Source:	TSG CN WG4
Title:	CRs on R99 Work Item TEI
Agenda item:	7.22
Document for:	APPROVAL

Introduction:

This document contains 8 CRs on R99 Work Item "TEI", that have been agreed by TSG CN WG4, and are forwarded to TSG CN Plenary meeting #12 for approval.

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.060	197		N4-010543	R99	RNC IP Address IE format	F	3.8.0
29.060	198		N4-010544	Rel-4	RNC IP Address IE format	A	4.0.0
29.060	193		N4-010524	R99	Correction/Clarification of GGSN handling of Update PDP Context Response	F	3.8.0
29.060	194		N4-010525	Rel-4	Correction/Clarification of GGSN handling of Update PDP Context Response	A	4.0.0
23.008	034	3	N4-010755	R99	Correction of references	F	3.5.0
23.008	035	3	N4-010756	Rel-4	Correction of references	A	4.0.0
23.082	009		N4-010655	R99	Interworking cases for Long Forwarded-to Numbers	F	3.5.0
23.082	010		N4-010656	Rel-4	Interworking cases for Long Forwarded-to Numbers	A	4.0.0

CR-Form-v3

CHANGE REQUEST

⌘   **23.008** CR **CR-034** ⌘ rev **3** ⌘ Current version: 3.5.0 ⌘

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network **x**

Title:	⌘	Correction of references
Source:	⌘	CN4
Work item code: ⌘	TEI	***Date:*** ⌘ 17/05/01
Category: ⌘	**F** (agreed by consensus)	***Release:*** ⌘ R99

Use <u>one</u> 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 <u>one</u> 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)*

Reason for change: ⌘	Information from the 'Table 1: Overview of data stored for non-GPRS Network Access Mode' and 'Table 2: Overview of data used for GPRS Network Access Mode' are missing. The references are in incorrect format.
Summary of change: ⌘	1. Update of the reference tables 2. UMTS TS have been replaced by 3GPP TS 3. "criteria" becomes "criterion"; see 2.14.1.1 and 2.14.1.2 4. "that that" becomes "that the given"; see 2.14.2.1 5. Update of the tables at the end of the document 6. Chapter 2.7.7, MNRR "For FFS" has been deleted, MNRR is only in HLR. 7. The check against 3GPP TS 21.101 version 3.2.0 was performed. No 3GPP equivallent document for GSM 02.32, 03.20, 03.35, 03.68, 03.69, 03.71, 12.03, 12.08, 08.08, 02.13 8. Removal of all editor's notes 9. Chapter 2.5.3 BCA is stored in HLR and VLR
Consequences if not approved: ⌘	Wrong referenced documents
Clauses affected: ⌘	All the document

Other specs affected:	⌘		Other core specifications	⌘	
			Test specifications		
			O&M Specifications		

Other comments:	⌘	

Foreword

This Technical Specification (TS) has been produced by the 3rd Generation Partnership Project (3GPP).

The present document provides a mechanism giving reliable transfer of signalling messages within the 3GPP system.

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x   the first digit:

1   presented to TSG for information;

2   presented to TSG for approval;

3   or greater indicates TSG approved document under change control.

y   the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z   the third digit is incremented when editorial only changes have been incorporated in the document.

0 Scope

The present document provides details concerning information to be stored in home location registers, visitor location registers and GPRS Support Nodes concerning mobile subscriber.

Clause 2 contains all details concerning the definition of the parameters, often given by reference to other specifications, and where the parameter is to be stored.

Table 1 in clause 3 gives a summary overview and clause 4 identifies the reference information required for accessing the information.

0.1 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 21.905: "3G Vocabulary for 3GPP Specifications".

[2]   3GPP TS 22.002: " Bearer Services (BS) supported by a GSM PLMN".

[3]   3GPP TS 22.003: " Circuit Teleservices supported by a Public Land Mobile Network (PLMN)"

[34]   3GPP TS 22.004: "General on supplementary services".

[45]   3GPP TS 23.003: "Numbering, addressing and identification".

[56]   3GPP TS 23.007: "Restoration procedures".

[67]   3GPP TS 23.009: "Handover procedures".

[78]   3GPP TS 23.012: "Location registration procedures".

[89]   3GPP TS 23.015: "Technical realization of operator determined barring (ODB)".

[910]   3GPP TS 23.040: "Technical realization of the Short Message Service (SMS) Point-to-Point".

[1011] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Stage 1".

[1112] 3GPP TS 23.067: "Enhanced Multi-Level Precedence and Preemption service (EMLPP) - Stage 2".

[1213] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) - Stage 2".

[1314] 3GPP TS 23.081: "Line identification Supplementary Services - Stage 2".

[1415] 3GPP TS 23.082: "Call Forwarding (CF) Supplementary Services - Stage 2".

[1516] 3GPP TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 2".

[1617] 3GPP TS 23.084: "Multi Party (MPTY) Supplementary Service - Stage 2".

[1718] 3GPP TS 23.085: "Closed User Group (CUG) Supplementary Service - Stage 2".

[1819] 3GPP TS 23.086: "Advice of Charge (AoC) Supplementary Service - Stage 2".

[1920]	3GPP TS 23.088: "Call Barring (CB) Supplementary Service - Stage 2".

[2021]	3GPP TS 23.060: "General Packet Radio Service (GPRS) Service Description; Stage 2".

[22]	3GPP TS 23.078: "CAMEL, stage2".

[2123]	3GPP TS 23.090: "Unstructured Supplementary Service Data (USSD) - Stage 2".

[2224]	3GPP TS 23.116: "Super-Charger Technical Realisation; Stage 2."

[2325]	3GPP TS 23.135: "Multicall supplementary service; Stage 2"

[2426]	3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols - Stage 3".

[2527]	3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[2628]	3GPP TS 29.007: "General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[29]	3GPP TS 29.060: "GPRS Tunnelling protocol (GTP) accross the Gn and Gp interface".

[27]	GSM 02.03: "Digital cellular telecommunications system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[2830]	GSM 02.32: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST) Service Description - Stage 1".

[2931]	GSM 03.20: "Digital cellular telecommunications system (Phase 2+); Security related network functions".

[3032]	GSM 03.35: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST) Stage 2".

[3133]	GSM 03.68: "Digital cellular telecommunications system (Phase 2+); Voice Group Call Service (VGCS) - Stage 2".

[3234]	GSM 03.69: "Digital cellular telecommunications system (Phase 2+); Voice Broadcast Service (VBS) - Stage 2".

[3335]	GSM 03.71: "Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Functional Description; Stage 2".

[3436]	GSM 12.03: "Digital cellular telecommunications system (Phase 2); Security management".

[3537]	GSM 12.08: "Digital cellular telecommunications system (Phase 2); Subscriber and Equipment Trace".

[3638]	ITU-T Recommendation Q.763: "Specifications of Signalling System No.7; Formats and codes".

[3739]	ANSI T1.113-1995: "Signalling System No7 (SS7) ISDNIntegrated Services Digital Network (ISDN) User Part"

[40]	3GPP TS 32.005 "Telecommunications Management; Charging and billing: GSM call and event data for the Circuit Switched (CS) domain"

[41]	3GPP TS 32.015 "Telecommunications Management; Charging and billing: GSM call and event data for the Packet Switched (PS) domain"

## 0.2	Abbreviations

For the purposes of the present document, the abbreviations listed in 3GPP TR 21.905 apply.

1 Introduction

1.1 Definition

The term subscriber data is used to designate all information associated with a subscription which is required for service provisions, identification, authentication, routing, call handling, GPRS mode transmission, charging, subscriber tracing, operation and maintenance purposes. Some subscriber data are referred to as permanent subscriber data, i.e. they can only be changed by administration means. Other data are temporary subscriber data which may change as a result of normal operation of the system.

Unless shown to be conditional, all data items are considered to be mandatory.

1.2 Storage facilities

This specification considers subscriber data stored in the following types of functional unit:

- Home location register (HLR) which contains all permanent subscriber data and all relevant temporary subscriber data for all mobile subscribers permanently registered in the HLR.

- Visitor location register (VLR) which contains all subscriber data required for call handling and other purposes for mobile subscribers currently located in the area controlled by the VLR.

- Serving GPRS Support Node (SGSN) which contains all subscriber data required for GPRS mode transmission and other purposes for mobile subscribers currently located in the area controlled by the SGSN.

- -Gateway GPRS Support Node (GGSN) which contains all subscriber data required for GPRS mode transmission for mobile subscribers using any service provided by the GGSN.

- Gateway Mobile Location Center (GMLC) which contains all subscriber data required for external clients of the Location Services (LCS).

- In GSM, Serving Mobile Location Center (SMLC) which contains all LMU data required to manage location measurements in LMUs. (Note: a Type A LMU is a network entity that shares many of the attributes of an MS including subscription data in the HLR and identification using an IMSI).

In addition, subscriber data may also be stored in the following functional unit:

- Group Call Register (GCR) which contains all data required for configuration, set-up and handling of voice group and voice broadcast calls. This encompasses subscribers identities (mobile as well as fixed network) who are nominated as dispatchers for one or several groups within the area controlled by the GCR.

- NOTE: The data stored in the GCR is not strictly "subscriber data". Description of GCR data is therefore out of scope of this specification and is covered in the corresponding specifications for enhanced Multi Level Precedence and Pre-emption Service (eMLPP), Voice Group Call Service (VGCS) and Voice Broadcast Service (VBS) instead (GSM 03.673GPP TS 23.067, GSM 03.68 and GSM 03.69).

1.3 Subscriber data in functional units other than the HLR, the VLR, the SGSN, the GGSN, the GMLC, the SMLC and the LMU

The individual Subscriber Authentication Key Ki defined in GSM 03.20 is stored in the Authentication Centre AuC; it is also stored in the SIM and therefore available in the MS. Version numbers of algorithms A3 and A8 may also be stored in the AuC.

- NOTE: It is for further study whether or not other types of functional units containing mobile subscriber parameters are to be included in this specification. Such units could include encryption key distribution centres, maintenance centres, etc.

2 Definition of subscriber data

2.1 Data related to subscription, identification and numbering

2.1.1 Data defining the subscription profile

2.1.1.1 International Mobile Subscriber Identity (IMSI)

International Mobile Subscriber Identity (IMSI) is defined in ~~GSM 03.03~~3GPP TS 23.003.

IMSI is permanent subscriber data. IMSI is stored in HLR, VLR, SGSN, GGSN and SMLC. For Anonymous Access, IMSI is not used in SGSN nor in GGSN. The IMSI serves as the root of the subscriber data pseudo-tree.

2.1.1.2 Network Access Mode (NAM)

The Network Access Mode defines if the subscriber is registered to get access to the non-GPRS network, to the GPRS network or to both networks. NAM describes the first level of the subscriber data pseudo-tree below the IMSI root. It is permanent subscriber data stored in the HLR and the SGSN with the Gs interface option..

2.1.2 Mobile Station International ISDN Number (MSISDN)

Mobile Station ISDN Number (MSISDN) is defined in ~~GSM 03.03~~3GPP TS 23.003.

The MSISDN is permanent subscriber data and is stored in HLR, VLR and SGSN.

If the multinumbering option applies, the MSISDN stored in the VLR and in the SGSN is the Basic MSISDN, see subclause 2.1.3.1.

2.1.3 MSISDNs for multinumbering option

If the HPLMN allocates different MSISDNs for different Basic Services (see ~~GSM 09.07~~3GPP TS 29.007), these numbers are conditionally stored as permanent data in the HLR.

2.1.3.1 The Basic MSISDN indicator

The Basic MSISDN is defined in ~~GSM 03.12~~3GPP TS 23.012. The Basic MSISDN indicator marks the MSISDN to be used as Basic MSISDN.

It is permanent subscriber data stored conditionally in the HLR.

2.1.3.2 The MSISDN-Alert indicator

The MSISDN-Alert is defined in ~~GSM 03.40~~3GPP TS 23.040. The MSISDN-Alert indicator marks the MSISDN to be used as MSISDN-Alert.

It is permanent subscriber data stored conditionally in the HLR.

2.1.4 Temporary mobile subscriber identity (TMSI)

Temporary mobile subscriber identity (TMSI) is defined in ~~GSM 03.03~~3GPP TS 23.003.

The TMSI is temporary subscriber data and is conditionally stored in the VLR.

2.1.5 Packet-Temporary Mobile Subscriber Identity (P-TMSI)

Packet-Temporary Mobile Subscriber Identity (P-TMSI) is defined in ~~GSM 03.03~~3GPP TS 23.003. Its usage is described in ~~GSM 03.60~~3GPP TS 23.060. P-TMSI is accompanied by the P-TMSI Signature, see subclause 2.3.7.

The P-TMSI is temporary subscriber data and is conditionally stored in the SGSN.

2.1.6 Temporary Link Layer Identifier (TLLI)

Temporary Link Layer Identifier (TLLI) is defined in ~~GSM 03.03~~3GPP TS 23.003. It is derived from the P-TMSI by the MS and occurs in the variants Local TLLI and Foreign TLLI. The TLLI is temporary subscriber data and is conditionally stored in the SGSN. For use of TLLI see ~~GSM 03.60~~3GPP TS 23.060.

2.1.7 Random TLLI

Random TLLI is chosen randomly by the MS. It is defined in ~~GSM 03.03~~3GPP TS 23.003. Random TLLI is short living temporary subscriber data and is conditionally stored in the SGSN. For use of Random TLLI see ~~GSM 03.60~~3GPP TS 23.060.

A Random TLLI may be used if no valid P-TMSI is available.

2.1.8 Local Mobile Station Identity (LMSI)

Local Mobile Station Identity (LMSI) is defined in ~~GSM 03.03~~3GPP TS 23.003. The LMSI is temporary subscriber data. The LMSI may be stored in the VLR; if it is received in the HLR it must be stored there.

2.1.9 International Mobile Equipment Identity (IMEI)

International Mobile Equipment Identity (IMEI) is defined in ~~GSM 03.03~~3GPP TS 23.003. The IMEI is temporary subscriber data and is conditionally stored in the SGSN.

2.2 Data related to Mobile Station types

2.2.1 Mobile Station Category

Mobile Station Category has a structure identical to that of "Calling Party's Category" defined in ISUP (CCITT Recommendation Q.763).

The following values of category shall be supported:

- ordinary subscriber.

The category is assigned per IMSI.

Mobile Station Category is permanent subscriber data and is stored in HLR and VLR.

2.2.2 LMU Identifier (GSM only)

The LMU identifier is part of the subscriber data for a Type A LMU, when associated with an NSS based SMLC, and serves to distinguish a Type A LMU from a normal MS.

2.3 Data related to authentication and ciphering

2.3.1 Random Number (RAND), Signed Response (SRES) and Ciphering Key (Kc)

Random Number (RAND), Signed Response (SRES) and Ciphering Key (Kc) form a triplet vector used for authentication and encryption as defined in GSM 03.20.

For GSM users, triplet vectors are calculated in the 2G AuC and provided to the 2G HLR (see GSM 12.03), and for UMTS users triplet vectors are derived from quintuplet vectors in the 3G HLR or 3G VLR, if needed (see 3GPP TS 33.102).

A set of up to 5 triplet values are sent from the 2G HLR to the VLR and the SGSN on request. These data are temporary subscriber data conditionally stored in the VLR and the SGSN.

2.3.2 Random Challenge (RAND), Expected Response (XRES), Cipher Key (CK), Integrity Key(IK) and Authentication Token(AUTN)

Random Challenge (RAND), Expected Response (XRES), Cipher Key (CK), Integrity Key(IK) and Authentication Token (AUTN) form a quintuplet vector used for user authentication, data confidentiality and data integrity as defined in 3GPP TS 33.102.

When both HLR and VLR or SGSN are 3G, a set of quintuplet vectors are calculated in the AuC, and up to 5 quintuplets are sent from the HLR to the VLR and to the SGSN on request (see 3GPP TS 29.002). These data are temporary subscriber data conditionally stored in the HLR, the VLR and the SGSN.

When the HLR is 2G and the VLR or SGSN are 3G, quintuplet vectors are derived by the 3G VLR or SGSN from the received triplet vectors from the HLR, if needed (see ~~UMTS~~3GPP TS 33.102).

2.3.3 The Ciphering Key Sequence Number (CKSN)

The Ciphering Key Sequence Number (CKSN) is used to ensure GSM authentication information (Kc) consistency between the MS and the VLR and between the MS and the SGSN.

CKSN and its handling are defined in ~~GSM 04.08~~3GPP TS 24.008 and GSM 03.20. It is a temporary subscriber data and is stored in the VLR and in the SGSN.

2.3.4 The Key Set Identifier (KSI)

The Key Set Identifier (KSI) is used to ensure UMTS authentication information (CK and IK) consistency between the MS and the VLR and between the MS and the SGSN.

KSI and its handling are defined in ~~UMTS~~3GPP TS 24.008 and ~~UMTS~~3GPP TS 33.102. It is temporary subscriber data and is stored in the VLR and the SGSN.

2.3.5 Selected Ciphering Algorithm

Selected Ciphering Algorithm is defined in ~~GSM 03.60~~3GPP TS 23.060.

Selected Ciphering Algorithm is temporary subscriber data stored in the SGSN.

2.3.6 Current Kc

Current Kc is defined in GSM 03.20.

Current Kc is temporary subscriber data stored in the SGSN.

2.3.7 P-TMSI Signature

P-TMSI Signature is defined in TSs ~~GSM 03.03~~3GPP TS 23.003 and ~~GSM 03.60~~3GPP TS 23.060. It is used for identification checking purposes.

P-TMSI Signature is temporary subscriber data and is conditionally stored in the SGSN.

2.4 Data related to roaming

2.4.1 Mobile Station Roaming Number (MSRN)

Mobile Station Roaming Number (MSRN) is defined in ~~GSM 03.03~~3GPP TS 23.003.

NOTE: There may be more than one MSRN simultaneously per IMSI.

The MSRN is short-lived temporary subscriber data stored in the VLR.

2.4.2 Location Area Identification (LAI)

Location Area Identification (LAI) is defined in ~~GSM 03.03~~3GPP TS 23.003.

The LAI is temporary subscriber data and is stored in the VLR.

2.4.3 Routing Area Identification (RAI)

Routing Area Identification (RAI) is defined in ~~GSM 03.03~~3GPP TS 23.003.

The RAI is temporary subscriber data and is stored in the SGSN.

2.4.4 Void

2.4.5 VLR number

VLR number is defined in ~~GSM 03.03~~3GPP TS 23.003.

The VLR number is temporary subscriber data and is stored in the HLR. Absence of the VLR number in HLR indicates that the mobile station is deregistered for non-GPRS or the subscriber has not a non-GPRS subscription in the HLR. The VLR number is stored in the SGSN with the Gs interface option. For usage of the VLR number in SGSN, please refer to ~~GSM 03.60~~3GPP TS 23.060.

2.4.6 MSC number

MSC number is defined in ~~GSM 03.03~~3GPP TS 23.003.

The MSC number is temporary subscriber data and is stored in the HLR and conditionally in the VLR. For absence of the MSC number in the HLR, the remarks on VLR number apply accordingly, see subclause 2.4.5.

2.4.7 HLR number

HLR number is defined in ~~GSM 03.03~~3GPP TS 23.003.

The HLR number may be stored in the VLR and SGSN. It is received as a mandatory parameter in the updating location accepted message. This data may be needed to retrieve subscribers to be restored after HLR reset.

The HLR number is temporary subscriber data and may optionally be stored in the VLR and SGSN.

2.4.8   GSN number

GSN number occurs as SGSN number and as GGSN number.

2.4.8.1   SGSN number

SGSN number is the SS7 address of the SGSN . It is defined in ~~GSM 03.03~~3GPP TS 23.003.

The SGSN number is temporary subscriber data and is stored in the HLR for a GPRS subscription. It is conditionally stored in the VLR if the Gs interface is installed. Absence of the SGSN number in the HLR indicates that the mobile station is deregistered for GPRS or the subscriber has no GPRS subscription in the HLR. Absence of the SGSN number in the VLR indicates that there is no association between the VLR and the SGSN for this MS. The SGSN number is to be distinguished from the SGSN address described in subclause 2.13.10.

2.4.8.2   GGSN number

GGSN number is the SS7 address of the GGSN .It is defined in ~~GSM 03.03~~3GPP TS 23.003. Its usage is described in ~~GSM 03.60~~3GPP TS 23.060. It is contained in the GGSN-list stored in the HLR and does not appear as separate subscriber data. Cf. subclause 2.13.11.

2.4.9   MLC number

The MLC number occurs as an SMLC number and as a GMLC number.

2.4.9.1   SMLC number (GSM only)

The SMLC number is the E.164 address of an NSS based SMLC.

The SMLC number is permanent data that may be stored in an MSC in association with either a set of IMSIs belonging to LMUs controlled by the SMLC or a set of cell identifiers belonging to the geographic area served by the SMLC.

2.4.9.2   GMLC number

The GMLC number is the E.164 address of the GMLC. One or more GMLC numbers may be stored in the MS subscriber data in the HLR and downloaded to the VLR. These GMLC numbers identify the GMLCs for the particular MS from which a location request for this MS may be confined for particular LCS clients.

2.4.10   Subscription restriction

Subscription restriction is a parameter indicating whether or not certain restrictions apply to the subscription. The parameter takes either of the following values (see also GSM 02.13):

- accessible area for service;

- all GSM PLMNs;

- one national and all foreign GSM PLMNs;

- regionally restricted (part of a GSM PLMN in one country);

- regionally restricted plus all other GSM PLMNs.

The HLR associates location updating information with subscription restriction. It deregisters the MS if the PLMN is not allowed and sets:

- the MSC area restricted flag if the MSC area is not allowed, see subclause 2.4.12;

- SGSN area restricted flag if the SGSN area is not allowed, see subclause 2.4.14.

Handling of Regionally Restricted Subscription is defined in subclause 2.4.11. By operator agreement, regional restriction in parts of different GSM PLMNs is also possible.

The subscription restriction is permanent subscriber data and is stored in the HLR.

2.4.11 Regional Subscription Information

If a mobile subscriber has a regional subscription, the HLR shall store a list of up to ten Regional Subscription Zone Identities (RSZIs) per Network Destination Code (NDC) of the PLMN involved. The structure of RSZI is defined in GSM 03.033GPP TS 23.003; since it is composed of the PLMN identification (CC NDC) and the Zone Code it is sufficient to store the Zone Code List per CC NDC.

On updating the VLR or the SGSN, the HLR identifies the VPLMN and NDC given by the VLR or SGSN number and transfers the pertaining Zone Code List to the VLR or SGSN. The VLR or SGSN derives from the Zone Code List the allowed and not allowed MSC or SGSN areas and location areas; it sets the "LA not allowed flag" should the target LAI of the mobile station be excluded, and it informs the HLR should the MSC or SGSN area be excluded. Signalling of cause value "location area not allowed" towards the mobile station is defined in TSs GSM 09.023GPP TS 29.002 and GSM 04.083GPP TS 24.008.

2.4.11.1 RSZI lists

The RSZI lists are permanent subscriber data stored conditionally in the HLR.

2.4.11.2 Zone Code List

The VLR and the SGSN shall store as permanent and conditional subscriber data at least those Zone Codes by which they are affected.

2.4.12 MSC area restricted flag

MSC area restricted flag is a parameter which can take either of the following values:

- MSC area restricted;

- MSC area not restricted.

The parameter is set in the HLR during updating of the VLR. Handling of unsupported services and information received from the VLR based on national roaming or regionally restricted subscription (subclause 2.4.11) determine its value. The parameter contributes to the "MS Not Reachable" state for handling of terminating traffic in the HLR. The default value is "MSC area not restricted".

The MSC area restricted flag is temporary subscriber data and is contained in the HLR.

2.4.13 LA not allowed flag

The LA not allowed flag is set in the VLR and the SGSN depending on National Roaming, Regionally Restricted Subscription and Roaming Restriction Due To UnSupported Feature, see GSM 09.023GPP TS 29.002. It is applied to restrict service on a location area basis.

The LA not allowed flag is temporary subscriber data stored in the VLR and the SGSN.

2.4.14 SGSN area restricted flag

SGSN area restricted flag is a parameter which can take either of the following values:

- SGSN area restricted;

- SGSN area not restricted.

The parameter is set in the HLR during updating of the SGSN. Handling of unsupported services and information received from the SGSN based on national roaming or regionally restricted subscription (subclause 2.4.11) determine its value. The parameter contributes to the "MS Not Reachable" state for handling of terminating traffic in the HLR. The default value is "SGSN area not restricted".

The SGSN area restricted flag is temporary subscriber data and is contained in the HLR.

2.4.15   Service restriction data induced by roaming

If in the course of roaming or at updating of the VLR or SGSN the HLR is informed that the VLR or SGSN does not support certain sensitive services or features, or, the HLR is informed in data request that the VLR or the SGSN supports only specific services, features or phases which do not correspond to subscribed services, features or phases, the HLR takes appropriate measures to restrict service for the mobile station in that VLR or SGSN by setting and sending network induced replacing services such as available services, features or phases, barring programs or the roaming restriction for the MSC or SGSN area.

These network-induced data have to be kept separate in the HLR, and where possible as discussed below in the VLR, from the permanent subscriber data of the call barring supplementary services, from the barring related data that can be modified by the subscriber or from the permanent regional subscription data.

These network-induced data have to be kept separate in the HLR, and where possible as discussed below in the SGSN, from the permanent regional subscription data.

The network induced data take precedence over the subscriber data of the user where they are in conflict. If, in the course of roaming, restrictions caused by a service are lifted, the original subscriber data have to be re-installed both in HLR, in SGSN and in VLR when applicable, regarding any remaining restrictions due to other service replacements.

All network-induced restriction data are temporary subscriber data.

For ODB, ~~GSM 03.15~~3GPP TS 23.015 recommends mainly barring programs to replace this feature. The replacing barring data are conditionally stored in the HLR and VLR. In the VLR they cannot be distinguished from the permanent supplementary services data with the available signalling means, and no additional storage is needed. Interrogation shall reflect in both HLR and VLR the valid setting of the replacing temporary data; to prevent interference with Subscriber Controlled Input and to inform the customer on the restriction, the "control of barring services" subscription option is also temporarily set to the value "by the service provider".

CUG is also replaced by Outgoing Call Barring as described in ~~GSM 03.85~~3GPP TS 23.085.

Roaming restriction in the MSC area due to unsupported features is used to replace AoCC, see ~~GSM 03.86~~3GPP TS 23.086, and Zone Codes for regional subscription, see subclause 2.4.11 and ~~GSM 09.02~~3GPP TS 29.002. A flag in HLR and VLR, see subclause 2.4.15.2, collects the sources of network-induced roaming restriction which are also kept separate by the HLR.

Roaming restriction in the SGSN area due to unsupported features is used to replace Zone Codes for regional subscription, see subclause 2.4.11 and ~~GSM 09.02~~3GPP TS 29.002. A flag in HLR and SGSN, see subclause 2.4.15.2, collects the sources of network-induced roaming restriction which are also kept separate by the HLR.

2.4.15.1   ODB-induced barring data

ODB-induced barring data are temporary data stored conditionally in the HLR; they include the necessary replacing barring programs for outgoing and incoming calls depending on the ODB profile. The subscription option "control of barring services" is set to "by the service provider". The corresponding barring supplementary services for outgoing calls are set by the HLR and sent to the VLR.

2.4.15.2   Roaming restriction due to unsupported feature

Roaming restriction due to unsupported feature is a parameter which indicates that one or several services or features are not supported by the MSC or the SGSN, resulting in roaming restriction in the MSC area or SGSN area. It can take either of the following values:

- roaming restricted;

-    roaming not restricted.

