3GPP TSG CN Plenary Meeting #17 **NP-020347**
4th - 6th September 2002. Biarritz, France.

Source: TSG CN WG2

Title: CRs on Rel-5 Work Item CAMEL4, CR Pack 8

Agenda item: 8.3

Document for: APPROVAL

Introduction:

This document contains 2 CRs on Rel-5 WI CAMEL4. These CRs have been agreed by TSG CN WG2 and are forwarded to TSG CN Plenary meeting #17 for approval.

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.078	258	2	N2-020777	Rel-5	Handling of partial implementations of CAMEL phase 4	C	5.0.0
23.078	416	3	N2-020786	Rel-5	Handling of partial implementations of CAMEL phase 4	C	5.0.0

3GPP TSG CN WG2 Meeting #25
Helsinki, Finland, 29th July – 2nd August 2002

N2-020777
N2-020736 rev

CR-Form-v7

CHANGE REQUEST

⌘ **29.078** **CR** **258** ⌘ **rev** **2** ⌘ Current version: **5.0.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Handling of partial implementations of CAMEL phase 4
Source:	⌘	Alcatel
Work item code:	⌘	CAMEL4
Date:	⌘	01/08/2002
Category:	⌘	**C**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	Rel-5 CAMEL stage 1 22.078 introcuces the "Handling of partial implementations of CAMEL phase 4". The 22.078 CR is contained in S1-021500. The current 29.078 CR introcuces the corresponding "Handling of partial implementations of CAMEL phase 4" mechanism in the Rel-5 CAMEL stage 3 specifications.
Summary of change:	⌘	Modification of the new parameters for the handling of "supported CAMEL 4 subsets" such that they handle now the "partial CAMEL implementations" by an entity. Note: Used terms in respect to the old "CAMEL phase 4 subsets" concept: - general: "partial implementation of CAMEL Phase 4"
Consequences if not approved:	⌘	The Handling of partial implementations of CAMEL phase 4 as indicated in Rel-5 CAMEL stage 1 22.078 is not possible.

Clauses affected:	⌘	6.1.1, 11.21.1.1, 11.22.1.1.2				
		Y	**N**			
Other specs affected:	⌘	**X**		Other core specifications	⌘	Rel-5 23.008-CR056, Rel-5 23.078-CR416, Rel-5 29.002-CR497
			X	Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

— First modified section —

6.1 gsmSSF/CCF - gsmSCF Interface

6.1.1 Operations and arguments

```
CAP-gsmSSF-gsmSCF-ops-args {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-gsmSSF-gsmSCF-ops-args(101) version4(3)}

DEFINITIONS IMPLICIT TAGS ::= BEGIN

-- This module contains the operations and operation arguments used for the
-- gsmSSF – gsmSCF interface, for the control of circuit switched calls.

-- The table in subclause 2.1 lists the specifications that contain the modules
-- that are used by CAP.

IMPORTS

    errortypes,
    datatypes,
    operationcodes,
    classes,
    tc-Messages,
    ros-InformationObjects
FROM CAP-object-identifiers {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version4(3)}

    OPERATION
FROM Remote-Operations-Information-Objects ros-InformationObjects

    CallingPartysCategory,
    HighLayerCompatibility,
    RedirectionInformation,
    ServiceKey
FROM CS1-DataTypes {itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
modules(0) cs1-datatypes(2) version1(0)}

    CallSegmentID {},
    MiscCallInfo
FROM CS2-datatypes {itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
cs2(20) modules(0) in-cs2-datatypes (0) version1(0)}

    Ext-BasicServiceCode,
    IMEI,
    IMSI,
    ISDN-AddressString
FROM MAP-CommonDataTypes {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-Network(1) modules(3) map-CommonDataTypes(18) version6(6)}

    CUG-Index,
    CUG-Interlock,
    CUG-Info,
    LocationInformation,
    MS-Classmark2,
    SubscriberState,
    SupportedCamelPhases,
    SupportedCamel4Subsets
    OfferedCamel4Functionalities
FROM MAP-MS-DataTypes {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-Network(1) modules(3) map-MS-DataTypes(11) version6(6)}

    CallReferenceNumber,
    SuppressionOfAnnouncement
FROM MAP-CH-DataTypes {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-Network(1) modules(3) map-CH-DataTypes(13) version6(6)}

    PARAMETERS-BOUND
FROM CAP-classes classes

    opcode-activityTest,
    opcode-applyCharging,
    opcode-applyChargingReport,
    opcode-assistRequestInstructions,
```

```
    opcode-callGap,
    opcode-callInformationReport,
    opcode-callInformationRequest,
    opcode-cancel,
    opcode-connect,
    opcode-connectToResource,
    opcode-continue,
    opcode-continueWithArgument,
    opcode-disconnectForwardConnection,
    opcode-dFCWithArgument,
    opcode-disconnectLeg,
    opcode-entityReleased,
    opcode-establishTemporaryConnection,
    opcode-eventReportBCSM,
    opcode-furnishChargingInformation,
    opcode-initialDP,
    opcode-initiateCallAttempt,
    opcode-moveLeg,
    opcode-playTone,
    opcode-releaseCall,
    opcode-requestReportBCSMEvent,
    opcode-resetTimer,
    opcode-sendChargingInformation,
    opcode-splitLeg
FROM CAP-operationcodes operationcodes

    AChBillingChargingCharacteristics {},
    AdditionalCallingPartyNumber {},
    AlertingPattern,
    AssistingSSPIPRoutingAddress {},
    BCSMEvent,
    BCSM-Failure,
    BearerCapability {},
    CalledPartyNumber {},
    CalledPartyBCDNumber {},
    CallingPartyNumber {},
    CallResult {},
    CallSegmentToCancel,
    CallSegmentFailure,
    Carrier,
    Cause {},
    CGEncountered,
    ChargeNumber {},
    ControlType,
    CorrelationID {},
    DestinationRoutingAddress {},
    EventSpecificChargingInformation {},
    EventSpecificInformationBCSM {},
    EventTypeBCSM,
    EventTypeChargingPLMN,
    Extensions {},
    FCIBillingChargingCharacteristics {},
    GapCriteria {},
    GapIndicators,
    GapTreatment,
    GenericNumbers {},
    InvokeID,
    IPRoutingAddress {},
    IPSSPCapabilities {},
    leg1,
    LegOrCallSegment {},
    LocationNumber {},
    MonitorMode,
    NAOliInfo,
    OCSIApplicable,
    OriginalCalledPartyID {},
    ReceivingSideID,
    RedirectingPartyID {},
    RequestedInformationList {},
    RequestedInformationTypeList,
    ScfID {},
    SCIBillingChargingCharacteristics {},
    SendingSideID,
    ServiceInteractionIndicatorsTwo,
    TimeAndTimezone {},
    TimerID,
    TimerValue
FROM CAP-datatypes datatypes
```

```
    cancelFailed,
    eTCFailed,
    missingCustomerRecord,
    missingParameter,
    parameterOutOfRange,
    requestedInfoError,
    systemFailure,
    taskRefused,
    unexpectedComponentSequence,
    unexpectedDataValue,
    unexpectedParameter,
    unknownLegID,
    unknownCSID
FROM CAP-errortypes errortypes

;

...

initialDP {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        InitialDPArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingCustomerRecord |
                     missingParameter |
                     parameterOutOfRange |
                     systemFailure |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter}
    CODE            opcode-initialDP}
-- Direction: gsmSSF -> gsmSCF, Timer: Tidp
-- This operation is used after a TDP to indicate request for service.

InitialDPArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    serviceKey                          [0] ServiceKey  ,
    calledPartyNumber                   [2] CalledPartyNumber {bound}               OPTIONAL,
    callingPartyNumber                  [3] CallingPartyNumber {bound}              OPTIONAL,
    callingPartysCategory               [5] CallingPartysCategory                   OPTIONAL,
    cGEncountered                       [7] CGEncountered                           OPTIONAL,
    iPSSPCapabilities                   [8] IPSSPCapabilities {bound}               OPTIONAL,
    locationNumber                      [10] LocationNumber {bound}                 OPTIONAL,
    originalCalledPartyID               [12] OriginalCalledPartyID {bound}          OPTIONAL,
    extensions                          [15] Extensions                             OPTIONAL,
    highLayerCompatibility              [23] HighLayerCompatibility                 OPTIONAL,
    additionalCallingPartyNumber        [25] AdditionalCallingPartyNumber {bound}   OPTIONAL,
    bearerCapability                    [27] BearerCapability {bound}               OPTIONAL,
    eventTypeBCSM                       [28] EventTypeBCSM                          OPTIONAL,
    redirectingPartyID                  [29] RedirectingPartyID {bound}             OPTIONAL,
    redirectionInformation              [30] RedirectionInformation                 OPTIONAL,
    cause                               [17] Cause {bound}                          OPTIONAL,
    serviceInteractionIndicatorsTwo     [32] ServiceInteractionIndicatorsTwo        OPTIONAL,
    carrier                             [37] Carrier {bound}                        OPTIONAL,
    cug-Index                           [45] CUG-Index                              OPTIONAL,
    cug-Interlock                       [46] CUG-Interlock                          OPTIONAL,
    cug-OutgoingAccess                  [47] NULL                                   OPTIONAL,
    iMSI                                [50] IMSI                                   OPTIONAL,
    subscriberState                     [51] SubscriberState                        OPTIONAL,
    locationInformation                 [52] LocationInformation                    OPTIONAL,
    ext-basicServiceCode                [53] Ext-BasicServiceCode                   OPTIONAL,
    callReferenceNumber                 [54] CallReferenceNumber                    OPTIONAL,
    mscAddress                          [55] ISDN-AddressString                     OPTIONAL,
    calledPartyBCDNumber                [56] CalledPartyBCDNumber {bound}           OPTIONAL,
    timeAndTimezone                     [57] TimeAndTimezone {bound}                OPTIONAL,
    callForwardingSS-Pending            [58] NULL                                   OPTIONAL,
    initialDPArgExtension               [59] InitialDPArgExtension                  OPTIONAL,
    ...
    }

InitialDPArgExtension ::= SEQUENCE {
    gmscAddress                         [0] ISDN-AddressString                      OPTIONAL,
    forwardingDestinationNumber         [1] CalledPartyNumber {bound}               OPTIONAL,
    ms-Classmark2                       [2] MS-Classmark2                           OPTIONAL,
    iMEI                                [3] IMEI                                    OPTIONAL,
    supportedCamelPhases                [4] SupportedCamelPhases                    OPTIONAL,
    supportedCamel4SubsetsofferedCamel4Functionalities              [5]
SupportedCamel4SubsetsOfferedCamel4Functionalities                  OPTIONAL,
```

```
    ...
}
-- If iPSSPCapabilities is not present then this denotes that a colocated gsmSRF is not
-- supported by the gsmSSF. If present, then the gsmSSF supports a colocated gsmSRF capable
-- of playing announcements via elementaryMessageIDs and variableMessages, the playing of
-- tones and the collection of DTMF digits. Other supported capabilities are explicitly
-- detailed in the IPSSPCapabilities parameter itself.
-- Carrier is included at the discretion of the gsmSSF operator.

InitiateCallAttempt {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        InitiateCallAttemptArg {bound}
    RESULT          InitiateCallAttemptRes {bound}
    ERRORS          {missingParameter |
                     parameterOutOfRange |
                     systemFailure |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter |
                     unknownCSId}
    CODE            opcode-initiateCallAttempt}
-- Direction: gsmSCF -> gsmSSF, Timer T_ica
-- This operation is used to instruct the gsmSSF to create a new call to a call party using the
-- address information provided by the gsmSCF.

InitiateCallAttemptArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    DestinationRoutingAddress           [0] DestinationRoutingAddress {bound},
    extensions                          [4] Extensions {bound}                      OPTIONAL,
    legToBeCreated                      [5] LegID                                   OPTIONAL,
    newCallSegment                      [6] CallSegmentID {bound}                   OPTIONAL,
    callingPartyNumber                  [30] CallingPartyNumber {bound}             OPTIONAL,
    callReferenceNumber                 [51] CallReferenceNumber                    OPTIONAL,
    gsmSCFAddress                       [52] ISDN-AddressString                     OPTIONAL,
    suppress-T-CSI                      [53] NULL                                   OPTIONAL,
    ...
    }

InitiateCallAttemptRes {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    supportedCamelPhases                [0] SupportedCamelPhases                    OPTIONAL,
    ~~supportedCamel4Subsets~~offeredCamel4Functionalities          [1]
~~SupportedCamel4Subsets~~OfferedCamel4Functionalities              OPTIONAL,
    extensions                          [2] Extensions {bound}                      OPTIONAL,
    ...
    }

...

END

...
```

