3GPP TSG CN Plenary Meeting #21 **NP-030410**
17th - 19th September 2003. Frankfurt, Germany.

Source: **TSG CN WG 1**

Title: **CR to Rel-6 on Work Item TEI6 towards 43.068**

Agenda item: **9.18**

Document for: **APPROVAL**

Introduction:

This document contains **1** CR, **Rel-6 to** Work Item **"TEI6"**, that have been agreed by **TSG CN WG1 in CN1#31 meeting**, and are forwarded to TSG CN Plenary meeting #21 for approval.

TDoc #	Tdoc Title	Spec	CR #	Rev	CAT	C_Version	Rel
N1-031332	Dispatcher signalled mute/unmute of talkers downlink and correction and update of incorrect implementation of CR 03.68 A022	43.068	014	2	F	5.2.0	Rel-6

3GPP TSG CN WG1 Meeting #31
Sophia Antipolis, FRANCE, 25th – 29th August 2003

N1-031332
(rev of N1-031219)

CR-Form-v7

CHANGE REQUEST

⌘ **43.068** **CR** **014** ⌘**rev** **2** ⌘ Current version: **5.2.0** ⌘

*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:	⌘	Dispatcher signalled mute/unmute of talkers downlink and correction and update of incorrect implementation of CR 03.68 A022
Source:	⌘	Nortel Networks, Siemens
Work item code:	⌘	~~ASCI~~TEI6
Date:	⌘	04/10/2002
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: ⌘

When a talker has control of the uplink in a VGCS call, its downlink is muted to prevent distracting echo. However, if a dispatcher wishes to speak, it is necessary for him to be able to indicate this to the network so that the network can command the talker's MS to unmute the downlink (so that he can hear the dispatchers comments). Similarly, once the dispatcher has finished speaking, he must indicate to the network that he has finished speaking, so that the network can command the talker's MS to mute the downlink again. This can be done using a pre-defined combination of DTMF tones from the dispatcher.

Also, CR A022 was submitted against 03.68 with mention of this possibility, but was not correctly implemented at the time that the CR was agreed. The missing text from that CR is added here, and updated to reflect the usage of DTMF as the mechanism.

Finally, DTMF tones are already used to indicate a termination request from a dispatcher. Rather than duplicate the extensive signalling flows for this feature in the mute/unmute DTMF flows, the method by which DTMF tones are transported into the network has been genericised for clarity.

Since it will be impossible for a dispatcher to interrupt the talker without this mechanism, this is considered to be an essential correction.

Summary of change: ⌘

Mute/Unmute signalling flows are detailed, DTMF tone signalling in network is made generic to any DTMF tone use, incorrect implementation of CR A022 is corrected.

Consequences if not approved:	⌘	Dispatchers have no way of being heard by a talker if they wish to make comments while the talker has control of the uplink of the voice group call channel.

Clauses affected:	⌘	3.2, 4.2.2.1, 7.1, 11.3.7, 11.3.8			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3.2 Abbreviations

For the purpose of the present document, the abbreviations given in 3GPP TR 21.905 [1a] and the following apply:

CC	Country Code
D-ATT	Downlink Attach
DA	Downlink Attach
DRX	Discontinuous reception
DTMF	Dual Tone Multi Frequency
eMLPP	enhanced Multi-Level Precedence and Pre-emption
GCA	Group Call Attributes
GCR	Group Call Register
NCH	Notification Channel
NDC	National Destination Code
SN	Subscriber Number
UA	Uplink Attach
VBS	Voice Broadcast Service
VGCS	Voice Group Call Service

****** Change required due to non-implementation of CR A022 ******

4.2.2 On-going group calls

4.2.2.1 Normal operation with successful outcome

Within each voice group call starting from the instant where the calling subscriber first becomes a listening service subscriber, one service subscriber has the access at any one time to the uplink of the voice group call channel and his speech is then broadcast on all voice group call channel downlinks accordingly. The mobile station of the talking service subscriber shall, while no dispatcher is talking, be commanded by the network to mute the downlink speech to avoid non intelligible echo's.

In case of one talking service subscriber plus a parallel talking dispatcher, the talking service subscriber's mobile station shall receive an indication by means of signalling from the network so that it can unmute the downlink. DTMF shall be used by dispatchers to trigger network signalling to mute and un-mute the downlink of a talking service subscriber as described in subclause 11.3.7.2.

If more than one service subscriber applies to the uplink, contention resolution shall be performed in the network. Contention resolution shall be performed in the group call anchor MSC.

