
	8	7	6	5	4	3	2	1
1	Type = zz4 (Decimal)							
2-3	Length							
4-5	Spare (0 0 0 0)				NSAPI			
6-7	DL GTP-U Sequence Number							
8-9	UL GTP-U Sequence Number							
10-11	Send N-PDU Number							
12-13	Receive N-PDU Number							

Figure 7.7.yy4.1: PDU Numbers Information Element

<END OF MODIFICATION>

<NEXT SECTION MODIFIED>

8.2 Usage of the GTP-C Header

For control plane messages the GTP header shall be used as specified in clause 6 with the following clarifications and additions:

- Version shall be set to decimal 1 ('001').
- Protocol Type flag (PT) shall be set to '1'.
- Sequence number flag (S) shall be set to '1'.
- N-PDU Number flag (PN) shall be set to '0'. A GTP-C receiver shall not return an error if this flag is set to '1'.
- Message Type shall be set to the unique value that is used for each type of control plane message. Valid message types are marked with an x in the GTP-C column in table 1.
- Length shall be the length in octets of the payload, i.e. the rest of the packet following the mandatory part of the GTP header (that is the first 8 octets). The Sequence Number, the N-PDU Number or any Extension headers shall be considered to be part of the payload, i.e. included in the length count.
- The Tunnel Endpoint Identifier is set by the sending entity to the value requested by the corresponding entity (SGSN or GGSN); it identifies all the PDP Contexts with the same PDP address and APN (for Tunnel Management messages) or it identifies each MS and its associated context data (for messages not related to Tunnel Management), except for the following cases:
 - The Create PDP Context Request message and the Create MBMS Context Request message for a given MS sent to a specific GGSN shall have the Tunnel Endpoint Identifier set to all zeroes, if the SGSN has not been assigned a Tunnel Endpoint Identifier Control Plane by the GGSN.
 - The Update PDP Context Request message for a given MS sent to a specific GGSN shall have the Tunnel Endpoint Identifier set to all zeros, if it is used to switch the GTP version of the tunnel to the GGSN from GTP v0 to GTP v1.
 - The Identification Request/Response messages, where the Tunnel Endpoint Identifier shall be set to all zeroes.
 - The SGSN Context Request message, where the Tunnel Endpoint Identifier shall be set to all zeroes.

- The Echo Request/Response, Supported Extension Headers notification and the Version Not Supported messages, where the Tunnel Endpoint Identifier shall be set to all zeroes.
- The Forward Relocation Request message, where the Tunnel Endpoint Identifier shall be set to all zeroes.
- The PDU Notification Request message, where the Tunnel Endpoint Identifier shall be set to all zeroes.
- The MBMS Notification Request message, where the Tunnel Endpoint Identifier shall be set to all zeroes.
- The RAN Information Relay message, where the Tunnel Endpoint Identifier shall be set to all zeroes.
- The Relocation Cancel Request message where the Tunnel Endpoint Identifier shall be set to all zeroes, except for the case where the old SGSN has already been assigned the Tunnel Endpoint Identifier Control Plane of the new SGSN.
- All Location Management messages, where the Tunnel Endpoint Identifier shall be set to all zeroes.
- If a GSN receives a GTP-C message requesting action related to a PDP context that the sending node believes is in existence, but that is not recognised by the receiving node, the receiving node shall send back to the source of the message, a response with the appropriate cause value (either 'Non-existent' or 'Context not found'). The Tunnel Endpoint Identifier used in the response message shall be set to all zeroes.
- All Service Specific MBMS messages, where the Tunnel Endpoint Identifier shall be set to all zeroes.

The GSN Address for Control Plane set in the request message could be different from the IP Source address of the message. The Tunnel Endpoint Identifier notified in the request message is also used in this case for sending the corresponding response message.

- Sequence Number shall be a message number valid for a path. Within a given set of contiguous Sequence Numbers from 0 to 65535, a given Sequence Number shall, if used, unambiguously define a GTP control plane request message sent on the path (see section Reliable delivery of signalling messages). The Sequence Number in a control plane response message shall be copied from the control plane request message that the GSN is replying to. For GTP-C messages not having a defined response message for a request message, i.e. for messages Version Not Supported, RAN Information Relay and Supported Extension Headers Notification, the Sequence Number shall be ignored by the receiver.
- N-PDU Number shall not be interpreted.

The GTP-C header may be followed by subsequent information elements dependent on the type of control plane message. Only one information element of each type is allowed in a single control plane message, except for the Authentication Triplet, the PDP Context, ~~and~~ the Tunnel Endpoint Identifier Data II, [NSAPI](#), [PS Handover Request Context and PDU Numbers](#) information element where several occurrences of each type are allowed.

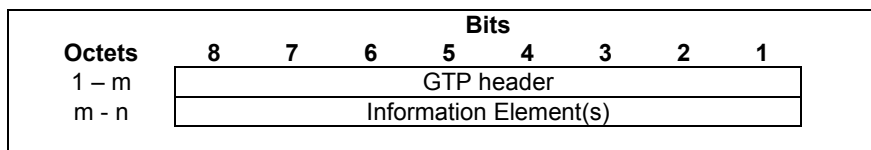


Figure 64: GTP Header followed by subsequent Information Elements

[END OF MODIFICATION>](#)