The parameter governs the "LA not allowed flag" in the VLR (see subclause 2.4.13) and the "MSC area restricted flag" in the HLR (see subclause 2.4.12), or the "LA not allowed flag" in the SGSN (see subclause 2.4.13) and the "SGSN area restricted flag" in the HLR (see subclause 2.4.14), see ~~GSM 09.02~~3GPP TS 29.002.

The flag "roaming restriction due to unsupported feature" is temporary subscriber data stored in the VLR, SGSN and in the HLR.

2.4.16   Cell Global ID or Service Area ID

The Cell Global ID or Service Area ID indicates the cell global identity of the cell in GSM (see 3GPP TS 23.003) or the service area identification of the service area in UMTS (see 3GPP TS 23.003) in which the MS is currently in radio contact or in which the MS was last in radio contact. The VLR and SGSN shall update the stored Cell Global ID or Service Area ID at establishment of every radio connection.

The cell ID is temporary subscriber data stored in the VLR and SGSN. It is conditional data, the VLR and SGSN shall store it whenever the subscriber data is marked as confirmed by radio contact.

2.4.17   Localised Service Area Information

If a mobile subscriber has a localised service area subscription, the HLR shall store a list of up to 20 Localised Service Area Identities (LSA IDs) per PLMN. The structure of LSA ID is defined in ~~GSM 03.03~~3GPP TS 23.003.

On updating the VLR or the SGSN, the HLR identifies the VPLMN given by the VLR or SGSN number and transfers the applicable LSA ID List to the VLR or SGSN. The VLR or SGSN derives from the LSA ID List the allowed LSA(s), priority of each LSA, the preferential access indicator, the active mode support indicator and active mode indication and the "LSA only access" indicator.

2.4.17.1   LSA Identity

LSA Identity (LSA ID) is defined in ~~GSM 03.03~~3GPP TS 23.003. The element uniquely identifies a LSA.

2.4.17.2   LSA Priority

Localised Service Area Priority (LSA Priority) is defined in GSM 08.08. The LSA Priority is permanent subscriber data stored conditionally in the HLR.

2.4.17.2A   LSA Preferential Access Indicator

The Localised Service Area Preferential Access Indicator defines if the subscriber shall be favoured in cells belonging to the LSA at resource allocation compared to other subscribers. The LSA Preferential Access Indicator is permanent subscriber data stored conditionally in the HLR.

2.4.17.2B   LSA Active Mode Support Indicator

The Localised Service Area Active Mode Support Indicator defines if cells belonging to the LSA shall be favoured for the subscriber compared to other cells at resource allocation. The LSA Active Mode Indicator is permanent subscriber data stored conditionally in the HLR.

2.4.17.3   LSA Only Access Indicator

The LSA Only Access Indicator defines if the subscriber is only allowed within its subscribed LSAs. The LSA Only Access Indicator is permanent subscriber data stored conditionally in the HLR.

2.4.17.4 LSA Active Mode Indicator

The Localised Service Area Active Mode Indicator defines if the LSA Identity of the cell in which the MS is currently in radio contact with shall be indicated to the subscriber in active mode. The LSA Active Mode Indicator is permanent subscriber data stored conditionally in the HLR.

2.4.17.5 VPLMN Identifier

The VPLMN Identifier identifies the VPLMN in which an LSA Identity is applicable. This identifier is not applicable to Universal LSA IDs as defined in ~~GSM 03.03~~3GPP TS 23.003. The VPLMN identifier is permanent subscriber data stored conditionally in the HLR.

2.5 Data related to basic services

2.5.1 Provision of bearer service

Provision of bearer service is a parameter identifying whether a bearer service is provisioned to the mobile subscriber or not. This provision can be achieved through subscription of the mobile subscriber or the bearer service can be generally available. The parameter "provision of bearer service" must be set for the bearer service defined in ~~GSM 02.02~~3GPP TS 22.002 for which a subscription is required.

Provision of bearer service is permanent subscriber data and is stored in the HLR and VLR.

2.5.2 Provision of teleservice

Provision of teleservice is a parameter identifying whether a teleservice is provisioned to the mobile subscriber or not. This provision can be achieved through subscription of the mobile subscriber or the teleservice can be generally available. The parameter "provision of teleservice" must be set for the teleservices defined in ~~GSM 02.03~~3GPP TS 22.003 for which a subscription is required.

Provision of teleservice is permanent subscriber data and is stored in the HLR, SGSN and VLR.

2.5.3 Bearer capability allocation

Bearer capability allocation is a parameter stored against each ISDN number in the case when the Home PLMN allocates one directory number per teleservice and bearer service. In this case it is used to permit the establishment of the correct bearer capability on the connection to the MS. (See ~~GSM 09.07~~3GPP TS 29.007). The bearer capability allocation is not required when the Home PLMN only allocates one directory number per subscriber for all bearer services and teleservices. It is permanent data stored conditionally in ~~the.~~HLR and VLR.

2.5.4 Transfer of SM option

Transfer of SM option is a parameter indicating which path should be used for transfer of Terminating Short Message when GPRS is not supported by the GMSC. Two options are possible :

- transfer of SM via the MSC when GPRS is not supported in the GMSC: this option is used to indicate that SM shall always be sent via the MSC when the GMSC does not support the GPRS functionality;

- transfer of SM via the SGSN when GPRS is not supported in the GMSC: this option is used to indicate that SM shall always be sent via the SGSN when the GMSC does not support the GPRS functionality.

Transfer of SM option is permanent subscriber data stored in HLR for a GPRS subscription.

The data has an interim nature since in the final solution, the decision on SM Transfer is taken in the SMS-GMSC.

2.6 Data related to supplementary services

Subscriber data related to supplementary services are contained in the 3GPP TS 23.08x and 3GPP TS 23.09x series of Technical Specifications, that is TS 23.081 and following describing the network functionality of supplementary services. Additionally, subscriber data related to the Multicall (MC) supplementary service are contained in TS 23.135.

There is no data type which is mandatory for all supplementary services; note that the provision status is mandatory for all supplementary services except CUG, 3GPP TS 23.085. All other data are conditional depending on the provision.

2.7 Mobile station status data

2.7.1 IMSI detached flag

IMSI detached flag is a parameter indicating that the MS is in the IMSI detached state, i.e. the subscriber is no longer reachable. For definition and handling see ~~GSM 03.12~~3GPP TS 23.012 and ~~GSM 09.02~~3GPP TS 29.002. The parameter takes the following values:

- IMSI detached;

- IMSI attached.

The parameter is temporary subscriber data and is stored conditionally in the VLR.

2.7.2 Mobile station Not Reachable for GPRS (MNRG)

In HLR, MNRG indicates whether the MS is marked as GPRS detached or GPRS not reachable in the SGSN and possibly in the GGSN. The reason why the MS is GPRS not reachable is indicated in the Mobile Not Reachable Reason (MNRR).

In SGSN, MNRG indicates whether activity from the MS shall be reported to the HLR.

In GGSN, MNRG indicates whether the MS is marked as GPRS detached in the SGSN.

MNRG is described in ~~GSM 03.60~~3GPP TS 23.060. It is temporary subscriber data stored in the HLR, in the SGSN and in the GGSN.

2.7.3 Mobility Management State

The Mobility Management State indicates the GPRS state of the MS. It takes one of three possible values:

1. READY - The MS is GPRS attached and its location is known at Cell Identity level.

2. STANDBY - The MS is GPRS attached and its location is known at Routing Area level.

3. IDLE - The MS is not GPRS attached.

The parameter is described in ~~GSM 03.60~~3GPP TS 23.060. It is temporary subscriber data stored in the SGSN.

2.7.4 Restoration flags

In the case of SGSN, VLR or HLR failure, location register data have to be restored as described in ~~GSM 03.07~~3GPP TS 23.007 and ~~GSM 09.02~~3GPP TS 29.002. The following flags are used for this purpose.

2.7.4.1 Confirmed by Radio Contact indicator

Confirmed by Radio Contact indicator is a restoration indicator defined in ~~GSM 03.07~~3GPP TS 23.007.

It is temporary subscriber data, stored in the VLR.

2.7.4.2 Subscriber Data Confirmed by HLR indicator

Subscriber Data Confirmed by HLR indicator is a restoration indicator defined in ~~GSM 03.07~~3GPP TS 23.007.

It is temporary subscriber data, stored in the VLR and in the SGSN.

2.7.4.3 Location Information Confirmed in HLR indicator

Location Information Confirmed in HLR indicator is a restoration indicator defined in ~~GSM 03.07~~3GPP TS 23.007.

It is temporary subscriber data, stored in the VLR and in the SGSN.

2.7.4.4 Check SS indicator

Check SS indicator is a restoration indicator defined in ~~GSM 03.07~~3GPP TS 23.007.

It is temporary subscriber data and is stored in the HLR.

2.7.5 MS purged for non-GPRS flag

MS purged for non-GPRS flag is set in the HLR per IMSI record in order to indicate that the subscriber data for the MS concerned have been purged in the VLR. The parameter takes the following values:

- MS purged;

- MS not purged.

The default value is "MS not purged". The parameter is temporary subscriber data, stored in the HLR.

2.7.6 MS purged for GPRS flag

MS purged for GPRS flag is set in the HLR per IMSI record in order to indicate that the subscriber data for the MS concerned have been purged in the SGSN. The parameter takes the following values:

- MS purged for GPRS;

- MS not purged for GPRS.

The default value is "MS not purged for GPRS". The parameter is temporary subscriber data, stored in the HLR for a GPRS subscription.

2.7.7 Mobile station Not Reachable Reason (MNRR)

Mobile station Not Reachable Reason (MNRR) for SMS is defined in ~~GSM 03.40~~3GPP TS 23.040.The MNRR is temporary subscriber data. It is conditionally stored in the HLR~~..~~-.

2.8 Data related to Operator Determined Barring

2.8.1 Subscriber status

Subscriber status is a flag which indicates whether the subscriber is subject to operator determined barring.

It is permanent subscriber data, and is conditionally stored in the HLR, the SGSN and the VLR.

2.8.2 Operator Determined Barring general data

2.8.2.1 Barring of outgoing calls

Barring of outgoing calls indicates which one of the following categories of operator determined barring of outgoing calls applies to the subscriber:

- No barring of outgoing calls;

- Barring of all outgoing calls;

- Barring of all outgoing international calls;

- Barring of all outgoing international calls except those directed to the home PLMN country;

- Barring of all outgoing inter-zonal calls;

- Barring of all outgoing inter-zonal calls except those directed to the home PLMN country;

- Barring of all outgoing international calls except those directed to the home PLMN country AND barring of all outgoing inter-zonal calls.

It is permanent data, and is stored conditionally in the HLR, the SGSN and the VLR.

2.8.2.2 Barring of incoming calls

Barring of incoming calls indicates which one of the following categories of operator determined barring of incoming calls applies to the subscriber:

- No barring of incoming calls;

- Barring of all incoming calls;

- Barring of all incoming calls when roaming outside the home PLMN country;

- Barring of all incoming calls when roaming outside the zone of the home PLMN country.

It is permanent data, and is stored conditionally in the HLR.

2.8.2.3 Barring of roaming

Barring of roaming indicates which one of the following categories of operator determined barring of roaming applies to the subscriber:

- No barring of roaming;

- Barring of roaming outside the home PLMN;

- Barring of roaming outside the home PLMN country.

It is permanent data, and is stored conditionally in the HLR both for non-GPRS and GPRS subscription.

2.8.2.4 Barring of premium rate calls

Barring of premium rate calls indicates which one of the following categories of operator determined barring of premium rate calls applies to the subscriber:

- No barring of premium rate calls;

- Barring of premium rate (information) calls;

- Barring of premium rate (entertainment) calls;

- Barring of premium rate (information) calls and premium rate (entertainment) calls.

It is permanent subscriber data, and is stored conditionally in the HLR and the VLR.

2.8.2.5 Barring of supplementary services management

Barring of supplementary services management is a flag which indicates whether the subscriber is subject to operator determined barring of supplementary services management.

It is permanent subscriber data, and is stored conditionally in the HLR and the VLR.

2.8.2.6 Barring of registration of call forwarding

Barring of registration of call forwarding indicates which one of the following categories of operator determined barring of registration of call forwarding applies to the subscriber:

- Barring of registration of any forwarded-to number;

- Barring of registration of any international forwarded-to number;

- Barring of registration of any international forwarded-to number except a number within the HPLMN country;

- Barring of registration of any inter-zonal forwarded-to number;

- Barring of registration of any inter-zonal forwarded-to number except a number within the HPLMN country.

It is permanent subscriber data, and is stored conditionally in the HLR.

2.8.2.7 Barring of invocation of call transfer

Barring of invocation of call transfer indicates which of the following categories of operator determined barring of invocation of call transfer applies to the subscriber:

One of:

- Barring of invocation of any call transfer;

- Barring of invocation of call transfer where at least one of the two calls is a call charged to the served subscriber;

- Barring of invocation of call transfer where at least one of the two calls is a call charged to the served subscriber at international rates;

- Barring of invocation of call transfer where at least one of the two calls is a call charged to the served subscriber at inter-zonal rates;

and independently:

- Barring of invocation of call transfer where both calls are calls charged to the served subscriber;

and independently:

- Barring of invocation of call transfer when there is an existing transferred call for the served subscriber in the same MSC/VLR.

It is permanent subscriber data, and is stored conditionally in the HLR and the VLR.

2.8.3 Operator Determined Barring PLMN-specific data

Operator determined barring PLMN-specific data indicates which of the following categories of operator specific barring, in any combination, applies to the subscriber:

- Operator specific barring (type 1);

- Operator specific barring (type 2);

- Operator specific barring (type 3);

- Operator specific barring (type 4).

It is permanent subscriber data. It is stored conditionally in the HLR, the SGSN and in the VLR when the subscriber is registered in the home PLMN.

2.8.4 Notification to CSE flag

This information element indicates whether the change of ODB data shall trigger Notification on Change of Subscriber Data or not.

2.8.5 gsmSCF address list

This information element contains the list of gsmSCF addresses to which Notification on Change of Subscriber Data is to be sent.

2.9 Data related to handover

2.9.1 Handover Number

Handover Number is defined in ~~GSM 03.03~~3GPP TS 23.003 and its use is specified in ~~GSM 03.09~~3GPP TS 23.009.

The Handover Number is short-lived subscriber data and is stored in the VLR.

2.10 Data related to short message support

2.10.1 Messages Waiting Data (MWD)

Messages Waiting Data (MWD) is defined in ~~GSM 03.40~~3GPP TS 23.040.

The MWD is temporary subscriber data, and is conditionally stored in the HLR.

2.10.2 Mobile Station Not Reachable Flag (MNRF)

Mobile Station Not Reachable Flag (MNRF) is defined in ~~GSM 03.40~~3GPP TS 23.040.

The MNRF is temporary data. It is stored in the VLR and conditionally stored in the HLR.

2.10.3 Memory Capacity Exceeded Flag (MCEF)

Memory Capacity Exceeded Flag (MCEF) is defined in ~~GSM 03.40~~3GPP TS 23.040.

The MCEF is temporary subscriber data and is conditionally stored in the HLR.

2.10.4 Mobile station Not Reachable for GPRS (MNRG)

For MNRG see subclause 2.7.2.

2.10.5 Mobile station Not Reachable Reason (MNRR)

For MNRR see subclause 2.7.7.

2.11 Data related to subscriber trace

2.11.1 Trace Reference

The Trace Reference is defined in GSM 12.08.

The Trace Reference is permanent subscriber data and is conditionally stored in the HLR and VLR.

2.11.2 Trace Type

The Trace Type is defined in GSM 12.08.

The Trace Type is permanent subscriber data and is conditionally stored in the HLR and VLR.

2.11.3 Operations Systems Identity

The Operations Systems Identity is defined in GSM 12.08.

The Operations Systems Identity is permanent subscriber data and is conditionally stored in the HLR and VLR.

2.11.4 HLR Trace Type

The HLR Trace Type is defined in GSM 12.08.

The HLR Trace Type is permanent subscriber data and is conditionally stored in the HLR.

2.11.5 MAP Error On Trace

The MAP Error On Trace is defined in GSM 12.08.

The MAP Error On Trace is temporary subscriber data and is conditionally stored in the HLR.

2.11.6 Trace Activated in VLR

The Trace Activated in VLR flag is defined in GSM 12.08.

The Trace Activated in VLR flag is temporary subscriber data and is conditionally stored in the HLR and VLR.

2.11.7 Trace Activated in SGSN

The Trace Activated in SGSN flag is defined in GSM 12.08.

The Trace Activated in SGSN flag is temporary subscriber data and is conditionally stored in the HLR and SGSN.

2.11.8 Foreign Subscriber Registered in VLR

The Foreign Subscriber Registered in VLR flag is handled by operation and maintenance means in the VLR and is defined in GSM 12.08.

The Foreign Subscriber Registered in VLR flag is permanent subscriber data and is conditionally stored in the VLR.

2.12 Data related to the support of voice group and broadcast calls

2.12.1 VGCS Group Membership List

VGCS Group Membership List and its special condition of storage in VLR is defined in GSM 03.68.

The VGCS Group Membership List is permanent subscriber data. It is stored conditionally in HLR and in the VLR.

2.12.2 VBS Group Membership List

VBS Group Membership List and its special condition of storage in VLR is defined in GSM 03.69.

The VBS Group Membership List is permanent subscriber data. It is stored conditionally in HLR and in the VLR.

2.12.2.1 Broadcast Call Initiation Allowed List

The Broadcast Call Initiation Allowed List and its special condition of storage in VLR is defined in GSM 03.69.

It is permanent subscriber data. It is stored conditionally in HLR and in the VLR.

2.13 Data related to GPRS NAM

The data listed in this subclause pertain to the Network Access Mode "GPRS" and have no counterpart for non-GPRS.

2.13.1 PDP Type

PDP Type is defined in ~~GSM 03.60~~3GPP TS 23.060. It indicates which type of protocol is used by the MS for a certain service, e.g. IP and X.25.

PDP Type is permanent subscriber data and conditionally stored in HLR, SGSN and GGSN.

2.13.2 PDP Address

PDP Address is defined in ~~GSM 03.60~~3GPP TS 23.060. It holds the address of the MS for a certain service, e.g. an X.121 address. If dynamic addressing is allowed, PDP Address is empty in the HLR, and, before the PDP context is activated, empty in the SGSN.

PDP Address is permanent subscriber data and conditionally stored in HLR, SGSN and GGSN.

2.13.3 NSAPI

NSAPI is defined in ~~GSM 03.60~~3GPP TS 23.060. It holds the index of the PDP Context.

NSAPI is temporary subscriber data and conditionally stored in SGSN and GGSN.

2.13.4 Packet Data Protocol (PDP) State

PDP State is defined in ~~GSM 03.60~~3GPP TS 23.060. The PDP State is either ACTIVE or INACTIVE.

PDP State is temporary subscriber data and conditionally stored in SGSN.

2.13.5 New SGSN Address

New SGSN Address is defined in ~~GSM 03.60~~3GPP TS 23.060. It is the IP-address of the new SGSN, to which N-PDUs should be forwarded from the old SGSN after an inter-SGSN routing update.

New SGSN Address is temporary subscriber data and conditionally stored in SGSN.

2.13.6   Access Point Name (APN)

Access Point Name (APN) is defined in TS ~~GSM 03.03~~3GPP TS 23.003 and 03.60 The APN field in the HLR contains either only an APN Network Identifier (i.e. an APN without APN Operator Identifier) or the wild card value (defined in ~~GSM 03.03~~3GPP TS 23.003).APN is permanent subscriber data conditionally stored in HLR, in GGSN and SGSN.

2.13.7   GGSN Address in Use

GGSN Address in Use is defined in ~~GSM 03.60~~3GPP TS 23.060. It is the IP address of the GGSN currently used by a certain PDP Address of the MS.

GGSN Address is temporary subscriber data and conditionally stored in SGSN.

2.13.8   VPLMN Address Allowed

VPLMN Address Allowed is defined in ~~GSM 03.60~~3GPP TS 23.060. It specifies whether the MS is allowed to use a dynamic address allocated in any VPLMN.

VPLMN Address Allowed is permanent subscriber data and conditionally stored in HLR and SGSN.

2.13.9   Dynamic Address

Dynamic Address is defined in ~~GSM 03.60~~3GPP TS 23.060. It indicates whether the address of the MS is dynamic.

Dynamic Address is temporary subscriber data conditionally stored in GGSN.

2.13.10   SGSN Address

SGSN Address is defined in ~~GSM 03.03~~3GPP TS 23.003. It is the IP Address of the SGSN currently serving the MS.

SGSN Address is temporary subscriber data stored in HLR and stored conditionally in GGSN. A pendant is the SGSN number, cf subclause 2.4.8.

2.13.11   GGSN-list

GGSN-list is defined in ~~GSM 03.60~~3GPP TS 23.060. It defines the GGSNs to be contacted when activity from the MS is detected and MNRG is set. It contains the GGSN number and optionally the GGSN IP address.

GGSN-list is temporary subscriber data stored in the HLR.

2.13.12   Quality of Service Subscribed

Quality of Service Subscribed is defined in ~~GSM 03.60~~3GPP TS 23.060. It specifies the quality of service subscribed for a certain PDP context.

Quality of Service Subscribed is permanent subscriber data and conditionally stored in HLR and SGSN.

2.13.13   Quality of Service Requested

Quality of Service Requested is defined in ~~GSM 03.60~~3GPP TS 23.060. It specifies the quality of service requested for a certain PDP context.

Quality of Service Requested is temporary subscriber data and conditionally stored in SGSN.

2.13.14 Quality of Service Negotiated

Quality of Service Negotiated is defined in ~~GSM 03.60~~3GPP TS 23.060. It specifies the quality of service for a certain PDP context, negotiated between the MS and the SGSN, and then the GGSN.

Quality of Service Negotiated is temporary subscriber data and conditionally stored in SGSN and GGSN.

2.13.15 SND

SND is defined in ~~GSM 03.60~~3GPP TS 23.060. It is the GPRS Tunnelling Protocol sequence number of the next downlink N-PDU.

SND is temporary subscriber data conditionally stored in SGSN and GGSN.

2.13.16 SNU

SNU is defined in ~~GSM 03.60~~3GPP TS 23.060. It is the GPRS Tunnelling Protocol sequence number of the next uplink N-PDU.

SNU is temporary subscriber data and conditionally stored in SGSN and GGSN.

2.13.17 DRX Parameters

DRX Parameters is defined in ~~GSM 03.60~~3GPP TS 23.060.

DRX Parameters is temporary subscriber data stored in SGSN.

2.13.18 Compression

Compression is defined in ~~GSM 03.60~~3GPP TS 23.060. There is one set of negotiated compression parameters per QoS priority level.

Compression is temporary subscriber data conditionally stored in the SGSN.

2.13.19 Non-GPRS Alert Flag (NGAF)

Non-GPRS Alert Flag (NGAF) is defined in ~~GSM 03.60~~3GPP TS 23.060. It indicates whether activity from the MS shall be reported to the MSC/VLR.

NGAF is temporary subscriber data and is conditionally stored in the SGSN if the Gs interface is installed.

2.13.20 Classmark

MS Classmark is defined in ~~GSM 04.08~~3GPP TS 24.008.

Classmark is temporary subscriber data stored in the SGSN.

2.13.21 Tunnel IDentifier (TID)

Tunnel Identifier is defined in ~~GSM 09.60~~3GPP TS 29.060. It is used for Anonymous Access. TID is temporary subscriber data conditionally stored in SGSN and GGSN.

2.13.22 Radio Priority

Radio Priority is defined in ~~GSM 03.60~~3GPP TS 23.060. It indicates the RLC/MAC radio priority level for uplink user data transmission for a certain PDP context.

Radio Priority is temporary subscriber data and conditionally stored in SGSN.

2.13.23 Radio Priority SMS

Radio Priority SMS is defined in ~~GSM 03.60~~3GPP TS 23.060. It indicates the RLC/MAC radio priority level for uplink SMS transmission.

Radio Priority SMS is temporary subscriber data and conditionally stored in SGSN.

2.13.24 PDP Context Identifier

PDP Context Identifier is defined in ~~GSM 03.60~~3GPP TS 23.060. It identifies uniquely each PDP context.

PDP Context Identifier is permanent subscriber data and conditionally stored in HLR and SGSN.

2.13.25 PDP Context Charging Characteristics

PDP Context Charging Charactertistics is defined in 3GPP TS 32.015. It indicates the charging type to be applied to the PDP context.

PDP Context Charging Characteristics is permanent subscriber data and conditionally stored in HLR, SGSN and GGSN.

2.14   Data related to CAMEL

2.14.1   Subscriber Data stored in HLR

2.14.1.1   Originating CAMEL Subscription Information (O-CSI)

This data defines the contents of the Originating CAMEL subscription information used to interwork with the gsmSCF for MO and MF call. It consists of:

- A TDP list. The TDP list is a list of TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the MO State Model where service triggering may take place. For O-CSI, the allowed DP value are *DP Collected_info, DP Route_Select_Failure.*

  2. A gsmSCF address. It is the gsmSCF address (E164 number) where the CAMEL service is treated for the subscriber. A gsmSCF address is associated to each serviceKey.

  3. A serviceKey. The serviceKey identifies to the gsmSCF the service logic. A serviceKey is associated to each TDP.

  4. A default Call Handling. The default call handling indicates whether the call shall be released or continued as requested in case of error in the gsmSSF to gsmSCF dialogue. A default Call Handling is associated to each serviceKey.

  5. DP criteria. The DP criteria indicates on which criteria the gsmSSF shall access the gsmSCF. DP criteria is associated to each TDP.

- CAMEL capability handling. It gives the CAMEL phase associated to the O-CSI (CAMEL phase1, phase2, or phase3).

- The CSI state. The CSI state indicates whether the O-CSI is active or not.

- The notification flag, the notification flag indicates whether changes of the O-CSI shall trigger Notification on Change of Subscriber Data.

TDP	Triggering Criteria (*)	ServiceKey	gsmSCF address	Default Call Handling
DP Collected_ Info	No Criteri~a~on Number criteria Basic service code criteria Call type criteria	One ServiceKey	One E164 gsmSCF address	One Default call handling
DP Route_Select_ Failure	No criteri~a~on Cause value criteria	One ServiceKey	One E164 gsmSCF address	One Default call handling

(*)   One or more TDP criteria shall be applicable. All applicable triggering criteria must be satisfied before the dialogue is established with the gsmSCF.

2.14.1.2 Terminating CAMEL Subscription Information (T-CSI) and VMSC Terminating CAMEL Subscription Information (VT-CSI));

This data defines the contents of the terminating CAMEL subscription information used to interwork with the gsmSCF for MT call. It consists of:

- A TDP list. DP The TDP list is a list of TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the MT State Model where service triggering may take place. For T-CSI, the allowed DP value are DP Terminating_Attempt_Authorised, DP T_Busy, DP T_No_Answer.

  2. A gsmSCF address. It is the gsmSCF address (E.164 number) where the CAMEL service is treated for the subscriber. A gsmSCF address is associated to each serviceKey.

  3. A serviceKey. The serviceKey identifies to the gsmSCF the service logic. A serviceKey is associated to each TDP.

  4. A default Call Handling. The default call handling indicates whether the call shall be released or continued as requested in case of error in the gsmSSF to gsmSCF dialogue. A default Call Handling is associated to each serviceKey.

  5. DP criteria. The DP criteria indicates on which criteria the gsmSSF shall access the gsmSCF. DP criteria is associated to each TDP.

- CAMEL capability handling. It gives the CAMEL phase associated to the T-CSI/VT-CSI (CAMEL phase1, or phase2, or phase3).

- The CSI state indicates whether the T-CSI/VT-CSI is active or not.

- Notification flag. The notification flag indicates whether the change of the T-CSI/VT-CSI shall trigger Notification on Change of Subscriber data.