Additionally, in order to speed up the uplink access procedure, the BSS may grant the uplink prior to contention resolution being performed by the group call anchor MSC. This would mean that more than one service subscriber may access to the uplink and the respective speech may be combined in the group call bridge and broadcast onto all voice group call downlink channels during a transitional period. The anchor MSC shall then select one of the talking subscribers and pre-empt the uplink use of the other talking subscribers.

Dispatchers voice involved shall be broadcast on the voice group call channel downlink at any time. Mobile dispatchers are provided with a standard link and thus with an dedicated permanent uplink different from the voice group call channel.

All non-dispatcher group call members are provided with an indication on the voice group call channel of whether the uplink is in use. When the uplink is not in use, any non-dispatcher group call member can request access to the uplink. Any speech from dispatchers is combined with any speech from a talking service subscriber.

~~In case of one talking service subscriber plus a parallel talking dispatcher, the talking service subscriber's mobile station shall receive an indication by means of signalling from the network so that it can unmute the downlink. DTMF tones should be used between dispatcher and network to indicate that the dispatcher wants to talk or to indicate talking is concluded.~~

~~Editor's Note: The use of other means such as Voice Activity Detection (VAD) is for further study.~~

****** Next Change ******

7 Transmission

7.1 Transmission architecture

A conference bridge is required to connect the transmission paths of the nominated cells. The bridge is to be located within the group call anchor MSC. The group call anchor MSC is responsible for setting up all connections, both to the nominated cells (voice group call channels) in the group call anchor MSC and in any related group call relay MSC, and to the dispatchers. Except when an originator, served by a relay MSC, is on the initial dedicated link, there shall be one link towards every relay MSC and a distribution function in the relay MSCs and from there one link per cell within the

group call relay MSC which is involved in the voice group call, while the originator is on a dedicated link served by a relay MSC, there is an additional link from the anchor MSC to the relay MSC serving the originator and an additional link from the relay MSC serving the originator to the cell serving the originator. There shall be no secondary bridges in BSCs.

While a talker served by a relay MSC is on any other dedicated or group channel than the initial dedicated channel , the following applies: The distribution function shall be implemented using a secondary conference bridge at the relay MSC so that VGCS talker speech sent on the current channel uplink is transmitted to local relay cells as well as being transmitted over the link back to the anchor MSC, for distribution to the rest of the network, dispatchers and nominated cells at other relay MSCs.

NOTE 1: The conference bridge shall not mute the uplink speech.

~~A mechanism is required to indicate the downlink muting and uplink busy when the dispatcher is talking. DTMF should be used for this mechanism.~~

****** Next Change ******

11.3.7 Uplink and Downlink~~transmission~~ management

11.3.7.1 Uplink transmission management

The downlink FACCH channel shall be used to indicate whether the uplink is in use.

If a request to talk is made by the user and the uplink has been free the mobile station shall start to transmit UPLINK_ACCESS messages as defined in the 3GPP TS 44.018.

If an VGCS_UPLINK_GRANT message is received by the mobile station with a different request reference than that of the access made by the mobile station, the mobile station shall not signal for a further 1 s. If in this time the uplink becomes busy, the mobile station shall indicate to the user that the access has been denied.

The user shall be provided with a short indication immediately after the reception of the VGCS_UPLINK_GRANT which indicates that he can speak. Contention caused by simultaneous access messages on the uplink of the voice group call channel shall be resolved as for standard random access procedures. If the uplink access is rejected a further indication shall be provided to the user to inform him that his access attempt was not successful.

The network then shall send an UPLINK_BUSY message on the FACCH of the voice group call channel downlink in all cells involved in the group call.

Signalling messages for call establishment and termination on the voice group call channel shall then only apply for the mobile station currently using the uplink. All other mobile stations shall not respond to this downlink signalling. Once the request to talk is over, this shall be indicated to the network by the mobile station, an UPLINK_FREE message is broadcast on all FACCHs in the group call area.

11.3.7.2 Mute/Unmute downlink of the talker

This subclause applies to the downlink of the voice group call channel only.

The mobile station of the talking service subscriber shall, while no dispatcher is talking, be commanded by the network to mute the downlink speech to avoid non intelligible echoes. After the last of talking dispatchers has stopped talking, the network shall command the mobile station of the talking service subscriber to mute the downlink speech to avoid non intelligible echo.

Should a dispatcher wish to be heard by the talking service subscriber, he shall indicate by means of an operator defined operation (via DTMF) that he wishes to talk. This will trigger the network to command the talking service subscriber's MS to unmute the downlink of voice group call channel if muted.

The dispatcher who has finished speaking shall indicate this by means of an operator defined operation (via DTMF). This will trigger the network to command the service subscriber's MS to mute the downlink of the voice group call channel if not already muted.

