

3GPP TSG CN Plenary Meeting #24
2nd – 4th June 2004 Seoul, KOREA.

NP-040284

Source: TSG CN WG4
Title: Corrections on Camel 4 enhancements
Agenda item: 9.13
Document for: APPROVAL

Spec	CR	Rev	Doc-2nd-Level N4-040	Phase	Subject	Cat	Ver_C
23.008	131	1	720	Rel-6	Active Location Retrieval for MT call handling	B	6.1.0
29.002	733	2	753	Rel-6	Retrieval of Current Location during MT call handling	B	6.5.0

CHANGE REQUEST

⌘ **23.008 CR 131** ⌘ rev **1** ⌘ Current version: **6.1.0** ⌘

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title: ⌘ Retrieval of Current Location during MT call handling

Source: ⌘ Ericsson

Work item code: ⌘ TEI6

Date: ⌘ 12 May 2004

Category: ⌘ **B**

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)

Release: ⌘ Rel-6

Use one of the following releases:

- 2 (GSM Phase 2)
- R96 (Release 1996)
- R97 (Release 1997)
- R98 (Release 1998)
- R99 (Release 1999)
- Rel-4 (Release 4)
- Rel-5 (Release 5)
- Rel-6 (Release 6)

Reason for change: ⌘ As part of terminating call handling, the HLR may request the VLR for subscriber information. The subscriber information is obtained with the MAP Provide Subscriber Info (PSI) MAP message. The subscriber information received from VLR, is then included in the MAP Send Routing Info (SRI) Ack message, sent to GMSC.

The subscriber information that may be requested from the VLR consists of Subscriber Location and Subscriber State; refer to section 4.3.7.1 of TS 23.078. This information is included in CAP Initial DP Operation for the MT call CAMEL Service.

This information may be used by the MT call CAMEL Service, as input to Service Logic processing. As an example, the location of a subscriber may indicate whether she qualifies for "office zone charging".

The Subscriber Location that may be obtained in this way is read from the VLR. However, the subscriber may have changed location since the VLR was last refreshed. Hence, the location information of the subscriber may be out of date. The age of the subscriber location information is indicated in the "Age of Location" information element, which is part of the Location Information.

Some MT call services require the **active location** of the subscriber. An example is Home Zone: if a subscriber is located in her home zone, then the MT call qualifies for a reduced (or zero) rate. However, since the location information reported in IDP may be out of date, the SCP would have to use e.g. Any Time Interrogation (ATI) to retrieve the subscriber's location. The Service Logic would have to wait until DP Alerting, before sending ATI. Using ATI has the additional risk that late call forwarding may have taken place (e.g. due to no paging response), in which case the alerting signal would pertain to the forwarded-to

subscriber, not the originally called B-party.

CAMEL Phase 3 has introduced “Active Location Information”. A gsmSCF may request location information at any time, using the Any Time Interrogation (ATI) mechanism. ATI may include the parameter “Current Location”. If ATI includes “Current Location” and “Location Information”, then VLR will page the subscriber, resulting in the current location of that subscriber to be returned to the gsmSCF.

However, when the subscriber location is retrieved from VLR within the context of terminating call handling, the active location option is currently not available.

The present CR proposes for 3GPP Rel-6 that the active location retrieval feature be made available to terminating call handling as well. The advantages would be (list is not exhaustive):

- Home Zone charging: A Home Zone service can use the exact subscriber location to determine the terminating call charge;
- VPN: A VPN service can use the exact subscriber location to determine the call handling for that subscriber;

The introduction of the active location retrieval for terminating calls has no impact on the MAP PSI message between HLR and VLR. For the VLR, it is transparent whether PSI is the result of SRI from GMSC or ATI from gsmSCF.

With this method, the Service Logic does not have to use ATI (with or without the ALR flag included); the active location is available at Service Logic invocation.

The requesting of location information, subscriber state or active location, as part of terminating call handling, is purely HLR-internal behaviour. Operators can configure the HLR to request subscriber location for selected subscriber groups, depending on their subscription to CAMEL services for MT call handling. An operator would activate this feature only for those subscribers who’s MT CAMEL Service requires the active location.

Refer to TS 23.078, Procedure CAMEL_T_CSI_CHECK_HLR. When the check box “subscriber info required” takes the yes exit, the procedure “CAMEL_Provide_Subscriber_Info” will be called. That procedure has the capability to request VLR for active location.

