3GPP TSG_CN#7 **NP-000098**
ETSI SMG3 Plenary Meeting #7,
Madrid, Spain
13th – 15th March 2000

Agenda item: **5.1.3**

Source: **TSG_N WG1**

Title: **CRs to 3G Work Item Out of Band Transcoder**

Introduction:

This document contains **"3"** CRs on **Work Item OoBT,** that have been agreed by **TSG_N WG1,** and are forwarded to **TSG_N Plenary** meeting #7 for approval.

Tdoc	Spec	CR	Rev	CAT	Rel.	Old Ver	New Ver	Subject
N1-000554	24.008	CR180	1	B	R99	3.2.1	3.3.0	Introduction of UMTS AMR
N1-000550	23.009	CR008	2	B	R99	3.1.0	3.2.0	Transcoder handling in the CN at inter-system handover and relocation
N1-000422	23.108	CR003		B	R99	3.1.0	3.2.0	Updates for call procedures for UMTS, including codec negotiation

3GPP TSG-N WG1 #11
Umea, Sweden 28 Feb– 03 Mar 2000

Document N1-000554~~willbe537~~
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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

24.008	**CR**	**180r1**	Current Version:	3.2.1

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

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

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

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

Source: CN1 **Date:** 28 Feb 1999

Subject: Introduction of UMTS AMR

Work item: Out-of-Band Transcoder Control

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

Reason for change:
In R99, UMTS-AMR is the only codec type which is used in UMTS environment, it should be used as a default codec type in R99. ME and the network always assume that UMTS AMR is used/selected even if the ME and the network does~~se~~ not indicate UMTS-AMR.
(Codec negotiation mechanism will be provided in the later release when another codec type is introduced.)

Clauses affected:

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

Other comments:

help.doc

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

First Paragraph Changed

5.2.1 Mobile originating call establishment

The call control entity of the mobile station initiates establishment of a CC connection by requesting the MM sublayer to establish a mobile originating MM connection and entering the "MM connection pending" state. There are two kinds of a mobile originating call: basic call and emergency call. The request to establish an MM connection shall contain a parameter to specify whether the call is a basic or an emergency call. This information may lead to specific qualities of services to be provided by the MM sublayers. Timer T303 is started when the CM SERVICE REQUEST message is sent.

For mobile stations supporting eMLPP basic calls may optionally have an associated priority level as defined in GSM 03.67. This information may also lead to specified qualities of service to be provided by the MM sublayers.

While being in the "MM connection pending" state, the call entity of the mobile station may cancel the call prior to sending the first call control message according to the rules given in section 4.5.1.7.

Having entered the "MM connection pending" state, upon MM connection establishment, the call control entity of the mobile station sends a setup message to its peer entity. This setup message is

- a SETUP message, if the call to be established is a basic call, and
- an EMERGENCY SETUP message, if the call to be established is an emergency call.

For UMTS speech calls no UMTS speech versions shall be included in *bearer capability IE*. For a ME which supports GSM and UMTS and supports more than GSM speech version 1 then speech versions for GSM shall be included in *Bearer Capability* IE. For a UMTS established call these GSM speech versions shall be used by the network for handover to GSM. For UMTS speech calls default UMTS AMR speech version shall be assumed.

It then enters the "call initiated" state. Timer T303 is not stopped.

The setup message shall contain all the information required by the network to process the call. In particular, the SETUP message shall contain the called party address information.

If timer T303 elapses in the "MM connection pending" state, the MM connection in progress shall be aborted and the user shall be informed about the rejection of the call.

Next Paragraph Changed

5.2.1.2 Receipt of a setup message

In the "null" or "recall present" states, upon receipt of a setup message (a SETUP message or an EMERGENCY SETUP message, see section 5.2.1.1), the call control entity of the network enters the "call initiated" state. It shall then analyse the call information contained in the setup message.

i) If, following the receipt of the setup message, the call control entity of the network determines that the call information received from the mobile station is invalid (e.g. invalid number), then the network shall initiate call clearing as defined in section 5.4 with one of the following cause values:

   # 1 "unassigned (unallocated) number"

   # 3 "no route to destination"

   # 22 "number changed"

   # 28 "invalid number format (incomplete number)"

ii) If, following the receipt of the setup message, the call control entity of the network determines that a requested service is not authorized or is not available, it shall initiate call clearing in accordance with section 5.4.2 with one of the following cause values:

   # 8 "operator determined barring",

   # 57 "bearer capability not authorized",

   # 58 "bearer capability not presently available",

   # 63 "service or option not available, unspecified", or

   # 65 "bearer service not implemented".

iii) Otherwise, the call control entity of the network shall either:

   - - send a CALL PROCEEDING message to its peer entity to indicate that the call is being processed; and enter the "mobile originating call proceeding" state.

   - - or: send an ALERTING message to its peer entity to indicate that alerting has been started at the called user side; and enter the "call received" state.

   - or: send a CONNECT message to its peer entity to indicate that the call has been accepted at the called user side; and enter the "connect request" state.

   The call control entity of the network may insert bearer capability information element(s) in the CALL PROCEEDING message to select options presented by the mobile station in the Bearer Capability information element(s) of the SETUP message. The bearer capability information element(s) shall contain the same parameters as received in the SETUP except those presenting a choice. Where choices were offered, appropriate parameters indicating the results of those choices shall be included.

   The CALL_PROCEEDING message may also contain the priority of the call in the case where eMLPP is applied and where the network has assigned a different priority to the call than that requested by the user, or where the user has not requested a priority and the network has assigned a default priority. Mobile stations supporting eMLPP shall indicate this priority level to higher sublayers and store this information for the duration of the call for further action. Mobile stations not supporting eMLPP shall ignore this information element if provided in a CALL PROCEEDING message.

The call control entity of the network having entered the "mobile originating call proceeding" state, the network may initiate the assignment of a traffic channel according to section 5.2.1.9 (early assignment).

For UMTS speech calls no UMTS speech versions shall be included in *bearer capability IE;* default UMTS AMR speech version shall be assumed.

GSM speech versions received by the network in *Bearer Capability* IE. Shall be used by the network for GSM call establishment and handover to GSM. For GSM speech calls where no speech versions are included in *bearer capability IE* the network shall assume GSM speech version 1.

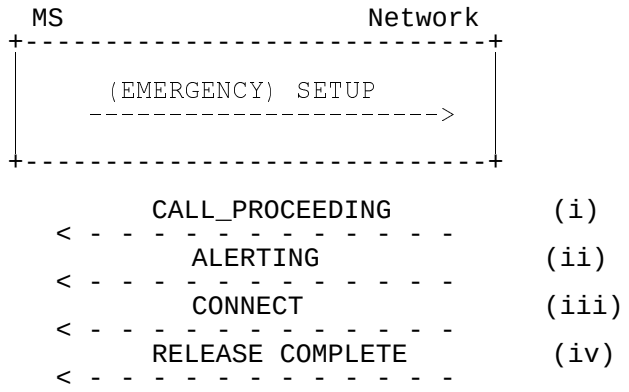


Figure 5.2/TS 24.008 Mobile originated call initiation and possible subsequent responses.

5.2.2.3.1 Response to SETUP

Having entered the "call present state" the call control entity of the mobile station shall - with the exception of the cases described below - acknowledge the SETUP message by a CALL CONFIRMED message, and enter the "mobile terminating call confirmed" state.

The call control entity of the mobile station may include in the CALL CONFIRMED message to the network one or two bearer capability information elements to the network, either preselected in the mobile station or corresponding to a service dependent directory number (see TS 29.007). The mobile station may also include one or two bearer capabilities in the CALL CONFIRMED message to define the radio channel requirements. For UMTS speech calls no UMTS speech versions shall be included in *bearer capability IE*. For a ME which supports GSM and UMTS and supports more than GSM speech version 1 then speech versions for GSM shall be included in *Bearer Capability* IE. For a UMTS established call these GSM speech versions shall be used by the network for handover to GSM. For UMTS speech calls default UMTS AMR speech version shall be assumed. In any case the rules specified in section 9.3.2.2 shall be followed.

NOTE: The possibility of alternative responses (e.g., in connection with supplementary services) is for further study.

A busy MS which satisfies the compatibility requirements indicated in the SETUP message shall respond either with a CALL CONFIRMED message if the call setup is allowed to continue or a RELEASE COMPLETE message if the call setup is not allowed to continue, both with cause #17 "user busy".

If the mobile user wishes to refuse the call, a RELEASE COMPLETE message shall be sent with the cause #21 "call rejected" .

In the cases where the mobile station responds to a SETUP message with RELEASE COMPLETE message the mobile station shall release the MM connection and enter the "null" state after sending the RELEASE COMPLETE message.

The network shall process the RELEASE COMPLETE message in accordance with section 5.4.

5.2.2.3.2 Receipt of CALL CONFIRMED and ALERTING by the network

The call control entity of the network in the "call present" state, shall, upon receipt of a CALL CONFIRMED message: stop timer T303, start timer T310 and enter the "mobile terminating call confirmed" state.

For UMTS speech calls no UMTS speech versions shall be included in *bearer capability IE;* default UMTS AMR speech version shall be assumed.

GSM speech versions received by the network in *Bearer Capability* IE. Shall be used by the network for GSM call establishment and handover to GSM. For GSM speech calls where no speech versions are included in *bearer capability IE* the network shall assume GSM speech version 1.

The call control entity of the mobile station having entered the "mobile terminating call confirmed" state, if the call is accepted at the called user side, the mobile station proceeds as described in 5.2.2.5. Otherwise, if the signal information element was present in the SETUP message user alerting is initiated at the mobile station side; if the signal information element was not present in the SETUP message, user alerting is initiated when an appropriate channel is available.

Here, initiation of user alerting means:

- the generation of an appropriate tone or indication at the mobile station; and
- sending of an ALERTING message by the call control entity of the MS to its peer entity in the network and entering the "call received" state.

The call control entity of the network in the "mobile terminated call confirmed" state shall, upon receipt of an ALERTING message: send a corresponding ALERTING indication to the calling user; stop timer T310; start timer T301, and enter the "call received" state.

5.3.4.3.2 Successful completion of in-call modification

If the destination network/mobile station receives a MODIFY message with a new mode which is already the actual one of the call the network/mobile station shall remain in the "active" state; send a MODIFY COMPLETE message with the actual mode; and shall not initiate anything else.

If the requested mode is a speech mode and the call is UMTS then default UMTS AMR speech version shall be assumed.

If the requested mode is speech and the call is GSM then if speech versions are included in *Bearer Capability IE* then the network shall use these speech versions, if none are included then GSM speech version 1 shall be assumed.

If the requested mode is not the actual one and can be supported by the destination interface it shall change the channel configuration, if required, and step on to any internal resources necessary to support the next call mode. If the requested mode is a data or facsimile mode, it shall also perform the appropriate means to take the direction of the data call into account.

After successful change of the channel configuration it shall start sending user information according to the next call mode and start interpreting received user channel information according to the next call mode; send a MODIFY COMPLETE message with the new call mode included and enter the "active" state (mobile station or network side). If the MODIFY message had contained a *reverse call setup direction* IE, the same IE shall be included in the MODIFY COMPLETE message.

In case of an alternate speech/facsimile group 3 service (refer to section 5.3.4) the old resources may still be kept reserved.

Upon receipt of the MODIFY COMPLETE message the originating side shall: initiate the alternation to those resources necessary to support the next call mode; stop timer T323; and enter the "active" state (mobile station or network side). The reaction of the originating side if it had included a reverse call setup direction IE in the MODIFY message, but the destination side did not include the IE in the MODIFY COMPLETE message is implementation dependent.

9.3.2 Call confirmed

This message is sent by the called mobile station to confirm an incoming call request.

See table 9.56/TS 24.008.

Message type: CALL CONFIRMED

Significance: local

Direction: mobile station to network

Table 9.56/TS 24.008: CALL CONFIRMED message content

IEI	Information element	Type / Reference	Presence	Format	Length
	Call control protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Transaction identifier	Transaction identifier 10.3.2	M	V	1/2
	Call confirmed message type	Message type 10.4	M	V	1
D-	Repeat Indicator	Repeat Indicator 10.5.4.22	C	TV	1
04	Bearer capability 1	Bearer capability 10.5.4.5	O	TLV	3-16
04	Bearer capability 2	Bearer capability 10.5.4.5	O	TLV	3-16
08	Cause	Cause 10.5.4.11	O	TLV	4-32
15	CC Capabilities	Call Control Capabilities 10.5.4.5a	O	TLV	3

9.3.2.1 Repeat indicator

The *repeat indicator* information element shall be included if *bearer capability 1* information element and *bearer capability 2* IE are both included in the message.

9.3.2.2 Bearer capability 1 and bearer capability 2

The *bearer capability 1* information element shall be included if and only if at least one of the following five cases holds:

- the mobile station wishes another bearer capability than that given by the *bearer capability 1* information element of the incoming SETUP message;
- the *bearer capability 1* information element is missing or not fully specified in the SETUP message;
- the *bearer capability 1* information element received in the SETUP message is accepted and the "radio channel requirement" of the mobile station is other than "full rate support only mobile station";
- the *bearer capability 1* information element received in the SETUP message indicates speech and is accepted and the mobile station supports other speech versions than GSM version 1; Except in the case of UMTS speech where default UMTS AMR speech version shall be assumed.
- the *bearer capability 1* information element received in the SETUP message included the “fixed network user rate“ parameter.

When the *bearer capability 1* information element is followed by the *bearer capability 2* IE in the SETUP, the above rules apply to both *bearer capability* 1 IE and bearer capability 2 IE. Except those cases identified in TS 27.001, if either *bearer capability* needs to be included, both shall be included.

Furthermore, both *bearer capability* information elements may be present if the mobile station wishes to reverse the order of occurrence of the *bearer capability* information elements (which is referred to in the *repeat indicator* information element, see section 10.5.4.22) in cases identified in TS 27.001.

9.3.2.3 Cause

This information element is included if the mobile station is compatible but the user is busy.

9.3.2.4 CC Capabilities

This information element may be included by the mobile station to indicate its call control capabilities.

Next Paragraph Changed

9.3.8 Emergency setup

This message is sent from the mobile station to initiate emergency call establishment.

See table 9.62/TS 24.008.

Message type: EMERGENCY SETUP

Significance: global

Direction: mobile station to network

Table 9.62/TS 24.008: EMERGENCY SETUP message content

IEI	Information element	Type / Reference	Presence	Format	Length
	Call control protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Transaction identifier	Transaction identifier 10.3.2	M	V	1/2
	Emergency setup message type	Message type 10.4	M	V	1
04	Bearer capability	Bearer capability 10.5.4.5	O	TLV	3-9

9.3.8.1 Bearer capability

If the element is not included, the network shall by default assume speech and select full rate speech version 1. If this information element is included, it shall indicate speech, the appropriate speech version(s) and have the appropriate value of radio channel requirement field.

For UMTS speech the default UMTS AMR speech version shall be assumed.

Next Paragraph Changed

9.3.17b CC-Establishment confirmed $(CCBS)$

A Network that does not support the "Network initiated MO call" option shall treat this message as a message with message type not defined for the PD.

This message is sent by the mobile station to the network to indicate the requested channel characteristics for the call which may be initiated by the mobile station .

See Table 9.67b/TS 24.008.

Message type: CC-ESTABLISHMENT CONFIRMED

Significance: local

Direction: mobile station to network

Table 9.67b/TS 24.008: CC-ESTABLISHMENT CONFIRMED message content

IEI	Information element	Type / Reference	Presence	Format	Length
	Call control protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Transaction identifier	Transaction identifier 10.3.2	M	V	1/2
	CC-Establishment confirmed message type	Message type 10.4	M	V	1
D-	Repeat Indicator	Repeat Indicator 10.5.4.22	C	TV	1
04	Bearer capability 1	Bearer capability 10.5.4.5	M	TLV	3-10
04	Bearer capability 2	Bearer capability 10.5.4.5	O	TLV	3-10
08	Cause	Cause 10.5.4.11	O	TLV	4-32

9.3.17b.1 Repeat indicator

The *repeat indicator* information element shall be included if *bearer capability 1* information element and *bearer capability 2* IE are both included in the message.

9.3.17b.2 Bearer capability 1 and bearer capability 2

If, in any subsequent SETUP message to be sent on this transaction the *bearer capability 1* information element is to be followed by the *bearer capability 2* IE, then the *bearer capability 2* IE shall be included in this message.

For UMTS speech the default UMTS AMR speech version shall be assumed.

9.3.17b.~~3~~9 Cause

This information element is included if the mobile station is compatible but the user is busy.

9.3.23.2 Setup (mobile originating call establishment)

This message is sent from the mobile station to the network to initiate a mobile originating call establishment.

See table 9.70a/TS 24.008.