TDP	Triggering Criteria (*)	ServiceKey	gsmSCF address	Default Call Handling
DP Terminating_ Attempt_Authorised	No Criteri~a~on Basic service criteria	One serviceKey	One E164 gsmSCF address	One Default call handling
DP T_Busy	No criteri~a~on Cause value criteria	One serviceKey	One E164 gsmSCF address	One Default call handling
DP T_No_Answer	No criteri~a~on Cause value criteria	One service Key	One E164 gsmSCF address	One Default call handling

(*)   One or more DP criteria shall be applicable. All applicable triggering criteria must be satisfied before the dialogue is established with the gsmSCF.

2.14.1.3   Location information/Subscriber state interrogation.

This data item indicates whether or not the HLR shall send the location information and state of the called subscriber , as available, when a GMSC requests routeing information for an MT call.

2.14.1.4   USSD CAMEL subscription information(U-CSI)

This data is used on USSD request receipt from the MS. It consists of a list of:

- a service code. The service code defines a specific application in the gsmSCF;

- a gsmSCFaddress. It is the gsmSCF address (E.164 number) where the USSD application is treated for this subscriber.

2.14.1.5   Supplementary Service invocation notification(SS-CSI)

This data is used to notify the gsmSCF about Supplementary service invocation. It consists of :

- notification criterion, which may be a list of Supplementary Service(s). The possible Supplementary Services are: ECT, CD or MPTY, CCBS;

- a gsmSCFaddress: it is the gsmSCF address (E.164 number) where the notification of the Supplementary Service invocation is treated for this subscriber;

- CSI state, indicates whether the SS-CSI is active or not;

- notification flag: it indicates whether the change of the SS-CSI shall trigger Notification on Change of Subscriber data.

2.14.1.6   Translation Information flag (TIF-CSI)

- TIF-CSI flag is used to indicate that the HLR shall not attempt to perform any actions on the FTN (translation, prohibited FTN checks, call barring checks) at the registration procedure.

- Notification flag. The notification flag indicates whether the change of TIF-CSI flag shall trigger Notification on Change of Subscriber data.

2.14.1.7   Mobility Management event notification (M-CSI)

This data indicates which Mobility Management events shall be reported to the gsmSCF. It consists of:

- gsmSCF address: this is the address of the gsmSCF where the Mobility Management event notification shall be sent to. The gsmSCF address is in E.164 format.

- Service Key: the service key is included in the notification to the gsmSCF and indicates to the gsmSCF which Service Logic shall be applied.

- Mobility Management Triggers: these triggers define which Mobility Managements events shall be reported to the gsmSCF. The mobility managements triggers may contain one or any combination of the following elements:

  - Location update in the same VLR service area;

  - Location update to another VLR service area;

  - IMSI attach;

  - MS initiated IMSI detach (explicit detach);

  - Network initiated IMSI detach (implicit detach).

- The CSI state, indicates whether the M-CSI is active or not.

- Notification flag. The notification flag indicates whether the change of M-CSI shall trigger Notification on Change of Subscriber data.

2.14.1.8   Short Message Service CAMEL Subscription Information (SMS-CSI)

This data defines the contents of the SMS CAMEL subscription information. The SMS CAMEL Subscription Information is used for the following interworking:

- Interworking between gsmSCF and gsmSSF, for CAMEL control of circuit switched MO SMS;

- Interworking between gsmSCF and gprsSSF, for CAMEL control of packet switched MO SMS.

SMS-CSI consists of the following data items:

- TDP List. The TDP list is a list of SMS TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the MO SMS State Model where service triggering may take place.
     For SMS-CSI, the only allowed DP value is *SMS_Collected_Info*.

  2. gsmSCF Address. The gsmSCF address is the address (E164 number) of the gsmSCF where the MO SMS CAMEL Service associated with this TDP, is located for this subscriber.

  3. Service Key. The service key identifies to the gsmSCF the service logic that shall be applied.

  4. Default SMS handling. The default SMS handling indicates whether the MO SMS submission request shall be rejected or continued in the case of error in the dialogue between the gsmSSF and gsmSCF or between the gprsSSF and gsmSCF;

- CAMEL Capability Handling. CAMEL Capability Handling indicates the CAMEL Phase that is required for the MO SMS service. The CAMEL Capability Handling for SMS-CSI shall have the value CAMEL phase 3.

- CSI state: indicates whether the SMS-CSI is active or not.

- Notification flag indicates whether the change of the SMS-CSI shall trigger Notification on change of subscriber Data or not.

2.14.1.9   GPRS CAMEL Subscription Information (GPRS-CSI)

This data defines the contents of the GPRS CAMEL subscription information. The GPRS CAMEL Subscription Information is used for the following interworking:

- Interworking between gsmSCF and gprsSSF, for CAMEL control of packet switch call.

GPRS-CSI consists of the following data items:

- TDP List. The TDP list is a list of GPRS TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the GPRS State Model where service triggering may take place.

  2. gsmSCF Address. The gsmSCF address is the address (E164 number) of the gsmSCF where the GPRS CAMEL Service associated with this TDP, is located for this subscriber.

  3. Service Key. The service key identifies to the gsmSCF the service logic that shall be applied.

  4. Default GPRS handling. The default GPRS handling indicates whether the GPRS submission request shall be rejected or continued in the case of error in the dialogue between the gprsSSF and gsmSCF.

- CAMEL Capability Handling. CAMEL Capability Handling indicates the CAMEL Phase that is required for the GPRS service. The CAMEL Capability Handling for GPRS-CSI shall have the value CAMEL phase 3.

- The CSI state indicates whether the GPRS-CSI is active or not.

- The notification flag indicates whether the change of the GPRS-CSI shall trigger Notification on change of subscriber Data or not.

2.14.1.10   Dialled service CAMEL Subscription Information (D-CSI)

This data defines the contents of the dialled service CAMEL subscription information used to interwork with the gsmSCF for MO and MF call. It is applicable at TDP Analysed Info. It consists of:

- DP Criteria list. This consists of 1 to 10 entries. Each entry shall contain the following items:

  1. DP Criterion. It indicates when the gsmSSF shall request gsmSCF for instructions. It is a destination number.

  2. A gsmSCF address. It is the gsmSCF address (E164 number) where this Subscribed Dialled CAMEL service is treated for the subscriber. A gsmSCF address is associated to each DP Criterion.

  3. A serviceKey. The serviceKey identifies to the gsmSCF the service logic. A serviceKey is associated to each DP Criterion.

  4. A default Call Handling. It indicates whether the call shall be released or continued as requested in case of error in the gsmSSF to gsmSCF dialogue. A default Call Handling is associated to each DP Criterion.

- CAMEL capability handling. It indicates the CAMEL phase associated to the D-CSI (CAMEL phase3 shall be indicated).

- CSI state: indicates whether the D-CSI is active or not.

- Notification Flag. It indicates whether the change of the D-CSI shall trigger the Notification on Change of Subscriber Data.

2.14.2   Other Data stored in the HLR

2.14.2.1   Negotiated CAMEL Capability Handling

The HLR shall have a set of *negotiated CAMEL Capability Handling* variables. Each CSI that may be downloaded to the VLR or to the SGSN shall have a negotiated CAMEL Capability Handling (CCH) variable associated with it.

The negotiated CCH variable for a CSI indicates what CAMEL Phase is indicated in that CSI in the VLR or SGSN.

When the negotiated CCH variable has a value NULL, it indicates that ~~that~~the given CSI has not been downloaded to the VLR or SGSN.

The following table shows the *negotiated CAMEL Capability Handling* variables.

Variable name	Associated CSI	CSI stored in	Allowable values for negotiated CCH
O-CSI Negotiated CAMEL Capability Handling	O-CSI	VLR	NULL, 1, 2, 3
D-CSI Negotiated CAMEL Capability Handling	D-CSI	VLR	NULL, 3
SS-CSI Negotiated CAMEL Capability Handling	SS-CSI	VLR	NULL, 2, 3
VT-CSI Negotiated CAMEL Capability Handling	VT-CSI	VLR	NULL, 3
SMS-CSI VLR Negotiated CAMEL Capability Handling	SMS-CSI	VLR	NULL, 3
M-CSI Negotiated CAMEL Capability Handling	M-CSI	VLR	NULL, 3
SMS-CSI SGSN Negotiated CAMEL Capability Handling	SMS-CSI	SGSN	NULL, 3
GPRS-CSI Negotiated CAMEL Capability Handling	GPRS-CSI	SGSN	NULL, 3

There is no *negotiated CAMEL Capability Handling* variable associated with TIF-CSI.

The HLR does not store a *Negotiated CAMEL Capability Handling* for CSIs that are sent to the GMSC, since a subscriber is not permanently registered in a GMSC.

2.14.2.2 Supported CAMEL Phases

The HLR shall store the supported CAMEL Phases of the VLR where the subscriber is currently registered and the SGSN where the subscriber is currently attached.

The following variables are required:

- VLR Supported CAMEL Phases

- SGSN Supported CAMEL Phases

The HLR does not store the Supported CAMEL Phases of the GMSC, since a subscriber is not permanently registered at a GMSC.

2.14.2.3 UG-CSI

The USSD general CAMEL service(UG-CSI) is also stored in the HLR. This data is used on USSD request receipt from the MS. It consists of a list of:

- a service code. The service code defines a specific application in the gsmSCF;

- a gsmSCFaddress. It is the gsmSCF address (E.164 number) where the USSD application is treated for this subscriber.

2.14.2.4 gsmSCF address for CSI

This information element contains the list of gsmSCF address(E164 address) to which Notification on Change of Subscriber Data is to be sent.

2.14.3 Subscriber data stored in VLR

2.14.3.1 Originating CAMEL Subscription Information (O-CSI)

The Originating CAMEL Subscription Information (O-CSI) are stored in the VLR.

This data defines the contents of the originating CAMEL subscription information used to interwork with the gsmSCF for MO and CF calls. It consists of:

- A TDP list: The TDP list is a list of TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the MO State Model where service triggering may take place. For O-CSI, the allowed DP value are *DP Collected_info, DP Route_Select_Failure.*

  2. A gsmSCF address. It is the gsmSCF address (E164 number) where the CAMEL service is treated for the subscriber. A gsmSCF address is associated to each serviceKey.

  3. A serviceKey. The serviceKey identifies to the gsmSCF the service logic.. A serviceKey is associated to each TDP.

  4. A default Call Handling. The default call handling indicates whether the call shall be released or continued as requested in case of error in the gsmSSF to gsmSCF dialogue. A default Call Handling is associated to each serviceKey.

  5. DP criteria: The DP criteria indicates on which criteria the gsmSSF shall access the gsmSCF. DP criteria is associated to each TDP.

- CAMEL capability handling. It gives the CAMEL phase associated to the O-CSI (CAMEL phase1, or phase2, or phase3).

2.14.3.2 VMSC Terminating CAMEL Subscription Information (VT-CSI)

This data defines the contents of the visited terminating CAMEL subscription information used by the VMSC to interwork with the gsmSCF for an MT call. It consists of:

- A TDP list. The TDP list is a list of TDP descriptions. Each TDP description contains the following elements:

    1. DP Value. The DP value identifies the DP in the MT State Model where service triggering may take place. For VT-CSI, the allowed DP value are *DP Terminating Attempt Authorised, DP T_Busy, DP T_No_Answer.*

    2. A gsmSCF address. It is the gsmSCF address (E164 number) where the CAMEL service is treated for the subscriber. A gsmSCF address is associated to each serviceKey.

    3. A serviceKey. The serviceKey identifies to the gsmSCF the service logic. A serviceKey is associated to each TDP.

    4. A default Call Handling. The default call handling indicates whether the call shall be released or continued as requested in case of error in the gsmSSF to gsmSCF dialogue. A default Call Handling is associated to each serviceKey.

    5. DP criteria: The DP criteria indicates on which criteria the gsmSSF shall access the gsmSCF.

- CAMEL capability handling. It gives the CAMEL phase associated to the VT-CSI. It is CAMEL phase3.

2.14.3.3 Supplementary Service invocation notification(SS-CSI)

This data is used to notify the gsmSCF about Supplementary Service invocation. It consists of :

- a notification criterion, which may be ECT, CD or MPTY

- a gsmSCFaddress. It is the gsmSCF address (E164 number) where the notification of the Supplementary service invocation is treated for this subscriber.

2.14.3.4 Mobility Management event notification (M-CSI)

This data indicates which Mobility Management events shall be reported to the gsmSCF. It consists of:

- gsmSCF address : This is the address of the gsmSCF where the Mobility Management event notification shall be sent to. The gsmSCF address must be in E.164 format.

- Service Key: The service key is included in the notification to the gsmSCF and indicates to the gsmSCF which Service Logic shall be applied.

- Mobility Management Triggers. These triggers define which Mobility Managements events shall be reported to the gsmSCF. The mobility managements triggers may contain one or any combination of the following elements:

    - Location update in the same VLR service area;

    - Location update to another VLR service area;

    - IMSI attach;

    - MS initiated IMSI detach (explicit detach);

    - Network initiated IMSI detach (implicit detach).

2.14.3.5 Short Message Service CAMEL Subscription Information (SMS-CSI)

This data defines the contents of the SMS CAMEL subscription information used for the interworkingbetween gsmSCF and gsmSSF, for CAMEL control of circuit switched MO SMS.

SMS-CSI consists of the following data items:

- TDP List. The TDP list is a list of SMS TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the MO SMS State Model where service triggering may take place.
     For SMS-CSI, the only allowed DP value is *SMS_Collected_Info*.

  2. gsmSCF Address. The gsmSCF addess is the address (E164 number) of the gsmSCF where the MO SMS CAMEL Service associated with this TDP, is located for this subscriber.

  3. Service Key. The service key identifies to the gsmSCF the service logic that shall be applied.

  4. Default SMS handling. The default SMS handling indicates whether the MO SMS submission request shall be rejected or continued in the case of error in the dialogue between the gsmSSF and gsmSCF or between the gprsSSF and gsmSCF;

- CAMEL Capability Handling. CAMEL Capability Handling indicates the CAMEL Phase that is required for the MO SMS service.
  The CAMEL Capability Handling for SMS-CSI shall have the value CAMEL phase 3.

2.14.3.6   Dialled service CAMEL Subscription Information (D-CSI)

This data defines the contents of the dialled service CAMEL subscription information used to interwork with the gsmSCF for MO and MF call. It is applicable at TDP Analysed Info. It consists of:

- DP Criteria list, this consists of 1 to 10 entries containing : DP Criterion: It indicates when the gsmSSF shall request gsmSCF for instructions.

  1. A gsmSCF address. It is the gsmSCF address (E164 number) where this Subscribed Dialled CAMEL service is treated for the subscriber. A gsmSCF address is associated to each DP Criterion.

  2. A serviceKey. The serviceKey identifies to the gsmSCF the service logic. A serviceKey is associated to each DP Criterion.

  3. A default Call Handling. It indicates whether the call shall be released or continued as requested in case of error in the gsmSSF to gsmSCF dialogue. A default Call Handling is associated to each DP Criterion.

- CAMEL capability handling. It indicates the CAMEL phase associated to the D-CSI (CAMEL phase3 shall be indicated).

2.14.3.7   Translation Information flag (TIF-CSI)

This flag is used to indicate that the VLR shall not attempt to perform any actions on the deflected to number (DTN).

2.14.4   Data stored in SGSN

2.14.4.1   Short Message Service CAMEL Subscription Information (SMS-CSI)

This data defines the contents of the SMS CAMEL subscription information. The SMS-CSI in SGSN is used for the Interworking between SGSN and gsmSCF, for CAMEL control of packet switched MO SMS.

SMS-CSI consists of the following data items:

- TDP List. The TDP list is a list of SMS TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the MO SMS State Model where service triggering may take place.
     For SMS-CSI, the only allowed DP value is *SMS_Collected_Info*.

2. gsmSCF Address. The gsmSCF addess is the address (E.164 number) of the gsmSCF where the MO SMS CAMEL Service associated with this TDP, is located for this subscriber.

3. Service Key. The service key identifies to the gsmSCF the service logic that shall be applied.

4. Default SMS handling. The default SMS handling indicates whether the MO SMS submission request shall be rejected or continued in the case of error in the dialogue between the gprsSSF and gsmSCF.

- CAMEL Capability Handling. CAMEL Capability Handling indicates the CAMEL Phase that is required for the MO SMS service.
  The CAMEL Capability Handling for SMS-CSI in SGSN shall have the value CAMEL phase 3.

2.14.4.2 GPRS CAMEL Subscription Information (GPRS-CSI)

This data defines the contents of the GPRS CAMEL subscription information. The GPRS CAMEL Subscription Information is used for the interworkingbetween gsmSCF and gprsSSF, for CAMEL control of packet switch call.

The GPRS-CSI consists of the following data items:

- TDP List. The TDP list is a list of GPRS TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the GPRS State Model where service triggering may take place.

  2. gsmSCF Address. The gsmSCF address is the address (E164 number) of the gsmSCF where the GPRS CAMEL Service associated with this TDP, is located for this subscriber.

  3. Service Key. The service key identifies to the gsmSCF the service logic that shall be applied.

  4. Default GPRS handling. The default GPRS handling indicates whether the GPRS submission request shall be rejected or continued in the case of error in the dialogue between the gprsSSF and gsmSCF.

- CAMEL Capability Handling. CAMEL Capability Handling indicates the CAMEL Phase that is required for the GPRS service. The CAMEL Capability Handling for GPRS-CSI in SGSN shall have the value CAMEL phase 3.

2.15 Data related to IST

2.15.1 IST Alert Timer

The IST Alert Timer indicates the timer value that the VMSC and the GMSC shall use to inform the HLR about each of the call activities that an IST non-CAMEL subscriber performs.

This parameter is only sent to the VLRs which support the non-CAMEL IST functionality.

2.16 Data related to Location Services

2.16.1 Subscriber Data stored in HLR

2.16.1.1 Privacy Exception List

This data contains the privacy classes for any target MS which identify the LCS clients permitted to locate the MS. For a detailed definition of this data, refer to GSM 03.71.

2.16.1.2 GMLC Numbers

This data contains the GMLC addresses for an MS subscriber. These addresses may be used to verify that a location request from specific LCS clients is authorized for the target MS.

2.16.1.3   MO-LR List

This data contains the classes of MO-LR that are permitted for the MS subscriber. For a detailed definition of this data, refer to GSM 03.71.

2.16.2   Data stored in GMLC

The GMLC stores data related to LCS clients. Refer to GSM 03.71 for a detailed description.

2.16.3   Data stored in SMLC (GSM only)

The SMLC stores data related to associated Type A and Type B LMUs from which location measurements may be received. Refer to GSM 03.71 for a detailed description.

2.16.4   Data stored in LMU (GSM only)

The LMU stores data related to its LCS measurement and O&M capabilities and may store data related to LCS measurements and O&M reports that it is required to provide to its controlling SMLC. The nature and content of this data is not defined in GSM.

2.16.5   Data stored in the MSC (GSM only)

In order to support routing of connectionless LCS messages to an SMLC or a Type B LMU, the MSC may store permanent routing data for an SMLC or a Type B LMU in association with a specific location area identifier or location area identifier plus cell identifier.

2.16.6   Data stored in the BSC (GSM only)

In order to support routing of connectionless LCS messages to an SMLC or a Type B LMU, the BSC may store permanent routing data for an SMLC or a Type B LMU in association with a specific location area identifier or location area identifier plus cell identifier.

2.17   Data related to Super-Charger

2.17.1   Age Indicator

This data indicates the age of the subscription data provided by the HLR, e.g. the date and time at which the subscriber data was last modified in the HLR.

2.18   Data related to bearer service priority

2.18.1   CS Allocation/Retention priority

The CS(Circuit Switched) Allocation/Retention priority corresponds to the allocation/retention priority which is defined in TS 23.107. It specifies the relative importance compared to other UMTS bearers for allocation and retention of the UMTS bearer in the CS domain.

The parameter is permanent subscriber data and is conditionally stored in the HLR and VLR.

2.19 Data related to charging

2.19.1 Subscribed Charging Characteristics

Subscribed Charging Characteristics specifies whether the subscriber is a normal, prepaid, flat rate and/or hot billing subscriber.

Subscribed Charging Characteristics is permanent subscriber data and conditionally stored in HLR, SGSN, and GGSN (see 3GPP TS 23.060).

3 Summary of data stored in location registers

Table 1 gives an overview of data stored in location registers for non-GPRS Network Access Mode, whereas table 2 shows the data stored in the location registers, in the SGSN and in the GGSN for GPRS Network Access Mode. In the tables, M = mandatory means that this parameter is stored for all subscribers with subscription of the Network Access Mode as shown in the table heading and defining the table; and C = conditional means that the parameter is subject to some condition (e.g. subscription of teleservice or other services, reception of optional message or short-lived data). The type indication indicates whether the subscriber data is temporary (T) or permanent (P) data, where permanent data can be set and modified but by the operator, whereas the temporary data are set and changed automatically by network functions.

4 Accessing subscriber data

It shall be possible to retrieve or store subscriber data concerning a specific MS from the HLR by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);

- Mobile Station ISDN Number (MSISDN).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the VLR by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);

- Temporary Mobile Subscriber Identity (TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the SGSN by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);

- Packet Temporary Mobile Subscriber identity (P-TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the GGSN by use of the following reference:

- International Mobile Subscriber Identity (IMSI).

See clause 3 for explanation of M, C, T and P in table 1 and table 2.

Table 1: Overview of data stored for non-GPRS Network Access Mode

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE
IMSI	2.1.1.1	M	M	P
Network Access Mode	2.1.1.2	M	-	P
International MS ISDN number	2.1.2	M	M	P
multinumbering MSISDNs	2.1.3	C	-	P
Basic MSISDN indicator	2.1.3.1	C	-	P
MSISDN-Alert indicator	2.1.3.2	C	-	P
TMSI	2.1.4	-	C	T
LMSI	2.1.8	C	C	T
Mobile Station Category	2.2.1	M	M	P
LMU Identifier	2.2.2	C	C	P
RAND, SRES and Kc	2.3.1		C	T
RAND, XRES, CK, IK and AUTN	2.3.2	M	C	T
Ciphering Key Sequence Number	2.3.3	-	M	T
Key Set Identifier (KSI)	2.3.4	-	M	T
MSRN	2.4.1	-	C	T
Location Area Identity	2.4.2	-	M	T
VLR number	2.4.5	M	-	T
MSC number	2.4.6	M	C	T
HLR number	2.4.7	-	C	T
Subscription restriction	2.4.10	C	-	P
RSZI lists	2.4.11.1	C	-	P
Zone Code List	2.4.11.2	-	C	P
MSC area restricted flag	2.4.12	M	-	T
LA not allowed flag	2.4.13	-	M	T
ODB-induced barring data	2.4.15.1	C	-	T
Roaming restriction due to unsupported feature	2.4.15.2	M	M	T
Cell Global ID or Service Area ID	2.4.16	-	C	T
LSA Identity	2.4.17.1	C	C	P
LSA Priority	2.4.17.2	C	C	P
LSA Preferential Access Indicator	2.4.17.2A	C	C	P
LSA Active Mode Support Indicator	2.4.17.4	C	C	P
LSA Only Access Indicator	2.4.17.3	C	C	P
LSA Active Mode Indicator	2.4.17.4	C	C	P
VPLMN Identifier	2.4.17.5	C	-	P
Provision of bearer service	2.5.1	M	M	P
Provision of teleservice	2.5.2	M	M	P
BC allocation	2.5.3	C	C	P
IMSI detached flag	2.7.1	-	C	T
Confirmed by Radio Contact indicator	2.7.4.1	-	M	T
Subscriber Data Confirmed by HLR indicator	2.7.4.2	-	M	T
Location Information Confirmed in HLR indicator	2.7.4.3	-	M	T
Check SS indicator	2.7.4.4	M	-	T
MS purged for non-GPRS flag	2.7.5	M	-	T
MNRR	2.7.7	C	-	T
Subscriber status	2.8.1	C	C	P
Barring of outgoing calls	2.8.2.1	C	C	P
Barring of incoming calls	2.8.2.2	C	-	P
Barring of roaming	2.8.2.3	C	-	P
Barring of premium rate calls	2.8.2.4	C	C	P
Barring of supplementary service management	2.8.2.5	C	C	P
Barring of registration of call forwarding	2.8.2.6	C	-	P
Barring of invocation of call transfer	2.8.2.7	C	C	P
Operator determined barring PLMN-specific data	2.8.3	C	C	P
Notification to CSE flag for ODB	2.8.4	C	-	T
gsmSCF address list for ODB	2.8.5	C	-	P
Handover Number	2.9.1	-	C	T
Messages Waiting Data	2.10.1	C	-	T
Mobile Station Not Reachable Flag	2.10.2	C	M	T
Memory Capacity Exceeded Flag	2.10.3	C	-	T

(continued)

Table 1 (concluded): Overview of data stored for non-GPRS Network Access Mode

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE
Trace Reference	2.11.1	C	C	P
Trace Type	2.11.2	C	C	P
Operations Systems Identity	2.11.3	C	C	P
HLR Trace Type	2.11.4	C	-	P
MAP Error On Trace	2.11.5	C	-	T
Trace Activated in VLR	2.11.6	C	C	T
Foreign Subscriber Registered in VLR	2.11.8	-	C	P
VGCS Group Membership List	2.12.1	C	C	P
VBS Group Membership List	2.12.2	C	C	P
Broadcast Call Initiation Allowed List	2.12.2.1	C	C	P
Originating CAMEL Subscription Information (O-CSI)	2.14.1.1/2.14.3.1	C	C	P
Terminating CAMEL Subscription Information (T-CSI)	2.14.1.2	C	-	P
VMSC Terminating CAMEL Subscription Information (VT-CSI)	2.14.1.2/2.14.3.2	C	C	P
Location Information/Subscriber state interrogation	2.14.1.3	C	-	P
USSD CAMEL subscription information(U-CSI)	2.14.1.4	C	-	P
SS invocation notification (SS-CSI)	2.14.1.5/2.14.3.5	C	C	P
Translation information flag(TIF-CSI)	2.14.1.6/2.14.3.7	C	C	P
Dialled service CAMEL Subscription Information (D-CSI)	2.14.1.10/2.14.3.6	C	C	P
USSD General CAMEL service information (UG-CSI)	2.14.2.3	C	-	P
O-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		P
SS-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		P
VT-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		P
Short Message Service CAMEL Subscription Information(SMS-CSI)	2.14.1.8/2.14.3.5	C	C	P
SMS-CSI VLR Negotiated CAMEL Capability Handling	2.14.2.1	C		P
M-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		P
VLR Supported CAMEL Phases	2.14.2.2	C		P
GsmSCF address for CSI	2.14.2.4	C		P
IST Alert Timer	2.15.1	C	C	P
Privacy Exception List	2.16.1.1	C	C	P
GMLC Numbers	2.16.2	C	C	P
MO-LR List	2.16.1.3	C	C	P
Age Indicator	2.17.1	C	C	T
CS Allocation/Retention priority	2.18.1	C	C	P

