**Source:**       **TSG CN WG 1**

**Title:**        **CRs to Rel-4 (with mirror CR) on Work Item TrFO towards 24.008**

**Agenda item:**  **7.7**

**Document for:**  **APPROVAL**

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**Introduction:**

This document contains **3** CRs on **R99 and Rel-4 with mirror CR on** Work Item **"TrFO"**, that have been agreed by **TSG CN WG1**, and are forwarded to TSG CN Plenary meeting #16 for approval.

| Spec | CR | Rev | Phase | Subject | Cat | Version Current | Version-New | Meeting-2nd-Level | Doc-2nd-Level |
|------|-----|-----|-------|---------|-----|---------|-------|-----------|-----------|
| 24.008 | 535 | 2 | Rel-4 | Correction of codec negotiation procedure | F | 4.6.0 | 4.7.0 | N1-23 | N1-020887 |
| 24.008 | 536 | 2 | Rel-5 | Correction of codec negotiation procedure | A | 5.3.0 | 5.4.0 | N1-23 | N1-020888 |
| 24.008 | 572 | 1 | R99 | Support of UMTS AMR 2 in R99 | F | 3.11.0 | 3.12.0 | N1-23 | N1-020720 |

*CR-Form-v5*

# CHANGE REQUEST

⌘ **24.008 CR 535** ⌘ **rev 2** ⌘ Current version: **4.6.0** ⌘

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

**Proposed change affects:** ⌘  (U)SIM ☐  ME/UE **X**  Radio Access Network ☐  Core Network **X**

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of codec negotiation procedure |
| ***Source:*** | ⌘ | SIEMENS AG |
| ***Work item code:*** | ⌘ TRFO-OOB | ***Date:*** ⌘ 02.04.02 |

**Category:** ⌘ **F**

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

**Release:** ⌘ REL-4

Use one of the following releases:
2        (GSM Phase 2)
R96      (Release 1996)
R97      (Release 1997)
R98      (Release 1998)
R99      (Release 1999)
REL-4    (Release 4)
REL-5    (Release 5)

| | |
|---|---|
| ***Reason for change:*** ⌘ | 1) Currently, requirements to the ME can be found in subclauses specifying the network behaviour and vice versa, which makes it difficult for implementers to find the complete set of requirements. A clearer separation between requirements to the ME and requirements to the network is proposed.

2) Recently, SA4 agreed that from Rel-4 onwards, UMTS AMR 2 replaces UMTS AMR as the default codec for speech services (SP-020078). This allows to simplify the wording in phrases like "A ME which supports UMTS codecs different from the UMTS AMR codec …", as this condition is always true, and thereby to clarify the requirements. Furthermore, in subclause 5.2.1.11, the definition of the default UMTS speech codec for R99 and Rel-4 terminals is removed to avoid conflicting requirements.

3) The statement in 5.2.1.2, "For GSM speech calls where no speech versions are included in *Bearer Capability IE* the network shall assume GSM speech version 1." is misleading, as in case of absence of octet 3a, etc. the radio channel requirement parameter will indicate which GSM codecs are supported by the ME (GSM speech version full rate 1, or both full rate 1 and half rate 1). The case that needs to be dealt with is that no *Bearer Capability* IE is included at all.

4) The terms "UMTS speech call" and "GSM speech call" were replaced by the general term "speech call", which may take place "in UMTS" or "in GSM", to avoid ambiguities like whether a speech call which was established in UMTS is still a UMTS speech call after inter-system handover.

5) Subclause 5.2.1.11: the sentence "If the *Supported Codec List* IE is received, the network shall select a codec from the list of codecs and indicate this to the ME via RANAP and RRC protocol in NAS Synchronisation Indicator IE." can be interpreted as a requirement that every Rel-4 network has to support UMTS AMR 2. This was not intended.

6) The description of the handling of the *Supported Codec List* IE in subclauses |

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5.2.3.2, CC-Establishment present, and 5.2.3.2.1, Recall alignment procedure, is incomplete.

7) In subclause 5.3.4.3.2 it is clarified that the *Supported Codec List* IE to be used by the network is received during call establishment. (I.e. no *Supported Codec List* IE is included in the MODIFY message.)

8) Subclause 5.3.3: the condition needs to be changed, as an MS may support only UMTS AMR 2.

9) Alignment between downlink signalling during call establishment (5.2.1.11) and in-call modification (5.3.4.3.2): if a Support Codec List IE is received, then the network will always indicate the selected codec explicitly.

10) Subclause 9.3.2.2, bullet 5: implicit signalling of UMTS speech codecs ("Except in the case …") no longer applies to the MS. Furthermore, it needs to be clarified that the condition "other speech versions than GSM speech version 1" refers to "other GSM speech versions".

11) The conditions for inclusion of the Supported Codec List IE in various message in clause 9 contain requirements which are given also in the call control procedures (clause 5), or in the definition of the Supported Codec List IE (10.5.4.32), and sometimes in both places. It is proposed to remove this text from clause 9 to avoid conflicting requirements.

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<td>***Summary of change:*** ⌘</td>
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<td>***Consequences if not approved:***</td>
<td>⌘</td>
<td>Without the changes the codec negotiation and selection procedures are partly wrong, partly incomplete, and partly hard to understand. Furthermore, the wording is not aligned to SA4's latest requirements concerning the support of UMTS_AMR_2.</td>
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<tr>
<td>***Clauses affected:***</td>
<td>⌘</td>
<td>5.2, 5.2.1, 5.2.1.2, 5.2.1.11, 5.2.2.3.1, 5.2.2.3.2, 5.2.2.10 (new), 5.2.3.2, 5.2.3.2.1, 5.2.3.3, 5.3.3, 5.3.4, 5.3.4.3.2, 9.3.2, 9.3.2.2, 9.3.2.6, 9.3.8.1, 9.3.8.3, 9.3.17b.2, 9.3.17b.4, 9.3.23.2.16</td>
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<td>***Other specs affected:***</td>
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<td>***Other comments:***</td>
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**How to create CRs using this form:**
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

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

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

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

## 5.2 Call establishment procedures

Establishment of a call is initiated by request of upper layer in either the mobile station or the network; it consists of:

- the establishment of a CC connection between the mobile station and the network;

- the activation of the codec or interworking function.

Whenever it is specified in the present document clause 5 that the mobile station shall attach the user connection, this means that the mobile station shall activate the codec or interworking function as soon as an appropriate channel is available. The mobile station shall de-activate the codec or interworking function whenever an appropriate channel is no longer available. As soon as an appropriate channel is (again) available, the codec or interworking function shall be re-activated. If a new order to attach the user connection is received, the new order shall supersede the previous one.

A channel shall be considered as appropriate if it is consistent with the possibly negotiated bearer capability applicable for the actual phase of the call. The mobile station shall not consider a channel as not appropriate because the type of the channel (full rate/half rate) is not the preferred one. If:

- the user connection has to be attached but no appropriate channel is available for a contiguous time of 30 seconds; or if

- the codec or interworking function is de-activated for a contiguous time of 30 seconds;

then the mobile station may initiate call clearing.

Upon request of upper layers to establish a call, restricting conditions for the establishment of the call are examined. These restricting conditions concern the states of parallel CC entities and are defined elsewhere. If these restricting conditions are fulfilled, the call establishment is rejected. Otherwise a CC entity in state U0, "null", is selected to establish the call. It initiates the establishment by requesting the MM sublayer to establish an MM connection.

In Iu mode, if the lower layers indicate the release of a radio access bearer, whereas as the corresponding call is still active e, the MS shall not automatically initiate the release of that call.

## 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 3GPP TS 23.067 [88]. 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 subclause 4.5.1.7.

The mobile station supporting multicall that is initiating an emergency call shall release one or more existing call to ensure the emergency call can be established if the multicall supported information stored in the mobile station described in subclauses 5.2.1.2 and 5.2.2.1 indicates the network does not support multicall and some ongoing calls exists.

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. A ME which supports UMTS codecs different from the UMTS AMR codec shall include a list of supported codecs in *Supported Codec List* IE. Otherwise default UMTS AMR (see subclause 5.2.1.11) speech version shall be assumed by the network.

For a GSM established call the list shall be used by the network for handover to UMTS.

The mobile station 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 the mobile station supports multicall, it shall include the Stream Identifier (SI) information element. For the first call i.e. when there are no other ongoing calls the SI value shall be 1.

For speech calls the mobile station shall indicate all codecs that it supports for UMTS in the *Supported Codec List* information element. Codecs for GSM shall be indicated in the *Bearer Capability* information element, if this information element is included.

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.

## 5.2.1.1 Call initiation

The "call initiated" state is supervised by timer T303.For normal MO calls, this timer will have already been started after entering the "MM connection pending" state. For network-initiated MO calls this timer will be started in the recall present state as defined in subclause 5.2.3.4

When the call control entity of the mobile station is in the "call initiated" state and if it receives:

    i) a CALL PROCEEDING message, it shall proceed as described in subclause 5.2.1.3;

    ii) an ALERTING message, it shall proceed as described in subclause 5.2.1.5;

    iii) a CONNECT message, it shall proceed as described in subclause 5.2.1.6;

    iv) a RELEASE COMPLETE message it shall proceed as described in subclause 5.2.1.2.

Abnormal case:

-    If timer T303 elapses in the "call initiated" state before any of the CALL PROCEEDING, ALERTING, CONNECT or RELEASE COMPLETE messages has been received, the clearing procedure described in subclause 5.4 is performed.

## 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 subclause 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.

In UMTS, network shall include the SI received in the SETUP message into the RABid and send it back to the mobile station. For RABid see 3GPP TS 25.413. If the network receives the SETUP message with no SI, the network shall set the SI value to 1.

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 subclause 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 subclause 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 shall also contain the priority of the call in the case where the network supports eMLPP. 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.

NOTE:  If the network supports only R98 or older versions of this protocol and the priority is not included in the CALL PROCEEDING message, this does not imply that the network does not support eMLPP.

- The CALL_PROCEEDING message shall contain the multicall supported information in the network call control capabilities in the case where the network supports multicall and there are no other ongoing calls to the MS. Mobile stations supporting multicall shall store this information until the call control state for all calls returns to null. Mobile stations not supporting multicall shall ignore this information if provided in a CALL PROCEEDING message. If the multicall supported information is not sent in the CALL_PROCEEDING message, the mobile station supporting multicall shall regard that the network doesn't support multicall.

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 subclause 5.2.1.9 (early assignment).

For UMTS speech calls no UMTS speech versions shall be included in *Bearer Capability IE;* if the SETUP includes a list of supported codecs in *Supported Codec List IE* then the network shall use this list to select the required codec type, see Chapter 5.2.1.11. Otherwise the default UMTS AMR (see subclause 5.2.1.11) speech version shall be assumed.

For a GSM established call the list shall be used by the network for handover to UMTS.

~~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.~~

For speech calls, if the SETUP message or EMERGENCY SETUP message contains a *Supported Codec List* information element, the network shall use this list to select the codec for UMTS. If no *Supported Codec List* information element is received, then for UMTS the network shall select the default UMTS speech codec according to subclause 5.2.1.11.

Codecs for GSM shall be selected from the codecs indicated in the *Bearer Capability* information element. If no *Bearer Capability* information element is received, then for GSM the network shall select GSM full rate speech version 1.

Codec information that does not apply to the currently serving radio access shall be used by the network if an inter-system change occurs.
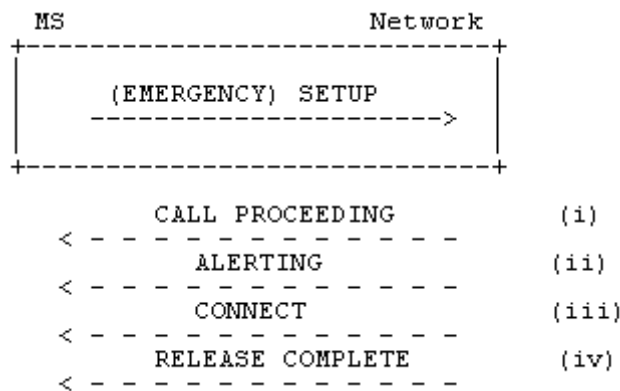


**Figure 5.2/3GPP TS 24.008 Mobile originated call initiation and possible subsequent responses.**

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# Next modified section

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## 5.2.1.11    Speech Codec Selection

~~The network can receive *Supported Codec List* IE in call establishment messages from the ME to inform the network of the codec types that it supports.~~ For speech calls, a mobile station implementing this version of the protocol shall indicate all codecs that it supports for UMTS in the *Supported Codec List* information element. Codecs for GSM shall be indicated in the *Bearer Capability* information element, if this information element is included.

If the network does not receive a *Supported Codec List* ~~IE~~ information element then for speech calls in UMTS it shall select the default UMTS ~~AMR~~ speech codec ~~version shall be assumed~~.

~~The default UMTS speech version for "R99 UMTS only" terminals is UMTS_AMR. The default UMTS speech version for terminals supporting GSM & UMTS radio accesses is UMTS_AMR_2. For further details see 3GPP TS 26.103 [83].~~

> ~~NOTE:     If the UE supports 'UMTS_AMR_2' and the network is R99 and assumes 'UMTS_AMR' then no interworking problems will occur.~~

For speech calls in GSM, if the network does not receive a *Bearer Capability* information element, the network shall select GSM full rate speech version 1.

The network shall determine the default UMTS speech codec~~version~~ by the following:

i)       If no GSM Speech Version codepoints are received in octet 3a etc. of the *Bearer Capabilities* IE then a "UMTS only" terminal is assumed and the default UMTS speech codec~~version~~ shall be UMTS_AMR.

ii)      If at least one GSM Speech Version codepoint is received in octet 3a etc. of the *Bearer Capabilities* IE then~~and~~ the ME supports GSM and UMTS ~~then~~and the default UMTS speech version shall be UMTS_AMR_2.

NOTE 1: In case (ii), if the call is set up in GSM by a R99 ME, call control in the core network may treat the ME as a "GSM only" ME. The default UMTS ~~AMR~~ speech codec~~version~~ will only become relevant when an intersystem handover to UMTS is initiated by the radio access network, and can be determined when this procedure is started.

