Technical Specification Group Services and System Aspects
Meeting #7, Madrid, Spain, 15-17 March 2000

TSGS#7(00)0062

Source: **TSG SA1**

Title: **CRs to 22.078**

Document for: **Approval**

Agenda Item: **5.1.3**

Doc-1st-Level	Status-1st-Level	Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New
SP-000062		22.078	032	1	R99	Call gapping / congestion control in HPLMN only	F	3.2.0	3.3.0
SP-000062		22.078	033		R99	In-band user interaction for dialled services in CAMEL ph3	F	3.2.0	3.3.0
SP-000062		22.078	035		R99	Reduced scope of CAMEL Phase 3 in release 99	F	3.2.0	3.3.0
SP-000062		22.078	034		R99	Correction of GPRS session description	F	3.2.0	3.3.0

3GPP SA1
Sophia Antipolis, France, 9-11 Feb 2000

Document S1-0095
Replaces 73/00
e.g. for 3GPP use the format TP-99xxx or for SMG, use the format P-99-xxx

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22.078	CR	032 r1	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG SA#7	for approval	X	strategic		(for SMG use only)
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Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME		UTRAN / Radio		Core Network	X

Source: TSG SA1 **Date:** 7 Feb 2000

Subject: Call gapping / congestion control in HPLMN only

Work item: CAMEL Phase 3

Category: *(only one category shall be marked with an X)*				**Release:**		
F	Correction	X		Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: N2A discussed the principle in Kyoto meeting, and it was then found acceptable to have gall gapping in the Home network only. This simplifies the implementation. It shall be noted also, that most of the load comes from the HPLMN.

Clauses affected: 4.2, 17

Other specs affected:			
Other 3G core specifications		→ List of CRs:	
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

****** FIRST MODIFIED SECTION ******

4.2 General Procedures

Each process is made up of a series of telecommunication events, some of which are service events. At a service event, the IPLMN or VPLMN may suspend the process and make contact with a CSE to ask for instructions or to send a notification. When a service event occurs, the IPLMN or VPLMN shall send to the CSE the information listed in this specification. All information sent to the CSE relates to the served CAMEL subscriber unless otherwise stated. The initial service events, and the corresponding CSE identity, which can initiate contact with the CSE are defined in the CAMEL Subscription Information.
The serving network shall accept the instruction from the CSE and continue call processing with the received information.

The CAMEL feature is applicable in a PLMN when the CAMEL subscription information is handled properly and when the communication to the CSE is compliant with the CAMEL protocol [8].
The CAMEL network capabilities are used at a PLMN when the CAMEL feature is applicable and:

- the CSI is received from the HPLMN; or
- the CSE requests congestion control in the VPLMN or IPLMN; or - $(CAMEL3$);
- the CSE creates a call - $(CAMEL3$).

In addition dialled network-based services may be applicable in a PLMN if so administered. -$(CAMEL3$)
The CSE shall be capable of responding to the CAMEL request with instructions on how to resume the suspended process. In the case of subscriber-based services the CSE shall be possible to instruct the IPLMN or VPLMN to:

- Activate further service events for potential invocation. These events shall remain active only for the life-time of the telecommunication service;
- Alter information relating to the suspended process;
- Alter information relating to the parties involved in the process;
- Indicate which of the possible parts of the process should occur next (e.g. terminate the call);
- Perform Charging activities -$(CAMEL2$);
- Order in band user interaction -$(CAMEL2$);
- Create additional parties in the call - $(CAMEL3$);
- Change the configuration of the connections between call parties - $(CAMEL3$).

$(begin$(CAMEL3$)
It shall be possible in the case of subscribed dialled services for the CSE to instruct the serving PLMN to:

- Continue the processing of the call, or;
- Connect the calling party to a specified called party;

After one of the above instructions, the relation between the serving network and the CSE shall be released. Any other behaviour may cause misoperation of CAMEL based services.

Serving network-based service numbers may be treated after the above described behaviour. These services are outside the scope of the CAMEL specification.
Serving network based service numbers may be provided on the descretion of the network operator but the are outside this specification.
$(end$(CAMEL3$)
CAMEL features shall form an integral part of the following processes:

- Mobile Originated call (MO call);
- Mobile Terminated call in GMSC (MT call);
- Mobile Terminated call in VMSC (MT call); $(CAMEL3$);
- Mobile Forwarded call (MF call) - early call forwarding; early forwarded calls are treated as MO calls;

- Mobile Forwarded call (MF call) - late call forwarding; late forwarded calls are treated as MO calls;
- supplementary service invocation -$(CAMEL2$);
- USSD user interaction. The of service codes for CAMEL services can be allocated on subscriber basis or globally for all subscribers of the HPLMN. -$(CAMEL2$);
- MO SM service; both via MSC and SGSN of GPRS $(CAMEL3$);
- GPRS $(CAMEL3$).
- Mobility Management events $(CAMEL3$)

The CSE shall be able to interrogate the HPLMN for information about a particular subscriber at any time.
It shall be possible for the CSE to originate calls on behalf of a CAMEL subscriber - $(CAMEL3$).

****** NEXT MODIFIED SECTION ******

17 CSE related congestion control $(CAMEL3$)

It shall be possible for the CSE to drop or reject either all or some CAMEL interrogations from a V/IPLMN, when the V/IPLMN is the subscriber's HPLMN. With a bilateral agreement the operators can also apply congestion control between different networks.

In the case where the contact from the V/IPLMN is not confirmed by the CSE, the V/IPLMN shall proceed in accordance to the Default Call Handling, Default SMS Handling or Default Session Handling.

In the case where the congestion control denies the contact to the CSE, the V/IPLMN shall proceed in accordance to the Default Call Handling.

3GPP SA Working Group 1 Meeting #7
Sophia Antipolis, 09 Feb - 11 Feb 2000

Document S1-000065
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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22.078	CR	033	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG SA#7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME		UTRAN / Radio		Core Network	X

Source: TSG SA1 **Date:** 7/2/00

Subject: In-band user interaction for dialled services in CAMEL ph3

Work item: CAMEL Phase 3

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: Clarify the scope of CAMEL phase 3. It is necessary to provide In-band user interaction capability for the dialled service (subscribed and serving network) as the user interaction capability is essential for CAMEL supported services. There is no clear reason to exclude this capability from CAMEL ph3, except for service interaction comes from previously invoked service. This is also mentioned for stage 2/3 specification.
In addition, the allowed instruction for the dialled service is too restrictive, so it is also proposed to remove such restriction.

Clauses affected: 5.3.2.2, 7.2

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	23.078
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:


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<--------- double-click here for help and instructions on how to create a CR.

---------- First modified section ----------

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instructions:

- bar the call (i.e. release the call prior to connection);
- allow the call processing to continue unchanged;
- allow the call processing with modified information. The CSE shall have the possibility to send the information listed in table: A-2 (Call set up request procedure 1).

5.3.2 Procedure for subscribed dialled services $(CAMEL3$)

The purpose of this procedure is to detect a call set-up request at the point where the called party number has been compared with the dialled services information, and allow the CSE to modify the handling of the call set-up request. Triggering of this procedure shall happen immediately after the procedure when dialled digits have been collected.

5.3.2.1 Initiation of contact with the CSE

If (according to the CSI):

- the subscriber is provisioned with a CAMEL based originating service; and
- the call set-up request occurs; and
- the criteria are satisfied.

Then the VPLMN shall suspend call processing, make contact with the CSE and await further instructions.
Note that contact to the CSE shall (if necessary) be made in this manner before network dialled services are invoked;
For mobile originated calls the information listed in table: A-1 (Call set-up request procedure 3) shall be provided to the CSE if available.
For forwarded calls the information listed in table: A-1 (Call set-up request procedure 4) shall be provided to the CSE if available.

5.3.2.2 Further processing of the call

When the VPLMN has made contact with the CSE (or reported events to the CSE when contact has already been established), the CSE shall be able to instruct the VPLMN to act as described below ~~by issuing one and only one of the following instructions~~:

- allow the call processing to continue unchanged;
- allow the call processing with modified information. The CSE shall have the possibility to send the information listed in table: A-2 (Call set up request procedure 2).
- release the call;
- perform charging activities.
- order in-band user interaction. (Interaction between the service triggered from previous triggering may be needed to avoid duplicated guidance etc.)

Further processing of the call continues as detailed in Sections 5.3 to 5.8, and the CSE contact initiated at this procedure is terminated.

---------- Second modified section ----------

7.2 Further processing of the call

When the serving network has made contact with the CSE, the CSE shall be able to instruct the serving network to act as described below ~~by issuing one and only one of the following instructions~~:

- allow the call processing to continue unchanged;
- allow the call processing with modified information. The CSE shall have the possibility to send the information listed in table: A-2 (Procedures for serving network dialled services 2).
- release the call;
- perform charging activities.
- order in-band user interaction. (Interaction between the service triggered from previous triggering may be needed to avoid duplicated guidance etc.)

Further processing of the call continues as detailed in Sections 5.3 to 5.8, and the CSE contact initiated at this procedure is terminated.

3GPP TSG SA WG1
Email Discussion

Document *159/00*
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

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22.078	CR	034	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

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list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME		UTRAN / Radio		Core Network	X

Source: TSG SA1 **Date:** 07.02.2000

Subject: Correction of GPRS session description

Work item: CAMEL Phase 3

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: The terms GPRS session, GPRS attach/detach and PDP context are used in the GPRS standards in various contexts and ways. The current set of contributions aligns the terminology to the 23.078 terminology, as this one is used most consistently.

Clauses affected:

Other specs affected:

Other 3G core specifications		→ List of CRs:	CR 23.078-106, CR 29.078-053
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

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— First modified section —

1 Scope

This standard specifies the stage 1 description for CAMEL feature (Customised Applications for Mobile network Enhanced Logic) which provides the mechanisms to support services consistently independently of the serving network. The CAMEL features shall facilitate service control of operator specific services external from the serving PLMN. 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.
CAMEL is developed in phases. The following phases exist:

- CAMEL phase 1. This is the default phase in this specification. Text that are only applicable to phase 1 are characterised with the formal designator - $(CAMEL1$)

- CAMEL phase 2. It is characterised where necessary with the formal designation - $(CAMEL2$) and sometimes with an indication of CAMEL phase 2. - $(CAMEL2$)

- CAMEL phase 3. It is characterised where necessary with the formal designation - $(CAMEL3$) and sometimes with an indication of CAMEL phase 2. - $(CAMEL3$)

The CAMEL feature is applicable

- to mobile originated and mobile terminated call related activities;

- as a CAMEL phase 2 function, to supplementary service invocations - $(CAMEL2$);

- as a CAMEL Phase 3 function, to SMS MO, to GPRS sessions and PDP contexts, to the control of HLR subscriber data, to control different call party connections, to the control of network signalling load and, - $(CAMEL3$);

- as a CAMEL Phase 3 function, to CSE created calls - $(CAMEL3$).

The mechanism described addresses especially the need for information exchange among the VPLMN, HPLMN and the CAMEL Service Environment (CSE) for support of such operator specific services. Any user procedures for operator specific services are outside the scope of this standard.
This specification describes the interactions between the functions of the VPLMN, HPLMN, IPLMN and the CSE.
The second phase of CAMEL enhance the capabilities of phase 1 and are included in this standard. Following capabilities are added:

- Additional event detection points.

- Interaction between a user and service using announcements, voice prompting and information collection via in band interaction or USSD interaction.

- Control of call duration and transfer of Advice of Charge Information to the mobile station.

- The CSE can be informed about the invocation of supplementary services (e.g ECT, CD, MPTY).

- For easy postprocessing, charging information from a serving node can be integrated in normal call records.

The third phase of CAMEL enhances the capabilities of phase 2. Following capabilities are added :

- Capabilities for enhanced handling of call party connections, together with the ability to handle more than 2 parties in a call

- Support of facilities to avoid overload situations.

- Capabilities to support Dialled Services.

- Capabilities to handle mobility events, such as (Not-)reachability and roaming.

- Control of GPRS sessions and PDP contexts.

- Control of circuit switched mobile originating SMS and packet switched mobile originating SMS.

- Support of SoLSA. Support of Localised Service Area interworking is an optional feature. The support for interworking with mobile terminating calls is a requirement, however the specific details of how this will be realised is for further study - $(CAMEL3$)

- The CSE can be informed about the invocation of GSM supplementary services (CCBS) - $(CAMEL3$)

Detailed information can be found in the respective sections.

— Next modified section —

3 Definitions and abbreviations

Operator Specific Service (OSS): Any service offered to a mobile user that is not standardised.
Interrogating PLMN (IPLMN): This is the PLMN that performs the interrogation of the HPLMN for information on the treatment of a terminating call.
CAMEL Service Environment (CSE): A CSE is a logical entity which processes activities related to Operator Specific Services (OSS).
Route select failure: A condition when routeing to the called party fails. Route Select Failure can be reported in an existing relationship $(CAMEL2$) or a new relationship can be initiated.- $(CAMEL3$)
Service event: A specific event of a process that may be used as part of an operator specific service.
Service procedure: A part of the CAMEL feature to be used to detect a specific CAMEL service event.
Network CAMEL Service Information (N-CSI): The N-CSI identifies services offered on a per-network basis by the serving PLMN operator for all subscribers. - $(CAMEL3$)

NOTE: These services may also be provided using a technology other than CAMEL.

CAMEL Subscription Information (CSI): The CSI identifies that CAMEL support is required for the subscriber and the identities of the CSEs to be used for that support. The CSI also contains information related to the OSS of the subscriber, e.g. Service Key.
These OSS may include both services provisioned for individual subscribers and services provisioned equally for all subscribers of an HPLMN. - $(CAMEL3$)
Location Information: The location information shall be an identification of the location of the served subscriber. The following location information should be sent to the CSE (if available):

- **Geographical information** (longitude and latitude)when Cell ID or Location Area Code is known) this may be calculated as the nominal central point of the cell or of the location area; alternative mechanisms for determining latitude and longitude may also be supported. The resolution and accuracy of the indicated location information may also be provided.

- **Cell ID** indicates the global identity of the current or last cell which the subscriber is using or has used. The VPLMN shall update the stored Cell ID at establishment of every radio connection and whenever the subscriber is handed over between cells.

- **VLR number** is the number of the serving VLR stored in the HPLMN.

- **Location status** indicates whether or not the location information has been confirmed by radio contact. If the location information has not been confirmed by radio contact a time stamp is sent indicating the time elapsed since the last radio contact with the subscriber.

- **Location number** is the number received on the incoming circuit (for an incoming call) or to be sent on the outgoing circuit (for an outgoing call).

Service Key: An identifier of the OSS which shall be transparent to the IPLMN/VPLMN.
Subscriber Status: An indication of the status of a subscriber, determined by the state of the subscriber's MS. The subscriber status can take one of three values:

- **CAMEL-busy**: the MS is engaged in a mobile-originated or mobile-terminated circuit-switched call.

- **Network determined not reachable**: the network can determine from its internal data that the MS is not reachable. This includes detached and purged mobile stations.

- **Assumed idle**: any MS that is not CAMEL-busy or network determined not reachable.

GPRS sessionattach: Is the period where the GPRS subscriber is registered to the GPRS data network. A GPRS session starts when the GPRS subscriber attaches to the GPRS data network. It ends when the GPRS subscriber detaches from the GPRS data network. - $(CAMEL3$)
GPRS sessionPDP Context: A PDP context session starts when a GPRS subscriber activates the start to send or receive data packets and ends when the subscriber deactivates the PDP transportcontext. - $(CAMEL3$)
PDP: Packet Data Protocol (as defined in TS 22.060 [6]) - $(CAMEL3$)
Route select failure: - $(CAMEL3$)
[test to be added]

Carrier Identification Code: Identifies uniquely the Carrier (NAEA). - $(CAMEL2$)
Carrier Selection Information: Is an indication whether the subscriber selected a carrier, or the carrier is predefined for the subscriber (NAEA). - $(CAMEL2$)

Originating Line Identification: Identifies uniquely the subscriber to be charged for the usage of the carrier (NAEA). - $(CAMEL2$)
Charge Number: Identifies uniquely the organisation to be charged for the usage of the carrier (NAEA). - $(CAMEL2$)
NAEA: North American Equal Access (NAEA). - $(CAMEL2$)
Subscribed Dialled Services: Identifies a set of maximum of ten service numbers. These service numbers are globally available to all HPLMN subscribers. No subscription is needed to access the service numbers within the HPLMN. Each service number is chosen on the HPLMN operators discretion. In the case of international roaming, the set of service numbers forms a part of the subscribers profile. - $(CAMEL3$)

— Next modified section —

4 Description

The CAMEL network feature enables the use of Operator Specific Services (OSS) by a subscriber even when roaming outside the HPLMN.

4.1 Provision of CAMEL

CAMEL subscribers have one or more CAMEL Subscription Information (CSI) elements. CAMEL Subscription Information is provided by the HPLMN operator by administrative means.
The following CSI's may be adminstered per subscriber:

O-CSI *Originating CAMEL Subscription Information (O-CSI)* is transferred to the VPLMN (at location update) and IPLMN (for an incoming call in GMSC). O-CSI contains trigger information that is required to invoke a CAMEL Service Logic for Mobile Originating calls (in VMSC) and Mobile Forwarding calls (in VMSC and GMSC).
See section 5 for the usage of O-CSI.

T-CSI *Terminating CAMEL Subscription Information (T-CSI)* is transferred to the IPLMN for an incoming call in GMSC. T-CSI contains trigger information that is required to invoke a CAMEL Service Logic for Mobile Terminating calls in the GMSC.
See section 6 for the usage of T-CSI.

TV-CSI $(CAMEL3$) *Terminating VMSC CAMEL Subscription Information (TV-CSI)* is transferred to the VPLMN at location update. TV-CSI contains trigger information that is required to invoke a CAMEL Service Logic for Mobile Terminating calls in the VMSC.
See section 6 for the usage of TV-CSI.

SS-CSI $(CAMEL2$) *Supplementary Service Invocation Notification CAMEL Subscription Information (SS-CSI)* is transferred to the VPLMN. SS-CSI is used to notify the CSE about the invocation of certain Supplementary Services.
See section 12.3 for the usage of SS-CSI.

