Source: **SA1**

Title: **CRs to 22.078 on Various subjects (Rel-6)**

Document for: **Approval**

Agenda Item: **7.1.3**

Meet	Doc. No.	Spec	CR	Rev	Phase	Cat	Subject	Vers	New Vers	Doc. SA1
SP-22	SP-030698	22.078	162	-	Rel-6	F	Add criteria "inter-MSC handover" for change of position procedures	6.2.0	6.3.0	S1-031194
SP-22	SP-030698	22.078	167	-	Rel-6	B	CAMEL4 prepay interworking with SCUDIF	6.2.0	6.3.0	S1-031318

CR-Form-v7

CHANGE REQUEST

⌘ **22.078** **CR** **162** ⌘ **rev** **-** ⌘ Current version: **6.2.0** ⌘

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

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

Title:	⌘	Add criteria "inter-MSC handover" for change of position procedures
Source:	⌘	SA1 (Siemens AG)
Work item code:	⌘	TEI_6
Date:	⌘	15/10/2003
Category:	⌘	**F**
Release:	⌘	Rel-6

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

Use one of the following releases:

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

Reason for change:	⌘	After 22.078--160, S1-030727, was been approved in SA1, it was noted at CN2 #30 in Sophia Antipolis that inter-MSC handover was not listed as one of the criteria for reporting the handover event. Although reporting upon the inter-MSC handover is NOT theoretically IMPOSSIBLE since it is always associated with the change of location information, considering the number of criteria allowed (10), it is practically IMPOSSIBLE to define all the possible inter-MSC handovers in one CAP_RequestReportBCSMEvent (stage 3). One solution would be to keep sending CAP_RequestReportBCSMEvent after detection of handover near the border of the MSC service area. However it would cost a lot of signalling load. Therefore, it would be useful to have the "inter-MSC handover" as one of the criteria to save the number of criteria to be sent by the CSE.
Summary of change:	⌘	Add the criterion "inter-MSC handover" for the change of position procedures. Improve the existing description to avoid difficulty in understandig. -- This is the reflection after discussion in CN2#30 (Sophia Antipolis, France, 25th – 29th August) and CN2 mailing list.
Consequences if not approved:	⌘	(1) If the CSE hopes to detect the inter-MSC handover, it will have to send CAP_RRB with updated criterion quite frequently. This makes the signaling load

	quite high. (2) Some confusion may occur in interpreting the stage 1.

Clauses affected:	⌘	5.12, 6.12			
Other specs affected:	⌘	**Y**	**N**		
		X		Other core specifications	⌘ 23.078, 29.078
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

***** First modified part *****

5.12 Change of position procedure

When the CSE instructs the VPLMN to arm the change of position event it may specify a ~~criterion~~list of up to 10 criteria against which ~~location the subscriber changed to/from~~the change of position shall be matched. The VPLMN shall report the event when the subscriber's location information ~~changed and~~changes and one of the criteria is met.

~~The instruction by the CSE may contain a list of up to 10 location changes to be reported as the criterion. The~~. Each element of the list of criteria contains either:

~~the border over~~- the identifier of a location which the subscriber ~~changes in terms of one of the following information:~~enters or leaves. It is specified as one of the following:

- cell global id;
- location area id;
- service area id;

~~or~~- or one of the following ~~changes;~~types of handover:

- "inter-system hand~~-~~over";
- "inter-PLMN ~~hand over",~~handover";
- "inter-MSC handover".

If more ~~then one criteria~~than one criterion is met, then only one change of position event shall be reported to the CSE.

If this list of ~~location change~~criteria is not included in the instruction, the criteria upon any change of position shall be regarded as fulfilled.

It shall be possible for the CSE to instruct the VPLMN to re-arm the change of position event when it is encountered.

If the CSE has activated this service event for the served subscriber and a change of position event occurs (as determined by the ~~criterion~~criteria for the change of position procedure being satisfied) the VPLMN shall:

- Notify the CSE and continue call processing.

The following information shall be provided to the CSE:

- Event met;
- Type of monitoring;
- ~~Event specific data;~~

~~Location information:~~Event specific data:

- Location information.

- Charge result if charging supervision is ~~provided:~~provided.

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:

- Change of position event.

- The party in the call for which the event shall be detected and reported;

- The type of monitoring (notification);

- 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.