Table 2: Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
IMSI	2.1.1.1	M	M	M	M	P
Network Access Mode	2.1.1.2	M	-	C note1	-	P
International MSISDN number	2.1.2	M	M	M	-	T
multinumbering MSISDNs	2.1.3	C	-	-	-	T
Basic MSISDN indicator	2.1.3.1	C	-	-	-	T .
MSISDN-Alert indicator	2.1.3.2	C	-	-	-	T
P-TMSI	2.1.4	-	-	C	-	T
TLLI	2.1.6	-	-	C	-	T
Random TLLI	2.1.7	-	-	C	-	T
IMEI	2.1.9	-	-	C	-	T
RAND/SRES and Kc		-	-	C	-	T
RAND, XRES, CK, IK, AUTN	2.3.2	M	-	C	-	T
Ciphering Key Sequence Number	2.3.3	-	-	M	-	T
Key Set Identifier (KSI)	2.3.4	-	-	M	-	T
Selected Ciphering Algorithm	2.3.5	-	-	M	-	T
Current Kc	2.3.6	-	-	M	-	T
P-TMSI Signature	2.3.7	-	-	C	-	T
Routing Area Identity	2.4.3	-	-	M	-	T
VLR Number	2.4.5	M	-	C note2	-	T
SGSN Number	2.4.8.1	M	C note2	-	-	T
GGSN Number	2.4.8.2	M	-	-	-	P
RSZI Lists	2.4.8.2	C	-	-	-	P
Zone Code List	2.4.11.2	-	-	C	-	P
LA not allowed flag	2.4.13	-	-	M	-	T
SGSN area restricted flag	2.4.14	M	-	-	-	T
Roaming Restriction in the SGSN ..	2.4.15.2	M	-	M	-	T
Cell Global ID or Service Area ID	2.4.16	-	-	C	-	T
LSA Identity	2.4.17.1	C	C	C	-	P
LSA Priority	2.4.17.2	C	C	C	-	P
LSA Preferential Access Indicator	2.4.17.2A	C	C	C		P
LSA Active Mode Support Indicator	2.4.17.2B	C	C	C		P
LSA Only Access Indicator	2.4.17.3	C	C	C	-	P
LSA Active Mode Indicator	2.4.17.4	C	C	C	-	P
VPLMN Identifier	2.4.17.5	C	-	-	-	P
Provision of teleservice	2.5.2	C	-	C	-	P
Transfer of SM option	2.5.4	M	-	-	-	P
MNRG	2.7.2	M	-	M	M	T
MM State	2.7.3	-	-	M	-	T
Subscriber Data Confirmed by HLR Indicator	2.7.4.2	-	-	M	-	T
Location Info Confirmed by HLR Indicator	2.7.4.3	-	-	M	-	T
MS purged for GPRS flag	2.7.6	M	-	-	-	T
MNRR	2.7.7	C	-	-	-	T
Subscriber Status	2.8.1	C	-	C	-	P
Barring of outgoing calls	2.8.2.1	C	-		-	P
Barring of roaming	2.8.2.3	C	-	C	-	P
ODB PLMN-specific data	2.8.3	C	-	C	-	P
Notification to CSE flag for ODB	2.8.4	C	-	-	-	T
gsmSCF address list for ODB	2.8.5	C	-	-	-	P
Trace Activated in SGSN	2.11.7	C	-	C	-	P
PDP Type	2.13.1	C	-	C	M	P
PDP Address	2.13.2	C	-	C	M	P
NSAPI	2.13.3	-	-	C	C	T
PDP State	2.13.4	-	-	C	-	T
New SGSN Address	2.13.5	-	-	C	-	T
Access Point Name	2.13.6	C	-	C	C	P/T
GGSN Address in Use	2.13.7	-	-	C	-	T
VPLMN Address Allowed	2.13.8	C	-	C	-	P
Dynamic Address	2.13.9	-	-	-	C	T
SGSN Address	2.13.10	-	-	-	M	T
GGSN-list	2.13.11	M	-	-	-	T

(continued)

Table 2 (concluded): Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
Quality of Service Subscribed	2.13.12	C	-	C	-	P
Quality of Service Requested	2.13.13	-	-	C	-	T
Quality of Service Negotiated	2.13.14	-	-	C	M	T
SND	2.13.15	-	-	C	C	T
SNU	2.13.16	-	-	C	C	T
DRX Parameters	2.13.17	-	-	M	-	T
Compression	2.13.18	-	-	C	-	T
NGAF	2.13.19	-	-	C note2	-	T
Classmark	2.13.20	-	-	M	-	T
TID	2.13.21	-	-	C	C	T
Radio Priority	2.13.22	-	-	C	-	T
Radio Priority SMS	2.13.23	-	-	C	-	T
PDP Context Identifier	2.13.24	C	-	C	-	T
PDP Context Charging Characteristics	2.13.25	C	-	C	C	P
Short Message Service CAMEL Subscription Information (SMS-CSI)	2.14.1.8/2.14.4.1	C	-	C	-	P
GPRS CAMEL Subscription Information (GPRS-CSI)	2.14.1.9/2.14.4.2	C	-	C	-	C
SMS-CSI SGSN Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	P
GPRS-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	P
SGSN Supported CAMEL Phases	2.14.2.2	C	-	-	-	P
GsmSCF address for CSI	2.14.2.4	C	-	-	-	P
Age Indicator	2.17.1	C	-	C	-	T
Subscribed Charging Characteristics	2.19.1	C	-	C	C	P

The HLR column indicates only GPRS related use, i.e. if the HLR uses a parameter in non-GPRS Network Access Mode but not in GPRS Network Access Mode, it is not mentioned in this table 2.

note1: This parameter is relevant in the SGSN only when the Gs interface is installed.

note2: The VLR column is applicable if Gs interface is installed. It only indicates GPRS related data to be stored and is only relevant to GPRS subscribers registered in VLR.

For special condition of storage see in clause 2.
See clause 3 for explanation of M, C, T and P in table 2.

CR-Form-v3

CHANGE REQUEST

⌘ **23.008** CR **CR-035** ⌘ rev **3** ⌘ Current version: 4.0.0 ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network x

Title: ⌘	Correction of references	
Source: ⌘	CN4	
Work item code: ⌘	TEI	***Date:*** ⌘ 17/05/01
Category: ⌘	**A**	***Release:*** ⌘ REL-04

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)*

Reason for change: ⌘	Information from the 'Table 1: Overview of data stored for non-GPRS Network Access Mode' and 'Table 2: Overview of data used for GPRS Network Access Mode' are missing. The references are in incorrect format.

Summary of change: ⌘	1. Update of the reference tables 2. UMTS TS have been replaced by 3GPP TS 3. "criteria" becomes "criterion"; see 2.14.1.1 and 2.14.1.2 4. "that that" becomes "that the given"; see 2.14.2.1 5. Update of the tables at the end of the document 6. Chapter 2.7.7, MNRR "For FFS" has been deleted, MNRR is only in HLR. 7. The check against 3GPP TS 21.101 version 3.2.0 was performed. No 3GPP equivallent document for GSM 03.71, 12.03, 12.08, 08.08, 02.13 8. Removal of all editor's notes 9. Chapter 2.5.3 BCA is stored in HLR and VLR

Consequences if not approved: ⌘	Wrong referenced documents

Clauses affected: ⌘	All the document

Other specs ⌘ ☐	Other core specifications	⌘	

affected:	☐ Test specifications	
	☐ O&M Specifications	
Other comments:	⌘	

Foreword

This Technical Specification (TS) has been produced by the 3rd Generation Partnership Project (3GPP).

The present document provides a mechanism giving reliable transfer of signalling messages within the 3GPP system.

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

    x the first digit:

        1 presented to TSG for information;

        2 presented to TSG for approval;

        3 or greater indicates TSG approved document under change control.

    y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

    z the third digit is incremented when editorial only changes have been incorporated in the document.

0 Scope

The present document provides details concerning information to be stored in home location registers, visitor location registers and GPRS Support Nodes concerning mobile subscriber.

Clause 2 contains all details concerning the definition of the parameters, often given by reference to other specifications, and where the parameter is to be stored.

Table 1 in clause 3 gives a summary overview and clause 4 identifies the reference information required for accessing the information.

0.1 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 21.905: "3G Vocabulary for 3GPP Specifications".

[2]   3GPP TS 22.002: " Bearer Services (BS) supported by a GSM PLMN".

[3]   3GPP TS 22.003: " Circuit Teleservices supported by a Public Land Mobile Network (PLMN)"

[34]   3GPP TS 22.004: "General on supplementary services".

[45]   3GPP TS 23.003: "Numbering, addressing and identification".

[56]   3GPP TS 23.007: "Restoration procedures".

[67]   3GPP TS 23.009: "Handover procedures".

[78]   3GPP TS 23.012: "Location registration procedures".

[89]   3GPP TS 23.015: "Technical realization of operator determined barring (ODB)".

[910]   3GPP TS 23.040: "Technical realization of the Short Message Service (SMS) Point-to-Point".

[1011]   3GPP TS 22.060: "General Packet Radio Service (GPRS); Stage 1".

[1112]   3GPP TS 23.067: "Enhanced Multi-Level Precedence and Preemption service (EMLPP) - Stage 2".

[1213]   3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) - Stage 2".

[1314]   3GPP TS 23.081: "Line identification Supplementary Services - Stage 2".

[1415]   3GPP TS 23.082: "Call Forwarding (CF) Supplementary Services - Stage 2".

[1516]   3GPP TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 2".

[1617]   3GPP TS 23.084: "Multi Party (MPTY) Supplementary Service - Stage 2".

[1718]   3GPP TS 23.085: "Closed User Group (CUG) Supplementary Service - Stage 2".

[1819]   3GPP TS 23.086: "Advice of Charge (AoC) Supplementary Service - Stage 2".

[1920]   3GPP TS 23.088: "Call Barring (CB) Supplementary Service - Stage 2".

[2021]   3GPP TS 23.060: "General Packet Radio Service (GPRS) Service Description; Stage 2".

[22]   3GPP TS 23.078: "CAMEL, stage2".

[2123]   3GPP TS 23.090: "Unstructured Supplementary Service Data (USSD) - Stage 2".

[2224]   3GPP TS 23.116: "Super-Charger Technical Realisation; Stage 2."

[2325]   3GPP TS 23.135: "Multicall supplementary service; Stage 2"

[2426]   3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols - Stage 3".

[2527]   3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[2628]   3GPP TS 29.007: "General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[29]   3GPP TS 29.060: "GPRS Tunnelling protocol (GTP) accross the Gn and Gp interface".

[27]   GSM 02.03: "Digital cellular telecommunications system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[2830]   3GPP TS 42.032GSM 02.32: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST) Service Description - Stage 1".

[2931]   3GPP TS 43.020GSM 03.20: "Digital cellular telecommunications system (Phase 2+); Security related network functions".

[3032]   3GPP TS 43.035GSM 03.35: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST); Stage 2".

[3133]   3GPP TS 43.068GSM 03.68: "Digital cellular telecommunications system (Phase 2+); Voice Group Call Service (VGCS); Stage 2".

[3234]   3GPP TS 43.069GSM 03.69: "Digital cellular telecommunications system (Phase 2+); Voice Broadcast Service (VBS); Stage 2".

[3335]   GSM 03.71: "Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Functional Description; Stage 2".

[3436]   GSM 12.03: "Digital cellular telecommunications system (Phase 2); Security management".

[3537]   GSM 12.08: "Digital cellular telecommunications system (Phase 2); Subscriber and Equipment Trace".

[3638]   ITU-T Recommendation Q.763: "Specifications of Signalling System No.7; Formats and codes".

[3739]   ANSI T1.113-1995: "Signalling System No7 (SS7) ISDNIntegrated Services Digital Network (ISDN) User Part"

[40]   3GPP TS 32.005 "Telecommunications Management; Charging and billing: GSM call and event data for the Circuit Switched (CS) domain"

[41]   3GPP TS 32.015 "Telecommunications Management; Charging and billing: GSM call and event data for the Packet Switched (PS) domain"

0.2   Abbreviations

For the purposes of the present document, the abbreviations listed in 3GPP TR 21.905 apply.

1 Introduction

1.1 Definition

The term subscriber data is used to designate all information associated with a subscription which is required for service provisions, identification, authentication, routing, call handling, GPRS mode transmission, charging, subscriber tracing, operation and maintenance purposes. Some subscriber data are referred to as permanent subscriber data, i.e. they can only be changed by administration means. Other data are temporary subscriber data which may change as a result of normal operation of the system.

Unless shown to be conditional, all data items are considered to be mandatory.

1.2 Storage facilities

This specification considers subscriber data stored in the following types of functional unit:

- Home location register (HLR) which contains all permanent subscriber data and all relevant temporary subscriber data for all mobile subscribers permanently registered in the HLR.

- Visitor location register (VLR) which contains all subscriber data required for call handling and other purposes for mobile subscribers currently located in the area controlled by the VLR.

- Serving GPRS Support Node (SGSN) which contains all subscriber data required for GPRS mode transmission and other purposes for mobile subscribers currently located in the area controlled by the SGSN.

- -Gateway GPRS Support Node (GGSN) which contains all subscriber data required for GPRS mode transmission for mobile subscribers using any service provided by the GGSN.

- Gateway Mobile Location Center (GMLC) which contains all subscriber data required for external clients of the Location Services (LCS).

- In GSM, Serving Mobile Location Center (SMLC) which contains all LMU data required to manage location measurements in LMUs. (Note: a Type A LMU is a network entity that shares many of the attributes of an MS including subscription data in the HLR and identification using an IMSI).

In addition, subscriber data may also be stored in the following functional unit:

- Group Call Register (GCR) which contains all data required for configuration, set-up and handling of voice group and voice broadcast calls. This encompasses subscribers identities (mobile as well as fixed network) who are nominated as dispatchers for one or several groups within the area controlled by the GCR.

NOTE: The data stored in the GCR is not strictly "subscriber data". Description of GCR data is therefore out of scope of this specification and is covered in the corresponding specifications for enhanced Multi Level Precedence and Pre-emption Service (eMLPP), Voice Group Call Service (VGCS) and Voice Broadcast Service (VBS) instead (~~GSM 03.67~~3GPP TS 23.067, ~~GSM 03.68~~3GPP TS 43.068 and ~~GSM 03.69~~3GPP TS 43.069).

1.3 Subscriber data in functional units other than the HLR, the VLR, the SGSN, the GGSN, the GMLC, the SMLC and the LMU

The individual Subscriber Authentication Key Ki defined in 3GPP TS 43.020~~GSM 03.20~~ is stored in the Authentication Centre AuC; it is also stored in the SIM and therefore available in the MS. Version numbers of algorithms A3 and A8 may also be stored in the AuC.

NOTE: It is for further study whether or not other types of functional units containing mobile subscriber parameters are to be included in this specification. Such units could include encryption key distribution centres, maintenance centres, etc.

2 Definition of subscriber data

2.1 Data related to subscription, identification and numbering

2.1.1 Data defining the subscription profile

2.1.1.1 International Mobile Subscriber Identity (IMSI)

International Mobile Subscriber Identity (IMSI) is defined in ~~GSM 03.03~~3GPP TS 23.003.

IMSI is permanent subscriber data. IMSI is stored in HLR, VLR, SGSN, GGSN and SMLC. For Anonymous Access, IMSI is not used in SGSN nor in GGSN. The IMSI serves as the root of the subscriber data pseudo-tree.

2.1.1.2 Network Access Mode (NAM)

The Network Access Mode defines if the subscriber is registered to get access to the non-GPRS network, to the GPRS network or to both networks. NAM describes the first level of the subscriber data pseudo-tree below the IMSI root. It is permanent subscriber data stored in the HLR and the SGSN with the Gs interface option..

2.1.2 Mobile Station International ISDN Number (MSISDN)

Mobile Station ISDN Number (MSISDN) is defined in ~~GSM 03.03~~3GPP TS 23.003.

The MSISDN is permanent subscriber data and is stored in HLR, VLR and SGSN.

If the multinumbering option applies, the MSISDN stored in the VLR and in the SGSN is the Basic MSISDN, see subclause 2.1.3.1.

2.1.3 MSISDNs for multinumbering option

If the HPLMN allocates different MSISDNs for different Basic Services (see ~~GSM 09.07~~3GPP TS 29.007), these numbers are conditionally stored as permanent data in the HLR.

2.1.3.1 The Basic MSISDN indicator

The Basic MSISDN is defined in ~~GSM 03.12~~3GPP TS 23.012. The Basic MSISDN indicator marks the MSISDN to be used as Basic MSISDN.

It is permanent subscriber data stored conditionally in the HLR.

2.1.3.2 The MSISDN-Alert indicator

The MSISDN-Alert is defined in ~~GSM 03.40~~3GPP TS 23.040. The MSISDN-Alert indicator marks the MSISDN to be used as MSISDN-Alert.

It is permanent subscriber data stored conditionally in the HLR.

2.1.4 Temporary mobile subscriber identity (TMSI)

Temporary mobile subscriber identity (TMSI) is defined in ~~GSM 03.03~~3GPP TS 23.003.

The TMSI is temporary subscriber data and is conditionally stored in the VLR.

2.1.5 Packet-Temporary Mobile Subscriber Identity (P-TMSI)

Packet-Temporary Mobile Subscriber Identity (P-TMSI) is defined in ~~GSM 03.03~~3GPP TS 23.003. Its usage is described in ~~GSM 03.60~~3GPP TS 23.060. P-TMSI is accompanied by the P-TMSI Signature, see subclause 2.3.7.

The P-TMSI is temporary subscriber data and is conditionally stored in the SGSN.

2.1.6 Temporary Link Layer Identifier (TLLI)

Temporary Link Layer Identifier (TLLI) is defined in ~~GSM 03.03~~3GPP TS 23.003. It is derived from the P-TMSI by the MS and occurs in the variants Local TLLI and Foreign TLLI. The TLLI is temporary subscriber data and is conditionally stored in the SGSN. For use of TLLI see ~~GSM 03.60~~3GPP TS 23.060.

2.1.7 Random TLLI

Random TLLI is chosen randomly by the MS. It is defined in ~~GSM 03.03~~3GPP TS 23.003. Random TLLI is short living temporary subscriber data and is conditionally stored in the SGSN. For use of Random TLLI see ~~GSM 03.60~~3GPP TS 23.060.

A Random TLLI may be used if no valid P-TMSI is available.

2.1.8 Local Mobile Station Identity (LMSI)

Local Mobile Station Identity (LMSI) is defined in ~~GSM 03.03~~3GPP TS 23.003. The LMSI is temporary subscriber data. The LMSI may be stored in the VLR; if it is received in the HLR it must be stored there.

2.1.9 International Mobile Equipment Identity (IMEI)

International Mobile Equipment Identity (IMEI) is defined in ~~GSM 03.03~~3GPP TS 23.003. The IMEI is temporary subscriber data and is conditionally stored in the SGSN.

2.2 Data related to Mobile Station types

2.2.1 Mobile Station Category

Mobile Station Category has a structure identical to that of "Calling Party's Category" defined in ISUP (CCITT Recommendation Q.763).

The following values of category shall be supported:

- ordinary subscriber.

The category is assigned per IMSI.

Mobile Station Category is permanent subscriber data and is stored in HLR and VLR.

2.2.2 LMU Identifier (GSM only)

The LMU identifier is part of the subscriber data for a Type A LMU, when associated with an NSS based SMLC, and serves to distinguish a Type A LMU from a normal MS.

2.3 Data related to authentication and ciphering

2.3.1 Random Number (RAND), Signed Response (SRES) and Ciphering Key (Kc)

Random Number (RAND), Signed Response (SRES) and Ciphering Key (Kc) form a triplet vector used for authentication and encryption as defined in 3GPP TS 43.020GSM 03.20.

For GSM users, triplet vectors are calculated in the 2G AuC and provided to the 2G HLR (see GSM 12.03), and for UMTS users triplet vectors are derived from quintuplet vectors in the 3G HLR or 3G VLR, if needed (see 3GPP TS 33.102).

A set of up to 5 triplet values are sent from the 2G HLR to the VLR and the SGSN on request. These data are temporary subscriber data conditionally stored in the VLR and the SGSN.

2.3.2 Random Challenge (RAND), Expected Response (XRES), Cipher Key (CK), Integrity Key(IK) and Authentication Token(AUTN)

Random Challenge (RAND), Expected Response (XRES), Cipher Key (CK), Integrity Key(IK) and Authentication Token (AUTN) form a quintuplet vector used for user authentication, data confidentiality and data integrity as defined in 3GPP TS 33.102.

When both HLR and VLR or SGSN are 3G, a set of quintuplet vectors are calculated in the AuC, and up to 5 quintuplets are sent from the HLR to the VLR and to the SGSN on request (see 3GPP TS 29.002). These data are temporary subscriber data conditionally stored in the HLR, the VLR and the SGSN.

When the HLR is 2G and the VLR or SGSN are 3G, quintuplet vectors are derived by the 3G VLR or SGSN from the received triplet vectors from the HLR, if needed (see UMTS3GPP TS 33.102).

2.3.3 The Ciphering Key Sequence Number (CKSN)

The Ciphering Key Sequence Number (CKSN) is used to ensure GSM authentication information (Kc) consistency between the MS and the VLR and between the MS and the SGSN.

CKSN and its handling are defined in GSM 04.083GPP TS 24.008 and GSM 03.203GPP TS 43.020. It is a temporary subscriber data and is stored in the VLR and in the SGSN.

2.3.4 The Key Set Identifier (KSI)

The Key Set Identifier (KSI) is used to ensure UMTS authentication information (CK and IK) consistency between the MS and the VLR and between the MS and the SGSN.

KSI and its handling are defined in UMTS3GPP TS 24.008 and UMTS3GPP TS 33.102. It is temporary subscriber data and is stored in the VLR and the SGSN.

2.3.5 Selected Ciphering Algorithm

Selected Ciphering Algorithm is defined in GSM 03.603GPP TS 23.060.

Selected Ciphering Algorithm is temporary subscriber data stored in the SGSN.

2.3.6 Current Kc

Current Kc is defined in GSM 03.203GPP TS 43.020.

Current Kc is temporary subscriber data stored in the SGSN.

2.3.7 P-TMSI Signature

P-TMSI Signature is defined in TSs ~~GSM 03.03~~3GPP TS 23.003 and ~~GSM 03.60~~3GPP TS 23.060. It is used for identification checking purposes.

P-TMSI Signature is temporary subscriber data and is conditionally stored in the SGSN.

2.4 Data related to roaming

2.4.1 Mobile Station Roaming Number (MSRN)

Mobile Station Roaming Number (MSRN) is defined in ~~GSM 03.03~~3GPP TS 23.003.

NOTE: There may be more than one MSRN simultaneously per IMSI.

The MSRN is short-lived temporary subscriber data stored in the VLR.

2.4.2 Location Area Identification (LAI)

Location Area Identification (LAI) is defined in ~~GSM 03.03~~3GPP TS 23.003.

The LAI is temporary subscriber data and is stored in the VLR.

2.4.3 Routing Area Identification (RAI)

Routing Area Identification (RAI) is defined in ~~GSM 03.03~~3GPP TS 23.003.

The RAI is temporary subscriber data and is stored in the SGSN.

2.4.4 Void

2.4.5 VLR number

VLR number is defined in ~~GSM 03.03~~3GPP TS 23.003.

The VLR number is temporary subscriber data and is stored in the HLR. Absence of the VLR number in HLR indicates that the mobile station is deregistered for non-GPRS or the subscriber has not a non-GPRS subscription in the HLR. The VLR number is stored in the SGSN with the Gs interface option. For usage of the VLR number in SGSN, please refer to ~~GSM 03.60~~3GPP TS 23.060.

2.4.6 MSC number

MSC number is defined in ~~GSM 03.03~~3GPP TS 23.003.

The MSC number is temporary subscriber data and is stored in the HLR and conditionally in the VLR. For absence of the MSC number in the HLR, the remarks on VLR number apply accordingly, see subclause 2.4.5.

2.4.7 HLR number

HLR number is defined in ~~GSM 03.03~~3GPP TS 23.003.

The HLR number may be stored in the VLR and SGSN. It is received as a mandatory parameter in the updating location accepted message. This data may be needed to retrieve subscribers to be restored after HLR reset.

The HLR number is temporary subscriber data and may optionally be stored in the VLR and SGSN.

2.4.8   GSN number

GSN number occurs as SGSN number and as GGSN number.

2.4.8.1   SGSN number

SGSN number is the SS7 address of the SGSN . It is defined in ~~GSM 03.03~~3GPP TS 23.003.

The SGSN number is temporary subscriber data and is stored in the HLR for a GPRS subscription. It is conditionally stored in the VLR if the Gs interface is installed. Absence of the SGSN number in the HLR indicates that the mobile station is deregistered for GPRS or the subscriber has no GPRS subscription in the HLR. Absence of the SGSN number in the VLR indicates that there is no association between the VLR and the SGSN for this MS. The SGSN number is to be distinguished from the SGSN address described in subclause 2.13.10.

2.4.8.2   GGSN number

GGSN number is the SS7 address of the GGSN .It is defined in ~~GSM 03.03~~3GPP TS 23.003. Its usage is described in ~~GSM 03.60~~3GPP TS 23.060. It is contained in the GGSN-list stored in the HLR and does not appear as separate subscriber data. Cf. subclause 2.13.11.

2.4.9   MLC number

The MLC number occurs as an SMLC number and as a GMLC number.

2.4.9.1   SMLC number (GSM only)

The SMLC number is the E.164 address of an NSS based SMLC.

The SMLC number is permanent data that may be stored in an MSC in association with either a set of IMSIs belonging to LMUs controlled by the SMLC or a set of cell identifiers belonging to the geographic area served by the SMLC.

2.4.9.2   GMLC number

The GMLC number is the E.164 address of the GMLC. One or more GMLC numbers may be stored in the MS subscriber data in the HLR and downloaded to the VLR. These GMLC numbers identify the GMLCs for the particular MS from which a location request for this MS may be confined for particular LCS clients.

2.4.10   Subscription restriction

Subscription restriction is a parameter indicating whether or not certain restrictions apply to the subscription. The parameter takes either of the following values (see also GSM 02.13):

- accessible area for service;

- all GSM PLMNs;

- one national and all foreign GSM PLMNs;

- regionally restricted (part of a GSM PLMN in one country);

- regionally restricted plus all other GSM PLMNs.

The HLR associates location updating information with subscription restriction. It deregisters the MS if the PLMN is not allowed and sets:

- the MSC area restricted flag if the MSC area is not allowed, see subclause 2.4.12;

- SGSN area restricted flag if the SGSN area is not allowed, see subclause 2.4.14.

Handling of Regionally Restricted Subscription is defined in subclause 2.4.11. By operator agreement, regional restriction in parts of different GSM PLMNs is also possible.

The subscription restriction is permanent subscriber data and is stored in the HLR.

2.4.11   Regional Subscription Information

If a mobile subscriber has a regional subscription, the HLR shall store a list of up to ten Regional Subscription Zone Identities (RSZIs) per Network Destination Code (NDC) of the PLMN involved. The structure of RSZI is defined in GSM 03.033GPP TS 23.003; since it is composed of the PLMN identification (CC NDC) and the Zone Code it is sufficient to store the Zone Code List per CC NDC.

On updating the VLR or the SGSN, the HLR identifies the VPLMN and NDC given by the VLR or SGSN number and transfers the pertaining Zone Code List to the VLR or SGSN. The VLR or SGSN derives from the Zone Code List the allowed and not allowed MSC or SGSN areas and location areas; it sets the "LA not allowed flag" should the target LAI of the mobile station be excluded, and it informs the HLR should the MSC or SGSN area be excluded. Signalling of cause value "location area not allowed" towards the mobile station is defined in TSs GSM 09.023GPP TS 29.002 and GSM 04.083GPP TS 24.008.

2.4.11.1   RSZI lists

The RSZI lists are permanent subscriber data stored conditionally in the HLR.

2.4.11.2   Zone Code List

The VLR and the SGSN shall store as permanent and conditional subscriber data at least those Zone Codes by which they are affected.

2.4.12   MSC area restricted flag

MSC area restricted flag is a parameter which can take either of the following values:

- MSC area restricted;

- MSC area not restricted.

The parameter is set in the HLR during updating of the VLR. Handling of unsupported services and information received from the VLR based on national roaming or regionally restricted subscription (subclause 2.4.11) determine its value. The parameter contributes to the "MS Not Reachable" state for handling of terminating traffic in the HLR. The default value is "MSC area not restricted".