— Next modified section —

11 Detailed operation procedures for circuit switched call control

11.21 InitialDP procedure

11.21.1 General description

The gsmSSF uses this operation after detection of a TDP-R in the BCSM, to request the gsmSCF for instructions to complete the call.

11.21.1.1 Parameters

- serviceKey:
  This parameter indicates to the gsmSCF the requested IN service. It is used to address the required application/SLP within the gsmSCF; this parameter is not for SCP addressing.

- calledPartyNumber:
  This parameter contains the number used to identify the called party in the forward direction, i.e. see ETSI EN 300 356-1 [23]. This parameter shall be sent only in the Mobile Terminating, Mobile Forwarding and mobile originating on unsuccessful TDP cases.

- callingPartyNumber:
  This parameter carries the calling party number to identify the calling party or the origin of the call. See ETSI EN 300 356-1 [23] Calling Party Number signalling information.

- callingPartysCategory:
  Indicates the type of calling party (e.g. operator, pay phone, ordinary subscriber). See ETSI EN 300 356-1 [23] Calling Party Category signalling information.

- locationNumber:
  This parameter is used to convey the geographical area address for mobility services, see ITU-T Recommendation Q.762 [44]. It is used when "callingPartyNumber" does not contain any information about the geographical location of the calling party (e.g., origin dependent routeing when the calling party is a mobile subscriber).

- originalCalledPartyID:
  If the call has met call forwarding on the route to the gsmSSF, then this parameter carries the dialled digits. Refer to EN 300 356-1[23] Original Called Number signalling information.

- highlayerCompatibility:
  This parameter indicates the type of the high layer compatibility, which will be used to determine the ISDN - teleservice of a connected ISDN terminal. The highlayerCompatibility can also be transported by ISUP (e.g. within the ATP (see ITU-T Recommendation Q.763 [45]) parameter).

- additionalCallingPartyNumber:
  The calling party number provided by the access signalling system of the calling user, e.g. provided by a PBX.

- bearerCapability:
  This parameter indicates the type of the bearer capability connection or the transmission medium requirements to the user. It is a network option to select which of the two parameters to be used:

  - bearerCap:
    This parameter contains the value of the ISUP User Service Information parameter.

    The parameter "bearerCapability" shall be included in the "InitialDP" operation only in the case the ISUP User Service Information parameter is available at the gsmSSF.

    If User Service Information and User Service Information Prime are available at the gsmSSF, then the "bearerCap" shall contain the value of the User Service Information Prime parameter.

- eventTypeBCSM:
  This parameter indicates the armed BCSM DP event, resulting in the "InitialDP" operation.

- redirectingPartyID:
  This parameter indicates the last directory number the call was redirected from.

- redirectionInformation:
  This parameter contains forwarding related information, such as redirecting counter.
  See ITU-T Recommendation Q.763 [45] Redirection Information signalling information.

- iPSSPCapabilities:
  This parameter indicates which gsmSRF resources supported within the VMSC or GMSC the gsmSSF resides in are attached and available.

- serviceInteractionIndicatorsTwo:
  This parameter contains indicators that are used to resolve interactions between CAMEL based services and network based services.

- iMSI:
  This parameter contains the IMSI of the mobile subscriber for which the service is invoked.

- subscriberState:
  This parameter indicates the the state of the mobile subscriber for which the service is invoked. The possible states are "busy", "idle" and "not reachable".

- locationInformation:
  This parameter indicates the location of the MS and the age of the information defining the location.

- ext-BasicServiceCode:
  This parameter indicates the Basic Service Code.

- callReferenceNumber:
  This parameter contains the call reference number assigned to the call by the CCF.

- mscAddress:
  This parameter contains the mscId assigned to the MSC.

- gmscAddress:
  This parameter contains the gmscId assigned to the GMSC.

- calledPartyBCDNumber:
  This parameter contains the number used to identify the called party in the forward direction. It may also include service selection information, including * and # characters.

- time&Timezone:
  This parameter contains the time that the gsmSSF was triggered, and the time zone that the invoking gsmSSF resides in.

- callForwardingSS-Pending:
  This parameter indicates that a forwarded-to-number was received and that the call will be forwarded due to the Call Forwarding supplementary service in the GMSC or in the VMSC, unless otherwise instructed by the gsmSCF.

- carrier:
  This parameter contains carrier information. It consists of the carrier selection field followed by the Carrier ID information associated with the calling subscriber of a mobile originating call, the called subscriber of a mobile terminating call or the forwarding subscriber of a mobile fowarded call.

  It contains the following embedded parameter:

  - carrierSelectionField:
    This parameter indicates how the selected carrier is provided (e.g. pre-subscribed).

  - carrierID:
    This parameter indicates the carrier to use for the call. It contains the digits of the carrier identification code.

- cug-Index:
  This parameter is used to select a CUG for an outgoing call at the user, or to indicate an incoming CUG call to the user.

- cug-Interlock:
  This parameter uniquely identifies a CUG within a network.

- cug-OutgoingAccess:
  This parameter indicates if the calling user has subscribed to the outgoing access inter-CUG accessibility subscription option.

- cGEncountered:
  This parameter indicates the type of call gapping the related call has been subjected to, if any.

- cause:
  This parameter indicates the release cause which triggered the event:

  For Route_Select_Failure" it shall contain the "FailureCause", if available.

  For T_Busy it may contain the following parameters, if available.

  - If the busy event is triggered by an ISUP release message, then the BusyCause shall a copy of the ISUP release cause, for example: Subscriber absent, 20 or User busy, 17.

  - If the busy event is triggered by a MAP error, for example: Absent subscriber, received from the HLR, then the MAP cause is mapped to the corresponding ISUP release cause.

  - If the busy event is triggered by call forwarding invocation in the GMSC or VMSC, then the BusyCause shall refer to the type of the call forwarding service in accordance with the mapping table in 3GPP TS 23.078 [7].

- forwardingDestinationNumber:
  This parameter contains the forwarding destination.

- ms-Classmark2:
  This parameter contains the MS Classmark 2 of the mobile subscriber for which the service is invoked.

- iMEI:
  This parameter contains the IMEI (with software version) of the mobile subscriber for which the service is invoked.

- supportedCamelPhases:
  This parameter indicates the CAMEL Phases supported in the GMSC or VMSC which sends this operation.

- ~~supportedCamel4Subsets~~offeredCamel4Functionalities:
  This parameter contains the ~~supported~~ offered CAMEL phase 4 functionalities~~subsets~~.

11.21.2 Invoking entity (gsmSSF)

11.21.2.1 Normal procedure

gsmSSF preconditions:

(1) An event fulfilling the criteria for the DP being executed has been detected.

(2) Call gapping and SS7 overload are not in effect for the call.

gsmSSF postconditions:

(1) If the DP was armed as a TDP-R and trigger conditions, if present, are fulfilled, then a control relationship between the gsmSCF and the gsmSSF is established. The gsmSSF transits to the State "Waiting_for_Instructions".

The address of the gsmSCF shall be fetched from the valid CSI. The gsmSSF shall provide all available parameters to the gsmSCF.

If no triggering takes place, because trigger conditions were not fulfilled, then the gsmSSF shall proceed with call handling without CAMEL Service.

The gsmSSF application timer Tssf is loaded and started when the gsmSSF sends "InitialDP" for requesting instructions from the gsmSCF. It is used to prevent excessive call suspension time.

11.21.2.2 Error handling

If the gsmSCF is not accessible, then the call proceeds in accordance with the Default Call Handling parameter in the CSI.

When Tssf expires, then the gsmSSF shall abort the interaction with the gsmSCF by means of an abort to TC and shall call continue the call in accordance with the Default Call Handling parameter in the valid CSI.

If the calling party abandons after the sending of "InitialDP", then the gsmSSF shall abort the interaction with the gsmSCF by means of an abort to TC.

NOTE TC will wait until the first response message from the gsmSCF has been received before it sends an abort to the gsmSCF (see also clause 14).

Generic error handling for the operation related errors are described in clause 10 and the TC services which are used for reporting operation errors are described in clause 14.

— Next modified section —

11.22 InitiateCallAttempt procedure

11.22.1 General Description

The gsmSCF uses this operation to request the gsmSSF to create a new call leg to one call party using the address information provided by the gsmSCF (e.g. wake-up call). The gsmSCF shall subsequently arm O_Answer as an EDP-R and the call failure events (Route_Select_Failure, O_Busy and O_No_Answer) as EDP-Rs and/or EDP-Ns, in order to enable the gsmSCF to treat this call appropriately when any of these events is encountered. InitiateCallAttempt can also be used to create an additional call party in a new Call Segment within an existing Call Segment Association.

11.22.1.1 Parameters

11.22.1.1.1 Argument Parameters

- destinationRouteingAddress:
  This parameter contains the called party number towards which the call shall be routed.

