



GSM TECHNICAL SPECIFICATION

GSM 03.08

April 1997

Version 5.1.0

Source: ETSI TC-SMG

Reference: TS/SMG-030308QR

ICS: 33.020

Key words: Digital cellular telecommunications system, Global System for Mobile communications (GSM)



Digital cellular telecommunications system (Phase 2+); Organization of subscriber data (GSM 03.08 version 5.1.0)

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Foreword

This Global System for Mobile communications Technical Specification (GTS) has been produced by the Special Mobile Group (SMG) Technical Committee (TC) of the European Telecommunications Standards Institute (ETSI).

This GTS provides a mechanism giving reliable transfer of signalling messages within the digital cellular telecommunications system (Phase 2/Phase 2+).

This GTS is a TC-SMG approved GSM technical specification version 5, which contains GSM Phase 2+ enhancements/features to the version 4 GSM technical specification. The ETS from which this Phase 2+ GTS has evolved is Phase 2 GSM 03.08 version 4.8.0.

The contents of this GTS are subject to continuing work within TC-SMG and may change following formal TC-SMG approval. Should TC-SMG modify the contents of this GTS it will then be republished by ETSI with an identifying change of release date and an increase in version number as follows:

Version 5.x.y

where:

- y the third digit is incremented when editorial only changes have been incorporated in the specification;

- x the second digit is incremented for all other types of changes, i.e. technical enhancements, corrections, updates, etc.

The specification from which this GTS has been derived was originally based on CEPT documentation, hence the presentation of this GTS may not be entirely in accordance with the ETSI rules.

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0 Scope

The scope of this Global System for Mobile communications Technical Specification (GTS) is to provide details concerning information to be stored in home location registers and visitor location registers 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 Normative references

This GTS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this GTS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

- [1] GSM 01.04 (ETR 350): "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".
- [2] GSM 02.02 (ETS 300 904): "Digital cellular telecommunications system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".
- [3] GSM 02.03 (ETS 300 905): "Digital cellular telecommunications system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".
- [4] GSM 02.04 (ETS 300 918): "Digital cellular telecommunications system (Phase 2+); General on supplementary services".
- [5] GSM 03.03 (ETS 300 927): "Digital cellular telecommunications system (Phase 2+); Numbering, addressing and identification".
- [6] GSM 03.07: "Digital cellular telecommunications system; Restoration procedures".
- [7] GSM 03.09: "Digital cellular telecommunications system (Phase 2+); Handover procedures".
- [8] GSM 03.12: "Digital cellular telecommunications system; Location registration procedures".
- [9] GSM 03.15: "Digital cellular telecommunications system (Phase 2+); Technical realization of operator determined barring".
- [10] GSM 03.20 (ETS 300 929): "Digital cellular telecommunications system; Security related network functions".
- [11] GSM 03.40 (ETS 300 901): "Digital cellular telecommunications system (Phase 2+); Technical realization of the Short Message Service (SMS) Point-to-Point (PP)".
- [12] GSM 03.67 (ETS 300 932): "Digital cellular telecommunications system (Phase 2+); enhanced Multi-Level Precedence and Pre-emption service (eMLPP) - Stage 2".
- [13] GSM 03.68 (ETS 300 933): "Digital cellular telecommunications system (Phase 2+); Voice Group Call Service (VGCS) - Stage 2".