Message type: SETUP

Significance: global

Direction: mobile station to network

Table 9.70a/TS 24.008: SETUP message content (mobile station to network direction)

IEI	Information element	Type / Reference	Presence	Format	Length
	Call control protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Transaction identifier	Transaction identifier 10.3.2	M	V	1/2
	Setup message type	Message type 10.4	M	V	1
D-	BC repeat indicator	Repeat indicator 10.5.4.22	C	TV	1
04	Bearer capability 1	Bearer capability 10.5.4.5	M	TLV	3-16
04	Bearer capability 2	Bearer capability 10.5.4.5	O	TLV	3-16
1C	Facility(simple recall alignment)	Facility 10.5.4.15	O	TLV	2-
5D	Calling party sub-address	Calling party subaddr. 10.5.4.10	O	TLV	2-23
5E	Called party BCD number	Called party BCD num. 10.5.4.7	M	TLV	3-43
6D	Called party sub-address	Called party subaddr. 10.5.4.8	O	TLV	2-23
D-	LLC repeat indicator	Repeat indicator 10.5.4.22	O	TV	1
7C	Low layer	Low layer comp.	O	TLV	2-18

	compatibility I	10.5.4.18			
7C	Low layer compatibility II	Low layer comp. 10.5.4.18	O	TLV	2-18
D-	HLC repeat indicator	Repeat indicator 10.5.4.22	O	TV	1
7D	High layer compatibility i	High layer comp. 10.5.4.16	O	TLV	2-5
7D	High layer compatibility ii	High layer comp. 10.5.4.16	O	TLV	2-5
7E	User-user	User-user 10.5.4.25	O	TLV	3-35
7F	SS version	SS version indicator 10.5.4.24	O	TLV	2-3
A1	CLIR suppression	CLIR suppression 10.5.4.11a	C	T	1
A2	CLIR invocation	CLIR invocation 10.5.4.11b	C	T	1
15	CC capabilities	Call Control Capabilities 10.5.4.5a	O	TLV	3
1D	Facility $(CCBS)$ (advanced recall alignment)	Facility 10.5.4.15	O	TLV	2-?
1B	Facility (recall alignment Not essential) $(CCBS)$	Facility 10.5.4.15	O	TLV	2-?

9.3.23.2.1 BC repeat indicator

The *BC repeat indicator* information element is included if and only if *bearer capability 1* IE and *bearer capability 2* IE are both present in the message.

9.3.23.2.2 Facility

The information element may be included for functional operation of supplementary services.

Three different codings of this IE exist, for further details see 04.10.

9.3.23.2.3 LLC repeat indicator

The *LLC repeat indicator* information element is included if and only if both following conditions hold:

- The *BC repeat indicator* IE is contained in the message.
- The *low layer compatibility I* IE is contained in the message.

If included, the *LLC repeat indicator* shall specify the same repeat indication as the *BC repeat indicator* IE.

9.3.23.2.4 Low layer compatibility I

The information element is included in the MS-to-network direction when the calling MS wants to pass low layer compatibility information to the called user.

9.3.23.2.5 Low layer compatibility II

Included if and only if the *LLC repeat indicator* information element is contained in the message.

9.3.23.2.6 HLC repeat indicator

The *HLC repeat indicator* information element is included if and only if both following conditions hold:

- The *BC repeat indicator* IE is contained in the message.
- The *high layer compatibility i* IE is contained in the message.

If included, the *HLC repeat indicator* shall specify the same repeat indication as the *BC repeat indicator* IE.

9.3.23.2.7 High layer compatibility i

The information element is included when the calling MS wants to pass high layer compatibility information to the called user.

9.3.23.2.8 High layer compatibility ii

Included if and only if the *HLC repeat indicator* information element is contained in the message.

9.3.23.2.9 User-user

The information element is included in the calling mobile station to network direction when the calling mobile station wants to pass user information to the called remote user.

9.3.23.2.10 SS version

This information element shall not be included if the *facility* information element is not present in this message.

This information element shall be included or excluded as defined in TS 24.010. This information element should not be transmitted unless explicitly required by TS 24.010.

9.3.23.2.11 CLIR suppression

The information element may be included by the MS (see TS 24.081). If this information element is included the *CLIR invocation* IE shall not be included.

9.3.23.2.12 CLIR invocation

The information element may be included by the MS (see TS 24.081). If this information element is included the *CLIR suppression* IE shall not be included.

9.3.23.2.13 CC Capabilities

This information element may be included by the mobile station to indicate its call control capabilities.

Next Paragraph Changed

10.5.4.5 Bearer capability

The purpose of the bearer capability information element is to describe a bearer service. The use of the bearer capability information element in relation to compatibility checking is described in annex B.

The bearer capability information element is coded as shown in figure 10.5.88/TS 24.008 and tables 10.5.102/TS 24.008 to 10.5.115/TS 24.008.

The bearer capability is a type 4 information element with a minimum length of 3 octets and a maximum length of 16 octets.

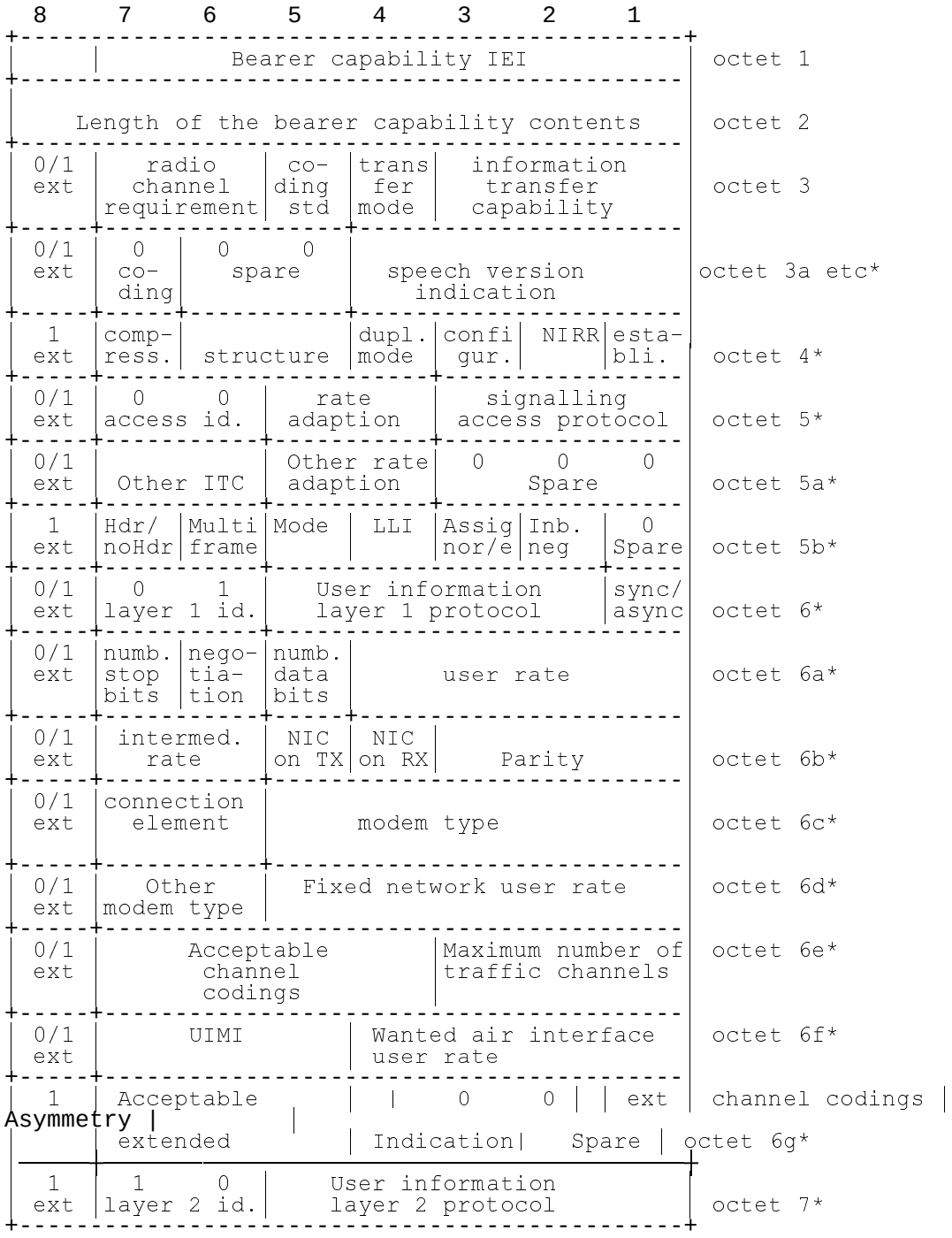


Figure 10.5.88/TS 24.008 Bearer capability information element

NOTEs: The coding of the octets of the bearer capability information element is not conforming to ITU Q.931.

An MS shall encode the Bearer Capability infomation element according to GSM call control requirements also if it is requesting for a UMTS service.

Table 10.5.102/TS 24.008: Bearer capability information element

Radio channel requirement (octet 3), network to MS direction
In GSM, i.e. not applicable for UMTS data services.

Bits 6 and 7 are spare bits. The sending side (i.e. the network) shall set bit 7 to value 0 and bit 6 to value 1.

Radio channel requirement (octet 3) MS to network direction

When information transfer capability (octet 3) indicates other values than speech:
Bits
7 6
0 0 reserved
0 1 full rate support only MS
1 0 dual rate support MS/half rate preferred
1 1 dual rate support MS/full rate preferred

When information transfer capability (octet 3) indicates the value speech and no speech version indication is present in octet 3a etc.:
Bits
7 6
0 0 reserved
0 1 full rate support only MS/fullrate speech version 1 supported
1 0 dual rate support MS/half rate speech version 1 preferred, full rate speech version 1 also supported

1 1 dual rate support MS/full rate speech version 1 preferred, half rate speech version 1 also supported

When information transfer capability (octet 3) indicates the value speech and speech version indication(s) is(are) present in octet 3a etc.:
Bits
7 6
0 0 reserved
0 1 the mobile station supports at least full rate speech version 1 but does not support half rate speech version 1. The complete voice codec preference is specified in octet(s) 3a etc.

1 0 The mobile station supports at least full rate speech version 1 and half rate speech version 1. The mobile station has a greater preference for half rate speech version 1 than for full rate speech version 1. The complete voice codec preference is specified in octet(s) 3a etc.

1 1 The mobile station supports at least full rate speech version 1 and half rate speech version 1. The mobile station has a greater preference for full rate speech version 1 than for half rate speech version 1. The complete voice codec preference is specified in octet(s) 3a etc.

Coding standard (octet 3)
Bit
5
0 GSM standardized coding as described below
1 reserved

(continued...)

Table 10.5.102/TS 24.008: Bearer capability information element (continued)

Transfer mode (octet 3)
Bit
4
0 circuit mode
1 packet mode

Information transfer capability (octet 3)
Bits
3 2 1
0 0 0 speech
0 0 1 unrestricted digital information
0 1 0 3.1 kHz audio, ex PLMN
0 1 1 facsimile group 3
1 0 1 Other ITC (See Octet 5a)
1 1 1 reserved, to be used in the network.
The meaning is: alternate speech/facsimile group 3 - starting with speech.

All other values are reserved

Table 10.5.103/TS 24.008 Bearer capability information element

Octet(s) 3a etc. MS to network direction
Octet(s) 3a etc. shall only be used to convey speech coding information belonging to a GSM Radio Access. When included for a UMTS call establishment they shall be used for handover to a GSM Radio Acess.

Coding

Bit
7
0 octet used for extension of information transfer capability
1 octet used for other extension of octet 3

When information transfer capability (octet 3) indicates speech and coding (bit 7 in octet 3a etc.) is coded as 0, bits 1 through 6 are coded:

Bits 5 and 6 are spare.

Speech version indication (octet(s) 3a etc.)
Bits
4 3 2 1
0 0 0 0 GSM full rate speech version 1
0 0 1 0 GSM full rate speech version 2
0 1 0 0 GSM full rate speech version 3
0 0 0 1 GSM half rate speech version 1
0 1 0 1 GSM half rate speech version 3

All other values have the meaning "speech version tbd" and shall be ignored when received.

If octet 3 is extended with speech version indication(s) (octets 3a etc.), all speech versions supported shall be indicated and be included in order of preference (the first octet (3a) has the highest preference and so on).

If information transfer capability (octet 3) indicates speech and coding (bit 7 in octet 3a etc.) is coded as 1, or the information transfer capability does not indicate speech, then the extension octet shall be ignored.

Octet(s) 3a etc. network to MS direction

The octet(s) 3a etc. shall be ignored by the MS.

3GPP TSG-CN 1 meeting #11
Umeå, Sweden, 28 Feb – 3 Mar 2000

Document N1-000550438
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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

23.009	CR	008r2	Current Version:	3.1.0

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

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

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

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

Source: CN1 **Date:** 2000-02-27

Subject: Transcoder handling in the CN at inter-system handover and relocation

Work item: Out of Band Transcoder

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

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

Reason for change: Updates to 23.009 in order to introduce transcoder handling.

Clauses affected: 4.3.1, 4.4.1, 8.1.1, 8.1.3.1, 8.2.1, 8.2.3.1, 8.3.1, 8.3.3.1, 13.3, 13.4

Other specs affected:

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

Other comments: For readability reasons the figures have been left out of this CR. There are no changes to the figures.

help.doc

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

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] ITU-T Recommendation Q.118: "Special release arrangements".

[2] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2a] TS 21.905: "3G Vocabulary"

[3] GSM 03.68: "Digital cellular telecommunications system (Phase 2+); Voice Group Call Service (VGCS) - Stage 2."

[4] GSM 05.08: "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".

[5] GSM 08.08: "Digital cellular telecommunications system (Phase 2+); Mobile Switching Centre - Base Station System (MSC - BSS) interface; Layer 3 specification".

[6] GSM 08.58: "Digital cellular telecommunications system (Phase 2+); Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Layer 3 specification".

[7] GSM 09.08: "Digital cellular telecommunications system (Phase 2+); Application of the Base Station System Application Part (BSSAP) on the E-interface".

[8] TS 29.010: " Information element mapping between Mobile Station - Base Station System (MS-BSS) and Base Station System - Mobile-services Switching Centre (BSS - MSC); Signalling procedures and the Mobile Application Part (MAP)".

[9] TS 22.129: "Handover Requirements between UMTS and GSM or other Radio Systems".

[10] TS 24.008: "Mobile radio interface layer 3 specification".

[11] TS 25.413: "UTRAN Iu interface RANAP signalling".

[12] TS 29.002: "Mobile Application Part (MAP) specification".

[13] TS 25.303: “Interlayer procedures in Connected Mode”

[14] TS 25.331: “RRC Protocol Specification”

[15] ITU-T G.711: “Pulse code modulation (PCM) of voice frequencies”

Next Change

4.3.1 Role of 3G_MSC-A

In the Intra-3G_MSC handover/relocation case, the 3G_MSC-A (simply termed 3G_MSC) controls the call, the mobility management and the radio resources before, during and after an Intra-3G_MSC handover/relocation. When RANAP procedures have to be performed, they are initiated and driven by 3G_MSC-A.

In the case of an inter-system, intra-MSC handover of a speech call, 3G_MSC-A controls the transcoder in the core network. The 3G_MSC-A determines if a transcoder is required to be inserted or released in the CN.

~~3G_MSC-A receives the supported codec types in DTAP messages at call establishment, with an indication for which radio access system the codec types are applicable. See TS 24.008.~~

In case of ATM network between 3G_MSC-A and 3G_MSC-B, 3G_MSC-A retains control of transcoder. In the case of TDM between 3G_MSC-A and 3G_MSC-B, 3G_MSC-A assumes ~~PCM/~~G.711 [15] coding on the TDM E-interface. In case of UMTS to GSM handover, 3G_MSC-A assumes ~~PCM/~~G.711 [15] coding on the ATM E-interface.

In the Inter-3G_MSC handover/relocation case, 3G_MSC-A is the 3G_MSC that controls the call and the mobility management of the UE/MS during the call, before, during and after a basic or subsequent handover/relocation. When RANAP procedures related to dedicated resources have to be performed towards the UE/MS, they are initiated and driven by 3G_MSC-A. The 3G_MSC-A - 3G_MSC-B interface works as a 3G_MSC - BSS interface for the RANAP procedures, sent as BSSMAP procedures. The Direct Transfer signalling is relayed transparently by 3G_MSC-B between 3G_MSC-A and the UE/MS.

During a basic handover/relocation, 3G_MSC-A initiates and controls all the handover/relocation procedure, from its initiation (reception of Relocation Required from RNS-A on Iu-interface) until its completion (reception of Relocation Complete from 3G_MSC-B on E-interface).

During a subsequent handover/relocation back to 3G_MSC-A, 3G_MSC-A acts as an RNS towards 3G_MSC-B, which controls the handover/relocation procedure until the termination in 3G_MSC-A of the handover radio resources allocation (sending of the Relocation Request Acknowledge to 3G_MSC-B from 3G_MSC-A). Then all handover/relocation related messages shall terminate at 3G_MSC-A (e.g. Relocation Detect/Complete from RNS-B, Relocation Failure from RNS-A).

During a subsequent handover/relocation to a third 3G_MSC, 3G_MSC-A works towards 3G_MSC-B' as described above in the basic handover/relocation paragraph and towards 3G_MSC-B as described above in subsequent handover/relocation paragraph.

In the Inter-System, inter-3G_MSC handover case, 3G_MSC-A is the 3G_MSC which controls the call and the mobility management of the UE/MS during the call, before, during and after a basic or subsequent inter-system handover. When BSSAP procedures related to dedicated resources have to be performed towards the UE/MS, they are initiated and driven by 3G_MSC-A. The 3G_MSC-A – MSC-B interface works as a 3G_MSC – BSS interface for a subset of BSSMAP procedures. These BSSMAP procedures described in GSM 09-08 are those related to dedicated resources. The DTAP signalling is relayed transparently by MSC-B between 3G_MSC-A and the UE/MS.

During a basic inter-system handover, 3G_MSC-A initiates and controls all the handover procedure, from its initiation (reception of Relocation Required from RNS-A on Iu-interface) until its completion (reception of Handover Complete from MSC-B on E-interface).

During a subsequent inter-system handover back to 3G_MSC-A, 3G_MSC-A acts as a BSS towards MSC-B, which controls the handover procedure until the termination in 3G_MSC-A of the handover radio resources allocation (sending of the Handover Request Acknowledge to MSC-B from 3G_MSC-A). Then all handover related messages shall terminate at 3G_MSC-A (e.g. Handover Detect/Complete from BSS-B, Relocation Failure from RNS-A).