- callingPartyNumber:
  This parameter identifies which number shall be regarded as the calling party for the created call.

- legToBeCreated:
  This parameter indicates the LegID to be assigned to the newly created party.

- newCallSegment:
  This parameter indicates the Call Segment ID to be assigned to the newly created Call Segment.

- callReferenceNumber:
  This parameter contains the call reference number assigned to the call by the gsmSCF.

- gsmSCFAddress:
  This parameter indicates the address of the gsmSCF initiating the operation.

- suppress-T-CSI:
  This parameter indicates that the T-CSI for the served subscriber shall be suppressed for this call leg.

11.22.1.1.2 Result Parameters

- supportedCamelPhases:
  This parameter indicates the CAMEL Phases supported in the gsmSSF which receives this operation.

- ~~supportedCamel4Subsets~~offeredCamel4Functionalities:
  This parameter contains the offered ~~supported~~ CAMEL phase 4 functionalities~~subsets~~.

11.22.2 Responding entity (gsmSSF)

11.22.2.1 Normal procedure

gsmSSF preconditions:

None.

gsmSSF postconditions:

1) A new O-BCSM has been created; call processing is suspended.

2) A Return Result is sent to the gsmSCF.

3) The CS_gsmSSF FSMtransits from the state "Idle" to the state "Waiting_for_Instructions".

All subsequent operations are treated in accordance with their normal procedures.

11.22.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10, and the TC services which are used for reporting operation errors are described in clause 14.

— End —

3GPP TSG CN WG2 Meeting #25 ***N2-020786***
Helsinki, Finland, 29th July – 2nd August 2002 N2-020775 rev

CR-Form-v7

CHANGE REQUEST

⌘ **23.078** **CR** **416** ⌘ **rev** **3** ⌘ Current version **5.0.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Handling of partial implementations of CAMEL phase 4
Source:	⌘	Alcatel
Work item code:	⌘	CAMEL4
Date:	⌘	01/08/2002
Category:	⌘	**C**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
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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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Rel-5 CAMEL stage 1 22.078 introduces the "Handling of partial implementations of CAMEL phase 4". The 22.078 CR is contained in S1-021500. Further assumptions are indicated in S1-021495. The current 23.078 CR introcuces the corresponding "Handling of partial implementations of CAMEL phase 4" mechanism in the Rel-5 CAMEL stage 2 specification.
Summary of change:	⌘	Modification of the new parameters for the handling of "supported CAMEL 4 subsets" such that they handle now the "partial CAMEL implementations" by an entity. Note: Used terms in respect to the old "CAMEL phase 4 subsets" concept: - general: "partial implementation of CAMEL Phase 4"
Consequences if not approved:	⌘	The Handling of partial implementations of CAMEL phase 4 as indicated in Rel-5 CAMEL stage 1 22.078 is not possible.

Clauses affected:	⌘	1.1, 4.6.1.8.2, 4.6.1.9.2, 4.6.2.19.1, 4.6.7.4.2, 4.6.8.1.2, 4.6.8.3.2, 4.6.8.4.2, 4.6.9.1.2, 4.6.10.1.2, 7.6.4.3, 9.4.1.1.2, 10.3.2.2.2			
		Y	**N**		
Other specs affected:	⌘	**X**		Other core specifications	⌘ Rel-5 23.008-CR056, Rel-5 29.078-CR258, Rel-5 29.002-CR479
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘	In addition to the indicated CSI-s, "support of CAMEL ph4 ATI for GPRS is			

	indicated to the HLR". ATI itself is not directly visible for the VMSC / SGSN. Therefore, this issue is indicated as PSI in the current contribution.

— First modified section —

1 Scope

The present document specifies the stage 2 description for the fourth phase (see 3GPP TS 22.078 [6]) of the Customized Applications for Mobile network Enhanced Logic (CAMEL) feature which provides the mechanisms to support services of operators which are not covered by standardized services even when roaming outside the HPLMN.

The CAMEL feature is a network feature and not a supplementary service. It is a tool to help the network operator to provide the subscribers with the operator specific services even when roaming outside the HPLMN.

In the present document, the GSM Service Control Function (gsmSCF) is treated as being part of the HPLMN. The regulatory environment in some countries may require the possibility that the gsmSCF and the HPLMN are controlled by different operators, and the gsmSCF and the HPLMN are therefore distinct entities.

The fourth phase of the CAMEL feature supports, in addition to the third phase of the CAMEL:

- Interactions with Optimal Routing;
- Call Party Handling;
- DTMF Mid call procedure for Mobile Originated and Mobile Terminating calls;
- Inclusion of flexible tone injection;
- Charging Notification to CSE;
- Provision of location information of called subscriber;
- Provide location information during ongoing call;
- CAMEL control over MT SMS;
- Notification of GPRS mobility management to CSE;
- Inclusion of ODB data in Any Time Modification;
- Enhancement of Any Time Interrogation and Provide Subscriber Information for PS Domain.

CAMEL applicability to IP-based multimedia services is introduced in the fourth phase of the CAMEL. It is specified in 3GPP TS 23.278 [27].

CAMEL is not applicable to Emergency Setup (TS 12), i.e., if an Emergency call is requested, then the gsmSSF shall not be invoked.

The mechanism described in the present document addresses especially the need for information exchange between the VPLMN or IPLMN and the HPLMN for support of operator specific services. Any user procedures for the control of operator specific services are outside the scope of the present document. Subscribers who have subscribed to operator specific services and therefore need the functional support of the CAMEL feature shall be marked in the HPLMN and VPLMN. In case a subscriber is marked to need CAMEL support, the appropriate procedures which provide the necessary information to the VPLMN or the HPLMN are invoked. It is possible for the HPLMN to instruct the VPLMN or IPLMN to interact with a gsmSCF which is controlled by the HPLMN.

The specification of operator specific services is outside the scope of the present document.

1.1 Support of partial implementation of CAMEL phase 4 ~~subsets~~

A~~n~~ functional entity (VMSC, GMSC or SGSN) may support the complete CAMEL phase 4 functionality or, as a network option, it may support the complete CAMEL phase 3 functionality and ~~one or more subsets~~ a partial implementation of CAMEL phase 4.

If a functional entity supports any part of CAMEL phase 4 then the HLR is informed of the CAMEL Phase 4 CSIs supported. An MSC or SGSN may also indicate support of the enhanced Provide Subscriber Information IF. To indicate support of a specific CSI, a functional entity shall have the ability to trigger on any initial service event possible for that CSI.

Note to previous paragraph: indication of support of PSI enhancements in the MSC is for further study.

If a VMSC or GMSC supports any of the CAMEL phase 4 circuit switched CSIs (O-CSI, D-CSI, T-CSI or VT-CSI) then the gsmSCF is informed of the CAMEL phase 4 circuit switched functionalities offered. The gsmSCF shall not send information flows or parameters that conflict with the functionalities offered by the VMSC or GMSC.

Note to previous paragraph: packet switched issue is for further study.

If a CAMEL subscriber attempts to register in a VMSC or SGSN which supports at least one CAMEL phase 4 CSI or the enhancement of Provide Subscriber Information IF then the VMSC or SGSN indicates in the registration request to the HLR the phase of CAMEL which the VMSC or SGSN supports (at least phase 4). In addition, the VMSC or SGSN indicates which CAMEL phase 4 CSIs may be downloaded. A~~n~~ VMSC or SGSN may also indicate support of enhancement of the Provide Subscriber Information IF.

Note to previous paragraph: indication of support of PSI enhancements in the VMSC is for further study.

If a GMSC supports at least one CAMEL phase 4 CSI then the GMSC indicates in the Send Routeing Info to the HLR the phase of CAMEL which the GMSC supports (at least phase 4). In addition, the GMSC indicates which CAMEL phase 4 CSIs may be downloaded.

If a VMSC/gsmSSF or GMSC/gsmSSF initiates contact with the gsmSCF using the Initial DP IF, or acknowledges a gsmSCF initiated contact using the Intitate Call Attempt ack IF, then the VMSC/gsmSSF or GMSC/gsmSSF indicates in the IF the CAMEL phase 4 functionalities offered to the gsmSCF.

If a VLR or SGSN initiates contact with the gsmSCF using a Mobility Management Event Notification IF then the VLR or SGSN indicates in the IF the CAMEL phase 4 CSIs and functionalities offered to the gsmSCF.

Note to previous paragraph: SGSN and CSIs issue is for further study.

1.1.1 CAMEL Phase 4 CSIs

A network entity may indicate to the HLR an offer of support for the following ~~The subsets of~~ CAMEL phase 4 CSIs ~~are the following~~:

- CAMEL phase 4 O-CSI
- CAMEL phase 4 D-CSI
- CAMEL phase 4 T-CSI
- CAMEL phase 4 VT-CSI
- CAMEL phase 4 MT- SMS-CSI
- CAMEL phase 4 MG-CSI

An MSC or SGSN may also indicate support of the CAMEL Phase 4 Provide Subscriber Information IF.

~~- Relative to Circuit switched Call Control;~~

~~- CS call handling,~~

~~- This subset contains the support of:~~

~~- Interactions with Optimal Routing;~~

~~- Call Party Handling;~~

~~- Mid call procedure for MO and MT calls;~~

~~- Inclusion of flexible tone injection;~~

~~— Provision of location information of called subscriber (Alerting phase); and~~

~~— Location information during an ongoing call (Handover DP).~~

~~— Charging notification (with CS call handling),~~

~~— This subset contains the support of:~~

~~— Charging notification to the CSE.~~

~~- Relative to GPRS interworking;~~

~~— Notification of GPRS mobility management to CSE.~~

~~— This subset contains the support of:~~

~~— Notification of GPRS mobility management to CSE.~~

~~— Relative to Short Message Services;~~

~~— CAMEL control over MT SMS.~~

~~— This subset contains the support of:~~

~~— CAMEL control over MT SMS.~~

~~— Relative to Subscriber Location and State retrieval.~~

~~- GPRS Any Time Interrogation.~~

~~— This subset contains the support of:~~

~~— Enhancement of Any Time Interrogation and Provide Subscriber Information for PS Domain.~~

A functional entity (VMSC, GMSC or SGSN) may ~~support~~ offer the ~~subsets~~ CSIs in any combination applicable for this entity~~; except that a functional entity supporting "Charging notification" shall support also "CS call handling"~~. A functional entity ~~will~~ shall indicate to the HLR ~~and/or gsmSCF~~ all the ~~subsets~~ CSIs it ~~supports~~offers.