- [14] GSM 03.69 (ETS 300 934): "Digital cellular telecommunications system (Phase 2+); Voice Broadcast Service (VBS) - Stage 2".
- [15] GSM 03.78 (TS 101 044): "Digital cellular telecommunications system (Phase 2+); Customized Applications for Mobile network Enhanced Logic (CAMEL) - Stage 2".
- [16] GSM 03.81: "Digital cellular telecommunications system; Line identification supplementary services - Stage 2".
- [17] GSM 03.82: "Digital cellular telecommunications system; Call Forwarding (CF) supplementary services - Stage 2".
- [18] GSM 03.83: "Digital cellular telecommunications system; Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 2".
- [19] GSM 03.84: "Digital cellular telecommunications system; Multi Party (MPTY) supplementary services - Stage 2".
- [20] GSM 03.85: "Digital cellular telecommunications system; Closed User Group (CUG) supplementary services - Stage 2".
- [21] GSM 03.86 (ETS 300 935): "Digital cellular telecommunications system; Advice of Charge (AoC) supplementary services - Stage 2".
- [22] GSM 03.88: "Digital cellular telecommunications system; Call Barring (CB) supplementary services - Stage 2".
- [23] GSM 03.90: "Digital cellular telecommunications system; Unstructured Supplementary Service Data (USSD) - Stage 2".
- [24] GSM 04.08 (ETS 300 940): "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".
- [25] GSM 09.02 (ETS 300 974): "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".
- [26] GSM 09.07 (ETS 300 976): "Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".
- [27] GSM 12.03 (ETS 300 614): "Digital cellular telecommunications system (Phase 2); Security management".
- [28] GSM 12.08 (ETS 300 627): "Digital cellular telecommunications system (Phase 2); Subscriber and Equipment Trace".
- [29] CCITT Recommendation Q.763: "Specifications of Signalling System No.7; Formats and codes".

0.2 Abbreviations

Abbreviations used in this GTS are listed in GSM 01.04.

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, 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 GTS considers subscriber data stored in two 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.

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 GTS 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, GSM 03.68 and GSM 03.69).

1.3 Subscriber data in functional units other than the HLR and the VLR

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 GTS. Such units could include encryption key distribution centres, maintenance centres, etc.

2 Definition of subscriber data

2.1 Data related to identification and numbering

2.1.1 International mobile subscriber identity (IMSI)

International mobile subscriber identity (IMSI) is defined in GSM 03.03.

IMSI is permanent subscriber data. IMSI is stored in both HLR and VLR.

2.1.2 Mobile Station International ISDN Number (MSISDN)

Mobile Station International ISDN Number (MSISDN) is defined in GSM 03.03.

The MSISDN number is permanent subscriber data and is stored in both HLR and VLR.

If the multinumbeing option applies, the MSISDN stored in the VLR is the Basic MSISDN, see subclause 2.1.3.1.

2.1.3 MSISDNs for multinumbeing option

If the HPLMN allocates different MSISDNs for different Basic Services (see GSM 09.07), 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. 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. 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.

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

2.1.5 Local Mobile Station Identity (LMSI)

Local Mobile Station Identity (LMSI) is defined in GSM 03.03. 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.

2.2 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.

2.3 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 of vectors used for authentication and encryption as defined in GSM 03.20.

A set of up to 5 triplet values is calculated in the AuC (see GSM 12.03), provided to and stored in the HLR and sent to the VLR on request. These data are temporary subscriber data stored in the HLR and the VLR.

2.3.2 The Ciphering Key Sequence Number (CKSN)

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

CKSN and its handling are defined in GSM 04.08 and GSM 03.20. It is a temporary subscriber data and is stored in the VLR.

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.

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.

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

2.4.3 VLR number

VLR number is defined in GSM 03.03.

The VLR number is temporary subscriber data and is stored in the HLR. Absence of the VLR number indicates that the mobile station is deregistered in the HLR.

2.4.4 MSC number

MSC number is defined in GSM 03.03.

The MSC number is temporary subscriber data and is stored in the HLR and conditionally in the VLR.

2.4.5 HLR number

HLR number is defined in GSM 03.03.

The HLR number may be stored in the VLR. 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.

2.4.6 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 2.4.8.

Handling of Regionally Restricted Subscription is defined in subclause 2.4.7. 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.

2.4.7 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 03.03; 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, the HLR identifies the VPLMN and NDC given by the VLR number and transfers the pertaining Zone Code List to the VLR. The VLR derives from the Zone Code List the allowed and not allowed MSC 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 area be excluded. Signalling of cause value "location area not allowed" towards the mobile station is defined in GSM 09.02 and GSM 04.08.