During a subsequent inter-system handover to a third 3G_MSC, 3G_MSC-A works towards MSC-B' as described above in the basic inter-system handover paragraph and towards 3G_MSC-B as described above in subsequent inter-system handover paragraph.

Next Change

4.4.1 Role of 3G_MSC-B

In the Intra-3G_MSC handover/relocation case, the 3G_MSC-B keeps the control of the whole Intra-3G_MSC handover/relocation procedure.

In case of TDM networks, the role of 3G_MSC-B is also to provide transcoder-resources ~~as required by 3G_MSC-A~~. In the case of ATM, 3G_MSC-B has no transcoder handling.

In the Inter-3G_MSC handover/relocation case, the role of 3G_MSC-B (3G_MSC-B') is only to provide radio resources control within its area. This means that 3G_MSC-B keeps control of the radio resources connection and release towards RNS-B. 3G_MSC-B will do some processing on the BSSMAP information received on the E-interface or the RANAP information received on the Iu-interface whereas it will relay the Direct Transfer information transparently between Iu-interface and E-interface. 3G_MSC-A initiates and drives RANAP procedures as BSSMAP procedures towards 3G_MSC-B, while 3G_MSC-B controls them towards its RNSs to the extent that 3G_MSC-B is responsible for the connections of its RNSs. The release of the dedicated resources between 3G_MSC-B and RNS-B is under the responsibility of 3G_MSC-B and RNS-B, and is not directly controlled by 3G_MSC-A. When clearing is to be performed due to information received from RNS-B, 3G_MSC-B shall transfer this clearing indication to 3G_MSC-A, to clear its connection with RNS-B, to terminate the dialogue with 3G_MSC-A through the E-interface, and to release its circuit connection with 3G_MSC-A, if any. In the same way, the release of the connection to its RNS-B, is initiated by 3G_MSC-B, when the dialogue with 3G_MSC-A ends normally and a release is received from the circuit connection with 3G_MSC-A, if any, or when the dialogue with the 3G_MSC-A ends abnormally.

When a release is received by 3G_MSC-B for the circuit connection with 3G_MSC-A then 3G_MSC-B shall release the circuit connection.

In the Inter-system Inter-3G_MSC handover case, the role of 3G_MSC-B (3G_MSC-B') is only to provide radio resources control within its area. This means that 3G_MSC-B keeps control of the radio resources connection and release towards RNS-B. 3G_MSC-B will do some processing on the BSSMAP information received on the E-interface or the RANAP information received on the Iu-interface whereas it will relay the Direct Transfer information transparently between Iu-interface and E-interface. MSC-A initiates and drives a subset of BSSMAP procedures towards 3G_MSC-B, while 3G_MSC-B controls them towards its RNSs to the extent that 3G_MSC-B is responsible for the connections of its RNSs. The release of the dedicated resources between 3G_MSC-B and RNS-B is under the responsibility of 3G_MSC-B and RNS-B, and is not directly controlled by MSC-A. When clearing is to be performed due to information received from RNS-B, 3G_MSC-B shall transfer this clearing indication to MSC-A, to clear its connection with RNS-B, to terminate the dialogue with MSC-A through the E-interface, and to release its circuit connection with MSC-A, if any. In the same way, the release of the connection to its RNS-B, is initiated by 3G_MSC-B, when the dialogue with MSC-A ends normally and a release is received from the circuit connection with MSC-A, if any, or when the dialogue with the MSC-A ends abnormally.

When a release is received by 3G_MSC-B for the circuit connection with MSC-A then 3G_MSC-B shall release the circuit connection.

Next Change

8.1.1 Basic Handover procedure requiring a circuit connection between 3G_MSC -A and MSC-B

The procedure used for successful Inter-3G_MSC UMTS to GSM Handover is shown in figure 18. Initiation of the UMTS to GSM handover procedure is described in section 5. The procedure described in this section makes use of messages from the Technical Specification GSM 08.08 and of the transport mechanism from the Mobile Application Part (MAP) (Technical Specification GSM 29.002). After an Inter-3G_MSC relocation/handover, Intra-3G_MSC UMTS to GSM handover may occur on 3G_MSC -B, this handover will follow the procedures specified in a previous section.

The UMTS to GSM handover is initiated as described in section 6.2.1. (This is represented by Iu-RELOCATION-REQUIRED in figure 18). Upon receipt of the Iu-RELOCATION-REQUIRED from RNS-A, 3G_MSC-A shall send a MAP-PREPARE-HANDOVER request to MSC-B including a complete A-HO-REQUEST message. (NOTE: 3G_MSC-A shall not send further MAP-PREPARE-HANDOVER requests while a MAP-PREPARE-HANDOVER response is pending or before any timeouts). The MAP-PREPARE-HANDOVER request shall carry in the A-HO-REQUEST all information needed by MSC-B for allocating a radio channel, see Technical Specification GSM 08.08.

For compatibility reasons, the MAP-PREPARE-HANDOVER request will also identify the cell to which the call is to be handed over. MSC-B will return the MAP-PREPARE-HANDOVER response after having retrieved a Handover Number from its associated VLR (exchange of the messages MAP-allocate-handover-number request and MAP-send-handover-report request). The Handover Number shall be used for routing the connection of the call from 3G_MSC-A to MSC-B. If a traffic channel is available in MSC-B the MAP-PREPARE-HANDOVER response, sent to 3G_MSC-A will contain the complete A-HO-REQUEST-ACKNOWLEDGE message received from BSS-B, containing the radio resources definition to be sent by RNS-A to the UE/MS and possible extra BSSMAP information, amended by MSC-B due to the possible interworking between the BSSMAP protocol carried on the E-interface and the BSSMAP protocol used on the A-interface. If the traffic channel allocation is queued by BSS-B, the A-QUEUING-INDICATION may optionally be sent back to 3G_MSC-A. The further traffic channel allocation result (A-HO-REQUEST-ACK or A-HO-FAILURE) will be transferred to 3G_MSC-A using the MAP-PROCESS-ACCESS-SIGNALLING request. If the traffic channel allocation is not possible, the MAP-PREPARE-HANDOVER response containing an A-HO-FAILURE will be sent to 3G_MSC-A. MSC-B will do the same if a fault is detected on the identity of the cell where the call has to be handed over. MSC-B simply reports the events related to the dialogue. It is up to 3G_MSC-A to decide the action to perform if it receives negative responses or the operation fails due to the expiry of the MAP-PREPARE-HANDOVER timer.

If an error related to the TCAP dialogue or to the MAP-PREPARE-HANDOVER request is returned from MSC-B, this will be indicated to 3G_MSC-A and 3G_MSC-A will terminate the handover attempt. 3G_MSC-A rejects the handover attempt towards RNS-A. The existing connection to the UE/MS shall not be cleared.

When the A-HO-REQUEST-ACKNOWLEDGE has been received, 3G_MSC-A shall establish a circuit between 3G_MSC-A and MSC-B by signalling procedures supported by the network. In figure 18 this is illustrated by the messages IAM (Initial Address Message) and ACM (Address Complete Message) of Signalling System no 7. MSC-B awaits the capturing of the UE/MS (section 6.2.1) on the radio path when the ACM is sent and 3G_MSC-A initiates the UMTS to GSM handover execution when ACM is received (illustrated by the Iu-RELOCATION-COMMAND and described in the section 6.2.1). 3G_MSC-A inserts or removes a transcoder in the path to the other party, depending on the type of connection. As handover to GSM means that a transcoder is inserted in the BSS-B then ~~PCM/~~G.711 [15] is assumed on the E-interface. If the original connection is transcoder free then 3G_MSC-A shall insert a transcoder. If 3G_MSC-A had a transcoder in the original path then it shall remove it.

MSC-B transfers to 3G_MSC-A the acknowledgement received from the correct UE/MS (A-HO-DETECT/A-HO-COMPLETE). The A-HO-DETECT, if received, is transferred to 3G_MSC-A using the MAP-PROCESS-ACCESS-SIGNALLING request. The A-HO-COMPLETE, when received from the correct UE/MS, is included in the MAP-SEND-END-SIGNAL request and sent back to 3G_MSC-A. The circuit is through connected in 3G_MSC-A when the A-HO-DETECT or the A-HO-COMPLETE is received from MSC-B. The old radio channel is released when the A-HO-COMPLETE message is received from MSC-B. The sending of the MAP-SEND-END-SIGNAL request starts the MAP supervision timer for the MAP dialogue between 3G_MSC-A and MSC-B. When the MAP-SEND-END-SIGNAL request including the A-HO-COMPLETE message is received in 3G_MSC-A, the resources in RNS-A shall be cleared.

In order not to conflict with the PSTN/ISDN signalling system(s) used between 3G_MSC-A and MSC-B, MSC-B must generate an answer signal when A-HO-DETECT/COMPLETE is received.

MSC-B shall release the Handover Number when the circuit between 3G_MSC-A and MSC-B has been established.

If the circuit between 3G_MSC-A and MSC-B cannot be established, (e.g. an unsuccessful backward message is received instead of ACM), 3G_MSC-A terminates the inter-3G_MSC UMTS to GSM handover attempt by sending an appropriate MAP message, for example an ABORT.

3G_MSC-A shall retain overall call control until the call is cleared by the fixed subscriber or the UE/MS and there is no further call control functions to be performed (e.g. servicing waiting calls, echo cancellers).

When 3G_MSC-A clears the call to the UE/MS it also clears the call control functions in 3G_MSC-A and sends the MAP-SEND-END-SIGNAL response to release the MAP resources in MSC-B.

3G_MSC-A may terminate the procedure at any time by sending an appropriate MAP message to MSC-B. If establishment of the circuit between 3G_MSC-A and MSC-B has been initiated, the circuit must also be cleared.

The UMTS to GSM handover will be aborted by 3G_MSC-A if it detects clearing or interruption of the radio path before the call has been established on MSC-B.

Next Change

8.1.3.1 Description of subsequent UMTS to GSM handover procedure i): 3G_MSC-B to MSC-A

The procedure for successful UMTS to GSM handover from MSC-B back to 3G_MSC-A is shown in figure 20.

The procedure is as follows:

3G_MSC-B sends the MAP-PREPARE-SUBSEQUENT-HANDOVER request to MSC-A indicating the new MSC number (MSC-A number), indicating also the identity of the cell where the call has to be handed over and including a complete A-HO-REQUEST message. (NOTE: 3G_MSC-B shall not send further MAP-PREPARE-SUBSEQUENT-HANDOVER requests while a handover attempt is pending or before any timeouts). Since MSC-A is the call controlling MSC, this MSC needs no Handover Number for routing purposes; MSC-A can immediately initiate the search for a free radio channel.

When a radio channel can be assigned, MSC-A shall return in the MAP-PREPARE-SUBSEQUENT-HANDOVER response the complete A-HO-REQUEST-ACKNOWLEDGE message received from the BSS-B and possible extra BSSMAP information, amended by MSC-A due to the possible interworking between the BSSMAP protocol carried on the E-interface and the BSSMAP protocol used on the A-interface. If the traffic channel allocation is queued by BSS-B, the A-QUEUING-INDICATION may optionally be sent back to 3G_MSC-B. The further traffic channel allocation result (A-HO-REQUEST-ACK or A-HO-FAILURE) will be transferred to 3G_MSC-B using the MAP-FORWARD-ACCESS-SIGNALLING request. If a radio channel cannot be assigned or if a fault is detected on the target cell identity, or the target cell identity in the A-HO-REQUEST is not consistent with the target MSC number, the MAP-PREPARE-SUBSEQUENT-HANDOVER response containing an A-HO-FAILURE message shall be given to 3G_MSC-B, in addition 3G_MSC-B shall maintain the connection with the UE/MS.

If the procedure in MSC-A is successful then 3G_MSC-B can request the UE/MS to retune to the new BSS-B on MSC-A. This is illustrated in figure 20 by the Iu-RELOCATION-COMMAND message. The operation is successfully completed when MSC-A receives the A-HO-COMPLETE message.

After UMTS to GSM handover MSC-A shall release the circuit to 3G_MSC-B.

MSC-A must also terminate the MAP procedure for the basic UMTS to GSM handover between MSC-A and 3G_MSC-B by sending an appropriate MAP message. 3G_MSC-B will clear the resources in RNS-A when the MAP-SEND-END-SIGNAL response is received.

Next Change

8.2.1 Basic Handover procedure requiring a circuit connection between MSC-A and 3G_MSC-B

The procedure used for successful Inter-3G_MSC Handover from GSM to UMTS is shown in figure 24. Initiation of the GSM to UMTS handover procedure is described in section 5. The procedure described in this section makes use of messages from the Technical Specification GSM 08.08 [5], TS 25.413 [11] and of the transport mechanism from the Mobile Application Part (MAP) (TS 29.002 [12]). After an Inter-3G_MSC handover further Intra-3G_MSC handovers may occur on 3G_MSC-B, these handovers will follow the procedures specified in the previous sections.

The GSM to UMTS handover is initiated as described in section 6.2.2. (This is represented by A-HO-REQUIRED in figure 24). Upon receipt of the A-HO-REQUIRED from BSS-A, MSC-A shall send a MAP-PREPARE-HANDOVER request to 3G_MSC-B including a complete A-HO-REQUEST message (NOTE: MSC-A shall not send further MAP-PREPARE-HANDOVER requests while a MAP-PREPARE-HANDOVER response is pending or before any timeouts). The MAP-PREPARE-HANDOVER request shall carry in the A-HO-REQUEST all information needed by 3G_MSC-B for allocating radio resources in RNS-B, see Technical Specification GSM 08.08 [5].

For compatibility reasons, the MAP-PREPARE-HANDOVER request will also identify the cell to which the call is to be handed over. 3G_MSC-B will return the MAP-PREPARE-HANDOVER response after having retrieved a Handover Number from its associated VLR (exchange of the messages MAP-allocate-handover-number request and MAP-send-handover-report request). The Handover Number shall be used for routing the connection of the call from MSC-A to 3G_MSC-B. 3G_MSC-B inserts a transcoder as G711 is assumed between 2G MSC and 3G_MSC-B. ~~according to the information received from MSC-A. If needed, 3G_MSC-B then configures the RAB assignment parameters for the IU-RELOCATION-REQUEST message according to the chosen codec type and modes.~~ If radio resources are available in RNS-B the MAP-PREPARE-HANDOVER response, sent to MSC-A from 3G_MSC-B will contain the complete A-HO-REQUEST-ACK message generated from the Iu-RELOCATION-REQUEST-ACK received from RNS-B, containing the radio resources definition to be sent by BSS-A to the UE/MS. If the radio resource allocation is queued by RNS-B, the A-QUEUING-INDICATION may optionally be sent back to MSC-A. The further radio resource allocation result (A-HO-REQUEST-ACK generated from Iu-RELOCATION-REQUEST-ACK received from RNS-B or A-HO-FAILURE generated from RELOCATION FAILURE received from RNS-B) will be transferred to MSC-A using the MAP-PROCESS-ACCESS-SIGNALLING request. If the radio resource allocation is not possible, the MAP-PREPARE-HANDOVER response containing an A-HO-FAILURE will be sent to MSC-A. 3G_MSC-B will do the same if a fault is detected on the identity of the cell where the call has to be handed over. 3G_MSC-B simply reports the events related to the dialogue. It is up to MSC-A to decide the action to perform if it receives negative responses or the operation fails due to the expiry of the MAP-PREPARE-HANDOVER timer.

If an error related to the TCAP dialogue or to the MAP-PREPARE-HANDOVER request is returned from 3G_MSC-B, this will be indicated to MSC-A and MSC-A will terminate the handover attempt. MSC-A shall reject the handover attempt towards BSS-A. The existing connection to the UE/MS shall not be cleared.

When the A-HO-REQUEST-ACK has been received, MSC-A shall establish a circuit between MSC-A and 3G_MSC-B by signalling procedures supported by the network. In figure 24 this is illustrated by the messages IAM (Initial Address Message) and ACM (Address Complete Message) of Signalling System no 7. 3G_MSC-B awaits the capturing of the UE/MS (section 6.2.2) on the radio path when the ACM is sent and MSC-A initiates the handover execution when ACM is received (illustrated by the A-HO-COMMAND and described in the section 6.2.2). ~~Prior to sending the A-HO-COMMAND to BSS-A, MSC-A shall send Selected Codec (received in MAP procedure) in DTAP message Selected Codec to UE/MS.~~

3G_MSC-B transfers to MSC-A the acknowledgement received from the correct UE/MS (A-HO-DETECT/A-HO-COMPLETE). The Iu-RELOCATION-DETECT, if received, is converted to A-HO-DETECT and transferred to MSC-A using the MAP-PROCESS-ACCESS-SIGNALLING request. The Iu-RELOCATION-COMPLETE, when received from the correct UE/MS, is converted to A-HO-COMPLETE and included in the MAP-SEND-END-SIGNAL request and sent back to MSC-A. The circuit is through-connected in MSC-A when the A-HO-DETECT or the A-HO-COMPLETE is received from 3G_MSC-B. The old radio channel is released when the A-HO-COMPLETE message is received from 3G_MSC-B. The sending of the MAP-SEND-END-SIGNAL request starts the MAP supervision timer for the MAP dialogue between MSC-A and 3G_MSC-B. When the MAP-SEND-END-SIGNAL request including the A-HO-COMPLETE message is received in MSC-A the resources in BSS-A shall be cleared.

In order not to conflict with the PSTN/ISDN signalling system(s) used between MSC-A and 3G_MSC-B, 3G_MSC-B must generate an answer signal when Iu-RELOCATION-DETECT/COMPLETE is received.