***** Next modified part *****

6.12 Change of position procedure

When the CSE instructs the VPLMN to arm the change of position event it may specify a ~~criterion~~list of up to 10 criteria against which ~~location the subscriber changed to/from~~the change of position shall be matched. The VPLMN shall report the event when the subscriber's location information ~~changed and~~changes and one of the criteria is met.

~~The instruction by the CSE may contain a list of up to 10 location changes to be reported as the criterion. The~~Each element of the list of criteria contains either:

~~the border over~~ the identifier of a location which the subscriber ~~changes in terms of one of the following information:~~enters or leaves. It is specified as one of the following:

- cell global id;

- location area id;

- service area id~~;~~

~~or~~ or one of the following ~~changes;~~types of handover:

- "inter-system hand~~-~~over";

- "inter-PLMN handover";

- "inter-MSC hand over".

If more then one ~~criteria~~criterion is met, then only one change of position event shall be reported to the CSE.

If this list of ~~location change~~criteria is not included in the instruction, the criteria upon any change of position shall be regarded as fulfilled.

It shall be possible for the CSE to instruct the VPLMN to re-arm the change of position event when it is encountered.

If the CSE has activated this service event for the served subscriber and a change of position event occurs (as determined by the ~~criterion~~criteria for the change of position procedure being satisfied) the VPLMN shall:

- Notify the CSE and continue call processing.

The following information shall be provided to the CSE:

- Event met;

- Type of monitoring;

- ~~Event specific data;~~

~~Location information:~~Event specific data:

- Location information.

- Charge result if charging supervision is ~~provided:~~provided.

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:

    - Change of position event.

  - The party in the call for which the event shall be detected and reported;

  - The type of monitoring (notification);

  - 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.

3GPP TSG SA WG1 Meeting #22
Bangkok, Thailand, 27th – 31st October 2003

S1-031318
(N2-030571)

CR-Form-v7

CHANGE REQUEST

⌘ **22.078** **CR** **167** ⌘ **rev** **-** ⌘ Current version: **6.2.0** ⌘

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

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

Title:	⌘	CAMEL4 prepay interworking with SCUDIF
Source:	⌘	SA1 (Nokia)
Work item code:	⌘	CAMEL4
Date:	⌘	30/10/2003
Category:	⌘	**B**
Release:	⌘	Rel-6

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

Use one of the following releases:

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

Reason for change:	⌘	Operators want to charge multimedia calls differnetly to speech calls, also for prepay. SCUDIF is a late Rel-5 feature.
Summary of change:	⌘	Basic service changes during active call shall be reported to SCP. Reporting is done only if gsmSCF/SCP requests MSC/SSP to do so. Also the ApplyChargingReport would be generated in order to get a new call period timer value.
Consequences if not approved:	⌘	Multimedia calls can not be charged correctly in prepay cases

Clauses affected:	⌘				
Other specs affected:	⌘	**Y**	**N**		
		X		Other core specifications	⌘ 23.078, 29.078, 29.002
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

- Discussion part – no change -

In CN2 & CN4 joint meeting we concluded that for Rel-5

1. In InitialDP possibility of SCUDIf is reported to SCP
2. At answer the used service (speech / multimedia BCIE) is reported to SCP.
3. Service change during call is **not** reported to (CAMEL) SCP.

However, Nokia believes that SA1 would be the right venue to decide on this. The two first bullets do not require a Stage 1 change because information flows are not shown in Stage 1. However, the last bullet would require a new detection point, and that is visible in stage 1.

Nokia also believes that leaving the 3rd bullet out would mean incomplete prepay charging. Some operators want to charge multimedia differently because it uses more network resources, and can be seen as a differenciating feature.

SCP needs to know also the basic service in order to control in-band tones and announcements. No in-band information shall be connected during UDI/multimedia phase of the call. The applies to CPH. Regular MSCs can not combine data streams appropriately.

Nokia is proposing a new detection point to CAP protocol, analogue to *ChangeOfPosition* DP. The new DP would be applicable to all call cases, except SCP initiated calls.

In general, the interworking of SCUDIF and CPH is an open issue. CPH applies to speech calls only, but SCUDIF call can be speech, multimedia or both. These issues would have to be solved regardless of this CR.