A dispatcher can be a mobile subscriber or a fixed line subscriber. The dispatcher shall use out-of-band DTMF messages if it is a mobile dispatcher, or DTMF tones, if it is a fixed line dispatcher. In case of a mobile dispatcher, the out-of-band messages START_DTMF(X) and STOP_DTMF are sent via the radio interface towards the network. If the out-of-band DTMF messages are sent by a mobile dispatcher who is not controlled by the anchor MSC, the DTMF messages will be converted by the controlling MSC (e.g. visited MSC) into DTMF tones and these DTMF tones will be sent through the network to the anchor MSC. If a fixed dispatcher initiates DTMF tones, the DTMF tones will be sent through the network to the anchor MSC.

NOTE: The transport of DTMF tones within the network is detailed in figures 7b, 7c and 7d.

Both for mobile and fixed line dispatchers the anchor MSC is responsible for the detection and collection of the out-of-band or inband DTMF signals. After the evaluation of the DTMF signals, the anchor MSC shall trigger the appropriate action (i.e. send/not send the SET_PARAMETER message according to previous paragraphs).

The DTMF sequences used for signalling are implementation specific. The DTMF sequences used for indication of start speaking and stop speaking shall not be the same.

For a dispatcher originated VGCS call the network shall assume that the originating dispatcher is talking. As a consequence no start-talking indication is required.

**** Next Change ****

11.3.8 Overview of signalling

In this overview, the messages required to implement the specified concept are identified, and brief details are given of each message.

A diagrammatic representation of the voice group call message structure proposed and actions required is given in figures 2 to 7d.

****** *Text Removed for Clarity* ******

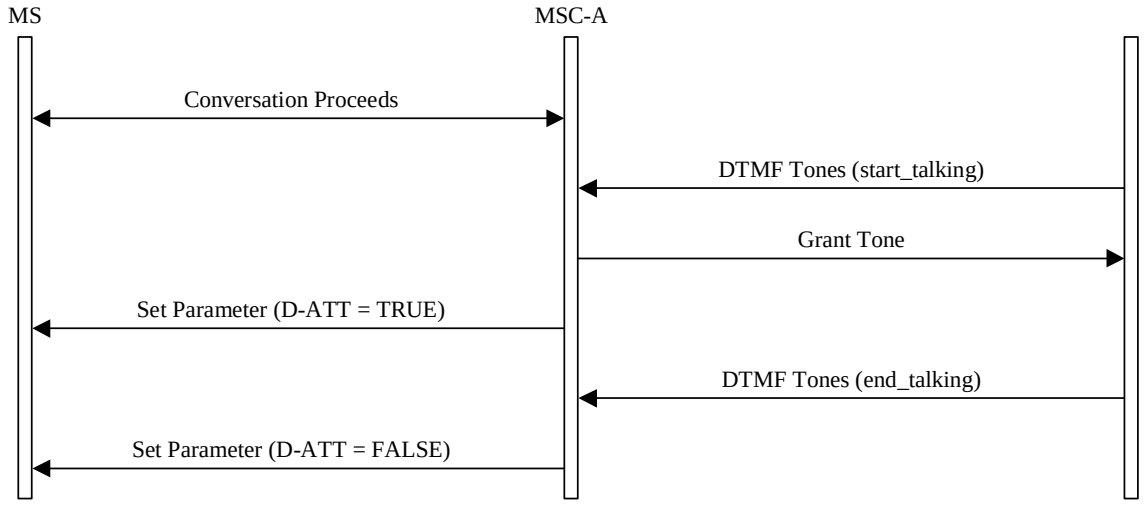


Figure 5a: Signalling information required when the talker is attached to the Anchor MSC and a dispatcher wishes to speak

Conversation proceeds: The talker is in control of the uplink (see figure 4) and is attached to the Anchor MSC. The mobile station's downlink is muted to prevent any distracting echo being heard by the mobile station user.

DTMF Tones (start_talking): This signalling sequence indicates the dispatcher's intention to start talking.

Grant Tone: The Anchor MSC plays an in-band tone to the dispatcher to indicate that the dispatcher's request is interpreted as a request to talk and that the talker will be informed.

Set Parameter (D-ATT = TRUE): The Anchor MSC sends this message to the talker to force his mobile station to unmute its downlink so that the user can hear what the dispatcher says.

NOTE 1: This message is sent when the first 'dispatcher request to talk' is received and no dispatcher is currently talking, i.e., when the downlink of the talker is muted.

DTMF Tones (end_talking): This signalling sequence indicates the dispatcher's intention to stop talking.

Set Parameter (D-ATT = FALSE): Once the dispatcher indicates that he has finished speaking, the Anchor MSC mutes the talker's downlink.