1.1.2 CAMEL Phase 4 Functionalities

The CAMEL phase 4 functionalities which may be offered to the gsmSCF are the following:

- Enhancement of Provide Subscriber Information *(for further study);*
- Creating additional parties in a call, Creating a new call (Initiate Call Attempt, Enhancements for Continue With Argument *(Exact parameters enhancements for Continue With Argument need to be specified.)*);
- Placing an individual call party on hold (Split Leg);
- Connecting an individual call party to the group (Move Leg);
- Releasing an individual call party (Disconnect Leg);
- Indication of the release of a call party or call segment (Entity Released);
- Enhancements for subscriber interactions with the gsmSCF (Disconnect Forward Connection With Argument);
- Inclusion of flexible tone injection (Play Tone);
- DTMF Mid call procedure for MO and VT calls (DP O_Mid_Call, DP T_Mid_Call, Automatic Rearm);
- Provision of charging indicator at answer DP (Charge Indicator at DP O_Answer, DP T_Answer);
- Support of Alerting DP (DP O_Term_Seized, DP Call_Accepted);
- Provision of location information of called subscriber in the alerting phase (Location information at Alerting DP);

- Provision of location information during an ongoing call (DP O_Change_Of_Position, DP T_Change_Of_Position, Automatic Rearm);

- Interactions with Optimal Routing (BOR Interogation Requested, Route Not Permitted);

- Warning tone enhancements (Play Burstlist for Audible Indicator); and

- Enhancements of Call Forwarding indication (Forwarding Destination Number).

A functional entity (VMSC or GMSC or SGSN) may offer the functionalities in any combination applicable for this entity and applicable to the offered CSIs.

Note to previous paragraph: SGSN issue is for further study.

A functional entity shall indicate to the gsmSCF all the functionallities it offers.

~~1.1.1 CS call handling~~

~~This subset of CAMEL phase 4 contains the functionality specified in the following clause:~~

- ~~Clause 4 "Circuit switched Call Control"; except the items related to Charging notification as defined in subclause 1.1.2 "Charging notification".~~

~~If the CAMEL phase 4 subset "CS call handling" is supported, then Clause 4 "Circuit switched Call Control" shall be supported.~~

~~This subset can be supported by the following functional entities: VMSC/VLR and GMSC.~~

~~1.1.2 Charging notification~~

~~This subset of CAMEL phase 4 is only applicable if the subset "CS call handling" is supported.~~

~~If the CAMEL phase 4 subset "Charging notification" is supported, then the complete clause 4 "Circuit switched Call Control" shall be supported. If a functional entity supports this subset it shall also support the "CS call handling" subset.~~

~~The items related to Charging notification are defined in clause 4 "Circuit switched Call Control". They are:~~

- ~~The handling of the input signals CAP_Request_Notification_Charging, Int_Event_Notification_Charging, in the SDL diagrams in subclause 4.5 "Procedures for CAMEL".~~

- ~~The information flows Event Notification Charging and Request Notification Charging as defined in subclause 4.6 "Description of information flows".~~

~~This subset can be supported by the following functional entities: VMSC/VLR and GMSC.~~

~~1.1.3 GPRS mobility management~~

~~This subset of CAMEL phase 4 contains the functionality specified in the following clause:~~

- ~~Clause 9 "Mobility Management" in respect to the SGSN.~~

~~If the CAMEL phase 4 subset "GPRS mobility management" is supported, then Clause 9 "Mobility Management" in respect to the SGSN shall be supported, except those parts clearly identified in that clause as being related to VLR.~~

~~This subset can be supported by the following functional entity: SGSN.~~

~~1.1.4 CAMEL control over MT SMS~~

~~This subset of CAMEL phase 4 contains the functionality specified in the following clause:~~

- ~~Clause 7 "Short Message Services".~~

~~If the CAMEL phase 4 subset "CAMEL control over MT SMS" is supported, then clause 7 "Short Message Services" shall be implemented.~~

~~This subset can be supported by the following entities: SGSN and VMSC/VLR.~~

~~1.1.5 GPRS Any Time Interrogation~~

~~This subset of CAMEL phase 4 contains the functionality specified in the following clause:~~

- ~~Clause 11 "Subscriber Location and State retrieval" in respect to the SGSN.~~

~~If the CAMEL phase 4 subset "GPRS Any Time Interrogation" is supported, then Clause 11 "Subscriber Location and State retrieval" in respect to the SGSN shall be supported, except those parts clearly identified in that clause as being related to VMSC/VLR or GMLC.~~

~~This subset of CAMEL phase 4 can be supported by the following functional entity: SGSN.~~

— Next modified section —

4.5.10 CAMEL specific handling of location updating and data restoration

When requesting a location update or data restoration the VLR shall indicate to the HLR which CAMEL phases it supports and which CAMEL phase 4 ~~subsets~~ CSIs ~~it supports~~can be downloaded.

The HLR may then send to the VLR CAMEL subscription data for one of the CAMEL phases supported by the VLR or, if some different handling is required, data for substitute handling.

When the location update has been completed, the MSC/VLR in which the subscriber is registered after the location update shall check the M-CSI. If a Mobility Management notification to the gsmSCF is required for this subscriber, then the MSC/VLR shall send the notification to the gsmSCF.

Refer to subclause 9.2.1 for a description of M-CSI and the conditions under which a notification shall be sent.

— Next modified section —

4.6.1 gsmSSF to gsmSCF information flows

4.6.1.8 Initiate Call Attempt ack

4.6.1.8.1 Description

This IF is the successful response to the Initiate Call Attempt IF.

4.6.1.8.2 Information Elements

Information element name	NC	NP	Description
Supported CAMEL Phases	M	M	This IE indicates the CAMEL Phases supported.
~~Supported~~ Offered CAMEL4 ~~Subsets~~Functionalities	M	M	This IE is described in section 4.6.1.9. This IE indicates the CAMEL phase 4 ~~subsets~~functionalities ~~supported~~offered.

4.6.1.9 Initial DP

4.6.1.9.1 Description

This IF is generated by the gsmSSF when a trigger is detected at a DP in the BCSM, to request instructions from the gsmSCF.

4.6.1.9.2 Information Elements

(Note: IEs in the NC columns in this IF may need further study.)

Information element name	MO	MF	MT	VT	NC	NP	Description
Additional Calling Party Number	C	C	C	C	-	C	This IE contains the calling party number provided by the access signalling system of the calling user or received from the gsmSCF due to the previous CAMEL processing.
Bearer Capability	M	C	C	C	-	C	This IE indicates the type of the bearer capability connection to the user.
Called Party Number	C	M	M	M	-	M	This IE contains the number used to identify the called party in the forward direction. For MO and MF calls this IE is used in the case of TDP Route_Select_Failure (this is the destination number used to route the call) and in the case of TDP Busy and TDP No Reply (this is the MSISDN when the destination number used for the call is an MSRN, or in the case of unsuccessful call establishment received from the HLR via the MAP interface, otherwise it is the number used to route the call). For VT calls when there is no forwarding pending this is the MSISDN received in the Provide Roaming Number; if the MSISDN is not available, the basic MSISDN is used. For the MT and VT call case when there is call forwarding or call deflection pending, this is the MSISDN, i.e. not the forwarded-to or deflected-to number. If the Initial DP IF is sent at TDP Route_Select_Failure or TDP Analysed_Information then the *NatureOfAddress indicator* may contain a national-specific value. For some national-specific *NatureOfAddress indicator* values the length of the digit part of the destination address may be zero.
Called Party BCD Number	C	-	-	-	-	-	This IE contains the number used to identify the called party in the forward direction. It is used for an MO call in all cases except in the case of TDP Route_Select_Failure. For the TDP Collected_Information, the number contained in this IE shall be identical to the number received over the access network. It may e.g. include service selection information, such as ∗ and # digits, or carrier selection information dialled by the subscriber. For the TDP Analysed_Information, the number contained in this IE shall be the dialled number received over the network access or received from a gsmSCF in a Connect IF, Service selection information, such as * and # digits may be present (see subclause 4.2.1.2.2); carrier selection information dialled by the subscriber is not present.
Calling Party Number	M	C	C	C	-	C	This IE carries the calling party number to identify the calling party or the origin of the call.
Calling Partys Category	M	C	C	C	-	C	This IE indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).
CallGap Encountered	C	C	C	C	-	C	This IE indicates the type of gapping which has been applied to the related call. This IE shall be present only if a call gapping context is applicable to the Initial DP IF.

Information element name	MO	MF	MT	VT	NC	NP	Description
Call Reference Number	M	M	M	M	-	M	This IE may be used by the gsmSCF for inclusion in a network optional gsmSCF call record. It has to be coupled with the identity of the MSC which allocated it in order to define unambiguously the identity of the call. For MO calls, the call reference number is set by the serving VMSC and included in the MO call record. For MT calls, the call reference number is set by the GMSC and included in the RCF call record in the GMSC and in the MT call record in the terminating MSC. For VT calls, the call reference number is set by the GMSC and included in the RCF call record in the GMSC and in the MT call record in the terminating MSC. For CF calls, the call reference number is set by the GMSC and included in the CF record in the forwarding MSC.
Cause	C	C	C	C	-	-	This IE indicates the cause specific to the armed BCSM DP event. This IE is applicable to DP Route_Select_Failure and DP T_Busy. The cause may be used by the gsmSCF to decide how to continue the call handling.
Event Type BCSM	M	M	M	M	-	M	This IE indicates the armed BCSM DP event, resulting in the Initial DP IF.
Ext-Basic Service Code	C	C	C	C	-	C	This IE indicates the type of basic service i.e., teleservice or bearer service.
High Layer Compatibility	C	C	C	C	-	C	This IE indicates the type of the high layer compatibility, which will be used to determine the ISDN-teleservice of a connected ISDN terminal.
IMSI	M	M	M	M	-	S	This IE identifies the mobile subscriber. For the NP case, the IMSI is mandatory if the new party is initiated in an MO, MF, MT, or VT call, otherwise it shall be absent.
IP SSP Capabilities	C	C	C	C	-	C	This IE indicates which SRF resources are supported within the gsmSSF and are available. If this IE is absent, it indicates that no gsmSRF is attached and available.
Location Information	M	-	C	M	-	-	This IE is described in a table below.
Location Number	M	C	C	C	-	-	For mobile originated calls this IE represents the location of the calling party. For all other call scenarios this IE contains the location number received in the incoming ISUP signalling.
MSC Address	M	M	M	M	-	M	For MO calls, the MSC Address carries the international E.164 address of the serving VMSC. For MT calls, the MSC Address carries the international E.164 address of the GMSC. For VT calls, the MSC Address carries the international E.164 address of the serving VMSC. For MF calls, the MSC Address carries the international E.164 address of the forwarding MSC. For the NP case, the MSC address carries the international E.164 address of the serving VMSC (the NP case in the GMSC will not cause an Initial DP IF).