TIF-CSI $(CAMEL2$) *Translation information Flag CAMEL Subscription Information (TIF-CSI)* is transferred to the VPLMN. TIF-CSI is used in the HLR for registering short Forwarded-to-Numbers (FTN's). When TIF-CSI is present, the subscriber is allowed to register short FTN's.
When the subscriber invokes Call Deflection, TIF-CSI in the VPLMN allows the subscriber to deflect to short Deflected-to-Numbers.
See section 18.3 for the usage of TIF-CSI.

U-CSI $(CAMEL2$) *USSD CAMEL Subscription Information (U-CSI)* is held in the HLR; it is not sent to any other node. U-CSI contains trigger information that is used to invoke a USSD application in the CSE for the served subscriber.
See section 14.3 for the usage of U-CSI.

UG-CSI $(CAMEL2$) *USSD General CAMEL Subscription Information (UG-CSI)* is held in the HLR; it is not sent to any other node. UG-CSI contains trigger information that is used to invoke a USSD application in the CSE for all subscribers.
See section 14.3 for the usage of UG-CSI.

SMS-CSI $(CAMEL3$) *Short Message Service CAMEL Subscription Information (SMS-CSI)* is transferred to the VPLMN. SMS-CSI contains trigger information that is required to invoke a CAMEL Service Logic for Mobile Originating Short Message submissions.
See section 9 for the usage of SMS-CSI.

GPRS-CSI $(CAMEL3$) *GPRS CAMEL Subscription Information (GPRS-CSI)* is transferred to the VPLMN. GPRS-CSI contains trigger information that is required to invoke a CAMEL Service Logic for ~~Originating~~ GPRS Sessions and PDP Contexts.
See section 10 for the usage of GPRS-CSI.

M-CSI $(CAMEL3$) *Mobility Management CAMEL Subscription Information (M-CSI)* is transferred to the VPLMN. M-CSI is used to notify the CSE about Mobility Management events.

See section 12.1 for the usage of M-CSI.
Refer to 3G TS 23.078 for detailed descriptions of the various CAMEL Subscription Informations.

The CSI may inculde the Default Call Handling Indicator.
The Default Call Handling indicates whether the call shall be released or continued in case of the contact to the CSE is not confirmed or interrupted.
[Network -based services may be provided by the serving PLMN operator. The provisioning mechanism is out of the scope of this specification. -$(CAMEL3$). See CR 023]

4.2 General Procedures

Each process is made up of a series of telecommunication events, some of which are service events. At a service event, the IPLMN or VPLMN may suspend the process and make contact with a CSE to ask for instructions or to send a notification. When a service event occurs, the IPLMN or VPLMN shall send to the CSE the information listed in this specification. All information sent to the CSE relates to the served CAMEL subscriber unless otherwise stated. The initial service events, and the corresponding CSE identity, which can initiate contact with the CSE are defined in the CAMEL Subscription Information.
The serving network shall accept the instruction from the CSE and continue call processing with the received information.

The CAMEL feature is applicable in a PLMN when the CAMEL subscription information is handled properly and when the communication to the CSE is compliant with the CAMEL protocol [8].
The CAMEL network capabilities are used at a PLMN when the CAMEL feature is applicable and:

- the CSI is received from the HPLMN; or
- the CSE requests congestion control in the VPLMN or IPLMN; or - $(CAMEL3$);
- the CSE creates a call - $(CAMEL3$).

In addition dialled network-based services may be applicable in a PLMN if so administered. -$(CAMEL3$)
The CSE shall be capable of responding to the CAMEL request with instructions on how to resume the suspended process. In the case of subscriber-based services the CSE shall be possible to instruct the IPLMN or VPLMN to:

- Activate further service events for potential invocation. These events shall remain active only for the life-time of the telecommunication service;
- Alter information relating to the suspended process;
- Alter information relating to the parties involved in the process;
- Indicate which of the possible parts of the process should occur next (e.g. terminate the call);
- Perform Charging activities -$(CAMEL2$);
- Order in band user interaction -$(CAMEL2$);
- Create additional parties in the call - $(CAMEL3$);
- Change the configuration of the connections between call parties - $(CAMEL3$).

$(begin$(CAMEL3$)
It shall be possible in the case of subscribed dialled services for the CSE to instruct the serving PLMN to:

- Continue the processing of the call, or;
- Connect the calling party to a specified called party;

After one of the above instructions, the relation between the serving network and the CSE shall be released. Any other behaviour may cause misoperation of CAMEL based services.

Serving network-based service numbers may be treated after the above described behaviour. These services are outside the scope of the CAMEL specification.
Serving network based service numbers may be provided on the descretion of the network operator but the are outside this specification.
$(end$(CAMEL3$)
CAMEL features shall form an integral part of the following processes:

- Mobile Originated call (MO call);

- Mobile Terminated call in GMSC (MT call);
- Mobile Terminated call in VMSC (MT call); $(CAMEL3$);
- Mobile Forwarded call (MF call) - early call forwarding; early forwarded calls are treated as MO calls;
- Mobile Forwarded call (MF call) - late call forwarding; late forwarded calls are treated as MO calls;
- supplementary service invocation -$(CAMEL2$);
- USSD user interaction. The of service codes for CAMEL services can be allocated on subscriber basis or globally for all subscribers of the HPLMN. -$(CAMEL2$);
- MO SM service; both via MSC and SGSN of GPRS $(CAMEL3$);
- GPRS $(CAMEL3$).
- Mobility Management events $(CAMEL3$)

The CSE shall be able to interrogate the HPLMN for information about a particular subscriber at any time.
It shall be possible for the CSE to originate calls on behalf of a CAMEL subscriber - $(CAMEL3$).

4.3 Applicability of CAMEL Procedures

CAMEL procedures are applicable to all circuit switched Basic Services without distinction (except Emergency calls).
CAMEL procedures are applicable to GPRS sessions and PDP contexts. $(CAMEL3$).
CAMEL procedures are applicable to circuit switched Mobile Originating Short Message Service and to packet switched Mobile Originating Short Message Service $(CAMEL3$).

— Next modified section —

10 Procedures for GPRS Data Transmission $(CAMEL3$)

NOTE: Other information elements not listed in the following subclauses may be necessary to meet some Stage 1 service requirements. Refer to the Stage 2 specification TS 23.078 for complete information element lists.

10.1 Initial service events

It shall be possible to specify the following initial service events which shall initiate contact with the CSE:
- Attach procedure: a subscriber requests to register to the GPRS network
- PDP Activation / Session Establishment: a subscriber requests the activation of a Packet Data Protocol Context.
- PDP Activation / Session Establishment Acknowledgement: the SGSN has received an acknowledgement from the GGSN for that request.

10.2 Criteria for contact with the CSE

It shall be possible for the HPLMN to specify criteria that must be satisfied before the CSE is contacted. The following criteria may be defined:

10.2.1 CSI criteria applicable at attach, session establishment and session establishment acknowledgement procedure

CSI criteria may be defined for a subscriber both for the case where the GPRS subscriber attaches to the data network, for the case where she starts to set up a PDP context~~data session~~ (PDP active) and for the case where acknowledgement of data session set-up is received (PDP activation acknowledgement).
Criterion at the attach procedure:
- Capabilities of GPRS MS class;

Criteria on the type of ~~session~~ PDP context (applicable at session establishment request and acknowledgement):
- Transfer characteristics; e.g. IP, X.25

- Service characteristics; e.g. Quality of Service

- Identities; e.g. Access Point Name

The criteria may be collectively defined to be either ‘enabling trigger criteria’ or ‘inhibiting trigger criteria’. The HPLMN may choose not to define any criteria.
If:

- Enabling trigger criteria are met, or

- Inhibiting trigger criteria are not met, or

- No trigger criteria are defined

Then criteria permit the contact with the CSE to be established.

10.3 Attach procedure

The purpose of this procedure is to detect a request from a GPRS subscriber to attach to the data network and allow the CSE to modify the handling of the attach request.
If (according to the CSI) :

- the subscriber is provisioned with a CAMEL based service, relevant for GPRS data transmission; and

- the attach request is set as a trigger detection; and

- the attach request occurs; and

- criteria permit the contact with the CSE to be established.

then-, the VPLMN shall suspend attach processing, make contact with the CAMEL Service Environment and await further instructions.
The information listed in table: A-3 (Attach procedure) shall be provided to the CAMEL Service Environment, if available.
When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.

- activate other control service events for the period being attached to the data network. The CSE shall have the possibility to send the following information:

    - The service event which shall be detected and reported:

        - PDP activation/session establishment request;

        - PDP session establishment acknowledgement;

        - Change of position;

        - PDP deactivation;

        - Detach procedure;

    - Perform charging activities (amongst others defining a data or time threshold).

There shall be no restriction regarding the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instructions:

- Reject the attachment request;

- allow the processing to continue unchanged.

10.4 PDP activation / Session Establishment

The purpose of this procedure is to manage a request from the subscriber to activate a Packet Data Protocol. If either (according to the CSI) :

- the subscriber is provisioned with a CAMEL based service relevant for GPRS data transmission; and

    - the PDP activation request is set as a trigger detection; and

- the PDP Activation request occurs; and

- criteria permit the contact with the CSE to be established,

or, the CSE has activated this service event for the attached subscriber and the PDP activation event occurs then,
- the VPLMN shall suspend processing, make contact with the CSE and await further instructions, or,

- send a notification and continue.

The information listed in table: A-3 (PDP activation / Session Establishment) shall be provided to the CSE if available.
When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.
- activate other control service events for the life of the PDP context. The CSE shall have the possibility to send the following information:

  - The service event which shall be detected and reported (including a GPRS session reference number):

    - Change of position

    - PDP session establishment acknowledgement

    - PDP deactivation procedure;

    - Detach procedure;

  - The type f monitoring.

- Perform Charging Activities (amongst others defining a data or time threshold),

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instruction:
- Release GPRS session,

- allow the processing to continue unchanged;

- allow the processing with modified information. The CSE shall have the possibility to send the following information:

  - Access Point Name.

10.5 PDP activation / Session Establishment Acknowledgement

The purpose of this procedure is to manage a request from the subscriber to activate a Packet Data Protocol. Multiple contacts to the CSE may be made in parallel due to PDP activation / session establishment acknowledgement events being detected whilst a GPRS subscriber is attached to the network.
If either (according to the CSI) :
- the subscriber is provisioned with a CAMEL based service relevant for GPRS data transmission; and

- the PDP activation / session establishment acknowledgement is set as a trigger detection point; and

- the PDP Activation/Session Establishment Acknowledgement request occurs; and

- criteria permit the contact with the CSE to be established,

or the CSE has activated this service event for the attached and / or active subscriber and the PDP activation acknowledgement event occurs then,
- the VPLMN shall suspend processing, make contact with the CSE and await further instructions, or,

- send a notification and continue.

The information listed in table: A-3 (PDP activation / Session Establishment Acknowledgement) shall be provided to the CSE if available.
When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described

below.

- activate other control service events for the life of the PDP context. The CSE shall have the possibility to send the following information:
  - The service event which shall be detected and reported (including a GPRS session reference number):
    - Change of position
    - PDP deactivation procedure;
    - Detach procedure;
- Perform Charging Activities (amongst others defining a data or time threshold),

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instruction:

- Release GPRS session or PDP Context,
- allow the processing to continue unchanged;

10.6 Change of Position Procedure

The purpose of this procedure is to detect a request from the GPRS subscriber for update the actual routing area, i.e. to change from one SGSN to another SGSN.
If the CSE has activated this service event ~~for the session~~ and a request to change the position occurs, the VPLMN shall send a notification and continue.
The following information shall be provided to the CSE if available:

- Event met;
- New routing area;

10.7 Data Volume or Time Threshold Procedure

The purpose of this procedure is to control the amount of transmitted by and transmitted to the served subscriber or the used time per GPRS Session or PDP Context. The threshold is valid for one GPRS session or PDP Context of the subscriber only. If the subscriber controls simultaneous GPRS sessions, thresholds per GPRS session or PDP Context have to defined.
The type of threshold is indicated per GPRS session or PDP Context either as:

- a maximum amount of data transmitted by and transmitted to the subscriber or
- a granted time to transmit data.

A threshold is reached within a GPRS session or PDP Context, when:

- the total amount of data transmitted by and transmitted to the subscriber reaches the granted data volume or,
- the allowed time for the GPRS Session or PDP Context has elapsed.

If the CSE has defined a threshold for a GPRS Session or PDP Context and the threshold has been reached, then the VPLMN shall inform the CSE.

The VPLMN shall not suspend the transmission of data packets to and from the GPRS terminal. The VPLMN shall immediately restart counting the amount of data transmitted by and transmitted to the GPRS terminal or restart timing the duration of the GPRS Session or PDP Context.

The CSE may instruct the VPLMN to release the GPRS Session or PDP Context when the threshold is reached.
The following information shall be provided to the CSE if available:

- Charge result (elapsed time or total amount of data transmitted);
- The GPRS session or PDP Context for which the event is reported;
- GPRS Session or PDP Context-Active indicator.

When the VPLMN has reported the reaching of the threshold to the CSE, the CSE shall be able to do the following (assuming the continuation of the applicable dialogue):

- perform charging activities (including the defining of a new threshold)
- activate control service events. The CSE shall have the possibility to send the following information:
- the Service event which shall be detected and reported reported (including a session or PDP Context reference number):
- PDP deactivation
- Detach Procedure
- The GPRS session or PDP Context for which the event shall be monitored and reported
- The type of monitoring (only monitor mode is allowed in this case)

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated.

Once the CSE has concluded issuing the above instructions, it shall be able to act as follows (provided the GPRS session or PDP context has not been released):

- release the GPRS session or PDP Context
- allow the GPRS session or PDP Context to continue

10.8 PDP deactivation / Session Release

The purpose of this procedure is to detect a request from the subscriber to release a Packet Data Protocol.
If the CSE has activated this service event for the attached subscriber and the PDP deactivation event occurs then the VPLMN shall suspend processing, make contact with the CSE and await further instructions or send a notification and continue.
The following information shall be provided to the CSE:

- Event met;
- The GPRS session or PDP Context for which the event is reported;
- Type of monitoring;

When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.

- activate other control service events for the GPRS session. The CSE shall have the possibility to send the following information:
- the Service event which shall be detected and reported reported:
  - Detach Procedure
- the type of monitoring
- perform charging activities;

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall send the following instruction:

- allow the processing to continue unchanged;

10.9 Detach procedure

The purpose of this procedure is to detect a request from a GPRS subscriber to detach from the data network and to

inform the CAMEL Service Environment on the request.
If the CSE has activated this service event for the attached subscriber and the Detach event occurs, then the VPLMN shall suspend processing, make contact with the CSE and await further instructions or send a notification and continue.
The following information shall be provided to the CAMEL Service Environment, if available:

- Event met;
- Type of monitoring;

When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.

- perform charging activities;

There shall be no restriction regarding the number of times the above instruction can be repeated. Once the CSE has concluded issuing the above instruction, it shall send the following instruction:

- allow the processing to continue unchanged.

10.10 CSE Initiated GPRS Detach Procedure

Following the CAMEL processing of the GPRS attach procedure or PDP context activation procedure it shall be possible for the CSE to initiate GPRS detach at any time.
To use this procedure, there shall be a control relationship between the CSE and the GPRS session.

10.11 CSE Initiated PDP Context Deactivation Procedure

Following the CAMEL processing of the PDP context activation procedure it shall be possible for the CSE to initiate PDP context deactivation at any time.
To use this procedure, there shall be a control relationship between the CSE and the PDP Context.

10.12 Change of Quality of Service Procedure

The CSE may request the VPLMN to report a change in Quality of Service (QoS).

When a QoS change occurs, then the VPLMN shall send a notification to the CSE and continue.

The following information shall be provided to the CSE:

- Charge result – this may be elapsed time or the total amount of data transmitted by and transmitted to the subscriber
- Quality of Service
- PDP ID
- PDP Context state

When the CSE receives the notification of change of QoS, it may instruct the VPLMM to act as follows:

- perform charging activities (including the defining of a new threshold)
- arm control service events. The CSE shall have the possibility to send the following information:
- the Service event which shall be detected and reported reported (including a GPRS session or PDP Context reference number):
- PDP deactivation
- Detach Procedure
- The GPRS session or PDP Context for which the event shall be monitored and reported
- The type of monitoring (only monitor mode is allowed in this case)

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated.

Once the CSE has concluded issuing the above instructions, it shall be able to act as follows:

- release the GPRS session or PDP Context
- allow the GPRS session or PDP Context to continue

10.13 Charging Procedures

The CSE can perform the following charging activities:

10.13.1 Advice of Charge

The CSE may send Charge Advice Information (CAI) elements to the SGSN.

10.13.2 Inclusion of Free Format data in CDR

The CSE may send free format data to the SGSN, for inclusion in a CDR. The CSE shall specify the GPRS session or PDP Contex for which the free format data is destined.
When sending the free format data to the VPLMN, the CSE may instruct the VPLMN to

- overwrite the existing free format data for that GPRS session or PDP Context, or
- append the newly received free format data to the existing free format data

10.13.3 Specify a threshold for transmitted data or used time

See section 10.7.

10.13.4 Request notification of change in Quality of Service

The CSE may request the VPLMN to notify the CSE when a change in Quality of Service has occurred for a PDP Context.

3GPP SA1
Sophia Antipolis, France, 9-11 Feb 2000

Document S1-00167
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

22.078	CR	035	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG SA#7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME		UTRAN / Radio		Core Network	X

Source: TSG SA1 **Date:** 04/02/2000

Subject: Reduced scope of CAMEL Phase 3 in release 99

Work item: CAMEL Phase 3

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: Reduced scope of CAMEL phase 3, means that stage 1 description has to be aligned with capabilities described in stage 2 functional description.

Clauses affected: 1, 2, 3, 4.1, 4.2, 5.3.1, 5.5, 5.6, 5.7, 5.8, 5.10, 6.3, 6.5, 6.6, 6.7, 6.8, 7, 8, 9.1, 11, 13.2, 14.1, 14.4, 20, 21, A1, A2, A3

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments: This Change request removes the features that have been postponed to CAMEL Phase 4. As the scope of CAMEL Phase 3 has been decided by the stability of the specifications of the features at CN2 #13.


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3G TS 22.078 V3.2.0 (1999-12)

Technical Specification

3rd Generation Partners
Technical Specification Group Services a

Aspects;
Customised Applications for Mobile network Enhanced Logic
(CAMEL);
Service description, Stage 1
(3G TS 22.078 version 3.2.0)

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Contents

Foreword

This Technical Specification has been produced by the 3GPP.