Summary of change: ☞ Specify in section 2.14.1.3 (Location information/Subscriber state interrogation) that the HLR may request the active location of the subscriber.

Table 5.1 (“Overview of data stored for non-GPRS Network Access Mode (CS)”) contains the entry: “Location Information/Subscriber state Information”. The present CR reckons that it is not needed to modify the text of that entry.

Consequences if not approved: ☞ Active Location will not be available for MT call handling. CAMEL services may miss out on a powerful feature.

Clauses affected: ☞ 2.14.1.3

Other specs affected:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Other core specifications	☞ 22.078-CRxxx; 23.078-CR659; 29.002-CR733
	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Test specifications	
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	O&M Specifications	

Other comments: ☞

***** First Modification *****

2 Definition of subscriber data for CS and PS domain

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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.

TDP	Triggering Criteria (see note)	ServiceKey	gsmSCF address	Default Call Handling
DP Collected_ Info	No Criterion Number criteria Basic service code criteria Call type criteria	One ServiceKey	One E164 gsmSCF address	One Default call handling
DP Route_Select_ Failure	No criterion Cause value criteria	One ServiceKey	One E164 gsmSCF address	One Default call handling
NOTE: One or more TDP criteria shall be applicable. All applicable triggering criteria must be satisfied before the dialogue is established with the gsmSCF.				

- CAMEL capability handling. It gives the CAMEL phase associated to the O-CSI (CAMEL phase 1, phase 2, phase 3, or phase 4).
- 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.

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. 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.

TDP	Triggering Criteria (see note)	ServiceKey	gsmSCF address	Default Call Handling
DP Terminating_Attempt_Authorised	No Criterion Basic service criteria	One serviceKey	One E164 gsmSCF address	One Default call handling
DP T_Busy	No criterion Cause value criteria	One serviceKey	One E164 gsmSCF address	One Default call handling
DP T_No_Answer	No criterion Cause value criteria	One service Key	One E164 gsmSCF address	One Default call handling
NOTE: One or more TDP criteria shall be applicable. All applicable triggering criteria must be satisfied before the dialogue is established with the gsmSCF.				

- CAMEL capability handling. It gives the CAMEL phase associated to the T-CSI/VT-CSI (CAMEL phase1, phase2, or phase3, or phase4).
- 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.

2.14.1.3 Location information/Subscriber state interrogation.

This data item indicates whether or not the HLR shall send the location information, [Current Location](#) and state of the called subscriber, as available, when a GMSC requests routing 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.

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***** End of Document *****

CHANGE REQUEST

⌘ **29.002 CR 733** ⌘ rev **2** ⌘ Current version: **6.5.0** ⌘

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Retrieval of Current Location during MT call handling		
Source:	⌘ CN4		
Work item code:	⌘ TEI6	Date:	⌘ 17 May 2004
Category:	⌘ B	Release:	⌘ Rel-6
Use <u>one</u> of the following categories:		Use <u>one</u> 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)	
		Rel-4 (Release 4)	
		Rel-5 (Release 5)	
		Rel-6 (Release 6)	

Reason for change: ⌘ As part of terminating call handling, the HLR may request the VLR for subscriber information. The subscriber information is obtained with the MAP Provide Subscriber Info (PSI) MAP message. The subscriber information received from VLR, is then included in the MAP Send Routing Info (SRI) Ack message, sent to GMSC.

The subscriber information that may be requested from the VLR consists of Subscriber Location and Subscriber State; refer to section 4.3.7.1 of TS 23.078. This information is included in CAP Initial DP Operation for the MT call CAMEL Service.

This information may be used by the MT call CAMEL Service, as input to Service Logic processing. As an example, the location of a subscriber may indicate whether she qualifies for “office zone charging”.

The Subscriber Location that may be obtained in this way is read from the VLR. However, the subscriber may have changed location since the VLR was last refreshed. Hence, the location information of the subscriber may be out of date. The age of the subscriber location information is indicated in the “Age of Location” information element, which is part of the Location Information.

Some MT call services require the **active location** of the subscriber. An example is Home Zone: if a subscriber is located in her home zone, then the MT call qualifies for a reduced (or zero) rate. However, since the location information reported in IDP may be out of date, the SCP would have to use e.g. Any Time Interrogation (ATI) to retrieve the subscriber’s location. The Service Logic would have to wait until DP Alerting, before sending ATI. Using ATI has the additional

risk that late call forwarding may have taken place (e.g. due to no paging response), in which case the alerting signal would pertain to the forwarded-to subscriber, not the originally called B-party.