Information element name	MO	MF	MT	VT	NC	NP	Description
GMSC Address	-	M	-	M	-	S	For CF calls, the GMSC Address carries the international E.164 address of the GMSC. For VT calls, the GMSC Address carries the international E.164 address of the GMSC. For NP case, the GMSC Address is mandatory if the new party is initiated in an MF call or in a VT call, otherwise it shall be absent. The GMSC Address carries the international E.164 address of the GMSC.
Carrier	S	S	S	S	-	S	This IE is described in a table below. This IE may be present when the VPLMN and the HPLMN of the subscriber are both North American. For MO calls, this IE shall identify any carrier that was explicitly selected by the calling subscriber. If no carrier was explicitly selected, this IE shall contain the calling subscriber's subscribed carrier. For MT and VT calls, the IE shall contain the carrier subscribed to by the called subscriber. For MF calls, the IE shall contain the carrier subscribed to by the forwarding subscriber.
Original Called Party ID	C	C	C	C	-	-	This IE carries the dialled digits if the call has met call forwarding on the route to the gsmSSF. This IE shall also be sent if it was received from the gsmSCF due to previous CAMEL processing.
Redirecting Party ID	C	C	C	C	-	-	This IE indicates the directory number the call was redirected from. This IE shall also be sent if it was received from the gsmSCF due to previous CAMEL processing.
Redirection Information	C	C	C	C	-	-	This IE contains forwarding related information, such as the redirection counter.
Service Key	M	M	M	M	-	M	This IE indicates to the gsmSCF the requested CAMEL Service. It is used to address the required application within the gsmSCF.
Subscriber State	-	-	C	C	-	-	This IE indicates the status of the MS. The states are: - CAMEL Busy: The MS is engaged on a transaction for a mobile originating or terminated circuit-switched call. - Network Determined Not Reachable: The network can determine from its internal data that the MS is not reachable. - Assumed Idle: The state of the MS is neither "CAMEL Busy" nor "Network Determined Not Reachable". - Not provided from VLR.
Time And Timezone	M	M	M	M	-	M	This IE contains the time that the gsmSSF was triggered, and the time zone in which gsmSSF resides.

Information element name	MO	MF	MT	VT	NC	NP	Description
Call Forwarding SS Pending	-	-	C	C	-	-	If the Initial DP IF is sent from the GMSC, then this IE shall be present in the following cases: - The GMSC has received an FTN in the 1st Send Routeing Info ack IF from the HLR. - The GMSC has received an FTN in the 2nd Send Routeing Info ack IF from the HLR and no relationship with the gsmSCF exists at that moment. - The GMSC has received the Resume Call Handling IF from the VMSC and no relationship with the gsmSCF exists at that moment. If the Initial DP IF is sent from the VMSC, then this IE shall be present in the following cases: - Conditional call forwarding is invoked and no relationship with the gsmSCF exists at that moment. - Call Deflection is invoked and no relationship with the gsmSCF exists at that moment.
Forwarding Destination Number	-	-	C	C	-	-	This IE contains the Forwarded-to-Number or the Deflected-to-Number. It shall be present if the Call Forwarding SS Pending IE is present, otherwise it shall be absent.
Service Interaction Indicators Two	C	C	C	C	-	C	The IE is described in a table below. This IE is present if it is received in the ISUP message or due to previous CAMEL processing.
CUG Index	C	-	-	-	-	C	See 3GPP TS 23.085 [21] for details of this IE.
CUG Interlock Code	C	C	C	C	-	C	This IE shall be set according to 3GPP TS 23.085 [21] unless modified by the gsmSCF via the Connect or Continue With Argument IFs.
Outgoing Access Indicator	C	C	C	C	-	C	This IE shall be set according to the 3GPP TS 23.085 [21] unless modified by the gsmSCF via the Connect or Continue With Argument IFs.
MS Classmark 2	C	-	-	-	-	-	This IE contains the MS classmark 2, which is sent by the MS when it requests access to setup the MO call or responds to paging in the CS domain.
IMEI (with software version)	C	-	-	-	-	-	This IE contains the IMEISV (as defined in 3GPP TS 23.003 [7]) of the ME in use by the served subscriber.
Supported CAMEL Phases	M	M	M	M	M	M	This IE indicates the CAMEL Phases supported by the GMSC or the VMSC.
~~Supported~~Offered CAMEL4 ~~Subsets~~Functionalities	M	M	M	M	M	M	This IE is described in a table below. This IE indicates the CAMEL phase 4 ~~subsets~~functionalities ~~supported~~offered by the GMSC or the VMSC.

Offered CAMEL4 Functionalities contains the following information elements:

Information element name	Status	Description
PSI Enhancements	S	This IE indicates that the of Enhancement of Provide Subscriber Information is offered. *Note: for further study*
Initiate Call Attempt	S	This IE indicates that the gsmSCF may send to the gsmSSF the Initiate Call Attempt IF and the CAMEL Phase 4 parameters in the Continue With Argument IF. *CR Editor's note: In the parameter list for CWA, it should be clear which parameters can only be used if ICA is supported.*
Split Leg	S	This IE indicates that the gsmSCF may send to the gsmSSF the Split Leg IF.
Move Leg	S	This IE indicates that the gsmSCF may send to the gsmSSF the Move Leg IF.
Disconnect Leg	S	This IE indicates that the gsmSCF may send to the gsmSSF the Disconnect Leg IF.
Entity Released	S	This IE indicates that the gsmSSF shall send to the gsmSCF the.
DFC With Argument	S	This IE indicates that the gsmSCF may send to the gsmSSF Disconnect Forward Connection With Argument IF.
Play Tone	S	This IE indicates that the gsmSCF may send to the gsmSSF the Play Tone IF.
DTMF Mid Call	S	This IE indicates that the gsmSCF may instruct the gsmSSF to arm the O_MidCall or T_MidCall DPs. The gsmSCF may instruct the gsmSSF to automatically re-arm the DPs.
Charging Indicator	S	This IE indicates that the Charge Indicator IE may be present in the Event Report BCSM IF reporting the O_Answer or T_Answer DP.
Alerting DP	S	This IE indicates that the gsmSCF may instruct the gsmSSF to arm the O_Term_Seized or Call_Accepted DPs.
Location At Alerting	S	This IE indicates that the Location Information IE shall be present (if available) in the Event Report BCSM IF reporting the Call_Accepted DP.
Change Of Position DP	S	This IE indicates that the gsmSCF may instruct the gsmSSF to arm the O_Change_Of_Position or T_Change_Of_Position DPs. The gsmSCF may instruct the gsmSSF to auromatically re-arm the DPs.
OR Interactions	S	This IE indicates that the gsmSCF may send to the gsmSSF the Basic OR Interrogation Requested IE in the Connect or Continue With Argument IFs. This IE indicates the Route Not Permitted IE may be present in the Event Report BCSM IF reporting the O_Abandon DP.
Warning Tone Enhancements	S	This IE indicates that the gsmSCF may send to the gsmSSF the Play Burstlist IE (within the Audible Indicator IE) in an Apply Charging IF.
CF Enhancements	S	This IE indicates that the Forwarding Destination Number IE may be present in the Event Report BCSM IF reporting the T_Busy or T_No_Answer DP.

Location Information is defined in 3GPP TS 23.018 [12]. The following differences apply:

Information element name	MO	MF	MT	VT	NC	NP	Description
Location Number	-	-	C	C	-	-	See 3GPP TS 23.018 [12].
Service area ID	C,E	-	C,E	C,E	-	-	See 3GPP TS 23.018 [12].
Cell ID	C,E	-	C,E	C,E	-	-	See 3GPP TS 23.018 [12].
Geographical information	C	-	C	C	-	-	See 3GPP TS 23.018 [12].
Geodetic information	C	-	C	C	-	-	See 3GPP TS 23.018 [12].
VLR number	M	-	C	M	-	-	See 3GPP TS 23.018 [12].
Age Of location information	M	-	C	C	-	-	See 3GPP TS 23.018 [12].
Current Location Retrieved	-	-	-	-	-	-	Not applicable
Location area ID	C,E	-	C,E	C,E	-	-	See 3GPP TS 23.003 [7].
Selected LSA Identity	S	-	S	S	-	-	This IE indicates the LSA identity associated with the current position of the MS. It shall be present if the LSA ID in the subscriber data matches the LSA ID of the current cell. In the case of multiple matches the LSA ID with the highest priority shall be present. See 3GPP TS 23.073 [17]. This IE shall be present if available and SoLSA is supported, otherwise it shall be absent.

Carrier contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	Description
Carrier Identification Code	M	M	M	M	-	M	This IE uniquely identifies a North American long distance carrier.
Carrier Selection Information	M	M	M	M	-	M	This IE indicates the way the carrier was selected i.e.: - dialled – subscribed

Service Interaction Indicators Two contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	Description
Forward Service Interaction Indicator	C	C	C	C	-	C	This IE is described in a table below.
HOLD Treatment Indicator	C	-	-	C	-	C	This IE indicates whether the CAMEL subscriber can invoke HOLD for the call.
CW Treatment Indicator	C	-	-	C	-	C	This IE indicates whether CW can be applied for a call to the CAMEL subscriber whilst this call is ongoing.
ECT Treatment Indicator	C	-	-	C	-	C	This IE indicates whether the call leg can become part of an ECT call initiated by the CAMEL subscriber.

Forward Service Interaction Indicator contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	Description
Conference Treatment Indicator	C	C	C	C	-	C	This IE indicates whether the call leg can become part of a MPTY call initiated by the called subscriber.
Call Diversion Treatment Indicator	C	C	C	C	-	C	This IE indicates whether the call can be forwarded using the Call Forwarding or Call Deflection supplementary services.

— Next modified section —

4.6.2 gsmSCF to gsmSSF information flows

4.6.2.19 Request Notification Charging

4.6.2.19.1 Description

This IF is used to request the gsmSSF to monitor and report the e-values or charge units generated by MSC or transit network.

~~The gsmSCF is allowed to send this information flow only if the CAMEL phase 4 subset Charging Notification is supported by the gsmSSF.~~

4.6.2.19.2 Information elements

Information element name	MO	MF	MT	VT	NC	NP	Description
Event type Charging	M	M	M	M	M	M	This IE is described in a table below. This IE indicates the charging event type that has to be monitored.
Monitor mode	M	M	M	M	M	M	This IE indicates the monitor mode applicable for the corresponding "eventTypeCharging". Monitor mode can be NotifyandContinue and Transparent only.
Legid	M	M	M	M	M	M	This IE indicates the leg for which the charging event has to be monitored.

Event type Charging contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	Description
Charge Units Total	S,E	S,E	S,E	S,E	S,E	S,E	This IE is described in a table below. This IE shall be present if the accumulated charge units are to be monitored.
Charge Units Components	S,E	S,E	S,E	S,E	S,E	S,E	This IE is described in a table below. This IE shall be present if the charge units are to be monitored for list of charging components.
e-values Total	S,E	S,E	S,E	S,E	S,E	S,E	This IE is described in a table below. This IE shall be present if the net applicable e-values are to be monitored.
e-values Components	S,E	S,E	S,E	S,E	S,E	S,E	This IE is described in a table below. This IE shall be present if e-values are to be monitored for list of charging components.