3G_MSC-B shall release the Handover Number when the circuit between MSC-A and 3G_MSC-B has been established.

If the circuit between MSC-A and 3G_MSC-B cannot be established (e.g. an unsuccessful backward message is received instead of ACM). MSC-A terminates the inter3G_MSC handover attempt by sending an appropriate MAP message, for example an ABORT.

MSC-A shall retain overall call control until the call is cleared by the fixed subscriber or the UE/MS and there is no further call control functions to be performed (e.g. servicing waiting calls, echo cancellers).

When MSC-A clears the call to the UE/MS it also clears the call control functions in MSC-A and sends the MAP-SEND-END-SIGNAL response to release the MAP resources in 3G_MSC-B.

MSC-A may terminate the procedure at any time by sending an appropriate MAP message to 3G_MSC-B. If establishment of the circuit between MSC-A and 3G_MSC-B has been initiated, the circuit must also be cleared.

The GSM to UMTS handover will be aborted by MSC-A if it detects clearing or interruption of the radio path before the call has been established on 3G_MSC-B.

Next Change

8.2.3.1 Description of subsequent GSM to UMTS handover procedure i): MSC-B to 3G_MSC-A

The procedure for successful GSM to UMTS handover from MSC-B back to 3G_MSC-A is shown in figure 26.

The procedure is as follows:

MSC-B sends the MAP-PREPARE-SUBSEQUENT-HANDOVER request to 3G_MSC-A indicating the new MSC number (3G_MSC-A number), indicating also the identity of the cell where the call has to be handed over and including a complete A-HO-REQUEST message. (NOTE: MSC-B shall not send further MAP-PREPARE-SUBSEQUENT-HANDOVER requests while a handover attempt is pending or before any timeouts). Since 3G_MSC-A is the call controlling MSC, this MSC needs no Handover Number for routing purposes; 3G_MSC-A can immediately initiate the search for free radio resources. 3G_MSC-A then inserts or removes a transcoder depending on the connection to the other party.

When radio resources can be assigned, 3G_MSC-A shall return in the MAP-PREPARE-SUBSEQUENT-HANDOVER response the complete A-HO-REQUEST-ACK message generated from the Iu-RELOCATION-REQUEST-ACK received from the RNS-B and possible extra BSSMAP information, amended by 3G_MSC-A due to the possible interworking between the BSSMAP protocol carried on the E-interface and the RANAP protocol used on the Iu-interface. ~~Prior to sending this MAP procedure response, 3G_MSC-A sends MAP-FORWARD-ACCESS-SIGNALLING with DTAP Selected Codec message (if the codec type is to be changed for the handover) to MSC-B, which sends the DTAP message to the UE/MS.~~ If the radio resource allocation is queued by RNS-B, the A-QUEUING-INDICATION may optionally be sent back to MSC-B. The further radio resource allocation result (A-HO-REQUEST-ACK or A-HO-FAILURE) will be transferred to MSC-B using the MAP-FORWARD-ACCESS-SIGNALLING request. If radio resources cannot be assigned or if a fault is detected on the target cell identity, or the target cell identity in the A-HO-REQUEST is not consistent with the target MSC number, the MAP-PREPARE-SUBSEQUENT-HANDOVER response containing an A-HO-FAILURE message shall be given to MSC-B, in addition MSC-B shall maintain the connection with the UE/MS.

If the procedure in 3G_MSC-A is successful then MSC-B can request the UE/MS to retune to the new RNS-B on 3G_MSC-A. This is illustrated in figure 26 by the A-HO-COMMAND message. The operation is successfully completed when 3G_MSC-A receives the Iu-RELOCATION-COMPLETE message.

After GSM to UMTS handover 3G_MSC-A shall release the circuit to MSC-B.

3G_MSC-A must also terminate the MAP procedure for the basic handover between 3G_MSC-A and MSC-B by sending an appropriate MAP message. MSC-B will clear the resources in BSS-A when the MAP-SEND-END-SIGNAL response is received.

Next Change

8.3.1 Basic relocation procedure requiring a circuit connection between 3G_MSC-A and 3G_MSC-B

The procedure used for successful Inter-3G_MSC SRNS relocation is shown in figure 30. Initiation of the relocation procedure is described in section 5. The procedure described in this section makes use of messages from the Technical Specification GSM 08.08 [5], TS 25.413 [11] and of the transport mechanism from the Mobile Application Part (MAP)

(Technical Specification TS 29.002 [12]). After an Inter-3G_MSC SRNS relocation further Intra-3G_MSC relocations may occur on 3G_MSC-B, these relocations will follow the procedures specified in a previous section.

The relocation is initiated as described in section 6.2.3. (This is represented by IU-RELOC-REQUIRED in figure 30). Upon receipt of the IU-RELOC-REQUIRED from RNS-A, 3G_MSC-A shall send a MAP-PREPARE-HANDOVER request to 3G_MSC-B including a complete A-HO-REQUEST message. (NOTE: 3G_MSC-A shall not send further MAP-PREPARE-HANDOVER requests while a MAP-PREPARE-HANDOVER response is pending or before any timeouts). The MAP-PREPARE-HANDOVER request shall carry in the A-HO-REQUEST all information needed by 3G_MSC-B for allocating radio resources in the case of SRNS relocation without Iur interface, see Technical Specification GSM 08.08 [5].

3G_MSC-A shall configure the RANAP RAB parameters according to the current selected codec and shall indicate in MAP-PREPARE-HANDOVER to 3G_MSC-B if a transcoder is required to be inserted.

For compatibility reasons, the MAP-PREPARE-HANDOVER request will also identify the cell to which the call is to be relocated (*the cell id in the MAP message is FFS*). 3G_MSC-B will return the MAP-PREPARE-HANDOVER response after having retrieved a Handover Number from its associated VLR (exchange of the messages MAP-allocate-handover-number request and MAP-send-handover-report request). If requested to do so in the MAP procedure 3G_MSC-B shall connect a transcoder needed, 3G_MSC-B reconfigures the RAB parameters according to the selected codec type that it chose. The Handover Number shall be used for routing the connection of the call from 3G_MSC-A to 3G_MSC-B. If radio resources are available in 3G_MSC-B, the MAP-PREPARE-HANDOVER response sent to 3G_MSC-A will contain the complete A-HO-REQUEST-ACKNOWLEDGE message generated from the IU-RELOC-REQUEST-ACKNOWLEDGE received from RNS-B, containing the radio resources definition to be sent by RNS-A to the UE (in case of relocation without Iur interface) and possible extra BSSMAP information, amended by 3G_MSC-B due to the possible interworking between the BSSMAP protocol carried on the E-interface and the BSSMAP protocol used on the A-interface.

If the radio resource allocation is queued by RNS-B, the A-QUEUING-INDICATION may optionally be sent back to 3G_MSC-A. The further radio resources allocation result (IU-RELOC-REQUEST-ACK or IU-RELOC-FAILURE sent in MAP as A-HO-REQUEST-ACK or A-HO-FAILURE) will be transferred to 3G_MSC-A using the MAP-PROCESS-ACCESS-SIGNALLING request. If the radio resource allocation is not possible, the MAP-PREPARE-HANDOVER response containing an IU-RELOCATION-FAILURE sent as A-HO-FAILURE will be sent to 3G_MSC-A. 3G_MSC-B will do the same if a fault is detected on the identity of the RNS where the call has to be relocated. 3G_MSC-B simply reports the events related to the dialogue. It is up to 3G_MSC-A to decide the action to perform if it receives negative responses or the operation fails due to the expiry of the MAP-PREPARE-HANDOVER timer.

If an error related to the TCAP dialogue or to the MAP-PREPARE-HANDOVER request is returned from 3G_MSC-B, this will be indicated to 3G_MSC-A and 3G_MSC-A will terminate the relocation attempt. The existing connection to the UE shall not be cleared.

When the A-HO-REQUEST-ACKNOWLEDGE has been received, 3G_MSC-A shall establish a circuit between 3G_MSC-A and 3G_MSC-B by signalling procedures supported by the network. In figure 30 this is illustrated by the messages IAM (Initial Address Message) and ACM (Address Complete Message) of Signalling System no 7. 3G_MSC-B awaits the capturing of the UE (section 6.2.3) on the radio path when the ACM is sent and 3G_MSC-A initiates the relocation execution when ACM is received (illustrated by the IU-RELOC-COMMAND and described in the section 6.2.3). Prior to sending the IU-RELOCATION-COMMAND, 3G_MSC-A sends Direct Transfer message Selected Codec with the Ccodec tType and modes to the UE. In case of TDM 3G_MSC-A shall insert or remove a transcoder between the MSC and other party, depending on the original connection.

3G_MSC-B transfers to 3G_MSC-A the acknowledgement received from the correct UE (IU-RELOC-DETECT/IU-RELOC-COMPLETE, sent as A-HO-DETECT/A-HO-COMPLETE). The IU-RELOC-DETECT, if received, is transferred to 3G_MSC-A as A-HO-DETECT using the MAP-PROCESS-ACCESS-SIGNALLING request. The IU-RELOC-COMPLETE, when received from the correct UE, is included in the MAP-SEND-END-SIGNAL request as A-HO-COMPLETE and sent back to 3G_MSC-A. The circuit is through connected in 3G_MSC-A when the A-HO-DETECT or the A-HO-COMPLETE is received from 3G_MSC-B. The old radio resources are released when the A-HO-COMPLETE message is received from 3G_MSC-B. The sending of the MAP-SEND-END-SIGNAL request starts the MAP supervision timer for the MAP dialogue between 3G_MSC-A and 3G_MSC-B. When the MAP-SEND-END-SIGNAL request including the A-HO-COMPLETE message is received in 3G_MSC-A, the resources in RNS-A shall be released.

In order not to conflict with the PSTN/ISDN signalling system(s) used between 3G_MSC-A and 3G_MSC-B, 3G_MSC-B must generate an answer signal when IU-RELOC-DETECT/COMPLETE is received.

3G_MSC-B shall release the Handover Number when the circuit between 3G_MSC-A and 3G_MSC-B has been established.

If the circuit between 3G_MSC-A and 3G_MSC-B cannot be established, (e.g. an unsuccessful backward message is received instead of ACM) 3G_MSC-A terminates the inter-3G_MSC relocation attempt by sending an appropriate MAP message, for example an ABORT.

3G_MSC-A shall retain overall call control until the call is cleared by the fixed subscriber or the UE and there is no further call control functions to be performed (e.g. servicing waiting calls, echo cancellers).

When 3G_MSC-A clears the call to the UE it also clears the call control functions in 3G_MSC-A and sends the MAP-SEND-END-SIGNAL response to release the MAP resources in 3G_MSC-B.

3G_MSC-A may terminate the procedure at any time by sending an appropriate MAP message to 3G_MSC-B. If establishment of the circuit between 3G_MSC-A and 3G_MSC-B has been initiated, the circuit must also be cleared.

The relocation will be aborted by 3G_MSC-A if it detects release or interruption of the radio path before the call has been established on 3G_MSC-B.

Next Change

8.3.3.1 Description of subsequent relocation procedure i): 3G_MSC-B to 3G_MSC-A

The procedure for successful relocation from 3G_MSC-B back to 3G_MSC-A is shown in figure 32.

The procedure is as follows:

3G_MSC-B sends the MAP-PREPARE-SUBSEQUENT-HANDOVER request to 3G_MSC-A indicating the new 3G_MSC number (3G_MSC-A number), indicating also the identity of the cell (*the cell id in the MAP message is FFS*) where the call has to be relocated and including a complete A-HO-REQUEST message. (NOTE: 3G_MSC-B shall not send further MAP-PREPARE-SUBSEQUENT-HANDOVER requests while a relocation attempt is pending or before any timeouts). Since 3G_MSC-A is the call controlling 3G_MSC, this 3G_MSC needs no Handover Number for routing purposes; 3G_MSC-A can immediately initiate the relocation towards the target RNS.

When relocation can be initiated, 3G_MSC-A shall return in the MAP-PREPARE-SUBSEQUENT-HANDOVER response the complete IU-RELOC-REQUEST-ACKNOWLEDGE message received from the RNS-B as A-HO-REQUEST-ACKNOWLEDGE and possible extra BSSMAP information, amended by 3G_MSC-A due to the possible interworking between the BSSMAP protocol carried on the E-interface and the BSSMAP protocol used on the A-interface. ~~Prior to sending this MAP procedure response, and if a codec change is required, 3G_MSC-A shall send MAP_FORWARD_ACCESS_SIGNALLING containing Direct Transfer message Selected Codec to the UE via 3G_MSC-B.~~

If the radio resource allocation is queued by RNS-B, the A-QUEUING-INDICATION may optionally be sent back to 3G_MSC-B. The further radio resource allocation result (IU-RELOC-REQUEST-ACK or IU-RELOC-FAILURE, sent as A-HO-REQUEST-ACK or A-HO-FAILURE) will be transferred to 3G_MSC-B using the MAP-FORWARD-ACCESS-SIGNALLING request. If a radio resource cannot be assigned or if a fault is detected on the target RNS identity, or the target RNS identity in the A-HO-REQUEST is not consistent with the target 3G_MSC number, the MAP-PREPARE-SUBSEQUENT-HANDOVER response containing an A-HO-FAILURE message shall be given to 3G_MSC-B, in addition 3G_MSC-B shall maintain the connection with the UE.

If the procedure in 3G_MSC-A is successful then 3G_MSC-B can request the UE to retune to the new RNS-B on 3G_MSC-A in the case of relocation without Iur interface, or request RNS-B to become serving RNS in the case of relocation with Iur interface. This is illustrated in figure 32 by the IU-RELOC-COMMAND message. The operation is successfully completed when 3G_MSC-A receives the IU-RELOC-COMPLETE message.

If 3G_MSC-A inserted a transcoder at basic ~~handover~~relocation then it shall remove it on successful subsequent ~~handover~~relocation back to 3G_MSC-A. If it removed a transcoder at basic ~~handover~~relocation then it shall insert a transcoder at successful subsequent ~~handover~~relocation back to 3G_MSC-A.

After relocation 3G_MSC-A shall release the circuit to 3G_MSC-B.

3G_MSC-A must also terminate the MAP procedure for the basic relocation between 3G_MSC-A and 3G_MSC-B by sending an appropriate MAP message. 3G_MSC-B will release the resources in RNS-A when the MAP-SEND-END-SIGNAL response is received.

Next Change

13.3 GSM to UMTS handover

If a circuit connection has to be set up (for example for a Mobile Originated or Mobile Terminated Call Establishment) after an Inter-3G_MSC GSM to UMTS handover without circuit connection, MSC-A shall request a Handover Number using a MAP-PREPARE-HANDOVER request, containing the A-ASSIGNMENT-REQUEST, on the established MAP connection. If 3G_MSC-B indicates to 3G_MSC-B and to MSC-A that at least one of two procedures assignment or Handover Number allocation can not be completed, then MSC-A shall terminate the circuit establishment attempt. The existing connection to the UE/MS shall be maintained, if possible.

Upon receipt of the MAP-PREPARE-HANDOVER request 3G_MSC-B shall perform the requested assignment operation towards the RNS. In addition it shall retrieve a Handover Number from VLR-B. If a failure occurs in the assignment or Handover Number allocation then it shall be reflected in the MAP-PREPARE-HANDOVER response that at least one of these two procedures has not been completed (i.e. either by a MAP-PREPARE-HANDOVER result with the assignment procedure outcome and the Handover Number allocation outcome or by a MAP-PREPARE-HANDOVER error). 3G_MSC-B inserts the transcoder according to the information received from MSC-A. ~~If needed, 3G_MSC-B then configures the RAB assignment parameters for the IU-RAB-ASSIGNMENT-REQUEST message according to the chosen codec type and modes.~~

When MSC-A receives a successful MAP-PREPARE-HANDOVER response, it shall establish a circuit connection to 3G_MSC-B by using the appropriate network supported procedures. In figure 38 this is indicated by the IAM (Initial Address Message) and ACM (Address Complete Message). 3G_MSC-B shall also send the Answer message if appropriate to the signalling system. Upon receipt of the Answer MSC-A shall consider the circuit connection establishment phase complete. If a failure occurs during the circuit establishment phase then the existing connection to the UE/MS shall be maintained, if possible.

Next Change

13.4 SRNS Relocation

If a circuit connection has to be set up (for example for a Mobile Originated or Mobile Terminated Call Establishment) after an Inter-3G_MSC relocation without circuit connection, 3G_MSC-A shall request a Handover Number using a MAP-PREPARE-HANDOVER request, containing the IU-RAB-ASSIGNMENT-REQUEST as A-ASSIGNMENT-REQUEST, on the established MAP connection. If 3G_MSC-B indicates to 3G_MSC-B and to 3G_MSC-A that at least one of two procedures (RAB) assignment or Handover Number allocation can not be completed, then 3G_MSC-A shall terminate the circuit establishment attempt. The existing connection to the UE shall be maintained, if possible. ~~For speech calls 3G_MSC-A shall configure the RAB assignment parameters according to the current selected codec type and modes.~~

Upon receipt of the MAP-PREPARE-HANDOVER request, 3G_MSC-B shall perform the requested RAB assignment operation towards the RNS. In addition it shall retrieve a Handover Number from VLR-B and connect a transcoder in case of TDM networks. ~~If needed, 3G_MSC-B reconfigures the RAB parameters according to the selected codec type that it chose.~~ If a failure occurs in the RAB assignment or Handover Number allocation then it shall be reflected in the MAP-PREPARE-HANDOVER response that at least one of these two procedures has not been completed (i.e. either by a MAP-PREPARE-HANDOVER result with the RAB assignment procedure outcome and the Handover Number allocation outcome or by a MAP-PREPARE-HANDOVER error).