2.4.7.1 RSZI lists

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

2.4.7.2 Zone Code List

The VLR shall store as permanent and conditional subscriber data at least those Zone Codes by which it is affected.

2.4.8 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 2.4.7) 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.

2.4.9 LA not allowed flag

The LA not allowed flag is set in the VLR depending on National Roaming, Regionally Restricted Subscription and Roaming Restriction Due To UnSupported Feature, see GSM 09.02. It is applied to restrict service on a location area basis.

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

2.4.10 Service restriction data induced by roaming

If in the course of roaming or at updating of the VLR the HLR is informed that the VLR does not support certain sensitive services or features, the HLR takes appropriate measures to restrict service for the mobile station in that VLR by setting and sending network induced replacing services such as barring programs or the roaming restriction for the MSC 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. 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 and in VLR, regarding any remaining restrictions due to other service replacements.

All network-induced restriction data are temporary subscriber data.

For ODB, GSM 03.15 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.

Roaming restriction in the MSC area due to unsupported features is used to replace AoCC, see GSM 03.86, and Zone Codes for regional subscription, see subclause 2.4.7 and GSM 09.02. A flag in HLR and VLR, see subclause 2.4.10.2, collects the sources of network-induced roaming restriction which are also kept separate by the HLR.

2.4.10.1 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.

2.4.10.2 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, resulting in roaming restriction in the MSC 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 2.4.9) and the "MSC area restricted flag" in the HLR (see subclause 2.4.8), see GSM 09.02.

The flag "roaming restriction due to unsupported feature" is temporary subscriber data stored in the VLR and 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 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 for which a subscription is required.

Provision of teleservice is permanent subscriber data and is stored in the HLR 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). 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 both HLR and VLR.

2.6 Data related to supplementary services

Subscriber data related to supplementary services are contained in the GSM 03.8x and 03.9x series of Technical Specifications, that is GSM 03.81 and following describing the network functionality of supplementary services.

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, GSM 03.85. All other data are conditional depending on the provision. The data settable but by O&M are the permanent data while the temporary data are those that can be modified by subscriber control in the mobile station.

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 and GSM 09.02. 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 Restoration flags

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

2.7.2.1 Confirmed by Radio Contact indicator

Confirmed by Radio Contact indicator is a restoration indicator defined in GSM 03.07.

It is temporary subscriber data, stored in the VLR.

2.7.2.2 Subscriber Data Confirmed by HLR indicator

Subscriber Data Confirmed by HLR indicator is a restoration indicator defined in GSM 03.07.

It is temporary subscriber data, stored in the VLR.

2.7.2.3 Location Information Confirmed in HLR indicator

Location Information Confirmed in HLR indicator is a restoration indicator defined in GSM 03.07.

It is temporary subscriber data, stored in the VLR.

2.7.2.4 Check SS indicator

Check SS indicator is a restoration indicator defined in GSM 03.07.

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

2.7.3 MS purged flag

MS purged 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.

2.8 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 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 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.

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, and in the VLR when the subscriber is registered in the home PLMN.

2.9 Data related to handover

2.9.1 Handover Number

Handover Number is defined in GSM 03.03 and its use is specified in GSM 03.09.

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.

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.

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.

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

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 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 CAMEL

2.13.1 Data stored in HLR

The following data are stored in the HLR:

- Originating CAMEL Subscription Information (O-CSI);
- Terminating CAMEL Subscription Information (T-CSI);
- Subscriber Information in SRI Ack Indicator.

For a more detailed description of the data see GSM 03.78.

The CAMEL related data is permanent subscriber data. It is stored conditionally in HLR.

2.13.2 Data stored in VLR

The following data are stored in the VLR:

- Originating CAMEL Subscription Information (O-CSI).

3 Summary of data stored in location registers

Table 1 gives an overview of data that may be stored in location registers. In the Table M = mandatory means that this parameter is stored for all subscribers and C = conditional means that the parameter is subject to some condition (e.g. subscription, 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).