The MSC area restricted flag is temporary subscriber data and is contained in the HLR.

2.4.13   LA not allowed flag

The LA not allowed flag is set in the VLR and the SGSN depending on National Roaming, Regionally Restricted Subscription and Roaming Restriction Due To UnSupported Feature, see GSM 09.023GPP TS 29.002. It is applied to restrict service on a location area basis.

The LA not allowed flag is temporary subscriber data stored in the VLR and the SGSN.

2.4.14   SGSN area restricted flag

SGSN area restricted flag is a parameter which can take either of the following values:

- SGSN area restricted;

- SGSN area not restricted.

The parameter is set in the HLR during updating of the SGSN. Handling of unsupported services and information received from the SGSN based on national roaming or regionally restricted subscription (subclause 2.4.11) determine its value. The parameter contributes to the "MS Not Reachable" state for handling of terminating traffic in the HLR. The default value is "SGSN area not restricted".

The SGSN area restricted flag is temporary subscriber data and is contained in the HLR.

2.4.15 Service restriction data induced by roaming

If in the course of roaming or at updating of the VLR or SGSN the HLR is informed that the VLR or SGSN does not support certain sensitive services or features, or, the HLR is informed in data request that the VLR or the SGSN supports only specific services, features or phases which do not correspond to subscribed services, features or phases, the HLR takes appropriate measures to restrict service for the mobile station in that VLR or SGSN by setting and sending network induced replacing services such as available services, features or phases, barring programs or the roaming restriction for the MSC or SGSN area.

These network-induced data have to be kept separate in the HLR, and where possible as discussed below in the VLR, from the permanent subscriber data of the call barring supplementary services, from the barring related data that can be modified by the subscriber or from the permanent regional subscription data.

These network-induced data have to be kept separate in the HLR, and where possible as discussed below in the SGSN, from the permanent regional subscription data.

The network induced data take precedence over the subscriber data of the user where they are in conflict. If, in the course of roaming, restrictions caused by a service are lifted, the original subscriber data have to be re-installed both in HLR, in SGSN and in VLR when applicable, regarding any remaining restrictions due to other service replacements.

All network-induced restriction data are temporary subscriber data.

For ODB, ~~GSM 03.15~~3GPP TS 23.015 recommends mainly barring programs to replace this feature. The replacing barring data are conditionally stored in the HLR and VLR. In the VLR they cannot be distinguished from the permanent supplementary services data with the available signalling means, and no additional storage is needed. Interrogation shall reflect in both HLR and VLR the valid setting of the replacing temporary data; to prevent interference with Subscriber Controlled Input and to inform the customer on the restriction, the "control of barring services" subscription option is also temporarily set to the value "by the service provider".

CUG is also replaced by Outgoing Call Barring as described in ~~GSM 03.85~~3GPP TS 23.085.

Roaming restriction in the MSC area due to unsupported features is used to replace AoCC, see ~~GSM 03.86~~3GPP TS 23.086, and Zone Codes for regional subscription, see subclause 2.4.11 and ~~GSM 09.02~~3GPP TS 29.002. A flag in HLR and VLR, see subclause 2.4.15.2, collects the sources of network-induced roaming restriction which are also kept separate by the HLR.

Roaming restriction in the SGSN area due to unsupported features is used to replace Zone Codes for regional subscription, see subclause 2.4.11 and ~~GSM 09.02~~3GPP TS 29.002. A flag in HLR and SGSN, see subclause 2.4.15.2, collects the sources of network-induced roaming restriction which are also kept separate by the HLR.

2.4.15.1 ODB-induced barring data

ODB-induced barring data are temporary data stored conditionally in the HLR; they include the necessary replacing barring programs for outgoing and incoming calls depending on the ODB profile. The subscription option "control of barring services" is set to "by the service provider". The corresponding barring supplementary services for outgoing calls are set by the HLR and sent to the VLR.

2.4.15.2 Roaming restriction due to unsupported feature

Roaming restriction due to unsupported feature is a parameter which indicates that one or several services or features are not supported by the MSC or the SGSN, resulting in roaming restriction in the MSC area or SGSN area. It can take either of the following values:

- roaming restricted;

- roaming not restricted.

The parameter governs the "LA not allowed flag" in the VLR (see subclause 2.4.13) and the "MSC area restricted flag" in the HLR (see subclause 2.4.12), or the "LA not allowed flag" in the SGSN (see subclause 2.4.13) and the "SGSN area restricted flag" in the HLR (see subclause 2.4.14), see ~~GSM 09.02~~3GPP TS 29.002.

The flag "roaming restriction due to unsupported feature" is temporary subscriber data stored in the VLR, SGSN and in the HLR.

2.4.16   Cell Global ID or Service Area ID

The Cell Global ID or Service Area ID indicates the cell global identity of the cell in GSM (see 3GPP TS 23.003) or the service area identification of the service area in UMTS (see 3GPP TS 23.003) in which the MS is currently in radio contact or in which the MS was last in radio contact. The VLR and SGSN shall update the stored Cell Global ID or Service Area ID at establishment of every radio connection.

The cell ID is temporary subscriber data stored in the VLR and SGSN. It is conditional data, the VLR and SGSN shall store it whenever the subscriber data is marked as confirmed by radio contact.

2.4.17   Localised Service Area Information

If a mobile subscriber has a localised service area subscription, the HLR shall store a list of up to 20 Localised Service Area Identities (LSA IDs) per PLMN. The structure of LSA ID is defined in ~~GSM 03.03~~3GPP TS 23.003.

On updating the VLR or the SGSN, the HLR identifies the VPLMN given by the VLR or SGSN number and transfers the applicable LSA ID List to the VLR or SGSN. The VLR or SGSN derives from the LSA ID List the allowed LSA(s), priority of each LSA, the preferential access indicator, the active mode support indicator and active mode indication and the "LSA only access" indicator.

2.4.17.1   LSA Identity

LSA Identity (LSA ID) is defined in ~~GSM 03.03~~3GPP TS 23.003. The element uniquely identifies a LSA.

2.4.17.2   LSA Priority

Localised Service Area Priority (LSA Priority) is defined in GSM 08.08. The LSA Priority is permanent subscriber data stored conditionally in the HLR.

2.4.17.2A   LSA Preferential Access Indicator

The Localised Service Area Preferential Access Indicator defines if the subscriber shall be favoured in cells belonging to the LSA at resource allocation compared to other subscribers. The LSA Preferential Access Indicator is permanent subscriber data stored conditionally in the HLR.

2.4.17.2B   LSA Active Mode Support Indicator

The Localised Service Area Active Mode Support Indicator defines if cells belonging to the LSA shall be favoured for the subscriber compared to other cells at resource allocation. The LSA Active Mode Indicator is permanent subscriber data stored conditionally in the HLR.

2.4.17.3   LSA Only Access Indicator

The LSA Only Access Indicator defines if the subscriber is only allowed within its subscribed LSAs. The LSA Only Access Indicator is permanent subscriber data stored conditionally in the HLR.

2.4.17.4 LSA Active Mode Indicator

The Localised Service Area Active Mode Indicator defines if the LSA Identity of the cell in which the MS is currently in radio contact with shall be indicated to the subscriber in active mode. The LSA Active Mode Indicator is permanent subscriber data stored conditionally in the HLR.

2.4.17.5 VPLMN Identifier

The VPLMN Identifier identifies the VPLMN in which an LSA Identity is applicable. This identifier is not applicable to Universal LSA IDs as defined in ~~GSM 03.03~~3GPP TS 23.003. The VPLMN identifier is permanent subscriber data stored conditionally in the HLR.

2.5 Data related to basic services

2.5.1 Provision of bearer service

Provision of bearer service is a parameter identifying whether a bearer service is provisioned to the mobile subscriber or not. This provision can be achieved through subscription of the mobile subscriber or the bearer service can be generally available. The parameter "provision of bearer service" must be set for the bearer service defined in ~~GSM 02.02~~3GPP TS 22.002 for which a subscription is required.

Provision of bearer service is permanent subscriber data and is stored in the HLR and VLR.

2.5.2 Provision of teleservice

Provision of teleservice is a parameter identifying whether a teleservice is provisioned to the mobile subscriber or not. This provision can be achieved through subscription of the mobile subscriber or the teleservice can be generally available. The parameter "provision of teleservice" must be set for the teleservices defined in ~~GSM 02.03~~3GPP TS 22.003 for which a subscription is required.

Provision of teleservice is permanent subscriber data and is stored in the HLR, SGSN and VLR.

2.5.3 Bearer capability allocation

Bearer capability allocation is a parameter stored against each ISDN number in the case when the Home PLMN allocates one directory number per teleservice and bearer service. In this case it is used to permit the establishment of the correct bearer capability on the connection to the MS. (See ~~GSM 09.07~~3GPP TS 29.007). The bearer capability allocation is not required when the Home PLMN only allocates one directory number per subscriber for all bearer services and teleservices. It is permanent data stored conditionally in ~~the.~~HLR and VLR.

2.5.4 Transfer of SM option

Transfer of SM option is a parameter indicating which path should be used for transfer of Terminating Short Message when GPRS is not supported by the GMSC. Two options are possible :

- transfer of SM via the MSC when GPRS is not supported in the GMSC: this option is used to indicate that SM shall always be sent via the MSC when the GMSC does not support the GPRS functionality;

- transfer of SM via the SGSN when GPRS is not supported in the GMSC: this option is used to indicate that SM shall always be sent via the SGSN when the GMSC does not support the GPRS functionality.

Transfer of SM option is permanent subscriber data stored in HLR for a GPRS subscription.

The data has an interim nature since in the final solution, the decision on SM Transfer is taken in the SMS-GMSC.

2.6 Data related to supplementary services

Subscriber data related to supplementary services are contained in the 3GPP TS 23.08x and 3GPP TS 23.09x series of Technical Specifications, that is TS 23.081 and following describing the network functionality of supplementary services. Additionally, subscriber data related to the Multicall (MC) supplementary service are contained in TS 23.135.

There is no data type which is mandatory for all supplementary services; note that the provision status is mandatory for all supplementary services except CUG, 3GPP TS 23.085. All other data are conditional depending on the provision.

2.7 Mobile station status data

2.7.1 IMSI detached flag

IMSI detached flag is a parameter indicating that the MS is in the IMSI detached state, i.e. the subscriber is no longer reachable. For definition and handling see ~~GSM 03.12~~3GPP TS 23.012 and ~~GSM 09.02~~3GPP TS 29.002. The parameter takes the following values:

- IMSI detached;

- IMSI attached.

The parameter is temporary subscriber data and is stored conditionally in the VLR.

2.7.2 Mobile station Not Reachable for GPRS (MNRG)

In HLR, MNRG indicates whether the MS is marked as GPRS detached or GPRS not reachable in the SGSN and possibly in the GGSN. The reason why the MS is GPRS not reachable is indicated in the Mobile Not Reachable Reason (MNRR).

In SGSN, MNRG indicates whether activity from the MS shall be reported to the HLR.

In GGSN, MNRG indicates whether the MS is marked as GPRS detached in the SGSN.

MNRG is described in ~~GSM 03.60~~3GPP TS 23.060. It is temporary subscriber data stored in the HLR, in the SGSN and in the GGSN.

2.7.3 Mobility Management State

The Mobility Management State indicates the GPRS state of the MS. It takes one of three possible values:

1. READY - The MS is GPRS attached and its location is known at Cell Identity level.

2. STANDBY - The MS is GPRS attached and its location is known at Routing Area level.

3. IDLE - The MS is not GPRS attached.

The parameter is described in ~~GSM 03.60~~3GPP TS 23.060. It is temporary subscriber data stored in the SGSN.

2.7.4 Restoration flags

In the case of SGSN, VLR or HLR failure, location register data have to be restored as described in ~~GSM 03.07~~3GPP TS 23.007 and ~~GSM 09.02~~3GPP TS 29.002. The following flags are used for this purpose.

2.7.4.1 Confirmed by Radio Contact indicator

Confirmed by Radio Contact indicator is a restoration indicator defined in ~~GSM 03.07~~3GPP TS 23.007.

It is temporary subscriber data, stored in the VLR.

2.7.4.2 Subscriber Data Confirmed by HLR indicator

Subscriber Data Confirmed by HLR indicator is a restoration indicator defined in ~~GSM 03.07~~3GPP TS 23.007.

It is temporary subscriber data, stored in the VLR and in the SGSN.

2.7.4.3 Location Information Confirmed in HLR indicator

Location Information Confirmed in HLR indicator is a restoration indicator defined in ~~GSM 03.07~~3GPP TS 23.007.

It is temporary subscriber data, stored in the VLR and in the SGSN.

2.7.4.4 Check SS indicator

Check SS indicator is a restoration indicator defined in ~~GSM 03.07~~3GPP TS 23.007.

It is temporary subscriber data and is stored in the HLR.

2.7.5 MS purged for non-GPRS flag

MS purged for non-GPRS flag is set in the HLR per IMSI record in order to indicate that the subscriber data for the MS concerned have been purged in the VLR. The parameter takes the following values:

- MS purged;

- MS not purged.

The default value is "MS not purged". The parameter is temporary subscriber data, stored in the HLR.

2.7.6 MS purged for GPRS flag

MS purged for GPRS flag is set in the HLR per IMSI record in order to indicate that the subscriber data for the MS concerned have been purged in the SGSN. The parameter takes the following values:

- MS purged for GPRS;

- MS not purged for GPRS.

The default value is "MS not purged for GPRS". The parameter is temporary subscriber data, stored in the HLR for a GPRS subscription.

2.7.7 Mobile station Not Reachable Reason (MNRR)

Mobile station Not Reachable Reason (MNRR) for SMS is defined in ~~GSM 03.40~~3GPP TS 23.040.The MNRR is temporary subscriber data. It is conditionally stored in the HLR~~.~~.-.

2.8 Data related to Operator Determined Barring

2.8.1 Subscriber status

Subscriber status is a flag which indicates whether the subscriber is subject to operator determined barring.

It is permanent subscriber data, and is conditionally stored in the HLR, the SGSN and the VLR.

2.8.2 Operator Determined Barring general data

2.8.2.1 Barring of outgoing calls

Barring of outgoing calls indicates which one of the following categories of operator determined barring of outgoing calls applies to the subscriber:

- No barring of outgoing calls;

- Barring of all outgoing calls;

- Barring of all outgoing international calls;

- Barring of all outgoing international calls except those directed to the home PLMN country;

- Barring of all outgoing inter-zonal calls;

- Barring of all outgoing inter-zonal calls except those directed to the home PLMN country;

- Barring of all outgoing international calls except those directed to the home PLMN country AND barring of all outgoing inter-zonal calls.

It is permanent data, and is stored conditionally in the HLR, the SGSN and the VLR.

2.8.2.2 Barring of incoming calls

Barring of incoming calls indicates which one of the following categories of operator determined barring of incoming calls applies to the subscriber:

- No barring of incoming calls;

- Barring of all incoming calls;

- Barring of all incoming calls when roaming outside the home PLMN country;

- Barring of all incoming calls when roaming outside the zone of the home PLMN country.

It is permanent data, and is stored conditionally in the HLR.

2.8.2.3 Barring of roaming

Barring of roaming indicates which one of the following categories of operator determined barring of roaming applies to the subscriber:

- No barring of roaming;

- Barring of roaming outside the home PLMN;

- Barring of roaming outside the home PLMN country.

It is permanent data, and is stored conditionally in the HLR both for non-GPRS and GPRS subscription.

2.8.2.4 Barring of premium rate calls

Barring of premium rate calls indicates which one of the following categories of operator determined barring of premium rate calls applies to the subscriber:

- No barring of premium rate calls;

- Barring of premium rate (information) calls;

- Barring of premium rate (entertainment) calls;

- Barring of premium rate (information) calls and premium rate (entertainment) calls.

It is permanent subscriber data, and is stored conditionally in the HLR and the VLR.

2.8.2.5 Barring of supplementary services management

Barring of supplementary services management is a flag which indicates whether the subscriber is subject to operator determined barring of supplementary services management.

It is permanent subscriber data, and is stored conditionally in the HLR and the VLR.

2.8.2.6 Barring of registration of call forwarding

Barring of registration of call forwarding indicates which one of the following categories of operator determined barring of registration of call forwarding applies to the subscriber:

- Barring of registration of any forwarded-to number;

- Barring of registration of any international forwarded-to number;

- Barring of registration of any international forwarded-to number except a number within the HPLMN country;

- Barring of registration of any inter-zonal forwarded-to number;

- Barring of registration of any inter-zonal forwarded-to number except a number within the HPLMN country.

It is permanent subscriber data, and is stored conditionally in the HLR.

2.8.2.7 Barring of invocation of call transfer

Barring of invocation of call transfer indicates which of the following categories of operator determined barring of invocation of call transfer applies to the subscriber:

One of:

- Barring of invocation of any call transfer;

- Barring of invocation of call transfer where at least one of the two calls is a call charged to the served subscriber;

- Barring of invocation of call transfer where at least one of the two calls is a call charged to the served subscriber at international rates;

- Barring of invocation of call transfer where at least one of the two calls is a call charged to the served subscriber at inter-zonal rates;

and independently:

- Barring of invocation of call transfer where both calls are calls charged to the served subscriber;

and independently:

- Barring of invocation of call transfer when there is an existing transferred call for the served subscriber in the same MSC/VLR.

It is permanent subscriber data, and is stored conditionally in the HLR and the VLR.

2.8.3 Operator Determined Barring PLMN-specific data

Operator determined barring PLMN-specific data indicates which of the following categories of operator specific barring, in any combination, applies to the subscriber:

- Operator specific barring (type 1);

- Operator specific barring (type 2);

- Operator specific barring (type 3);

-	Operator specific barring (type 4).

It is permanent subscriber data. It is stored conditionally in the HLR, the SGSN and in the VLR when the subscriber is registered in the home PLMN.

### 2.8.4	Notification to CSE flag

This information element indicates whether the change of ODB data shall trigger Notification on Change of Subscriber Data or not.

### 2.8.5	gsmSCF address list

This information element contains the list of gsmSCF addresses to which Notification on Change of Subscriber Data is to be sent.

## 2.9	Data related to handover

### 2.9.1	Handover Number

Handover Number is defined in ~~GSM 03.03~~3GPP TS 23.003 and its use is specified in ~~GSM 03.09~~3GPP TS 23.009.

The Handover Number is short-lived subscriber data and is stored in the VLR.

## 2.10	Data related to short message support

### 2.10.1	Messages Waiting Data (MWD)

Messages Waiting Data (MWD) is defined in ~~GSM 03.40~~3GPP TS 23.040.

The MWD is temporary subscriber data, and is conditionally stored in the HLR.

### 2.10.2	Mobile Station Not Reachable Flag (MNRF)

Mobile Station Not Reachable Flag (MNRF) is defined in ~~GSM 03.40~~3GPP TS 23.040.

The MNRF is temporary data. It is stored in the VLR and conditionally stored in the HLR.

### 2.10.3	Memory Capacity Exceeded Flag (MCEF)

Memory Capacity Exceeded Flag (MCEF) is defined in ~~GSM 03.40~~3GPP TS 23.040.

The MCEF is temporary subscriber data and is conditionally stored in the HLR.

### 2.10.4	Mobile station Not Reachable for GPRS (MNRG)

For MNRG see subclause 2.7.2.

### 2.10.5	Mobile station Not Reachable Reason (MNRR)

For MNRR see subclause 2.7.7.

2.11   Data related to subscriber trace

2.11.1   Trace Reference

The Trace Reference is defined in GSM 12.08.

The Trace Reference is permanent subscriber data and is conditionally stored in the HLR and VLR.

2.11.2   Trace Type

The Trace Type is defined in GSM 12.08.

The Trace Type is permanent subscriber data and is conditionally stored in the HLR and VLR.

2.11.3   Operations Systems Identity

The Operations Systems Identity is defined in GSM 12.08.

The Operations Systems Identity is permanent subscriber data and is conditionally stored in the HLR and VLR.

2.11.4   HLR Trace Type

The HLR Trace Type is defined in GSM 12.08.

The HLR Trace Type is permanent subscriber data and is conditionally stored in the HLR.

2.11.5   MAP Error On Trace

The MAP Error On Trace is defined in GSM 12.08.

The MAP Error On Trace is temporary subscriber data and is conditionally stored in the HLR.

2.11.6   Trace Activated in VLR

The Trace Activated in VLR flag is defined in GSM 12.08.

The Trace Activated in VLR flag is temporary subscriber data and is conditionally stored in the HLR and VLR.

2.11.7   Trace Activated in SGSN

The Trace Activated in SGSN flag is defined in GSM 12.08.

The Trace Activated in SGSN flag is temporary subscriber data and is conditionally stored in the HLR and SGSN.

2.11.8   Foreign Subscriber Registered in VLR

The Foreign Subscriber Registered in VLR flag is handled by operation and maintenance means in the VLR and is defined in GSM 12.08.

The Foreign Subscriber Registered in VLR flag is permanent subscriber data and is conditionally stored in the VLR.

2.12 Data related to the support of voice group and broadcast calls

2.12.1 VGCS Group Membership List

VGCS Group Membership List and its special condition of storage in VLR is defined in ~~GSM 03.68~~3GPP TS 43.068.

The VGCS Group Membership List is permanent subscriber data. It is stored conditionally in HLR and in the VLR.

2.12.2 VBS Group Membership List

VBS Group Membership List and its special condition of storage in VLR is defined in ~~GSM 03.69~~3GPP TS 43.069.

The VBS Group Membership List is permanent subscriber data. It is stored conditionally in HLR and in the VLR.

2.12.2.1 Broadcast Call Initiation Allowed List

The Broadcast Call Initiation Allowed List and its special condition of storage in VLR is defined in ~~GSM 03.69~~3GPP TS 43.069.

It is permanent subscriber data. It is stored conditionally in HLR and in the VLR.

2.13 Data related to GPRS NAM

The data listed in this subclause pertain to the Network Access Mode "GPRS" and have no counterpart for non-GPRS.

2.13.1 PDP Type

PDP Type is defined in ~~GSM 03.60~~3GPP TS 23.060. It indicates which type of protocol is used by the MS for a certain service, e.g. IP and X.25.

PDP Type is permanent subscriber data and conditionally stored in HLR, SGSN and GGSN.

2.13.2 PDP Address

PDP Address is defined in ~~GSM 03.60~~3GPP TS 23.060. It holds the address of the MS for a certain service, e.g. an X.121 address. If dynamic addressing is allowed, PDP Address is empty in the HLR, and, before the PDP context is activated, empty in the SGSN.

PDP Address is permanent subscriber data and conditionally stored in HLR, SGSN and GGSN.

2.13.3 NSAPI

NSAPI is defined in ~~GSM 03.60~~3GPP TS 23.060. It holds the index of the PDP Context.

NSAPI is temporary subscriber data and conditionally stored in SGSN and GGSN.

2.13.4 Packet Data Protocol (PDP) State

PDP State is defined in ~~GSM 03.60~~3GPP TS 23.060. The PDP State is either ACTIVE or INACTIVE.

PDP State is temporary subscriber data and conditionally stored in SGSN.

2.13.5 New SGSN Address

New SGSN Address is defined in ~~GSM 03.60~~3GPP TS 23.060. It is the IP-address of the new SGSN, to which N-PDUs should be forwarded from the old SGSN after an inter-SGSN routing update.

New SGSN Address is temporary subscriber data and conditionally stored in SGSN.

2.13.6   Access Point Name (APN)

Access Point Name (APN) is defined in TS ~~GSM 03.03~~3GPP TS 23.003 and 03.60 The APN field in the HLR contains either only an APN Network Identifier (i.e. an APN without APN Operator Identifier) or the wild card value (defined in ~~GSM 03.03~~3GPP TS 23.003).APN is permanent subscriber data conditionally stored in HLR, in GGSN and SGSN.

2.13.7   GGSN Address in Use

GGSN Address in Use is defined in ~~GSM 03.60~~3GPP TS 23.060. It is the IP address of the GGSN currently used by a certain PDP Address of the MS.

GGSN Address is temporary subscriber data and conditionally stored in SGSN.

2.13.8   VPLMN Address Allowed

VPLMN Address Allowed is defined in ~~GSM 03.60~~3GPP TS 23.060. It specifies whether the MS is allowed to use a dynamic address allocated in any VPLMN.

VPLMN Address Allowed is permanent subscriber data and conditionally stored in HLR and SGSN.

2.13.9   Dynamic Address

Dynamic Address is defined in ~~GSM 03.60~~3GPP TS 23.060. It indicates whether the address of the MS is dynamic.

Dynamic Address is temporary subscriber data conditionally stored in GGSN.

2.13.10   SGSN Address

SGSN Address is defined in ~~GSM 03.03~~3GPP TS 23.003. It is the IP Address of the SGSN currently serving the MS.

SGSN Address is temporary subscriber data stored in HLR and stored conditionally in GGSN. A pendant is the SGSN number, cf subclause 2.4.8.

2.13.11   GGSN-list

GGSN-list is defined in ~~GSM 03.60~~3GPP TS 23.060. It defines the GGSNs to be contacted when activity from the MS is detected and MNRG is set. It contains the GGSN number and optionally the GGSN IP address.

GGSN-list is temporary subscriber data stored in the HLR.

2.13.12   Quality of Service Subscribed

Quality of Service Subscribed is defined in ~~GSM 03.60~~3GPP TS 23.060. It specifies the quality of service subscribed for a certain PDP context.

Quality of Service Subscribed is permanent subscriber data and conditionally stored in HLR and SGSN.

2.13.13   Quality of Service Requested

Quality of Service Requested is defined in ~~GSM 03.60~~3GPP TS 23.060. It specifies the quality of service requested for a certain PDP context.

Quality of Service Requested is temporary subscriber data and conditionally stored in SGSN.

2.13.14 Quality of Service Negotiated

Quality of Service Negotiated is defined in ~~GSM 03.60~~3GPP TS 23.060. It specifies the quality of service for a certain PDP context, negotiated between the MS and the SGSN, and then the GGSN.

Quality of Service Negotiated is temporary subscriber data and conditionally stored in SGSN and GGSN.

2.13.15 SND

SND is defined in ~~GSM 03.60~~3GPP TS 23.060. It is the GPRS Tunnelling Protocol sequence number of the next downlink N-PDU.

SND is temporary subscriber data conditionally stored in SGSN and GGSN.

2.13.16 SNU

SNU is defined in ~~GSM 03.60~~3GPP TS 23.060. It is the GPRS Tunnelling Protocol sequence number of the next uplink N-PDU.

SNU is temporary subscriber data and conditionally stored in SGSN and GGSN.

2.13.17 DRX Parameters

DRX Parameters is defined in ~~GSM 03.60~~3GPP TS 23.060.

DRX Parameters is temporary subscriber data stored in SGSN.

2.13.18 Compression

Compression is defined in ~~GSM 03.60~~3GPP TS 23.060. There is one set of negotiated compression parameters per QoS priority level.

Compression is temporary subscriber data conditionally stored in the SGSN.

2.13.19 Non-GPRS Alert Flag (NGAF)

Non-GPRS Alert Flag (NGAF) is defined in ~~GSM 03.60~~3GPP TS 23.060. It indicates whether activity from the MS shall be reported to the MSC/VLR.

NGAF is temporary subscriber data and is conditionally stored in the SGSN if the Gs interface is installed.

2.13.20 Classmark

MS Classmark is defined in ~~GSM 04.08~~3GPP TS 24.008.

Classmark is temporary subscriber data stored in the SGSN.

2.13.21 Tunnel IDentifier (TID)

Tunnel Identifier is defined in ~~GSM 09.60~~3GPP TS 29.060. It is used for Anonymous Access. TID is temporary subscriber data conditionally stored in SGSN and GGSN.