When 3G_MSC-A receives a successful MAP-PREPARE-HANDOVER response, it shall establish a circuit connection to 3G_MSC-B by using the appropriate network supported procedures. In figure 39 this is indicated by the IAM (Initial

Address Message) and ACM (Address Complete Message). 3G_MSC-B shall also send the Answer message if appropriate to the signalling system. Upon receipt of the Answer 3G_MSC-A shall consider the circuit connection establishment phase complete. If a failure occurs during the circuit establishment phase then the existing connection to the UE shall be maintained, if possible.

3GPP TSG-N WG1 #11
Umea, Sweden 28 Feb– 03 Mar 2000

***Document* N1-000422**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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

23.108	CR	003	Current Version:	3.1.0

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

For submission to:	TSG-N #11	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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

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

Source: CN1 **Date:** 25 Nov 1999

Subject: Updates for call procedures for UMTS, including codec negotiation.

Work item: Out-of-Band Transcoder Control

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

Reason for change: Document has not been updated since split from 04.08 and contains no UMTS Call handling. Some procedures between RANAP RAB procedures and CC messages are needed. Further codec negotiation procedures from this WI must be added.

Clauses affected: 7.1, 7.3.2, 7.3.3, 7.3.4, 7.3.6, 7.3.8, 7.3.9

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

Other comments:

help.doc

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

First Paragraph Changed

7.1.8 UMTS Radio Access Bearer Establishment

This section describes the general sequence for UMTS Radio Access Bearer Establishment. For more detail see TS 25.413, TS 25.415 & 25.331

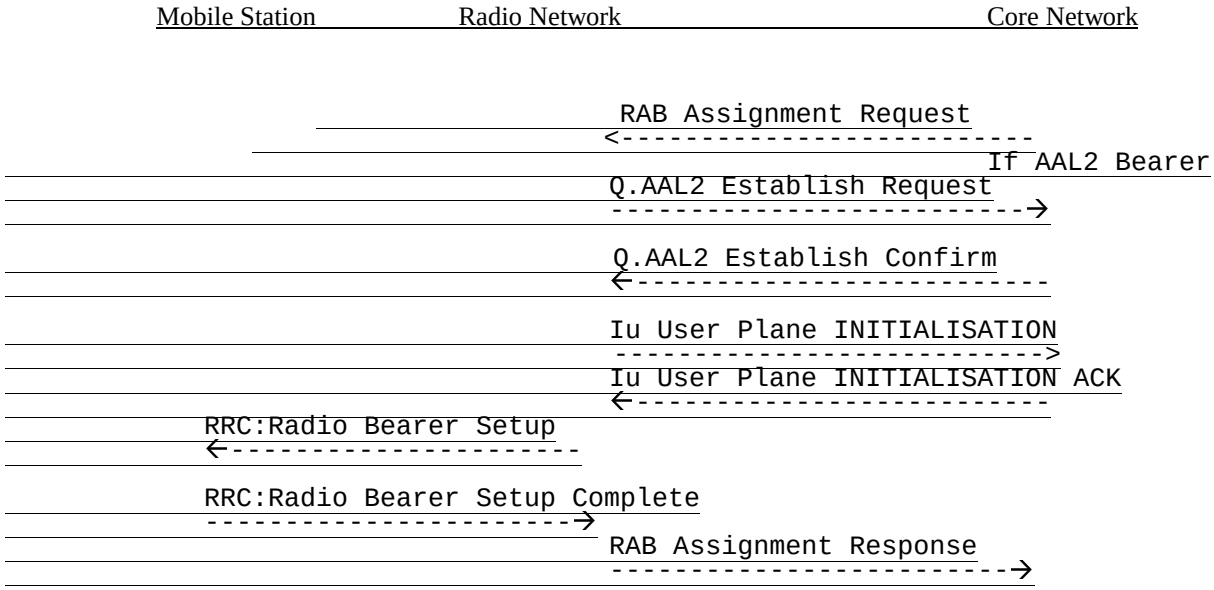
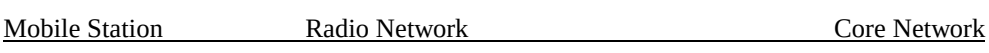


Figure 7.1.8/TS 23.108 RAB assignment

7.1.9 UMTS Radio Access Bearer Release

This section describes the general sequence for UMTS Radio Access Bearer Release. For more detail see TS 25.413, TS 25.415 & 25.331



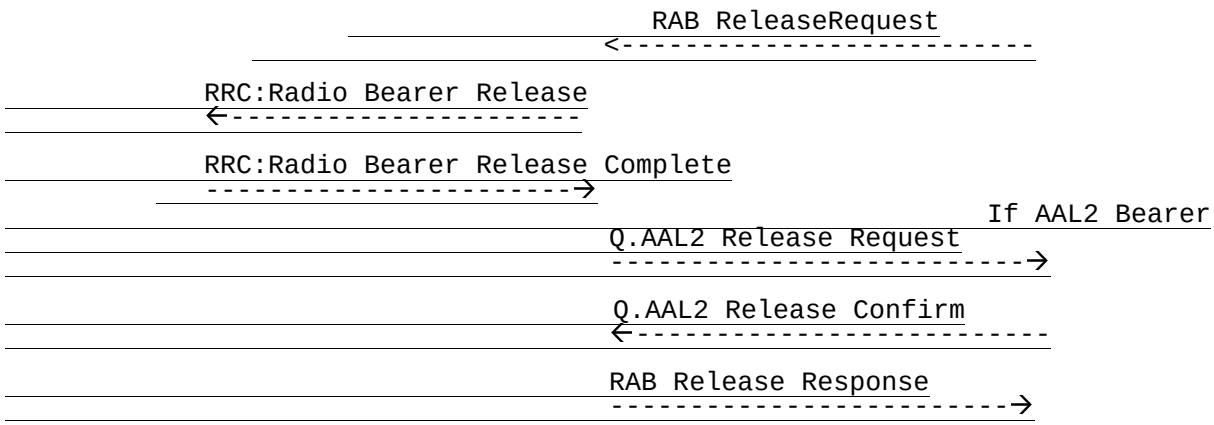


Figure 7.1.9/TS 23.108 RAB assignment

7.3.2 Mobile originating call establishment

The mobile station initiates immediate assignment, service request using the CM SERVICE REQUEST message, and contention resolution. The network may initiate authentication and may start the ciphering mode setting.

After sending the CIPHERING MODE COMPLETE message, the mobile station initiates call establishment by sending the SETUP message to the network. The network answers with a CALL PROCEEDING message.

a) Non-OACSU option (early assignment)

With this option the network allocates a traffic channel to the mobile station before it initiates call establishment in the fixed network.

If call queuing is applied, it may cause variable delay in the traffic channel assignment.

When user alerting has been initiated at the called side, an ALERTING message is sent to the mobile station. The network may optionally instruct the MS to attach the user connection at this stage of the call, by means of the progress indicator information element set to the value #1 or #8(if the ringing tone will be sent by the remote end) in the ALERTING message. In that case, an alerting ringing tone has to be generated by the network.

NOTE: The speech codec is transparent for supervisory tones.

A CONNECT message and its acknowledgement CONNECT ACKNOWLEDGE complete the call establishment when the called party has answered.

The mobile originating call setup with early assignment is shown in figure 7.10a/GSM 04.08.

b) OACSU option (late assignment)

The network determines when the traffic channel is to be assigned. The assignment may be performed at any time after call establishment has been initiated in the fixed network. In the following the case is considered where the network will only allocate a traffic channel after the called party has answered the call (late assignment).

As in a) an ALERTING message is sent to the mobile station when user alerting has been initiated at the called side. If the ringing tone is needed, it has to be generated locally at the mobile station as no traffic channel is allocated. When the called party has answered, the network will initiate the channel assignment procedure in order to allocate a traffic channel to the mobile station. If call queuing is applied, it may cause variable delay in the traffic channel assignment. Once the channel assignment has been completed the network will send a CONNECT message to the mobile station. The MS attaches then the user connection. The CONNECT ACKNOWLEDGE message will complete the call setup.

The mobile originating call setup with late assignment is shown in figure 7.10b/GSM 04.08.

c) Very early assignment

The network assigns the traffic channel at the earliest possible moment, i.e. in the immediate assignment procedure. The mode of the traffic channel is changed from signalling only to the mode necessary for the call by means of the channel mode change procedure. An appropriate moment for that change is after the network has sent the CALL PROCEEDING message, when the call is established towards the called user.

With this option, call queuing is never applied.

The further establishment of the call is as in a).

The mobile originating call setup with very early assignment is shown in figure 7.10c/GSM 04.08.

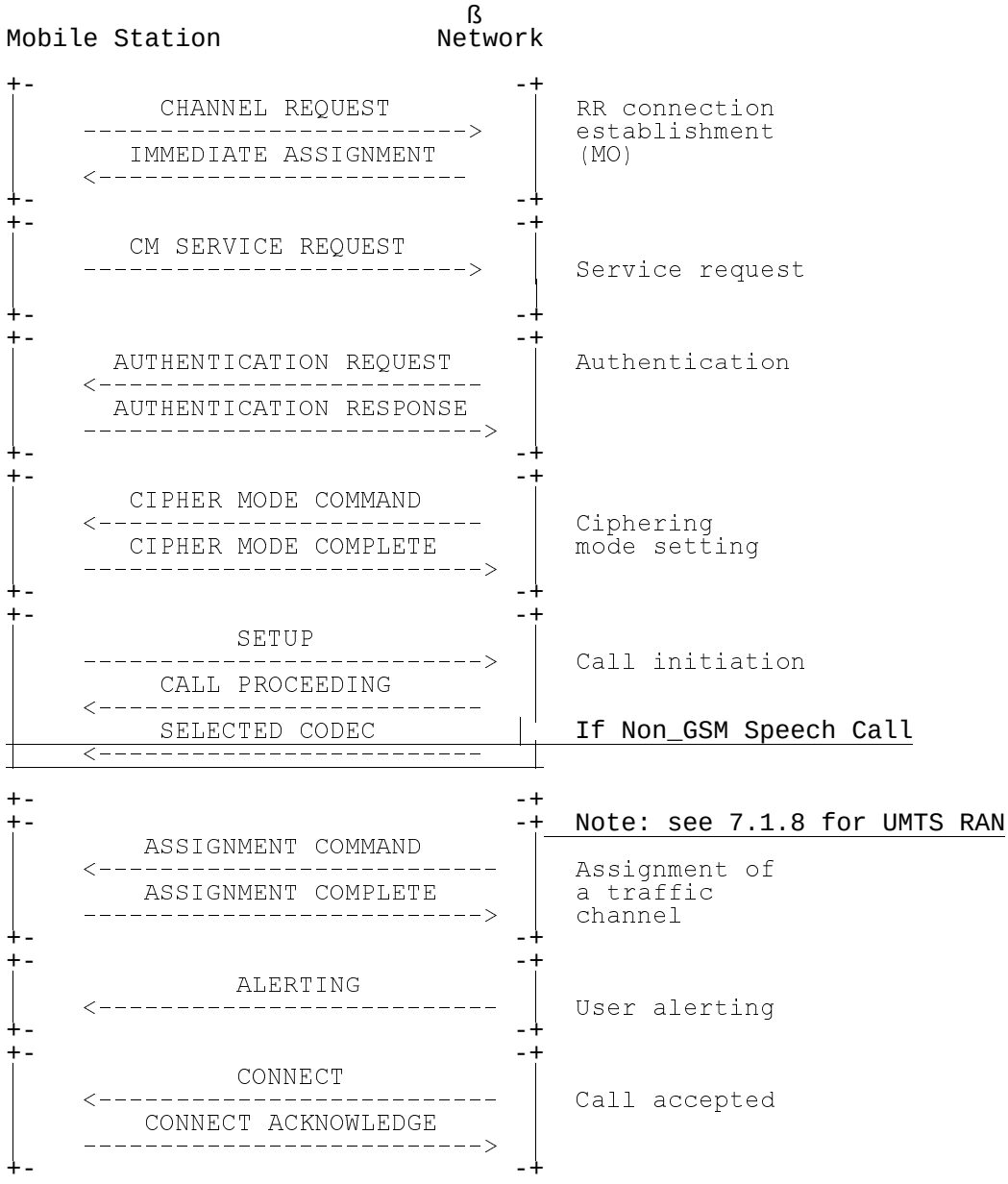


Figure 7.10a/ TS23.108~~GSM 04.08~~: Mobile originating call establishment without OACSU (early assignment)

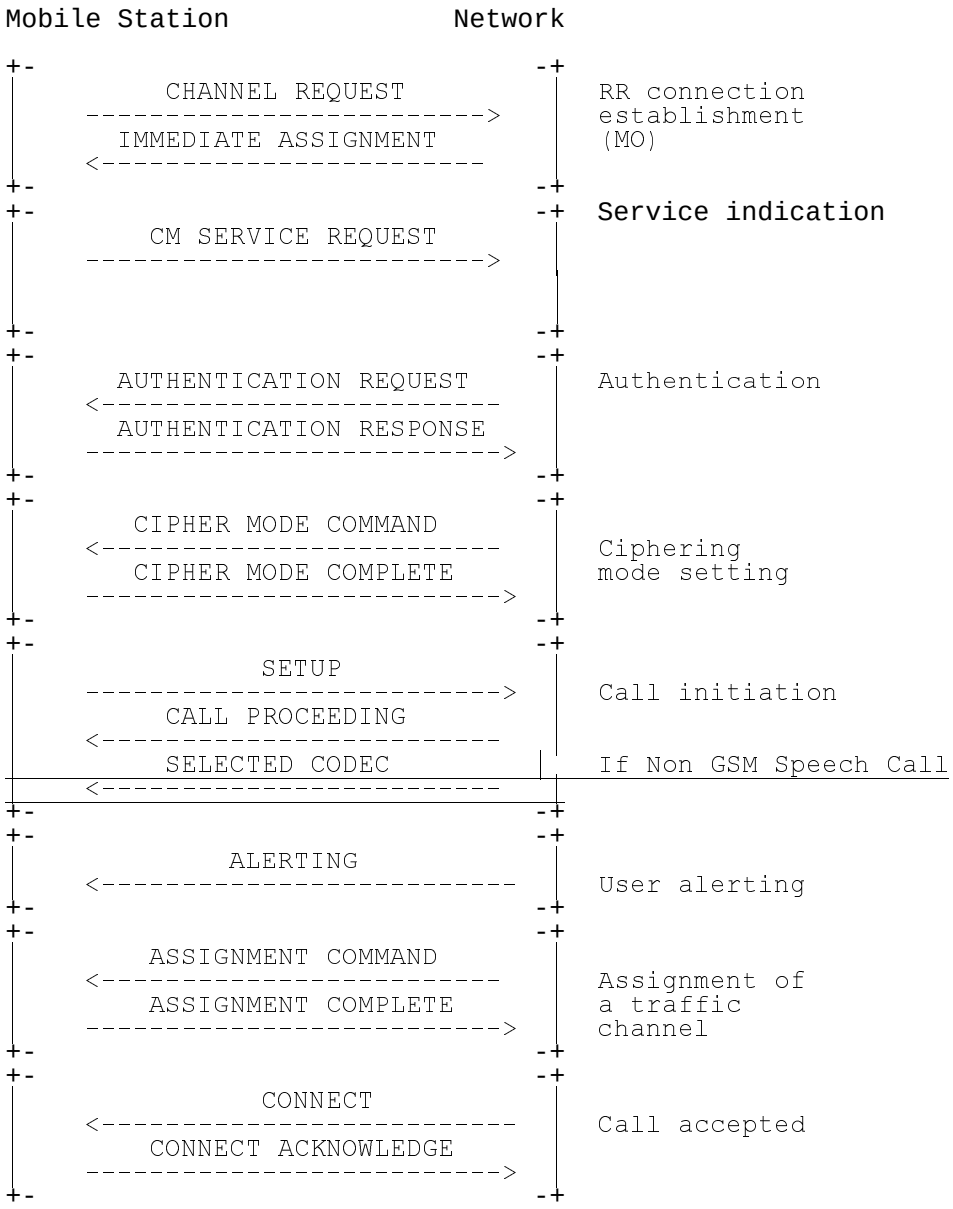


Figure 7.10b/ TS23.108~~GSM 04.08~~: Mobile originating call establishment with OACSU (late assignment)