This TS defines the stage 1 description for the first phase of the CAMEL feature (Customised Applications for Mobile network Enhanced Logic) which provides the mechanisms to support services consistently independently of the serving network within the 3GPP system.

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

Version x~~3~~.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 Indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the specification;

Introduction

The present document includes references to features which are not part of the Phase 2+ Release 96 of the GSM Technical specifications. All subclauses which were changed as a result of these features contain a marker (see table below) relevant to the particular feature.

The following table lists all features that were introduced after Release 96.

Feature	Designator
CAMEL Phase 2	$(CAMEL2)$ Release 97
CAMEL Phase 3	$(CAMEL3)$ Release 99

1 Scope

This standard specifies the stage 1 description for CAMEL feature (Customised Applications for Mobile network Enhanced Logic) which provides the mechanisms to support services consistently independently of the serving network. The CAMEL features shall facilitate service control of operator specific services external from the serving PLMN. 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.
CAMEL is developed in phases. The following phases exist:

- CAMEL phase 1. This is the default phase in this specification. Text that are only applicable to phase 1 are characterised with the formal designator - $(CAMEL1$)

- CAMEL phase 2. It is characterised where necessary with the formal designation - $(CAMEL2$) and sometimes with an indication of CAMEL phase 2. - $(CAMEL2$)

- CAMEL phase 3. It is characterised where necessary with the formal designation - $(CAMEL3$) and sometimes with an indication of CAMEL phase 2. - $(CAMEL3$)

The CAMEL feature is applicable

- to mobile originated and mobile terminated call related activities;

- as a CAMEL phase 2 function, to supplementary service invocations - $(CAMEL2$);

- as a CAMEL Phase 3 function, to SMS MO, to GPRS sessions, to the control of HLR subscriber data, ~~to control different call party connections,~~ to the control of network signalling load ~~and,~~ - $(CAMEL3$);

- ~~as a CAMEL Phase 3 function, to CSE created calls - $(CAMEL3$).~~

The mechanism described addresses especially the need for information exchange among the VPLMN, HPLMN and the CAMEL Service Environment (CSE) for support of such operator specific services. Any user procedures for operator specific services are outside the scope of this standard.
This specification describes the interactions between the functions of the VPLMN, HPLMN, IPLMN and the CSE.
The second phase of CAMEL enhance the capabilities of phase 1 and are included in this standard. Following capabilities are added:

- Additional event detection points.

- Interaction between a user and service using announcements, voice prompting and information collection via in band interaction or USSD interaction.

- Control of call duration and transfer of Advice of Charge Information to the mobile station.

- The CSE can be informed about the invocation of supplementary services (e.g ECT, CD, MPTY).

- For easy postprocessing, charging information from a serving node can be integrated in normal call records.

The third phase of CAMEL enhances the capabilities of phase 2. Following capabilities are added :

- ~~Capabilities for enhanced handling of call party connections, together with the ability to handle more than 2 parties in a call~~

- Support of facilities to avoid overload situations.

- Capabilities to support Dialled Services.

- Capabilities to handle mobility events, such as (Not-)reachability and roaming.

- Control of GPRS sessions.

- Control of circuit switched mobile originating SMS and packet switched mobile originating SMS.

- Support of SoLSA. Support of Localised Service Area interworking is an optional feature~~. The support for interworking with mobile terminating calls is a requirement, however the specific details of how this will be realised is for further study~~ - $(CAMEL3$)

- The CSE can be informed about the invocation of GSM supplementary services (CCBS) - $(CAMEL3$)

Detailed information can be found in the respective sections.

2 References

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

document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- For this Release 1999 document, references to ~~GSM~~ 3GPP documents are for Release 1999 versions (version ~~8~~3.x.y).

[1] TS 22.093: ""Completion of Calls to Busy Subscriber (CCBS); Service description, Stage 1".

[2] TS 22.079: ""Support of Optimal Routeing (SOR); Service definition (Stage 1)".

[3] TS 22.030: ""Man-machine Interface (MMI) of the Mobile Station (MS) (Stage 1)".

[4] TS 22.090: ""Stage 1 Decision of Unstructured Supplementary Service Data (USSD)".

[5] TS 22.097: ""Multiple Subscriber Profile (MSP); Service definition (Stage 1)".

[6] TS 22.060: ""General Packed Radio Service (GPRS); Service definition (Stage 1)".

[7] TS 22.057: ""Mobile Station Execution Environment (MExE); Service definition (Stage 1)".

[8] TS 22.071: ""Location Services; Service Definition (Stage1) ""

3 Definitions and abbreviations

Operator Specific Service (OSS): Any service offered to a mobile user that is not standardised.
Interrogating PLMN (IPLMN): This is the PLMN that performs the interrogation of the HPLMN for information on the treatment of a terminating call.
CAMEL Service Environment (CSE): A CSE is a logical entity which processes activities related to Operator Specific Services (OSS).
Route select failure: A condition when routeing to the called party fails. Route Select Failure can be reported in an existing relationship $(CAMEL2$) or a new relationship can be initiated.- $(CAMEL3$)
Service event: A specific event of a process that may be used as part of an operator specific service.
Service procedure: A part of the CAMEL feature to be used to detect a specific CAMEL service event.
Network CAMEL Service Information (N-CSI): The N-CSI identifies services offered on a per-network basis by the serving PLMN operator for all subscribers. - $(CAMEL3$)

NOTE: These services may also be provided using a technology other than CAMEL.

CAMEL Subscription Information (CSI): The CSI identifies that CAMEL support is required for the subscriber and the identities of the CSEs to be used for that support. The CSI also contains information related to the OSS of the subscriber, e.g. Service Key.
The~~se~~ OSS may include both services provisioned for individual subscribers and services provisioned equally for all ~~subscribers of an HPLMN~~ users of a VPLMN. - $(CAMEL3$)
Location Information: The location information shall be an identification of the location of the served subscriber. The following location information should be sent to the CSE (if available):

- **Geographical information** (longitude and latitude)when Cell ID or Location Area Code is known) this may be calculated as the nominal central point of the cell or of the location area; alternative mechanisms for determining latitude and longitude may also be supported. The resolution and accuracy of the indicated location information may also be provided.

- **Geodetic Information** *(text to be added)*

- **Cell ID** indicates the global identity of the current or last cell which the subscriber is using or has used. The VPLMN shall update the stored Cell ID at establishment of every radio connection and whenever the subscriber is handed over between cells.

- **VLR number** is the number of the serving VLR stored in the HPLMN.

- **Location status** indicates whether or not the location information has been confirmed by radio contact. If the location information has not been confirmed by radio contact a time stamp is sent indicating the time elapsed since the last radio contact with the subscriber.

- **Location number** is the number received on the incoming circuit (for an incoming call) or to be sent on the outgoing circuit (for an outgoing call).

Service Key: An identifier of the OSS which shall be transparent to the IPLMN/VPLMN.
Subscriber Status: An indication of the status of a subscriber, determined by the state of the subscriber's MS. The subscriber status can take one of three values:

- **CAMEL-busy**: the MS is engaged in a mobile-originated or mobile-terminated circuit-switched call.

- **Network determined not reachable**: the network can determine from its internal data that the MS is not reachable. This includes detached and purged mobile stations.

- **Assumed idle**: any MS that is not CAMEL-busy or network determined not reachable.

GPRS attach: Is the period where the GPRS subscriber is registered to the GPRS data network. - $(CAMEL3$)
GPRS session: A session starts when a GPRS subscriber activates the start to send or receive data packets and ends when the subscriber deactivates the PDP transport. - $(CAMEL3$)
PDP: Packet Data Protocol (as defined in TS 22.060 [6]) - $(CAMEL3$)
~~**Route select failure:** - $(CAMEL3$)~~
~~[test to be added]~~

Carrier Identification Code: Identifies uniquely the Carrier (NAEA). - $(CAMEL2$)
Carrier Selection Information: Is an indication whether the subscriber selected a carrier, or the carrier is predefined for the subscriber (NAEA). - $(CAMEL2$)
Originating Line Identification: Identifies uniquely the subscriber to be charged for the usage of the carrier (NAEA). - $(CAMEL2$)
Charge Number: Identifies uniquely the organisation to be charged for the usage of the carrier (NAEA). - $(CAMEL2$)
NAEA: North American Equal Access (NAEA). - $(CAMEL2$)
Subscribed Dialled Services: Identifies a set of maximum of ten service numbers. ~~These service numbers are globally available to all HPLMN subscribers. No subscription is needed to access the service numbers within the HPLMN.~~ Each service number is chosen on the HPLMN operators discretion. In the case of international roaming, the set of service numbers forms a part of the subscribers profile. - $(CAMEL3$)

4 Description

The CAMEL network feature enables the use of Operator Specific Services (OSS) by a subscriber even when roaming outside the HPLMN.

4.1 Provision of CAMEL

CAMEL subscribers have one or more CAMEL Subscription Information (CSI) elements. CAMEL Subscription Information is provided by the HPLMN operator by administrative means.
The following CSI's may be ~~adminstered~~administered per subscriber:

O-CSI *Originating CAMEL Subscription Information (O-CSI)* is transferred to the VPLMN (at location update) and IPLMN (for an incoming call in GMSC). O-CSI contains trigger information that is required to invoke a CAMEL Service Logic for Mobile Originating calls (in VMSC) and Mobile Forwarding calls (in VMSC and GMSC).
See section 5 for the usage of O-CSI.

T-CSI *Terminating CAMEL Subscription Information (T-CSI)* is transferred to the IPLMN for an incoming call in GMSC. T-CSI contains trigger information that is required to invoke a CAMEL Service Logic for Mobile Terminating calls in the GMSC.
See section 6 for the usage of T-CSI.

VT~~V~~-CSI $(CAMEL3$) VMSC *Terminating ~~VMSC~~ CAMEL Subscription Information (VT~~V~~-CSI)* is transferred to the VPLMN at location update. ~~T~~VT-CSI contains trigger information that is required to invoke a CAMEL Service Logic for Mobile Terminating calls in the VMSC.
See section 6 for the usage of VT~~T~~V-CSI.

SS-CSI $(CAMEL2$) *Supplementary Service Invocation Notification CAMEL Subscription Information (SS-CSI)* is transferred to the VPLMN. SS-CSI is used to notify the CSE about the invocation of certain Supplementary Services.
See section 12.3 for the usage of SS-CSI.

TIF-CSI $(CAMEL2$) *Translation information Flag CAMEL Subscription Information (TIF-CSI)* is transferred to the VPLMN. TIF-CSI is used in the HLR for registering short Forwarded-to-Numbers (FTN's). When TIF-CSI is present, the subscriber is allowed to register short FTN's.
When the subscriber invokes Call Deflection, TIF-CSI in the VPLMN allows the subscriber to deflect

	to short Deflected-to-Numbers. See section 18.3 for the usage of TIF-CSI.
U-CSI	$(CAMEL2$) *USSD CAMEL Subscription Information (U-CSI)* is held in the HLR; it is not sent to any other node. U-CSI contains trigger information that is used to invoke a USSD application in the CSE for the served subscriber. See section 14.3 for the usage of U-CSI.
UG-CSI	$(CAMEL2$) *USSD General CAMEL Subscription Information (UG-CSI)* is held in the HLR; it is not sent to any other node. UG-CSI contains trigger information that is used to invoke a USSD application in the CSE for all subscribers. See section 14.3 for the usage of UG-CSI.
SMS-CSI	$(CAMEL3$) *Short Message Service CAMEL Subscription Information (SMS-CSI)* is transferred to the VPLMN. SMS-CSI contains trigger information that is required to invoke a CAMEL Service Logic for Mobile Originating Short Message submissions. See section 9 for the usage of SMS-CSI.
GPRS-CSI	$(CAMEL3$) *GPRS CAMEL Subscription Information (GPRS-CSI)* is transferred to the VPLMN. GPRS-CSI contains trigger information that is required to invoke a CAMEL Service Logic for Originating GPRS Sessions and PDP Contexts. See section 10 for the usage of GPRS-CSI.
M-CSI	$(CAMEL3$) *Mobility Management CAMEL Subscription Information (M-CSI)* is transferred to the VPLMN. M-CSI is used to notify the CSE about Mobility Management events. See section 12.1 for the usage of M-CSI.
D-CSI	$(CAMEL3$) *Dialled Services CAMEL Subscription Information* (D-CSI) is transferred to the VPLMN (at location update) and IPLMN (for an incoming call in GMSC). D-CSI contains trigger information that is required to invoke a CAMEL service logic for subscribers dialled services. See section 5.3.2 for the usage of D-CSI.

Refer to 3G TS 23.078 for detailed descriptions of the various CAMEL Subscription Informations.

The CSI may ~~inculde~~include the Default Call Handling Indicator, Default GPRS Handling or Default SMS Handling. The Default Call Handling indicates whether the call shall be released or continued in case of the contact to the CSE is not confirmed or interrupted.
[Network -based services may be provided by the serving PLMN operator. The provisioning mechanism is out of the scope of this specification. -$(CAMEL3$~~). See CR 023~~]

4.2 General Procedures

Each process is made up of a series of telecommunication events, some of which are service events. At a service event, the IPLMN or VPLMN may suspend the process and make contact with a CSE to ask for instructions or to send a notification. When a service event occurs, the IPLMN or VPLMN shall send to the CSE the information listed in this specification. All information sent to the CSE relates to the served CAMEL subscriber unless otherwise stated. The initial service events, and the corresponding CSE identity, which can initiate contact with the CSE are defined in the CAMEL Subscription Information.
The serving network shall accept the instruction from the CSE and continue call processing with the received information.

The CAMEL feature is applicable in a PLMN when the CAMEL subscription information is handled properly and when the communication to the CSE is compliant with the CAMEL protocol [8].
The CAMEL network capabilities are used at a PLMN when the CAMEL feature is applicable and:

- the CSI is received from the HPLMN; or
- the CSE requests congestion control in the VPLMN or IPLMN; or - $(CAMEL3$);
- ~~the CSE creates a call - $(CAMEL3$).~~

In addition dialled network-based services may be applicable in a PLMN if so administered. -$(CAMEL3$)
The CSE shall be capable of responding to the CAMEL request with instructions on how to resume the suspended process. In the case of subscriber-based services the CSE shall be possible to instruct the IPLMN or VPLMN to:

- Activate further service events for potential invocation. These events shall remain active only for the life-time of the telecommunication service;
- Alter information relating to the suspended process;
- Alter information relating to the parties involved in the process;

- Indicate which of the possible parts of the process should occur next (e.g. terminate the call);
- Perform Charging activities -$(CAMEL2$);
- Order in band user interaction -$(CAMEL2$);
- ~~Create additional parties in the call - $(CAMEL3$);~~
- ~~Change the configuration of the connections between call parties - $(CAMEL3$).~~

$(begin$(CAMEL3$)
It shall be possible in the case of subscribed dialled services for the CSE to instruct the serving PLMN to:

- Continue the processing of the call, or;
- Continue the processing of the call with modified information, or;
- ~~-~~Connect the calling party to a specified called party~~;~~ or ;
- Release the call

After one of the above instructions, the relation between the serving network and the CSE shall be released. Any other behaviour may cause misoperation of CAMEL based services.

Serving network-based service numbers may be treated after the above described behaviour. These services are outside the scope of the CAMEL specification.
Serving network based service numbers may be provided on the ~~descretion~~ discretion of the network operator but these are outside this specification.
$(end$(CAMEL3$)
CAMEL features shall form an integral part of the following processes:

- Mobile Originated call (MO call);
- Mobile Terminated call in GMSC (MT call);
- Mobile Terminated call in VMSC (MT call); $(CAMEL3$);
- Mobile Forwarded call (MF call) - early call forwarding; early forwarded calls are treated as MO calls;
- Mobile Forwarded call (MF call) - late call forwarding; late forwarded calls are treated as MO calls;
- supplementary service invocation -$(CAMEL2$);
- USSD user interaction. The of service codes for CAMEL services can be allocated on subscriber basis or globally for all subscribers of the HPLMN. -$(CAMEL2$);
- MO SM service; both via MSC and SGSN of GPRS $(CAMEL3$);
- GPRS $(CAMEL3$).
- Mobility Management events $(CAMEL3$)
- Control of Subscription Data $(CAMEL3$)

The CSE shall be able to interrogate the HPLMN for information about a particular subscriber at any time.
~~It shall be possible for the CSE to originate calls on behalf of a CAMEL subscriber - $(CAMEL3$).~~

4.3 Applicability of CAMEL Procedures

CAMEL procedures are applicable to all circuit switched Basic Services without distinction (except Emergency calls).
CAMEL procedures are applicable to GPRS sessions $(CAMEL3$).
CAMEL procedures are applicable to circuit switched Mobile Originating Short Message Service and to packet switched Mobile Originating Short Message Service $(CAMEL3$).

5 Procedures for Mobile Originated Calls and Forwarded Calls

NOTE: Other information elements not listed in the following subclauses may be necessary to meet some Stage 1 service requirements. Refer to the Stage 2 specification TS 23.078 for complete information element lists.

5.1 Initial service events

It shall be possible to specify which of the following initial service events shall initiate contact with the CSE:

- Collection of dialled digits;

$(begin$(CAMEL3$)

- Analysis of dialled digits - $(CAMEL3$);
- Detection of unsuccessful call establishment - $(CAMEL3$).
  Unsuccessful call establishment may be caused by:
  - route select failure.

$(end$(CAMEL3$)

The definition of which of the above initial service events shall initiate contact with the CSE is part of the subscriber's CAMEL subscription information. Analysis of dialled digits can open a new dialogue regardless whether there exists a relationship or not. Upon detection of unsuccessful call establishment no new relationship is opened if there is already a dialogue open due to same CSI.

~~Type of number (TON): Identifies the format a number.~~

5.2 Criteria for contact with the CSE $(CAMEL2$)

It shall be possible for the HPLMN to specify criteria which must be satisfied before the CSE is contacted.

The following criteria may be defined:

5.2.1 CSI criteria applicable at call setup

5.2.1.1 CSI criteria applicable at call setup when dialled digits have been collected $(CAMEL2$)

CSI criteria may be defined for a subscriber for the case where collection of dialled digits has been performed $(CAMEL3$).