Charge Units Total contains the following information element:

Information element name	MO	MF	MT	VT	NC	NP	Description
Reporting Condition Units	M	M	M	M	M	M	This IE is described in a table below. This IE indicates the reporting condition which must be satisfied for the indicated leg before reporting charge units.

Charge Units Components contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	Description
Monitor Component	M	M	M	M	M	M	This IE is described in a table below. This IE indicates the specific charging component to be monitored.
Reporting Condition Units	M	M	M	M	M	M	This IE indicates the reporting condition which must be satisfied for the indicated leg before reporting charge units.

e-values Total contains the following information element:

Information element name	MO	MF	MT	VT	NC	NP	Description
Reporting Condition e-values	M	M	M	M	M	M	This IE is described in a table below. This IE indicates the reporting condition which must be satisfied for the indicated leg before reporting e-values.

e-values Components contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	Description
Monitor Component	M	M	M	M	M	M	This IE indicates the specific charging component to be monitored.
Reporting Condition Evalue	M	M	M	M	M	M	This IE indicates the reporting condition which must be satisfied for the indicated leg before reporting e-values.

Reporting Condition Units contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	Description
End Of Connection	S,E	S,E	S,E	S,E	S,E	S,E	This IE shall be present if the charge units are to be reported when the leg clears.
Threshold Counter Value	S,E	S,E	S,E	S,E	S,E	S,E	This IE indicates the threshold value. This IE shall be present if the charge units are to be reported when threshold is reached or exceeded.

Monitor Component contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	Description
Charges Specific PLMN	C	C	C	C	C	C	This IE indicates that the PLMN specific charges at the serving MSC determined by operator based on radio resource utilization, roaming etc are to be monitored.
Charges Transit Network	C	C	C	C	C	C	This IE indicates that the specific charges at the serving MSC based on the charging information received from the transit network are to be monitored.

Reporting Condition e-values contains the following information element:

Information element name	MO	MF	MT	VT	NC	NP	Description
Occurrence Of Event	M	M	M	M	M	M	This IE indicates that the e-values are to be reported immediately after occurrence of any charging event related to the indicated leg.

— Next modified section —

4.6.7 HLR to VLR information flows

4.6.7.4 Provide Roaming Number

4.6.7.4.1 Description

This IF is specified in 3GPP TS 23.018 [12]; it is used by the HLR to request a roaming number from the VLR.

4.6.7.4.2 Information Elements

Provide Roaming Number contains the following CAMEL specific information elements:

Information element name	Status	Description
Suppression Of Announcements	S	This IE indicates that announcements or tones generated as a result of unsuccessful call establishment shall be suppressed. It shall be present if the HLR received it in the Send Routeing Info IF.
Call Reference Number	M	This IE carries the Call Reference Number provided by the GMSC or the gsmSCF in the Send Routeing Info IF.
GMSC Or gsmSCF Address	M	This IE is the E.164 address of the GMSC for an MT call or the E.164 address of the gsmSCF for a gsmSCF initiated call.
Alerting Pattern	S	This IE indicates the kind of Alerting Pattern to be applied. It shall be present if the HLR received it from the GMSC or the gsmSCF in the Send Routeing Info IF.
Supported CAMEL Phases In GMSC	S	This IE indicates the CAMEL Phases supported in the GMSC. It shall be present if the HLR received it from the GMSC or the gsmSCF in the Send Routeing Info.
~~Supported~~Offered CAMEL4 ~~Subsets~~ CSIs In GMSC	S	This IE indicates the CAMEL phase 4 ~~subsets~~ CSIs ~~supported~~offered in the GMSC. It shall be present if the HLR received it from the GMSC or the gsmSCF in the Send Routeing Info.
Suppress VT-CSI	S	This IE indicates that VT-CSI shall be suppressed for the called party. This IE shall be present if the HLR received it in the Send Routeing Info IF.
OR not Supported In GMSC	S	This IE indicates that the VMSC should not attempt to invoke Optimal Routeing of late call forwarding. It shall be present if this IF was triggered by a Send Routeing IF for a gsmSCF initiated call.

Offered CAMEL4 CSIs In GMSC contains the following information elements:

Information element name	Status	Description
O—CSI	S	This IE indicates the offer of CAMEL phase 4 O-CSI. It shall be present if the HLR received it from the GMSC or the gsmSCF in the Send Routeing Info.
D—CSI	S	This IE indicates the offer of CAMEL phase 4 D-CSI. It shall be present if the HLR received it from the GMSC or the gsmSCF in the Send Routeing Info.
T—CSI	S	This IE indicates the offer of CAMEL phase 4 T-CSI. It shall be present if the HLR received it from the GMSC or the gsmSCF in the Send Routeing Info.

— Next modified section —

4.6.8 VLR to HLR information flows

4.6.8.1 Insert Subscriber Data ack

4.6.8.1.1 Description

This IF is used by the VLR to indicate to the HLR the result of the Insert Subscriber Data IF. It is specified in 3GPP TS 29.002 [32].

4.6.8.1.2 Information Elements

Insert Subscriber Data ack contains the following CAMEL specific information elements:

Information element name	Status	Description
Supported CAMEL Phases	S	This IE identifies which CAMEL phases are supported by the VMSC/VLR. It shall be present when a CSI has been included in the ISD.
~~Supported~~Offered CAMEL4 ~~Subsets~~ CSIs	S	This IE indicates the CAMEL phase 4 ~~subsets~~ CSIs ~~supported~~offered in the VMSC/VLR. It shall be present if a CSI has been included in the ISD.

Offered CAMEL4 CSIs contains the following information elements:

Information element name	Status	Description
O—CSI	S	This IE indicates the offer of CAMEL phase 4 O-CSI. It shall be present if a CSI has been included in the ISD.
D—CSI	S	This IE indicates the offer of CAMEL phase 4 D-CSI. It shall be present if a CSI has been included in the ISD.
VT—CSI	S	This IE indicates the offer of CAMEL phase 4 VT-CSI. It shall be present if a CSI has been included in the ISD.
T—CSI	S	This IE indicates the offer of CAMEL phase 4 T-CSI. It shall be present if a CSI has been included in the ISD.
MT—SMS—CSI	S	This IE indicates the offer of CAMEL phase 4 MT-SMS-CSI. It shall be present if a CSI has been included in the ISD.
MG—CSI	S	This IE indicates the offer of CAMEL phase 4 MG-CSI. It shall be present if a CSI has been included in the ISD. *Note: for further study*
PSI Enhancements	S	This IE indicates the offer of CAMEL phase 4 Enhancements of Provide Subscriber Information. *Note: for further study*

CR editor's note: The following should be done later: "This IE table should contain only VLR to HLR related IEs. To indicate further IEs the IE table has to be duplicated to the intended interface and enhanced there by the required IEs.This should be done in general."

4.6.8.2 Provide Subscriber Info ack

4.6.8.2.1 Description

This IF is described in TS 23.018 [12]; it is used by the VLR to provide the requested information to the HLR.

4.6.8.3 Update Location

4.6.8.3.1 Description

This IF is used by the VLR to provide information about supported CAMEL phases to the HLR. It shall be present when a CSI has been included in the Insert Subscriber Data IF.

4.6.8.3.2 Information Elements

Update Location contains the following CAMEL specific information element:

Information element name	Status	Description
Supported CAMEL Phases	S	This IE indicates which phases of CAMEL are supported. It shall be present if a CAMEL phase higher than phase 1 is supported. Otherwise may be absent.
~~Supported~~Offered CAMEL4 ~~Subsets~~ CSIs	S	This IE indicates the CAMEL phase 4 ~~subsets~~ CSIs ~~supported~~offered in the VMSC/VLR. It shall be present if the "Supported CAMEL Phases" IE indicates support of CAMEL phase 4.

Offered CAMEL4 CSIs contains the following information elements:

Information element name	Status	Description
O—CSI	S	This IE indicates the offer of CAMEL phase 4 O-CSI
D—CSI	S	This IE indicates the offer of CAMEL phase 4 D-CSI
VT—CSI	S	This IE indicates the offer of CAMEL phase 4 VT-CSI
T—CSI	S	This IE indicates the offer of CAMEL phase 4 T-CSI
MT—SMS—CSI	S	This IE indicates the offer of CAMEL phase 4 MT-SMS-CSI
PSI Enhancements	S	This IE indicates the offer of CAMEL phase 4 Enhancements of Provide Subscriber Information. *Note: for further study*

4.6.8.4 Restore Data

4.6.8.4.1 Description

This IF is used by the VLR to provide the information about supported CAMEL phases to the HLR.

4.6.8.4.2 Information Elements

Restore Data contains the following CAMEL specific information element:

Information element name	Status	Description
Supported CAMEL Phases	S	This IE indicates which phases of CAMEL are supported. It shall be present if a CAMEL phase higher than phase 1 is supported. Otherwise may be absent.
~~Supported~~Offered CAMEL4 ~~Subsets~~ CSIs	S	This IE indicates the CAMEL phase 4 ~~subsets~~ CSIs ~~supported~~offered in the VMSC/VLR. It shall be present if the "Supported CAMEL Phases" IE indicates support of CAMEL phase 4.

Offered CAMEL4 CSIs contains the following information elements:

Information element name	Status	Description
O—CSI	S	This IE indicates the offer of CAMEL phase 4 O-CSI
D—CSI	S	This IE indicates the offer of CAMEL phase 4 D-CSI
VT—CSI	S	This IE indicates the offer of CAMEL phase 4 VT-CSI
T—CSI	S	This IE indicates the offer of CAMEL phase 4 T-CSI
MT—SMS—CSI	S	This IE indicates the offer of CAMEL phase 4 MT-SMS-CSI
PSI Enhancements	S	This IE indicates the offer of CAMEL phase 4 Enhancements of Provide Subscriber Information. *Note: for further study*

— Next modified section —

4.6.9 HLR to GMSC information flows

4.6.9.1 Send Routeing Info ack

4.6.9.1.1 Description

This IF is specified in 3GPP TS 23.018 [12]; it is used by the HLR to transfer the requested routeing information to the GMSC.