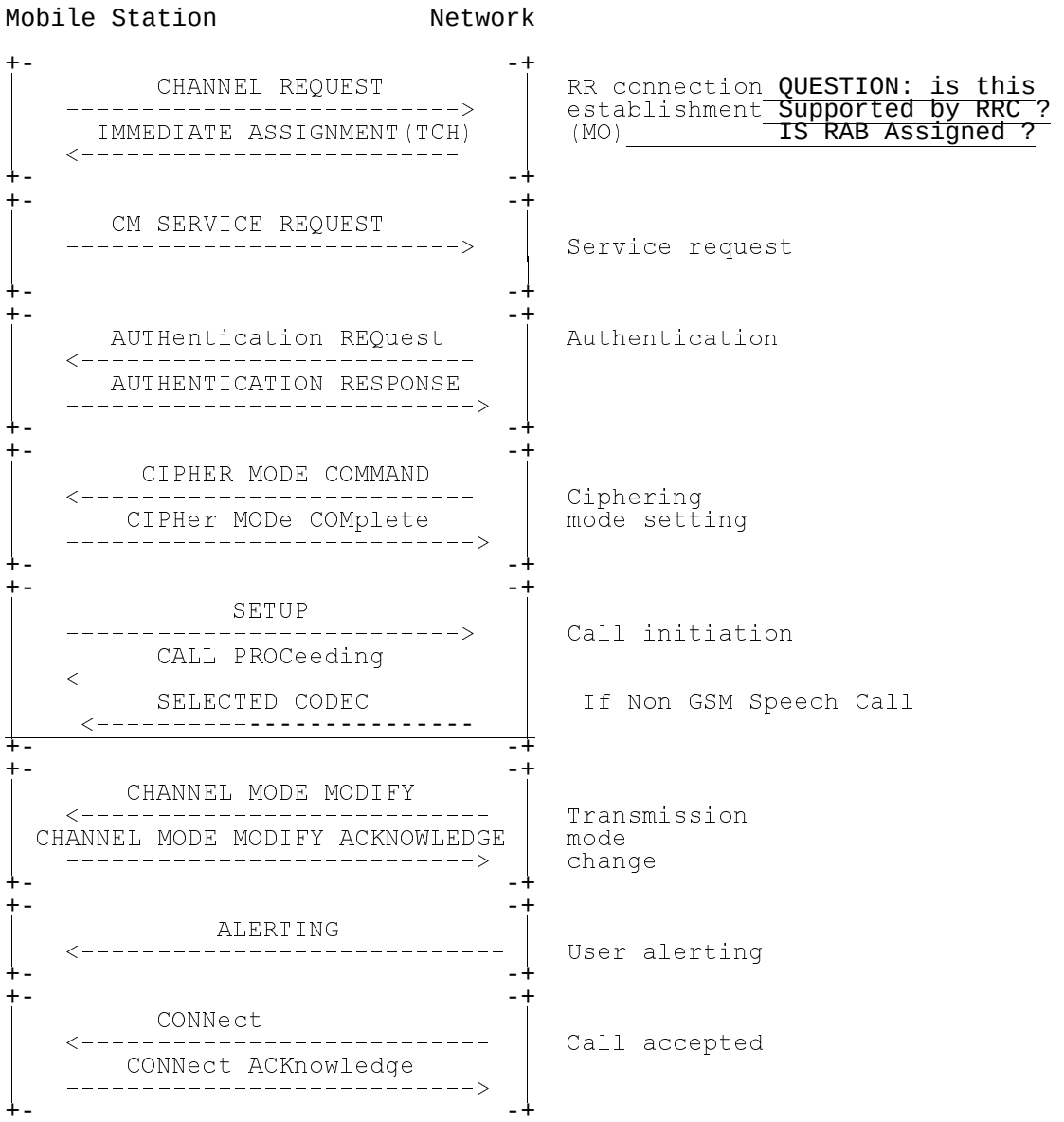


Figure 7.10c/ TS23.108~~GSM 04.08~~: Mobile originating call establishment with very early assignment

7.3.3 Mobile terminating call establishment

Mobile terminating call establishment is initiated by the network sending a PAGING REQUEST message (see figure 7.11a/GSM 04.08). Upon receiving this message the mobile station initiates the immediate assignment procedure and responds to the network by sending the PAGING RESPONSE message within a layer 2 SABM frame. The network returns a layer 2 UA frame containing the same information field as was sent in the SABM frame.

Authentication and ciphering are treated by the network in the same way as defined for the mobile originating call establishment (section 7.3.2). After ciphering has been started, the network sends a SETUP message to the mobile station. The capability of the mobile station (at that time) to accept the call is confirmed when the mobile station returns a CALL CONFIRMED message to the network.

a) Non-OACSU option (early assignment)

With this option the network initiates the assignment of a traffic channel upon receiving the CALL CONFIRMED message.

The signal IE is not included in the SETUP message, therefore user alerting is initiated only after a traffic channel has been allocated. An ALERTING message will be sent to the network.

When the called user answers, the mobile station sends a CONNECT message to the network. Upon receiving the CONNECT message the network completes the through connection of the communication path and sends a CONNECT ACK message to the mobile station.

b) OACSU option (late assignment)

In that option, the signalling IE is included in the SETUP message. Consequently, user alerting is initiated as soon as the MS has accepted the call.

The network determines when the traffic channel is to be assigned. The assignment may be performed at any time after user alerting has been initiated. In the following the case is considered where the network will only allocate a traffic channel to the mobile station after having received the CONNECT message sent from the mobile station (see figure 7.11b).

Upon receiving the ASSIGNMENT COMPLETE message from the mobile station, the network completes the through connection of the communication path and sends a CONNECT ACKNOWLEDGE message to the mobile station.

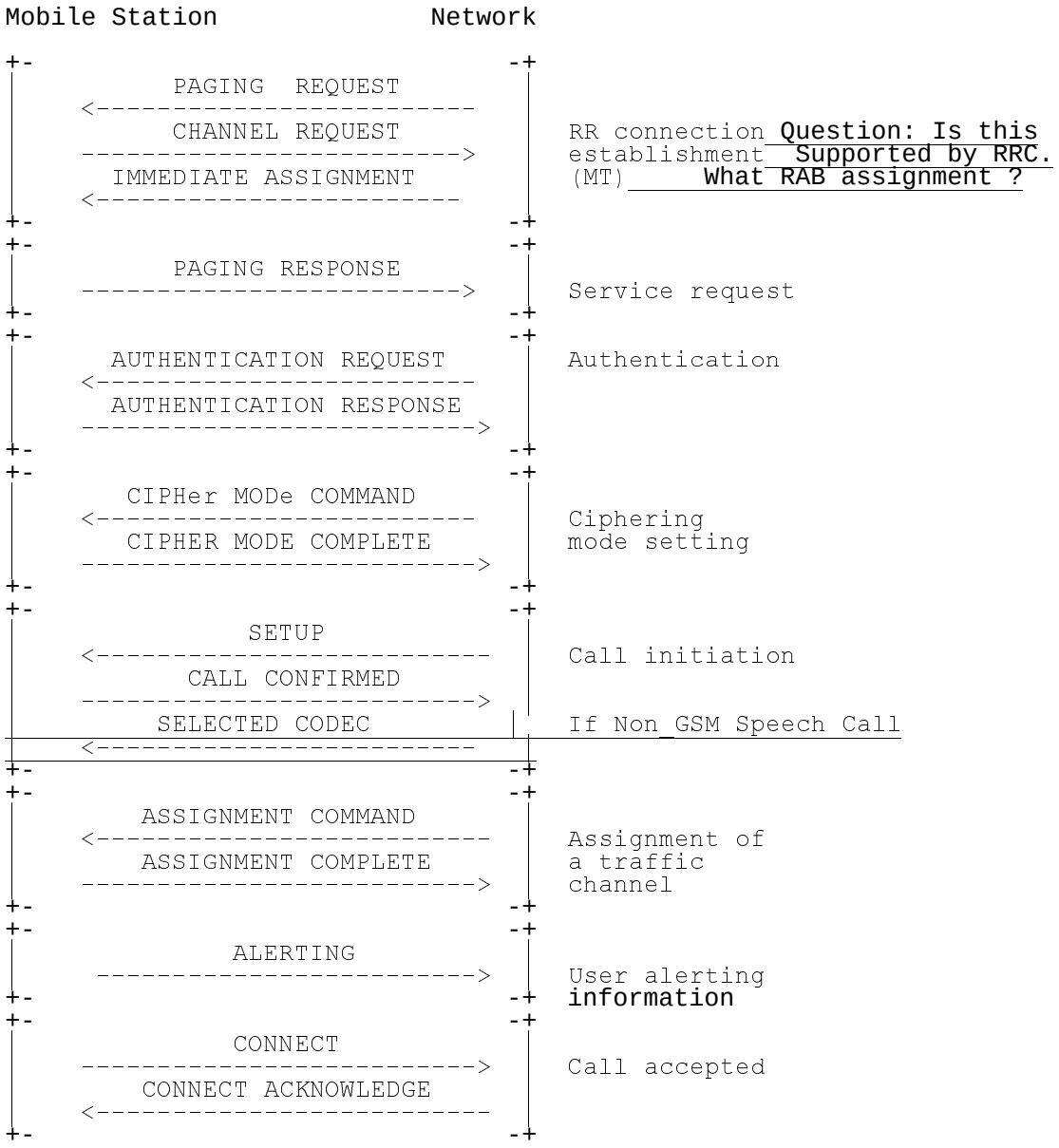


Figure 7.11a/ TS23.108 ~~GSM 04.08~~ - Mobile terminating: call establishment without OACSU (early assignment)

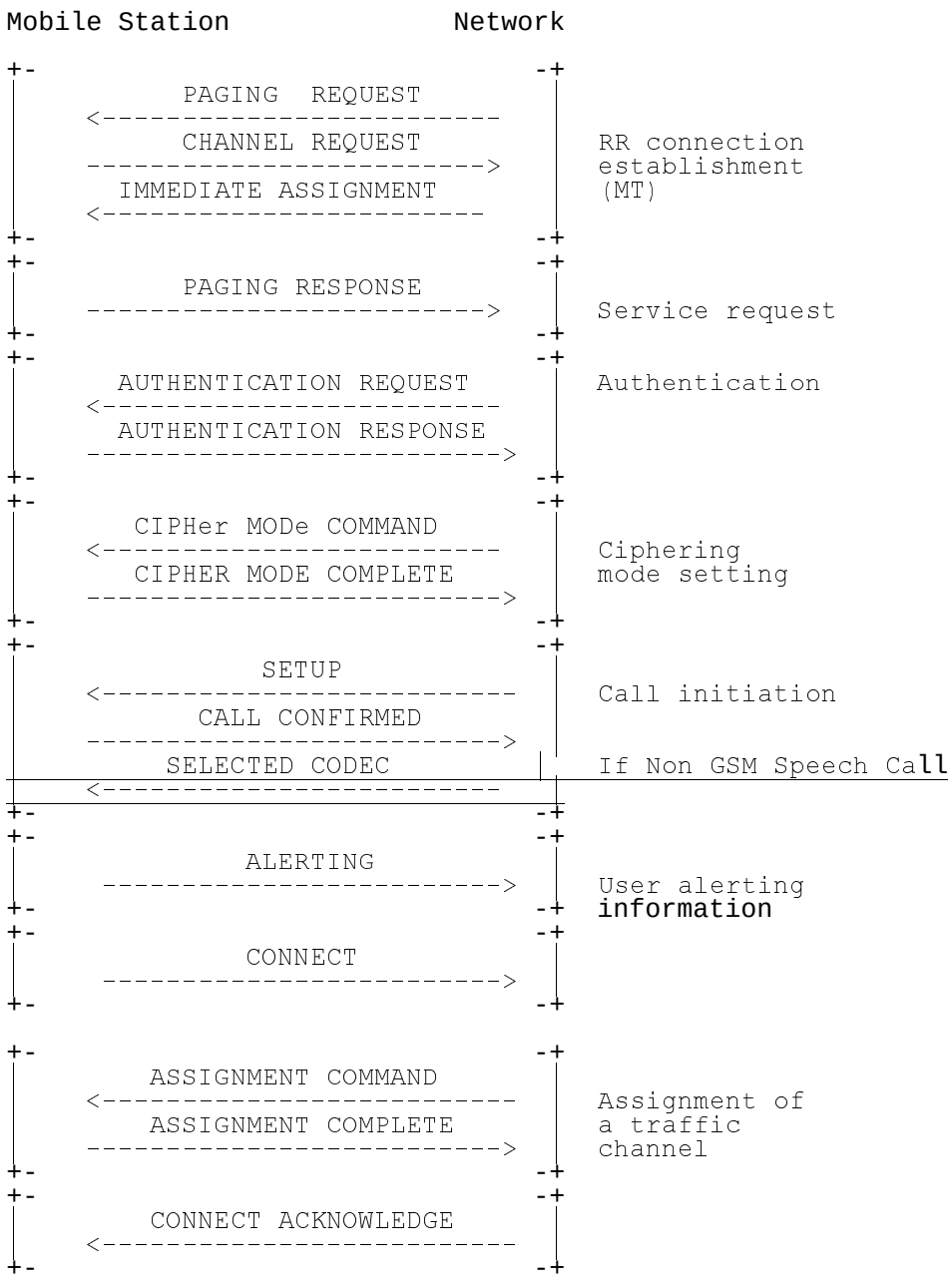


Figure 7.11b/ TS23.108 ~~GSM 04.08~~ - Mobile terminating: call establishment with OACSU (late assignment)

7.3.4 Call clearing

a) initiated by the network

The network initiates the clearing of a call by sending a DISCONNECT message to the mobile station (see also section 5.4.4).

Upon receiving the DISCONNECT message from the network the mobile station sends a RELEASE message to the network.

Upon receiving the RELEASE message from the mobile station, the network sends a RELEASE COMPLETE to the mobile station and, if the traffic channel is longer needed (e.g. last activity on the traffic channel), performs the channel release procedure as described in section 7.1.7.

Upon receiving the RELEASE COMPLETE message and if the cleared call was the last activity on the traffic channel, the mobile station waits for the release of the channel which is always initiated by the network.

The mobile station shall not release the transaction identity for the call until it receives the release of the bearer from the network.

Call clearing initiated by the network is shown in figure 7.12a.

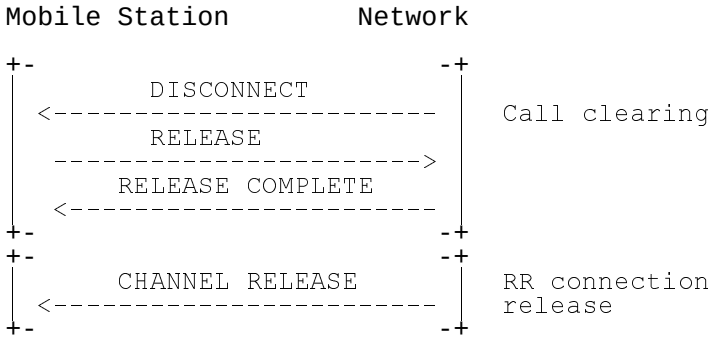
b) initiated by the mobile station

The mobile station initiates the clearing of a call by sending a DISCONNECT message to the network (see also section 5.4.3).

Upon receiving the DISCONNECT message from the mobile station the network sends a RELEASE message to the mobile station.

Upon receiving the RELEASE message from the network, the mobile station sends a RELEASE COMPLETE to the network, which, if the traffic channel is no longer needed (e.g. last activity on the traffic channel), performs the channel release procedure as described in section 7.1.6.

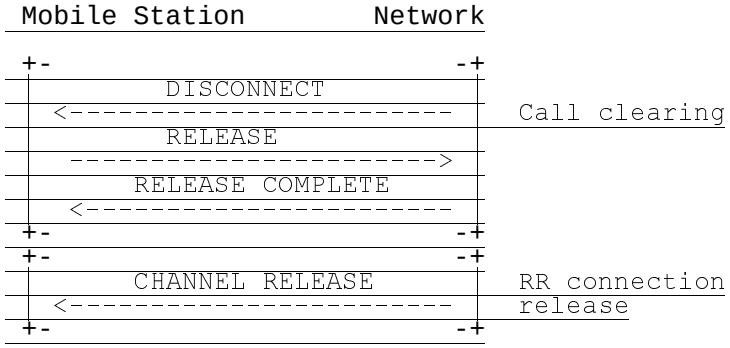
Call clearing initiated by the mobile station is shown in figure 7.12b.



a) Call clearing initiated by the network

Figure 7.12a/GSM 04.08 Call clearing

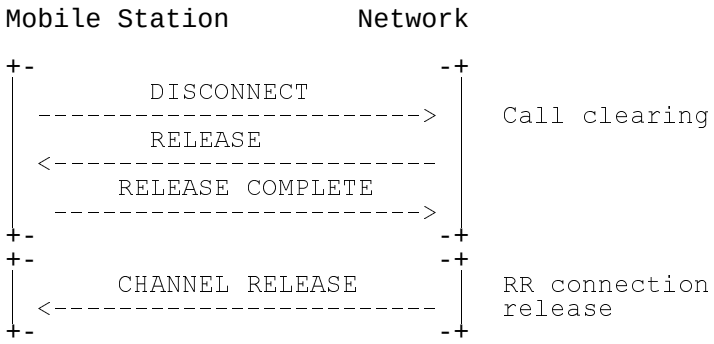
Question - what was the issue here ?



Call clearing initiated by the network

Figure 7.3.4.1/TS 23.108 UMTS Call clearing

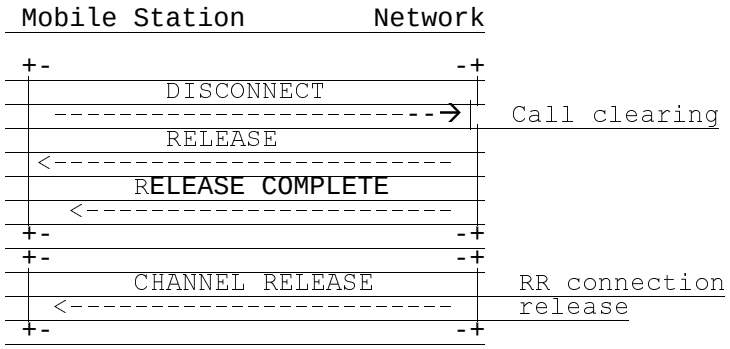
a)



b) Call clearing initiated by the MS

Figure 7.12b/GSM 04.08 Call clearing

Question - what was the issue here ?



Call clearing initiated by the MS

Figure 7.3.4.2/TS 23.108 UMTS Call clearing

7.3.6 Handover

Figure 7.14 shows the structured procedure for handover to a finely synchronized cell, successful case.