- Criteria on the dialled number; these consist of:
  - The contents of the dialled number (a list of up to 10 dialled number strings may be defined in the criteria. Each dialled number string may be of any type of number (TON) format. supported by the access protocol); <u>There is no restriction on the Number Plan Indicator (NPI).</u>
  - The length of the dialled number (a list of up to three lengths may be defined.).
- The criteria on the dialled number may be collectively defined to be either "enabling" triggering criteria or "inhibiting" triggering criteria (see below). The HPLMN may also choose not to define any criteria on the dialled number.
- A criterion on the basic service: this consists of a list of <u>up to 5</u> basic service codes for individual basic services or basic service groups ~~(the list shall be able to contain at least 5 basic service codes)~~. The HPLMN may also choose not to define any criterion on the basic service.
- A criterion on the type of call: this consists of defining whether or not the call must be a forwarded call.

  A call is treated as forwarded in this respect when either a forwarding supplementary service applies or when the call is forwarded as a result of a terminating CAMEL based service. The HPLMN may also choose not to define any criterion on the type of call.

If the criteria on dialled number are "enabling" then the dialled number criteria are satisfied if:

- the dialled number matches a dialled number string defined in the criteria; or
- the length of the dialled number matches a dialled number length defined in the criteria.

If the criteria on the dialled number are "inhibiting" then the dialled number criteria are satisfied if:

- the dialled number does not match any of the dialled number strings defined in the critera; and
- the length of the dialled number is not the same as any dialled number length defined in the criteria.

In these tests the dialled number matches one of the dialled number strings if:

- the two numbers are of the same Type Of Number (TON); and
- the two numbers have the same Number Plan Indicator (NPI); and
- the dialled number is at least as long as the dialled number string in the criteria; and
- all the digits in the dialled number string in the criteria match the leading digits of the dialled number.

If no criterion on the dialled number is specified then the dialled number criteria are satisfied.
The criterion on the basic service is satisfied if the basic service used for the call corresponds to any basic service code or basic service group defined in the criterion or if no basic service criterion is specified.
The criterion on the type of call is satisfied if the type of the call is the same as the type defined in the criterion or if no call type criterion is specified.
The criteria on the call setup event procedure are satisfied if:

- the criteria on the dialled number are satisfied; and
- the criterion on the basic service is satisfied; and
- the criterion on the type of call is satisfied.

5.2.1.2 CSI criterion applicable at call setup for subscribed dialled services $(CAMEL3S)

A CSI criterion on the contents of the called number shall be defined for subscribed dialled services. A list of up to 10 called number strings may be defined in the criterion. Each entry in the called number list has associated with it a CSE identity and a service key which defines the service to be triggered if the criterion is satisfied.

The called number criterion is satisfied if the called number matches a called number string defined in the criterion.
In this test the called number matches one of the called number strings if:

- the two numbers are of the same Type Of Number (TON); and
- the two numbers have the same Number Plan Indicator (NPI); and
- the called number is at least as long as the called number string in the criteria; and
- all the digits in the called number string in the criteria match the leading digits of the called number.

5.2.1.3 CSI criterion applicable on detection of unsuccessful call establishment $(CAMEL3$)

A criterion on the release cause may be defined. This consists of a list of up to 5 cause values. The criterion on the release cause is satisfied if the received call release cause corresponds to any cause value defined in the list or if no criterion is defined.

5.3 Call set-up request procedure

5.3.1 Procedure when dialled digits have been collected

The purpose of this procedure is to detect a call set-up request at the point where digits have been collected but not analysed, and to allow the CSE to modify the handling of the call set-up request.
If (according to the CSI):

- the subscriber is provisioned with a CAMEL based originating service; and
- the call set-up request occurs; and
- the criteria are satisfied $(CAMEL2$).

Then the VPLMN/IPLMN shall suspend call processing, make contact with the CSE and await further instructions.

For mobile originated calls the information listed in table: A-1 (Call set-up request procedure 1) shall be provided to the CSE if available.
For forwarded calls the information listed in table: A-1 (Call set-up request procedure 2) shall be provided to the CSE if available.
When the VPLMN/IPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.

- perform charging activities; $(CAMEL2$);
- activate other control service events for the call. The CSE shall have the possibility to send the following information:
  - The service event which shall be detected and reported:
    - Called party connection;
    - Call disconnection;
    - Calling party abandon -$(CAMEL2$);
    - Unsuccessful call establishment. In the case of no answer the CSE may provide a no answer timer - $(CAMEL2$);
    - ~~Mid call event (DTMF). The CSE shall specify the digit string(s) for which the instruction is valid. $(CAMEL3$);~~
  - The party in the call for which the event shall be detected and reported (calling or called party);
  - The type of monitoring (control or notification).
- ~~Create additional parties in the call (refer to Section 'Creation of called parties') $(CAMEL3$);~~
- ~~Remove individual call parties from the call $(CAMEL3$);~~
- ~~Connect an individual call party or a group of call parties to another call party or group of call parties, within the same call $(CAMEL3$);~~
- order in-band user interaction. $(CAMEL2$).

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instructions:

- bar the call (i.e. release the call prior to connection);
- allow the call processing to continue unchanged;
- allow the call processing with modified information. The CSE shall have the possibility to send the information listed in table: A-2 (Call set up request procedure 1).

5.3.2 Procedure for subscribed dialled services $(CAMEL3$)

The purpose of this procedure is to detect a call set-up request at the point where the called party number has been compared with the dialled services information, and allow the CSE to modify the handling of the call set-up request. Triggering of this procedure shall happen immediately after the procedure when dialled digits have been collected.

5.3.2.1 Initiation of contact with the CSE

If (according to the CSI):

- the subscriber is provisioned with a CAMEL based originating service; and
- the call set-up request occurs; and
- the criteria are satisfied.

Then the VPLMN/IPLMN shall suspend call processing, make contact with the CSE and await further instructions. ~~Note that c~~Contact to the CSE shall (if necessary) be made in this manner before network dialled services are invoked; For mobile originated calls the information listed in table: A-1 (Call set-up request procedure 3) shall be provided to the CSE if available.
For forwarded calls the information listed in table: A-1 (Call set-up request procedure 4) shall be provided to the CSE if available.

5.3.2.2 Further processing of the call

When the VPLMN/IPLMN has made contact with the ~~CSE (or reported events to the CSE when contact has already been established)~~, the CSE shall be able to instruct the VPLMN/IPLMN to act as described below by issuing one and only one of the following instructions:

- allow the call processing to continue unchanged;
- allow the call processing with modified information. The CSE shall have the possibility to send the information listed in table: A-2 (Call set up request procedure 2).
- release the call;
- perform charging activities (the CSE is only allowed to include charging data in the Call Data Record).

~~Further processing of the call continues as detailed in Sections 5.3 to 5.8, and the CSE contact initiated at this procedure is terminated~~.

5.4 Calling party abandon $(CAMEL2$)

The purpose of this procedure is to manage an outgoing call set-up at the time it is terminated by the calling party before the call is established.
If the CSE has activated this service event for this call in notify mode and the calling party abandon event occurs the VPLMN/IPLMN shall:

- notify the CSE and continue.

The following information shall be provided to the CSE:
- Event met;
- Type of monitoring;

The CSE shall send the following instruction:

- allow the call processing to continue unchanged.

$(begin$(CAMEL3$)

If the CSE has activated this service event for this call in request mode and the calling party abandon event occurs the VPLMN/IPLMN shall suspend call processing, make contact with the CSE and await further instructions.

When the VPLMN/IPLMN has made contact with the CSE in request mode, the CSE shall be able to instruct the VPLMN to act as described below.

- perform charging activities;

There shall be no restriction regarding the number of times the above instruction can be repeated. Once the CSE has concluded issuing the above instruction, it shall issue the following instruction:

- allow the call processing to continue unchanged.

$(end$(CAMEL3$)

5.5 Unsuccessful call establishment $(CAMEL2$)

The purpose of this procedure is to manage an outgoing call set-up at the time when the call establishment is unsuccessful.
If no control relationship for the given call exists and

- the unsuccessful call establishment procedure is defined as initial service event (according to the CSI); and

- the call attempt is unsuccessful; and
- the triggering criteria are satisfied .

Then the VPLMN/IPLMN shall suspend call processing, make contact with the CSE and await further instructions.

If a relationship for the given call already exists and the CSE has activated this service event for this call and the unsuccessful call establishment event occurs the VPLMN/IPLMN shall:

- suspend call processing, notify the CSE and await further instructions, or
- notify the CSE and continue call processing.

In both cases above the following information shall be provided to the CSE:

- Event met;
- Type of monitoring;
- Cause for unsuccessful call establishment:
  - not reachable
  - busy
  - no answer
  - route select failure

If the unsuccessful call procedure is armed as a initial service event, the information listed in table: A-1 (Unsuccessful call establishment (MO)) shall be provided to the CSE additionally if available. A new relationship is opened only if triggering criteria are fulfilled and no relationship exists already for the same CSI - $(CAMEL3$)

When the VPLMN/IPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN/IPLMN to act as described below:

- perform charging activities;
- activate other control service events for the call. The CSE shall have the possibility to send the following information:
  - The service event which shall be detected and reported:
    - Called party connection;
    - Call disconnection;
    - Calling party abandon;
    - Unsuccessful call establishment. In the case of no answer the CSE may provide a no answer timer;
    - ~~Mid call event (DTMF) $(CAMEL3$);~~
  - The party in the call for which the event shall be detected and reported (calling or called party);
  - The type of monitoring (control or notification).
- ~~Create additional parties in the call (refer to Section 'Creation of called parties') $(CAMEL3$);~~
- ~~Put call parties on hold $(CAMEL3$);~~
- ~~Remove individual call parties from the call $(CAMEL3$);~~
- ~~Reconnect an individual call party or a group of call parties to another call party or group of call parties, within the same call $(CAMEL3$);~~
- order in-band user interaction.

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instructions:

- allow the call processing to continue unchanged;
- allow the call processing with modified information. The CSE shall have the possibility to send the following information listed in table: A-2 (Unsuccessful call establishment (MO)).
- release call

5.6 Called party connection procedure

The purpose of this procedure is to manage an outgoing call set-up at the time when the called party answers and the call is successfully established.
If the CSE has activated this service event for this call and the called party connection event occurs the VPLMN/IPLMN shall:

- suspend call processing, notify the CSE and await further instructions, or
- notify the CSE and continue call processing.

The following information shall be provided to the CSE:
- Event met;
- The party in the call for which the event is reported (only Called party applicable);
- Type of monitoring.

When the VPLMN/IPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN/IPLMN to act as described below.

- perform charging activities;
- activate other control service events for the call. The CSE shall have the possibility to send the following information:
  - The service event which shall be detected and reported:
    - Call disconnection;
    - ~~Mid call event (DTMF) $(CAMEL3$);~~
  - The party in the call for which the event shall be detected and reported (calling or called party);
  - The type of monitoring (control or notification).
- ~~Create additional parties in the call (refer to Section 'Creation of called parties') $(CAMEL3$);~~
- ~~Put call parties on hold $(CAMEL3$);~~
- ~~Remove individual call parties from the call $(CAMEL3$);~~
- ~~Reconnect an individual call party or a group of call parties to another call party or group of call parties, within the same call $(CAMEL3$);~~
- Order in-band user interaction $(CAMEL3$).

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instructions:
- release the call;
- allow the call processing to continue unchanged;

5.7 ~~Mid call procedure $(CAMEL3$)~~Reserved section

~~When the CSE instructs the VPLMN to arm the mid-call event it shall specify a criterion against which digits entered by the originating subscriber using the DTMF procedure shall be matched.~~
~~The criterion consists of a list of up to 3 entries. Each entry is either a digit string or a definition of a range. A range definition consists of a lower bound followed by an upper bound. The lower bound and the upper bound are each digit strings. A digit string shall be at least 1 digit and at most 6 digits. Each digit shall be taken from the ordered set (0 - 9, *, #, A, B, C, D).~~
~~When collecting digits, the VPLMN shall consider a digit which follows the first digit of the string to be part of the string only if the interval between successive digits does not exceed 4 seconds.~~
~~The criterion for the mid-call DP is satisfied if the digits collected from the subscriber match the digits in a digit string in the criterion, or if the digits collected from the subscriber are included in a range defined in the criterion. Triggering of the mid-call event shall occur immediately after the criterion has been satisfied. Once the triggering occurs the VPLMN shall disable all entries from the criterion list.~~
~~Digits collected from the subscriber shall be relayed as DTMF towards the destination subscriber independent of any CAMEL processing.~~
~~If the CSE has activated this service event for this call and a mid-call event (as determined by the criterion for the mid-call procedure being satisfied) occurs the VPLMN shall:~~

- ~~suspend call processing, notify the CSE and await further instructions, or~~
- ~~notify the CSE and continue call processing.~~

~~The following information shall be provided to the CSE:~~

- ~~Event met;~~
- ~~The party in the call for which the event is reported;~~
- ~~Type of monitoring;~~
- ~~event specific data:~~
  - ~~received DTMF digits.~~

~~When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below:~~

- ~~perform charging activities~~
- ~~activate other control service events for the call. The CSE shall have the possibility to send the following information:~~
  - ~~The service event which shall be detected and reported:~~
    - ~~Call disconnection;~~
    - ~~Mid call event (DTMF);~~
  - ~~The party in the call for which the event shall be detected and reported (calling or a called party);~~
  - ~~The type of monitoring (control or notification).~~
- ~~Create additional parties in the call (refer to Section 'Creation of called parties');~~
- ~~Put call parties on hold;~~
- ~~Remove individual call parties from the call;~~
- ~~Reconnect an individual call party or a group of call parties to another call party or group of call parties, within the same call;~~
- ~~order in-band user interaction~~

~~There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instruction:~~

~~allow the call processing to continue unchanged, or;~~

~~release the call;~~

5.8 Call disconnection procedure

The purpose of this procedure is to manage the actions on disconnection of an established call. This procedure is applicable to the calling party and to the called party~~to any party in the call~~.
If the CSE has activated this service event for this call and the call disconnection event occurs the VPLMN/IPLMN shall:

- suspend call processing, notify the CSE and await further instructions, or
- notify the CSE and continue call processing.

The following information shall be provided to the CSE:

- Event met;
- The party in the call for which the event is reported;
- Type of monitoring;
- Disconnection reason.

$(begin$(CAMEL2$)

When the VPLMN/IPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN/IPLMN to act as described below:

- perform charging activities
- activate other control service events for the call. The CSE shall have the possibility to send the following information:
  - The service event which shall be detected and reported:
    - Called party connection;
    - Call disconnection;
    - Calling party abandon;
    - Unsuccessful call establishment. In the case of no answer the CSE may provide a no answer timer;

  ~~Mid call event (DTMF). The CSE shall specify the digit string(s) for which the instruction is valid. $(CAMEL3$);~~
  - The party in the call for which the event shall be detected and reported (calling or called party);
  - The type of monitoring (control or notification).

~~Create additional parties in the call (refer to Section 'Creation of called parties') $(CAMEL3$);~~

~~Put call parties on hold $(CAMEL3$);~~

~~Remove individual call parties from the call $(CAMEL3$);~~

~~Reconnect an individual call party or a group of call parties to another call party or group of call parties, within the same call $(CAMEL3$);~~

- order in-band user interaction.

$(end$(CAMEL2$)

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instruction:

- allow the call processing to continue unchanged, i.e. to release the call;

$(begin$(CAMEL2$)
- allow the call processing with modified information. The CSE shall have the possibility to send the information listed in table: A-2 (Call disconnection procedure (MO)):

$(end$(CAMEL2$)

5.9 CSE initiated call release procedure

Following the CAMEL processing of the Call set-up request procedure it shall be possible for the CSE to initiate a call release at any moment of the call.
To use this procedure the CSE shall previously have activated any of these service events (with "Type of monitoring" set to control.)

5.10 ~~Creation of called parties $(CAMEL3$)~~Reserved section

~~The purpose of this procedure is to allow the CSE to initiate the creation of called parties in the call as long as a controlling relation to the CSE exists.~~
~~The CSE shall send a request to initiate a call attempt. In this case the CSE shall always arm all events pertaining to unsuccessful call connection and to answer, and then continue processing of the call attempt before any other activities are performed on the call party created.~~
~~The information that it shall be possible to receive in the initiate call attempt request is listed in table: A-2 (Creation of called parties).~~
~~Upon receipt of an answer or unsuccessful call establishment event then the event is reported to the CSE.~~
~~The following information shall be provided to the CSE:~~

- ~~Event met;~~
- ~~The party in the call for which the event is reported (only a Called party is applicable);~~
- ~~Type of monitoring.~~

~~Processing then continues as defined in the following Sections:~~

- ~~5.3.1,~~
- ~~5.4,~~
- ~~5.5,~~
- ~~5.6,~~
- ~~5.9.~~
- ~~6.3.~~
- ~~6.4.~~
- ~~6.5.~~
- ~~6.6.~~
- ~~6.8, and.~~
- ~~6.9.~~

6 Procedures for Mobile Terminated Calls

NOTE: Other information elements not listed in the following subclauses may be necessary to meet some Stage 1 service requirements. Refer to the Stage 2 specification TS 23.078 for complete information element lists.

In the following subclauses VPLMN applies to CAMEL3 only.

6.1 Initial service events

It shall be possible to specify which of the following initial service events shall initiate contact with the CSE:

- Terminating Attempt Authorised~~Authorisation attempt~~

$(begin$(CAMEL3$)
- Detection of unsuccessful call establishment.

  Unsuccessful call establishment may be caused by:

  - called subscriber busy;

  - called subscriber not reachable;

- no answer from called subscriber.

Upon detection of unsuccessful call establishment no new relationship is opened if there is already a dialogue opened due to same CSI.
$(end$(CAMEL3$)

6.2 Criteria for contact with the CSE $(CAMEL2$)

6.2.1 CSI criteria applicable on terminating attempt authorisation

It shall be possible for the HPLMN to specify a criterion which must be satisfied before the CSE is contacted.

The following criterion may be defined:

- A criterion on the basic service; this consists of a list of up to 5 basic service codes for individual basic services or basic service groups ~~(the list shall be able to contain at least 5 basic service codes)~~. The HPLMN may also choose not to define any criterion on the basic service.

The criterion on the basic service is satisfied if the basic service used for the call corresponds to any basic service code defined in the criterion or if no basic service criterion is specified.
On the incoming call request event procedure the CSE shall be contacted if the criterion on the basic service is satisfied.