If the *Supported Codec List* IE is received, then the network shall use this list to select the codec for UMTS ~~select a codec from the list of codecs~~ and indicate the selected codec ~~this~~ to the ME via RANAP and RRC protocol in the NAS Synchronisation Indicator IE. See 3GPP TS 25.413 and 3GPP TS 25.331 [32c].

The NAS Synchronisation Indicator IE shall be coded as the 4 least significant bits ~~Coding~~ of the selected codec type (CoID) ~~shall be, as~~ defined in ~~3GPP~~ 3GPP TS 26.103 [83], subclause 6.3.

The network shall determine the preference for the selected codec type; codec type prioritisation is not provided by the ME.

The ME shall activate the codec type received in the NAS Synchronisation Indicator IE.

If the mobile station does not receive the NAS Synchronisation Indicator IE (RRC protocol) then it shall select~~assume default~~the UMTS_-AMR_2 speech codec~~version~~.

NOTE 2: If the network does not support UMTS_AMR_2, it may activate the UMTS_AMR codec and indicate to the mobile station that it shall select UMTS_AMR_2. According to 3GPP TS 26.103 [83], subclause 5.4, no interworking problem will occur in this case.

For adaptive multirate codec types no indication of subsets of modes is supported in this protocol, from the mobile station~~ME~~ or to the mobile station~~ME~~. It is a pre-condition that the support of such codec types by the mobile station~~ME~~ implicitly includes all modes defined for that codec type.

## 5.2.2 Mobile terminating call establishment

Before call establishment can be initiated in the mobile station, the MM connection must be established by the network.

### 5.2.2.1 Call indication

After the arrival of a call from a remote user, the corresponding call control entity in the network shall: initiate the MM connection establishment according to clause 4 and enter the "MM connection pending" state. The request to establish the MM connection is passed from the CM sublayer to the MM sublayer. It contains the necessary routing information derived from the SETUP message.

Upon completion of the MM connection, the call control entity of the network shall: send the SETUP message to its peer entity at the mobile station, start timer T303 and enter the "call present" state.

The SETUP message shall contain the multicall supported information in the network call control capabilities in the case where the network supports multicall and there are no other ongoing calls to the MS. Mobile stations supporting multicall shall store this information until the call control state for all calls returns to null. Mobile stations not supporting multicall shall ignore this information if provided in a SETUP message. If the multicall supported information is not sent in the SETUP message, the mobile station supporting multicall shall regard that the network does not support multicall.

Upon receipt of a SETUP message, the mobile station shall perform compatibility checking as described in subclause 5.2.2.2. If the result of the compatibility checking was compatibility, the call control entity of the mobile station shall enter the "call present" state. An incompatible mobile station shall respond with a RELEASE COMPLETE message in accordance with subclause 5.2.2.3.4.

If no response to the SETUP message is received by the call control entity of the network before the expiry of timer T303, the procedures described in subclause 5.2.2.3.3 shall apply.
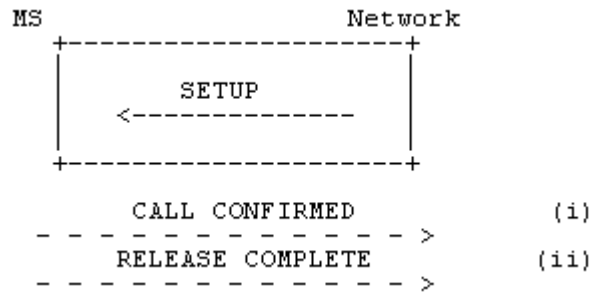
**Figure 5.6/3GPP TS 24.008 Mobile terminating call initiation and possible subsequent responses.**

## 5.2.2.2 Compatibility checking

The mobile station receiving a SETUP message shall perform compatibility checking before responding to that SETUP message. Annex B defines compatibility checking to be performed by the mobile station upon receiving a SETUP message.

## 5.2.2.3 Call confirmation

### 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.

If the mobile station supports multicall, it shall include the Stream Identifier (SI) information element in the CALL CONFIRMED message.

If the mobile station is located in the network supporting multicall, it shall never include the SI that is in use and shall include with either of the following two values:

- SI="no bearer";

- SI=new value (not used by any of the existing bearers).

If the mobile station supporting multicall is located in the network not supporting multicall, it shall include the SI with value 1.

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 3GPP TS 29.007 [38]). 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. A ME which supports UMTS codecs different from the UMTS AMR codec shall include the supported codecs in *Supported Codec List* IE in the CALL CONFIRMED message, otherwise default UMTS AMR (see subclause 5.2.1.11) speech version shall be assumed by the network.~~ In any case the rules specified in subclause 9.3.2.2 shall be followed.

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

For speech calls the mobile station shall indicate all codecs that it supports for UMTS in the *Supported Codec List* information element. Codecs for GSM shall be indicated in the *Bearer Capability* information element, if this information element is included.

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 subclause 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.

In UMTS, network shall include the SI received in the CALL CONFIRMED message into the RABid and send it back to the mobile station. For RABid see 3GPP TS 25.413. If the network receives the CALL CONFIRMED message with no SI, the network shall set the SI value to 1.

For speech calls, if the CALL CONFIRMED message contains a *Supported Codec List* information element, the network shall use this list to select the codec for UMTS. If no *Supported Codec List* information element is received, then for UMTS the network shall select the default UMTS speech codec according to subclause 5.2.1.11.

Codecs for GSM shall be selected from the codecs indicated in the *Bearer Capability* information element. If no *Bearer Capability* information element is received, then for GSM the network shall select GSM full rate speech version 1.

Codec information that does not apply to the currently serving radio access shall be used by the network if an inter-system change occurs.

For UMTS speech calls no UMTS speech versions shall be included in *bearer capability IE;* if the CALL CONFIRMED message includes a list of supported codecs in *Supported Codec List IE* then the network shall use this list to select the required codec type, see subclause 5.2.1.11. If no *Supported Codec List IE* is received by the network then default UMTS AMR (see subclause 5.2.1.11) 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 subclause 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.

In the "mobile terminating call confirmed" state or the "call received" state, if the user of a mobile station is User Determined User Busy then a DISCONNECT message shall be sent with cause #17 "user busy". In the "mobile terminating call confirmed" state, if the user of a mobile station wishes to reject the call then a DISCONNECT message shall be sent with cause #21 "call rejected".

## 5.2.2.10　　Speech Codec Selection

The principles described in section 5.2.1.11 apply accordingly.

## 5.2.3　Network initiated MO call $(CCBS)$

The procedures of subclause 5.2.3 are mandatory for mobile stations supporting "Network initiated MO call".

> NOTE:　The behaviour of a mobile station that does not support "Network initiated MO call" is described in clause 4.

### 5.2.3.1　Initiation

Before call establishment can be initiated in the mobile station, the MM connection shall be established by the network.

After the arrival of an appropriate stimulus (for example a Remote User Free Indication), the corresponding call control entity in the network shall initiate the MM connection establishment according to clause 4, enter the "CC connection pending" state and start timer T331. The request to establish the MM connection is passed from the CM sublayer to the MM sublayer. It contains the necessary routing information derived from the received stimulus.

Upon completion of the MM connection, the call control entity of the mobile station shall send a START CC message to its peer entity in the network. The mobile station shall then enter the "Wait for network information" state and start timer T332.

If the network receives a START CC message while in the "CC connection pending" state, the network stops T331, sends the CC-ESTABLISHMENT message, starts timer T333 and enters the "CC-establishment present" state.

The MM connection establishment may be unsuccessful for a variety of reasons, in which case the MM sublayer in the network will inform the CC entity in the network with an indication of the reason for the failure. The CC entity shall then stop all running timers, enter the "Null" state and inform all appropriate entities within the network.

If timer T331 expires, the network shall abort the MM connection establishment attempt, stop all running CC timers, enter the "Null" state and inform all appropriate entities within the network.

### 5.2.3.2　CC-Establishment present

In the "CC establishment present" state, the mobile station, upon receipt of the CC-ESTABLISHMENT message, shall stop timer T332.

The CC-ESTABLISHMENT message contains information which the mobile station shall use for the subsequent SETUP message (if any) related to this CC-ESTABLISHMENT.

The CC-ESTABLISHMENT message shall contain the *Setup Container IE*.

If no CC-ESTABLISHMENT message is received by the call control entity of the mobile station before the expiry of timer T332, then the mobile station shall initiate clearing procedures towards the network using a RELEASE COMPLETE message with cause #102 "recovery on timer expiry" and proceed in accordance with subclause 5.4.2.

Upon receipt of a CC-ESTABLISHMENT message the mobile station shall perform checks on the Setup Container IE in order to align the contained information with the mobile's present capabilities and configuration. The "recall alignment procedure" is defined later on in this subclause.

If the recall alignment procedure has succeeded, the call control entity of the Mobile Station shall:

- form and store the SETUP message for sending later in the "Recall present" state,

- acknowledge the CC-ESTABLISHMENT message with a CC-ESTABLISHMENT CONFIRMED message,

- start timer T335, and

- enter the "CC-establishment confirmed" state.

Exception:

A busy mobile station which has successfully performed the recall alignment procedure shall respond with a CC-ESTABLISHMENT CONFIRMED message with cause #17 "user busy", and proceed as stated above.

For speech calls the mobile station shall indicate all codecs that it supports for UMTS in the *Supported Codec List* information element of the CC-ESTABLISHMENT CONFIRMED message. Codecs for GSM shall be indicated in the *Bearer Capability* information element.

A mobile station, for which the recall alignment procedure failed, shall respond with a RELEASE COMPLETE message in accordance with subclause 5.4.2 with the appropriate cause code as indicated in the description of the recall alignment procedure.

The SETUP message is constructed from the *Setup Container IE* received in the CC ESTABLISHMENT MESSAGE. The mobile station shall assume that the *Setup Container IE* contains an entire SETUP message with the exception of the Protocol Discriminator, Transaction ID and Message Type elements. The mobile station may assume that the contents of the *Setup Container IE* are the same as were sent from the subscriber in a previous SETUP message of the mobile originating call establishment attempt. The mobile station shall copy the *Setup Container* to the SETUP message and not modify the contents except as defined in the recall alignment procedure and as defined in *exceptions* below. The mobile station shall not add other Information Elements to the end of the SETUP message.

Exceptions:

*Bearer Capability IE(s), HLC IE(s) and LLC ~~(s)~~ IE(s) (*including *Repeat Indicator(s),* if there are 2 bearer capabilities)*, and the *Supported Codec List IE* require handling as described in the recall alignment procedure below.

If the *CC Capabilities* in the *Setup Container IE* is different to that supported by the mobile station, the mobile station shall modify the *CC Capabilities* in the SETUP message to indicate the true capabilities of the mobile station.

*Facility IE(s) and SS Version IE(s)* require handling as described in the recall alignment procedure.

*Stream Identifier IE* requires handling as described in the recall alignment procedure.

If no response to the CC-ESTABLISHMENT message is received by the call control entity of the network before the expiry of timer T333, then the network shall initiate clearing procedures towards the called mobile station using a RELEASE COMPLETE message with cause #102 "recovery on timer expiry" and inform all appropriate entities within the network, proceeding in accordance with subclause 5.4.2.

```
MS                                   Network
+-----------------------------------+
|       CC-ESTABLISHMENT            |
|          <--------------          |
|                                   |
|  CC-ESTABLISHMENT CONFIRMED|      (i)
|  - - - - - - - - - - - - >        |
|        RELEASE COMPLETE    |      (ii)
|  - - - - - - - - - - - - >        |
+-----------------------------------+
```
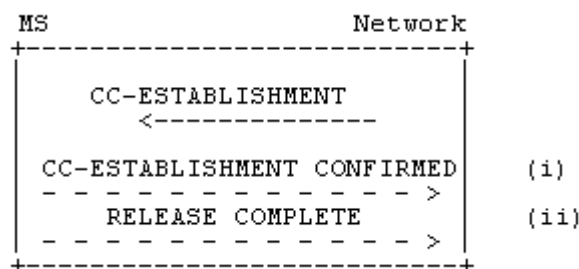
**Figure 5.7a/3GPP TS 24.008 Call initiation and possible subsequent responses.**

## 5.2.3.2.1 Recall Alignment Procedure

The recall alignment procedure consists of three parts:

- basic service group alignment,

- facility alignment, and

- stream identifier alignment.

Basic service group alignment:

The mobile station shall check that the *Bearer Capability, HLC* and *LLC* and *Repeat Indicator* fields, which are embedded in the *Setup Container IE,* match a basic service group supported by the mobile station.

If this check fails, then the recall alignment procedure has failed. The mobile station shall use the cause #88 "incompatible destination" afterwards.

Otherwise, the mobile station is allowed to alter the content within the *Bearer Capability, HLC,* and *LLC* ~~and~~ *~~Supported Codec List~~* Information Elements (e.g. the speech codec version(s), the data rate, the radio channel requirement) provided that the basic service group is not changed. Furthermore, for speech calls the mobile station is allowed to add or remove the *Supported Codec List* Information Element, or to alter the contents of this information element dependent on the codecs supported by the mobile station. The result shall be that the mobile station has derived *Bearer Capability, HLC,* ~~and~~ *LLC, and Supported Codec List* Information Elements, which it can use for a later call setup according to its configuration and capabilities.

Facility alignment:

> This only applies if the *Setup Container* contains 1 or more *Facility IEs.* Each *Facility IE* within the *Setup Container* will be associated with the common *SS Version IE,* if present. The handling for each *Facility IE* is defined below. The mobile station shall align each facility IE contained in the *Setup Container.* The rules defined in 3GPP TS 24.010 also apply.

The *Facility IE* is encoded as 'simple recall alignment', 'advanced recall alignment' or 'recall alignment not essential' (see 3GPP TS 24.010). If the encoding indicates, that

- a simple recall alignment is required, the mobile station shall copy the Facility IE and the common SS version IE from the *Setup Container* to the SETUP message without modifying the content.

- an advanced recall alignment is required, the mobile station must recognise and support the operation defined in the facility. If the mobile station does not recognise or support the operation, then the recall alignment procedure has failed and the mobile station shall use the cause #29 "facility rejected" in the subsequent rejection of the CC establishment request.

- the recall alignment is not essential, then the facility operation is not an essential part of the SETUP. If the MS does not recognise the operation then the SS Version IE and Facility IE are discarded, and NOT copied into the SETUP message.