Based on joint SA1-CN2 discussion,

- the MSC shall send ApplyChargingReport if basic service changes so that charging rate can be changed after bearer service modification.
- The new detection point shalll be EDP-N.
- The new detection point shall be reported when service has been changed successfully, i.e. the non-initiating terminal acknowledges.

- First modified section -

1 Scope

This standard specifies the stage 1 description for the 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.

If an IPLMN or VPLMN supports CAMEL Phase 4, it shall also provide the functionality of all previous CAMEL phases.

Phase 4 network signalling shall support interworking with CAMEL Phases 3 and 2.

The CAMEL feature is applicable

- To mobile originated and mobile terminated call related activities;
- To supplementary service invocations;
- To SMS MO, to GPRS sessions and PDP contexts, to the control of HLR subscriber data, to the control of network signalling load.

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 enhances the capabilities of phase 1 where the following capabilities have been added:

- Additional event detection points;
- Interaction between a user and a 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 the supplementary services ECT, CD and MPTY;
- For easier post-processing, charging information from a serving node can be integrated in normal call records.

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

- Support of facilities to avoid overload;
- 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 mobile originating SMS through both circuit switched and packet switched serving network entities.
- Interworking with SoLSA. (Support of Localised Service Area). Support for this interworking is optional.
- The CSE can be informed about the invocation of the supplementary services CCBS.

Detailed information is given in the respective sections.

The fourth phase of CAMEL enhances the capabilities of phase 3. The following capabilities are added:

- CAMEL support for Optimal Routeing of circuit-switched mobile-to-mobile calls;

- The capability for the CSE to create additional parties in an existing call;
- The capability for the CSE to create a new call unrelated to any other existing call;
- Capabilities for the enhanced handling of call party connections;
- The capability for the CSE to control sessions in the IP Multimedia Subsystem.
- Enhanced CSE capability for Dialled Services.
- The capability to report basic service changes during ongoing call.

With CAMEL Phase 4, it is possible that only a limited subset of the new functionalities is supported, in addition to the complete support of CAMEL Phase 3.

- Next modified section -

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.

Then 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, the CSE shall be able to instruct the VPLMN to act as described below.

- Perform charging activities;
- Activate subsequent control service events for the call. The CSE shall have the possibility to send the following information:
  - The subsequent service event which shall be detected and reported:
    - Called party alert;
    - 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 or out of band information). The CSE shall specify the digit string(s) or the out of band information for which the instruction is valid. Out-band information may be detected during alerting phase of the call;
    - Change of basic service.

CR editor's note: These lists should be finally changed to real bulletet lists.

  - 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).
- 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:

- Bar the call (i.e. release the call prior to connection);
- Continue the call processing;
- Continue the call processing with modified information;
- Continue the handling of the calling party without routeing the call to the destination.

- Next modified section -

5.3.2 Procedure for subscribed dialled services

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.

Contact with the CSE shall (if necessary) be made in this manner before network dialled services are invoked.

5.3.2.2 Further processing of the call

If a relationship exists with a CSE, then 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 The CSE is only allowed to send e-values (refer to sect. 15.1, 'CSE controlled e-values') and include free format data in Call Data Records (refer to sect. 15.2, 'Inclusion in charging records of information received from the CSE');
- Order in-band user interaction. (Interaction between the service triggered from previous triggering may be needed to avoid duplicated guidance etc.).

Once the CSE has concluded issuing the above instructions, it shall issue one and only one of the following instructions:

- Release the call;
- Continue the call processing;
- Continue the call processing with modified information;

If no relationship exists with a CSE for the call, then 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 subsequent control service events for the call. The CSE shall have the possibility to send the following information:
    - The subsequent service event which shall be detected and reported:
        - Called party alert;
        - 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 or out of band information). The CSE shall specify the digit string(s) or the out of band information for which the instruction is valid. Out-band information may be detected during alerting phase of the call;

- Change of basic service.

  - 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).

- 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;
- Continue the handling of the calling party without routeing the call to the destination;
- Release the call.

Due to interworking problems, the service operator shall ensure that sending of e-values and call period control is not used by the other services in the same call of the served subscriber with *Enhanced CSE capability for Dialled Services.*

- Next modified section -

5.5 Unsuccessful call establishment

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 an 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 subsequent 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 an initial service event, a new relationship is opened only if triggering criteria are fulfilled and no relationship already exists for the same CSI.