CAMEL Phase 3 has introduced “Active Location Information”. A gsmSCF may request location information at any time, using the Any Time Interrogation (ATI) mechanism. ATI may include the parameter “Current Location”. If ATI includes “Current Location” and “Location Information”, then VLR will page the subscriber, resulting in the current location of that subscriber to be returned to the gsmSCF.

However, when the subscriber location is retrieved from VLR within the context of terminating call handling, the active location option is currently not available.

The present CR proposes for 3GPP Rel-6 that the active location retrieval feature be made available to terminating call handling as well. The advantages would be (list is not exhaustive):

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- VPN: A VPN service can use the exact subscriber location to determine the call handling for that subscriber;

The introduction of the active location retrieval for terminating calls has no impact on the MAP PSI message between HLR and VLR. For the VLR, it is transparent whether PSI is the result of SRI from GMSC or ATI from gsmSCF.

With this method, the Service Logic does not have to use ATI (with or without the ALR flag included); the active location is available at Service Logic invocation.

The requesting of location information, subscriber state or active location, as part of terminating call handling, is purely HLR-internal behaviour. Operators can configure the HLR to request subscriber location for selected subscriber groups, depending on their subscription to CAMEL services for MT call handling. An operator would active this feature only for those subscribers who’s MT CAMEL Service requires the active location.

Refer to TS 23.078, Procedure CAMEL_T_CSI_CHECK_HLR. When the check box “subscriber info required” takes the yes exit, the procedure “CAMEL_Provide_Subscriber_Info” will be called. That procedure has the capability to request VLR for active location.

Summary of change: ☞ Specify in section section 17.6.3 (Call Handling Operations) that the MAP SRI timer should be set to the upper limit, if the GMSC is prepared to wait longer for MAP SRI Result.

Consequences if not approved: ☞ Active Location will not be available for MT call handling. CAMEL services may miss out on a powerful feature.

Clauses affected: ☞ 7.6.5.1x (new clause), 10.1.2, 10.1.3, 17.6.3, 17.7.3

	Y	N		☞
Other specs affected:	X		Other core specifications	22.078-CRxxx; 23.008-CR131; 23.078-CR659
		X	Test specifications	
		X	O&M Specifications	

Other comments: ☞

*** **First Modification** ***

7.6.5 Call parameters

7.6.5.1 Call reference number

This parameter refers to a call reference number allocated by a call control MSC.

7.6.5.2 Interrogation type

This parameter refers to the type of interrogation for routing information which is sent from a GMSC to an HLR. It can take either of two values:

- basic call (for information to route a call before the call has been extended to the VMSC of the called party);
- forwarding (for information to route the call to the forwarded-to destination after the VMSC of the forwarding party has requested the GMSC to resume handling of the call.

7.6.5.3 OR interrogation

This parameter indicates that the GMSC which interrogated the HLR for routing information is not in the same PLMN as the HLR, and therefore that the call will potentially be optimally routed.

7.6.5.4 OR capability

This parameter indicates the phase of OR which the GMSC supports.

7.6.5.5 Forwarding reason

This parameter indicates the reason for which the call is to be forwarded. It can take one of three values:

- busy subscriber;
- mobile subscriber not reachable;
- no subscriber reply.

7.6.5.6 Forwarding interrogation required

This parameter indicates that if the VMSC of the forwarding subscriber requests the GMSC to resume handling of the call the GMSC shall interrogate the HLR for forwarding information.

7.6.5.7 O-CSI

This parameter identifies the subscriber as having originating CAMEL services as defined in 3GPP TS 23.078.

7.6.5.7A D-CSI

This parameter identifies the subscriber as having originating CAMEL dialled services as defined in 3GPP TS 23.078.

7.6.5.7B T-CSI

This parameter identifies the subscriber as having terminating CAMEL services in the GMSC, as defined in 3GPP TS 23.078.

7.6.5.7C VT-CSI

This parameter identifies the subscriber as having terminating CAMEL services in the VMSC, as defined in 3GPP TS 23.078.

7.6.5.7D O-IM-CSI

This parameter identifies the subscriber as having originating IP Multimedia Core Network CAMEL services as defined in 3GPP TS 23.278.

7.6.5.7E D-IM-CSI

This parameter identifies the subscriber as having originating IP Multimedia Core Network CAMEL dialled services as defined in 3GPP TS 23.278.

7.6.5.7F VT-IM-CSI

This parameter identifies the subscriber as having terminating IP Multimedia Core Network CAMEL services as defined in 3GPP TS 23.278.