6.2.2 CSI criterion applicable on detection of unsuccessful call establishment $(CAMEL3$)

A criterion on the failure reason may be defined. This consists of a list of up to 5 failure reasons. A failure reason can denote a release cause value or can denote that the HPLMN determined that the called subscriber was not reachable. The criterion on the failure reason is satisfied if the reason for failure of the call corresponds to any failure reason defined in the list or if no criterion is defined.

6.3 Incoming call request procedure

The purpose of this procedure is to detect an incoming call request and allow the CSE to modify the handling of the incoming call.
If (according to the CSI):

- the subscriber is provisioned with a CAMEL based terminating service; and

- the incoming call request event occurs

Then the IPLMN/VPLMN shall suspend call processing, make contact with the CSE and await further instructions.

For mobile terminated calls the following information listed in table: A-1 (Incoming call request procedure) shall be provided to the CSE if available.
When the IPLMN/VPLMN has made contact with the CSE, the CSE shall be able to instruct the IPLMN/VPLMN to act as described below.

- perform charging activities; -$(CAMEL2$)

- activate other control service events for the call. The CSE shall have the possibility to send the following information:

  - The service event which shall be detected and reported:

    - Called party connection;

- Call disconnection;
- Calling party abandon -$(CAMEL2$);
- Unsuccessful call establishment. In case of no answer the CSE may provide a no answer timer $(CAMEL2$).
- ~~Mid call event (DTMF). The CSE shall specify the digit string(s) for which the instruction is valid. $(CAMEL3$);~~

- The party in the call for which the event shall be detected and reported (calling or called party);
- The type of monitoring (control or notification).

~~$(begin$(CAMEL3$) activate control service events for the originating call leg. The CSE shall have the possibility to send the following information:~~

- ~~The service event which shall be detected and reported:~~
  - ~~Called party connection;~~
  - ~~Call disconnection;~~
  - ~~Calling party abandon;~~
  - ~~Unsuccessful call establishment. The CSE may specify the distinct unsuccessful case(s) for which the instruction is valid.;~~
  - ~~Mid call event (DTMF). The CSE shall specify the digit string(s) for which the instruction is valid.~~
- ~~The party in the call for which the event shall be detected and reported (calling or called party);~~

~~$(end$(CAMEL3$)~~

- suppress tones and announcements which may be played to the calling party, if an unsuccessful call establishment occurs.

  $(begin$(CAMEL1$)

  This is only applicable when the called party number is unchanged by the CSE.

  $(end$(CAMEL1$)

- ~~Create additional parties in the call (refer to Section 'Creation of called parties') $(CAMEL3$);~~
- ~~Remove individual call parties from the call $(CAMEL3$);~~
- ~~Reconnect an individual call party or a group of call parties to another call party or group of call parties, within the same call $(CAMEL3$);~~
- order in-band user interaction.$(CAMEL2$)

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instructions:

- bar the call (i.e. release the call prior to connection);
- allow the call processing to continue unchanged;
- allow the call processing with modified information. The CSE shall have the possibility to send the information listed in table: A-2 (Incoming call request procedure).

In the case the CSE instructs the IPLMN/VPLMN to allow the call processing with a changed called party number, the CSE shall indicate whether the resulting call shall be treated by the IPLMN/VPLMN as a forwarded call or not. Any forwarded call resulting from a CSE Call Forwarding service may cause an invocation of any mobile originated CAMEL based service in the IPLMN/VPLMN.

$(begin$(CAMEL2$)

In the case the CSE instructs the IPLMN to allow the call processing with modified information, the CSE may send to the IPLMN an alerting pattern in order to alert the called subscriber in a specific manner. This alerting pattern shall be transferred to the VPLMN.

$(end$(CAMEL2$)

6.4 Calling party abandon $(CAMEL2$)

The purpose of this procedure is to manage an incoming call set-up at the time it is terminated by the calling party before the call is established.
If the CSE has activated this service event for this call in notify mode and the calling party abandon event occurs the IPLMN/VPLMN shall:

- notify the CSE and continue.

The following information shall be provided to the CSE:

- Event met;
- Type of monitoring;

$(begin$(CAMEL3$)

If the CSE has activated this service event for this call in request mode and the calling party abandon event occurs the IPLMN/VPLMN shall suspend call processing, make contact with the CSE and await further instructions.

When the IPLMN/VPLMN has made contact with the CSE in request mode, the CSE shall be able to instruct the IPLMN/VPLMN to act as described below.

- perform charging activities;

There shall be no restriction regarding the number of times the above instruction can be repeated. Once the CSE has concluded issuing the above instruction, it shall issue the following instruction:

- allow the call processing to continue unchanged;

$(end$(CAMEL3$)

6.5 Unsuccessful call establishment $(CAMEL2$)

The purpose of this procedure is to manage an incoming call set-up at the time when the call establishment is unsuccessful.
$(begin$(CAMEL3$)
If no relationship for the given call exists and

- the unsuccessful call establishment procedure is defined as initial service event (according to the CSI); and
- the call attempt is unsuccessful; and
- the triggering criteria are satisfied ,

then the VPLMN/IPLMN shall suspend call processing, make contact with the CSE and await further instructions.

$(end$(CAMEL3$)

If a relationship for the given call already exists and the CSE has activated this service event for this call and the unsuccessful call establishment event occurs the VPLMN/IPLMN shall:

- suspend call processing, notify the CSE and await further instructions, or
- notify the CSE and continue call processing.

In bothe cases above the following information shall be provided to the CSE:

- Event met;
- Type of monitoring;

- Cause for unsuccessful call establishment:
    - not reachable;
    - busy;
- no answer.
- Forwarding notification

If the unsuccessful call establishment procedure is armed as a initial service event, information listed in table: A.1 (Unsuccessful call establishment (MT)) shall be provided to the CSE additionally if available. -$(CAMEL3$).

When the IPLMN/VPLMN has made contact with the CSE, the CSE shall be able to instruct the IPLMN/VPLMN to act as described below.

- perform charging activities;
- activate other control service events for the call. The CSE shall have the possibility to send the following information:
    - The service event which shall be detected and reported:
        - Called party connection;
        - Call disconnection;
        - Calling party abandon;
        - Unsuccessful call establishment. In the case of no answer the CSE may provide a no answer timer;
        - ~~Mid call event (DTMF). The CSE shall specify the digit string(s) for which the instruction is valid. $(CAMEL3$);~~
    - The party in the call for which the event shall be detected and reported (calling or called party);
    - The type of monitoring (control or notification).
- ~~Create additional parties in the call (refer to Section 'Creation of called parties') $(CAMEL3$);~~
- ~~Put call parties on hold $(CAMEL3$);~~
- ~~Remove individual call parties from the call $(CAMEL3$);~~
- ~~Reconnect an individual call party or a group of call parties to another call party or group of call parties, within the same call $(CAMEL3$);~~
- order in-band user interaction.

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instructions:

- allow the call processing to continue unchanged;
- allow the call processing with modified information. The CSE shall have the possibility to send the information listed in table: A-2 (Unsuccessful call establishment (MT)).
- release call

6.6 Called party connection procedure

The purpose of this procedure is to manage an incoming call set-up at the time when the called party answers and the call is successfully established.
If the CSE has activated this service event for this call and the called party connection event occurs, the IPLMN/VPLMN shall:

- suspend call processing, notify the CSE and await further instructions, or
- notify the CSE and continue call processing.

The following information shall be provided to the CSE:

- Event met;
- The party in the call for which the event is reported (only Called party applicable);
- Type of monitoring.

When the IPLMN/VPLMN has made contact with the CSE, the CSE shall be able to instruct the IPLMN/IPLMN to act as described below.

- perform charging activities;$(CAMEL2$)
- activate other control service events for the call. The CSE shall have the possibility to send the following information:
  - The service event which shall be detected and reported:
    - ~~(~~Call disconnection~~)~~;
    - ~~Mid call event (DTMF) $(CAMEL3$);~~
  - The party in the call for which the event shall be detected and reported (calling or called party);
  - The type of monitoring (control or notification).
- ~~Create additional parties in the call (refer to Section 'Creation of called parties') $(CAMEL3$);~~
- ~~Put call parties on hold $(CAMEL3$);~~
- ~~Remove individual call parties from the call $(CAMEL3$);~~
- ~~Reconnect an individual call party or a group of call parties to another call party or group of call parties, within the same call $(CAMEL3$);~~
- order in-band user interaction. - $(CAMEL3$);

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instructions:

- release the call;
- allow the call processing to continue unchanged;

6.7 ~~Mid Call procedure $(CAMEL3$)~~Reserved Section

~~When the CSE instructs the VPLMN to arm the mid-call event it shall specify a criterion against which digits entered by the terminating subscriber using the DTMF procedure shall be matched.~~
~~The criterion consists of a list of up to 3 entries. Each entry is either a digit string or a definition of a range. A range definition consists of a lower bound followed by an upper bound. The lower bound and the upper bound are each digit strings. A digit string shall be at least 1 digit and at most 6 digits. Each digit shall be taken from the ordered set (0 - 9, *, #, A, B, C, D).~~
~~When collecting digits, the VPLMN shall consider a digit which follows the first digit of the string to be part of the string only if the interval between successive digits does not exceed 4 seconds.~~
~~The criterion for the mid-call DP is satisfied if the digits collected from the subscriber match the digits in a digit string in the criterion, or if the digits collected from the subscriber are included in a range defined in the criterion. Triggering of the mid-call event shall occur immediately after the criterion has been satisfied. Once the triggering occurs the VPLMN shall disable all entries from the criterion list.~~
~~Digits collected from the subscriber shall be relayed as DTMF towards the destination subscriber independent of any CAMEL processing.~~
~~If the CSE has activated this service event for this call and a mid-call event (as determined by the criterion for the mid-call procedure being satisfied) occurs the IPLMN shall:~~

- ~~suspend call processing, notify the CSE and await further instructions, or~~
- ~~notify the CSE and continue call processing.~~

~~The following information shall be provided to the CSE:~~

- ~~Event met;~~
- ~~The party in the call for which the event is reported;~~
- ~~Type of monitoring;~~
- ~~event specific data:~~
  - ~~received DTMF digits.~~

~~When the IPLMN has made contact with the CSE, the CSE shall be able to instruct the IPLMN to act as described below:~~

- ~~perform charging activities~~
- ~~activate other control service events for the call. The CSE shall have the possibility to send the following information:~~
  - ~~The service event which shall be detected and reported:~~
    - ~~Call disconnection;~~
    - ~~Mid call event (DTMF).~~
  - ~~The party in the call for which the event shall be detected and reported (calling or a called party);~~
  - ~~The type of monitoring (control or notification).~~
- ~~Create additional parties in the call (refer to Section 'Creation of called parties');~~
- ~~Put call parties on hold;~~
- ~~Remove individual call parties from the call;~~
- ~~Reconnect an individual call party or a group of call parties to another call party or group of call parties, within the same call;~~
- ~~order in-band user interaction~~

~~There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instruction:~~

- ~~allow the call processing to continue unchanged, or;~~
- ~~release the call~~

6.8 Call disconnection procedure

The purpose of this procedure is to manage the actions on disconnection of an established call.
If the CSE has activated this service event for this call and the call disconnection event occurs the IPLMN/VPLMN shall:

- suspend call processing, notify the CSE and await further instructions, or
- notify the CSE and continue call processing.

The following information shall be provided to the CSE:

- Event met;
- The party in the call for which the event is reported;
- Type of monitoring;
- Disconnection reason.

$(begin$(CAMEL2$)
When the IPLMN/VPLMN has made contact with the CSE, the CSE shall be able to instruct the IPLMN/VPLMN to act as described below.

- perform charging activities;
- activate other control service events for the call. The CSE shall have the possibility to send the following information:
  - The service event which shall be detected and reported:
    - Called party connection;
    - Call disconnection;
    - Calling party abandon;
    - Unsuccessful call establishment. In the case of no answer the CSE may provide a no answer timer;
    - ~~Mid call event (DTMF). The CSE shall specify the digit string(s) for which the instruction is valid. $(CAMEL3$);~~
  - The party in the call for which the event shall be detected and reported (calling or called party);
  - The type of monitoring (control or notification).
- ~~Create additional parties in the call (refer to Section 'Creation of called parties') $(CAMEL3$);~~
- ~~Put call parties on hold $(CAMEL3$);~~
- ~~Remove individual call parties from the call $(CAMEL3$);~~
- ~~Reconnect an individual call party or a group of call parties to another call party or group of call parties, within the same call $(CAMEL3$);~~
- order in-band user interaction.

$(end$(CAMEL2$)

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instruction:

- allow the call processing to continue unchanged, i.e. to release the call;

$(begin$(CAMEL2$)
- allow the call processing with modified information. The CSE shall have the possibility to send the information listed in table: A-2 (Call disconnection procedure (MT)).

$(end$(CAMEL2$)

6.9 CSE initiated call release procedure

Following the CAMEL processing of the incoming call request procedure it shall be possible for the CSE to initiate a call release at any moment of the call.
To use this procedure the CSE shall previously have activated at least one of these service events. [with "Type of monitoring" set to control.]

7 Procedures for serving network dialled services $(CAMEL3$)

The purpose of this procedure is to detect a ~~a~~ match between the called party number and a stored network service number at the call set-up request. It is to allow the CSE to modify the handling of the call set-up request. If this procedure is triggered it shall happen after processing of Subscribed Dialled Services triggered via the CSI. If any other CAMEL dialogue has changed called party number then the modified called party number is ~~compared to triggering criteria~~ used for conditional triggering check.

7.1 Initiation of contact with the CSE

If:

- the call set up request occurs and
- the call set up request procedure is passed and
- the PLMN is provisioned with network based service information~~; and~~

t~~T~~hen the VPLMN shall suspend call processing, make contact with the CSE and await further instructions.
For mobile originated calls the following information listed in table: A-1 (Procedures for serving network dialled services 1) shall be provided to the CSE if available.
For forwarded calls the information listed in table: A-1 (Procedures for serving network dialled services 2) shall be provided to the CSE if available.

7.2 Further processing of the call

When the serving network has made contact with the CSE, the CSE shall be able to instruct the serving network to act as described below by issuing one and only one of the following instructions:

- allow the call processing to continue unchanged;
- allow the call processing with modified information. The CSE shall have the possibility to send the information listed in table: A-2 (Procedures for serving network dialled services 2).
- release the call;
- perform charging activities(the CSE is only allowed to include charging data in the Call Data Record).

Further processing of the call continues as detailed in Sections 5.3 to 5.8, and the CSE contact initiated at this procedure is terminated.

8 ~~CSE initiated call set up $(CAMEL3$)~~Reserved Section

~~The purpose of this procedure is to allow the CSE to initiate a call. The CSE shall send a request to initiate a call attempt by creating a connection from the IPLMN/VPLMN to an initial call party. The CSE shall always arm all events pertaining to unsuccessful call connection and to answer, and then the CSE shall request continuation of the call process before any other activities are performed on the initial call party.~~
~~The information that it shall be possible to receive in the initiate call attempt request is listed in table: A-2 (CSE initiated call set up).~~
~~Upon receipt of an answer or unsuccessful call establishment event then the event is reported to the CSE.~~
~~The following information shall be provided to the CSE:~~

- ~~Event met;~~
- ~~The party in the call for which the event is reported (only Called party applicable);~~
- ~~Type of monitoring.~~

~~Processing then continues as defined in the section for dialled services.~~
~~[Editors Note: The reference has to been checked after inclusion of respective chapter]~~

9 Procedures for SMS $(CAMEL3$)

9.1 Short message submission request procedure

The purpose of this procedure is to detect a SMS set-up request and allow the CSE to modify the handling of the SMS set-up request.
The SMS set-up request may be circuit switched based or packet switched based.
If (according to the CSI) :

- the subscriber is provisioned with a CAMEL based SMS originating service; and
- the SMS set-up request occurs;

Then the VPLMN shall suspend SMS processing, make contact with the CSE and await further instructions.

For mobile originated SMS the following information shall be provided to the CSE if available:

- Event met;
- IMSI;

- Short Message handling information:
- Validity Period Format
- Status Report Request
- User Data Header Indicator
- Reply Path
- Protocol Identifier
- Data Coding Scheme
- Validity Period;
- SMSC address;
- Calling Party's Number;
- Service Key;
- Location information of the calling subscriber;
- time and time zone;
- Called Party Number;
- ~~MExE / SAT application identifier~~
- ~~MExE / SAT Free formatted information..~~

When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.

- perform charging activities;
- activate other control service events for the SM submission. The CSE shall have the possibility to send the following information:
  - The service event which shall be detected and reported:
    - Successful SM submission to the SMSC
    - Unsuccessful SM submission to the SMSC;
- The type of monitoring.

There shall be no restriction regarding the order of the above instructions. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instructions:

- bar the SM submission;
- allow the submission to continue unchanged;
- allow the SMS submission with modified information. The CSE shall have the possibility to send the following information:
  - Called Party Number;
  - Calling Party's Number;
  - SMSC address.

In the case where the SM submission is barred, the served subscriber shall be informed.

9.~~A~~2 Successful Short Message submission procedure

The purpose of this procedure is to detect the successful submission of a Short Message (SM) to the SMSC

and to inform the CSE about it.
If the successful SM submission event occurs, then the VPLMN shall suspend processing, make contact with the CSE and await further instructions or send a notification and continue.
The following information shall be provided to the CSE, if available:

- Event met;
- Type of monitoring.

When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.

- perform charging activities.

Once the CSE has concluded performing charging activities, it shall issue the following instruction:

- allow the processing to continue.

9.~~B~~3 Unsuccessful Short Message submission procedure

The purpose of this procedure is to detect the unsuccessful submission of a Short Message (SM) to the SMSC and to inform the CSE about it.
If the unsuccessful SM submission event occurs, then the VPLMN shall suspend processing, make contact with the CSE and await further instructions or send a notification and continue.
The following information shall be provided to the CSE, if available:

- Event met;
- Type of monitoring.

When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.

- perform charging activities.

Once the CSE has concluded performing charging activities, it shall issue the following instruction:

- allow the processing to continue.

9.~~C~~4 Charging Procedures

9.~~C~~4.1 Inclusion of Free Format data in CDR

The CSE may send free format data to the VPLMN, for inclusion in a CDR.