2.13.22 Radio Priority

Radio Priority is defined in ~~GSM 03.60~~3GPP TS 23.060. It indicates the RLC/MAC radio priority level for uplink user data transmission for a certain PDP context.

Radio Priority is temporary subscriber data and conditionally stored in SGSN.

2.13.23 Radio Priority SMS

Radio Priority SMS is defined in ~~GSM 03.60~~3GPP TS 23.060. It indicates the RLC/MAC radio priority level for uplink SMS transmission.

Radio Priority SMS is temporary subscriber data and conditionally stored in SGSN.

2.13.24 PDP Context Identifier

PDP Context Identifier is defined in ~~GSM 03.60~~3GPP TS 23.060. It identifies uniquely each PDP context.

PDP Context Identifier is permanent subscriber data and conditionally stored in HLR and SGSN.

2.13.25 PDP Context Charging Characteristics

PDP Context Charging Charactertistics is defined in 3GPP TS 32.015. It indicates the charging type to be applied to the PDP context.

PDP Context Charging Characteristics is permanent subscriber data and conditionally stored in HLR, SGSN and GGSN.

2.14 Data related to CAMEL

2.14.1 Subscriber Data stored in HLR

2.14.1.1 Originating CAMEL Subscription Information (O-CSI)

This data defines the contents of the Originating CAMEL subscription information used to interwork with the gsmSCF for MO and MF call. It consists of:

- A TDP list. The TDP list is a list of TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the MO State Model where service triggering may take place. For O-CSI, the allowed DP value are *DP Collected_info, DP Route_Select_Failure.*

  2. A gsmSCF address. It is the gsmSCF address (E164 number) where the CAMEL service is treated for the subscriber. A gsmSCF address is associated to each serviceKey.

  3. A serviceKey. The serviceKey identifies to the gsmSCF the service logic. A serviceKey is associated to each TDP.

  4. A default Call Handling. The default call handling indicates whether the call shall be released or continued as requested in case of error in the gsmSSF to gsmSCF dialogue. A default Call Handling is associated to each serviceKey.

  5. DP criteria. The DP criteria indicates on which criteria the gsmSSF shall access the gsmSCF. DP criteria is associated to each TDP.

- CAMEL capability handling. It gives the CAMEL phase associated to the O-CSI (CAMEL phase1, phase2, or phase3).

- The CSI state. The CSI state indicates whether the O-CSI is active or not.

- The notification flag, the notification flag indicates whether changes of the O-CSI shall trigger Notification on Change of Subscriber Data.

TDP	Triggering Criteria (*)	ServiceKey	gsmSCF address	Default Call Handling
DP Collected_ Info	No Criteriaon Number criteria Basic service code criteria Call type criteria	One ServiceKey	One E164 gsmSCF address	One Default call handling
DP Route_Select_ Failure	No criteriaon Cause value criteria	One ServiceKey	One E164 gsmSCF address	One Default call handling

(*)   One or more TDP criteria shall be applicable. All applicable triggering criteria must be satisfied before the dialogue is established with the gsmSCF.

2.14.1.2 Terminating CAMEL Subscription Information (T-CSI) and VMSC Terminating CAMEL Subscription Information (VT-CSI));

This data defines the contents of the terminating CAMEL subscription information used to interwork with the gsmSCF for MT call. It consists of:

- A TDP list. DP The TDP list is a list of TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the MT State Model where service triggering may take place. For T-CSI, the allowed DP value are DP Terminating_Attempt_Authorised, DP T_Busy, DP T_No_Answer.

  2. A gsmSCF address. It is the gsmSCF address (E.164 number) where the CAMEL service is treated for the subscriber. A gsmSCF address is associated to each serviceKey.

  3. A serviceKey. The serviceKey identifies to the gsmSCF the service logic. A serviceKey is associated to each TDP.

  4. A default Call Handling. The default call handling indicates whether the call shall be released or continued as requested in case of error in the gsmSSF to gsmSCF dialogue. A default Call Handling is associated to each serviceKey.

  5. DP criteria. The DP criteria indicates on which criteria the gsmSSF shall access the gsmSCF. DP criteria is associated to each TDP.

- CAMEL capability handling. It gives the CAMEL phase associated to the T-CSI/VT-CSI (CAMEL phase1, or phase2, or phase3).

- The CSI state indicates whether the T-CSI/VT-CSI is active or not.

- Notification flag. The notification flag indicates whether the change of the T-CSI/VT-CSI shall trigger Notification on Change of Subscriber data.

TDP	Triggering Criteria (*)	ServiceKey	gsmSCF address	Default Call Handling
DP Terminating_ Attempt_Authorised	No Criteriaon Basic service criteria	One serviceKey	One E164 gsmSCF address	One Default call handling
DP T_Busy	No criteriaon Cause value criteria	One serviceKey	One E164 gsmSCF address	One Default call handling
DP T_No_Answer	No criteriaon Cause value criteria	One service Key	One E164 gsmSCF address	One Default call handling

(*)   One or more DP criteria shall be applicable. All applicable triggering criteria must be satisfied before the dialogue is established with the gsmSCF.

2.14.1.3   Location information/Subscriber state interrogation.

This data item indicates whether or not the HLR shall send the location information and state of the called subscriber , as available, when a GMSC requests routeing information for an MT call.

2.14.1.4   USSD CAMEL subscription information(U-CSI)

This data is used on USSD request receipt from the MS. It consists of a list of:

- a service code. The service code defines a specific application in the gsmSCF;

- a gsmSCFaddress. It is the gsmSCF address (E.164 number) where the USSD application is treated for this subscriber.

2.14.1.5   Supplementary Service invocation notification(SS-CSI)

This data is used to notify the gsmSCF about Supplementary service invocation. It consists of :

- notification criterion, which may be a list of Supplementary Service(s). The possible Supplementary Services are: ECT, CD or MPTY, CCBS;

- a gsmSCFaddress: it is the gsmSCF address (E.164 number) where the notification of the Supplementary Service invocation is treated for this subscriber;

- CSI state, indicates whether the SS-CSI is active or not;

- notification flag: it indicates whether the change of the SS-CSI shall trigger Notification on Change of Subscriber data.

2.14.1.6   Translation Information flag (TIF-CSI)

- TIF-CSI flag is used to indicate that the HLR shall not attempt to perform any actions on the FTN (translation, prohibited FTN checks, call barring checks) at the registration procedure.

- Notification flag. The notification flag indicates whether the change of TIF-CSI flag shall trigger Notification on Change of Subscriber data.

2.14.1.7   Mobility Management event notification (M-CSI)

This data indicates which Mobility Management events shall be reported to the gsmSCF. It consists of:

- gsmSCF address: this is the address of the gsmSCF where the Mobility Management event notification shall be sent to. The gsmSCF address is in E.164 format.

- Service Key: the service key is included in the notification to the gsmSCF and indicates to the gsmSCF which Service Logic shall be applied.

- Mobility Management Triggers: these triggers define which Mobility Managements events shall be reported to the gsmSCF. The mobility managements triggers may contain one or any combination of the following elements:

  - Location update in the same VLR service area;

  - Location update to another VLR service area;

  - IMSI attach;

  - MS initiated IMSI detach (explicit detach);

  - Network initiated IMSI detach (implicit detach).

- The CSI state, indicates whether the M-CSI is active or not.

- Notification flag. The notification flag indicates whether the change of M-CSI shall trigger Notification on Change of Subscriber data.

2.14.1.8 Short Message Service CAMEL Subscription Information (SMS-CSI)

This data defines the contents of the SMS CAMEL subscription information. The SMS CAMEL Subscription Information is used for the following interworking:

- Interworking between gsmSCF and gsmSSF, for CAMEL control of circuit switched MO SMS;

- Interworking between gsmSCF and gprsSSF, for CAMEL control of packet switched MO SMS.

SMS-CSI consists of the following data items:

- TDP List. The TDP list is a list of SMS TDP descriptions. Each TDP description contains the following elements:

    1. DP Value. The DP value identifies the DP in the MO SMS State Model where service triggering may take place.
       For SMS-CSI, the only allowed DP value is *SMS_Collected_Info*.

    2. gsmSCF Address. The gsmSCF address is the address (E164 number) of the gsmSCF where the MO SMS CAMEL Service associated with this TDP, is located for this subscriber.

    3. Service Key. The service key identifies to the gsmSCF the service logic that shall be applied.

    4. Default SMS handling. The default SMS handling indicates whether the MO SMS submission request shall be rejected or continued in the case of error in the dialogue between the gsmSSF and gsmSCF or between the gprsSSF and gsmSCF;

- CAMEL Capability Handling. CAMEL Capability Handling indicates the CAMEL Phase that is required for the MO SMS service. The CAMEL Capability Handling for SMS-CSI shall have the value CAMEL phase 3.

- CSI state: indicates whether the SMS-CSI is active or not.

- Notification flag indicates whether the change of the SMS-CSI shall trigger Notification on change of subscriber Data or not.

2.14.1.9 GPRS CAMEL Subscription Information (GPRS-CSI)

This data defines the contents of the GPRS CAMEL subscription information. The GPRS CAMEL Subscription Information is used for the following interworking:

- Interworking between gsmSCF and gprsSSF, for CAMEL control of packet switch call.

GPRS-CSI consists of the following data items:

- TDP List. The TDP list is a list of GPRS TDP descriptions. Each TDP description contains the following elements:

    1. DP Value. The DP value identifies the DP in the GPRS State Model where service triggering may take place.

    2. gsmSCF Address. The gsmSCF address is the address (E164 number) of the gsmSCF where the GPRS CAMEL Service associated with this TDP, is located for this subscriber.

    3. Service Key. The service key identifies to the gsmSCF the service logic that shall be applied.

    4. Default GPRS handling. The default GPRS handling indicates whether the GPRS submission request shall be rejected or continued in the case of error in the dialogue between the gprsSSF and gsmSCF.

- CAMEL Capability Handling. CAMEL Capability Handling indicates the CAMEL Phase that is required for the GPRS service. The CAMEL Capability Handling for GPRS-CSI shall have the value CAMEL phase 3.

- The CSI state indicates whether the GPRS-CSI is active or not.

- The notification flag indicates whether the change of the GPRS-CSI shall trigger Notification on change of subscriber Data or not.

2.14.1.10   Dialled service CAMEL Subscription Information (D-CSI)

This data defines the contents of the dialled service CAMEL subscription information used to interwork with the gsmSCF for MO and MF call. It is applicable at TDP Analysed Info. It consists of:

- DP Criteria list. This consists of 1 to 10 entries. Each entry shall contain the following items:

    1. DP Criterion. It indicates when the gsmSSF shall request gsmSCF for instructions. It is a destination number.

    2. A gsmSCF address. It is the gsmSCF address (E164 number) where this Subscribed Dialled CAMEL service is treated for the subscriber. A gsmSCF address is associated to each DP Criterion.

    3. A serviceKey. The serviceKey identifies to the gsmSCF the service logic. A serviceKey is associated to each DP Criterion.

    4. A default Call Handling. It indicates whether the call shall be released or continued as requested in case of error in the gsmSSF to gsmSCF dialogue. A default Call Handling is associated to each DP Criterion.

- CAMEL capability handling. It indicates the CAMEL phase associated to the D-CSI (CAMEL phase3 shall be indicated).

- CSI state: indicates whether the D-CSI is active or not.

- Notification Flag. It indicates whether the change of the D-CSI shall trigger the Notification on Change of Subscriber Data.

2.14.2   Other Data stored in the HLR

2.14.2.1   Negotiated CAMEL Capability Handling

The HLR shall have a set of *negotiated CAMEL Capability Handling* variables. Each CSI that may be downloaded to the VLR or to the SGSN shall have a negotiated CAMEL Capability Handling (CCH) variable associated with it.

The negotiated CCH variable for a CSI indicates what CAMEL Phase is indicated in that CSI in the VLR or SGSN.

When the negotiated CCH variable has a value NULL, it indicates that ~~that~~the given CSI has not been downloaded to the VLR or SGSN.

The following table shows the *negotiated CAMEL Capability Handling* variables.

Variable name	Associated CSI	CSI stored in	Allowable values for negotiated CCH
O-CSI Negotiated CAMEL Capability Handling	O-CSI	VLR	NULL, 1, 2, 3
D-CSI Negotiated CAMEL Capability Handling	D-CSI	VLR	NULL, 3
SS-CSI Negotiated CAMEL Capability Handling	SS-CSI	VLR	NULL, 2, 3
VT-CSI Negotiated CAMEL Capability Handling	VT-CSI	VLR	NULL, 3
SMS-CSI VLR Negotiated CAMEL Capability Handling	SMS-CSI	VLR	NULL, 3
M-CSI Negotiated CAMEL Capability Handling	M-CSI	VLR	NULL, 3
SMS-CSI SGSN Negotiated CAMEL Capability Handling	SMS-CSI	SGSN	NULL, 3
GPRS-CSI Negotiated CAMEL Capability Handling	GPRS-CSI	SGSN	NULL, 3

There is no *negotiated CAMEL Capability Handling* variable associated with TIF-CSI.

The HLR does not store a *Negotiated CAMEL Capability Handling* for CSIs that are sent to the GMSC, since a subscriber is not permanently registered in a GMSC.

2.14.2.2   Supported CAMEL Phases

The HLR shall store the supported CAMEL Phases of the VLR where the subscriber is currently registered and the SGSN where the subscriber is currently attached.

The following variables are required:

- VLR Supported CAMEL Phases

- SGSN Supported CAMEL Phases

The HLR does not store the Supported CAMEL Phases of the GMSC, since a subscriber is not permanently registered at a GMSC.

2.14.2.3   UG-CSI

The USSD general CAMEL service(UG-CSI) is also stored in the HLR. This data is used on USSD request receipt from the MS. It consists of a list of:

- a service code. The service code defines a specific application in the gsmSCF;

- a gsmSCFaddress. It is the gsmSCF address (E.164 number) where the USSD application is treated for this subscriber.

2.14.2.4   gsmSCF address for CSI

This information element contains the list of gsmSCF address(E164 address) to which Notification on Change of Subscriber Data is to be sent.

2.14.3   Subscriber data stored in VLR

2.14.3.1   Originating CAMEL Subscription Information (O-CSI)

The Originating CAMEL Subscription Information (O-CSI) are stored in the VLR.

This data defines the contents of the originating CAMEL subscription information used to interwork with the gsmSCF for MO and CF calls. It consists of:

- A TDP list: The TDP list is a list of TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the MO State Model where service triggering may take place. For O-CSI, the allowed DP value are *DP Collected_info, DP Route_Select_Failure.*

  2. A gsmSCF address. It is the gsmSCF address (E164 number) where the CAMEL service is treated for the subscriber. A gsmSCF address is associated to each serviceKey.

  3. A serviceKey. The serviceKey identifies to the gsmSCF the service logic.. A serviceKey is associated to each TDP.

  4. A default Call Handling. The default call handling indicates whether the call shall be released or continued as requested in case of error in the gsmSSF to gsmSCF dialogue. A default Call Handling is associated to each serviceKey.

  5. DP criteria: The DP criteria indicates on which criteria the gsmSSF shall access the gsmSCF. DP criteria is associated to each TDP.

- CAMEL capability handling. It gives the CAMEL phase associated to the O-CSI (CAMEL phase1, or phase2, or phase3).

2.14.3.2 VMSC Terminating CAMEL Subscription Information (VT-CSI)

This data defines the contents of the visited terminating CAMEL subscription information used by the VMSC to interwork with the gsmSCF for an MT call. It consists of:

- A TDP list. The TDP list is a list of TDP descriptions. Each TDP description contains the following elements:

    1. DP Value. The DP value identifies the DP in the MT State Model where service triggering may take place. For VT-CSI, the allowed DP value are *DP Terminating Attempt Authorised, DP T_Busy, DP T_No_Answer.*

    2. A gsmSCF address. It is the gsmSCF address (E164 number) where the CAMEL service is treated for the subscriber. A gsmSCF address is associated to each serviceKey.

    3. A serviceKey. The serviceKey identifies to the gsmSCF the service logic. A serviceKey is associated to each TDP.

    4. A default Call Handling. The default call handling indicates whether the call shall be released or continued as requested in case of error in the gsmSSF to gsmSCF dialogue. A default Call Handling is associated to each serviceKey.

    5. DP criteria: The DP criteria indicates on which criteria the gsmSSF shall access the gsmSCF.

- CAMEL capability handling. It gives the CAMEL phase associated to the VT-CSI. It is CAMEL phase3.

2.14.3.3 Supplementary Service invocation notification(SS-CSI)

This data is used to notify the gsmSCF about Supplementary Service invocation. It consists of :

- a notification criterion, which may be ECT, CD or MPTY

- a gsmSCFaddress. It is the gsmSCF address (E164 number) where the notification of the Supplementary service invocation is treated for this subscriber.

2.14.3.4 Mobility Management event notification (M-CSI)

This data indicates which Mobility Management events shall be reported to the gsmSCF. It consists of:

- gsmSCF address : This is the address of the gsmSCF where the Mobility Management event notification shall be sent to. The gsmSCF address must be in E.164 format.

- Service Key: The service key is included in the notification to the gsmSCF and indicates to the gsmSCF which Service Logic shall be applied.

- Mobility Management Triggers. These triggers define which Mobility Managements events shall be reported to the gsmSCF. The mobility managements triggers may contain one or any combination of the following elements:

    - Location update in the same VLR service area;

    - Location update to another VLR service area;

    - IMSI attach;

    - MS initiated IMSI detach (explicit detach);

    - Network initiated IMSI detach (implicit detach).

2.14.3.5 Short Message Service CAMEL Subscription Information (SMS-CSI)

This data defines the contents of the SMS CAMEL subscription information used for the interworkingbetween gsmSCF and gsmSSF, for CAMEL control of circuit switched MO SMS.

SMS-CSI consists of the following data items:

- TDP List. The TDP list is a list of SMS TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the MO SMS State Model where service triggering may take place.
     For SMS-CSI, the only allowed DP value is *SMS_Collected_Info*.

  2. gsmSCF Address. The gsmSCF addess is the address (E164 number) of the gsmSCF where the MO SMS CAMEL Service associated with this TDP, is located for this subscriber.

  3. Service Key. The service key identifies to the gsmSCF the service logic that shall be applied.

  4. Default SMS handling. The default SMS handling indicates whether the MO SMS submission request shall be rejected or continued in the case of error in the dialogue between the gsmSSF and gsmSCF or between the gprsSSF and gsmSCF;

- CAMEL Capability Handling. CAMEL Capability Handling indicates the CAMEL Phase that is required for the MO SMS service.
  The CAMEL Capability Handling for SMS-CSI shall have the value CAMEL phase 3.

2.14.3.6 Dialled service CAMEL Subscription Information (D-CSI)

This data defines the contents of the dialled service CAMEL subscription information used to interwork with the gsmSCF for MO and MF call. It is applicable at TDP Analysed Info. It consists of:

- DP Criteria list, this consists of 1 to 10 entries containing : DP Criterion: It indicates when the gsmSSF shall request gsmSCF for instructions.

  1. A gsmSCF address. It is the gsmSCF address (E164 number) where this Subscribed Dialled CAMEL service is treated for the subscriber. A gsmSCF address is associated to each DP Criterion.

  2. A serviceKey. The serviceKey identifies to the gsmSCF the service logic. A serviceKey is associated to each DP Criterion.

  3. A default Call Handling. It indicates whether the call shall be released or continued as requested in case of error in the gsmSSF to gsmSCF dialogue. A default Call Handling is associated to each DP Criterion.

- CAMEL capability handling. It indicates the CAMEL phase associated to the D-CSI (CAMEL phase3 shall be indicated).

2.14.3.7 Translation Information flag (TIF-CSI)

This flag is used to indicate that the VLR shall not attempt to perform any actions on the deflected to number (DTN).

2.14.4 Data stored in SGSN

2.14.4.1 Short Message Service CAMEL Subscription Information (SMS-CSI)

This data defines the contents of the SMS CAMEL subscription information. The SMS-CSI in SGSN is used for the Interworking between SGSN and gsmSCF, for CAMEL control of packet switched MO SMS.

SMS-CSI consists of the following data items:

- TDP List. The TDP list is a list of SMS TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the MO SMS State Model where service triggering may take place.
     For SMS-CSI, the only allowed DP value is *SMS_Collected_Info*.

2. gsmSCF Address. The gsmSCF addess is the address (E.164 number) of the gsmSCF where the MO SMS CAMEL Service associated with this TDP, is located for this subscriber.

3. Service Key. The service key identifies to the gsmSCF the service logic that shall be applied.

4. Default SMS handling. The default SMS handling indicates whether the MO SMS submission request shall be rejected or continued in the case of error in the dialogue between the gprsSSF and gsmSCF.

- CAMEL Capability Handling. CAMEL Capability Handling indicates the CAMEL Phase that is required for the MO SMS service.
  The CAMEL Capability Handling for SMS-CSI in SGSN shall have the value CAMEL phase 3.

2.14.4.2 GPRS CAMEL Subscription Information (GPRS-CSI)

This data defines the contents of the GPRS CAMEL subscription information. The GPRS CAMEL Subscription Information is used for the interworkingbetween gsmSCF and gprsSSF, for CAMEL control of packet switch call.

The GPRS-CSI consists of the following data items:

- TDP List. The TDP list is a list of GPRS TDP descriptions. Each TDP description contains the following elements:

  1. DP Value. The DP value identifies the DP in the GPRS State Model where service triggering may take place.

  2. gsmSCF Address. The gsmSCF address is the address (E164 number) of the gsmSCF where the GPRS CAMEL Service associated with this TDP, is located for this subscriber.

  3. Service Key. The service key identifies to the gsmSCF the service logic that shall be applied.

  4. Default GPRS handling. The default GPRS handling indicates whether the GPRS submission request shall be rejected or continued in the case of error in the dialogue between the gprsSSF and gsmSCF.

- CAMEL Capability Handling. CAMEL Capability Handling indicates the CAMEL Phase that is required for the GPRS service. The CAMEL Capability Handling for GPRS-CSI in SGSN shall have the value CAMEL phase 3.

2.15   Data related to IST

2.15.1   IST Alert Timer

The IST Alert Timer indicates the timer value that the VMSC and the GMSC shall use to inform the HLR about each of the call activities that an IST non-CAMEL subscriber performs.

This parameter is only sent to the VLRs which support the non-CAMEL IST functionality.

2.16   Data related to Location Services

2.16.1   Subscriber Data stored in HLR

2.16.1.1   Privacy Exception List

This data contains the privacy classes for any target MS which identify the LCS clients permitted to locate the MS. For a detailed definition of this data, refer to GSM 03.71.

2.16.1.2   GMLC Numbers

This data contains the GMLC addresses for an MS subscriber. These addresses may be used to verify that a location request from specific LCS clients is authorized for the target MS.

2.16.1.3   MO-LR List

This data contains the classes of MO-LR that are permitted for the MS subscriber. For a detailed definition of this data, refer to GSM 03.71.

2.16.2   Data stored in GMLC

The GMLC stores data related to LCS clients. Refer to GSM 03.71 for a detailed description.

2.16.3   Data stored in SMLC (GSM only)

The SMLC stores data related to associated Type A and Type B LMUs from which location measurements may be received. Refer to GSM 03.71 for a detailed description.

2.16.4   Data stored in LMU (GSM only)

The LMU stores data related to its LCS measurement and O&M capabilities and may store data related to LCS measurements and O&M reports that it is required to provide to its controlling SMLC. The nature and content of this data is not defined in GSM.

2.16.5   Data stored in the MSC (GSM only)

In order to support routing of connectionless LCS messages to an SMLC or a Type B LMU, the MSC may store permanent routing data for an SMLC or a Type B LMU in association with a specific location area identifier or location area identifier plus cell identifier.

2.16.6   Data stored in the BSC (GSM only)

In order to support routing of connectionless LCS messages to an SMLC or a Type B LMU, the BSC may store permanent routing data for an SMLC or a Type B LMU in association with a specific location area identifier or location area identifier plus cell identifier.

2.17   Data related to Super-Charger

2.17.1   Age Indicator

This data indicates the age of the subscription data provided by the HLR, e.g. the date and time at which the subscriber data was last modified in the HLR.

2.18   Data related to bearer service priority

2.18.1   CS Allocation/Retention priority

The CS(Circuit Switched) Allocation/Retention priority corresponds to the allocation/retention priority which is defined in TS 23.107. It specifies the relative importance compared to other UMTS bearers for allocation and retention of the UMTS bearer in the CS domain.

The parameter is permanent subscriber data and is conditionally stored in the HLR and VLR.

2.19 Data related to charging

2.19.1 Subscribed Charging Characteristics

Subscribed Charging Characteristics specifies whether the subscriber is a normal, prepaid, flat rate and/or hot billing subscriber.

Subscribed Charging Characteristics is permanent subscriber data and conditionally stored in HLR, SGSN, and GGSN (see 3GPP TS 23.060).

3 Summary of data stored in location registers

Table 1 gives an overview of data stored in location registers for non-GPRS Network Access Mode, whereas table 2 shows the data stored in the location registers, in the SGSN and in the GGSN for GPRS Network Access Mode. In the tables, M = mandatory means that this parameter is stored for all subscribers with subscription of the Network Access Mode as shown in the table heading and defining the table; and C = conditional means that the parameter is subject to some condition (e.g. subscription of teleservice or other services, reception of optional message or short-lived data). The type indication indicates whether the subscriber data is temporary (T) or permanent (P) data, where permanent data can be set and modified but by the operator, whereas the temporary data are set and changed automatically by network functions.

4 Accessing subscriber data

It shall be possible to retrieve or store subscriber data concerning a specific MS from the HLR by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);

- Mobile Station ISDN Number (MSISDN).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the VLR by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);

- Temporary Mobile Subscriber Identity (TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the SGSN by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);

- Packet Temporary Mobile Subscriber identity (P-TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the GGSN by use of the following reference:

- International Mobile Subscriber Identity (IMSI).

See clause 3 for explanation of M, C, T and P in table 1 and table 2.