> NOTE. A mobile station may include a *Facility IE* without an associated *SS Version IE.* This would indicate that the SS operation is encoded using Phase 1 protocols.

Further details on Facility handling are given in 3GPP TS 24.010

Stream identifier alignment:

The mobile station shall check whether the *Stream Identifier* field is contained in the *Setup Container* or no*t.*

If the *Stream Identifier* is contained in the *Setup Container*, the mobile station shall behave as one of the following.

- the mobile station re-assign the *Stream Identifier* value, and modify the *Stream Identifier* field.

- the mobile station remove the *Stream Identifier* field.

If the *Stream Identifier* is not contained in the *Setup Container*, the mobile station may behave as follows.

- the mobile station assign the *Stream Identifier* value, and add the *Stream Identifier IE* to the end of the SETUP message.

## 5.2.3.3    CC-Establishment confirmation

The call control entity of the network in the "CC-establishment present" state, shall, upon receipt of a CC-ESTABLISHMENT CONFIRMED message, stop timer T333 and enter the "CC-establishment confirmed" state.

For speech calls, if the ESTABLISHMENT CONFIRMED message contains a *Supported Codec List* information element, the network shall use this list to select the codec for UMTS. If no *Supported Codec List* information element is received, then for UMTS the network shall select the default UMTS speech codec according to subclause 5.2.1.11.

Codecs for GSM shall be selected from the codecs indicated in the *Bearer Capability* information element. If no *Bearer Capability* information element is received, then for GSM the network shall select GSM full rate speech version 1.

Codec information that does not apply to the currently serving radio access shall be used by the network if an inter-system change occurs.

In the "CC-establishment confirmed" state, the network sends a RECALL message. This message initiates user alerting and also shall include the Facility IE (providing additional information to be presented to the user for notification). The network starts timer T334 and enters the 'recall present' state.

Upon reception of the RECALL message the Mobile station stops T335 and enters the "recall present" state.

Additionally, for UMTS speech calls a ME which supports more than UMTS AMR codec shall include the list of supported codecs in *Supported Codec List* IE in the ESTABLISHMENT CONFIRMED message.

If a *Supported Codec List* IE is received the network shall use the codec list for codec selection. See subclause 5.2.1.11. If no *Supported Codec List* IE is received by the network then default UMTS AMR (see subclause 5.2.1.11) speech version shall be assumed.
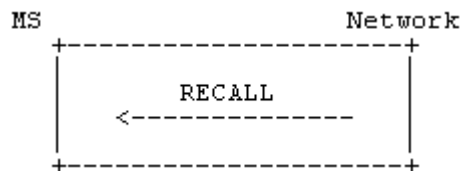
```
MS                              Network
+--------------------+
|                    |
|      RECALL        |
|   <------------    |
|                    |
+--------------------+
```

**Figure 5.7b/3GPP TS 24.008 Recall**

## 5.2.3.4    Recall present

In the "recall present" state, the call control entity in the mobile station waits for acceptance of the Recall by the user. Once confirmation is received, the mobile station indicates acceptance of a recall by

- sending a SETUP message to its peer entity in the network;

- starting Timer T303; and

- entering the "call initiated" state and proceeding as described in subclause 5.2.1.1.

The MS shall ensure that the contents of the *Bearer Capability IE(s)* and *Supported Codec List* IE sent in the SETUP message are the same as the *Bearer Capability IE(s)* and *Supported Codec List* IE in the previous CC-ESTABLISHMENT CONFIRMED message related to this Network Initiated MO Call.

In the "recall-present" state, if the user of a mobile station is User Determined User Busy then a RELEASE COMPLETE message shall be sent with cause #17 "user busy" In the "recall-present" state. If the user of a mobile station wishes to reject the recall then a RELEASE COMPLETE message shall be sent with cause #21 "call rejected".

In either case, the mobile shall release the connection in accordance with subclause 5.4.2

On receipt of the SETUP message in the "recall present" state, the network shall stop timer T334 and proceed as specified in subclause 5.2.1.2.

If the call control entity of the network does not receive a SETUP message before the expiry of timer T334, then the network shall send a RELEASE COMPLETE message to the mobile using cause #102 "recovery on timer expiry", release the MM connection, enter the "null" state and shall inform all appropriate entities within the network.
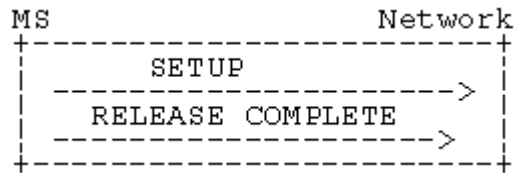
**Figure 5.7b/3GPP TS 24.008 Recall acceptance or rejection by user**

### 5.2.3.5 Traffic channel assignment during network initiated mobile originating call establishment

It is a network dependent decision whether or not to initiate the assignment of a traffic channel during the "CC-establishment confirmed" state.

# 5.3 Signalling procedures during the "active" state

## 5.3.1 User notification procedure

The mobile terminating user notification procedure allows the network to notify a mobile station of any appropriate call-related event during the "active" state of a call. The procedure consists in the network sending a NOTIFY message to the mobile station. No state change occurs at any of the interface sides following the sending or the receipt of this message (but an appropriate indication may optionally be generated in the mobile station).

The mobile originating notification procedure allows the mobile station to notify the remote user of any appropriate call-related event during the "active" state of a call by sending a NOTIFY message containing a notification indicator to the network; upon receipt of this message, the network sends a NOTIFY message containing the same notify indicator to the other user involved in the call. No state change occurs at any of the interface sides following the sending or the receipt of this message.

## 5.3.2 Call rearrangements

Call rearrangements on the radio interface are not supported by explicit messages (e.g. SUSPEND and RESUME messages as defined in ETS 300 102-1 [70]). However if a remote non-PLMN user initiates call rearrangements, the network shall inform the mobile station by means of a NOTIFY message. In a similar way the mobile station can inform the network about rearrangements by sending a NOTIFY message (e.g. change of user equipment connected to the mobile station).

## 5.3.3 Codec Change Procedure

If a mobile station~~ME~~ supports more than one UMTS codec~~s different from the UMTS AMR speech codec (*Supported Codec List* IE received by the network)~~ the network can modify the codec due to Out Of Band Transcoder Control procedures. If this is the case, the network shall send a codec type in RANAP NAS Synchronisation Indicator IE in order to inform the mobile station to change codec. See subclause 5.2.1.11.

## 5.3.4 Support of Dual Services

The behaviour described in this subclause is used to realize the following required services throughout subclause 5.3.4. The mobile station is not obliged to support the network originated in-call modification procedure. In that case, the mobile station shall, when receiving a MODIFY message, treat the message as unknown and react as described in subclause 8.4. If the mobile station is already prepared to support the procedure in both directions, it shall act as described in this subclause.

Alternate Speech/Group 3 fax (Teleservice 61 according to 3GPP TS 22.003 [4]).

## 5.3.4.1　Service Description

This circuit switched service allows the two users on a point-to-point connection to use the connection between them for different information transfer during the same call, but not at the same time.

If the negotiation during call establishment leads to the recognition of the above mentioned services, the in-call modification procedure is allowed to be executed within the current call by changing from one call mode to the other.

In some cases the in-call modification procedure makes it necessary to change the channel configuration by allocating a new channel and in other cases to change channel configuration parameters while keeping the previously allocated channel. This change is determined by the network, which initiates either the channel assignment procedure, handover procedure or channel mode modify procedure (see clause 3).

The capability and the initial mode desired must be identified by the mobile station by identifying each mode of operation with a separate information element during call establishment. Further the type of change between the modes must be identified by means of the repeat indicator:

> mode 1 "alternate" mode 2.

## 5.3.4.2　Call establishment

For both mobile originating and mobile terminating calls, the normal call establishment procedures apply.

### 5.3.4.2.1　Mobile Originating Establishment

The service is requested by the originating mobile station by transferring a SETUP message to the network containing the *BC repeat indicator* IE, the *bearer capability 1* information element, and the *bearer capability 2* information element. The first mode of operation ("call mode") shall be indicated by the *bearer capability 1* information element and the second call mode by the *bearer capability 2* information element.

A low layer compatibility may optionally be specified for each call mode in a *low layer compatibility I* and *low layer compatibility II* information element. In that case:

- the SETUP message shall contain the *LLC repeat indicator* IE and both *low layer compatibility I* and *low layer compatibility II* information elements. The *low layer compatibility I* information element then corresponds to the *bearer capability 1* information element and the *low layer compatibility II* information element to the *bearer capability 2* information element;

- if no low layer compatibility specification applies for one of the two call modes, the corresponding low layer compatibility IE (*low layer compatibility I* or *low layer compatibility II)* shall indicate "not applicable";

- the *LLC repeat indicator* shall specify the same repeat indication as the *BC repeat indicator* IE.

Similarly, a high layer compatibility may optionally be specified for each call mode in a *high layer compatibility i* and *high layer compatibility ii* information element. In that case:

- the SETUP message shall contain the *HLC repeat indicator* IE and both *high layer compatibility i* and *high layer compatibility ii* information elements. The *high layer compatibility i* information element then corresponds to the *bearer capability 1* information element and the *high layer compatibility ii* information element to the *bearer capability 2* information element;

- if no high layer compatibility specification applies for one of the two call modes, the corresponding high layer compatibility IE (*high layer compatibility i* or *high layer compatibility ii)* shall indicate "not applicable";

- the *HLC repeat indicator* shall specify the same repeat indication as the *BC repeat indicator* IE.

The receiving entity shall ignore whether the *LLC repeat indicator* IE or *HLC repeat indicator* are contained in the message or not; it shall also ignore the repeat indication of an *LLC repeat indicator* IE or *HLC repeat indicator* IE. If the *low layer compatibility II* IE is not contained in the message and the *low layer compatibility I* IE is contained in the message, the receiving entity shall relate it to a call mode indicated in the message that does not specify speech (if any). If the *high layer compatibility ii* IE is not contained in the message and the *high layer compatibility i* IE is contained in the message, the receiving entity shall relate it to a call mode indicated in the message that does not specify speech (if any).

The specific part of the network which is sensitive to the call mode shall examine each mode described in the bearer capabilities included in the SETUP message by performing compatibility checking as defined in Annex B. If as a result of this compatibility checking the network decides to reject the call, then the network shall initiate call clearing as specified in subclause 5.4 with the following causes:

    a)  #57 "bearer capability not authorized";

    b)  #58 "bearer capability not presently available";

    c)  #65 "bearer service not implemented";

    d)  #70 "only restricted digital information bearer capability is available".

## 5.3.4.2.2　Mobile Terminating Establishment

The service is indicated to the called mobile station by a SETUP message coded in the same manner as in the mobile originating call establishment. As specified for normal terminating call establishment, the service may be indicated by the called mobile station in the CALL CONFIRMED message.

The destination mobile station shall perform the compatibility checking as defined in Annex B for both required modes if indicated in the SETUP message. If as a result of compatibility checking the mobile station decides to reject the call, the mobile station shall initiate call clearing according to the procedures of subclause 5.4 with one of the following causes:

    a)  #57 "bearer capability not authorized";

    b)  #58 "bearer capability not presently available";

    c)  #65 "bearer service not implemented";

    d)  #88 "incompatible destination".

The mobile station may accept the call if the first mode indicated is free irrespective of whether the other mode is free or busy.

## 5.3.4.3　Changing the Call Mode

In order to change the call mode, the following in-call modification procedures shall be used.

Either side of the radio interface may act as the requesting user to invoke the in-call modification.

Upon each successful completion of the in-call modification procedure, the call changes to the next mode negotiated and agreed during the establishment phase of the call.

The in-call modification procedures are completely symmetrical at the radio interface.

    NOTE:    Considering a possible future evolution, in-call modification is specified as a symmetrical procedure.

### 5.3.4.3.1　Initiation of in-call modification

The procedure is initiated by the requesting originating side in the "active" state of the call. It shall send a MODIFY message including the new mode to be changed to; start timer T323; and enter the "mobile originating modify" state (mobile station side) or the "mobile terminating modify" state (network side). Any internal resources necessary to support the next call mode shall be reserved. The new mode given in the MODIFY message shall be one of those already negotiated and agreed during the establishment phase of the call. If the data call direction is different from the direction of the call setup a reverse call setup direction IE shall be included in the MODIFY message; otherwise this IE shall not be included. The MODIFY originating side shall stop sending Bm-channel information; and stop interpreting received Bm-channel information according to the old call mode.

Upon receipt of the MODIFY message, the destination side shall check to ensure that the requested call mode can still be supported and if so, it shall initiate the reservation of any resources necessary to support the next call mode and enter the "mobile originating modify" (network side) or "mobile terminating modify" state (mobile station side).

### 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 speech and if during call establishment the network received a *Supported Codec List* IE, the network shall use this list to select the codec for UMTS. If no *Supported Codec List* information element is received, then for UMTS the network shall select the default UMTS speech codec according to subclause 5.2.1.11.

Codecs for GSM shall be selected from the codecs indicated in the *Bearer Capability* information element. If no *Bearer Capability* information element is received, then for GSM the network shall select GSM full rate speech version 1.

If the *Supported Codec List* IE is received, then the network shall indicate the codec selected for UMTS to the mobile station via RANAP and RRC protocol in the NAS Synchronisation Indicator IE (see subclause 5.2.1.11).

~~If the requested mode is a speech mode and the call is UMTS then if the ME supports UMTS codecs different from the UMTS AMR codec (*Supported Codec List* IE received by the network) then the network shall select a codec from this list, otherwise default UMTS AMR (see subclause 5.2.1.11) speech version shall be assumed. If a codec is selected other than default AMR, the network shall send the selected codec type to the ME via RANAP NAS Synchronisation Indicator IE (see subclause 5.2.1.11),.~~

~~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 subclause 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.

# Next modified section

## 9.3.2 Call confirmed

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

See table 9.56/3GPP TS 24.008.

    Message type:    CALL CONFIRMED

    Significance:    local

    Direction:    mobile station to network

**Table 9.56/3GPP 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 |
| 2D | Stream Identifier | Stream Identifier 10.5.4.28 | O | TLV | 3 |
| 40 | Supported Codecs | Supported Codec List 10.5.4.32 | O | TLV | 5-n |

## 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 GSM codecsspeech versions than GSM speech version 1; Except in the case of UMTS speech where (if no *Supported Codec List* IE is included) 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 3GPP 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 subclause 10.5.4.22) in cases identified in 3GPP TS 27.001 [36].

