TSG-SA Working Group 1 (Services) meeting #3
Hampton Court, Surrey, UK 10th-12th May 1999

TSGS1#3(99)260

Agenda Item: 4.10 (CAMEL ph3)

Source: NTT DoCoMo *

Title: CR 02.78-??? on the calcification of MidCall DP in T-BCSM

Document for: Discussion/Confirmation

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Abstract

This document confirms the requirements in 02.78 [version Dx.5.0, for CAMEL ph3 (1999 release)], discusses the Mid_Call event handling in the VPLMN (VMSC) and make minor change request on 02.78 if needed. They would be based on the confirmation result in this document and would not intend to introduce drastic changes to 02.78.

1. Introduction

In this document the requirements in 02.78 on the Mid_Call event detection in a VPLMN for terminating side is clarified, because the Mid_Call event detection is mentioned for both mobile originated calls (section 5.B) and mobile terminated calls (section 6.B), in addition the application of the T-BCSM in VMSC for the terminating side MT has been agreed in N2#2.

The Mid_Call event is depicted as DTMF event currently, however the other event (e.g. FACILITY IE reception) may also be detected via T-BCSM without drastic changes to signalling system between MSCs since BCSMs in CAMEL ph3 can be allocated to the MSC which will directly serve to an MT.

Considering them, this document first makes clarification on the requirement (section 2.1 of this document) on Mid_Call event detection in 02.78. If the requirement is confirmed, proposed collection will be listed-up in section 2.2 and 2.3 depending on the discussion result.

2. Discussion

2.1 Clarification on 02.78 (version x.5.0)

Mid_Call event detection is referred in several sub-sections in section 6 "Procedures for Mobile Terminated Calls" of 02.78 as following:

>   Section 6.2 Incoming call request procedure
>   "Mid call event (DTMF)" is listed up as one of "the service events which shall be detected and reported" by IPLMN. In addition, "The party in the call for which the event shall be detected and reported (calling or called party)" is depicted as the required action for IPLMN. The detailed description is also available for the originating leg as well.

>   Section 6.B Mid Call procedure $(CAMEL3$)
>   In the first paragraph, the relationship with the CSE (CAMEL Service Environment) and VPLMN is mentioned:
>   "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. "
>   After this paragraph, except for one occurrence of VPLMN, IPLMN is used for the network that will communicate with the CSE. (Inconsitency?)

Since O/T BCSMs in stage2 level may have similar function like the detection of Busy, Answer, No_Answer, and Mid Call event, the usage of the term IPLMN and VPLMN will affect the interpretation of 02.78 for stage2. <u>Which BCSM</u>

or both BCSMs need to be enhanced for Mid_Call is the clarification point. DTMF can be detected in the networks that route the call to terminating MT, if a forward or backward connection is through connected and the appropriate handler is monitoring the DTMF. However it may not be always supposed that such handler is available. The management of the event detection should also be considered and resolved to avoid the duplicated control from CSE on the same DTMF, but this is the subject for stage2. In addition, the term DTMF discussed in the TSG SA#2 and it may not be limited to DTMF only, but this might be incorrect hearing of the discussion.

On the other hand, N2#2 has decided to introduce the T-BCSM to VPLMN's VMSC. This means Mid_Call event may be detected both in IPLMN (GMSC) and VPLMN's VMSC for the terminating MT. In addition, the T-BCSM in the VMSC can easily detect the reception of non-DTMF signal from the MT, e.g. out-of-band information (FACILITY for supplementary service invocation etc.), because it is not necessary to carry such information via transport mechanism (like ISUP) to gsmSSF and the existing transport mechanism will deliver the information to gsmSSF without drastic change to CNs.

Considering these, this document originator would like to ask the meeting following relating to the 02.78 draft version x.5.0:

1. Dose 02.78 include the Mid_Call event detection (with control or monitor) in VPLMN (VMSC) as a requirement?

2. Dose 02.78 allows other indication than DTMF from terminating side MT for CAMEL ph3 1999 release? Example is FACILITY for Operator Specific Service (OSS) invocations in call associated case.