Table 1: Overview of data stored for non-GPRS Network Access Mode

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE
IMSI	2.1.1.1	M	M	P
Network Access Mode	2.1.1.2	M	-	P
International MS ISDN number	2.1.2	M	M	P
multinumbering MSISDNs	2.1.3	C	-	P
Basic MSISDN indicator	2.1.3.1	C	-	P
MSISDN-Alert indicator	2.1.3.2	C	-	P
TMSI	2.1.4	-	C	T
LMSI	2.1.8	C	C	T
Mobile Station Category	2.2.1	M	M	P
LMU Identifier	2.2.2	C	C	P
RAND, SRES and Kc	2.3.1		C	T
RAND, XRES, CK, IK and AUTN	2.3.2	M	C	T
Ciphering Key Sequence Number	2.3.3	-	M	T
Key Set Identifier (KSI)	2.3.4	-	M	T
MSRN	2.4.1	-	C	T
Location Area Identity	2.4.2	-	M	T
VLR number	2.4.5	M	-	T
MSC number	2.4.6	M	C	T
HLR number	2.4.7	-	C	T
Subscription restriction	2.4.10	C	-	P
RSZI lists	2.4.11.1	C	-	P
Zone Code List	2.4.11.2	-	C	P
MSC area restricted flag	2.4.12	M	-	T
LA not allowed flag	2.4.13	-	M	T
ODB-induced barring data	2.4.15.1	C	-	T
Roaming restriction due to unsupported feature	2.4.15.2	M	M	T
Cell Global ID or Service Area ID	2.4.16	-	C	T
LSA Identity	2.4.17.1	C	C	P
LSA Priority	2.4.17.2	C	C	P
LSA Preferential Access Indicator	2.4.17.2A	C	C	P
LSA Active Mode Support Indicator	2.4.17.4	C	C	P
LSA Only Access Indicator	2.4.17.3	C	C	P
LSA Active Mode Indicator	2.4.17.4	C	C	P
VPLMN Identifier	2.4.17.5	C	-	P
Provision of bearer service	2.5.1	M	M	P
Provision of teleservice	2.5.2	M	M	P
BC allocation	2.5.3	C	C	P
IMSI detached flag	2.7.1	-	C	T
Confirmed by Radio Contact indicator	2.7.4.1	-	M	T
Subscriber Data Confirmed by HLR indicator	2.7.4.2	-	M	T
Location Information Confirmed in HLR indicator	2.7.4.3	-	M	T
Check SS indicator	2.7.4.4	M	-	T
MS purged for non-GPRS flag	2.7.5	M	-	T
MNRR	2.7.7	C	-	T
Subscriber status	2.8.1	C	C	P
Barring of outgoing calls	2.8.2.1	C	C	P
Barring of incoming calls	2.8.2.2	C	-	P
Barring of roaming	2.8.2.3	C	-	P
Barring of premium rate calls	2.8.2.4	C	C	P
Barring of supplementary service management	2.8.2.5	C	C	P
Barring of registration of call forwarding	2.8.2.6	C	-	P
Barring of invocation of call transfer	2.8.2.7	C	C	P
Operator determined barring PLMN-specific data	2.8.3	C	C	P
Notification to CSE flag for ODB	2.8.4	C	-	T
gsmSCF address list for ODB	2.8.5	C	-	P
Handover Number	2.9.1	-	C	T
Messages Waiting Data	2.10.1	C	-	T
Mobile Station Not Reachable Flag	2.10.2	C	M	T
Memory Capacity Exceeded Flag	2.10.3	C	-	T

(continued)

Table 1 (concluded): Overview of data stored for non-GPRS Network Access Mode

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE
Trace Reference	2.11.1	C	C	P
Trace Type	2.11.2	C	C	P
Operations Systems Identity	2.11.3	C	C	P
HLR Trace Type	2.11.4	C	-	P
MAP Error On Trace	2.11.5	C	-	T
Trace Activated in VLR	2.11.6	C	C	T
Foreign Subscriber Registered in VLR	2.11.8	-	C	P
VGCS Group Membership List	2.12.1	C	C	P
VBS Group Membership List	2.12.2	C	C	P
Broadcast Call Initiation Allowed List	2.12.2.1	C	C	P
Originating CAMEL Subscription Information (O-CSI)	2.14.1.1/2.14.3.1	C	C	P
Terminating CAMEL Subscription Information (T-CSI)	2.14.1.2	C	-	P
VMSC Terminating CAMEL Subscription Information (VT-CSI)	2.14.1.2/2.14.3.2	C	C	P
Location Information/Subscriber state interrogation	2.14.1.3	C	-	P
USSD CAMEL subscription information(U-CSI)	2.14.1.4	C	-	P
SS invocation notification (SS-CSI)	2.14.1.5/2.14.3.5	C	C	P
Translation information flag(TIF-CSI)	2.14.1.6/2.14.3.7	C	C	P
Dialled service CAMEL Subscription Information (D-CSI)	2.14.1.10/2.14.3.6	C	C	P
USSD General CAMEL service information (UG-CSI)	2.14.2.3	C	-	P
O-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		P
SS-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		P
VT-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		P
Short Message Service CAMEL Subscription Information(SMS-CSI)	2.14.1.8/2.14.3.5	C	C	P
SMS-CSI VLR Negotiated CAMEL Capability Handling	2.14.2.1	C		P
M-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		P
VLR Supported CAMEL Phases	2.14.2.2	C		P
GsmSCF address for CSI	2.14.2.4	C		P
IST Alert Timer	2.15.1	C	C	P
Privacy Exception List	2.16.1.1	C	C	P
GMLC Numbers	2.16.2	C	C	P
MO-LR List	2.16.1.3	C	C	P
Age Indicator	2.17.1	C	C	T
CS Allocation/Retention priority	2.18.1	C	C	P

Table 2: Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
IMSI	2.1.1.1	M	M	M	M	P
Network Access Mode	2.1.1.2	M	-	C note1	-	P
International MSISDN number	2.1.2	M	M	M	-	T
multinumbering MSISDNs	2.1.3	C	-	-	-	T
Basic MSISDN indicator	2.1.3.1	C	-	-	-	T .
MSISDN-Alert indicator	2.1.3.2	C	-	-	-	T
P-TMSI	2.1.4	-	-	C	-	T
TLLI	2.1.6	-	-	C	-	T
Random TLLI	2.1.7	-	-	C	-	T
IMEI	2.1.9	-	-	C	-	T
RAND/SRES and Kc		-	-	C	-	T
RAND, XRES, CK, IK, AUTN	2.3.2	M	-	C	-	T
Ciphering Key Sequence Number	2.3.3	-	-	M	-	T
Key Set Identifier (KSI)	2.3.4	-	-	M	-	T
Selected Ciphering Algorithm	2.3.5	-	-	M	-	T
Current Kc	2.3.6	-	-	M	-	T
P-TMSI Signature	2.3.7	-	-	C	-	T
Routing Area Identity	2.4.3	-	-	M	-	T
VLR Number	2.4.5	M	-	C note2	-	T
SGSN Number	2.4.8.1	M	C note2	-	-	T
GGSN Number	2.4.8.2	M	-	-	-	P
RSZI Lists	2.4.8.2	C	-	-	-	P
Zone Code List	2.4.11.2	-	-	C	-	P
LA not allowed flag	2.4.13	-	-	M	-	T
SGSN area restricted flag	2.4.14	M	-	-	-	T
Roaming Restriction in the SGSN ..	2.4.15.2	M	-	M	-	T
Cell Global ID or Service Area ID	2.4.16	-	-	C	-	T
LSA Identity	2.4.17.1	C	C	C	-	P
LSA Priority	2.4.17.2	C	C	C	-	P
LSA Preferential Access Indicator	2.4.17.2A	C	C	C		P
LSA Active Mode Support Indicator	2.4.17.2B	C	C	C		P
LSA Only Access Indicator	2.4.17.3	C	C	C	-	P
LSA Active Mode Indicator	2.4.17.4	C	C	C	-	P
VPLMN Identifier	2.4.17.5	C	-	-	-	P
Provision of teleservice	2.5.2	C	-	C	-	P
Transfer of SM option	2.5.4	M	-	-	-	P
MNRG	2.7.2	M	-	M	M	T
MM State	2.7.3	-	-	M	-	T
Subscriber Data Confirmed by HLR Indicator	2.7.4.2	-	-	M	-	T
Location Info Confirmed by HLR Indicator	2.7.4.3	-	-	M	-	T
MS purged for GPRS flag	2.7.6	M	-	-	-	T
MNRR	2.7.7	C	-	-	-	T
Subscriber Status	2.8.1	C	-	C	-	P
Barring of outgoing calls	2.8.2.1	C	-		-	P
Barring of roaming	2.8.2.3	C	-	C	-	P
ODB PLMN-specific data	2.8.3	C	-	C	-	P
Notification to CSE flag for ODB	2.8.4	C	-	-	-	T
gsmSCF address list for ODB	2.8.5	C	-	-	-	P
Trace Activated in SGSN	2.11.7	C	-	C	-	P
PDP Type	2.13.1	C	-	C	M	P
PDP Address	2.13.2	C	-	C	M	P
NSAPI	2.13.3	-	-	C	C	T
PDP State	2.13.4	-	-	C	-	T
New SGSN Address	2.13.5	-	-	C	-	T
Access Point Name	2.13.6	C	-	C	C	P/T
GGSN Address in Use	2.13.7	-	-	C	-	T
VPLMN Address Allowed	2.13.8	C	-	C	-	P
Dynamic Address	2.13.9	-	-	-	C	T
SGSN Address	2.13.10	-	-	-	M	T
GGSN-list	2.13.11	M	-	-	-	T

(continued)

Table 2 (concluded): Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
Quality of Service Subscribed	2.13.12	C	-	C	-	P
Quality of Service Requested	2.13.13	-	-	C	-	T
Quality of Service Negotiated	2.13.14	-	-	C	M	T
SND	2.13.15	-	-	C	C	T
SNU	2.13.16	-	-	C	C	T
DRX Parameters	2.13.17	-	-	M	-	T
Compression	2.13.18	-	-	C	-	T
NGAF	2.13.19	-	-	C note2	-	T
Classmark	2.13.20	-	-	M	-	T
TID	2.13.21	-	-	C	C	T
Radio Priority	2.13.22	-	-	C	-	T
Radio Priority SMS	2.13.23	-	-	C	-	T
PDP Context Identifier	2.13.24	C	-	C	-	T
PDP Context Charging Characteristics	2.13.25	C	-	C	C	P
Short Message Service CAMEL Subscription Information (SMS-CSI)	2.14.1.8/2.14.4.1	C	-	C	-	P
GPRS CAMEL Subscription Information (GPRS-CSI)	2.14.1.9/2.14.4.2	C	-	C	-	C
SMS-CSI SGSN Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	P
GPRS-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	P
SGSN Supported CAMEL Phases	2.14.2.2	C	-	-	-	P
GsmSCF address for CSI	2.14.2.4	C	-	-	-	P
Age Indicator	2.17.1	C	-	C	-	T
Subscribed Charging Characteristics	2.19.1	C	-	C	C	P

The HLR column indicates only GPRS related use, i.e. if the HLR uses a parameter in non-GPRS Network Access Mode but not in GPRS Network Access Mode, it is not mentioned in this table 2.

note1: This parameter is relevant in the SGSN only when the Gs interface is installed.

note2: The VLR column is applicable if Gs interface is installed. It only indicates GPRS related data to be stored and is only relevant to GPRS subscribers registered in VLR.

For special condition of storage see in clause 2.
See clause 3 for explanation of M, C, T and P in table 2.

<table>
<tr><td align="right">CR-Form-v3</td></tr>
</table>

CHANGE REQUEST

| ⌘ | **23.082** CR | **9** | ⌘rev | **-** | ⌘**Current vers** | **3.5.0** | ⌘ |

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network **X**

Title: ⌘	Interworking cases for Long Forwarded-to Numbers
Source: ⌘	CN4
Work item code: ⌘	Call Forwarding Enhancements ***Date:*** ⌘ 20th of April 2001
Category: ⌘ **F**	(Wrong implementation of a previous CR) ***Release:*** ⌘ R99

Use <u>one</u> 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 <u>one</u> 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)

Reason for change: ⌘	Incorrect implementation of CR N4-000348 approved in CN4#2 and later in CN#8 (NP-000291) but not correctly implemented in TS 23.082.
Summary of change: ⌘	
Consequences if not approved: ⌘	

Clauses affected: ⌘	1.10.1, 1.10.3, 2.3
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ 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/3G_Specs/CRs.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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

****First Modified Section ****

1.10.1 MS does not support Long Forwarded-to Numbers

The MS shall indicate whether it supports Long Forwarded-to Numbers in the RegisterSS, ActivateSS and InterrogateSS messages.

If the MS does not support Long Forwarded-to Numbers, and a long forwarded-to number is registered, the acknowledgement message shall ~~not~~ contain a ~~truncated version of the registered long~~ forwarded-to number ~~(i.e. the leading 15 digits of the registered long forwarded to number)~~.

****Next Modified Section ****

1.10.3 GMSC does not support Long Forwarded-to Numbers

The HLR can determine from the Send Routing Info message whether the GMSC supports Long Forwarded-to Numbers.

If the GMSC does not support Long Forwarded-to Numbers and the HLR identifies that CFU should be invoked, then:

- If the registered forwarded-to number contains a maximum of 15 digits then the HLR shall populate the Forwarded-to number parameter in the Send Routing Info ack message with the registered forwarded-to number.

- If the registered forwarded-to number contains more than 15 digits then~~, as a network option, the HLR can:~~

- If a default forwarded-to number (containing a maximum of 15 digits) is stored in the HLR, the HLR shall ~~P~~populate the Forwarded-to number parameter in the Send Routing Info ack message with ~~an alternative~~the default forwarded-to number. ~~(containing a maximum of 15 digits), or~~

- ~~Allow the call to continue without invoking CFU, or~~

- Otherwise, the HLR shall instruct the GMSC to ~~R~~release the call.

****Nex Modified Section ****

2.3 Information stored in the HLR

The following logical states are applicable for CFB (refer to 3G TS 23.011 for an explanation of the notation):

Provisioning State	Registration State	Activation State	HLR Induction State
(Not Provisioned,	Not Registered,	Not Active,	Not Induced)
(Provisioned,	Not Registered,	Not Active,	Not Induced)
(Provisioned,	Registered,	Not Active,	Not Induced)
(Provisioned,	Registered,	Active and Quiescent,	Not Induced)
(Provisioned,	Registered,	Active and Operative,	Not Induced)

The registration and activation state may be different for each applicable elementary basic service group.

The provisioning state shall be on a per subscriber basis, and hence the same for all basic service groups.

The HLR shall store:

- the state of CFB (which shall be one of the valid states listed above) for each applicable elementary basic service group;

- the subscription option "notification to the calling party" on a per subscriber basis;

    This subscription option takes one of the following values:

    - no notification;

    - notification.

- the subscription option "notification to the forwarding party" on a per subscriber basis;

    This subscription option takes one of the following values:

    - no notification;

    - notification.

the subscription option " MSISDN of the served subscriber can be presented to the forwarded-to subscriber" on a per subscriber basis;

    This subscription option takes one of the following values:

    - presentation restricted;

    - presentation allowed.

- —the registration parameter "forwarded-to number" (possibly including a forwarded-to sub-address) for each applicable elementary basic service group.

- the default forwarded-to number (containing less than 16 digits) for each applicable elementary basic service group.

****End of document ****

CR-Form-v3

CHANGE REQUEST

⌘   **23.082** CR **10**   ⌘**rev** **-** ⌘**Current vers** **4.0.0** ⌘

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Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network **X**

Title: ⌘	Interworking cases for Long Forwarded-to Numbers
Source: ⌘	CN4
Work item code: ⌘	Call Forwarding Enhancements ***Date:*** ⌘ 20th of April 2001
Category: ⌘	**A** ***Release:*** ⌘ REL-4

	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)*

Reason for change: ⌘	Mirror CR for R4 of N4-010655.
Summary of change: ⌘	
Consequences if not approved: ⌘	

Clauses affected: ⌘	1.10.1, 1.10.3, 2.3
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ 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/3G_Specs/CRs.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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

1.10.1   MS does not support Long Forwarded-to Numbers

The MS shall indicate whether it supports Long Forwarded-to Numbers in the RegisterSS, ActivateSS and InterrogateSS messages.

If the MS does not support Long Forwarded-to Numbers, and a long forwarded-to number is registered, the acknowledgement message shall <u>not</u> contain a ~~truncated version of the registered long~~-forwarded-to number ~~(i.e. the leading 15 digits of the registered long forwarded to number)~~.

1.10.3   GMSC does not support Long Forwarded-to Numbers

The HLR can determine from the Send Routing Info message whether the GMSC supports Long Forwarded-to Numbers.

If the GMSC does not support Long Forwarded-to Numbers and the HLR identifies that CFU should be invoked, then:

- If the registered forwarded-to number contains a maximum of 15 digits then the HLR shall populate the Forwarded-to number parameter in the Send Routing Info ack message with the registered forwarded-to number.

- If the registered forwarded-to number contains more than 15 digits then~~, as a network option, the HLR can:~~

- <u>If a default forwarded-to number (containing a maximum of 15 digits) is stored in the HLR, the HLR shall P</u>~~P~~opulate the Forwarded-to number parameter in the Send Routing Info ack message with ~~an alternative~~<u>the default</u> forwarded-to number.~~(containing a maximum of 15 digits), or~~

~~Allow the call to continue without invoking CFU, or~~

- <u>Otherwise, the HLR shall instruct the GMSC to R</u>~~R~~release the call.

2.3   Information stored in the HLR

The following logical states are applicable for CFB (refer to 3G TS 23.011 for an explanation of the notation):

Provisioning State	Registration State	Activation State	HLR Induction State
(Not Provisioned,	Not Registered,	Not Active,	Not Induced)
(Provisioned,	Not Registered,	Not Active,	Not Induced)
(Provisioned,	Registered,	Not Active,	Not Induced)
(Provisioned,	Registered,	Active and Quiescent,	Not Induced)
(Provisioned,	Registered,	Active and Operative,	Not Induced)

The registration and activation state may be different for each applicable elementary basic service group.

The provisioning state shall be on a per subscriber basis, and hence the same for all basic service groups.

The HLR shall store:

- the state of CFB (which shall be one of the valid states listed above) for each applicable elementary basic service group;

- the subscription option "notification to the calling party" on a per subscriber basis;

    This subscription option takes one of the following values:

    - no notification;

    - notification.

- the subscription option "notification to the forwarding party" on a per subscriber basis;

    This subscription option takes one of the following values:

    - no notification;

    - notification.

  the subscription option " MSISDN of the served subscriber can be presented to the forwarded-to subscriber" on a per subscriber basis;

    This subscription option takes one of the following values:

    - presentation restricted;

    - presentation allowed.

- —the registration parameter "forwarded-to number" (possibly including a forwarded-to sub-address) for each applicable elementary basic service group.

- the default forwarded-to number (containing less than 16 digits) for each applicable elementary basic service group.

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3GPP TSG-CN4 Meeting #8 *Tdoc N4-010524*
Puerto Rico, USA, 14-18th May 2001

CR-Form-v3

CHANGE REQUEST

⌘ **29.060** CR **193** ⌘ rev **-** ⌘ Current version: **3.8.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title: ⌘	Correction/Clarification of GGSN handling of Update PDP Context Response	
Source: ⌘	CN4	
Work item code: ⌘	TEI	***Date:*** ⌘ 19/04/01
Category: ⌘	**F** (Critical correction)	***Release:*** ⌘ 99

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)*

Reason for change: ⌘	Currently 29.060 states states 'If the GGSN receives an Update PDP Context Response with a Cause value other than 'Request accepted', it shall abort the update of the PDP context'. However 'Update PDP Context Response' is used to supply the End User IP address to the SGSN after PDP Context establishment if the GGSN is being used as a DHCP Relay Agent. If this procedure fails the GGSN is not aware if the SGSN has the End User Address which is a mandatory parameter of the PDP context IE. Therefore in this case the GGSN should delete the PDP context.
Summary of change: ⌘	Additional text to ensure that that the GGSN deletes the PDP context in the situation described above.
Consequences if not approved: ⌘	SGSN/GGSN behaviour is not clearly defined, leaving to interworking problems and incorrect operation of PDP context activation.

Clauses affected: ⌘	7.3.4

Other specs affected: ⌘	☐ Other core specifications ⌘	
	☐ Test specifications	
	☐ O&M Specifications	

Other comments: ⌘	

7.3.3 Update PDP Context Request

An Update PDP Context Request message shall be sent from a SGSN to a GGSN as part of the GPRS Inter SGSN Routeing Update procedure or the PDP Context Modification procedure or to redistribute contexts due to load sharing. It shall be used to change the QoS and the path. In addition it shall be used if it is neccessary to change the GTP version of a tunnel to a GGSN from GTP v0 to GTP v1. The message shall be sent by the new SGSN at the Inter SGSN Routeing Update procedure.

The NSAPI information element together with the Tunnel Endpoint Identifier in the GTP header unambiguously identifies a PDP Context in the GGSN.

The IMSI shall be included if the message is sent during an Inter SGSN change when changing the GTP version from GTP v0 to GTP v1; this is required, as the TEID in the header of the message is set to all zeros in this case.

The Tunnel Endpoint Identifier Data field specifies a downlink Tunnel Endpoint Identifier for G-PDUs which is chosen by the SGSN. The GGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent downlink G-PDUs that are related to the requested PDP context.

The Tunnel Endpoint Identifier Control Plane field specifies a downlink Tunnel Endpoint Identifier Control Plane messages which is chosen by the SGSN. The GGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent downlink control plane messages that are related to the requested PDP context. If the SGSN has already confirmed successful assignment of its Tunnel Endpoint Identifier Control Plane to the peer GGSN, this field shall not be present. The SGSN confirms successful assignment of its Tunnel Endpoint Identifier Control Plane to the GGSN when it receives any message with its assigned Tunnel Endpoint Identifier Control Plane in the GTP header from the GGSN.

The Quality of Service Profile information element shall include the QoS negotiated between the MS and SGSN at PDP Context activation or the new QoS negotiated in the PDP Context Modification procedure.

The SGSN shall include an SGSN Address for control plane and an SGSN address for user traffic, which may differ from that provided by the underlying network service (e.g. IP). The GGSN shall store these SGSN Addresses and use them when sending subsequent control plane on this GTP tunnel or G-PDUs to the SGSN for the MS. When active contexts are being redistributed due to load sharing, G-PDUs that are in transit across the Gn-interface are in an undetermined state and may be lost.

The SGSN shall include a Recovery information element into the Update PDP Context Request if the SGSN is in contact with the GGSN for the very first time or if the SGSN has restarted recently and the new Restart Counter value has not yet been indicated to the GGSN. The GGSN that receives a Recovery information element in the Update PDP Context Request message element shall handle it in the same way as when receiving an Echo Response message. The Update PDP Context Request message shall be considered as a valid update request for the PDP context indicated in the message.

The Traffic Flow Template (TFT) is used to distinguish between different user traffic flows.

The SGSN shall include Trace Reference, Trace Type, Trigger Id, and OMC Identity in the message if GGSN trace is activated while the PDP context is active. The SGSN shall copy Trace Reference, Trace Type, and OMC Identity from the trace request received from the HLR or OMC.

The optional Private Extension contains vendor or operator specific information.

Table 7: Information Elements in an SGSN-Initiated Update PDP Context Request

Information element	Presence requirement	Reference
IMSI	Conditional	7.7.2
Recovery	Optional	7.7.11
Tunnel Endpoint Identifier Data I	Mandatory	7.7.13
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
NSAPI	Mandatory	7.7.17
Trace Reference	Optional	7.7.24
Trace Type	Optional	7.7.25
SGSN Address for Control Plane	Mandatory	GSN Address 7.7.32
SGSN Address for User Traffic	Mandatory	GSN Address 7.7.32
Quality of Service Profile	Mandatory	7.7.34
TFT	Optional	7.7.36
Trigger Id	Optional	7.7.41
OMC Identity	Optional	7.7.42
Private Extension	Optional	7.7.44

An Update PDP Context Request may also be sent from a GGSN to a SGSN to re-negotiate the QoS of a PDP context. This GGSN-initiated Update PDP Context Request can also be used to provide a PDP address to the SGSN (and MS). The latter shall be used by GGSN when it acts as a DHCP Relay Agent or Mobil IP Foreign Agent.

The Quality of Service Profile information element shall include the GGSN requested QoS.

The End User Address information element shall contain a valid IPv4 or IPv6 address.

The GGSN shall include a Recovery information element into the Update PDP Context Request if the GGSN has restarted recently and the new Restart Counter value has not yet been indicated to the SGSN. The SGSN that receives a Recovery information element in the Update PDP Context Request message element shall handle it in the same way as when receiving an Echo Response message. The Update PDP Context Request message shall be considered as a valid update request for the PDP context indicated in the message.

The NSAPI information element together with the Tunnel Endpoint Identifier in the GTP header unambiguously identifies a PDP Context in the SGSN.

The optional Private Extension contains vendor or operator specific information.

Table 8: Information Elements in a GGSN-Initiated Update PDP Context Request

Information element	Presence requirement	Reference
Recovery	Optional	7.7.11
NSAPI	Mandatory	7.7.17
End User Address	Optional	7.7.27
Quality of Service Profile	Optional	7.7.34
Private Extension	Optional	7.7.44

*** First Modified Section ***

7.3.4 Update PDP Context Response

The message shall be sent from a GGSN node to a SGSN node as a response of an Update PDP Context Request.

If the SGSN receives an Update PDP Context Response with a Cause value other than 'Request accepted', it shall abort the update of the PDP context.

Only the Cause information element and optionally the Recovery information element shall be included in the response if the Cause contains another value than 'Request accepted'.

Possible Cause values are:

- 'Request Accepted'.

- 'Non-existent'.

- 'Service not supported'.

- 'System failure'.

- 'Semantic error in the TFT operation'.

- 'Syntactic error in the TFT operation'.

- 'Semantic errors in packet filter(s)'.

- 'Syntactic errors in packet filters(s)'.

- 'Mandatory IE incorrect'.

- 'Mandatory IE missing'.

- 'Optional IE incorrect'.

- 'Invalid message format'.

- 'Version not supported'.

The Tunnel Endpoint Identifier Data field specifies an uplink Tunnel Endpoint Identifier for G-PDUs that is chosen by the GGSN. The SGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent uplink G-PDUs that are related to the requested PDP context. This information element shall be included if the Cause contains the value 'Request accepted'.

The Tunnel Endpoint Identifier Control Plane field specifies an uplink Tunnel Endpoint Identifier Control Plane messages which is chosen by the GGSN. The SGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent uplink control plane messages which are related to the requested PDP context. If the GGSN has already confirmed successful assignment of its Tunnel Endpoint Identifier Control Plane to the peer SGSN, this field shall not be present. The GGSN confirms successful assignment of its Tunnel Endpoint Identifier Control Plane to the SGSN when it receives any message with its assigned Tunnel Endpoint Identifier Control Plane in the GTP header from the SGSN.

The QoS values supplied in the Update PDP Context Request may be negotiated downwards by the GGSN. The negotiated values or the original value from SGSN is inserted in the Quality of Service Profile information element. This information element shall be included if the Cause contains the value 'Request accepted'.

The GGSN may start to forward T-PDUs after the Update PDP Context Response has been sent. The SGSN may start to forward T-PDUs when the Update PDP Context Response has been received. In this case the SGSN shall also be prepared to receive T-PDUs from the GGSN after it has sent an Update PDP Context Request but before an Update PDP Context Response has been received.

The GGSN shall include a GGSN Address for control plane and an GGSN address for user traffic, which may differ from that provided by the underlying network service (e.g. IP). The SGSN shall store these GGSN Addresses and use them when sending subsequent control plane on this GTP tunnel or G-PDUs to the GGSN for the MS. When active contexts are being redistributed due to load sharing, G-PDUs that are in transit across the Gn-interface are in an undetermined state and may be lost. The GGSN Address for control plane and the GGSN Address for user traffic shall be included if the Cause contains the value 'Request accepted'.

The GGSN shall include the Recovery information element into the Update PDP Context Response if the GGSN is in contact with the SGSN for the first time or if the GGSN has restarted recently and the new Restart Counter value has not yet been indicated to the SGSN. The SGSN receiving the Recovery information element shall handle it as when an Echo Response message is received but shall consider the PDP context as updated and active if the response cause indicates a successful operation at the GGSN.

The Charging ID is used to identify all charging records produced in SGSN(s) and the GGSN for this PDP context. The Charging ID has been previously generated by the GGSN and is unique for this PDP context. If an inter-SGSN routing area update occurs, it is transferred to the new SGSN as part of each active PDP context. This information element shall be included if the Cause contains the value 'Request accepted'.

The Charging Gateway Address is the IP address of the recommended Charging Gateway Functionality to which the SGSN should transfer the Charging Detail Records (CDR) for this PDP Context.

The optional Private Extension contains vendor or operator specific information.

Table 9: Information Elements in an Update PDP Context Response sent by a GGSN

Information element	Presence requirement	Reference
Cause	Mandatory	7.7.1
Recovery	Optional	7.7.11
Tunnel Endpoint Identifier Data I	Conditional	7.7.13
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
Charging ID	Conditional	7.7.26
GGSN Address for Control Plane	Conditional	GSN Address 7.7.32
GGSN Address for User Traffic	Conditional	GSN Address 7.7.32
Quality of Service Profile	Conditional	7.7.34
Charging Gateway Address	Optional	7.7.43
Private Extension	Optional	7.7.44

The message can also be sent from a SGSN node to a GGSN node as a response of a GGSN-initiated Update PDP Context Request.