When sending the free format data to the VPLMN, the CSE may instruct the VPLMN to

- overwrite the existing data in the CDR with the newly received free format data or
- append the newly received free format data to the existing data in the CDR.

10 Procedures for GPRS Data Transmission $(CAMEL3$)

NOTE: Other information elements not listed in the following subclauses may be necessary to meet some Stage 1 service requirements. Refer to the Stage 2 specification TS 23.078 for complete information element lists.

10.1 Initial service events

It shall be possible to specify the following initial service events which shall initiate contact with the CSE:

- Attach procedure: a subscriber requests to register to the GPRS network
- PDP Activation / Session Establishment: a subscriber requests the activation of a Packet Data Protocol Context.
- PDP Activation / Session Establishment Acknowledgement: the SGSN has received an acknowledgement from the GGSN for that request.
- Change of Position Session: a subscriber who has an active GPRS Session changes position to another SGSN
- Change of Position Context: a subscriber who has an active PDP Conext changes position to another SGSN

10.2 Criteria for contact with the CSE

It shall be possible for the HPLMN to specify criteria that must be satisfied before the CSE is contacted. The following criteria may be defined:

~~10.2.1 CSI criteria applicable at attach, session establishment and session establishment acknowledgement procedure~~

~~CSI criteria may be defined for a subscriber both for the case where the GPRS subscriber attaches to the data network, for the case where she starts to set up a data session (PDP active) and for the case where acknowledgement of data session set up is received (PDP activation acknowledgement).~~
~~Criterion at the attach procedure:~~

- ~~Capabilities of GPRS MS class;~~

~~Criteria on the type of session (applicable at session establishment request and acknowledgement):~~

- ~~Transfer characteristics; e.g. IP, X.25~~
- ~~Service characteristics; e.g. Quality of Service~~
- ~~Identities; e.g. Access Point Name~~

~~The criteria may be collectively defined to be either 'enabling trigger criteria' or 'inhibiting trigger criteria'. The HPLMN may choose not to define any criteria.~~
~~If:~~

- ~~Enabling trigger criteria are met, or~~
- ~~Inhibiting trigger criteria are not met, or~~
- ~~No trigger criteria are defined~~

~~Then criteria permit the contact with the CSE to be established.~~

10.3 Attach procedure

The purpose of this procedure is to detect a request from a GPRS subscriber to attach to the data network and allow the CSE to modify the handling of the attach request.
If (according to the CSI) :

- the subscriber is provisioned with a CAMEL based service, relevant for GPRS data transmission; and
- the attach request is set as a trigger detection; and
- the attach request occurs~~; and~~
- ~~criteria permit the contact with the CSE to be established.~~

then ,the VPLMN shall suspend attach processing, make contact with the CAMEL Service Environment and await further instructions.
The information listed in table: A-3 (Attach procedure) shall be provided to the CAMEL Service Environment, if available.
When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.

- activate other control service events for the period being attached to the data network. The CSE shall have the possibility to send the following information:
  - The service event which shall be detected and reported:
    - PDP activation/session establishment request;
    - PDP session establishment acknowledgement;
    - Change of position;
    - PDP deactivation;
  - Detach procedure;

- Type of monitoring

- Perform charging activities (amongst others defining a data or time threshold).

There shall be no restriction regarding the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instructions:

- Reject the attachment request;

- allow the processing to continue unchanged.

10.4 PDP activation / Session Establishment

The purpose of this procedure is to manage a request from the subscriber to activate a Packet Data Protocol. Multiple contacts to the CSE may be made in parallel due to PDP activation / session establishment acknowledgement events being detected whilst a GPRS subscriber is attached to the network. If either (according to the CSI) :

- the subscriber is provisioned with a CAMEL based service relevant for GPRS data transmission; and

  - the PDP activation request is set as a trigger detection; and

  - the PDP Activation request occurs~~; and~~,

~~criteria permit the contact with the CSE to be established,~~

or, the CSE has activated this service event for the attached subscriber and the PDP activation event occurs then,

- the VPLMN shall suspend processing, make contact with the CSE and await further instructions, or,

- send a notification and continue.

The information listed in table: A-3 (PDP activation / Session Establishment) shall be provided to the CSE if available. When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.

- activate other control service events for the life of the PDP context. The CSE shall have the possibility to send the following information:

  - The service event which shall be detected and reported ~~(including a session reference number)~~:

    - Change of position

    - PDP session establishment acknowledgement

    - PDP deactivation procedure;

    - Detach procedure;

  - The type of monitoring.

- Perform Charging Activities (amongst others defining a data or time threshold),

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instruction:

- Release session,

- allow the processing to continue unchanged;

- allow the processing with modified information. The CSE shall have the possibility to send the following information:

  - Access Point Name.

10.5 PDP activation / Session Establishment Acknowledgement

The purpose of this procedure is to manage a confirmation from the GGSN ~~request from the subscriber~~ to activate a

Packet Data Protocol. Multiple contacts to the CSE may be made in parallel due to PDP activation / session establishment acknowledgement events being detected whilst a GPRS subscriber is attached to the network.
If either (according to the CSI) :

- the subscriber is provisioned with a CAMEL based service relevant for GPRS data transmission; and
- the PDP activation / session establishment acknowledgement is set as a trigger detection point; and
- the PDP Activation/Session Establishment Acknowledgement request occurs~~; and~~

~~- criteria permit the contact with the CSE to be established,~~

or the CSE has activated this service event for the attached and / or active subscriber and the PDP activation acknowledgement event occurs then,

- the VPLMN shall suspend processing, make contact with the CSE and await further instructions, or,
- send a notification and continue.

The information listed in table: A-3 (PDP activation / Session Establishment Acknowledgement) shall be provided to the CSE if available.
When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.

- activate other control service events for the life of the PDP context. The CSE shall have the possibility to send the following information:
  - The service event which shall be detected and reported ~~(including a session reference number)~~:
    - Change of position
    - PDP deactivation procedure;
    - ~~-~~ Detach procedure;
    - Type of monitoring
- Perform Charging Activities (amongst others defining a data or time threshold),

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instruction:

- Release session or PDP Context,
- allow the processing to continue unchanged;

10.6 Change of Position Procedure

The purpose of this procedure is to detect a request from the GPRS subscriber for update the actual routing area, i.e. to change from one SGSN to another SGSN.
If the CSE has activated this service event for the session and a request to change the position occurs, the VPLMN shall send a notification and continue.
The following information shall be provided to the CSE if available:

- Event met;
- New routing area;

10.7 Data Volume or Time Threshold Procedure

The purpose of this procedure is to control the amount of data transmitted by and transmitted to the served subscriber or the used time per Session or PDP Context. The threshold is valid for one session or PDP Context of the subscriber only. If the subscriber controls simultaneous sessions, thresholds per session or PDP Context have to defined.
The type of threshold is indicated per session or PDP Context ~~either~~ as:

- a maximum amount of data transmitted by and transmitted to the subscriber ~~or~~
- a granted time to transmit and receive data.

A threshold is reached within a session or PDP Context, when:

- the total amount of data transmitted by and transmitted to the subscriber reaches the granted data volume or,
- the allowed time for the Session or PDP Context has elapsed.

If the CSE has defined a threshold for a Session or PDP Context and the threshold has been reached, then the VPLMN shall inform the CSE.

The VPLMN shall not suspend the transmission of data packets to and from the GPRS terminal. The VPLMN shall immediately restart counting the amount of data transmitted by and transmitted to the GPRS terminal ~~or~~ and restart timing the duration of the Session or PDP Context.

~~The CSE may instruct the VPLMN to release the Session or PDP Context when the threshold is reached.~~
The following information shall be provided to the CSE if available:

- Charge result (elapsed time or total amount of data transmitted);
- The session or PDP Context for which the event is reported;
- Session or PDP Context-Active indicator.

When the VPLMN has reported the reaching of the threshold to the CSE, the CSE shall be able to do the following (assuming the continuation of the applicable dialogue):

- perform charging activities (including the defining of a new threshold or time limit)
- activate control service events. The CSE shall have the possibility to send the following information:
- the Service event which shall be detected and reported ~~reported~~ ~~(including a session or PDP Context reference number):~~

  -PDP deactivation

  -Detach Procedure
- The session or PDP Context for which the event shall be monitored and reported
- The type of monitoring (only monitor mode is allowed in this case)

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated.

Once the CSE has concluded issuing the above instructions, it shall be able to act as follows (provided the session or PDP context has not been released):

- release the session or PDP Context
- allow the session or PDP Context to continue

10.8 PDP deactivation / Session Release

The purpose of this procedure is to detect a request from the subscriber to release a Packet Data Protocol.
If the CSE has activated this service event for the attached subscriber and the PDP deactivation event occurs then the VPLMN shall suspend processing, make contact with the CSE and await further instructions or send a notification and continue.
The following information shall be provided to the CSE:

- Event met;
- The session or PDP Context for which the event is reported;
- Type of monitoring;

When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.

- activate other control service events for the session. The CSE shall have the possibility to send the following information:

- the Service event which shall be detected and reported ~~reported~~:

  - Detach Procedure

- the type of monitoring

- perform charging activities;

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall send the following instruction:

- allow the processing to continue unchanged;

10.9 Detach procedure

The purpose of this procedure is to detect a request from a GPRS subscriber to detach from the data network and to inform the CAMEL Service Environment on the request.
If the CSE has activated this service event for the attached subscriber and the Detach event occurs, then the VPLMN shall suspend processing, make contact with the CSE and await further instructions or send a notification and continue.
The following information shall be provided to the CAMEL Service Environment, if available:

- Event met;

- Type of monitoring;

When the VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.

- perform charging activities;

There shall be no restriction regarding the number of times the above instruction can be repeated. Once the CSE has concluded issuing the above instruction, it shall send the following instruction:

- allow the processing to continue unchanged.

10.10 CSE Initiated GPRS Detach Procedure

Following the CAMEL processing of the GPRS attach procedure or PDP context activation procedure it shall be possible for the CSE to initiate GPRS detach at any time.
To use this procedure, there shall be a control relationship between the CSE and the session.

10.11 CSE Initiated PDP Context Deactivation Procedure

Following the CAMEL processing of the PDP context activation procedure it shall be possible for the CSE to initiate PDP context deactivation at any time.
To use this procedure, there shall be a control relationship between the CSE and the PDP Context.

10.12 Change of Quality of Service Procedure

The CSE may request the VPLMN to report a change in Quality of Service (QoS).

When a QoS change occurs, then the VPLMN shall send a notification to the CSE and continue.

The following information shall be provided to the CSE:

- Charge result – this may be elapsed time or the total amount of data transmitted by and transmitted to the subscriber

- Quality of Service

- PDP ID
- PDP Context state

When the CSE receives the notification of change of QoS, it may instruct the VPLMM to act as follows:

- perform charging activities (including the defining of a new threshold)
- arm control service events. The CSE shall have the possibility to send the following information:
- the Service event which shall be detected and reported ~~reported~~ (including a session or PDP Context reference number):

  -PDP deactivation

  -Detach Procedure
- The session or PDP Context for which the event shall be monitored and reported
- The type of monitoring (only monitor mode is allowed in this case)

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated.

Once the CSE has concluded issuing the above instructions, it shall be able to act as follows:

- release the session or PDP Context
- allow the session or PDP Context to continue

10.13 Charging Procedures

The CSE can perform the following charging activities:

10.13.1 Advice of Charge

The CSE may send Charge Advice Information (CAI) elements to the SGSN.

10.13.2 Inclusion of Free Format data in CDR

The CSE may send free format data to the SGSN, for inclusion in a CDR. The CSE shall specify the session or PDP ~~Contex~~ context for which the free format data is destined.
When sending the free format data to the VPLMN, the CSE may instruct the VPLMN to

- overwrite the existing free format data for that session or PDP Context, or
- append the newly received free format data to the existing free format data

10.13.3 Specify a threshold for transmitted data or used time

See section 10.7.

10.13.4 Request notification of change in Quality of Service

The CSE may request the VPLMN to notify the CSE when a change in Quality of Service has occurred for a PDP Context.

11 ~~Procedures for USSD $(CAMEL3$)~~Reserved Section

~~The purpose of this procedure is to give the CSE visibility of USSD messages sent or received by the subscriber, and to give the CSE the opportunity of blocking the sending or reception of USSD messages by the subscriber.~~
~~The CSE shall be able to indicate to the network how it wants to be informed about the sending / reception of USSD~~

~~messages:~~

~~[inform CSE about sending of USSD MMI mode messages]~~

~~inform CSE about sending of USSD application mode messages~~

~~[inform CSE about reception of USSD MMI mode messages]~~

~~inform CSE about reception of USSD application mode messages~~

~~In all the above cases, the CSE shall be able to specify whether it requires to be notified on each USSD message or on every 'n' messages (e.g. notify CSE every 20 sent USSD bearer mode messages).~~
~~At any time, the CSE shall be able to set the required handling of USSD messages by the network:~~

~~[allow / prevent USSD MMI mode messages]~~

~~allow / prevent USSD application mode messages.~~

~~[Editors Node: The need for MMI mode has to be checked. Text [] will be removed if not justified]~~

12 Notifications of non-traffic events to the CSE $(CAMEL3$)

12.1 Mobility management $(CAMEL3$)

It shall be possible to mark for a subscriber that a notification shall be sent to the CSE when the VPLMN has completed the processing of any of the following mobility events:

~~Location update of MS. It shall be possible to define the following criteria:~~

- Location update to a different VLR service area;
- Location update within the same VLR service area;

- MS-initiated detach (MS switched off);
- Network initiated detach (periodic location update of MS failed);
- Attach of MS (MS switched on, successful location update after network initiated detach);

The notification shall contain the following information if available:

- Event met;
- Service Key;
- IMSI;
- Basic MSISDN;
- Location information;
- LSA identity;
- CAMEL phases supported at the VPLMN.

12.2 Notification to CSE of change of subscriber data $(CAMEL3$)

It shall be possible to mark for a subscriber that a notification shall be sent to the CSE when any of the following subscriber data are changed as a result of a request from any entity except the CSE to which the notification shall be sent:

- CF SS data
- CB SS data;
- ODB data;
- CAMEL subscription information

One ore more CSEs may be defined to which the notification shall be sent.

12.3 Supplementary service invocation notification to CSE $(CAMEL2$)

It shall be possible to mark for a subscriber that a notification shall be sent to the CSE when any of the following supplementary services are invoked:

- ECT
- CD
- MPTY
- CCBS - $(CAMEL3$)

13 CSE control of subscription data

13.1 Any time interrogation

It shall be possible for the CSE (as part of an OSS, including special handling of mobile terminating calls) to interrogate the HLR for information about a particular subscriber, for which it is entitled to do so (e.g. the subscriber belongs to the same HPLMN as the CSE).

This may be information from the list below:

- subscriber status;
- location information (see section 22);
- Call forwarding SS data $(CAMEL3$);
- Call barring SS data $(CAMEL3$);
- Operator determined barring data $(CAMEL3$);
- CAMEL subscription information $(CAMEL3$);
- CAMEL phases supported at the VPLMN $(CAMEL3$).

The HPLMN shall have the possibility to reject any interrogation from any CSE.

13.2 Any time modification $(CAMEL3$)

It shall be possible for the CSE to modify user data for a particular subscriber, for which it is entitled to do so (e.g. the subscriber belongs to the same HPLMN as the CSE).

This shall be data from the list below:

- Call forwarding supplementary service data;
- Call barring supplementary service data;
- Activation/Deactivation of CAMEL subscription information.

The HPLMN shall have the possibility to reject any modification from any CSE.

14 Subscriber interactions with the CSE

14.1 Announcement and tones insertion $(CAMEL2$)

As a part of the call set-up request procedure, unsuccessful call establishment procedure, call disconnection procedure and incoming call request procedure it shall be possible for the CSE to order the playing of announcements or tones towards the calling subscriber.

$(begin$(CAMEL3$)

It shall be possible for the CSE to order the playing of announcements and tones towards a call party, ~~or a group of call parties who are connected together,~~ at any time in the active phase of a call.

[Editors Note: The possibility will be checked by SMG3 WPC]

$(end$(CAMEL3$)
The HPLMN operator is responsible for the administration of announcements. In case of bilateral agreements also the VPLMN operator may administrate announcements.

14.2 Voice prompting and information collection $(CAMEL2$)

$(begin$(CAMEL2$)
As a part of the call set-up request procedure, unsuccessful call establishment procedure, call disconnection procedure and incoming call request procedure it shall be possible for the CSE to order voice prompting and information collection towards the calling subscriber. It shall not be possible to collect information from the user as part of the originating CAMEL handling for a forwarding.
$(end$(CAMEL2$)
~~$(begin$(CAMEL3$)~~
~~It shall be possible for the CSE to order voice prompting and information collection towards a call party in any phase of the call as long as the call party is active and the call is under control of the CSE. Furthermore, this shall be possible both whilst the call is suspended (and awaiting instructions from the CSE) and whilst the call is proceeding. Note that the collection of information is only possible when the call party is not connected to another call party. This may be during call setup, or as a result of a call party being put on hold. It shall not be possible to collect information from the user as part of the originating CAMEL handling for a forwarding.~~
~~$(end$(CAMEL3$)~~

14.3 Subscriber interaction by using USSD $(CAMEL2$)

It shall be possible for the CSE to initiate a USSD towards the served subscriber at any time. It shall be possible for the CSE to receive a served subscriber initiated USSD at any time (see TS 22.030 [3] and TS 22.090 [4]).

14.4 ~~User interaction scripts $(CAMEL3$)~~Reserved Section

~~It shall be possible for the CSE to instruct a SRF to execute a logic script which defines the process of a user interaction. The SRF shall be in either the HPLMN or the VPLMN. The SRF shall notify the CSE of the result of executing the logic script.~~

15 Charging Activities $(CAMEL2$)

The following general principles are valid for CAMEL based charging aspects:

- calls may be divided into call periods for the purpose to control the call duration;
- the management and the control of a tariff switch which applies to subscriber charging is under the responsibility of the HPLMN. The time at which the tariff switches apply~~ies~~ shall be the same for the control of e-values and for the control of the call duration;
- the tariff switch time is indicated to the network in form of a relative time to the reception of the instruction.