7.6.5.8 Void

7.6.5.9 Void

7.6.5.10 Void

7.6.5.11 CCBS Feature

This parameter corresponds to the 'CCBS Description' parameter in 3GPP TS 23.093. It refers to the necessary set of information required in order to characterise a certain CCBS request. The parameter may contain the following information:

- CCBS Index (see 3GPP TS 23.093 for the use of this parameter);
- B-subscriber number (see clause 7.6.2.48);
- B-subscriber subaddress (see clause 7.6.2.49);
- Basic Service Group Code (see clause 7.6.4.40).

7.6.5.12 UU Data

This parameter includes User-To-User Data. It is defined in 3GPP TS 23.087.

7.6.5.13 UUS CF Interaction

This parameter indicates if the call forwarding or call deflection has been activated after UUS1 request has been accepted . It is defined in 3GPP TS 23.087.

7.6.5.14 Number Portability Status

This parameter indicates the number portability status of subscriber. See 3GPP TS 23.066 [108].

7.6.5.15 Pre-paging supported

This parameter indicates that the entity which sent it supports pre-paging ~~or retrieval of Current Location during mobile terminating call handling.~~

7.6.5.1x Maximum SRI Timer Value Indicator

This parameter indicates that the entity, which sent it, has set the Operation timer for Send Routing Info to the maximum value. It is used when the entity, which sent it, supports pre-paging or retrieval of Current Location during mobile terminating call handling

10.1 MAP_SEND_ROUTING_INFORMATION service

10.1.1 Definition

This service is used between the Gateway MSC and the HLR. The service is invoked by the Gateway MSC to perform the interrogation of the HLR in order to route a call towards the called MS.

This is a confirmed service using the primitives listed in table 10.1/1.

This service is also used between the GMSC and the NPLR and between the gsmSCF and the HLR.

10.1.2 Service primitives

Table 10.1/1: MAP_SEND_ROUTING_INFORMATION parameters

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
Interrogation Type	M	M(=)		
GMSC or gsmSCF Address	M	M(=)		
MSISDN	M	M(=)	C	C(=)
OR Interrogation	C	C(=)		
OR Capability	C	C(=)		
CUG Interlock	C	C(=)	C	C(=)
CUG Outgoing Access	C	C(=)	C	C(=)
Number of Forwarding	C	C(=)		
Network Signal Info	C	C(=)		
Supported CAMEL Phases	C	C(=)	C	C(=)
Suppress T-CSI	C	C(=)		
Offered CAMEL 4 CSIs	C	C(=)		
Suppression of Announcement	C	C(=)		
Call Reference Number	C	C(=)		
Forwarding Reason	C	C(=)		
Basic Service Group	C	C(=)		
Basic Service Group 2	C	C(=)		
Alerting Pattern	C	C(=)		
CCBS Call	C	C(=)		
Supported CCBS Phase	C	C(=)		
Additional Signal Info	C	C(=)		
IST Support Indicator	C	C(=)		
Maximum SRI Timer Value	C	C(=)		
Indicator Pre-paging supported				
Call Diversion Treatment Indicator	C	C(=)		
Long FTN Supported	C	C(=)		
Suppress VT-CSI	C	C(=)		
Suppress Incoming Call Barring	C	C(=)		
gsmSCF Initiated Call	C	C(=)		
Network Signal Info 2	C	C(=)		
IMSI			C	C(=)
MSRN			C	C(=)
Forwarding Data			C	C(=)
Forwarding Interrogation Required			C	C(=)
VMSC address			C	C(=)
GMSC Camel Subscription Info			C	C(=)
Location Information			C	C(=)
Subscriber State			C	C(=)
Basic Service Code			C	C(=)
CUG Subscription Flag			C	C(=)
North American Equal Access preferred			U	C(=)
Carrier Id				
User error			C	C(=)
SS-List			U	C(=)
CCBS Target			C	C(=)

Parameter name	Request	Indication	Response	Confirm
Keep CCBS Call Indicator			C	C(=)
IST Alert Timer			C	C(=)
Number Portability Status			U	C(=)
Supported CAMEL Phases in VMSC			C	
Offered CAMEL 4 CSIs in VMSC			C	C(=)
MSRN 2			C	C(=)
Forwarding Data 2			C	C(=)
SS-List 2			C	C(=)
Basic Service Code 2			C	C(=)
Allowed Services			C	C(=)
Unavailability Cause			C	C(=)
Provider error				O

10.1.3 Parameter use

See clause 7.6 for a definition of the parameters used in addition to the following. Note that:

- a conditional parameter whose use is defined only in 3GPP TS 23.078 shall be absent if the sending entity does not support CAMEL;
- a conditional parameter whose use is defined only in 3GPP TS 23.079 [99] shall be absent if the sending entity does not support optimal routing;
- a conditional parameter whose use is defined only in 3GPP TS 23.078 & 3GPP TS 23.079 [99] shall be absent if the sending entity supports neither CAMEL nor optimal routing.