NOTE 2: This message is sent when the last talking dispatcher sends a request to stop talking, i.e., when the downlink of the talker is unmuted.

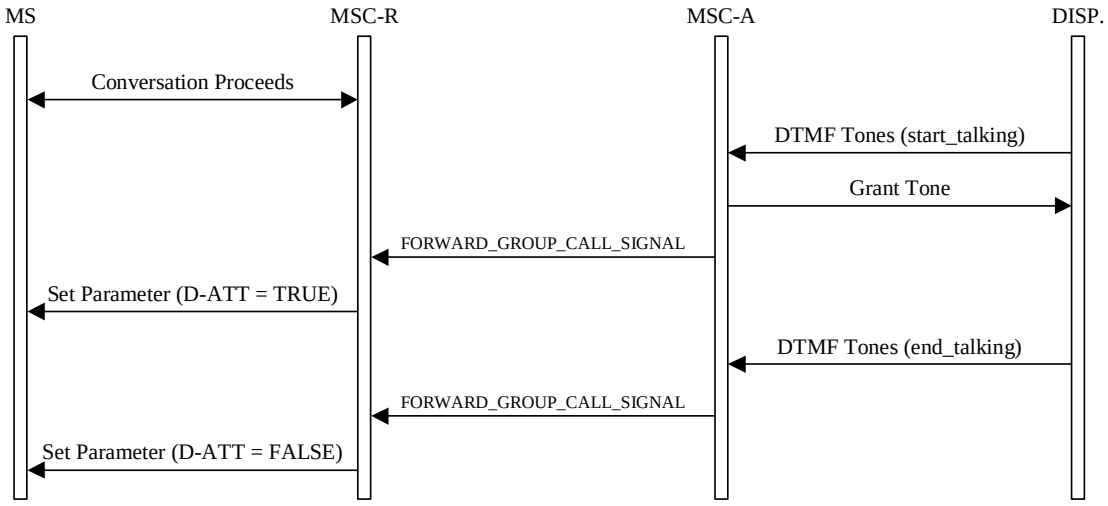


Figure 5b: Signalling information required when the talker is attached to a Relay MSC and a dispatcher wishes to speak

Conversation proceeds: The talker is in control of the uplink (see figure 4) and is attached to a Relay MSC. The mobile station's downlink is muted to prevent any distracting echo being heard by the mobile station user.

DTMF Tones (start_talking): This signalling sequence indicates the dispatcher's intention to start talking.

Grant Tone: The Anchor MSC plays an in-band tone to the dispatcher to indicate that the dispatcher's request is interpreted as a request to talk and that the talker will be informed.

FORWARD_GROUP_CALL_SIGNAL: This message is sent to the Relay MSC when anchor MSC wants to change the mute/unmute status of the talking service subscriber. In this case **stateAttributes::DA = TRUE, UA = TRUE** are set.