If the mobile station wishes to indicate capability for an alternative call mode, which can be entered during the call through in-call modification, this is indicated by adding a *bearer capability information ele*ment (bearer capability) 2 element (see subclause 5.3.6).

### 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.

### 9.3.2.5 Stream Identifier

This information element shall be included by the mobile station supporting multicall.

### 9.3.2.6 Supported Codecs

This information element shall be included for speech calls, if the mobile station supports UMTS radio access.

This information element shall be included by the ME for UMTS speech calls for a ME which supports UMTS codecs different from the UMTS AMR codec.

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# Next modified section

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## 9.3.8 Emergency setup

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

See table 9.62/3GPP TS 24.008.

> Message type: EMERGENCY SETUP
>
> Significance: global
>
> Direction: mobile station to network

**Table 9.62/3GPP 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 |
| 2D  | Stream Identifier | Stream Identifier 10.5.4.28 | O | TLV | 3 |
| 40  | Supported Codecs | Supported Codec List 10.5.4.32 | O | TLV | 5-n |
| 2E  | Emergency category | Service category 10.5.4.33 | O | TLV | 3 |

### 9.3.8.1 Bearer capability

If the element is not included, the network shall by default assume speech and select the speech codec according to subclauses 5.2.1.2 and 5.2.1.11.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 if no *Supported Codec List* IE is included then the default UMTS AMR (see c subclause 5.2.1.11) speech version shall be assumed by the network.

### 9.3.8.2 Stream Identifier

This information element shall be included by the mobile station supporting multicall.

### 9.3.8.3 Supported Codecs

This information element shall be included if the mobile station supports UMTS radio access.

This information element shall be included by the mobile station for UMTS speech calls for a ME which supports UMTS codecs different from the UMTS AMR codec. If this information element is not included then the network shall assume default UMTS AMR (see subclause 5.2.1.11) speech codec.

### 9.3.8.4 Service category

If this information element is included, it shall indicate the selected emergency call category.

If the element is not included, the network shall by default assume a non-specific emergency call.

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## Next modified section

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## 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/3GPP TS 24.008.

Message type:    CC-ESTABLISHMENT CONFIRMED

Significance:    local

Direction:    mobile station to network

**Table 9.67b/3GPP 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 |
| 40 | Supported Codecs | Supported Codec List 10.5.4.32 | O | TLV | 5-n |

### 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 if no *Supported Codec List* IE is included then the default UMTS AMR (see subclause 5.2.1.11) speech version shall be assumed by the network.

### 9.3.17b.3    Cause

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

### 9.3.17b.4    Supported Codecs

This information element shall be included for speech calls, if the mobile station supports UMTS radio access.

This information element shall be included by the mobile station for UMTS speech calls for a ME which supports UMTS codecs different from the UMTS AMR codec.

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# Next modified section

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### 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/3GPP TS 24.008.

   Message type:    SETUP

   Significance:    global

   Direction:    mobile station to network

**Table 9.70a/3GPP 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 compatibility I | Low layer comp. 10.5.4.18 | O | TLV | 2-18 |
| 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-? |
| 2D | Stream Identifier | Stream Identifier 10.5.4.28 | O | TLV | 3 |
| 40 | Supported Codecs | Supported Codec List 10.5.4.32 | O | TLV | 5-n |

### 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 3GPP TS 24.010.

### 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 3GPP TS 24.010 [21]. This information element should not be transmitted unless explicitly required by 3GPP TS 24.010.

### 9.3.23.2.11 CLIR suppression

The information element may be included by the MS (see 3GPP TS 24.081 [25]). 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 3GPP 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.

### 9.3.23.2.14 Stream Identifier

This information element shall be included by the mobile station supporting multicall.

### 9.3.23.2.15 Bearer capability 1 and bearer capability 2

If the mobile station wishes to indicate capability for an altenative call mode, which can be entered throughfallback, this is indicated by adding a *bearer capability information ele*ment (bearer capability) 2 element (see subclause 5.3.6).

### 9.3.23.2.16 Supported Codecs

This information element shall be included for speech calls, if the mobile station supports UMTS radio access.

This information element shall be included by the mobile station for UMTS speech calls for a ME which supports UMTS codecs different from the UMTS AMR codec.

*CR-Form-v5*

# CHANGE REQUEST

⌘      **24.008 CR 536**   ⌘**rev** **2** ⌘   Current version: **5.3.0** ⌘

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

**Proposed change affects:** ⌘    (U)SIM ☐    ME/UE **X**    Radio Access Network ☐    Core Network **X**

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction of codec negotiation procedure |
| ***Source:*** | ⌘ | SIEMENS AG |
| ***Work item code:*** ⌘ | TRFO-OOB | ***Date:*** ⌘   02.04.02 |
| ***Category:*** ⌘ **A** | | ***Release:*** ⌘   REL-5 |

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

Use <u>one</u> of the following releases:
2      (GSM Phase 2)
R96    (Release 1996)
R97    (Release 1997)
R98    (Release 1998)
R99    (Release 1999)
REL-4   (Release 4)
REL-5   (Release 5)

| | |
|---|---|
| ***Reason for change:*** ⌘ | 1)   Currently, requirements to the ME can be found in subclauses specifying the network behaviour and vice versa, which makes it difficult for implementers to find the complete set of requirements. A clearer separation between requirements to the ME and requirements to the network is proposed. |
| | 2)   Recently, SA4 agreed that from Rel-4 onwards, UMTS AMR 2 replaces UMTS AMR as the default codec for speech services (SP-020078). This allows to simplify the wording in phrases like "A ME which supports UMTS codecs different from the UMTS AMR codec …", as this condition is always true, and thereby to clarify the requirements. Furthermore, in subclause 5.2.1.11, the definition of the default UMTS speech codec for R99 and Rel-4 terminals is removed to avoid conflicting requirements. |
| | 3)   The current wording for the mobile originating call setup in 5.2.1, "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 and in *Supported Codec List* IE …" gives the impression that, e.g., an ME supporting only GSM speech version full rate 1 and UMTS AMR2 is obliged to include the GSM codecs also in the *Supported Codec List* UE. This was not intended, as can be seen from subclause 10.5.4.32, Supported Codec List. It is proposed to remove the condition "… supports more than GSM speech version 1", because it only complicates the specification, but should practically always be true. (An MS supporting UMTS AMR or UMTS AMR 2 will as a rule also support AMR_FR or AMR_HR.) |
| | 4)   The statement in 5.2.1.2, "For GSM speech calls where no speech versions are included in *Bearer Capability IE* the network shall assume GSM speech version 1." is misleading, as in case of absence of octet 3a, etc. the radio channel requirement parameter will indicate which GSM codecs are supported by the ME (GSM speech version full rate 1, or both full rate 1 and half rate 1). The case that needs to be dealt with is that no *Bearer Capability* IE is included at all. |

5) The terms "UMTS speech call" and "GSM speech call" were replaced by the general term "speech call", which may take place "in UMTS" or "in GSM", to avoid ambiguities like whether a speech call which was established in UMTS is still a UMTS speech call after inter-system handover.

6) Subclause 5.2.1.11: the sentence "If the *Supported Codec List* IE is received, the network shall select a codec from the list of codecs and indicate this to the ME via RANAP and RRC protocol in NAS Synchronisation Indicator IE." can be interpreted as a requirement that every Rel-4 network has to support UMTS AMR 2. This was not intended.

7) The description of the handling of the *Supported Codec List* IE in subclauses 5.2.3.2, CC-Establishment present, and 5.2.3.2.1, Recall alignment procedure, is incomplete.

8) In subclause 5.3.4.3.2 it is clarified that the *Supported Codec List* IE to be used by the network is received during call establishment. (I.e. no *Supported Codec List* IE is included in the MODIFY message.)

9) Subclause 5.3.3: the condition needs to be changed, as an MS may support only UMTS AMR 2.

10) Alignment between downlink signalling during call establishment (5.2.1.11) and in-call modification (5.3.4.3.2): if a Support Codec List IE is received, then the network will always indicate the selected codec explicitly.

11) Subclause 9.3.2.2, bullet 5: implicit signalling of UMTS speech codecs ("Except in the case …") no longer applies to the MS. Furthermore, it needs to be clarified that the condition "other speech versions than GSM speech version 1" refers to "other GSM speech versions".

12) The conditions for inclusion of the Supported Codec List IE in various message in clause 9 contain requirements which are given also in the call control procedures (clause 5), or in the definition of the Supported Codec List IE (10.5.4.32), and sometimes in both places. It is proposed to remove this text from clause 9 to avoid conflicting requirements.

| | |
|---|---|
| ***Summary of change:*** ⌘ | |
| | |
| ***Consequences if not approved:*** ⌘ | Without the changes the codec negotiation and selection procedures are partly wrong, partly incomplete, and partly hard to understand. Furthermore, the wording is not aligned to SA4's latest requirements concerning the support of UMTS_AMR_2. |

| | |
|---|---|
| ***Clauses affected:*** ⌘ | 5.2, 5.2.1, 5.2.1.2, 5.2.1.11, 5.2.1.12, 5.2.2.3.1, 5.2.2.3.2, 5.2.2.10 (new), 5.2.2.11, 5.2.3.2, 5.2.3.2.1, 5.2.3.3, 5.3.3, 5.3.4, 5.3.4.3.2, 9.3.2, 9.3.2.2, 9.3.2.6, 9.3.8.1, 9.3.8.3, 9.3.17b.2, 9.3.17b.4, 9.3.23.2.16, 10.5.4.32 |

| | | | | |
|---|---|---|---|---|
| ***Other specs affected:*** | ⌘ ☐ | Other core specifications | ⌘ | |
| | ☐ | Test specifications | | |
| | ☐ | O&M Specifications | | |

| | |
|---|---|
| ***Other comments:*** ⌘ | |

## How to create CRs using this form:

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

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under [ftp://ftp.3gpp.org/specs/](ftp://ftp.3gpp.org/specs/) For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

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

## 5.2 Call establishment procedures

Establishment of a call is initiated by request of upper layer in either the mobile station or the network; it consists of:

- the establishment of a CC connection between the mobile station and the network;

- the activation of the codec or interworking function.

Whenever it is specified in the present document clause 5 that the mobile station shall attach the user connection, this means that the mobile station shall activate the codec or interworking function as soon as an appropriate channel is available. The mobile station shall de-activate the codec or interworking function whenever an appropriate channel is no longer available. As soon as an appropriate channel is (again) available, the codec or interworking function shall be re-activated. If a new order to attach the user connection is received, the new order shall supersede the previous one.

A channel shall be considered as appropriate if it is consistent with the possibly negotiated bearer capability applicable for the actual phase of the call. The mobile station shall not consider a channel as not appropriate because the type of the channel (full rate/half rate) is not the preferred one. If:

- the user connection has to be attached but no appropriate channel is available for a contiguous time of 30 seconds; or if

- the codec or interworking function is de-activated for a contiguous time of 30 seconds;

then the mobile station may initiate call clearing.

Upon request of upper layers to establish a call, restricting conditions for the establishment of the call are examined. These restricting conditions concern the states of parallel CC entities and are defined elsewhere. If these restricting conditions are fulfilled, the call establishment is rejected. Otherwise a CC entity in state U0, "null", is selected to establish the call. It initiates the establishment by requesting the MM sublayer to establish an MM connection.

In Iu mode, if the lower layers indicate the release of a radio access bearer, whereas~as~ the corresponding call is still active~e~, the MS shall not automatically initiate the release of that call.

### 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 3GPP TS 23.067 [88]. 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 subclause 4.5.1.7.

The mobile station supporting multicall that is initiating an emergency call shall release one or more existing call to ensure the emergency call can be established if the multicall supported information stored in the mobile station described in subclauses 5.2.1.2 and 5.2.2.1 indicates the network does not support multicall and some ongoing calls exists.

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

The mobile station 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 the mobile station supports multicall, it shall include the Stream Identifier (SI) information element. For the first call i.e. when there are no other ongoing calls the SI value shall be 1.

For speech calls the mobile station shall indicate all codecs that it supports for UMTS in the *Supported Codec List* information element. Codecs for GSM shall be indicated in the *Bearer Capability* information element, if this information element is included. Additionally, if the mobile station supports codecs for GSM and UMTS, it shall indicate the codecs for GSM also in the *Supported Codec List* information element.

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.

## 5.2.1.1 Call initiation

The "call initiated" state is supervised by timer T303.For normal MO calls, this timer will have already been started after entering the "MM connection pending" state. For network-initiated MO calls this timer will be started in the recall present state as defined in subclause 5.2.3.4

When the call control entity of the mobile station is in the "call initiated" state and if it receives:

i) a CALL PROCEEDING message, it shall proceed as described in subclause 5.2.1.3;

ii) an ALERTING message, it shall proceed as described in subclause 5.2.1.5;

iii) a CONNECT message, it shall proceed as described in subclause 5.2.1.6;

iv) a RELEASE COMPLETE message it shall proceed as described in subclause 5.2.1.2.

Abnormal case:

-   If timer T303 elapses in the "call initiated" state before any of the CALL PROCEEDING, ALERTING, CONNECT or RELEASE COMPLETE messages has been received, the clearing procedure described in subclause 5.4 is performed.

## 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 subclause 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.

In UMTS, network shall include the SI received in the SETUP message into the RABid and send it back to the mobile station. For RABid see 3GPP TS 25.413. If the network receives the SETUP message with no SI, the network shall set the SI value to 1.

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 subclause 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 subclause 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 shall also contain the priority of the call in the case where the network supports eMLPP. 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.

NOTE:  If the network supports only R98 or older versions of this protocol and the priority is not included in the CALL PROCEEDING message, this does not imply that the network does not support eMLPP.

- The CALL_PROCEEDING message shall contain the multicall supported information in the network call control capabilities in the case where the network supports multicall and there are no other ongoing calls to the MS. Mobile stations supporting multicall shall store this information until the call control state for all calls returns to null. Mobile stations not supporting multicall shall ignore this information if provided in a CALL PROCEEDING message. If the multicall supported information is not sent in the CALL_PROCEEDING message, the mobile station supporting multicall shall regard that the network doesn't support multicall.