Interrogation Type

See 3GPP TS 23.079 [99] for the use of this parameter.

GMSC or gsmSCF address

The E.164 address of the GMSC or the gsmSCF. This parameter contains the gsmSCF address if the gsmSCF initiated call parameter is present, otherwise it is the GMSC address.

MSISDN

This is the Mobile Subscriber ISDN number assigned to the called subscriber. In the Request & Indication it is the number received by the GMSC in the ISUP IAM. If the call is to be forwarded and the HLR supports determination of the redirecting number, the HLR inserts the basic MSISDN in the Response.

See 3GPP TS 23.066 [108] for the use of this parameter and the conditions for its presence in the response.

OR Interrogation

See 3GPP TS 23.079 [99] for the use of this parameter and the conditions for its presence.

OR Capability

See 3GPP TS 23.079 [99] for the use of this parameter and the conditions for its presence.

CUG Interlock

See 3GPP TS 23.018 [97] for the use of this parameter and the conditions for its presence.

CUG Outgoing Access

See 3GPP TS 23.018 [97] for the use of this parameter and the conditions for its presence.

Number of Forwarding

See 3GPP TS 23.018 [97] for the use of this parameter and the conditions for its presence.

Network Signal Info

See 3GPP TS 23.018 [97] for the conditions for the presence of the components of this parameter.

Supported CAMEL Phases

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

T-CSI Suppression

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

Offered CAMEL 4 CSIs

This parameter indicates the CAMEL phase 4 CSIs offered in the GMSC/VLR (see clause 7.6.3.36D).

Suppression Of Announcement

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

Call Reference Number

The use of this parameter and the conditions for its presence are specified in 3GPP TS 23.078 [98] and 3GPP TS 23.079 [99].

Forwarding Reason

See 3GPP TS 23.079 [99] for the use of this parameter and the conditions for its presence.

Basic Service Group

See 3GPP TS 23.079 [99] for the use of this parameter and the conditions for its presence.

Basic Service Group 2

See 3GPP TS 23.079[99] for the use of this parameter and the conditions for its presence.

Alerting Pattern

See 3GPP TS 23.018 [97] and 3GPP TS 23.078 [98] for the use of this parameter and the conditions for its presence.

CCBS Call

See 3GPP TS 23.093 [107] for the use of this parameter and the conditions for its presence.

Supported CCBS Phase

This parameter indicates by its presence that CCBS is supported and the phase of CCBS which is supported.

Additional Signal Info

See 3GPP TS 23.081 [27] for the conditions for the presence of the components of this parameter.

IST Support Indicator

This parameter is used to indicate to the HLR that the GMSC supports basic IST functionality, that is, the GMSC is able to terminate the subscriber call activity that originated the IST Alert when it receives the IST Alert response indicating that the call(s) shall be terminated. If this parameter is not included in the Send Routing Information indication and the subscriber is marked as an IST subscriber, then the HLR may limit the service for the call (by barring the incoming call if it is not subject to forwarding, or suppressing Call Forwarding from the GMSC), or allow the call assuming the associated risk of not having the basic IST mechanism available.

This parameter can also indicate that the GMSC supports the IST Command, including the ability to terminate all calls being carried for the identified subscriber by using the IMSI as a key. If this additional capability is not included in the Send Routing Information indication and the subscriber is marked as an IST subscriber, then the HLR may limit the service for the subscriber (by barring the incoming calls if they are not subject to forwarding, or suppressing Call Forwarding from the GMSC), or allow the incoming calls assuming the associated risk of not having the IST Command mechanism available.

[Maximum SRI Timer Value Indicator](#)~~Pre-paging supported~~

See 3GPP TS 23.018 [and 3GPP TS 23.078 \[98\]](#) for the use of this parameter and the conditions for its presence.

Call Diversion Treatment Indicator

This parameter indicates whether or not call diversion is allowed.