15.1 CSE controlled e-values

If the subscriber is provisioned with a CAMEL based service and if a contact exists between the ~~IPLMN/~~VPLMN and the CSE, the CSE shall be able to send e-values for the Advice of Charge supplementary service.
For the purpose of charge indication on the MS even when one (or more) tariff switch occurs during the call, several sets of e-values may be sent by the CSE to the ~~IPLMN/~~VPLMN and transmitted in sequence to the Mobile Station.
Before the call is answered, the CSE may send either one set or two set of e-values :

- If one set is sent, then the set of e-values is applicable from the beginning of the call, that is from the time the call is answered;
- If two sets are sent, then:
  - a tariff switch time when the second set becomes valid must also be sent;
  - the first set of e-values is applicable from the beginning of the call except in the case where the tariff switch time occurs before the call is answered, then the second set of e-values is applicable at the beginning of the call.

During the call, the CSE may send a new set of e-values either to be transmitted directly to the mobile station or stored

until the next tariff switch is reached. The tariff switch time is sent together with the new set of e-values.
When the tariff switch time is reached, the stored set of e-values is sent immediately to the mobile station, if available.

15.2 Inclusion in charging records of information received from the CSE

The CSE shall be able at one or several active service events to download free-format charging information to be transparently output to the call record available at the IPLMN/VPLMN depending on the call scenario.

15.3 Support of additional charging information to the CSE

It shall be possible for the CSE to request from the VPLMN/IPLMN a call information report to be delivered at the end of the call. The report shall contain call duration and release cause.

15.4 CSE control of call duration

The purpose of this procedure is to allow the CSE to monitor and influence the call duration.
If the subscriber is provisioned with a CAMEL based service and a contact between the IPLMN/VPLMN and the CSE exists, the CSE shall be able to instruct the IPLMN/VPLMN , at the beginning of the call or during the monitoring of the call, to act as described below:

a) receive a maximum call period duration time from the CSE;

b) receive a switch time until the next tariff switch applies;

c) receive sets of e-values (for the purpose of AoC controlled by the CSE).

The following combinations of the instructions are allowed:

- (a) or (a and b) or (b and c) or (a and b and c) or (c).

In case a.) the CSE shall be able to instruct the IPLMN/VPLMN on how to proceed when the maximum call period duration time ~~is~~ has expired, i.e. release the call or ~~report to the CSE~~allow the call to continue. In both cases, a charging report shall be sent to the CSE. The CSE shall also be able to instruct the IPLMN/VPLMN of a tone to be played before the maximum call period duration time is expired~~, and of the time when the tone shall be played~~.
~~$(begin$(CAMEL3$)~~
~~The CSE shall be able to instruct the IPLMN/VPLMN to begin playing the tone at anytime before the maximum call period time is expired:~~
~~The tone to be played shall consist of up to three audible bursts. A burst shall consist of a single tone, or a sequence of two tones, or a sequence of three tones. A normal speech path connecting all parties in the call shall be established between bursts. Only designated call parties shall hear a burst. The CSE shall be able to instruct the IPLMN/VPLMN:~~

- ~~The time before the maximum call period time expires when tone playing shall start.~~
- ~~The number of bursts to be played (1, 2 or 3).~~
- ~~The time interval between bursts (maximum 120 seconds).~~
- ~~The number of tones in each burst (1, 2 or 3).~~
- ~~The duration of tones in a burst.~~
- ~~The pause between tones in a burst.~~
- ~~The tone, from a selection of at least three available tones.~~
- ~~The parties in the call that shall hear a burst.~~

~~$(end$(CAMEL3$)~~
When the instruction sent by the CSE is received at the IPLMN/VPLMN as a result of the call set up request procedure before the call is established, the IPLMN/VPLMN shall immediately set the reference point for the next tariff switch, if available.
When the call is answered, the IPLMN/VPLMN shall:

- start the timer for the first call period;
- send e-values, if available:

- If one set of e-parameters were received from the CSE~~is sent~~, then the set of e-values is applicable from the beginning of the call, that is from the time the call is answered;

- If two sets of e-parameters were received from the CSE~~are sent~~, then:

  - a tariff switch time when the second set becomes valid must be also sent;

  - the first set of e-values is applicable from the beginning of the call except in the case where the tariff switch time occurs before the call is answered, then the second set of e-values is applicable at the beginning of the call.

When the reference point for the tariff switch is reached, the stored set of e-values is sent immediately to the mobile station, if available.
When the end of a call period is reached, the IPLMN/VPLMN shall report to the CSE:

- if no tariff switch has occurred since the call is answered:

  - report the elapsed time since the call is answered to the CSE,

- if a tariff switch has occurred since the call is answered:

  - report the elapsed time since the last tariff switch has applied,

  - report the elapsed time from when the call is answered, or from when the previous tariff switch occurred to the time when the most recent tariff switch occurred.

When the IPLMN/VPLMN has made contact with the CSE, the CSE shall be able to instruct the VPLMN to act as described below.

- perform charging activities;

- activate other control service events for the call. The CSE shall have the possibility to send the following information:

  - The service event which shall be detected and reported (Call disconnection);

  - The party in the call for which the event shall be detected and reported (calling or called party);

  - The type of monitoring (control or notification).

There shall be no restriction regarding the order of the above instructions or the number of times each of the above instructions can be repeated. Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instructions:

- release the call;

- allow the call processing to continue unchanged;

At the end of a call period and after the relevant information was sent to the CSE, the IPLMN/VPLMN may receive instructions applicable to for the next call period :

- The timing of the new call period shall start as soon as the previous call period is ended.

- The timing since the call was answered or the last tariff switch occurred shall keep on running

- If the instruction contains an indication for a new tariff switch during the call period, the IPLMN/VPLMN shall set the reference point for the next tariff switch and store the new set of e-values, if available.

When the reference point for the tariff switch is reached, the stored set of e-values is sent immediately to the mobile station, if available.
When the call is released, the IPLMN/VPLMN shall report to the CSE:

- if no tariff switch has occurred since the call is answered:

  - report the elapsed time since the call is answered to the CSE.

- if a tariff switch has occurred since the call is answered:

  - report the elapsed time since the last tariff switch has applied,

- report the elapsed time from when the call is answered, or from when the previous tariff switch occurred to the time when the most recent tariff switch occurred.

In addition, the report to the CSE shall always contain:
- the state whether the call is ~~ongoing or released~~active or inactive.

The following figure explains the distinction of a call into separate call periods and shows when and which information is sent from the IPLMN/VPLMN to the CSE.

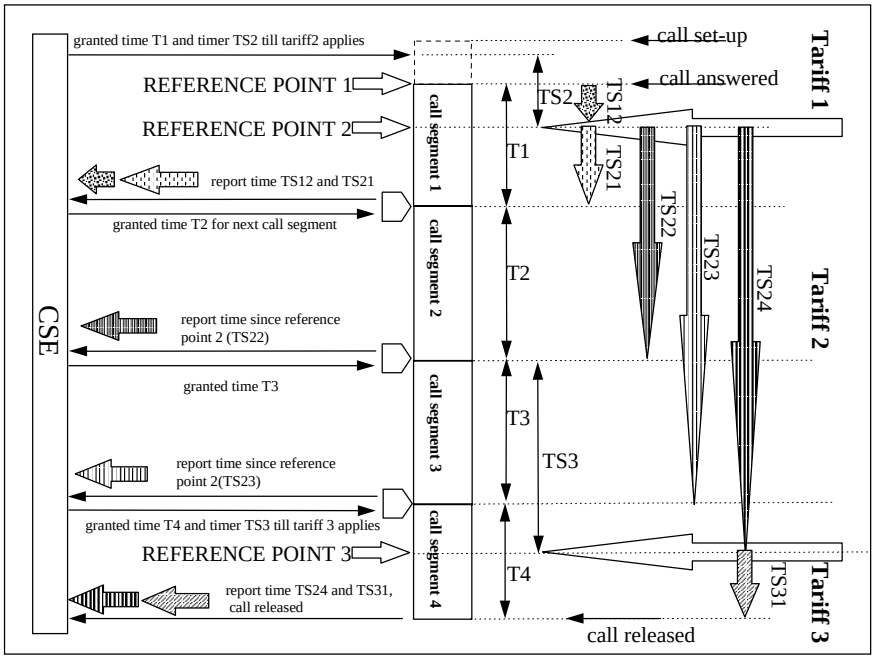

Figure 1: CSE control of call duration

Reference Point 1: when the call is answered, tariff 1 applies
Reference Point 2: the point in time when tariff 2 applies
Reference Point 3: the point in time when tariff 3 applies
A call period is a certain time part of an ongoing call. The duration of a call period is limited by the granted time from the CSE.
Timers indicating the maximum duration (or granted time) for the call periods are called Tx (x is the number of the call period).
Timers indicating the duration until the next tariff applies are called TSx (x is the number of the tariff).
Timers indicating the elapsed time in a certain tariff are called TSxy (x is the number of the tariff and y is the elapsed time since the previous reference point).
When a call period is ended, the elapsed time in each tariff is reported towards the CSE.

At the end of the call period any timer indicating the duration until the next tariff switch and any stored e-values are discarded.
If the report is not confirmed by the CSE within a specified time, the IPLMN/VPLMN shall release the call.
The procedure may be repeated sequentially, i.e. when a report is sent to the CSE, the CSE may instruct the IPLMN/VPLMN to monitor the call for a further period.

16 Exceptional procedures or unsuccessful outcome

[Editors Note: Text to be checked. Section is on hold. Needs discussion and advice on MoU]

16.1 Roaming in non-supporting networks

The HPLMN shall control handling of roaming, when a CAMEL subscriber attempts to register in a network not supporting CAMEL without relying on extra functionality in network entities not supporting CAMEL. The HPLMN shall have the possibility to decide on a per subscriber basis whether to allow or to deny MO calls and/or MT calls (e.g. applying ODB, denying location up-date).
If the HPLMN allows MO calls, the originating OSSs are not supported for the roaming subscriber.

If the HPLMN allows MT calls, the terminating OSSs are not always (fully) supported for the roaming subscriber.

16.2 Call Set-up from a non-supporting interrogating PLMN

In case the CAMEL feature is not supported in the IPLMN the following will happen:

- Mobile originating calls:

  Not applicable.

- Mobile terminating calls:

  Mobile terminating OSSs are not supported (in the IPLMN).

16.3 Roaming in a VPLMN which supports only CAMEL phase 1 $(CAMEL2$)

If a CAMEL subscriber attempts to register in a VPLMN which supports CAMEL, the VPLMN shall indicate in the registration request to the HPLMN the phase of CAMEL which the VPLMN supports. If the VPLMN supports only CAMEL phase 1 the HPLMN shall take such action (including denying the registration request or transferring to the VPLMN subscription information appropriate to CAMEL phase 1) as may be decided by the HPLMN operator.

16.4 Call setup from a VPLMN which supports only CAMEL phase 1 $(CAMEL2$)

If the served subscriber requests an MO call which requires the VPLMN to contact the CSE, the VPLMN shall indicate to the CSE which phase of CAMEL the VPLMN supports. If the VPLMN supports only CAMEL phase 1 and the CSE determines that as a consequence a service which is provisioned for the subscriber will not operate correctly, the CSE shall take such action (including denying the call request or handling the call using only CAMEL phase 1 capabilities) as may be decided by the CSE operator.

16.5 Call setup from an IPLMN which supports only CAMEL phase 1 $(CAMEL2$)

When the IPLMN contacts the CSE for instructions to handle an MT call, the IPLMN shall indicate to the CSE which phase of CAMEL it supports. If the IPLMN supports only CAMEL phase 1 and the CSE determines that as a consequence a service which is provisioned for the subscriber will not operate correctly, the CSE shall take such action (including denying the call request or handling the call using only CAMEL phase 1 capabilities) as may be decided by the CSE operator.

17 CSE related congestion control $(CAMEL3$)

It shall be possible for the CSE to drop or reject either all or some CAMEL interrogations from a V/IPLMN.
In the case where the contact from the V/IPLMN is not confirmed by the CSE, the V/IPLMN shall proceed in accordance ~~to~~ with the Default Call Handling, , Default GPRS Handling or Default SMS Handling.

18 Interactions with supplementary services

18.1 General

This subclause defines the interaction between supplementary services and the CAMEL feature. However, it should be noted that the most effective way to control those service interactions is through managing the provisioning of services. Where possible, subscribers provisioned with services using the CAMEL feature shall not be provisioned with services having an adverse interaction with the CAMEL based services. supplementary services shall not have any knowledge of CAMEL based services.
In general, call independent supplementary service operations (registration, erasure, activation, deactivation and interrogation) are not modified by CAMEL. The exceptions to this for CAMEL phase 2 are the call forwarding services, described in subclause 12.3.1.

18.2 Line Identification

18.2.1 Calling Line Identification Presentation (CLIP)

The CSE shall be able to create or modify an additional calling line identity (additional calling party number) which is presented to the called subscriber via the CLIP supplementary service. There shall be no restriction to the format of the additional calling line identity determined by the CSE.
~~For an MT call~~, ~~t~~The CSE shall not be able to modify the calling line identity (calling party number).
~~For an MO call, the CSE shall be able to send to the VPLMN IPLMN an indication that the presentation indicator shall be set to Withheld in the calling party number parameter. However, the CSE shall not be able to change the actual number contained in the calling party number parameter.~~

18.2.2 Calling Line Identification Restriction (CLIR)

~~No interaction.~~For an MT call, ~~t~~The CSE is not able to change the presentation indicator given to the called subscriber via the CLIP supplementary service.
For an MO call, the CSE shall be able to send to the VPLMN/IPLMN an indication that the presentation indicator shall be set to Withheld in the calling party number parameter.

18.2.3 Connected Line Identification Presentation (COLP)

No interaction. The CSE is not able to change the connected line identity.

18.2.4 Connected Line Identification Restriction (COLR)

No interaction. The CSE is not able to change the presentation indicator given to the calling subscriber via the COLP supplementary service.

18.3 Call Forwarding

$(begin$(CAMEL2$)
For the registration of call forwarding supplementary services the network shall accept any forwarded to number for a subscriber provided with a TIF-CSI. In this case the HPLMN shall treat the forwarded-to number transparently at the time of registration, i.e. it shall not perform validity checks or translations of the format of the number. The forwarding PLMN shall treat the forwarded-to number transparently when the call forwarding service is invoked. The CSE may modify the forwarded-to number within the MO CAMEL Service provided for the subscriber when the call forwarding service is invoked.

NOTE: Network operators should ensure that the TIF-CSI is provided only to subscribers who are provided with an MO CAMEL service which is capable of translating the registered forwarded-to number.

If the forwarding PLMN does not support CAMEL phase 2, the HPLMN shall consider the call forwarding service as not registered if the forwarded-to number is not stored in international format.

NOTE: If the served subscriber requires invocation of call forwarding services even when the forwarding PLMN does not support CAMEL phase 2, she has to register a forwarded-to number in E.164 international format.

NOTE: Network operators should be aware that unpredictable service behaviour could be experienced if the detection points for 'Busy', 'Not Reachable' or 'No Answer' are armed when the corresponding 'conditional' call forwarding supplementary service is active.

$(end$(CAMEL2$)

18.3.1 Call Forwarding Unconditional (CFU)

The Call Forwarding Unconditional service will be invoked after any terminating CAMEL based service. Any forwarded call resulting from a Call Forwarding supplementary service may cause invocation of any mobile originated CAMEL based services.
$(begin$(CAMEL3$)
The CSE shall be able to instruct the forwarding PLMN to suppress the normal handling of Call Forwarding Unconditional and replace it by one or other of the following:

- If Call Forwarding Unconditional is active and operative for the call being processed, the call shall fail, with a reason of Forwarding Violation;

- The call shall be handled as if Call Forwarding Unconditional was not active and operative.

$(end$(CAMEL3$)

18.3.2 Call Forwarding on Busy (CFB)

As for Call Forwarding Unconditional (see subclause 18.3.1).
$(begin$(CAMEL3$)
The CSE shall be able to instruct the forwarding PLMN to suppress the normal handling of Call Forwarding on Busy and to handle the call as if Call Forwarding on Busy was not active and operative.
If no terminating CAMEL service is active then a new relationship is opened to the CSE prior to CF invocation. In order to open new relationship the failure reason criterion shall be checked. In order to check triggering criteria the forwarding PLMN shall derive reason code from call forwarding reason; this derived reason code is compared to the triggering criteria.
$(end$(CAMEL3$)

18.3.3 Call Forwarding on No Reply (CFNRy)

As for Call Forwarding on Busy (see subclause 18.3.1).

18.3.4 Call Forwarding on Not Reachable (CFNRc)

As for Call Forwarding on Busy (see subclause 18.3.1).

18.4 Call Completion

18.4.1 Call Hold (CH)

For both originating and terminating calls, the Call Hold service is invoked after the CAMEL feature is invoked. When a call is established the CSE shall instruct the VPLMN of the served subscriber whether Call Hold is possible.A call created when a call has been put on hold may be subject to the CAMEL feature in the same way as a normal mobile originating call.

18.4.2 Call Waiting (CW)

Incoming, waiting calls are treated by the CSE as any other mobile terminating calls which encounter an idle subscriber. When a call is established the CSE shall instruct the VPLMN of the served subscriber whether Call Waiting is possible.

18.5 Multi Party (MPTY)

A multi party call may include one or more call legs subject to CAMEL based services. If a call leg is subject to CAMEL based services the CSE shall be able to instruct the VPLMN of the served subscriber whether that leg may be included in a multi party call.

18.6 Closed User Group (CUG)

The CSE shall decide whether to invoke the CUG supplementary service and shall perform the necessary processing for a Mobile Originated, Mobile Terminated or Forwarded call.When a terminating call with CUG information is received for a CAMEL marked subscriber and if the terminating CAMEL based service attempts to modify the called party number:

- the IPLMN shall release the call towards the calling party when the called subscriber subscribes to CUG;

- the IPLMN shall continue the call establishment towards the modified called party number when the called subscriber does not subscribe to CUG.