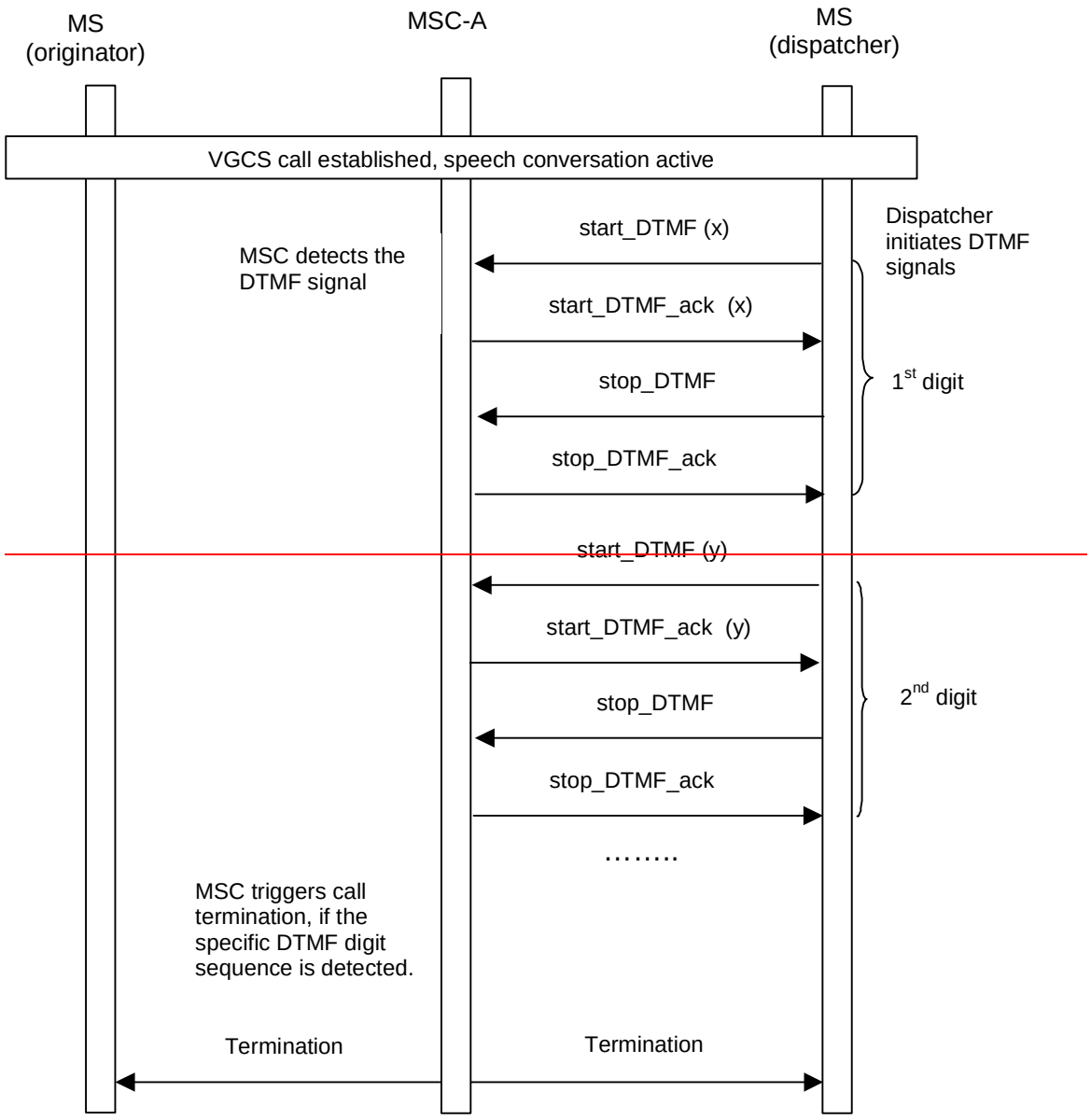
Set Parameter (D-ATT = TRUE/FALSE): The Relay MSC sends this message to the talker when a FORWARD GROUP CALL SIGNAL containing a STATE_ATTRIBUTES information element is received. The D-ATT field is set as received in STATE_ATTRIBUTES element.

DTMF Tones (end_talking): This signalling sequence indicates the dispatcher's intention to stop talking

FORWARD_GROUP_CALL_SIGNAL: This message is sent to the Relay MSC when the anchor MSC wants to change the mute/unmute status of the talking service subscriber. In this case **stateAttributes::UA = TRUE** is set.

Set Parameter (D-ATT = FALSE): Once the dispatcher indicates that he has finished speaking, the MSC mutes the talker's downlink again.