4.6.9.1.2 Information Elements

Send Routeing Info ack contains the following CAMEL specific information elements:

Information element name	Status	Description
Location Information	C	This IE indicates the location of the served subscriber.
O—CSI	S	O-CSI is defined in subclause 4.3.1. This IE identifies the subscriber as having originating CAMEL services. It shall be present if O-CSI is active, and CFU or CFNRc has been invoked, or if both O-CSI and T-CSI are active.
D—CSI	S	D-CSI is defined in subclause 4.3.2. This IE identifies the subscriber as having originating CAMEL dialled services. It shall be present if D-CSI is active, and CFU or CFNRc has been invoked, or if both D-CSI and T-CSI are active.
Subscriber State	C	This IE indicates the status of the MS. The possible values of the IE are: - CAMEL Busy: The VLR has indicated that the MS is engaged in a transaction for a mobile originating or terminated circuit-switched call. - Network Determined Not Reachable: The VLR has indicated that the network can determine from its internal data that the MS is not reachable. - Assumed Idle: The VLR has indicated that the state of the MS is neither "CAMEL Busy" nor "Network Determined Not Reachable". - Not Provided From VLR: The VLR did not provide any information on subscriber state even though it was requested.
T—CSI	S	This IE is described in a table below. This IE identifies the subscriber as having terminating CAMEL services. It shall be present if T-CSI is active and no Suppress T-CSI indicator is present in the Send Routeing Info IF.
Basic Service Code	C	This IE indicates the type of basic service i.e., teleservice or bearer service.
CUG Subscription Flag	S	This IE indicates if the called party has a CUG subscription. It shall be present only if the T-CSI is active and included in the Send Routing Information ack IF.
Supported CAMEL Phases In VMSC	S	This IE indicates the supported CAMEL phases of the VLR. It shall be present if known by the HLR, otherwise it shall be absent.
~~Supported~~Offered CAMEL4 ~~Subsets~~ CSIs In VMSC	S	This IE indicates the CAMEL phase 4 ~~subsets~~ CSIs ~~supported~~offered in the VMSC. It shall be present if known by the HLR, otherwise it shall be absent.
VMSC Address	M	This IE indicates the E.164 address of the VMSC in whose area the B subscriber is currently registered.

Location Information is defined in 3GPP TS 23.018 [12]. The following differences apply:

Information element name	Status	Description
Service area ID	C,E	See 3GPP TS 23.018 [12].
Cell ID	C,E	See 3GPP TS 23.018 [12].
Current Location Retrieved	-	Not applicable
Location area ID	C,E	See 3GPP TS 23.003 [7].
Selected LSA Identity	S	This IE indicates the LSA identity associated with the current position of the MS. Shall be present if the LSA ID in the subscriber data matches the LSA ID of the current cell. If there are multiple matches the LSA ID with the highest priority shall be sent. See 3GPP TS 23.073 [17].

T-CSI contains the following information elements:

Information element name	Status	Description
gsmSCF Address	M	This IE is described in subclause 4.3.5.
Service Key	M	This IE is described in subclause 4.3.5.
Default Call Handling	M	This IE is described in subclause 4.3.5.
TDP List	M	This IE is described in subclause 4.3.5.
CAMEL Capability Handling	C	This IE is described in subclause 4.3.5. If this IE is absent then this indicates that CAMEL phase 1 support is requested.

Offered CAMEL4 CSIs In VMSC contains the following information elements:

Information element name	Status	Description
O—CSI	S	This IE indicates the offer of CAMEL phase 4 O-CSI. It shall be present if known by the HLR, otherwise it shall be absent.
D—CSI	S	This IE indicates the offer of CAMEL phase 4 D-CSI. It shall be present if known by the HLR, otherwise it shall be absent.
VT—CSI	S	This IE indicates the offer of CAMEL phase 4 VT-CSI. It shall be present if known by the HLR, otherwise it shall be absent.
MT—SMS—CSI	S	This IE indicates the offer of CAMEL phase 4 MT-SMS-CSI. It shall be present if known by the HLR, otherwise it shall be absent.
PSI Enhancements	S	This IE indicates the offer of CAMEL phase 4 Enhancement of Provide Subscriber Information. It shall be present if known by the HLR, otherwise it shall be absent. *Note: for further study.*

— Next modified section —

4.6.10 GMSC to HLR information flows

4.6.10.1 Send Routeing Info

4.6.10.1.1 Description

This IF is described in 3GPP TS 23.018 [12]; it is used to request information from the HLR to route an MT call.

4.6.10.1.2 Information Elements

Send Routeing Info contains the following CAMEL specific information elements:

Information element name	Status	Description
Alerting Pattern	S	This IE indicates the kind of Alerting Pattern to be applied. It shall be present if it was received from the gsmSCF or set by the gsmSSF.
Suppression Of Announcement	S	This IE indicates that announcements or tones generated as a result of unsuccessful call setup shall be suppressed. It shall be present in the interrogation if available, i.e., when it has been received from the gsmSCF.
Suppress T-CSI	S	This IE indicates that T-CSI shall be suppressed. It shall always be present in the second interrogation or if it was received from the gsmSCF due to an Initiate Call Attempt IF.
Supported CAMEL Phases	M	This IE lists the supported CAMEL phases.
~~Supported~~Offered CAMEL4 ~~Subsets~~ CSIs	M	This IE indicates the CAMEL phase 4 ~~subsets~~ CSIs ~~supported~~offered in the GMSC.
Call Reference Number	M	This IE carries the Call Reference Number allocated for the call by the GMSC. It shall be allocated once per call and present in both first and second interrogations.
GMSC Address	M	This IE is the E.164 address of the GMSC.
Call Diversion Treatment Indicator	S	This IE indicates whether or not the call can be forwarded using the Call Forwarding or Call Deflection supplementary services. It shall be present if it was received within Forward Service Interaction Indicator in Service Interaction Indicators Two from the ISUP Initial Address Message or previous CAMEL processing.

Offered CAMEL4 CSIs contains the following information elements:

Information element name	Status	Description
O—CSI	S	This IE indicates the offer of CAMEL phase 4 O-CSI
D—CSI	S	This IE indicates the offer of CAMEL phase 4 D-CSI
T—CSI	S	This IE indicates the offer of CAMEL phase 4 T-CSI

— Next modified section —

4.6.14 gsmSCF to HLR information flows

4.6.14.1 Send Routeing Info

4.6.14.1.1 Description

This IF is defined in 3GPP TS 23.018 [12] and subclause 4.6.10.1; it is used to request information from the HLR to route a gsmSCF initiated call.

4.6.14.1.2 Information Elements

Send Routeing Info from the gsmSCF contains the following information elements:

Information element name	Status	Description
MSISDN	M	This IE indicates the MSISDN of the called subscriber.
Alerting Pattern	O	This IE indicates the kind of Alerting Pattern to be applied.
CUG Interlock	O	For the definition of this IE, see 3GPP TS 23.085 [21].
CUG Outgoing Access	O	For the definition of this IE, see 3GPP TS 23.085 [21].
Suppression Of Announcement	O	This IE indicates that announcements or tones generated as a result of unsuccessful call establishment shall be suppressed.
Suppress T—CSI	M	This IE indicates that CAMEL subscription information should not be returned in the first Send Routeing Info ack (to avoid the need for a second interrogation).
Supported CAMEL Phases	O	This IE indicates the CAMEL Phases supported by the gsmSCF.
~~Supported CAMEL4 Subsets~~	~~S~~	~~This IE indicates the CAMEL phase 4 subsets supported by the gsmSCF. It shall be present if the "Supported CAMEL Phases" IE indicates support of CAMEL phase 4.~~
Call Reference Number	M	This IE carries the Call Reference Number allocated for the call by the gsmSCF.
GMSC Or gsmSCF Address	M	This IE is the E.164 address of the gsmSCF.
Call Diversion Treatment Indicator	O	This IE indicates whether or not the call is allowed to be forwarded on behalf of the called party using the Call Forwarding supplementary service.
Pre-paging Supported	S	This IE shall be present if the gsmSCF supports pre-paging, otherwise it shall be absent.
Interrogation Type	M	This IE shall contain the value "Basic Call".
Long FTN Supported	O	This IE indicates that the gsmSCF supports Long Forwarded to Numbers.
gsmSCF Initiated Call	M	This IE indicates that the IF was originated by a gsmSCF.
Suppress Incoming Call Barring	O	This IE indicates that Incoming Call Barrings shall be suppressed for the called party.
Suppress VT-CSI	O	This IE indicates that VT-CSI shall be suppressed.

— Next modified section —

7 Short Message Services

7.6 Description of information flows

7.6.4 VLR or SGSN to HLR information flows

7.6.4.1 Insert Subscriber Data ack

See subclause 4.6.8.1. This information flow is sent by the VLR.

7.6.4.2 Update Location

See subclause 4.6.8.3.

7.6.4.3 Update GPRS Location

7.6.4.3.1 Description

This IF is used by the SGSN to indicate to the HLR the CAMEL phases and CAMEL phase 4 ~~subsets~~ CSIs ~~supported~~offered by the SGSN. It is specified in 3GPP TS 29.002 [32].

7.6.4.3.2 Information Elements

Update GPRS location contains the following CAMEL specific information element:

Information element name	Status	Description
Supported CAMEL Phases	S	This IE indicates which CAMEL phases are supported by the SGSN. The SGSN may indicate support of CAMEL phase 3 or higher. It shall be present when the SGSN supports CAMEL.
~~Supported~~Offered CAMEL4 ~~Subsets~~ CSIs	S	This IE indicates the CAMEL phase 4 ~~subsets~~ CSIs ~~supported~~offered in the SGSN. It shall be present if the "Supported CAMEL Phases" IE contains support of CAMEL phase 4.

Offered CAMEL4 CSIs contains the following information elements:

Information element name	Status	Description
MT—SMS—CSI	S	This IE indicates the offer of CAMEL phase 4 MT-SMS-CSI

— Next modified section —

9 Mobility Management

9.4 Description of information flows

CR Editor's Note: Please renumber the level 3 heading of 9.4.

9.4.1 VLR or SGSN to gsmSCF information flows

9.4.1.1 Mobility Management event Notification

9.4.1.1.1 Description

This IF is generated by the VLR or SGSN to notify the gsmSCF of a Mobility Management event.

9.4.1.1.2 Information Elements

Information element name	VLR	SGSN	Description
Event Met	M	M	This IE indicates the type of Mobility Management event that lead to the notification. Refer to subclause 9.2.1.1 for the CS subscriber and subclause 9.2.2.1 for the GPRS subscriber.
Service Key	M	M	This IE indicates the Service Logic that the gsmSCF shall apply.
IMSI	M	M	This IE identifies the mobile subscriber to whom the Mobility Event applies.
Basic MSISDN	M	M	This IE identifies the mobile subscriber to whom the Mobility Event applies.
Location Information for CS subscriber	C	-	This IE is described in a table below. This IE indicates the current location of the MS.
Location Information for GPRS subscriber	-	C	This IE indicates the current location of the MS which is equivalent to the location info SGSN IE in subclause 7.6.1.2.
Supported CAMEL Phases	M	M	This IE indicates the CAMEL Phases that are supported by the sending entity (VMSC/VLR or SGSN) in which the MS is registered after the mobility management event.
~~Supported~~Offered CAMEL4 ~~Subsets~~ CSIs	M	M	This IE indicates the CAMEL phase 4 ~~subsets~~ CSIs ~~supported~~offered by the sending entity (VMSC/VLR or SGSN). *Note: for further study*
Offered CAMEL4 Functionalities	M	-	This IE is described in section 4.1.6.9. It indicates the CAMEL phase 4 functionalities offered by the VMSC/VLR.