18.7 Advice of Charge (AoC)

Advice of Charge is not guaranteed to operate correctly for calls subject to CAMEL phase 1 based services. It is recommended that subscribers are not provisioned with Advice of Charge and any CAMEL based service for which there is an adverse interaction.
$(begin$(CAMEL2$)
If CAMEL phase 2 is supported and the phase 2 charging function "CSE controlled e-values" is used, the VPLMN shall

use the received e-values from the CSE for the purpose of the AoC supplementary service. Once the VPLMN has received e-values from the CSE, only CSE provided e-values are applicable for this call. The e-values shall only be sent by the VPLMN to the MS if the served subscriber is provided with the AoC supplementary service according to TS 22.086. CAMEL phase 2 allows CSE to modify e-values in MO calls only
$(end$(CAMEL2$)
$(begin$(CAMEL3$)
If CAMEL phase 2 or 3 is supported and the phase 2 or 3 charging function "CSE controlled e-values" is used, the VPLMN/~~IPLMN~~ shall use the received e-values from the CSE for the purpose of the AoC supplementary service. Once the VPLMN/~~IPLMN~~ has received e-values from the CSE, only CSE provided e-values are applicable for this call. The e-values shall only be sent by the VPLMN/~~IPLMN~~ to the MS if the served subscriber is provided with the AoC supplementary service according to ~~GSM 02.86~~3G TS 22.068. CAMEL phase 3 allows CSE to modify e-values in MO and MT calls.
$(end$(CAMEL3$)

18.8 Call Barring

$(begin$(CAMEL2$)

NOTE: CAMEL may be used to establish forwarded-legs and CAMEL based re-routing-legs that violate conditional outgoing call barring and ODB services. Network operators should take care to avoid problems that may arise because of this interaction.

$(end$(CAMEL2$)

18.8.1 Barring of all outgoing calls

18.8.1.1~~A~~ Mobile originated calls

No interaction. The Barring of all outgoing calls supplementary service will be invoked. Thus, originating CAMEL based services will not be invoked.

18.8.1.2~~B~~ Forwarded Calls

No interaction. If the Barring of all outgoing calls supplementary service is active and operative, it shall prevent the registration or activation of Call Forwarding as specified in TS 22.082.
[Editor's note: this may be TS 22.088 - needs checking]

18.8.2 Barring of outgoing international calls

18.8.2.1 Mobile originated calls

No interaction. Any originating CAMEL based services shall be invoked before the Barring of outgoing international calls supplementary service.
$(begin$(CAMEL3$)
The CSE shall be able to instruct the originating VPLMN to suppress the invocation of Barring of outgoing international calls and to handle the call as if Barring of outgoing international calls was not active and operative.
$(end$(CAMEL3$)

18.8.2.2 Forwarded Calls

No interaction. The interaction between call forwarding and call barring is not be modified by CAMEL. This means that the interaction is applied prior to the invocation of call forwarding. When call forwarding is invoked (possibly with originating CAMEL services in the forwarding leg) then the VPLMN or IPLMN shall not apply outgoing call barring services.
$(begin$(CAMEL2$)
If the served subscriber is provided with a TIF-CSI the network shall not perform the interaction of call forwarding services with this barring program, i.e.

- the registration request is accepted even if this barring program is active and operative;
- the activation of this barring program is accepted even if a call forwarding supplementary service is active.

When call forwarding is invoked(possibly with originating CAMEL services in the forwarding leg) the VPLMN or

IPLMN shall not invoke outgoing call barring services.
$(end$(CAMEL2$)
$(begin$(CAMEL1$)

NOTE: This behaviour means that CAMEL may be used to establish forwarded-legs that violate conditional outgoing call barring and ODB services. Network operators should take care to avoid problems that may arise because of this interaction.

$(end$(CAMEL1$)

18.8.3 Barring of outgoing international calls except those directed to the HPLMN country

As for Barring of outgoing international calls (see subclause 12.8.2).

18.8.4 Barring of all incoming calls

[Editors Note: text to be drafted]

No interaction. The Barring of all incoming calls supplementary service shall be invoked. Thus, terminating CAMEL based services will not be invoked.

18.8.5 Barring of incoming calls when roaming

Same as Barring of all incoming calls (see subclause 12.8.4).

18.9 Explicit Call Transfer (ECT)

An ECT call may include one or both call legs subject to CAMEL based services. If a call leg is subject to CAMEL based services the CSE shall be able to instruct the VPLMN of the served subscriber whether that leg may be included in an explicitly transferred call.

18.10 Completion of Call to Busy Subscriber (CCBS)

When a CCBS request is planted the CSE shall be able to instruct the VPLMN of the served subscriber whether CCBS is possible.

18.11 Multiple Subscriber Profile (MSP)

See TS 22.097 [5].

19 Interactions with Operator Determined Barring (ODB)

19.1 Barring of all outgoing calls

Same principle as for subclause 12.8.1.

19.2 Barring of all outgoing international calls

Same principle as for subclause 12.8.2.

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

Same principle as for subclause 12.8.3.

19.4 Barring of outgoing calls when roaming outside the home PLMN country

If the subscriber is outside her home PLMN country the Barring of outgoing calls when roaming outside the home PLMN country service will be invoked. Thus, originating CAMEL based services will not be invoked.

19.5 Barring of outgoing premium rate calls

Same principle as for subclause 13.3. The handling will be the same both for Premium rate information and Premium rate entertainment.

19.6 Barring of incoming calls

Same principle as for subclause 12.8.4.

19.7 Barring of incoming calls when roaming outside the home PLMN country

Same principle as for subclause 12.8.4.

19.8 Operator Specific Barring

No interaction. Any originating or terminating CAMEL based services shall be invoked before Operator Specific Barring of type 1,2,3,4. Operator Specific Barring is only applicable when registered in HPLMN.

NOTE: Operators should be aware of this interaction when defining Operator Specific ODB categories.

19.9 Barring of Supplementary Services Management

No interaction.

20 Interactions with Optimal Routeing (OR)

Invocation of OR shall not have any impact of any CAMEL based service.

If OR is applied to a late Call Forward then the interrogating PLMN shall invoke a mobile originated CAMEL based service, if required for the served subscriber.

$(begin$(CAMEL2$)

If OR of a basic mobile-to-mobile call is invoked, mobile originating services based on CAMEL phase 2 which rely on the destination of the MO call leg being determined by the dialled number (in particular, prepayment services) will not necessarily operate correctly.

If OR of late call forwarding is invoked from an IPLMN which is also the forwarding subscriber's HPLMN, then mobile terminating services based on CAMEL phase 2 which rely on the destination of the leg from the IPLMN being determined by the MSRN (in particular, prepayment services) will not necessarily operate correctly.

$(end$(CAMEL2$)

$(begin$(CAMEL3$)

~~When VPLMN-A contacts the CSE of the originating subscriber, it shall indicate whether it supports OR. If the CSE of the originating subscriber indicates that the call may be subject to basic OR, VPLMN-A shall act as an IPLMN and interrogate HPLMN-B as specified for SOR.~~

If a call is subject to basic OR, VPLMN-A shall pass the address defining the ultimate destination of the call (whether VPLMN-B, HPLMN-B or the forwarded-to destination) to the CSE of the originating subscriber.

If a call is subject to OR of late call forwarding from an IPLMN which is also the forwarding subscriber's HPLMN, then the IPLMN shall pass the forwarded-to number to the CSE which handles mobile terminating CAMEL-based services for the forwarding subscriber.

[Editors Note: Interaction with OR LCF R'96 has to be studied and text might be changed.]

$(end$(CAMEL3$)

Specific interaction is described in TS 22.079 [2]~~.~~

21 ~~Interactions with SAT and MexE~~Reserved Section

~~For interworking purposes SAT and MExE applications shall be able to include free formatted information in the call set up for MO calls (mobile originated calls), MO SMS (mobile originated SMS) and GPRS session set up. This information shall be forwarded transparently to a CAMEL CSE.~~

~~A CAMEL CSE shall be able to include free formatted information for MT calls (mobile terminated calls) that shall be forwarded transparently to a SAT or MExE application.~~

22 Location Information

The purpose of this procedure is to obtain the location of a particular subscriber. The resolution of the location information may be based on the Cell Identity of the subscriber's location, or may be based on more accurate

positioning information ($CAMEL3$).
The CSE may interrogate the HLR in order to obtain a particular subscriber's location based on the cell identity. The HLR may return the cell identity stored in the VLR ($CAMEL1$) or may return the current cell identity as a result of paging the subscriber ($CAMEL3$).

($begin(CAMEL3$)
The CSE may interrogate the GMLC in order to obtain a particular subscriber's current location based on accurate geographical information as defined by LCS in TS 22.071 [8]. The GMLC has the possibility to reject any interrogation from any CSE.
($end(CAMEL3$)

232 Cross Phase compatibility with future Phases of CAMEL

Where different entities support different phases of CAMEL they shall operate at the highest common phase. CAMEL phase 1 is the lowest common phase.

Annex A (normative): Information Tables

A.1 Information provided to the CSE

The following table shows the information that is transferred towards the CSE on various events. The numbers are reflecting the applicable Camel phase (!, 2, 3).

	Call set-up request procedure 1	Call set-up request procedure 2	Call set-up request procedure 3	Call set-up request procedure 4	Unsuccessful call establishment	Unsuccessful call establishment (MT)	Incoming call request procedure	Procedures for serving network dialled services 1	Procedures for serving network dialled services 2
Event met	1	1	3	3	3	3	1	3	3
IMSI	1	1	3	3	3	3	1	3	3
Calling Party's Number	1	1	3	3	3	3	1	3	3
Calling Party's Category	1	1	3	3	-	3	1	3	3
Additional Calling Party Number	-	1	-	3	-	3	1	-	3
Called Party BCD Number	1	-	3	-	3	-	-	3	-
Called Party Number	-	1	-	3	-	3	1	-	3
Original Called Party Number	-	1	-	3*1	-	3	1	-	3*1
Redirecting (Party) Number ????	-	1	-	3	-	3	1	-	3
Redirection Information	-	1	-	3	-	3	1	-	3
Service Key	1	1	3	3	3	3	1	3	3
ISDN Bearer Capability	1	1	3	3	3	3	1	3	3
High Layer Compatibility	1	1	3	3	3	3	1	3	3
Basic Service Code	1	1	3	3	3	3	1	3	3
Call Identification Information	1	1	3	3	3	-	-	?	?
Location Information of the Calling Subscriber	1	-	3	-	3	-	-	3	-
Location Number of the Calling Subscriber	-	-	-	-	-	3	1	-	-
Location information of the called subscriber	-	-	-	-	-	3	1	-	-
Subscriber State of the called subscriber	-	-	-	-	-	3	1	-	-
Cause - $(CAMEL3$)	-	-	-	-	3	3	-	-	-
Time and Time Zone Information - $(CAMEL2$)	2	2	3	3	3	3	2	?	?
~~Optimal Routing Indication - $(CAMEL3$)~~	-	-	~~?~~	~~?~~	-	~~3~~	-	~~3~~	~~3~~
Calling Party LSA (if available) $(CAMEL3$)	3	-	3	-	-	-	-	3	-
~~IMEI - $(CAMEL3$)~~	~~3~~	-	~~3~~	-	~~3~~	-	-	~~?~~	-
~~Terminal characteristics and capabilities (see MExE, 02.57) - $(CAMEL3$)~~	3	-	3	-	3	-	-	?	-
~~MExE classmark (see MExE, 02.57) - $(CAMEL3$)~~	~~3~~	-	~~3~~	-	~~3~~	-	-	~~?~~	-
~~MExE / SAT application identifier - $(CAMEL3$)~~	~~3~~	-	~~3~~	-	~~3~~	-	-	~~3~~	-
~~MExE / SAT Free formatted information - $(CAMEL3$)~~	~~3~~	-	~~3~~	-	~~3~~	~~3~~	-	~~3~~	-
NAEA Carrier Identification Code (CIC) -$(CAMEL3$)	2	2	3	3	3	3	2	3	3
NAEA Carrier Selection Information (pre-subscribed or on-demand) -$(CAMEL3$)	2	2	3	3	3	-	2	3	3

CUG Index if received from the calling subscriber	3	-	-	-	-	-	-	-	-
CUG Interlock Code	-	3	-	-	-	-	3	-	-
CUG Outgoing Access Indicator	-	3	-	-	-	-	3	-	-

Table A-1: Information transferred towards the CSE

*1: If any other CAMEL dialogue has modified called party number then the modified number is reported to the CSE of dialled services.

[CR editor's note: S1 tdoc S1-99674 has no column for MT unsuccessful case. However, it indicates that some elements are supported in CAMEL ph 2 for unsuccessful cases. This fact needs clarification in future meetings.]

A.2 Information sent by the CSE

The following table shows the information that is sent by the CSE on various events. The numbers are reflecting the applicable Camel phase (1, 2, 3).

	Ca	Ca	Un	Ca	~~Cf~~	In	Un	Ca	Pr	~~CS~~
Called Party Number	1	3	2	2	~~3~~	1	2	2	3	~~3~~
Calling Party Number	-	-	-	-	~~3~~	-	-	-	-	~~3~~
Calling Party's Category	1	3	2	2	~~3~~	1	2	2	3	~~3~~
Calling IMSI	-	-	-	-	-	-	-	-	-	~~3~~
ISUP CUG information	-	-	-	-	~~3~~	-	-	-	-	-
Additional Calling Party's Number	1	3	2	2	~~3~~	1	2	2	3	~~3~~
Original Called Party Number	1	3	2	2	-	1	2	2	3	-
Redirection Party Number	1	3	2	2	~~3~~	1	2	2	3	-
Redirection Information	1	3	2	2	~~3~~	1	2	2	3	-
Alerting Pattern	-	-	-	-	~~3~~	2	-	-	-	~~3~~
ISDN Access releated Information	-	-	-	-	~~3~~	-	-	-	-	~~3~~
ISDN Bearer Capability	-	-	-	-	~~3~~	-	-	-	-	~~3~~
High Layer Compatibility	-	-	-	3	-	-	-	-	-	~~3~~
Basic Service Code	-	-	-	3	-	-	-	-	-	~~3~~
Called Party to be Created	-	-	-	-	~~3~~	-	-	-	-	~~3~~
New Call Segment	-	-	-	-	~~3~~	-	-	-	-	~~3~~
In Service Compatibility Response	-	-	-	-	~~3~~	-	-	-	-	~~3~~
Service Interaction Indicators Two	-	-	-	-	~~3~~	-	-	-	-	~~3~~
Location Number	-	-	-	-	~~3~~	-	-	-	-	~~3~~
~~Optimal Routing Indication $(CAMEL3$)~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	-	~~3~~
~~MExE / SAT Free formatted information – $(CAMEL3$)~~	-	-	-	-	-	~~3~~	-	-	-	-
NAEA Carrier Identification Code (CIC) - $(CAMEL2$)	2	2	2	2	~~3~~	2	2	2	3	~~3~~
NAEA Carrier Selection Information (pre-subscribed or on-demand) - $(CAMEL2$)	2	2	2	2	~~3~~	2	2	2	3	~~3~~
NAEA Originating Line Identification (OLI) - $(CAMEL2$)	2	2	2	2	~~3~~	2	2	2	3	~~3~~
NAEA Charge Number (CN) - $(CAMEL2$)	2	2	2	2	~~3~~	2	2	2	3	~~3~~
CSE Address	-	-	-	-	-	-	-	-	-	~~3~~
CUG Interlock Code	3	3	-	-	-	3	-	-	-	-
CUG Outgoing Access Indicator	3	3	-	-	-	3	-	-	-	-
Service Interaction Indicators	3	3			~~3~~	3				~~3~~

Table A-2: Information sent by the CSE

A.3 GPRS Information provided to the CSE

The following table shows the information that is transferred towards the CSE on various GPRS events. The numbers are reflecting the applicable Camel phase (3).

	Attach procedure	PDP activation / Session Establishment	PDP activation / Session Establishment
Event met	3	3	3
Type of monitoring	-	3	3
MSISDN	3	3	3
IMSI	3	3	3
Service Key	3	3	3
Location information at least to the resolution of Routing Area of the attaching subscriber	3	3	3
Time stamp information	3	3	3
Time zone information	3	3	3
GPRS MS Class	3	3	3
~~MExE / SAT application identifier~~	~~3~~	~~3~~	~~3~~
~~MExE / SAT Free formatted information~~	~~3~~	~~3~~	~~3~~
PDP transport protocol, i.e. IP or X.25	-	3	3
Quality of Service information (subscribed, requested,	-	3	3
Destination address information	-	3	3
GPRS charging correlation ID	-	-	3
Destination address information	-	-	3

Table A-3: GPRS Information transferred towards the CSE

Annex B:
Change history

Change history						
TSG SA#	**Spec**	**Version**	**CR**	**<Phase>**	**New Version**	**Subject/Comment**
Jun 1999	GSM 02.78	8.0.0				Transferred to 3GPP SA1
SA#04	22.078				3.0.0	
SA#05	22.078	3.0.0	001 002 003 004 005 006 007 008 009 010 011 012 013 014 015 016 017 018 019 020 021 022 023 024 025 026 027 028 029	R99	3.1.0	Camel control of packet switched MO SMS Removal Initial Service Events in case of Unsuccessful MO call establishment Work Item Camel Phase 3 CSE Related overload control Referenced by LS in 344 Inclusion of Service Key in Mobility Management event notifications + editorial modifications Clarification the behaviour when network provided dialled services are used 279 > 341 284 > 342 336 > 345 CR Rev Jeremy Editorial update of references for GSM/3GPP use CR for CAMEL3 interworking with GPRS; Change of position CR for CAMEL3 DTMF Mid-Call corrections and clarifications CR for CAMEL3 clean-up of IPLMN and VPLMN references CR Defining successful SM submission to SMSC as EDP CR SAT/MExE interworking Correction Annex A.2; Information sent by the CSE Correction on GPRS handling (Version 2) Short Message Submission Handling (version2) CR O-CSI Information CR Free formatted information Defining Successful SM submission and Unsuccessful SM submission as EDP-N and EDP-R CR for CAMEL3 corrections to new Trigger Detection Points (TDP) (2nd version) CSI description CR for CAMEL3 corrections and clarifications to dialled services (subscribed & serving network) Charging clarifications for MO-SMS CR for CAMEL3 Call Forwarding and new TDP interworking (2nd Version) CLI modification CCBS Service interaction CR Network based CAMEL service invocation
SA#06	22.078	3.1.0	030 031	R99	3.2.0	CSE ability to change CLI PI for an MO call Enhancement of the capabilities of dialled services

History

Document history		
V3.0.0	July 1999	Transferred to TSG SA at ETSI SMG#29. Under TSG TSG SA Change Control.
V3.1.0	October 1999	Inclusion of CRs at SA#05
V3.2.0	December 1999	Inclusion of CRs at SA#06