****** Next Change ******



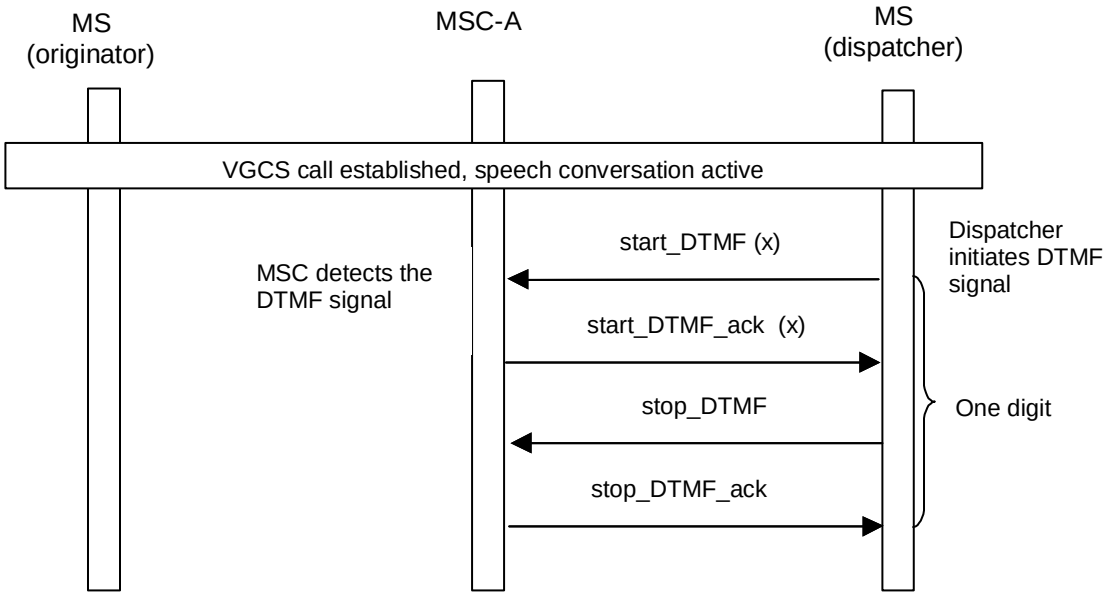
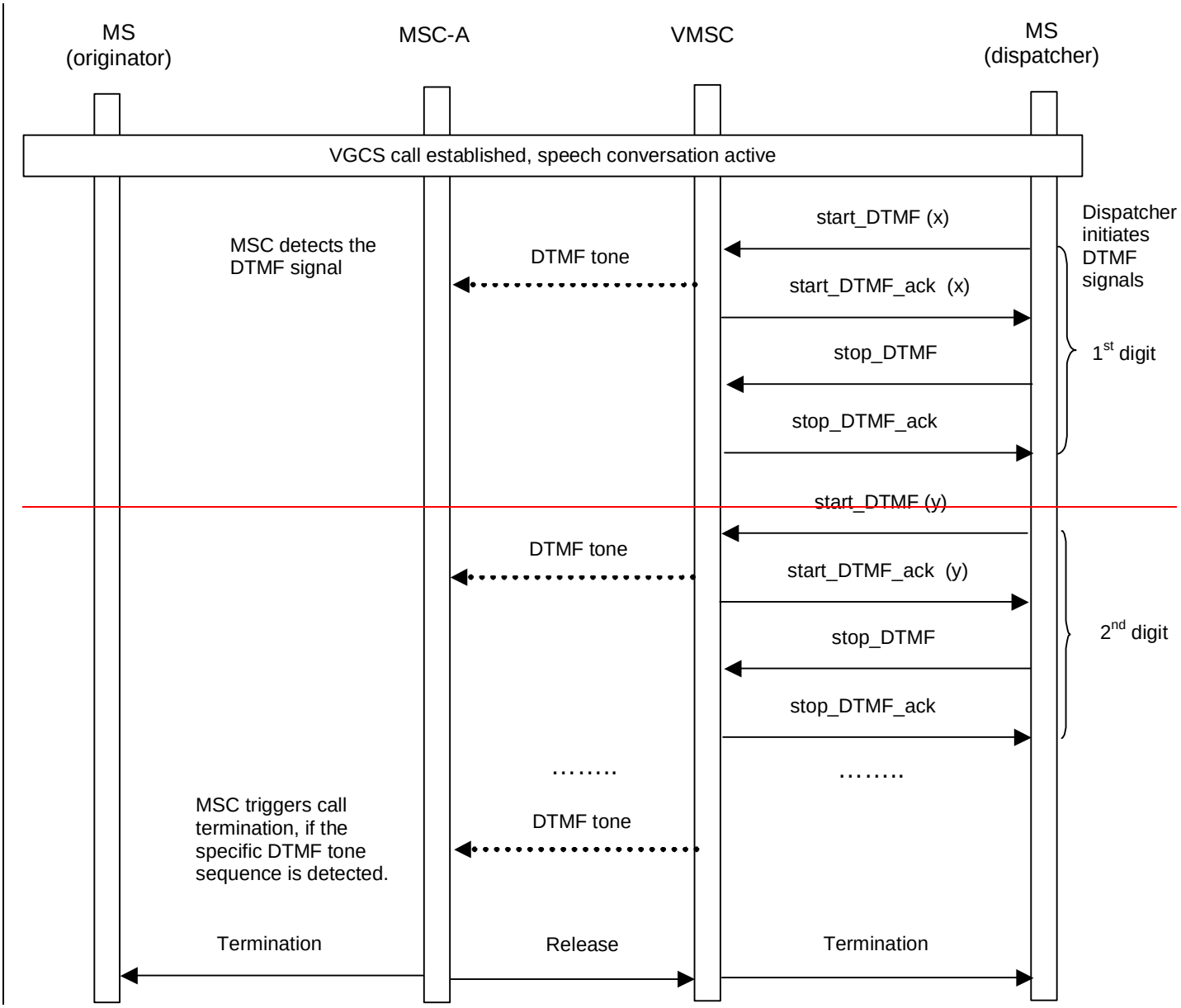


Figure 7b: Signalling required for communication of ~~group call termination~~DTMF digit entry by an entitled mobile dispatcher, if the mobile dispatcher is controlled by the~~-~~ anchor MSC of the group call.