Location Information for CS subscriber is defined in 3GPP TS 23.018 [12]. The following differences apply:

Information element name	Status	Description
Service area ID	C,E	See 3GPP TS 23.018 [12].
Cell ID	C,E	See 3GPP TS 23.018 [12].
Current Location Retrieved	-	Not applicable
Location area ID	C,E	See 3GPP TS 23.003 [7].
Selected LSA Identity	S	This IE indicates the LSA identity associated with the current position of the MS. It shall be present if the LSA ID in the subscriber data matches the LSA ID of the current cell. In the case of multiple matches the LSA ID with the highest priority it shall be present. See 3GPP TS 23.073 [17].

Note: the following table is for further study.

Offered CAMEL4 CSIs contains the following information elements:

Information element name	VLR	SGSN	Description
O—CSI	S	-	This IE indicates the offer of CAMEL phase 4 O-CSI
D—CSI	S	-	This IE indicates the offer of CAMEL phase 4 D-CSI
VT—CSI	S	-	This IE indicates the offer of CAMEL phase 4 VT-CSI
T—CSI	S	-	This IE indicates the offer of CAMEL phase 4 T-CSI
MT—SMS—CSI	S	S	This IE indicates the offer of CAMEL phase 4 MT-SMS-CSI
MG—CSI	-	S	This IE indicates the offer of CAMEL phase 4 MG-CSI
PSI Enhancements	S	S	This IE indicates the offer of CAMEL phase 4 Enhancement of Provide Subscriber Information

— Next modified section —

10 Control and interrogation of subscription data

10.3 Description of information flows

10.3.2 HLR to gsmSCF information flows

10.3.2.1 Any Time Modification ack

10.3.2.1.1 Description

This IF is used by the HLR to provide the modified information to the gsmSCF.

10.3.2.1.2 Information Elements

Information element name	Status	Description
Call Forwarding SS Data	S	This IE is described in a table below. It shall be present if it was modified.
Call Barring SS Data	S	This IE is described in a table below. It shall be present if it was modified.
Operator Determined Barring Information	S	This IE is described in a table below. It shall be present if it was modified.
CAMEL Subscription Information	S	This IE is described in a table below. It shall be present if it was modified.

Call Forwarding SS Data contains the following information elements:

Information element name	Status	Description
SS Code	S	This IE indicates Call Forwarding supplementary service as defined in 3GPP TS 22.004 [2]. Only the SS code for which the modification applies is sent.
Forwarding Feature List	S	This IE is described in a table below. If a Forwarding Feature List item is modified then all applicable fields within the item shall be sent. All modified Forwarding Feature List items shall be returned.
Notification-to-CSE Flag	S	This IE indicates whether the gsmSCF is notified of a change of Call Forwarding SS data. The IE shall be sent if it was modified.

Forwarding Feature List contains 1 to 32 items of the following information elements:

Information element name	Status	Description
Basic Service	C	See 3GPP TS 29.002 [32].
SS Status	C	See 3GPP TS 23.011 [9].
Forwarded-to Number	C	See 3GPP TS 23.082 [19].
Forwarded-to Subaddress	C	See 3GPP TS 29.002 [32].
Subscription Options	C	See 3GPP TS 23.082 [19].
No Reply Condition Timer	C	See 3GPP TS 23.082 [19].

Call Barring SS Data contains the following information elements:

Information element name	Status	Description
SS Code	S	This IE indicates Call Barring supplementary service as defined in 3GPP TS 22.004 [2]. Only the SS code for which the modification applies is sent.
Call Barring Feature List	S	This IE is described in a table below. If a Call Barring Feature List item is modified then all applicable fields within the item shall be sent. All modified Call Barring Feature List items shall be returned.
Password	S	See 3GPP TS 23.011 [9]. The IE shall be sent if it was modified.
Wrong Password Attempts Counter	S	See 3GPP TS 23.011 [9]. The IE shall be sent if it was modified.
Notification-to-CSE Flag	S	This IE indicates whether the gsmSCF is notified of a change of Call Barring SS data. The IE shall be sent if it was modified.

Call Barring Feature List contains 1 to 32 items of the following information elements:

Information element name	Status	Description
Basic Service	C	See 3GPP TS 29.002 [32].
SS Status	C	See 3GPP TS 23.011 [9].

Operator Determined Barring Information contains the following information elements:

Information element name	Status	Description
ODB Data	C	See subclause 10.3.2.3
Notification-to-CSE Flag	C	This IE indicates whether the gsmSCF is notified of a change of ODB data.

CAMEL Subscription Information contains the following information elements:

Information element name	Status	Description
O—CSI	S	See subclause 4.3.1. It shall be present if it was modified.
D—CSI	S	See subclause 4.3.2. It shall be present if it was modified.
T—CSI	S	See subclause 4.3.5. It shall be present if it was modified.
VT—CSI	S	See subclause 4.3.6. It shall be present if it was modified.
TIF—CSI	S	See subclause 4.3.4. It shall be present if it was modified.
GPRS-CSI	S	See subclause 6.3.1. It shall be present if it was modified.
MO—SMS-CSI	S	See subclause 7.3.1. It shall be present if it was modified.
MT—SMS-CSI	S	See subclause 7.3.2. It shall be present if it was modified.
SS—CSI	S	See subclause 8.2.1. It shall be present if it was modified.
M—CSI	S	See subclause 9.2.1. It shall be present if it was modified.
MG—CSI	S	See subclause 9.2.2. It shall be present if it was modified.

10.3.2.2 Any Time Subscription Interrogation ack

10.3.2.2.1 Description

This IF is used by the HLR to provide the requested subscription information to the gsmSCF.

10.3.2.2.2 Information Elements

Information element name	Status	Description
Call Forwarding SS Data	C	This IE is described in a table below.
Call Barring SS Data	C	This IE is described in a table below.
Operator Determined Barring Data	C	This IE is described in a table below.
CAMEL Subscription Information	C	This IE is described in a table below.
Supported CAMEL Phases In VLR	C	This IE indicates the CAMEL phase supported in the VLR.
~~Supported~~Offered CAMEL4 ~~Subsets~~ CSIs In VLR	S	This IE indicates the CAMEL phase 4 ~~subsets~~ CSIs ~~supported~~offered in the VMSC/VLR. It shall be present if the "Supported CAMEL Phases In VLR" IE indicates CAMEL phase 4.
Supported CAMEL Phases In SGSN	C	This IE indicates the CAMEL phase supported in the SGSN.
~~Supported~~Offered CAMEL4 ~~Subsets~~ CSIs In SGSN	S	This IE indicates the CAMEL phase 4 ~~subsets~~ CSIs ~~supported~~offered in the SGSN. It shall be present if the "Supported CAMEL Phases In SGSN" IE indicates support of CAMEL phase 4.

Call Forwarding SS Data contains the following information elements:

Information element name	Status	Description
Forwarding Feature List	C	This IE is described in a table below
Notification-to-CSE Flag	C	This IE indicates whether the gsmSCF is notified of a change of Call Forwarding SS data.

Forwarding Feature List contains 1 to 32 items of the following information elements:

Information element name	Status	Description
Basic Service	C	See 3GPP TS 29.002 [32].
SS Status	C	See 3GPP TS 23.011 [9].
Forwarded-to Number	C	See 3GPP TS 23.082 [19].
Forwarded-to Subaddress	C	See 3GPP TS 29.002 [32].
Subscription Options	C	See 3GPP TS 23.082 [19].
No Reply Condition Time	C	See 3GPP TS 23.082 [19].

Call Barring SS Data contains the following information elements:

Information element name	Status	Description
Call Barring Feature List	C	This IE is described in a table below.
Password	C	See 3GPP TS 23.011 [9].
Wrong Password Attempts Counter	C	See 3GPP TS 23.011 [9].
Notification-to-CSE Flag	C	This IE indicates whether the gsmSCF is notified of a change of Call Barring SS data.

Call Barring Feature List contains 1 to 32 items of the following information elements:

Information element name	Status	Description
Basic Service	C	See 3GPP TS 29.002 [32].
SS Status	C	See 3GPP TS 23.011 [9].

Operator Determined Barring Bata contains the following information elements:

Information element name	Status	Description
ODB General Data	C	This IE indicates the set of subscribers features that the network operator or the service provider can regulate.
ODB HPLMN Specific Data	C	This IE indicates the set of subscribers features that the network operator or the service provider can regulate only when the subscriber is registered in the HPLMN.
Notification-to-CSE Flag	C	This IE indicates whether the gsmSCF is notified of a change of ODB data.

CAMEL Subscription Information contains the following information elements:

Information element name	Status	Description
O—CSI	C	See subclause 4.3.1.
D—CSI	C	See subclause 4.3.2.
T—CSI	C	See subclause 4.3.5.
VT—CSI	C	See subclause 4.3.6.
TIF—CSI	C	See subclause 4.3.4.
GPRS-CSI	C	See subclause 6.3.1.
MO—SMS-CSI	C	See subclause 7.3.1.
MT—SMS-CSI	C	See subclause 7.3.2.
SS—CSI	C	See subclause 8.2.1.
M—CSI	C	See subclause 9.2.1.
MG—CSI	C	See subclause 9.2.2.

Offered CAMEL4 CSIs In VLR contains the following information elements:

Information element name	Status	Description
O—CSI	S	This IE indicates the offer of CAMEL phase 4 O-CSI
D—CSI	S	This IE indicates the offer of CAMEL phase 4 D-CSI
VT—CSI	S	This IE indicates the offer of CAMEL phase 4 VT-CSI
T—CSI	S	This IE indicates the offer of CAMEL phase 4 T-CSI
MT—SMS—CSI	S	This IE indicates the offer of CAMEL phase 4 MT-SMS-CSI
PSI Enhancements	S	This IE indicates the offer of CAMEL phase 4 Enhancement of Provide Subscriber Information. *Note: for further study*

Offered CAMEL4 CSIs In SGSN contains the following information elements:

Information element name	Status	Description
MT—SMS—CSI	S	This IE indicates the offer of CAMEL phase 4 MT-SMS-CSI
MG—CSI	S	This IE indicates the offer of CAMEL phase 4 MG-CSI
PSI Enhancements	S	This IE indicates the offer of CAMEL phase 4 Enhancement of Provide Subscriber Information

— End —