Network Signal Info 2

See 3GPP TS 23.172 [126] for the conditions for the presence of the components of this parameter.

IMSI

See 3GPP TS 23.018 [97] and 3GPP TS 23.066 [108] for the use of this parameter and the conditions for its presence.

MSRN

See 3GPP TS 23.018 [97], 3GPP TS 23.066 [108] and 3GPP TS 23.079 [99] for the use of this parameter and the conditions for its presence. If the NPLR returns only the MSISDN-number without Routeing Number to the GMSC, the MSISDN-number shall be returned as MSRN.

Forwarding Data

This parameter includes a number to define the forwarded-to destination, the forwarding reason and the forwarding options Notification to calling party and Redirecting presentation, and can include the forwarded-to subaddress. See 3GPP TS 23.018 [97] and 3GPP TS 23.079 [99] for the conditions for the presence of its components.

Forwarding Interrogation Required

See 3GPP TS 23.079 [99] for the use of this parameter and the conditions for its presence.

Long FTN Supported

This parameter indicates that the GMSC supports Long Forwarded-to Numbers.

Suppress VT-CSI

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

Suppress Incoming Call Barring

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

gsmSCF Initiated Call

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

VMSC address

See 3GPP TS 23.079 [99] and 3GPP TS 23.078 [98] for the use of this parameter and the conditions for its presence.

GMSC CAMEL Subscription Info

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

Location Information

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

Subscriber State

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

CUG Subscription Flag

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

North American Equal Access preferred Carrier Id

This parameter is returned to indicate the preferred carrier identity to be used to set-up the call (i.e. forwarding the call or establishing the roaming leg).

SS-List

This parameter includes SS-codes and will be returned as an operator option. The HLR shall not send PLMN-specific SS-codes across PLMN boundaries. However if the GMSC receives PLMN-specific SS-codes from a foreign PLMN's HLR the GMSC may ignore it. If the GMSC attempts to process the PLMN-specific SS-codes, this may lead to unpredictable behaviour but the GMSC shall continue call processing.

Basic Service Code

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

If the CAMEL service is not involved, this parameter includes the basic service code and will be returned as an operator option. The HLR shall not send a PLMN-specific Basic Service Code across PLMN boundaries. However if the GMSC receives a PLMN-specific Basic Service Code from a foreign PLMN's HLR the GMSC may ignore it. If the GMSC attempts to process the PLMN-specific Basic Service codes, this may lead to unpredictable behaviour but the GMSC shall continue call processing.

CCBS Target

See 3GPP TS 23.093 [107] for the use of this parameter and the conditions for its presence.

Keep CCBS Call Indicator

See 3GPP TS 23.093 [107] for the use of this parameter and the conditions for its presence.

IST Alert Timer

It includes the IST Alert timer value that must be used to inform the HLR about the call activities that the subscriber performs. This parameter is only sent to the GMSC in response to a Send Routing Information request which indicates the the GMSC supports IST.

Number Portability Status

This parameter indicates the number portability status of the subscriber. This parameter may be present if the sender of SRIack is NPLR.

Supported CAMEL Phases in VMSC

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

Offered CAMEL 4 CSIs in VMSC

This parameter is defined in clause 7.6.3.36F.

MSRN 2

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.172 [126].

Forwarding Data 2

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.172 [126].

SS-List 2

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.172 [126].

Basic Service Code 2

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.172 [126].

Allowed Services

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.172 [126].

Unavailability Cause

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.172 [126].

User error

This parameter is sent by the responder when an error is detected and if present, takes one of the following values:

- Unknown Subscriber;

The diagnostic for the Unknown Subscriber error may indicate “NPDB Mismatch”.

- Number changed;
- Call Barred;

This error will indicate that either incoming calls are barred for this MS or that calls are barred due to Operator Determined Barring (see 3GPP TS 22.041 [8] for a definition of this network feature);

- CUG Reject;

The value of this error cause will indicate the reason for CUG Reject;

- Bearer Service Not Provisioned;
- Teleservice Not Provisioned;

A subscription check has been performed and the call has not passed the check due to incompatibility with regard to the requested service. Depending on the nature of the incompatibility, either of these messages will be returned;

- Facility Not Supported;
- Absent Subscriber;

This indicates that the location of the MS is not known (either the station is not registered and there is no location information available or the Provide Roaming Number procedure fails due to IMSI detached flag being set), or the GMSC requested forwarding information with a forwarding reason of not reachable, and the call forwarding on MS not reachable service is not active;