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

Table 1: Overview of data stored in location registers

Parameter	Subclause	HLR	VLR	Type	
IMSI	2.1.1	M	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	2.1.5	C	C	T	Note
Mobile Station Category	2.2.1	M	M	P	
RAND, SRES and Kc	2.3.2	M	M	T	
Ciphering Key Sequence Number	2.3.3	-	M	T	
MSRN	2.4.1	-	C	T	Note
Location Area Identity	2.4.2	-	M	T	
VLR number	2.4.3	M	-	T	Note
MSC number	2.4.4	M	C	T	
HLR number	2.4.5	-	C	T	
Subscription restriction	2.4.6	C	-	P	
RSZI lists	2.4.7.1	C	-	P	
Zone Code List	2.4.7.2	-	C	P	
MSC area restricted flag	2.4.8	M	-	T	
LA not allowed flag	2.4.9	-	M	T	
ODB-induced barring data	2.4.10.1	C	-	T	
Roaming restriction due to unsupported feature	2.4.10.2	M	M	T	
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	2.7.2.1	-	M	T	
Subscriber Data Confirmed by HLR indicator	2.7.2.2	-	M	T	
Location Information Confirmed in HLR indicator	2.7.2.3	-	M	T	
Check SS indicator	2.7.2.4	M	-	T	
MS purged flag	2.7.3	M	-	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	
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	
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	2.11.7	-	C	P	Note
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	2.13.1/2.13.2	C	C	P	
Terminating CAMEL Subscription Information	2.13.1	C	-	P	
Subscriber Information in SRI Ack Indicator	2.13.1	C	-	P	

NOTE: For special conditions of storage, see in the indicated subclause.

Annex A (informative): Status of Technical Specification GSM 03.08

Status of Technical Specification GSM 03.08		
date	version	remarks
July 1991	Version 4.0.0	CRs agreed at GSM #31: CR 03.08-025 rev 1 CR 03.08-027 rev 2 CR 03.08-028 rev 2 CR 03.08-029 rev 4 CR 03.08-030 rev 1 CR 03.08-031 rev 1 CR 03.08-032 rev 1 CR 03.08-034 rev 1 CR 03.08-035 rev 3 CR 03.08-036 rev 1 CR 03.08-040 rev 1 CR 03.08-042
October 1991	Version 4.1.0	CRs agreed at GSM #32: CR 03.08-039 CR 03.08-041 rev 1
January 1992	Version 4.2.0	CRs agreed at SMG #1: CR 03.08-045 rev 1
April 1992	Version 4.3.0	CRs agreed at SMG #2: CR 03.08-046
January 1993	Version 4.4.0	CRs agreed at SMG #5: CR 03.08-047 CR 03.08-048 CR 03.08-049 rev 1
April 1993	Version 4.5.0	CRs agreed at SMG #6: CR 03.08-050 rev 1
October 1993	Version 4.5.1	CRs agreed at SMG #8: CR 03.08-051
January 1994	Version 4.6.0	CRs agreed at SMG #9: CR 03.08-053r1 CR 03.08-056 CR 03.08-057 CR 03.08-59r1
April 1994	Version 4.7.0	CRs agreed at SMG #10: CR 03.08-060 CR 03.08-061 CR 03.08-062
April 1996	Version 4.8.0	CR agreed at SMG #18: CR 03.08-002r2
April 1996	Version 5.0.0	CR agreed at SMG #18: CR 03.08-A003r2
February 1997	Version 5.1.0	CRs agreed at SMG #21: CR 03.08-A004 rev 1 CR 03.08-A005 rev 1 CR 03.08-A006
Text: WinWord6 Stylesheet: etsiw_60.dot		

History

Document history	
April 1996	Creation of Version 5.0.0 (GSM 03.08 Version 4.8.0+CR 03.08-A003r2)
May 1996	Publication of Version 5.0.0
April 1997	Publication of Version 5.1.0