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 subclause 5.2.1.9 (early assignment).

For UMTS speech calls no UMTS speech versions shall be included in *Bearer Capability IE;* if the SETUP includes a list of supported codecs in *Supported Codec List IE* then the network shall use this list to select the required codec type, see Chapter 5.2.1.11.

For a GSM established call the list shall be used by the network for handover to UMTS.

If no *Supported Codec List* IE is received by the network, then GSM speech versions 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.

If *Supported Codec List* IE is received by the network, then GSM speech versions in *Supported Codec List* IE or *Bearer Capability* IE shall be used for GSM call establishment and handover to GSM.

For speech calls, if the SETUP message or EMERGENCY SETUP message contains a *Supported Codec List* information element, the network shall use this list to select the codec for UMTS. If no *Supported Codec List* information element is received, then for UMTS the network shall select the default UMTS speech codec according to subclause 5.2.1.11.

Codecs for GSM shall be selected from the codecs indicated in the *Supported Codec List* information element or in the *Bearer Capability* information element. If neither a *Supported Codec List* information element nor a *Bearer Capability* information element is received, then for GSM the network shall select GSM full rate speech version 1.

Codec information that does not apply to the currently serving radio access shall be used by the network if an inter-system change occurs.
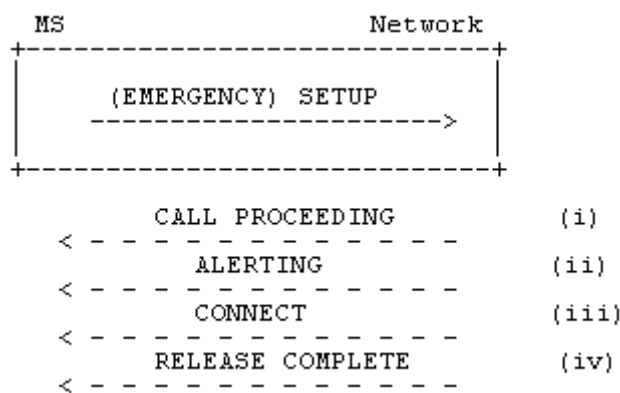
```
        MS                     Network
        +---------------------------+
        |                           |
        |   (EMERGENCY) SETUP       |
        |   --------------------->  |
        |                           |
        +---------------------------+

              CALL PROCEEDING        (i)
        < - - - - - - - - - - - -
                  ALERTING           (ii)
        < - - - - - - - - - - - -
                  CONNECT            (iii)
        < - - - - - - - - - - - -
              RELEASE COMPLETE       (iv)
        < - - - - - - - - - - - -
```

**Figure 5.2/3GPP TS 24.008 Mobile originated call initiation and possible subsequent responses.**

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# Next modified section

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## 5.2.1.11    Speech Codec Selection

The network can receive *Supported Codec List* IE in call establishment messages from the ME to inform the network of the codec types that it supports. For speech calls, a mobile station implementing this version of the protocol shall indicate all codecs that it supports for UMTS in the *Supported Codec List* information element. Codecs for GSM shall be indicated in the *Bearer Capability* information element, if this information element is included. Additionally, if the mobile station supports codecs for GSM and UMTS, it shall indicate the codecs for GSM also in the *Supported Codec List* information element.

If the network does not receive a *Supported Codec List* IE information element then for speech calls in UMTS it shall select the default UMTS AMR speech codec version shall be assumed for UMTS calls.

For GSM speech calls in GSM, if where the network does not receive a *Supported Codec List* IE information element nor a and no speech versions are included in *Bearer Capability* IE information element, the network shall select assume GSM full rate speech version 1.

The default UMTS speech version for "R99 UMTS only" terminals is UMTS_AMR. The default UMTS speech version for terminals supporting GSM & UMTS radio accesses is UMTS_AMR_2. For further details see 3GPP TS 26.103 [83].

NOTE: If the UE supports 'UMTS_AMR_2' and the network is R99 and assumes 'UMTS_AMR' then no interworking problems will occur.

The network shall determine the default UMTS speech codecversion by the following:

i) If no GSM Speech Version codepoints are received in the *Supported Codec List* IE or in octet 3a etc. of the *Bearer Capabilities* IE then a "UMTS only" terminal is assumed and the default UMTS speech codecversion shall be UMTS_AMR.

ii) If at least one GSM Speech Version codepoint is received in the *Supported Codec List* IE or in octet 3a etc. of the *Bearer Capabilities* IE thenand the ME supports GSM and UMTS andthen the default UMTS speech codecversion shall be UMTS_AMR_2.

NOTE 1: In case (ii), if the call is set up in GSM by a R99 ME, call control in the core network may treat the ME as a "GSM only" ME. The default UMTS AMR speech codecversion will only become relevant when an intersystem handover to UMTS is initiated by the radio access network, and can be determined when this procedure is started.

If the *Supported Codec List* IE is received, then the network shall select a codec from the list of codecs use this list to select the codec for UMTS and indicate the selected codecthis to the ME via RANAP and RRC protocol in the NAS Synchronisation Indicator IE. See 3GPP TS 25.413 and 3GPP TS 25.331 [32c].

The NAS Synchronisation Indicator IE shall be coded as the 4 least significant bitsCoding of the selected codec type (CoID) shall be, as defined in 3GPP 3GPP TS 26.103 [83], subclause 6.3.

The network shall determine the preference for the selected codec type; codec type prioritisation is not provided by the ME.

The ME shall activate the codec type received in the NAS Synchronisation Indicator IE.

If the mobile station does not receive the NAS Synchronisation Indicator IE (RRC protocol) then it shall selectassume default the UMTS_-AMR_2 speech codecversion.

NOTE 2: If the network does not support UMTS_AMR_2, it may activate the UMTS_AMR codec and indicate to the mobile station that it shall select UMTS_AMR_2. According to 3GPP TS 26.103 [83], subclause 5.4, no interworking problem will occur in this case.

For adaptive multirate codec types no indication of subsets of modes is supported in this protocol, from the mobile stationME or to the mobile stationME. It is a pre-condition that the support of such codec types by the mobile stationME implicitly includes all modes defined for that codec type.

### 5.2.1.12    Cellular Text telephone Modem (CTM) selection

The mobile station can send The network can receive a CTM support indication in the *Bearer Capability* IE in call establishment messages from the ME to inform the network of the use of CTM text in the call.

When the mobile stationME indicates speech and support of CTM text telephony, the network shall select a speech codec and additionally CTM text telephony detection/conversion functions as specified in 3GPP TS 23.226 [92] and 3GPP TS 26.226 [93], if such functions are available.

NOTE: If CTM support is indicated by the mobile stationME, then it supports CTM text telephony together with any supported speech codec and for any supported radio access.

## 5.2.2    Mobile terminating call establishment

Before call establishment can be initiated in the mobile station, the MM connection must be established by the network.

### 5.2.2.1    Call indication

After the arrival of a call from a remote user, the corresponding call control entity in the network shall: initiate the MM connection establishment according to clause 4 and enter the "MM connection pending" state. The request to establish the MM connection is passed from the CM sublayer to the MM sublayer. It contains the necessary routing information derived from the SETUP message.

Upon completion of the MM connection, the call control entity of the network shall: send the SETUP message to its peer entity at the mobile station, start timer T303 and enter the "call present" state.

The SETUP message shall contain the multicall supported information in the network call control capabilities in the case where the network supports multicall and there are no other ongoing calls to the MS. Mobile stations supporting multicall shall store this information until the call control state for all calls returns to null. Mobile stations not supporting multicall shall ignore this information if provided in a SETUP message. If the multicall supported information is not sent in the SETUP message, the mobile station supporting multicall shall regard that the network does not support multicall.

Upon receipt of a SETUP message, the mobile station shall perform compatibility checking as described in subclause 5.2.2.2. If the result of the compatibility checking was compatibility, the call control entity of the mobile station shall enter the "call present" state. An incompatible mobile station shall respond with a RELEASE COMPLETE message in accordance with subclause 5.2.2.3.4.

If there are no *bearer capability* IEs in the SETUP message, the network may provide information about the requested service in the *backup bearer capability* IE.

If no response to the SETUP message is received by the call control entity of the network before the expiry of timer T303, the procedures described in subclause 5.2.2.3.3 shall apply.
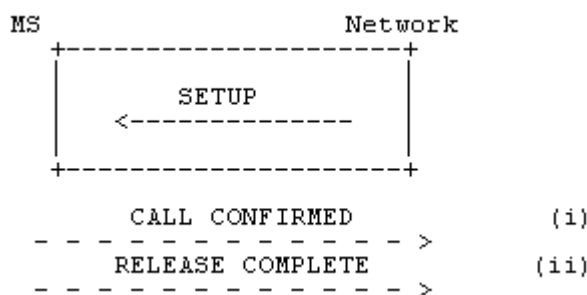
```
MS                              Network
   +--------------------+
   |                    |
   |        SETUP       |
   |  <-------------     |
   |                    |
   +--------------------+

         CALL CONFIRMED               (i)
- - - - - - - - - - - - >
         RELEASE COMPLETE             (ii)
- - - - - - - - - - - - >
```

**Figure 5.6/3GPP TS 24.008 Mobile terminating call initiation and possible subsequent responses.**

## 5.2.2.2      Compatibility checking

The mobile station receiving a SETUP message shall perform compatibility checking before responding to that SETUP message. Annex B defines compatibility checking to be performed by the mobile station upon receiving a SETUP message. For a *backup bearer capability* IE received with a SETUP message the mobile station shall not perform compatibility checking as described in annex B.

## 5.2.2.3      Call confirmation

### 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.

If the mobile station supports multicall, it shall include the Stream Identifier (SI) information element in the CALL CONFIRMED message.

   If the mobile station is located in the network supporting multicall, it shall never include the SI that is in use and shall include with either of the following two values:

-   SI="no bearer";

-   SI=new value (not used by any of the existing bearers).

If the mobile station supporting multicall is located in the network not supporting multicall, it shall include the SI with value 1.

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 3GPP TS 29.007 [38]). The mobile station may also use the *backup bearer*

*capability* IE, if provided by the network, to deduce the requested service (see 3GPP TS 27.001, subclause 8.3.3.1). The mobile station may also include one or two bearer capabilities in the CALL CONFIRMED message to define the radio channel requirements. In any case the rules specified in subclause 9.3.2.2 shall be followed.

~~For a ME which supports more than GSM speech version 1 and supports UMTS codecs different from the UMTS AMR, then speech versions for GSM shall be included in both Supported Codec List IE (see 10.5.4.32) and *Bearer Capability* IE.~~

~~A ME which supports UMTS codecs different from the UMTS AMR codec shall include the supported codecs in *Supported Codec List* IE in the CALL CONFIRMED message, otherwise default UMTS AMR (see subclause 5.2.1.11) speech version shall be assumed by the network. In any case the rules specified in subclause 9.3.2.2 shall be followed.~~

~~For a UMTS established call GSM speech versions shall be used by the network for handover to GSM.~~

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

For speech calls the mobile station shall indicate all codecs that it supports for UMTS in the *Supported Codec List* information element. Codecs for GSM shall be indicated in the *Bearer Capability* information element, if this information element is included. Additionally, if the mobile station supports codecs for GSM and UMTS, it shall indicate the codecs for GSM also in the *Supported Codec List* information element.

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 subclause 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.

In UMTS, network shall include the SI received in the CALL CONFIRMED message into the RABid and send it back to the mobile station. For RABid see 3GPP TS 25.413. If the network receives the CALL CONFIRMED message with no SI, the network shall set the SI value to 1.

For speech calls, if the CALL CONFIRMED message contains a *Supported Codec List* information element, the network shall use this list to select the codec for UMTS. If no *Supported Codec List* information element is received, then for UMTS the network shall select the default UMTS speech codec according to subclause 5.2.1.11.

Codecs for GSM shall be selected from the codecs indicated in the *Supported Codec List* information element or in the *Bearer Capability* information element. If neither a *Supported Codec List* information element nor a *Bearer Capability* information element is received, then for GSM the network shall select GSM full rate speech version 1.

Codec information that does not apply to the currently serving radio access shall be used by the network if an inter-system change occurs.

~~For UMTS speech calls no UMTS speech versions shall be included in *bearer capability IE;* if the CALL CONFIRMED message includes a list of supported codecs in *Supported Codec List IE* then the network shall use this list to select the required codec type, see subclause 5.2.1.11. If no *Supported Codec List IE* is received by the network then default UMTS AMR (see subclause 5.2.1.11) speech version shall be assumed.~~

~~GSM speech versions received by the network in *Bearer Capability* IE and *Supported Codec List* IE (see 10.5.4.32) 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 subclause 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.

In the "mobile terminating call confirmed" state or the "call received" state, if the user of a mobile station is User Determined User Busy then a DISCONNECT message shall be sent with cause #17 "user busy". In the "mobile terminating call confirmed" state, if the user of a mobile station wishes to reject the call then a DISCONNECT message shall be sent with cause #21 "call rejected".

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# Next modified section

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## 5.2.2.10    Speech Codec Selection

The principles described in section 5.2.1.11 apply accordingly.

## 5.2.2.11~~10~~Cellular Text telephone Modem (CTM) selection

The principles described in subclause 5.2.1.12 apply accordingly.

## 5.2.3    Network initiated MO call $(CCBS)$

The procedures of subclause 5.2.3 are mandatory for mobile stations supporting "Network initiated MO call".

>   NOTE:    The behaviour of a mobile station that does not support "Network initiated MO call" is described in clause 4.

### 5.2.3.1    Initiation

Before call establishment can be initiated in the mobile station, the MM connection shall be established by the network.

After the arrival of an appropriate stimulus (for example a Remote User Free Indication), the corresponding call control entity in the network shall initiate the MM connection establishment according to clause 4, enter the "CC connection pending" state and start timer T331. The request to establish the MM connection is passed from the CM sublayer to the MM sublayer. It contains the necessary routing information derived from the received stimulus.

Upon completion of the MM connection, the call control entity of the mobile station shall send a START CC message to its peer entity in the network. The mobile station shall then enter the "Wait for network information" state and start timer T332.

If the network receives a START CC message while in the "CC connection pending" state, the network stops T331, sends the CC-ESTABLISHMENT message, starts timer T333 and enters the "CC-establishment present" state.