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 subsequent control service events for the call. The CSE shall have the possibility to send the following information:
  - The subsequent service event which shall be detected and reported:
    - Called party alert;
    - 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 or out of band information). The CSE shall specify the digit string(s) or the out-band information for which the instruction is valid. Out-band information may be detected during alerting phase of the call. The detection of the mid call event shall be limited to the VPLMN;

- Change of basic service.

  - 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).

- 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:

- Release the call;
- Continue the call processing;
- Continue the call processing with modified information.

- Next modified section -

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 subsequent 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);
- The charge indicator which will be used in the Call Data Record if available;
- Type of monitoring.

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;
- Activate subsequent control service events for the call. The CSE shall have the possibility to send the following information:
  - The subsequent service event which shall be detected and reported:
    - Call disconnection;
    - Mid call event (DTMF or out of band information). The out-band information may be detected during alerting phase. The detection of the mid call event shall be limited to VPLMN only);
    - Change of basic service.
  - 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).
- 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:

- Release the call;
- Continue the call processing.

- Next modified section -

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 any party in the call.

If the CSE has activated this subsequent 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.

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 subsequent control service events for the call. The CSE shall have the possibility to send the following information:
  - The subsequent service event which shall be detected and reported:
    - Called party alert;
    - 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 or out of band information). The CSE shall specify the digit string(s) or the out-band information for which the instruction is valid;
    - Change of basic service.
  - 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).
- 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:

- Continue the call processing, i.e. release the call;
- Continue the call processing with modified information.

- Next modified section -

5.11 Called party alert reporting procedure

The purpose of this procedure is to manage an outgoing call set-up at the time when the called party is alerted.

If the CSE has activated this service event for this call and the called party alert 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/VPLMN to act as described below:

- Perform charging activities;
- Activate subsequent 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:
    - Calling party abandon;
    - Unsuccessful call establishment. In the case of no answer the CSE may provide a no answer timer;
    - Call disconnection;
    - Mid call event (DTMF);
    - Called party connection.
    - Change of basic service.
  - The party in the call for which the event shall be detected and reported;
  - The type of monitoring (control or notification).
- Order in-band user interaction with the calling party.

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 the following instruction:

- Continue the call processing.

- Next modified section -

5.x Change of basic service

When the CSE has instructed the IPLMN/VPLMN to arm the change of basic service event, the IPLMN/VPLMN shall report the event when the basic service changes. It shall be possible for the CSE to instruct the IPLMN/VPLMN to re-arm the change of basic service event when it is encountered. The CSE may arm this event in the various phases of the call (as specified in this specification)– however the IPLMN/VPLMN reports the basic service changes in the active phase of the call only.

If the CSE has activated this service event for the served subscriber and a change of basic service event occurs the IPLMN/VPLMN shall:

- Notify the CSE and continue call processing.

The following information shall be provided to the CSE:

- Event met;
- Type of monitoring;
- Event specific data;
  - Basic service:
- Charge result if charging supervision is provided:

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:
    - Change of basic service.
  - The party in the call for which the event shall be detected and reported;
  - The type of monitoring (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.

- Next modified section -

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.

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

- Perform charging activities;
- Activate subsequent control service events for the call. The CSE shall have the possibility to send the following information:
  - The subsequent service event which shall be detected and reported:
    - Called party alert;
    - 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 or out of band information). The CSE shall specify the digit string(s) or the out of band information for which the instruction is valid;
    - Change of basic service.
  - 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).
- Suppress tones and announcements which may be played to the calling party, if an unsuccessful call establishment occurs.
- 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:

- Bar the call (i.e. release the call before connection);
- Continue the call processing;
- Continue the call processing with modified information;
- Continue the handling of the calling party without routeing the call to the destination.

If the CSE instructs the IPLMN/VPLMN to continue 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. 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.

If 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.

- Next modified section -

6.5 Unsuccessful call establishment

The purpose of this procedure is to manage an incoming call set-up at the time when the call establishment is unsuccessful.

If no relationship for the given call exists and

- The unsuccessful call establishment procedure is defined as an 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 subsequent 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;
    - Forwarding notification.