- Busy Subscriber;

This indicates that Call Forwarding on Busy was not active for the specified basic service group when the GMSC requested forwarding information with a forwarding reason of busy;

The error may also indicate that the subscriber is busy due to an outstanding CCBS recall. In the error data it may then be specified that CCBS is possible for the busy encountered call;

- No Subscriber Reply;

This indicates that Call Forwarding on No Reply was not active for the specified basic service group when the GMSC requested forwarding information with a forwarding reason of no reply;

- OR Not Allowed;

This indicates that the HLR is not prepared to accept an OR interrogation from the GMSC, or that calls to the specified subscriber are not allowed to be optimally routed;

- Forwarding Violation;
- System Failure;
- Data Missing;
- Unexpected Data Value.

See clause 7.6 for a definition of these errors.

Provider error

These are defined in clause 7.6.

***** Next Modification *****

17.6.3 Call Handling Operations

```
MAP-CallHandlingOperations {
    itu-t identified-organization (4) etsi (0) mobileDomain (0)
    gsm-Network (1) modules (3) map-CallHandlingOperations (7)
    version9 (9)}
```

DEFINITIONS

::=

BEGIN

EXPORTS

```
    sendRoutingInfo,
    provideRoamingNumber,
    resumeCallHandling,
    setReportingState,
    statusReport,
    remoteUserFree,
    ist-Alert,
    ist-Command
```

;

IMPORTS

OPERATION

```
FROM Remote-Operations-Information-Objects {
    joint-iso-itu-t remote-operations(4)
    informationObjects(5) version1(0)}
```

```
    systemFailure,
    dataMissing,
    unexpectedDataValue,
    facilityNotSupported,
    or-NotAllowed,
    unknownSubscriber,
    numberChanged,
    bearerServiceNotProvisioned,
    teleserviceNotProvisioned,
    noRoamingNumberAvailable,
    absentSubscriber,
    busySubscriber,
    noSubscriberReply,
    callBarred,
    forwardingViolation,
    forwardingFailed,
    cug-Reject,
    resourceLimitation,
    incompatibleTerminal,
    unidentifiedSubscriber
```

FROM MAP-Errors {

```
    itu-t identified-organization (4) etsi (0) mobileDomain (0)
    gsm-Network (1) modules (3) map-Errors (10) version9 (9)}
    SendRoutingInfoArg,
    SendRoutingInfoRes,
    ProvideRoamingNumberArg,
    ProvideRoamingNumberRes,
    ResumeCallHandlingArg,
    ResumeCallHandlingRes,
    SetReportingStateArg,
    SetReportingStateRes,
    StatusReportArg,
    StatusReportRes,
    RemoteUserFreeArg,
    RemoteUserFreeRes,
    IST-AlertArg,
    IST-AlertRes,
    IST-CommandArg,
    IST-CommandRes
```

```

FROM MAP-CH-DataTypes {
    itu-t identified-organization (4) etsi (0) mobileDomain (0)
    gsm-Network (1) modules (3) map-CH-DataTypes (13) version9 (9)}
;

```

```

sendRoutingInfo OPERATION ::= {                                     --Timer m
-- The timer is set to the upper limit of the range if the GMSC supports pre-paging
-- or if the GMSC supports retrieval of Current Location during mobile terminating
-- call handling.
    ARGUMENT
        SendRoutingInfoArg
    RESULT
        SendRoutingInfoRes
    ERRORS {
        systemFailure |
        dataMissing |
        unexpectedDataValue |
        facilityNotSupported |
        or-NotAllowed |
        unknownSubscriber |
        numberChanged |
        bearerServiceNotProvisioned |
        teleserviceNotProvisioned |
        absentSubscriber |
        busySubscriber |
        noSubscriberReply |
        callBarred |
        cug-Reject |
        forwardingViolation}
    CODE local:22 }

```

```

provideRoamingNumber OPERATION ::= {                               --Timer m
-- The timer is set to the upper limit of the range if the HLR supports pre-paging.
    ARGUMENT
        ProvideRoamingNumberArg
    RESULT
        ProvideRoamingNumberRes
    ERRORS {
        systemFailure |
        dataMissing |
        unexpectedDataValue |
        facilityNotSupported |
        or-NotAllowed |
        absentSubscriber |
        noRoamingNumberAvailable}
    CODE local:4 }