MS (originator)
MSC-A
VMSC
MS (dispatcher)
VGCS call established, speech conversation active
start_DTMF (x)
Dispatcher initiates DTMF signals
MSC detects the DTMF signal
DTMF tone
start_DTMF_ack (x)
stop_DTMF
1st digit
stop_DTMF_ack
start_DTMF (y)
DTMF tone
start_DTMF_ack (y)
stop_DTMF
2nd digit
stop_DTMF_ack
.....
.....
MSC triggers call termination, if the specific DTMF tone sequence is detected.
DTMF tone
Termination
Release
Termination

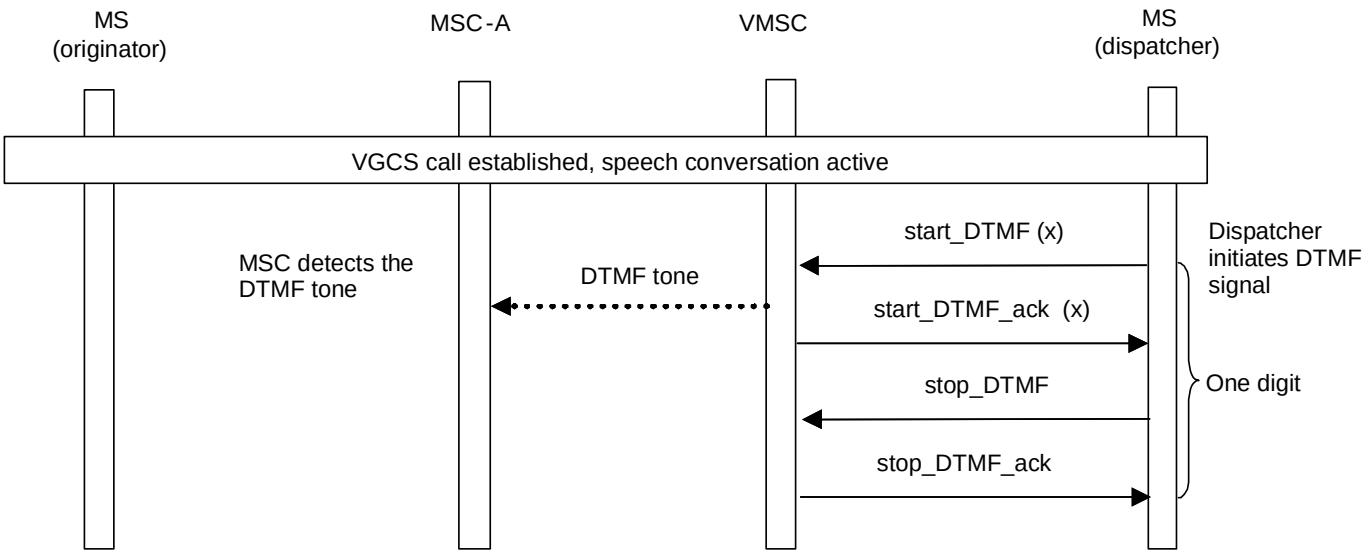
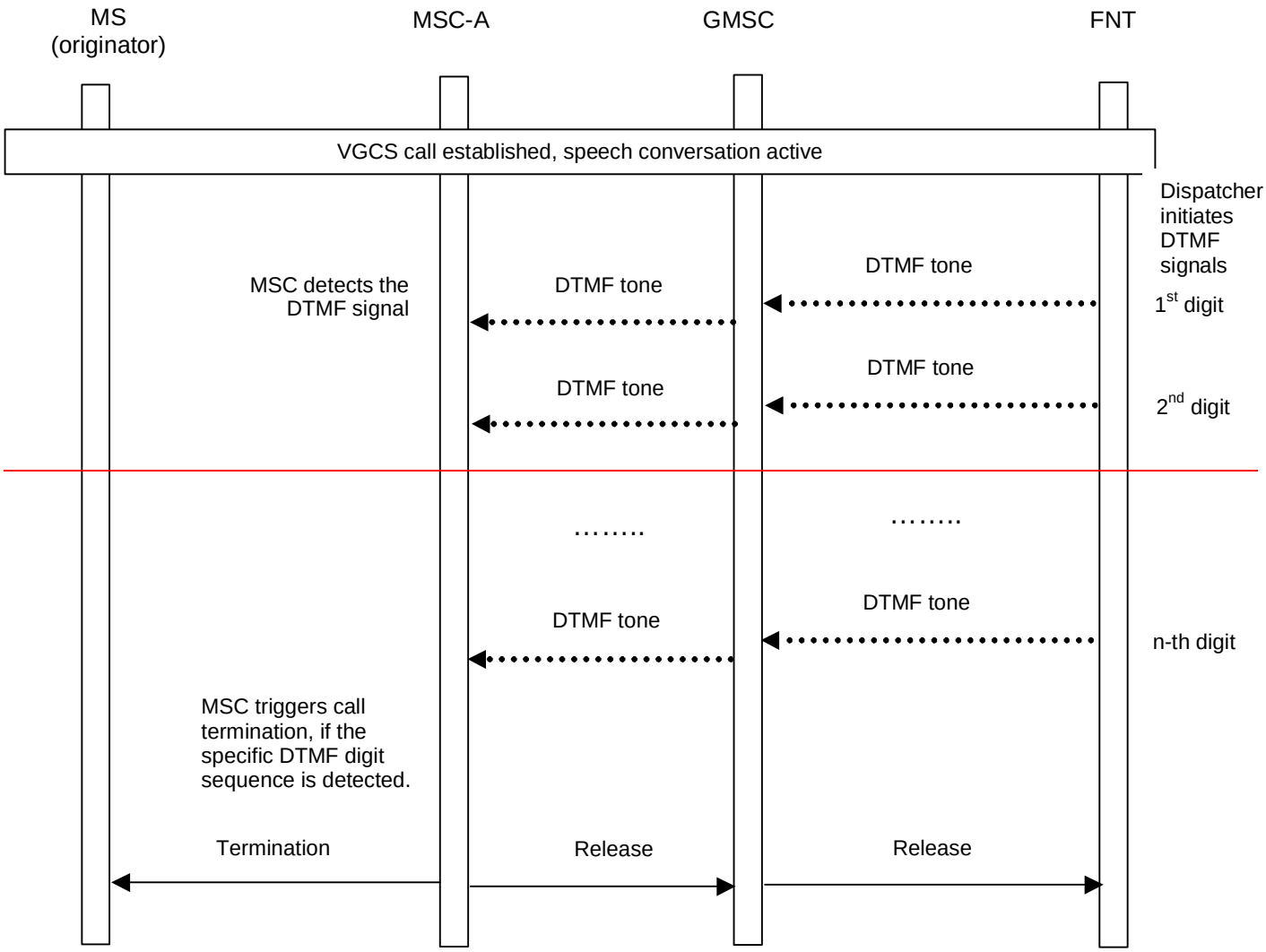