The MM connection establishment may be unsuccessful for a variety of reasons, in which case the MM sublayer in the network will inform the CC entity in the network with an indication of the reason for the failure. The CC entity shall then stop all running timers, enter the "Null" state and inform all appropriate entities within the network.

If timer T331 expires, the network shall abort the MM connection establishment attempt, stop all running CC timers, enter the "Null" state and inform all appropriate entities within the network.

## 5.2.3.2 CC-Establishment present

In the "CC establishment present" state, the mobile station, upon receipt of the CC-ESTABLISHMENT message, shall stop timer T332.

The CC-ESTABLISHMENT message contains information which the mobile station shall use for the subsequent SETUP message (if any) related to this CC-ESTABLISHMENT.

The CC-ESTABLISHMENT message shall contain the *Setup Container IE.*

If no CC-ESTABLISHMENT message is received by the call control entity of the mobile station before the expiry of timer T332, then the mobile station shall initiate clearing procedures towards the network using a RELEASE COMPLETE message with cause #102 "recovery on timer expiry" and proceed in accordance with subclause 5.4.2.

Upon receipt of a CC-ESTABLISHMENT message the mobile station shall perform checks on the Setup Container IE in order to align the contained information with the mobile's present capabilities and configuration. The "recall alignment procedure" is defined later on in this subclause.

If the recall alignment procedure has succeeded, the call control entity of the Mobile Station shall:

- form and store the SETUP message for sending later in the "Recall present" state,

- acknowledge the CC-ESTABLISHMENT message with a CC-ESTABLISHMENT CONFIRMED message,

- start timer T335, and

- enter the "CC-establishment confirmed" state.

Exception:

A busy mobile station which has successfully performed the recall alignment procedure shall respond with a CC-ESTABLISHMENT CONFIRMED message with cause #17 "user busy", and proceed as stated above.

For speech calls the mobile station shall indicate all codecs that it supports for UMTS in the *Supported Codec List* information element of the CC-ESTABLISHMENT CONFIRMED message. Codecs for GSM shall be indicated in the *Bearer Capability* information element. Additionally, if the mobile station supports codecs for GSM and UMTS, it shall indicate the codecs for GSM also in the *Supported Codec List* information element.

A mobile station, for which the recall alignment procedure failed, shall respond with a RELEASE COMPLETE message in accordance with subclause 5.4.2 with the appropriate cause code as indicated in the description of the recall alignment procedure.

The SETUP message is constructed from the *Setup Container IE* received in the CC ESTABLISHMENT MESSAGE. The mobile station shall assume that the *Setup Container IE* contains an entire SETUP message with the exception of the Protocol Discriminator, Transaction ID and Message Type elements. The mobile station may assume that the contents of the *Setup Container IE* are the same as were sent from the subscriber in a previous SETUP message of the mobile originating call establishment attempt. The mobile station shall copy the *Setup Container* to the SETUP message and not modify the contents except as defined in the recall alignment procedure and as defined in *exceptions* below. The mobile station shall not add other Information Elements to the end of the SETUP message.

Exceptions:

*Bearer Capability IE(s), HLC IE(s) and LLC ~~(s)~~ IE(s)* (including *Repeat Indicator(s),* if there are 2 bearer capabilities), and the *Supported Codec List IE* require handling as described in the recall alignment procedure below.

If the *CC Capabilities* in the *Setup Container IE* is different to that supported by the mobile station, the mobile station shall modify the *CC Capabilities* in the SETUP message to indicate the true capabilities of the mobile station.

*Facility IE(s) and SS Version IE(s)* require handling as described in the recall alignment procedure.

*Stream Identifier IE* requires handling as described in the recall alignment procedure.

If no response to the CC-ESTABLISHMENT message is received by the call control entity of the network before the expiry of timer T333, then the network shall initiate clearing procedures towards the called mobile station using a

RELEASE COMPLETE message with cause #102 "recovery on timer expiry" and inform all appropriate entities within the network, proceeding in accordance with subclause 5.4.2.
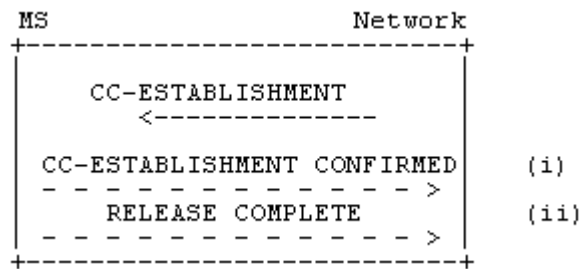
```
MS                              Network
+-----------------------------+
|                             |
|     CC-ESTABLISHMENT        |
|       <-------------        |
|                             |
| CC-ESTABLISHMENT CONFIRMED  |    (i)
| - - - - - - - - - - - - - > |
|     RELEASE COMPLETE        |    (ii)
| - - - - - - - - - - - - - > |
+-----------------------------+
```

**Figure 5.7a/3GPP TS 24.008 Call initiation and possible subsequent responses.**

## 5.2.3.2.1 Recall Alignment Procedure

The recall alignment procedure consists of three parts:

- basic service group alignment,

- facility alignment, and

- stream identifier alignment.

Basic service group alignment:

The mobile station shall check that the *Bearer Capability, HLC* and *LLC* and *Repeat Indicator* fields, which are embedded in the *Setup Container IE,* match a basic service group supported by the mobile station.

If this check fails, then the recall alignment procedure has failed. The mobile station shall use the cause #88 "incompatible destination" afterwards.

Otherwise, the mobile station is allowed to alter the content within the *Bearer Capability, HLC,* and *LLC* and *Supported Codec List* Information Elements (e.g. the speech codec version(s), the data rate, the radio channel requirement) provided that the basic service group is not changed. Furthermore, for speech calls the mobile station is allowed to add or remove the *Supported Codec List* Information Element, or to alter the contents of this information element dependent on the codecs supported by the mobile station. The result shall be that the mobile station has derived *Bearer Capability, HLC,* and *LLC, and Supported Codec List* Information Elements, which it can use for a later call setup according to its configuration and capabilities.

Facility alignment:

This only applies if the *Setup Container* contains 1 or more *Facility IEs.* Each *Facility IE* within the *Setup Container* will be associated with the common *SS Version IE*, if present. The handling for each *Facility IE* is defined below. The mobile station shall align each facility IE contained in the *Setup Container.* The rules defined in 3GPP TS 24.010 also apply.

The *Facility IE* is encoded as 'simple recall alignment', 'advanced recall alignment' or 'recall alignment not essential' (see 3GPP TS 24.010). If the encoding indicates, that

- a simple recall alignment is required, the mobile station shall copy the Facility IE and the common SS version IE from the *Setup Container* to the SETUP message without modifying the content.

- an advanced recall alignment is required, the mobile station must recognise and support the operation defined in the facility. If the mobile station does not recognise or support the operation, then the recall alignment procedure has failed and the mobile station shall use the cause #29 "facility rejected" in the subsequent rejection of the CC establishment request.

- the recall alignment is not essential, then the facility operation is not an essential part of the SETUP. If the MS does not recognise the operation then the SS Version IE and Facility IE are discarded, and NOT copied into the SETUP message.

NOTE. A mobile station may include a *Facility IE* without an associated *SS Version IE*. This would indicate that the SS operation is encoded using Phase 1 protocols.

Further details on Facility handling are given in 3GPP TS 24.010

Stream identifier alignment:

The mobile station shall check whether the *Stream Identifier* field is contained in the *Setup Container* or no*t*.

If the *Stream Identifier* is contained in the *Setup Container*, the mobile station shall behave as one of the following.

- the mobile station re-assign the *Stream Identifier* value, and modify the *Stream Identifier* field.

- the mobile station remove the *Stream Identifier* field.

If the *Stream Identifier* is not contained in the *Setup Container*, the mobile station may behave as follows.

- the mobile station assign the *Stream Identifier* value, and add the *Stream Identifier IE* to the end of the SETUP message.

## 5.2.3.3 CC-Establishment confirmation

The call control entity of the network in the "CC-establishment present" state, shall, upon receipt of a CC-ESTABLISHMENT CONFIRMED message, stop timer T333 and enter the "CC-establishment confirmed" state.

For speech calls, if the ESTABLISHMENT CONFIRMED message contains a *Supported Codec List* information element, the network shall use this list to select the codec for UMTS. If no *Supported Codec List* information element is received, then for UMTS the network shall select the default UMTS speech codec according to subclause 5.2.1.11.

Codecs for GSM shall be selected from the codecs indicated in the *Supported Codec List* information element or in the *Bearer Capability* information element. If neither a *Supported Codec List* information element nor a *Bearer Capability* information element is received, then for GSM the network shall select GSM full rate speech version 1.

Codec information that does not apply to the currently serving radio access shall be used by the network if an inter-system change occurs.

In the "CC-establishment confirmed" state, the network sends a RECALL message. This message initiates user alerting and also shall include the Facility IE (providing additional information to be presented to the user for notification). The network starts timer T334 and enters the 'recall present' state.

Upon reception of the RECALL message the Mobile station stops T335 and enters the "recall present" state.

Additionally, for UMTS speech calls a ME which supports more than UMTS AMR codec shall include the list of supported codecs in *Supported Codec List* IE in the ESTABLISHMENT CONFIRMED message.

For speech calls a ME which supports UMTS codecs different from the UMTS AMR, shall include the list of supported codecs in the *Supported Codec List* IE in the ESTABLISHMENT CONFIRMED message. If this information element is not included then the network shall use GSM speech versions received in *Bearer Capability* IE for GSM calls.

A ME which supports only GSM codecs, shall include the list of supported codecs in *Bearer Capability* IE in the ESTABLISHMENT CONFIRMED message.

If a *Supported Codec List* IE is received the network shall use the codec list for codec selection. See subclause 5.2.1.11. If no *Supported Codec List* IE is received by the network then default UMTS AMR (see subclause 5.2.1.11) speech version shall be assumed for UMTS, and the network shall determine the supported GSM speech versions from the *Bearer Capability* IE.

```
MS                              Network
+---------------------------+
|                           |
|          RECALL           |
|   <---------------        |
|                           |
+---------------------------+
```
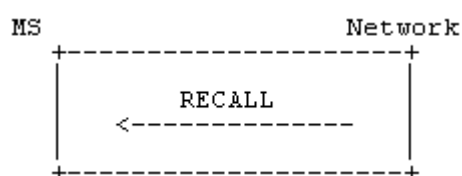
**Figure 5.7b/3GPP TS 24.008 Recall**

### 5.2.3.4 Recall present

In the "recall present" state, the call control entity in the mobile station waits for acceptance of the Recall by the user. Once confirmation is received, the mobile station indicates acceptance of a recall by

- sending a SETUP message to its peer entity in the network;

- starting Timer T303; and

- entering the "call initiated" state and proceeding as described in subclause 5.2.1.1.

The MS shall ensure that the contents of the *Bearer Capability IE(s)* and *Supported Codec List* IE sent in the SETUP message are the same as the *Bearer Capability IE(s)* and *Supported Codec List* IE in the previous CC-ESTABLISHMENT CONFIRMED message related to this Network Initiated MO Call.

In the "recall-present" state, if the user of a mobile station is User Determined User Busy then a RELEASE COMPLETE message shall be sent with cause #17 "user busy" In the "recall-present" state. If the user of a mobile station wishes to reject the recall then a RELEASE COMPLETE message shall be sent with cause #21 "call rejected".

In either case, the mobile shall release the connection in accordance with subclause 5.4.2

On receipt of the SETUP message in the "recall present" state, the network shall stop timer T334 and proceed as specified in subclause 5.2.1.2.

If the call control entity of the network does not receive a SETUP message before the expiry of timer T334, then the network shall send a RELEASE COMPLETE message to the mobile using cause #102 "recovery on timer expiry", release the MM connection, enter the "null" state and shall inform all appropriate entities within the network.
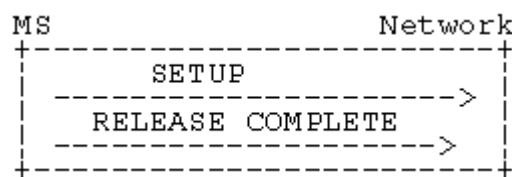
```
MS                                    Network
+-----------------------------+
|          SETUP              |
| ------------------------->  |
|      RELEASE COMPLETE       |
| ------------------------->  |
+-----------------------------+
```

**Figure 5.7b/3GPP TS 24.008 Recall acceptance or rejection by user**

### 5.2.3.5 Traffic channel assignment during network initiated mobile originating call establishment

It is a network dependent decision whether or not to initiate the assignment of a traffic channel during the "CC-establishment confirmed" state.

## 5.3 Signalling procedures during the "active" state

### 5.3.1 User notification procedure

The mobile terminating user notification procedure allows the network to notify a mobile station of any appropriate call-related event during the "active" state of a call. The procedure consists in the network sending a NOTIFY message to the mobile station. No state change occurs at any of the interface sides following the sending or the receipt of this message (but an appropriate indication may optionally be generated in the mobile station).

The mobile originating notification procedure allows the mobile station to notify the remote user of any appropriate call-related event during the "active" state of a call by sending a NOTIFY message containing a notification indicator to the network; upon receipt of this message, the network sends a NOTIFY message containing the same notify indicator to the other user involved in the call. No state change occurs at any of the interface sides following the sending or the receipt of this message.

## 5.3.2 Call rearrangements

Call rearrangements on the radio interface are not supported by explicit messages (e.g. SUSPEND and RESUME messages as defined in ETS 300 102-1 [70]). However if a remote non-PLMN user initiates call rearrangements, the network shall inform the mobile station by means of a NOTIFY message. In a similar way the mobile station can inform the network about rearrangements by sending a NOTIFY message (e.g. change of user equipment connected to the mobile station).

## 5.3.3 Codec Change Procedure

If a mobile station~~ME~~ supports more than one UMTS codec~~s different from the UMTS AMR speech codec (*Supported Codec List* IE received by the network)~~ the network can modify the codec due to Out Of Band Transcoder Control procedures. If this is the case, the network shall send a codec type in RANAP NAS Synchronisation Indicator IE in order to inform the mobile station to change codec. See subclause 5.2.1.11.