```

```

resumeCallHandling OPERATION ::= {                                 --Timer m
    ARGUMENT
        ResumeCallHandlingArg
    RESULT
        ResumeCallHandlingRes
        -- optional
    ERRORS {
        forwardingFailed |
        or-NotAllowed |
        unexpectedDataValue |
        dataMissing }
    CODE local:6 }

```

```

setReportingState OPERATION ::= {                                  --Timer m
    ARGUMENT
        SetReportingStateArg
    RESULT
        SetReportingStateRes
        -- optional
    ERRORS {
        systemFailure |
        unidentifiedSubscriber |
        unexpectedDataValue |
        dataMissing |
        resourceLimitation |
        facilityNotSupported}
    CODE local:73 }

```

```

statusReport OPERATION ::= {                                     --Timer m
  ARGUMENT
    StatusReportArg
  RESULT
    StatusReportRes
    -- optional
  ERRORS {
    unknownSubscriber |
    systemFailure |
    unexpectedDataValue |
    dataMissing}
  CODE local:74 }

```

```

remoteUserFree OPERATION ::= {                                 --Timer m1
  ARGUMENT
    RemoteUserFreeArg
  RESULT
    RemoteUserFreeRes
  ERRORS {
    unexpectedDataValue |
    dataMissing |
    incompatibleTerminal |
    absentSubscriber |
    systemFailure |
    busySubscriber}
  CODE local:75 }

```

```

ist-Alert OPERATION ::= {                                     --Timer m
  ARGUMENT
    IST-AlertArg
  RESULT
    IST-AlertRes
    -- optional
  ERRORS {
    unexpectedDataValue |
    resourceLimitation |
    unknownSubscriber |
    systemFailure |
    facilityNotSupported}
  CODE local:87 }

```

```

ist-Command OPERATION ::= {                                   --Timer m
  ARGUMENT
    IST-CommandArg
  RESULT
    IST-CommandRes
    -- optional
  ERRORS {
    unexpectedDataValue |
    resourceLimitation |
    unknownSubscriber |
    systemFailure |
    facilityNotSupported}
  CODE local:88 }

```

END

***** Next Modification *****

17.7.3 Call handling data types

.....omitted text.....

NumberOfForwarding ::= INTEGER (1..5)

```

SendRoutingInfoArg ::= SEQUENCE {
    msisdn [0] ISDN-AddressString,
    cug-CheckInfo [1] CUG-CheckInfo OPTIONAL,
    numberOfForwarding [2] NumberOfForwarding OPTIONAL,
    interrogationType [3] InterrogationType,
    or-Interrogation [4] NULL OPTIONAL,
    or-Capability [5] OR-Phase OPTIONAL,
    gsmc-OrGsmSCF-Address [6] ISDN-AddressString,
    callReferenceNumber [7] CallReferenceNumber OPTIONAL,
    forwardingReason [8] ForwardingReason OPTIONAL,
    basicServiceGroup [9] Ext-BasicServiceCode OPTIONAL,
    networkSignalInfo [10] ExternalSignalInfo OPTIONAL,
    camelInfo [11] CamelInfo OPTIONAL,
    suppressionOfAnnouncement [12] SuppressionOfAnnouncement OPTIONAL,
    extensionContainer [13] ExtensionContainer OPTIONAL,
    . . . ,
    alertingPattern [14] AlertingPattern OPTIONAL,
    ccbs-Call [15] NULL OPTIONAL,
    supportedCCBS-Phase [16] SupportedCCBS-Phase OPTIONAL,
    additionalSignalInfo [17] Ext-ExternalSignalInfo OPTIONAL,
    istSupportIndicator [18] IST-SupportIndicator OPTIONAL,
    maximumSRI-TimerValueIndicator pre-pagingSupported [19] NULL
    OPTIONAL,
    callDiversionTreatmentIndicator [20] CallDiversionTreatmentIndicator OPTIONAL,
    longFTN-Supported [21] NULL OPTIONAL,
    suppress-VT-CSI [22] NULL OPTIONAL,
    suppressIncomingCallBarring [23] NULL OPTIONAL,
    gsmSCF-InitiatedCall [24] NULL OPTIONAL,
    basicServiceGroup2 [25] Ext-BasicServiceCode OPTIONAL,
    networkSignalInfo2 [26] ExternalSignalInfo OPTIONAL
}
    
```

SuppressionOfAnnouncement ::= NULL

```

InterrogationType ::= ENUMERATED {
    basicCall (0),
    forwarding (1)}
    
```

OR-Phase ::= INTEGER (1..127)

***** End of Document *****