If the unsuccessful call establishment procedure is armed as an initial service event, and the IPLMN/VPLMN has made contact with the CSE, the CSE shall be able to instruct the IPLMN to act as described below:

- Perform charging activities;
- Activate subsequent control service events for the call. The CSE shall have the possibility to send the following information:
    - The subsequent service event which shall be detected and reported:
        - Called party alert;
        - 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 or out of band information). The CSE shall specify the digit string(s) or the out of band information for which the instruction is valid;
        - Change of basic service.
    - 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).

- 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:

- Release the call;
- Continue the call processing;
- Continue the call processing with modified information.

- Next modified section -

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 subsequent 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);
- The charge indicator which will be used in the Call Data Record if available;
- Type of monitoring.

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 subsequent control service events for the call. The CSE shall have the possibility to send the following information:
  - The subsequent service event which shall be detected and reported:
    - (Call disconnection);
    - Mid call event (DTMF or out of band information). Detection of the mid call event shall be limited to the VPLMN. Out-band information may be detected during alerting phase of the call.);
    - Change of basic service.
  - 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).
- 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:

- Release the call;
- Continue the call processing;

- Next modified section -

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 subsequent service event for the 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.

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 subsequent control service events for the call. The CSE shall have the possibility to send the following information:
  - The service subsequent event which shall be detected and reported:
    - Called party alert;
    - 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 or out of band information). The CSE shall specify the digit string(s) or out of band information for which the instruction is valid;
    - Change of basic service.
  - 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).
- 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:

- Continue the call processing, i.e. release the call;
- Continue the call processing with modified information.

- Next modified section -

6.10 Called party alert reporting procedure

The purpose of this procedure is to manage an outgoing call set-up at the time when the called party is alerted.

If the CSE has activated this service event for this call and the called party alert 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.

If the VPLMN reports the alerting event to the CSE, the location information of the MS shall be provided to the CSE.

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 subsequent 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:
    - Calling party abandon;
    - Unsuccessful call establishment. In the case of no answer the CSE may provide a no answer timer;
    - Call disconnection;
    - Mid call event (DTMF);
    - Called party connection;
    - Change of basic service.
  - The party in the call for which the event shall be detected and reported;
  - The type of monitoring (control or notification).
- Order in-band user interaction with the calling party.

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 the following instruction:

- Continue the call processing.

- Next modified section -

6.x Change of basic service

When the CSE has instructed the IPLMN/VPLMN to arm the change of basic service event, the IPLMN/VPLMN shall report the event when the basic service changes. It shall be possible for the CSE to instruct the IPLMN/VPLMN to re-arm the change of basic service event when it is encountered. The CSE may arm this event in the various phases of the call (as specified in this specification)– however the IPLMN/VPLMN reports the basic service changes in the active phase of the call only.

If the CSE has activated this service event for the served subscriber and a change of basic service event occurs the IPLMN/VPLMN shall:

- Notify the CSE and continue call processing.

The following information shall be provided to the CSE:

- Event met;
- Type of monitoring;
- Event specific data;
  - Basic service:
- Charge result if charging supervision is provided:

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:
    - Change of basic service.
  - The party in the call for which the event shall be detected and reported;
  - The type of monitoring (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.

- Next modified section -

7.2 Further processing of the call

If a relationship exists with a CSE, then 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:

- Release the call;
- Continue the call processing;
- Continue the call processing with modified information;
- Perform charging activities (the CSE is only allowed to include charging data in the Call Data Record);
- Order in-band user interaction. (Interaction between the service triggered from previous triggering may be needed to avoid duplicated guidance etc.)

If no relationship exists with a CSE for the call, then 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:

- Perform charging activities;
- Activate subsequent control service events for the call. The CSE shall have the possibility to send the following information:
  - The subsequent service event which shall be detected and reported:
    - Called party alert;
    - 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 or out of band information). The CSE shall specify the digit string(s) or the out of band information for which the instruction is valid. Out-band information may be detected during alerting phase of the call;
    - Change of basic service.
  - 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).
- 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;
- Continue the handling of the calling party without routeing the call to the destination;
- Release the call.

Due to interworking problems, the service operator shall ensure that sending of e-values and call period control is not used by the other services in the same call of the served subscriber with *Enhanced CSE capability for Dialled Services.*

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