If the GGSN receives an Update PDP Context Response with a Cause value other than 'Request accepted', it shall abort the update of the PDP context if the associated Update PDP Context Request was sent only to re-negotiate the QoS of a PDP context. Furthermore if the associated Update PDP Context Request included an 'End User Address' information element the GGSN shall delete the PDP context using the Delete PDP Context procedure and may notify the Operation and Maintenance network element.

Only the Cause information element and optionally the Recovery information element shall be included in the response if the Cause contains another value than 'Request accepted'.

Possible Cause values are the same as for the Update PDP Context Response sent by a GGSN.

The QoS values supplied in the Update PDP Context Request may be negotiated downwards by the SGSN. The negotiated values or the original value from GGSN is inserted in the Quality of Service Profile information element. This information element shall be included if the Cause contains the value 'Request accepted' and a QoS information element was supplied in the corresponding request message.

The SGSN shall include the Recovery information element into the Update PDP Context Response if the SGSN has restarted recently and the new Restart Counter value has not yet been indicated to the GGSN. The GGSN receiving the Recovery information element shall handle it as when an Echo Response message is received but shall consider the PDP context as updated and active if the response cause indicates a successful operation at the SGSN.

Table 10: Information Elements in an Update PDP Context Response sent by a SGSN

Information element	Presence requirement	Reference
Cause	Mandatory	7.7.1
Recovery	Optional	7.7.11
Quality of Service Profile	Conditional	7.7.34
Private Extension	Optional	7.7.44

*** Last Modified Section ***

3GPP TSG-CN4 Meeting #8   *Tdoc N4-010525*
Puerto Rico, USA, 14-18th May 2001

CR-Form-v3

CHANGE REQUEST

| ✄ | **29.060 CR 194** | ✄ rev | **-** | ✄ | Current version: | **4.0.0** | ✄ |

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

Proposed change affects: ✄   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network [x]

Title: ✄	Correction/Clarification of GGSN handling of Update PDP Context Response	
Source: ✄	CN4	
Work item code: ✄	TEI	***Date:*** ✄ 19/04/01
Category: ✄ **A**		***Release:*** ✄ 4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
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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)*

Reason for change: ✄	Currently 29.060 states states 'If the GGSN receives an Update PDP Context Response with a Cause value other than 'Request accepted', it shall abort the update of the PDP context'. However 'Update PDP Context Response' is used to supply the End User IP address to the SGSN after PDP Context establishment if the GGSN is being used as a DHCP Relay Agent. If this procedure fails the GGSN is not aware if the SGSN has the End User Address which is a mandatory parameter of the PDP context IE. Therefore in this case the GGSN should delete the PDP context.
Summary of change: ✄	Additional text to ensure that that the GGSN deletes the PDP context in the situation described above.
Consequences if not approved: ✄	SGSN/GGSN behaviour is not clearly defined, leaving to interworking problems and incorrect operation of PDP context activation.

Clauses affected: ✄	7.3.4
Other specs affected: ✄	☐ Other core specifications ✄ ☐ Test specifications ☐ O&M Specifications
Other comments: ✄	

7.3.3 Update PDP Context Request

An Update PDP Context Request message shall be sent from a SGSN to a GGSN as part of the GPRS Inter SGSN Routeing Update procedure or the PDP Context Modification procedure or to redistribute contexts due to load sharing. It shall be used to change the QoS and the path. In addition it shall be used if it is neccessary to change the GTP version of a tunnel to a GGSN from GTP v0 to GTP v1. The message shall be sent by the new SGSN at the Inter SGSN Routeing Update procedure.

The NSAPI information element together with the Tunnel Endpoint Identifier in the GTP header unambiguously identifies a PDP Context in the GGSN.

The IMSI shall be included if the message is sent during an Inter SGSN change when changing the GTP version from GTP v0 to GTP v1; this is required, as the TEID in the header of the message is set to all zeros in this case.

The Tunnel Endpoint Identifier Data field specifies a downlink Tunnel Endpoint Identifier for G-PDUs which is chosen by the SGSN. The GGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent downlink G-PDUs that are related to the requested PDP context.

The Tunnel Endpoint Identifier Control Plane field specifies a downlink Tunnel Endpoint Identifier Control Plane messages which is chosen by the SGSN. The GGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent downlink control plane messages that are related to the requested PDP context. If the SGSN has already confirmed successful assignment of its Tunnel Endpoint Identifier Control Plane to the peer GGSN, this field shall not be present. The SGSN confirms successful assignment of its Tunnel Endpoint Identifier Control Plane to the GGSN when it receives any message with its assigned Tunnel Endpoint Identifier Control Plane in the GTP header from the GGSN.

The Quality of Service Profile information element shall include the QoS negotiated between the MS and SGSN at PDP Context activation or the new QoS negotiated in the PDP Context Modification procedure.

The SGSN shall include an SGSN Address for control plane and an SGSN address for user traffic, which may differ from that provided by the underlying network service (e.g. IP). The GGSN shall store these SGSN Addresses and use them when sending subsequent control plane on this GTP tunnel or G-PDUs to the SGSN for the MS. When active contexts are being redistributed due to load sharing, G-PDUs that are in transit across the Gn-interface are in an undetermined state and may be lost.

The SGSN shall include a Recovery information element into the Update PDP Context Request if the SGSN is in contact with the GGSN for the very first time or if the SGSN has restarted recently and the new Restart Counter value has not yet been indicated to the GGSN. The GGSN that receives a Recovery information element in the Update PDP Context Request message element shall handle it in the same way as when receiving an Echo Response message. The Update PDP Context Request message shall be considered as a valid update request for the PDP context indicated in the message.

The Traffic Flow Template (TFT) is used to distinguish between different user traffic flows.

The SGSN shall include Trace Reference, Trace Type, Trigger Id, and OMC Identity in the message if GGSN trace is activated while the PDP context is active. The SGSN shall copy Trace Reference, Trace Type, and OMC Identity from the trace request received from the HLR or OMC.

The optional Private Extension contains vendor or operator specific information.

Table 7: Information Elements in an SGSN-Initiated Update PDP Context Request

Information element	Presence requirement	Reference
IMSI	Conditional	7.7.2
Recovery	Optional	7.7.11
Tunnel Endpoint Identifier Data I	Mandatory	7.7.13
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
NSAPI	Mandatory	7.7.17
Trace Reference	Optional	7.7.24
Trace Type	Optional	7.7.25
SGSN Address for Control Plane	Mandatory	GSN Address 7.7.32
SGSN Address for User Traffic	Mandatory	GSN Address 7.7.32
Quality of Service Profile	Mandatory	7.7.34
TFT	Optional	7.7.36
Trigger Id	Optional	7.7.41
OMC Identity	Optional	7.7.42
Private Extension	Optional	7.7.44

An Update PDP Context Request may also be sent from a GGSN to a SGSN to re-negotiate the QoS of a PDP context. This GGSN-initiated Update PDP Context Request can also be used to provide a PDP address to the SGSN (and MS). The latter shall be used by GGSN when it acts as a DHCP Relay Agent or Mobil IP Foreign Agent.

The Quality of Service Profile information element shall include the GGSN requested QoS.

The End User Address information element shall contain a valid IPv4 or IPv6 address.

The GGSN shall include a Recovery information element into the Update PDP Context Request if the GGSN has restarted recently and the new Restart Counter value has not yet been indicated to the SGSN. The SGSN that receives a Recovery information element in the Update PDP Context Request message element shall handle it in the same way as when receiving an Echo Response message. The Update PDP Context Request message shall be considered as a valid update request for the PDP context indicated in the message.

The NSAPI information element together with the Tunnel Endpoint Identifier in the GTP header unambiguously identifies a PDP Context in the SGSN.

The optional Private Extension contains vendor or operator specific information.

Table 8: Information Elements in a GGSN-Initiated Update PDP Context Request

Information element	Presence requirement	Reference
Recovery	Optional	7.7.11
NSAPI	Mandatory	7.7.17
End User Address	Optional	7.7.27
Quality of Service Profile	Optional	7.7.34
Private Extension	Optional	7.7.44

*** First Modified Section ***

7.3.4 Update PDP Context Response

The message shall be sent from a GGSN node to a SGSN node as a response of an Update PDP Context Request.

If the SGSN receives an Update PDP Context Response with a Cause value other than 'Request accepted', it shall abort the update of the PDP context.

Only the Cause information element and optionally the Recovery information element shall be included in the response if the Cause contains another value than 'Request accepted'.

Possible Cause values are:

- 'Request Accepted'.

- 'Non-existent'.

- 'Service not supported'.

- 'System failure'.

- 'Semantic error in the TFT operation'.

- 'Syntactic error in the TFT operation'.

- 'Semantic errors in packet filter(s)'.

- 'Syntactic errors in packet filters(s)'.

- 'Mandatory IE incorrect'.

- 'Mandatory IE missing'.

- 'Optional IE incorrect'.

- 'Invalid message format'.

- 'Version not supported'.

The Tunnel Endpoint Identifier Data field specifies an uplink Tunnel Endpoint Identifier for G-PDUs that is chosen by the GGSN. The SGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent uplink G-PDUs that are related to the requested PDP context. This information element shall be included if the Cause contains the value 'Request accepted'.

The Tunnel Endpoint Identifier Control Plane field specifies an uplink Tunnel Endpoint Identifier Control Plane messages which is chosen by the GGSN. The SGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent uplink control plane messages which are related to the requested PDP context. If the GGSN has already confirmed successful assignment of its Tunnel Endpoint Identifier Control Plane to the peer SGSN, this field shall not be present. The GGSN confirms successful assignment of its Tunnel Endpoint Identifier Control Plane to the SGSN when it receives any message with its assigned Tunnel Endpoint Identifier Control Plane in the GTP header from the SGSN.

The QoS values supplied in the Update PDP Context Request may be negotiated downwards by the GGSN. The negotiated values or the original value from SGSN is inserted in the Quality of Service Profile information element. This information element shall be included if the Cause contains the value 'Request accepted'.

The GGSN may start to forward T-PDUs after the Update PDP Context Response has been sent. The SGSN may start to forward T-PDUs when the Update PDP Context Response has been received. In this case the SGSN shall also be prepared to receive T-PDUs from the GGSN after it has sent an Update PDP Context Request but before an Update PDP Context Response has been received.

The GGSN shall include a GGSN Address for control plane and an GGSN address for user traffic, which may differ from that provided by the underlying network service (e.g. IP). The SGSN shall store these GGSN Addresses and use them when sending subsequent control plane on this GTP tunnel or G-PDUs to the GGSN for the MS. When active contexts are being redistributed due to load sharing, G-PDUs that are in transit across the Gn-interface are in an undetermined state and may be lost. The GGSN Address for control plane and the GGSN Address for user traffic shall be included if the Cause contains the value 'Request accepted'.

The GGSN shall include the Recovery information element into the Update PDP Context Response if the GGSN is in contact with the SGSN for the first time or if the GGSN has restarted recently and the new Restart Counter value has not yet been indicated to the SGSN. The SGSN receiving the Recovery information element shall handle it as when an Echo Response message is received but shall consider the PDP context as updated and active if the response cause indicates a successful operation at the GGSN.

The Charging ID is used to identify all charging records produced in SGSN(s) and the GGSN for this PDP context. The Charging ID has been previously generated by the GGSN and is unique for this PDP context. If an inter-SGSN routing area update occurs, it is transferred to the new SGSN as part of each active PDP context. This information element shall be included if the Cause contains the value 'Request accepted'.

The Charging Gateway Address is the IP address of the recommended Charging Gateway Functionality to which the SGSN should transfer the Charging Detail Records (CDR) for this PDP Context.

The optional Private Extension contains vendor or operator specific information.

Table 9: Information Elements in an Update PDP Context Response sent by a GGSN

Information element	Presence requirement	Reference
Cause	Mandatory	7.7.1
Recovery	Optional	7.7.11
Tunnel Endpoint Identifier Data I	Conditional	7.7.13
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
Charging ID	Conditional	7.7.26
GGSN Address for Control Plane	Conditional	GSN Address 7.7.32
GGSN Address for User Traffic	Conditional	GSN Address 7.7.32
Quality of Service Profile	Conditional	7.7.34
Charging Gateway Address	Optional	7.7.43
Private Extension	Optional	7.7.44

The message can also be sent from a SGSN node to a GGSN node as a response of a GGSN-initiated Update PDP Context Request.

If the GGSN receives an Update PDP Context Response with a Cause value other than 'Request accepted', it shall abort the update of the PDP context if the associated Update PDP Context Request was sent only to re-negotiate the QoS of a PDP context. Furthermore if the associated Update PDP Context Request included an 'End User Address' information element the GGSN shall delete the PDP context using the Delete PDP Context procedure and may notify the Operation and Maintenance network element.

Only the Cause information element and optionally the Recovery information element shall be included in the response if the Cause contains another value than 'Request accepted'.

Possible Cause values are the same as for the Update PDP Context Response sent by a GGSN.

The QoS values supplied in the Update PDP Context Request may be negotiated downwards by the SGSN. The negotiated values or the original value from GGSN is inserted in the Quality of Service Profile information element. This information element shall be included if the Cause contains the value 'Request accepted' and a QoS information element was supplied in the corresponding request message.

The SGSN shall include the Recovery information element into the Update PDP Context Response if the SGSN has restarted recently and the new Restart Counter value has not yet been indicated to the GGSN. The GGSN receiving the Recovery information element shall handle it as when an Echo Response message is received but shall consider the PDP context as updated and active if the response cause indicates a successful operation at the SGSN.

Table 10: Information Elements in an Update PDP Context Response sent by a SGSN

Information element	Presence requirement	Reference
Cause	Mandatory	7.7.1
Recovery	Optional	7.7.11
Quality of Service Profile	Conditional	7.7.34
Private Extension	Optional	7.7.44

*** Last Modified Section ***

CR-Form-v3

CHANGE REQUEST

⌘ **29.060** CR **197** ⌘ rev **-** ⌘ Current version: **3.8.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	RNC IP Address IE format	
Source:	⌘	CN4	
Work item code:	⌘ TEI	***Date:*** ⌘	08 May 2001
Category:	⌘ **F** Agreed by consensus	***Release:*** ⌘	R99

Use one of the following categories:	*Use one of the following releases:*
F *(correction)*	*2 (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	*REL-4 (Release 4)*
be found in 3GPP TR 21.900.	*REL-5 (Release 5)*

Reason for change:	⌘	Currently the GSN and the RNC addresses are handled in different ways. There is no reason for that. The Type and Length IEs are redundant in both cases. Therefore, sub section 7.7.39 should be aligned with sub section 7.7.32. Reference in 7.7.32 is corrected
Summary of change:	⌘	The Type and Length IEs removed from RNC IP Address IE
Consequences if not approved:	⌘	GTP Interworking in a multi-vendor situation may not work

Clauses affected:	⌘	7.7.32; 7.7.39

Other specs affected:	⌘	☐ Other core specifications	⌘	
		☐ Test specifications		
		☐ 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/3G_Specs/CRs.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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

7.7.32　GSN Address

The GSN Address information element contains the address of a GSN as defined in 3G TS 23.003. The Address Type and Address Length fields from 023.003 are not included in the GSN Address field.
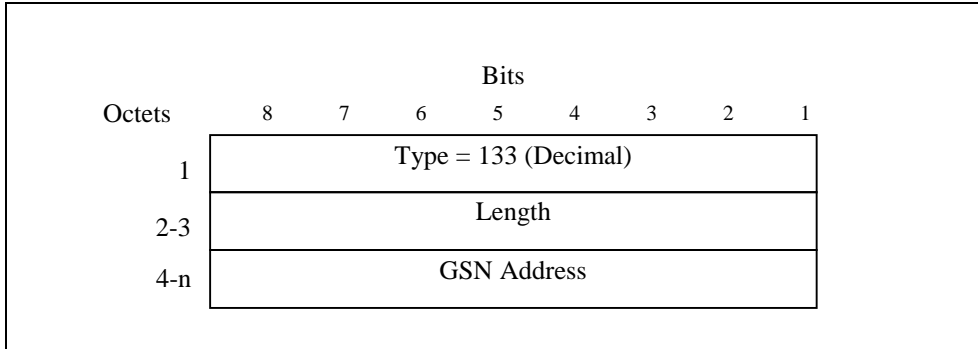
	Bits							
Octets	8	7	6	5	4	3	2	1
1	Type = 133 (Decimal)							
2-3	Length							
4-n	GSN Address							

Figure 46: GSN Address Information Element

*** *Next Modification* ***

7.7.39　RAB Setup Information

If the target RNC successfully allocated resources associated with the NSAPI, the RAB Setup Information IE contains the RNC Tunnel Endpoint Identifier and RNC IP address for data forwarding from source RNC to target RNC. If the target RNC or the new SGSN failed to allocate resources the RAB Setup Information IE contains only Length and NSAPI indicating that the source RNC shall release the resources associated with the NSAPI.

The spare bits x indicate unused bits, which shall be set to 0 by the sending side and which shall not be evaluated by the receiving side.

The format of the RNC IP address is the same as the GSN address as defined in 3G TS 23.003. The Address Type and Address Length fields from 3G TS 23.003 are not included in the RNC IP Address field.
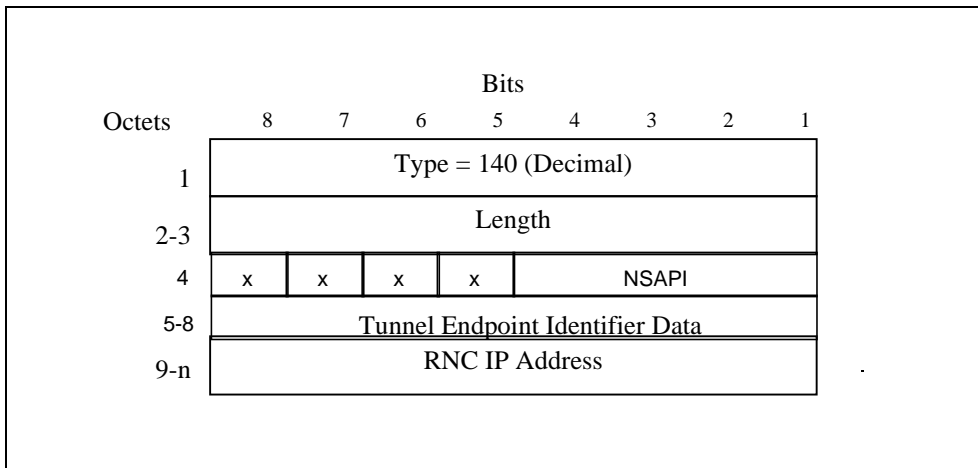
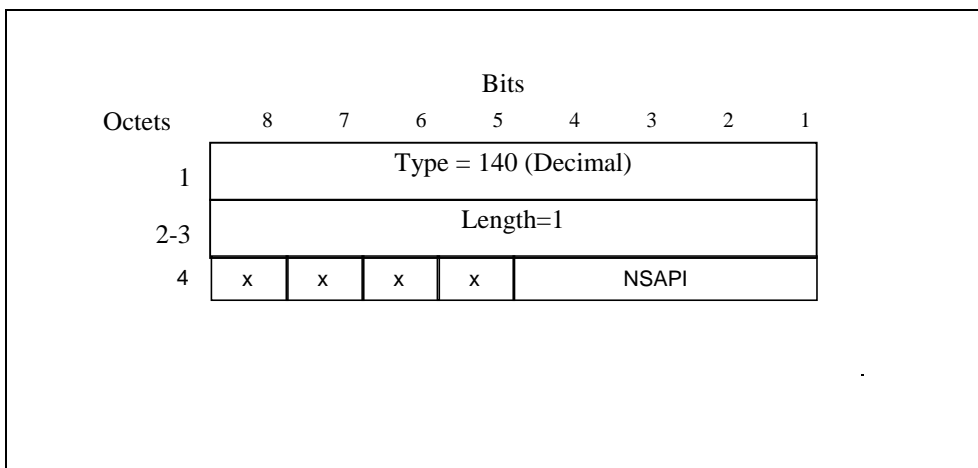**Figure 53: RAB Setup Information IE for data forwarding**

Figure 54: RAB Setup Information IE for release of resources

CR-Form-v3

CHANGE REQUEST

| ⌘ | **29.060** CR **198** | ⌘ rev | **-** | ⌘ | Current version: | **4.0.0** | ⌘ |

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	RNC IP Address IE format	
Source: ⌘	CN4	
Work item code: ⌘	TEI	***Date:*** ⌘ 08 May 2001
Category: ⌘	**A**	***Release:*** ⌘ Rel-4

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)*

Reason for change: ⌘	Currently the GSN and the RNC addresses are handled in different ways. There is no reason for that. The Type and Length IEs are redundant in both cases. Therefore, sub section 7.7.39 should be aligned with sub section 7.7.32.

Reference in 7.7.32 is corrected |
| ***Summary of change:*** ⌘ | The Type and Length IEs removed from RNC IP Address IE |
| ***Consequences if not approved:*** ⌘ | Interworking in a multi vendor environment may not work |

Clauses affected: ⌘	7.7.32; 7.7.39

Other specs affected: ⌘	☐ Other core specifications ⌘	
	☐ Test specifications	
	☐ 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/3G_Specs/CRs.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.

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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.

7.7.32   GSN Address

The GSN Address information element contains the address of a GSN as defined in 3G TS 23.003. The Address Type and Address Length fields from 023.003 are not included in the GSN Address field.
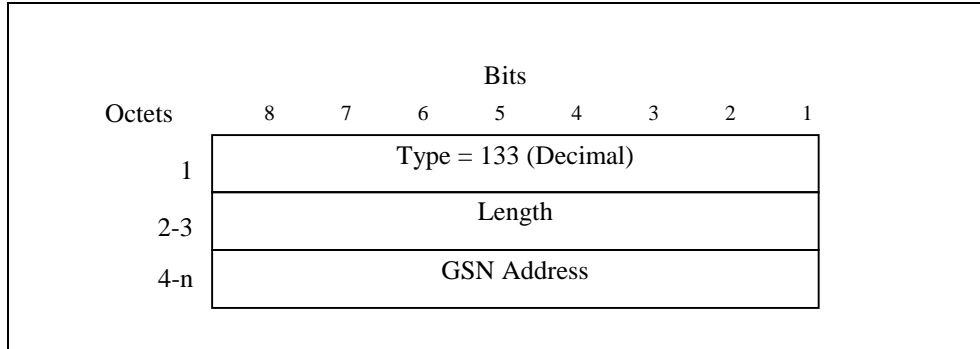
Octets	Bits
	8 7 6 5 4 3 2 1
1	Type = 133 (Decimal)
2-3	Length
4-n	GSN Address

Figure 46: GSN Address Information Element

*** *Next Modification* ***

7.7.39   RAB Setup Information

If the target RNC successfully allocated resources associated with the NSAPI, the RAB Setup Information IE contains the RNC Tunnel Endpoint Identifier and RNC IP address for data forwarding from source RNC to target RNC. If the target RNC or the new SGSN failed to allocate resources the RAB Setup Information IE contains only Length and NSAPI indicating that the source RNC shall release the resources associated with the NSAPI.

The spare bits x indicate unused bits, which shall be set to 0 by the sending side and which shall not be evaluated by the receiving side.

The format of the RNC IP address is the same as the GSN address as defined in 3G TS 23.003. The Address Type and Address Length fields from 3G TS 23.003 are not included in the RNC IP Address field.
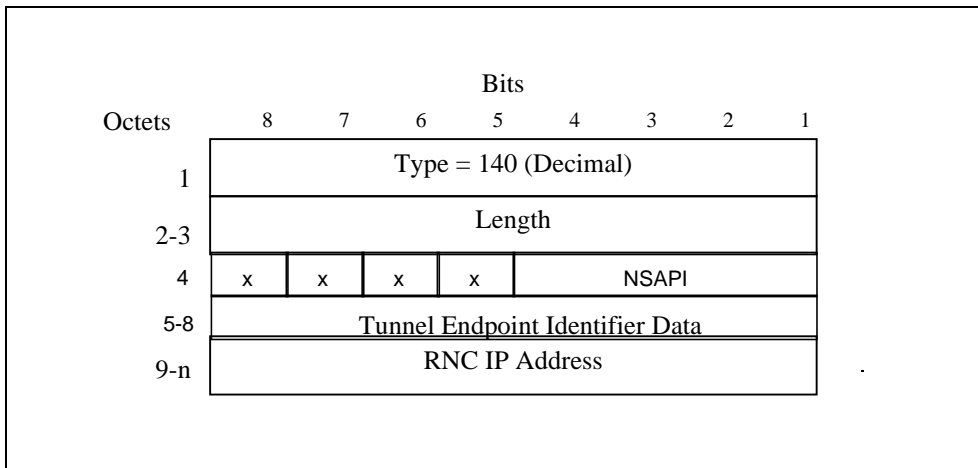
```
                              Bits
Octets      8    7    6    5    4    3    2    1
        ┌─────────────────────────────────────────┐
  1     │         Type = 140 (Decimal)            │
        ├─────────────────────────────────────────┤
  2-3   │              Length                     │
        ├────┬────┬────┬────┬─────────────────────┤
  4     │ x  │ x  │ x  │ x  │       NSAPI          │
        ├────┴────┴────┴────┴─────────────────────┤
  5-8   │     Tunnel Endpoint Identifier Data     │
        ├─────────────────────────────────────────┤
  9-n   │            RNC IP Address               │    .
        └─────────────────────────────────────────┘
```

Figure 53: RAB Setup Information IE for data forwarding

```
                              Bits
Octets      8    7    6    5    4    3    2    1
        ┌─────────────────────────────────────────┐
  1     │         Type = 140 (Decimal)            │
        ├─────────────────────────────────────────┤
  2-3   │              Length=1                   │
        ├────┬────┬────┬────┬─────────────────────┤
  4     │ x  │ x  │ x  │ x  │       NSAPI          │
        └────┴────┴────┴────┴─────────────────────┘

                                              .
```
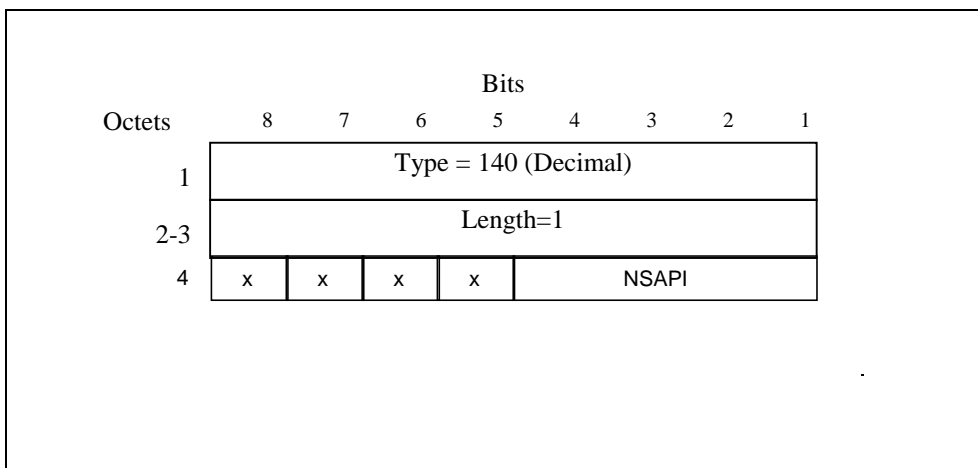
Figure 54: RAB Setup Information IE for release of resources