If there are positive answers to the questions and it is confirmed that restriction mentioned in this section may be described, 02.78 needs slight modification. Summary is described in section 2.2 and section 2.3 can be skipped.

In other cases, both section 2.2 and 2.3 should be discussed.

2.2 Summary of proposed changes for 02.78

Since both IPLMN and VPLMN can refer the network that will communicate with CSE, the occurrence of *PLMN may be replaced with IPLMN/VPLMN in section 6. In addition, the DTMF is expanded to cover other transport mechanisms that will not affect NNI if the event detection is limited to VMSC. Since this function may be applied to the MT alerting phase, it is also taken into account. For the completeness the CSE needs to respond the Mid_Call event detection via out-of-band information in the opposite direction (NW to MT direction), this need to be confirmed by the meeting since it may be the addition.

CR for this case is attached as **Annex 1**. The limitation on the detection of DTMF and out-of-band information is not depicted since it may be mentioned in protocol specification (stage2 or later).

2.3 Additional discussion for Mid_Call event detection in VPLMN

As explained in section 2.1, the event detection of Mid_Call can be distributed to the IPLMN and VPLMN (similar to No_Answer etc.) so there is no drastic change to introduce the detection of the Mid_Call event in VMSC of VPLMN. In addition, the introduction of T-BCSM in VMSC also has the hidden capability that can detect not only DTMF but also other out-of-band indication from the terminating MT without introducing complicated transferring mechanism between MSCs. If such differentiation is clearly mentioned, there will be little impact to other interfaces than CAP.

CR for this case is attached as **Annex 2**. The difference to annex 1 is to reflect that the detection of DTMF can be dealt with GMSC and the detection of indication other than DTMF is limited to VMSC only.

Considering items discussed in section 2 being forwarded to the 2000 release of CAMEL, another CR is attached as annex 3. **Annex 3** only clarifies that IPLMN/VPLMN may handle the Mid_Call (DTMF) event for 1999 release and the Mid_Call event other than DTMF in T-BCSM will be forwarded to 2000. This result in the replace of VPLMN with IPLMN/VPLMN appropriately in section 6.2 and 6.B. The limitation of the detection will be handled with the same manner as annex 1 and 2.

3. Proposal

It is proposed to agree on one of the following (smaller number is preferred from contributor's point of view):

1. Take CR (annex 1) for 1999 release 02.78,
2. Take CR (annex 2) for 1999 release 02.78,
3. Take CR (annex 3) for 1999 release 02.78, and forward the Mid_Call event handling in T-BCSM to 2000 release.

Annex 1

<table>
<tr><td colspan="4">CHANGE REQUEST No :</td><td>A???</td><td><i>Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.</i></td></tr>
<tr><td colspan="2">Technical Specification GSM</td><td>02.78</td><td>Version:</td><td colspan="2">x.5.0</td></tr>
<tr><td>Submitted to SMG</td><td>#29</td><td>for approval</td><td></td><td>without presentation ("non-strategic")</td><td></td></tr>
<tr><td colspan="2"><i>list SMG plenary meeting no. here ↑</i></td><td>for information</td><td></td><td>with presentation ("strategic")</td><td></td></tr>
<tr><td colspan="6"><i>PT SMG CR cover form is available from: http://docbox.etsi.org/tech-org/smg/Document/smg/tools/CR_form/crf28_1.zip</i></td></tr>
</table>

Proposed change affects: SIM [ ]   ME [ ]   Network [X]
(at least one should be marked with an X)

Work item: CAMEL ph3

Source: NTT DoCoMo   **Date:**   1999/May/6

Subject: Clarification of MidCall DP in T-BCSM

Category: *(one category and one release only 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
				UMTS	