Figure 7.15 shows the structured procedure for handover to a non-synchronized cell, successful case.

Figure 7.16 shows the structured procedure for handover failure, and reconnection to the old traffic channel.

Figure 7.3.6.1 shows inter-MSC 3G to 3G handover with codec change.

Figure 7.3.6.2 shows inter-MSC 2G to 3G handover with codec change

Figure 7.3.6.3 shows inter-MSC 3G to 2G handover with codec change

Figure 7.3.6.4 shows inter-MSC 3G to 3G handover with codec change cancelled.

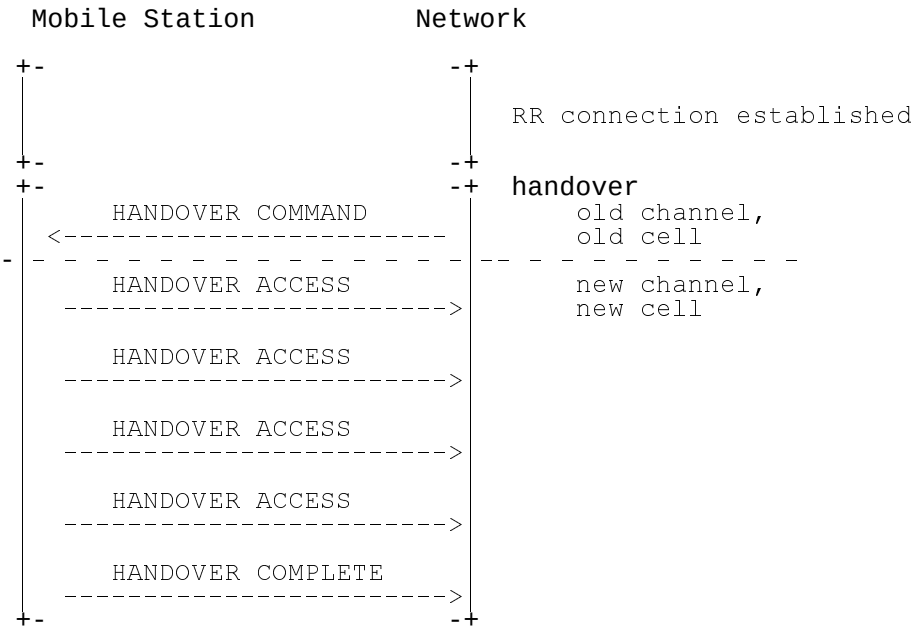


Figure 7.14/GSM 04.08: Handover to a finely synchronized cell, successful case

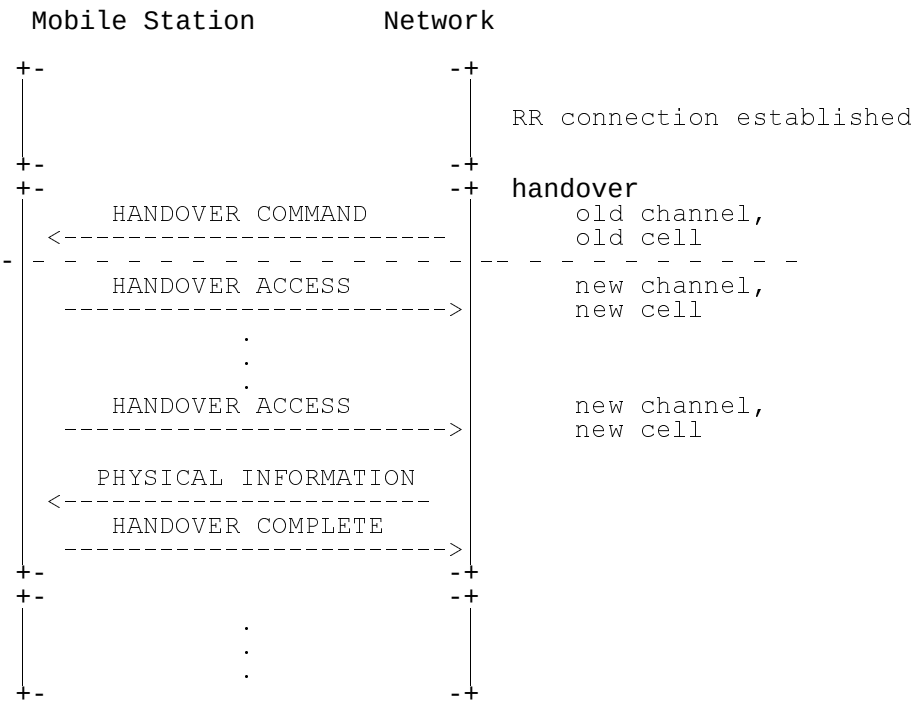


Figure 7.15/GSM 04.08: Handover to a non-synchronized cell, successful case

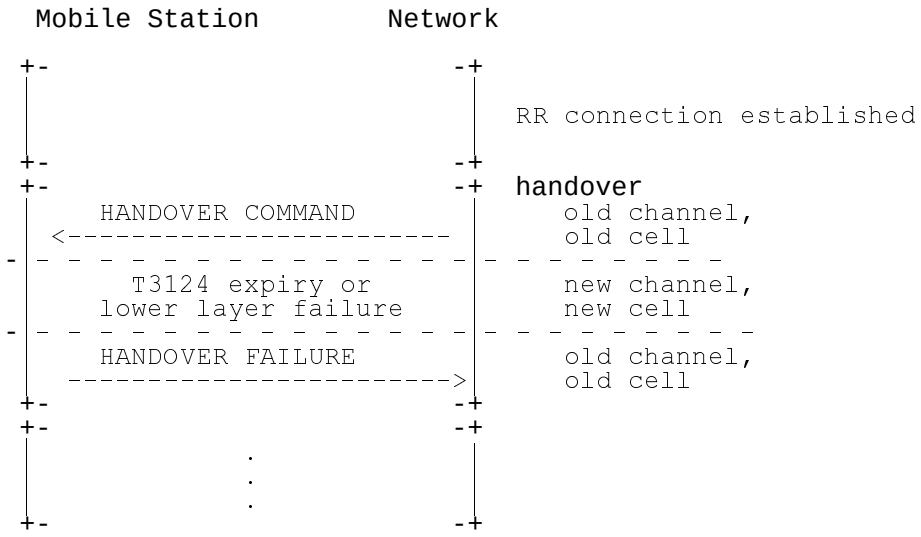


Figure 7.16/GSM 04.08: Handover failure, reconnection to the old traffic channel

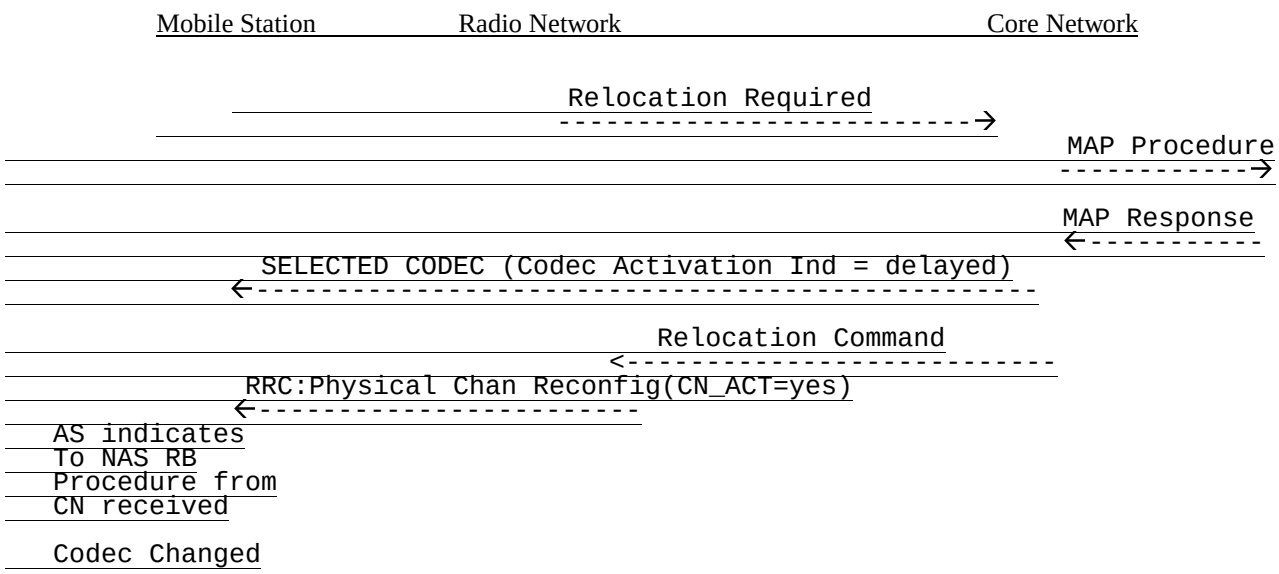


Figure 7.3.6.1/TS 23.108 3G to 3G handover with Codec Change

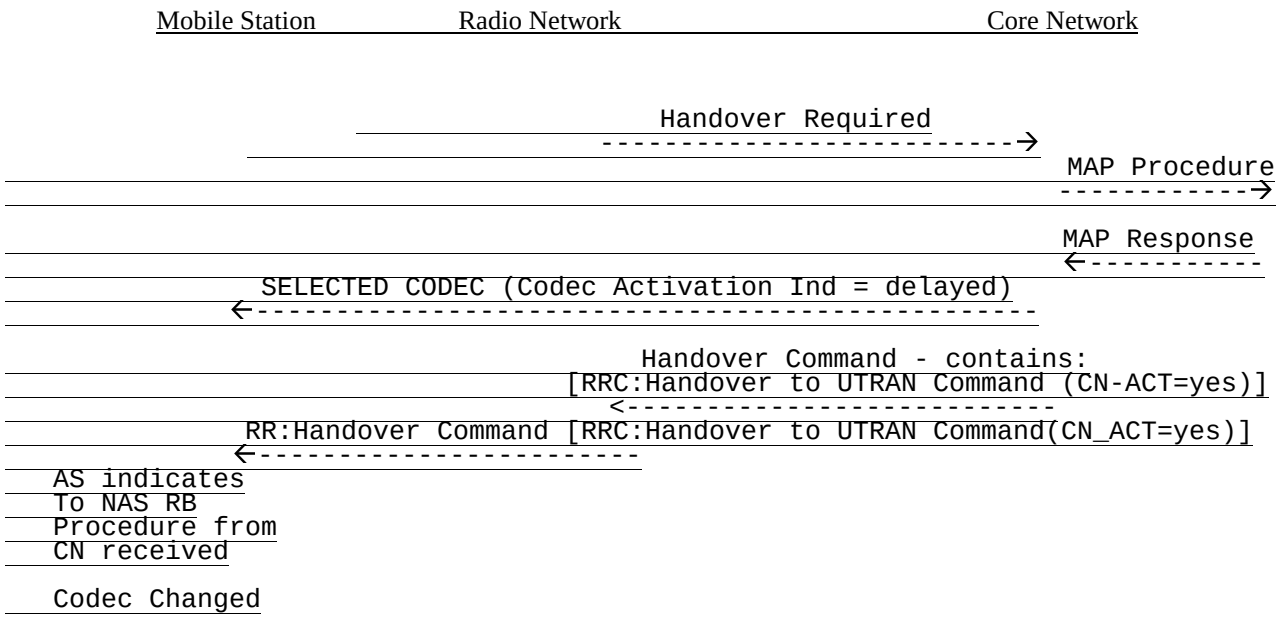


Figure 7.3.6.2/TS 23.108 2G to 3G handover with Codec Change

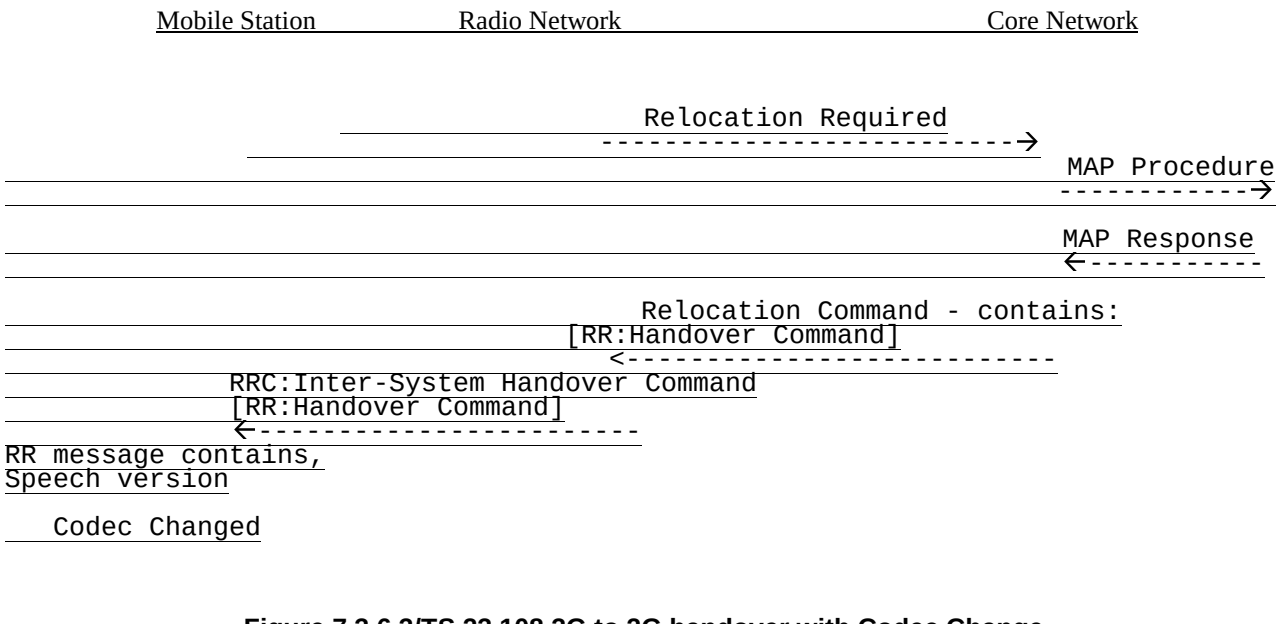


Figure 7.3.6.3/TS 23.108 3G to 2G handover with Codec Change

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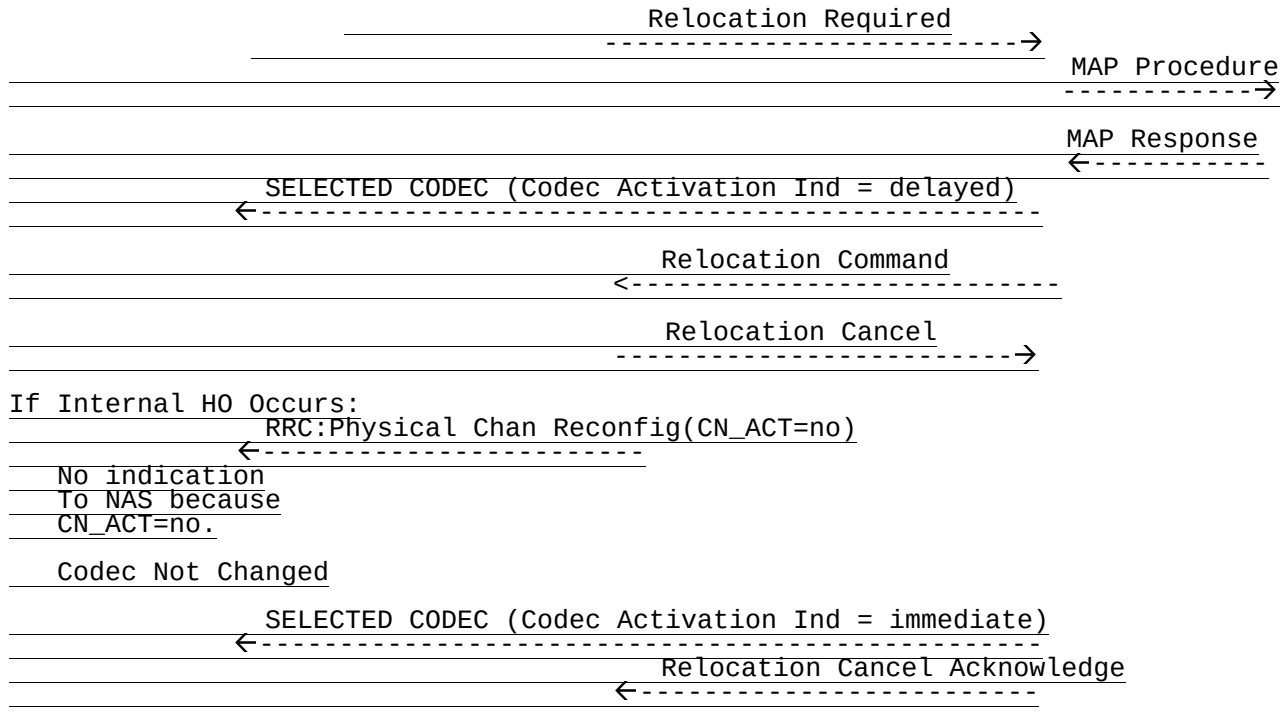

Figure 7.3.6.4/TS 23.108 3G to 3G handover with Codec Change - cancelled

7.3.7 In-call modification

Figure 7.17/GSM 04.08 shows the structured procedure for in-call modification.