## 5.3.4 Support of Dual Services

The behaviour described in this subclause is used to realize the following required services throughout subclause 5.3.4. The mobile station is not obliged to support the network originated in-call modification procedure. In that case, the mobile station shall, when receiving a MODIFY message, treat the message as unknown and react as described in subclause 8.4. If the mobile station is already prepared to support the procedure in both directions, it shall act as described in this subclause.

> Alternate Speech/Group 3 fax (Teleservice 61 according to 3GPP TS 22.003 [4]).

### 5.3.4.1 Service Description

This circuit switched service allows the two users on a point-to-point connection to use the connection between them for different information transfer during the same call, but not at the same time.

If the negotiation during call establishment leads to the recognition of the above mentioned services, the in-call modification procedure is allowed to be executed within the current call by changing from one call mode to the other.

In some cases the in-call modification procedure makes it necessary to change the channel configuration by allocating a new channel and in other cases to change channel configuration parameters while keeping the previously allocated channel. This change is determined by the network, which initiates either the channel assignment procedure, handover procedure or channel mode modify procedure (see clause 3).

The capability and the initial mode desired must be identified by the mobile station by identifying each mode of operation with a separate information element during call establishment. Further the type of change between the modes must be identified by means of the repeat indicator:

> mode 1 "alternate" mode 2.

### 5.3.4.2 Call establishment

For both mobile originating and mobile terminating calls, the normal call establishment procedures apply.

### 5.3.4.2.1 Mobile Originating Establishment

The service is requested by the originating mobile station by transferring a SETUP message to the network containing the *BC repeat indicator* IE, the *bearer capability 1* information element, and the *bearer capability 2* information element. The first mode of operation ("call mode") shall be indicated by the *bearer capability 1* information element and the second call mode by the *bearer capability 2* information element.

A low layer compatibility may optionally be specified for each call mode in a *low layer compatibility I* and *low layer compatibility II* information element. In that case:

- the SETUP message shall contain the *LLC repeat indicator* IE and both *low layer compatibility I* and *low layer compatibility II* information elements. The *low layer compatibility I* information element then corresponds to the

*bearer capability 1* information element and the *low layer compatibility II* information element to the *bearer capability 2* information element;

- if no low layer compatibility specification applies for one of the two call modes, the corresponding low layer compatibility IE (*low layer compatibility I* or *low layer compatibility II)* shall indicate "not applicable";

- the *LLC repeat indicator* shall specify the same repeat indication as the *BC repeat indicator* IE.

Similarly, a high layer compatibility may optionally be specified for each call mode in a *high layer compatibility i* and *high layer compatibility ii* information element. In that case:

- the SETUP message shall contain the *HLC repeat indicator* IE and both *high layer compatibility i* and *high layer compatibility ii* information elements. The *high layer compatibility i* information element then corresponds to the *bearer capability 1* information element and the *high layer compatibility ii* information element to the *bearer capability 2* information element;

- if no high layer compatibility specification applies for one of the two call modes, the corresponding high layer compatibility IE (*high layer compatibility i* or *high layer compatibility ii)* shall indicate "not applicable";

- the *HLC repeat indicator* shall specify the same repeat indication as the *BC repeat indicator* IE.

The receiving entity shall ignore whether the *LLC repeat indicator* IE or *HLC repeat indicator* are contained in the message or not; it shall also ignore the repeat indication of an *LLC repeat indicator* IE or *HLC repeat indicator* IE. If the *low layer compatibility II* IE is not contained in the message and the *low layer compatibility I* IE is contained in the message, the receiving entity shall relate it to a call mode indicated in the message that does not specify speech (if any). If the *high layer compatibility ii* IE is not contained in the message and the *high layer compatibility i* IE is contained in the message, the receiving entity shall relate it to a call mode indicated in the message that does not specify speech (if any).

The specific part of the network which is sensitive to the call mode shall examine each mode described in the bearer capabilities included in the SETUP message by performing compatibility checking as defined in Annex B. If as a result of this compatibility checking the network decides to reject the call, then the network shall initiate call clearing as specified in subclause 5.4 with the following causes:

a) #57 "bearer capability not authorized";

b) #58 "bearer capability not presently available";

c) #65 "bearer service not implemented";

d) #70 "only restricted digital information bearer capability is available".

### 5.3.4.2.2 Mobile Terminating Establishment

The service is indicated to the called mobile station by a SETUP message coded in the same manner as in the mobile originating call establishment. As specified for normal terminating call establishment, the service may be indicated by the called mobile station in the CALL CONFIRMED message.

The destination mobile station shall perform the compatibility checking as defined in Annex B for both required modes if indicated in the SETUP message. If as a result of compatibility checking the mobile station decides to reject the call, the mobile station shall initiate call clearing according to the procedures of subclause 5.4 with one of the following causes:

a) #57 "bearer capability not authorized";

b) #58 "bearer capability not presently available";

c) #65 "bearer service not implemented";

d) #88 "incompatible destination".

The mobile station may accept the call if the first mode indicated is free irrespective of whether the other mode is free or busy.

### 5.3.4.3 Changing the Call Mode

In order to change the call mode, the following in-call modification procedures shall be used.

Either side of the radio interface may act as the requesting user to invoke the in-call modification.

Upon each successful completion of the in-call modification procedure, the call changes to the next mode negotiated and agreed during the establishment phase of the call.

The in-call modification procedures are completely symmetrical at the radio interface.

> NOTE: Considering a possible future evolution, in-call modification is specified as a symmetrical procedure.

### 5.3.4.3.1 Initiation of in-call modification

The procedure is initiated by the requesting originating side in the "active" state of the call. It shall send a MODIFY message including the new mode to be changed to; start timer T323; and enter the "mobile originating modify" state (mobile station side) or the "mobile terminating modify" state (network side). Any internal resources necessary to support the next call mode shall be reserved. The new mode given in the MODIFY message shall be one of those already negotiated and agreed during the establishment phase of the call. If the data call direction is different from the direction of the call setup a reverse call setup direction IE shall be included in the MODIFY message; otherwise this IE shall not be included. The MODIFY originating side shall stop sending Bm-channel information; and stop interpreting received Bm-channel information according to the old call mode.

Upon receipt of the MODIFY message, the destination side shall check to ensure that the requested call mode can still be supported and if so, it shall initiate the reservation of any resources necessary to support the next call mode and enter the "mobile originating modify" (network side) or "mobile terminating modify" state (mobile station side).

### 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 speech and if during call establishment the network received a *Supported Codec List* IE, the network shall use this list to select the codec for UMTS. If no *Supported Codec List* information element is received, then for UMTS the network shall select the default UMTS speech codec according to subclause 5.2.1.11.

Codecs for GSM shall be selected from the codecs indicated in the *Supported Codec List* information element or in the *Bearer Capability* information element. If neither a *Supported Codec List* information element nor a *Bearer Capability* information element is received, then for GSM the network shall select GSM full rate speech version 1.

If the *Supported Codec List* IE is received, then the network shall indicate the codec selected for UMTS to the mobile station via RANAP and RRC protocol in the NAS Synchronisation Indicator IE (see subclause 5.2.1.11).

~~If the requested mode is a speech mode and the call is UMTS then if the ME supports UMTS codecs different from the UMTS AMR codec (*Supported Codec List* IE received by the network) then the network shall select a codec from this list, otherwise default UMTS AMR (see subclause 5.2.1.11) speech version shall be assumed. If a codec is selected other than default AMR, the network shall send the selected codec type to the ME via RANAP NAS Synchronisation Indicator IE (see subclause 5.2.1.11),.~~

~~If the requested mode is speech and the call is GSM then if GSM speech versions are included in either *Supported Codec List IE* or 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 subclause 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.

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# Next modified section

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## 9.3.2 Call confirmed

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

See table 9.56/3GPP TS 24.008.

    Message type:    CALL CONFIRMED

    Significance:    local

    Direction:    mobile station to network

**Table 9.56/3GPP 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 |
| 2D | Stream Identifier | Stream Identifier 10.5.4.28 | O | TLV | 3 |
| 40 | Supported Codecs | Supported Codec List 10.5.4.32 | O | TLV | 5-n |

### 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 six 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 CTM text telephony;

- the *bearer capability 1* information element received in the SETUP message indicates speech and is accepted and the mobile station supports other GSM codecs~~speech versions~~ than GSM speech version 1; ~~Except in the case of UMTS speech where (if no *Supported Codec List* IE is included) 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 3GPP 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 subclause 10.5.4.22) in cases identified in 3GPP TS 27.001 [36].

If the mobile station wishes to indicate capability for an alternative call mode, which can be entered during the call through in-call modification, this is indicated by adding a *bearer capability information ele*ment (bearer capability) 2 element (see subclause 5.3.6).

### 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.

### 9.3.2.5 Stream Identifier

This information element shall be included by the mobile station supporting multicall.

### 9.3.2.6 Supported Codecs

This information element shall be included for speech calls, if the mobile station supports UMTS radio access.

~~This information element shall be included by the ME for UMTS speech calls for a ME which supports UMTS codecs different from the UMTS AMR codec. For speech calls a ME which supports UMTS codecs different from the UMTS AMR, shall include the list of supported codecs in *Supported Codec List* IE (see 10.5.4.32). If this information element is not included then the network shall use GSM speech versions received in *Bearer Capability* for GSM calls.~~

## 9.3.8 Emergency setup

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

See table 9.62/3GPP TS 24.008.

Message type: EMERGENCY SETUP

Significance: global

Direction: mobile station to network

**Table 9.62/3GPP 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 | 3-11 |
| 2D | Stream Identifier | Stream Identifier 10.5.4.28 | O | TLV | 3 |
| 40 | Supported Codecs | Supported Codec List 10.5.4.32 | O | TLV | 5-n |
| 2E | Emergency category | Service category 10.5.4.33 | O | TLV | 3 |

### 9.3.8.1 Bearer capability

If the element is not included, the network shall by default assume speech and select the speech codec according to subclauses 5.2.1.2 and 5.2.1.11. 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.

This information element shall be included by an ME supporting CTM text telephony.

For UMTS speech if no *Supported Codec List* IE is included then the network shall assume default UMTS AMR (see subclause 5.2.1.11) speech version and determine supported GSM speech versions from *Bearer Capability* IE.

For GSM speech if no *Supported Codec List* IE is included then the network shall use GSM speech versions received in *Bearer Capability* for GSM calls.

### 9.3.8.2 Stream Identifier

This information element shall be included by the mobile station supporting multicall.

### 9.3.8.3 Supported Codecs

This information element shall be included if the mobile station supports UMTS radio access.

This information element shall be included by the mobile station for UMTS speech calls for a ME which supports UMTS codecs different from the UMTS AMR codec. If this information element is not included then the network shall assume default UMTS AMR (see subclause 5.2.1.11) speech codec.

~~For speech calls a ME which supports UMTS codecs different from the UMTS AMR, shall include the list of supported codecs in *Supported Codec List* IE (see 10.5.4.32). If this information element is not included then the network shall use GSM speech versions received in *Bearer Capability* for GSM calls.~~

## 9.3.8.4    Service category

If this information element is included, it shall indicate the selected emergency call category.

If the element is not included, the network shall by default assume a non-specific emergency call.

# Next modified section

# 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/3GPP TS 24.008.

Message type:    CC-ESTABLISHMENT CONFIRMED

Significance:    local

Direction:    mobile station to network

**Table 9.67b/3GPP 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 |
| 40 | Supported Codecs | Supported Codec List 10.5.4.32 | O | TLV | 5-n |

## 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 if no *Supported Codec List* IE is included then the default UMTS AMR (see subclause 5.2.1.11) speech version shall be assumed by the network.

For GSM speech if no *Supported Codec List* IE is included then the network shall use GSM speech versions received in *Bearer Capability* for GSM calls.

### 9.3.17b.3 Cause

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

### 9.3.17b.4 Supported Codecs

This information element shall be included for speech calls, if the mobile station supports UMTS radio access.

This information element shall be included by the mobile station for UMTS speech calls for a ME which supports UMTS codecs different from the UMTS AMR codec.

For speech calls a ME which supports UMTS codecs different from the UMTS AMR, shall include the list of supported codecs in *Supported Codec List* IE (see 10.5.4.32). If this information element is not included then the network shall use GSM speech versions received in *Bearer Capability* for GSM calls.

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# Next modified section

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### 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/3GPP TS 24.008.

    Message type:    SETUP

    Significance:     global

    Direction:     mobile station to network

**Table 9.70a/3GPP 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 compatibility I | Low layer comp. 10.5.4.18 | O | TLV | 2-18 |
| 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-? |
| 2D | Stream Identifier | Stream Identifier 10.5.4.28 | O | TLV | 3 |
| 40 | Supported Codecs | Supported Codec List 10.5.4.32 | O | TLV | 5-n |

### 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 3GPP TS 24.010.

### 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 3GPP TS 24.010 [21]. This information element should not be transmitted unless explicitly required by 3GPP TS 24.010.

### 9.3.23.2.11 CLIR suppression

The information element may be included by the MS (see 3GPP TS 24.081 [25]). 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 3GPP 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.

### 9.3.23.2.14 Stream Identifier

This information element shall be included by the mobile station supporting multicall.

### 9.3.23.2.15 Bearer capability 1 and bearer capability 2

If the mobile station wishes to indicate capability for an altenative call mode, which can be entered throughfallback, this is indicated by adding a *bearer capability information ele*ment (bearer capability) 2 element (see subclause 5.3.6).

### 9.3.23.2.16 Supported Codecs

This information element shall be included for speech calls, if the mobile station supports UMTS radio access.

~~This information element shall be included by the mobile station for UMTS speech calls for a ME which supports UMTS codecs different from the UMTS AMR codec.~~

~~For speech calls a ME which supports UMTS codecs different from the UMTS AMR, shall include the list of supported codecs in *Supported Codec List* IE (see 10.5.4.32). If this information element is not included then the network shall use GSM speech versions received in *Bearer Capability* for GSM calls.~~

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# Next modified section

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### 10.5.4.32 Supported codec list

The purpose of the *Supported Codec List* information element is to provide the network with information about the speech codecs supported by the mobile.

The *Supported Codec List* information element is coded as shown in figure 10.5.118c/3GPP TS 24.008.

The *Supported Codec List* information element is a type 4 information element with a minimum length of 5 octets and a maximum length of m+3 octets.