Reason for change: Please see the main body of Tdoc S1 99260. (this part will be extracted from main body, if agreed)

Clauses affected:

Other specs affected:

Other releases of same spec	[ ]	→ List of CRs:		
Other core specifications	[X]	→ List of CRs:	03.78, 09.02, 09.78	
MS test specifications / TBRs	[ ]	→ List of CRs:		
BSS test specifications	[ ]	→ List of CRs:		
O&M specifications	[ ]	→ List of CRs:		

Other comments:

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

6.2   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 [-$(CAMEL3$)] 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 [-$(CAMEL3$)] has made contact with the CSE, the CSE shall be able to instruct the IPLMN/VPLMN [-$(CAMEL3$)] 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 $(CAMEL2$). The CSE may specify the distinct unsuccessful case(s) for which the instruction is valid. $(CAMEL3$);

        - Mid call event (DTMF, or other out-of-band information. Latter including MT alerting phase). The CSE shall specify the digit string(s) for which the instruction is valid, or should specify specific information pattern for the out-of-band information. $(CAMEL3$);

    - 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, or other out-of-band information. Latter including MT alerting phase). The CSE shall specify the digit string(s) for which the instruction is valid, or should specify specific information pattern for the out-of-band information.

- 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 [-$(CAMEL3$)] 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 [-$(CAMEL3$)] 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 [-$(CAMEL3$)].

$(begin$(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$)

---------- Last modified section -----------

6.B   Mid Call procedure $(CAMEL3$)

When the CSE instructs the IPLMN/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 IPLMN/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.

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/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.

     -    received out-of-band information.

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:

          -    Call disconnection;

          -    Mid call event (DTMF, or other out-of-band information. Latter including MT alerting phase. CSE should specify specific information pattern for the out-of-band information).

     -    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/out-of-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

Annex 2

<table>
<tr>
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Reason for change: Please see the main body of Tdoc S1 99260. (this part will be extracted from main body, if agreed)

Clauses affected:

Other specs affected:

Other releases of same spec		→ List of CRs:	
Other core specifications	X	→ List of CRs:	03.78, 09.02, 09.78
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Then the IPLMN/VPLMN [-$(CAMEL3$)] 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.

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

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

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

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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).

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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/VPLMN shall:

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The following information shall be provided to the CSE:

- Event met;

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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:

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Annex 3

CHANGE REQUEST No :	**A???**	*Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.*

Technical Specification GSM **02.78**   Version: **x.5.0**

Submitted to SMG **#29**   for approval ☐   without presentation ("non-strategic") ☐
list SMG plenary meeting no. here ↑   for information ☐   with presentation ("strategic")

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Work item: CAMEL ph3

Source: NTT DoCoMo   **Date:** 1999/May/6

Subject: Clarification of MidCall DP in T-BCSM

Category: F Correction   **X**   **Release:** Phase 2   ☐
          A Corresponds to a correction in an earlier release   ☐   Release 96   ☐
(one category   B Addition of feature   ☐   Release 97   ☐
and one release   C Functional modification of feature   ☐   Release 98   ☐
only shall be   D Editorial modification   ☐   Release 99   **X**
                                                                      ☐   UMTS   ☐
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        -   Mid call event (DTMF which can be detected in IPLMN depending on the physical configuration of the path for a call.). The CSE shall specify the digit string(s) for which the instruction is valid. $(CAMEL3$);

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  $(begin$(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 which can be detected in IPLMN depending on the physical configuration of the path for a call.). The CSE shall specify the digit string(s) for which the instruction is valid, or should specify specific information pattern for the out-of-band information.

- 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 [-$(CAMEL3$)] 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 [-$(CAMEL3$)] 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 [-$(CAMEL3$)].

$(begin$(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$)

---------- Last modified section -----------

6.B   Mid Call procedure $(CAMEL3$)

When the CSE instructs the IPLMN/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 IPLMN/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.

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/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 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:

        -    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