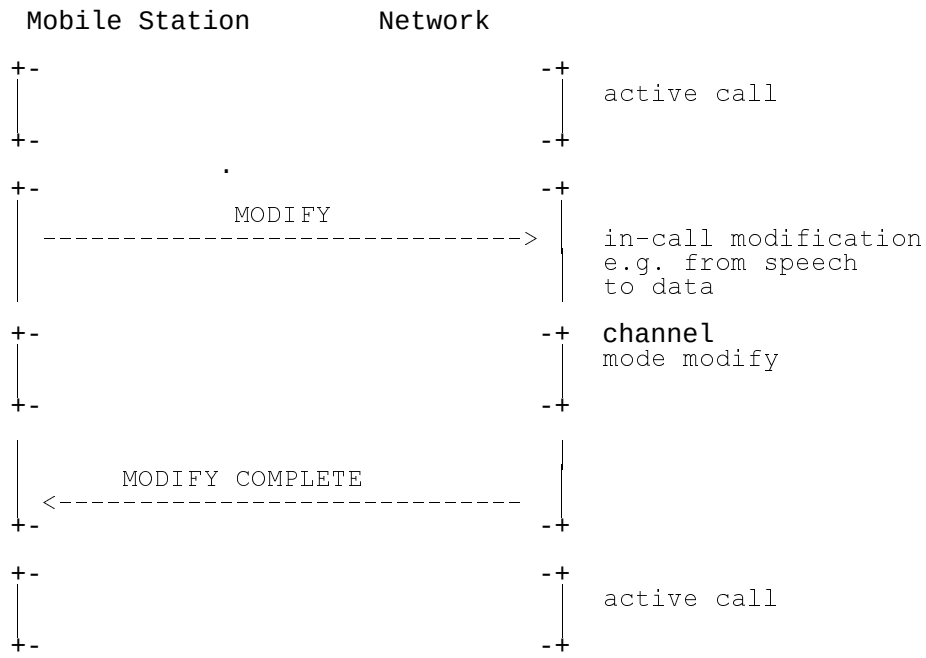

Figure 7.17/GSM 04.08: In-call modification

7.3.9 Network initiated mobile originating call $(CCBS)$

Network initiated mobile originating call establishment (which is used, for example, for CCBS Service) is initiated by the network sending a PAGING REQUEST message. Upon receiving this message the mobile station initiates the immediate assignment procedure and responds to the network by sending the PAGING RESPONSE message within a layer 2 SABM frame. The network returns a layer 2 UA frame containing the same information field as was sent in the SABM frame.

Authentication and ciphering are treated by the network in the same way as defined for the mobile originating call establishment (section 7.3.2). After ciphering has been started, the network sends a CM SERVICE PROMPT message, indicating that the CM protocol is to be started, to the mobile station. The basic capability of the mobile station to accept any form of recall service is confirmed when the mobile station returns a START CC message to the network.

a) assignment before A party alerting

With this option the network allocates a traffic channel to the mobile station before the mobile station alerts its user.

The network responds to the START CC message with a CC-ESTABLISHMENT message. The MS answers with a CC-ESTABLISHMENT CONFIRMED message indicating the wanted channel characteristics. The network then initiates traffic channel assignment.

When the traffic channel has been assigned, the network indicates a pending recall by sending a RECALL message.

If the calling user accepts the recall, a SETUP message is sent to the network. The network responds with a CALL PROCEEDING message and initiates call establishment in the fixed network.

When user alerting has been initiated at the called side, an ALERTING message is sent to the mobile station. The network may optionally instruct the MS to attach the user connection at this stage of the call, by means of the progress indicator information element set to the value #1 or #8(if the ringing tone will be sent by the remote end) in the ALERTING message. In that case, an alerting ringing tone has to be generated by the network.

NOTE: The speech codec is transparent for supervisory tones.

A CONNECT message and its acknowledgement CONNECT ACKNOWLEDGE complete the call establishment when the called party has answered.

The network initiated mobile originating call establishment with assignment before A part alerting is shown in figure 7.19/GSM 04.08.

b) assignment before B party alerting

With this option the network allocates a traffic channel to the mobile station after the mobile station has alerted its user and after its user has accepted the recall but before the network initiates call establishment in the fixed network.

The network responds to the START CC message with a CC-ESTABLISHMENT message. The MS answers with a CC-ESTABLISHMENT CONFIRMED message indicating the wanted channel characteristics.

The network indicates a pending recall by sending a RECALL message. If the calling user accepts the recall, a SETUP message is sent to the network. The network responds with a CALL PROCEEDING message and initiates traffic channel assignment.

When the traffic channel has been assigned, the network initiates call establishment in the fixed network.

When user alerting has been initiated at the called side, an ALERTING message is sent to the mobile station. The network may optionally instruct the MS to attach the user connection at this stage of the call, by means of the progress indicator information element set to the value #1 or #8(if the ringing tone will be sent by the remote end) in the ALERTING message. In that case, an alerting ringing tone has to be generated by the network.

NOTE: The speech codec is transparent for supervisory tones.

A CONNECT message and its acknowledgement CONNECT ACKNOWLEDGE complete the call establishment when the called party has answered.

The network initiated mobile originating call establishment with assignment before B party alerting is shown in figure 7.20/GSM 04.08.

c) assignment after A and B party alerting

With this option, the network determines when the traffic channel is to be assigned. The assignment may be performed at any time after call establishment has been initiated in the fixed network. In the following, the case is considered where the network will only allocate a traffic channel after the called party has answered the call (late assignment).

The network responds to the START CC message with a CC-ESTABLISHMENT. The MS answers with a CC-ESTABLISHMENT CONFIRMED message indicating the wanted channel characteristics.

The network indicates a pending recall by sending a RECALL message. If the calling user accepts the recall, a SETUP message is sent to the network. The network responds with a CALL PROCEEDING message and initiates call establishment in the fixed network.

As in a) and b) an ALERTING message is sent to the mobile station when user alerting has been initiated at the called side. If the ringing tone is needed, it has to be generated locally at the mobile station as no traffic channel is allocated. When the called party has answered, the network will initiate the channel assignment procedure in order to allocate a traffic channel to the mobile station. Once the channel assignment has been completed the network will send a CONNECT message to the mobile station. The MS attaches then the user connection. The CONNECT ACKNOWLEDGE message will complete the call setup.

The network initiated mobile originating call establishment with assignment after A and B party alerting is shown in figure 7.21/GSM 04.08.

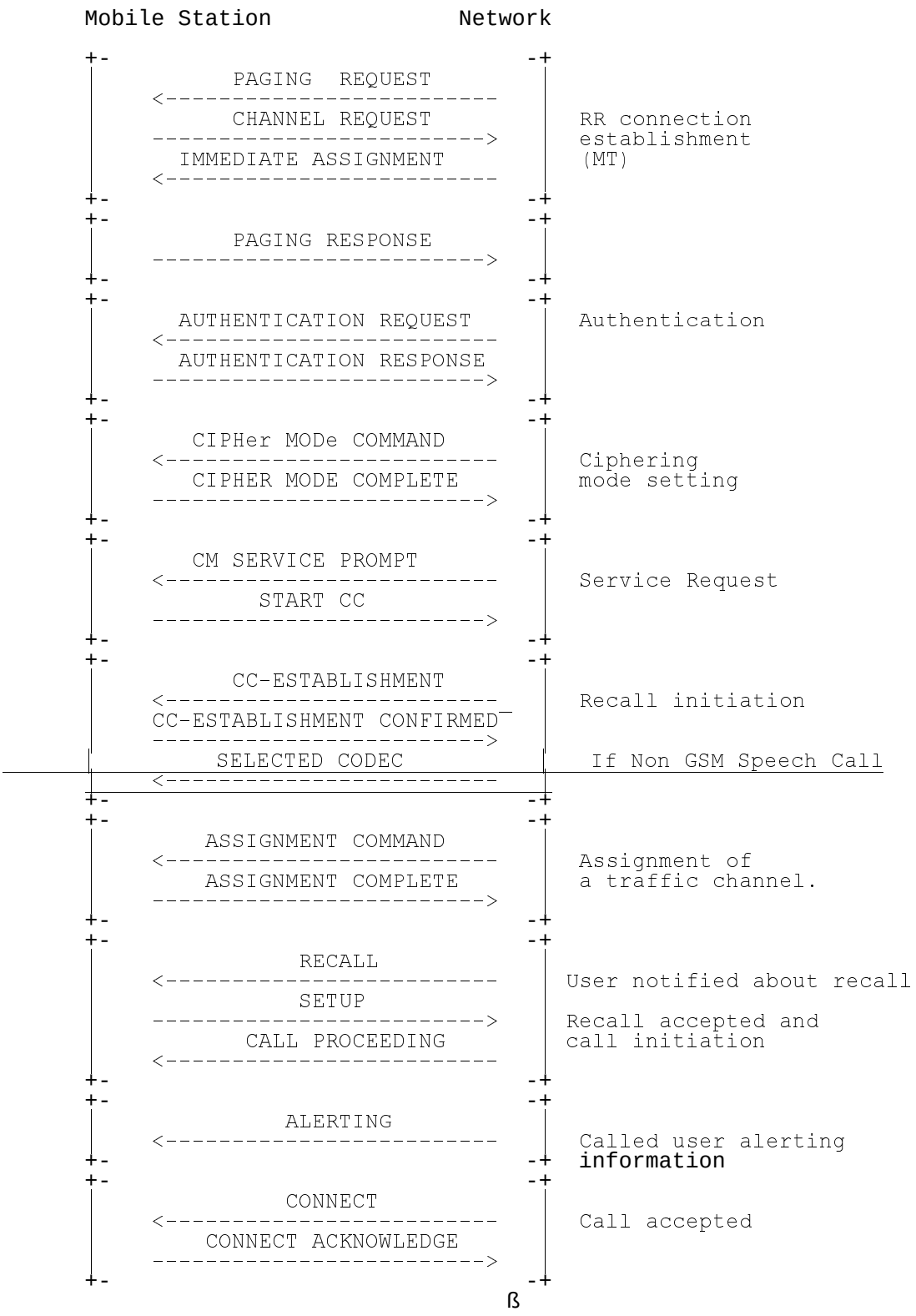

Figure 7.19/ TS23.108 Network initiated mobile originating call establishment with assignment before A party alerting

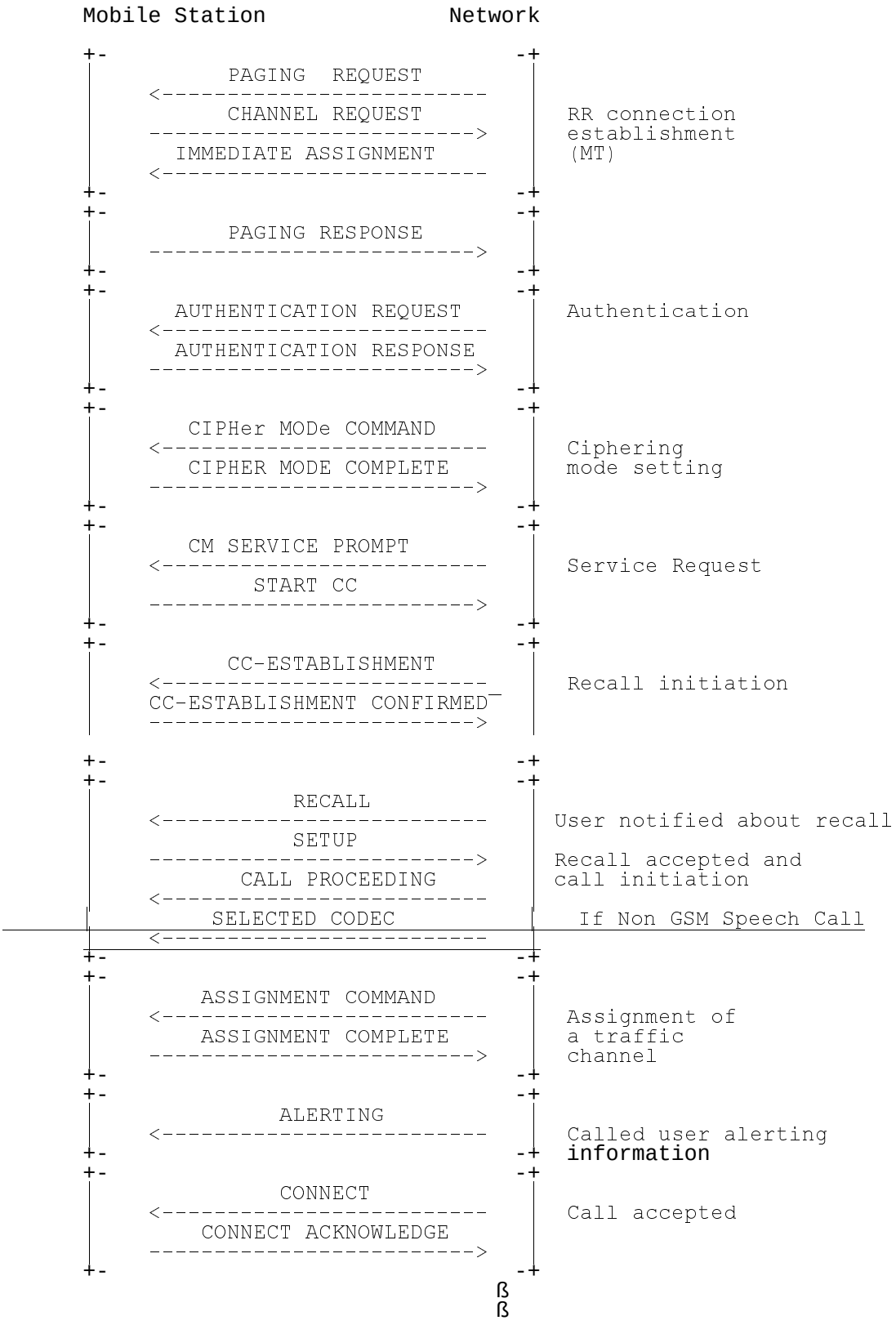

Figure 7.20/ TS23.108 ~~TS 23.108~~ Network initiated mobile originating call establishment with assignment before B party alerting

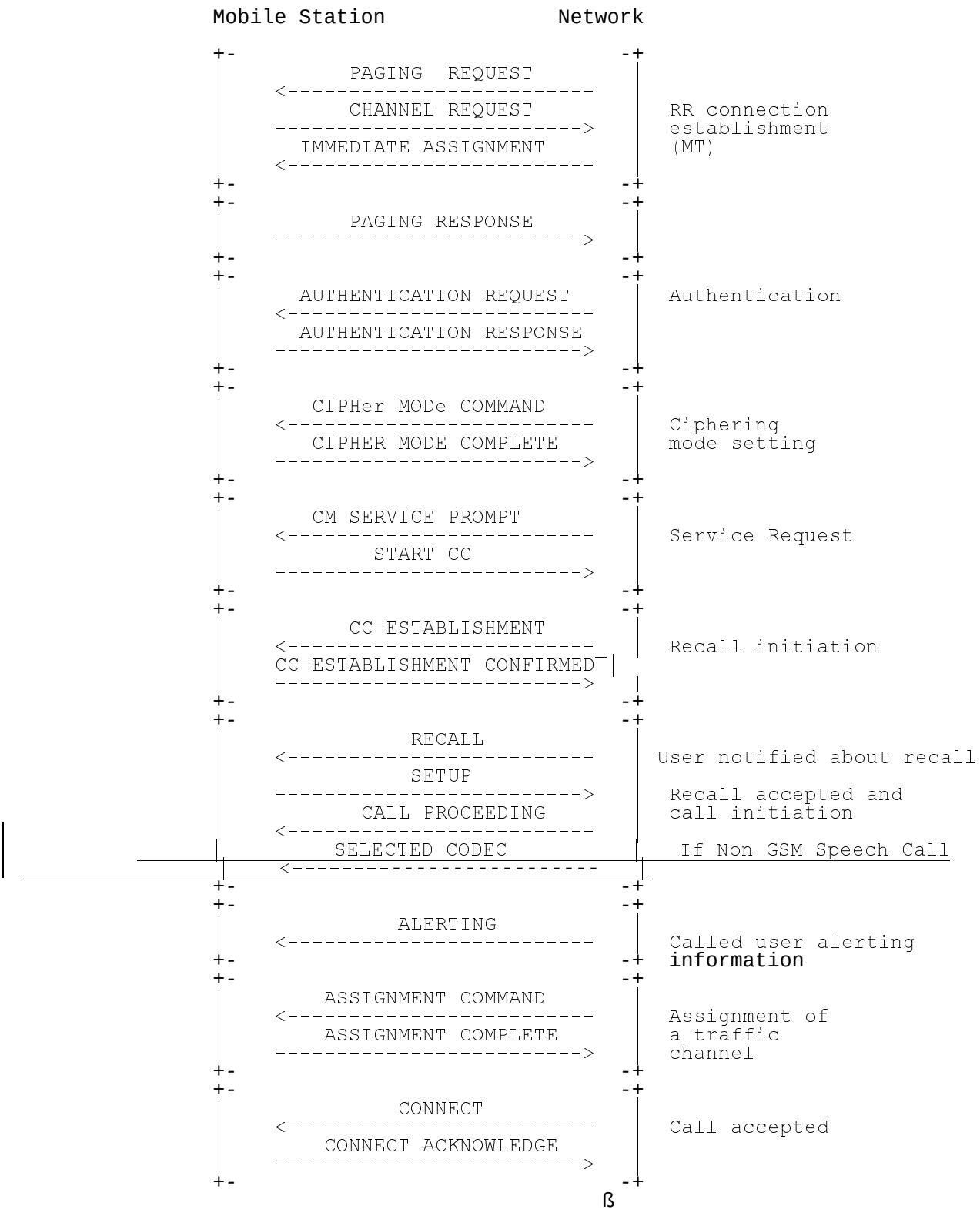

Figure 7.21/ TS23.108 Network initiated mobile originating call establishment with assignment after A and B party alerting