MS (originator)
MSC-A
VMSC
MS (dispatcher)
VGCS call established, speech conversation active
start_DTMF (x)
Dispatcher initiates DTMF signal
MSC detects the DTMF tone
DTMF tone
start_DTMF_ack (x)
stop_DTMF
One digit
stop_DTMF_ack

Figure 7c: Signalling required for communication of DTMF digit entry ~~group call termination~~ by an entitled mobile dispatcher, if the mobile dispatcher is controlled by a visited MSC (could be a relay MSC) of the group call.



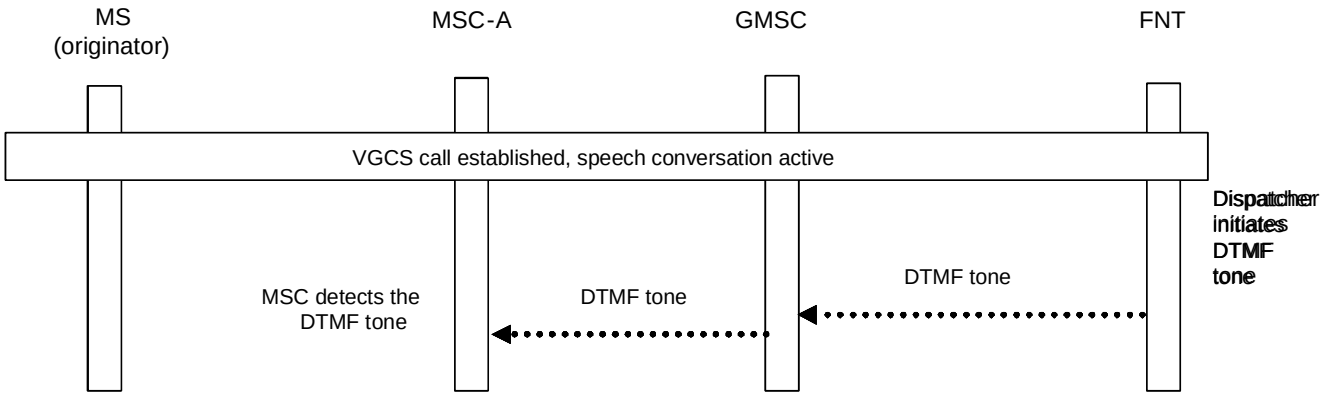


Figure 7d: Signalling required for communication of DTMF digit entry ~~group call termination~~ by an entitled fixed line dispatcher.