Speech codec information belonging to GSM and UMTS radio access shall be conveyed by this information element. ~~when the ME supports UMTS codecs different from the UMTS AMR. GSM codecs are only included if the MS supports GSM speech codecs different from GSM speech version 1.~~

| 8 | 7 | 6 5 | 4 | 3 | 2 | 1 | |
|---|---|---|---|---|---|---|---|
| Supported Codec List IEI | | | | | | | octet 1 |
| Length Of Supported Codec list | | | | | | | octet 2 |
| System Identification 1 (SysID 1) | | | | | | | octet 3 |
| Length Of Bitmap for SysID 1 | | | | | | | octet 4 |
| Codec Bitmap for SysID 1, bits 1 to 8 | | | | | | | octet 5 |
| Codec Bitmap for SysID 1, bits 9 to 16 | | | | | | | octet 6 |
| System Identification 2 (SysID 2) | | | | | | | octet j |
| Length Of Bitmap for (SysID 2) | | | | | | | octet j+1 |
| Codec Bitmap for (SysID 2), bits 1 to 8 | | | | | | | octet j+2 |
| Codec Bitmap for (SysID 2), bits 9 to 16 | | | | | | | octet j+3 |
| System Identification x (SysID x) | | | | | | | octet m |
| Length Of Bitmap for (SysID x) | | | | | | | octet m+1 |
| Codec Bitmap for (SysID x), bits 1 to 8 | | | | | | | octet m+2 |
| Codec Bitmap for (SysID x), bits 9 to 16 | | | | | | | octet m+3 |

**Figure 10.5.118c/3GPP TS 24.008 Supported codec list information element**

**Table 10.5.4.135c/3GPP TS 24.008:** *Supported Codec List* **information element**

Octet 3, (j+1), m etc
SysID indicates the radio access technology for which the proceeding codec
types may be used.
Coding of this Octet is defined in 3GPP TS 26.103.

Octet 4, (j+2), m+1 etc
Length Of Codec Bitmap for SysID indicates the number of octets included in the
list for the given SysID.

Octets (5 & 6), (J+2 & j+3), (m+2 & m+3) etc
The coding of the Codec Bitmap is defined in 3GPP TS 26.103.

*CR-Form-v5*

# CHANGE REQUEST

⌘      **24.008 CR 572**    ⌘ **rev** **1** ⌘    Current version: **3.11.0** ⌘

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

**Proposed change affects:** ⌘    (U)SIM ☐    ME/UE **X**    Radio Access Network ☐    Core Network **X**

| | | |
|---|---|---|
| ***Title:*** ⌘ | Support of UMTS AMR 2 in R99 | |
| ***Source:*** ⌘ | Siemens AG | |
| ***Work item code:*** ⌘ | OoBTC | ***Date:*** ⌘ 02.04.02 |

**Category:** ⌘ **F**

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

**Release:** ⌘ R99

Use <u>one</u> of the following releases:
2    (GSM Phase 2)
R96    (Release 1996)
R97    (Release 1997)
R98    (Release 1998)
R99    (Release 1999)
REL-4    (Release 4)
REL-5    (Release 5)

| | |
|---|---|
| ***Reason for change:*** ⌘ | TSG SA plenary #14 approved the CR 26.103-011, Inclusion of codec type UMTS AMR2 in R99 codec list, which allows the support of UMTS AMR2 also for R99 mobile stations. This change needs to be reflected in TS 24.008. |
| ***Summary of change:*** ⌘ | It is clarified that in R99 for speech calls in UMTS the network only supports the UMTS AMR codec. Furthermore, a note is added that the UMTS AMR 2 codec in the MS can interwork with the UMTS AMR codec in the network without problems. |
| ***Consequences if not approved:*** ⌘ | Without the CR it remains unclear whether the description of the UMTS codec negotiation in TS 24.008 for R99 is complete. |

| | |
|---|---|
| ***Clauses affected:*** ⌘ | 2, 5.2.1.11 (new), 5.2.2.10 (new) |
| ***Other specs affected:*** ⌘ | ☐ Other core specifications ⌘ <br> ☐ Test specifications <br> ☐ O&M Specifications |
| ***Other comments:*** ⌘ | |

## How to create CRs using this form:

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

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

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

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

# 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.  In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]     3GPP TS 01.02: "Digital cellular telecommunications system (Phase 2+); General description of a GSM Public Land Mobile Network (PLMN)".

[2]     3GPP TS 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2a]    3GPP TS 21.905 "3G Vocabulary for 3GPP Specifications"

[3]     3GPP TS 22.002: "Digital cellular telecommunications system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[4]     3GPP TS 22.003: "Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[5]     3GPP TS 02.09: "Digital cellular telecommunications system (Phase 2+); Security aspects".

[6]     3GPP TS 22.011: "Digital cellular telecommunications system (Phase 2+); Service accessibility".

[7]     3GPP TS 02.17: "Digital cellular telecommunications system (Phase 2+); Subscriber identity modules  Functional characteristics".

[8]     3GPP TS 02.40: "Digital cellular telecommunications system (Phase 2+); Procedures for call progress indications".

[9]     3GPP TS 03.01: "Digital cellular telecommunications system (Phase 2+); Network functions".

[10]    3GPP TS 23.003: "Digital cellular telecommunications system (Phase 2+); Numbering, addressing and identification".

[11]    3GPP TS 03.13: "Digital cellular telecommunications system (Phase 2+); Discontinuous Reception (DRX) in the GSM system".

[12]    3GPP TS 23.014: "Digital cellular telecommunications system (Phase 2+); Support of Dual Tone Multi-Frequency signalling (DTMF) via the GSM system".

[12a]   Void.

[13]    3GPP TS 03.20: "Digital cellular telecommunications system (Phase 2+); Security related network functions".

[14]    3GPP TS 23.122: "NAS Functions related to Mobile Station (MS) in idle mode".

[15]    3GPP TS 24.002: "GSM-UMTS Public Land Mobile Network (PLMN) access reference configuration".

[16]    3GPP TS 04.03: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface  Channel structures and access capabilities".

[17]    3GPP TS 04.04: "Digital cellular telecommunications system (Phase 2+); layer 1  General requirements".

[18]    3GPP TS 04.05: "Digital cellular telecommunications system (Phase 2+); Data Link (DL) layer General aspects".

[19]    3GPP TS 04.06: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface  Data Link (DL) layer specification".

[20]    3GPP TS 24.007: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface signalling layer 3 General aspects".

[21]    3GPP TS 24.010: "Digital cellular telecommunications system ; Mobile radio interface layer 3 Supplementary services specification  General aspects".

[22]    3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[23]    3GPP TS 24.012: "Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".

[23a]   3GPP TS 24.071: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 location services specification".

[23b]   3GPP TS 04.31 "Digital cellular telecommunication system (Phase 2+); Location Services;Mobile Station (MS) – Serving Mobile Location Centre (SMLC); Radio Resource LCS Protocol (RRLP)".

[23c]   3GPP TS 25.331 : "3rd Generation Partnership Project;Technical Specification Group Radio Access Network; RRC Protocol Specification"

[24]    3GPP TS 24.080: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 supplementary services specification  Formats and coding".

[25]    3GPP TS 24.081: "Digital cellular telecommunications system (Phase 2+); Line identification supplementary services - Stage 3".

[26]    3GPP TS 24.082: "Digital cellular telecommunications system (Phase 2+); Call Forwarding (CF) supplementary services - Stage 3".

[27]    3GPP TS 24.083: "Digital cellular telecommunications system (Phase 2+); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 3".

[28]    3GPP TS 24.084: "Digital cellular telecommunications system (Phase 2+); MultiParty (MPTY) supplementary services - Stage 3".

[29]    3GPP TS 24.085: "Digital cellular telecommunications system (Phase 2+); Closed User Group (CUG) supplementary services - Stage 3".

[30]    3GPP TS 24.086: "Digital cellular telecommunications system (Phase 2+); Advice of Charge (AoC) supplementary services - Stage 3".

[31]    3GPP TS 24.088: "Call Barring (CB) supplementary services - Stage 3".

[32]    3GPP TS 05.02: "Digital cellular telecommunications system (Phase 2+); Multiplexing and multiple access on the radio path".

[33]    3GPP TS 05.05: "Digital cellular telecommunications system (Phase 2+); Radio transmission and reception".

[34]    3GPP TS 05.08: "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".

[35]    3GPP TS 05.10: "Digital cellular telecommunications system (Phase 2+); Radio subsystem synchronization".

[36]    3GPP TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[37]    3GPP TS 29.002: "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".

[38]     3GPP TS 29.007: "Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[39]     GSM 11.10: "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformity specification".

[40]     GSM 11.21: "Digital cellular telecommunications system (Phase 2); The GSM Base Station System (BSS) equipment specification".

[41]     ISO/IEC 646 (1991): "Information technology - ISO 7-bit coded character set for information interchange".

[42]     ISO/IEC 6429: "Information technology - Control functions for coded character sets".

[43]     ISO 8348 (1987): "Information processing systems - Data communications - Network service definition".

[44]     ITU-T Recommendation E.163: "Numbering plan for the international telephone service".

[45]     ITU-T Recommendation E.164: "Numbering plan for the ISDN era".

[46]     ITU-T Recommendation E.212: "Identification plan for land mobile stations".

[47]     ITU-T Recommendation F.69 (1993): "Plan for telex destination codes".

[48]     ITU-T Recommendation I.330: "ISDN numbering and addressing principles".

[49]     ITU-T Recommendation I.440 (1989): "ISDN user-network interface data link layer - General aspects".

[50]     ITU-T Recommendation I.450 (1989): "ISDN user-network interface layer 3 General aspects".

[51]     ITU-T Recommendation I.500 (1993): "General structure of the ISDN interworking recommendations".

[52]     ITU-T Recommendation T.50: "International Alphabet No. 5".

[53]     ITU Recommendation Q.931: ISDN user-network interface layer 3 specification for basic control".

[54]     ITU-T Recommendation V.21: "300 bits per second duplex modem standardized for use in the general switched telephone network".

[55]     ITU-T Recommendation V.22: "1200 bits per second duplex modem standardized for use in the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[56]     ITU-T Recommendation V.22bis: "2400 bits per second duplex modem using the frequency division technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[57]     ITU-T Recommendation V.23: "600/1200-baud modem standardized for use in the general switched telephone network".

[58]     ITU-T Recommendation V.26ter: "2400 bits per second duplex modem using the echo cancellation technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[59]     ITU-T Recommendation V.32: "A family of 2-wire, duplex modems operating at data signalling rates of up to 9600 bit/s for use on the general switched telephone network and on leased telephone-type circuits".

[60]     ITU-T Recommendation V.110: "Support of data terminal equipments (DTEs) with V-Series interfaces by an integrated services digital network".

[61]     ITU-T Recommendation V.120: "Support by an ISDN of data terminal equipment with V-Series type interfaces with provision for statistical multiplexing".

[62]     ITU-T Recommendation X.21: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for synchronous operation on public data networks".

[63]     ITU-T Recommendation X.25: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".

[64]     ITU-T Recommendation X.28: "DTE/DCE interface for a start-stop mode data terminal equipment accessing the packet assembly/disassembly facility (PAD) in a public data network situated in the same country".

[65]     ITU-T Recommendation X.30: "Support of X.21, X.21 bis and X.20 bis based data terminal equipments (DTEs) by an integrated services digital network (ISDN)".

[66]     ITU-T Recommendation X.31: "Support of packet mode terminal equipment by an ISDN".

[67]     ITU-T Recommendation X.32: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and accessing a packet switched public data network through a public switched telephone network or an integrated services digital network or a circuit switched public data network".

[68]     ITU-T Recommendation X.75 (1988): "Packet-switched signalling system between public networks providing data transmission services".

[69]     ITU-T Recommendation X.121: "International numbering plan for public data networks".

[70]     ETS 300 102-1: "Integrated Services Digital Network (ISDN); User-network interface layer 3 Specifications for basic call control".

[71]     ETS 300 102-2: "Integrated Services Digital Network (ISDN); User-network interface layer 3 Specifications for basic call control".

[72]     ISO/IEC10646: "Universal Multiple-Octet Coded Character Set (UCS)"; UCS2, 16 bit coding.

[73]     3GPP TS 22.060: "General Packet Radio Service (GPRS); Service Description; Stage 1".

[74]     3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".

[75]     3GPP TS 03.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Overall description of the GPRS radio interface; Stage 2".

[76]     3GPP TS 04.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station - Base Station System (MS-BSS) interface; Radio Link Control and Medium Access Control (RLC/MAC) layer specification".

[77]     IETF RFC 1034: "Domain names - Concepts and Facilities " (STD 7).

[78]     3GPP TS 04.65: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Subnetwork Dependent Convergence Protocol (SNDCP)".

[79]     ITU Recommendation I.460: "Multiplexing, rate adaption and support of existing services".

[80]     3GPP TS 26.111: "Codec for Circuit Switched Multimedia Telephony Service; Modifications to H.324"

[81]     3GPP TS 23.107: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; QoS Concept and Architecture"

[82]     3GPP TS 03.22: " Digital cellular telecommunications system (Phase 2+); Functions related to Mobile Station (MS) in idle mode and group receive mode".

[83]     3GPP TS 04.18: "Mobile radio interface layer 3 specification, Radio Resource Control Protocol".

[84]     3GPP TS 03.55: "Dual Transfer Mode; Stage 2".

[85]     3GPP TS 23.67: "enhanced Multi-Level Precedence and Pre-emption service (eMLPP) - Stage 2"

[86]        3GPP TS 26.103: "3rd Generation Partnership Project; TSG-SA Codec Working Group; Speech Codec List for GSM and UMTS"

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# Next modified section

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## 5.2.1.11        Speech Codec Selection

In this version of the protocol the network shall use the UMTS_AMR codec as the default UMTS AMR speech version. For the mobile station the default UMTS AMR speech version is specified in TS 3GPP TS 26.103 [86].

NOTE:     According to 3GPP TS 26.103 [86], subclause 5.4, no interworking problem will occur if the mobile station uses UMTS_AMR_2 and the network uses UMTS_AMR.

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# Next modified section

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## 5.2.2.10        Speech Codec Selection

The principles described in section 5.2.1.11 apply accordingly.