Agenda item: **5.1.3**

Source: **TSG_N WG1**

Title: **CRs on Work TEI**

<u>**Introduction**</u>:

This document contains **"4"** CRs agreed by **TSG_N WG1** and forwarded to **TSG_N Plenary** meeting **#6** for approval.

Tdoc	Spec	CR	Rev	CAT	Rel.	Old Ver	New Ver	Subject
N1-99C24	23.014	001	1	C	R99	3.0.0	3.1.0	Clarification of DTMF Message Sequencing
N1-99C91	24.008	003	3	C	R99	3.1.0	3.2.0	Clarification of DTMF Message Sequencing
N1-99E87	24.008	074	1	C	R99	3.1.0	3.2.0	Clean-up for GSM
N1-99F54	24.008	075	2	C	R99	3.1.0	3.2.0	Clean-up for UMTS

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23.014	CR	001r1	Current Version:	3.0.0

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

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

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

Proposed change affects:
(at least one should be marked with an X)

(U)SIM		ME		UTRAN / Radio		Core Network	X

Source:	Vodafone, Siemens	**Date:**	08/10/1999

Subject:	Clarification of DTMF procedure

Work item:	TEI

Category:

(only one category shall be marked with an X)

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

| **Reason for change:** | Phase 1 of GSM 04.08 specified two timers in the MS to ensure that the recommended minimum length of a DTMF tone and the minimum gap between DTMF tones were achieved. These timers were later removed because the transmission time of the DTMF messages across the radio interface ensures that the recommended minimum times are met.
With the introduction of a faster radio interface for UMTS (UTRAN), the minimum length of a DTMF tone and minimum gap between tones need to be maintained and the sequence of DTMF messages should be specified more clearly.
Therefore, this CR proposes that:

Individual networks (rather than the MS) shall be responsible for ensuring that the recommended minimum times are achieved. |
| --- | --- |

Clauses affected:	4, 6.2, 6.3

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	CR 003r3 to 24.008
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:	References to old CEPT documents in this specification have now been updated to refer to the equivalent ETSI Technical Report. These recommendations are European. Other regions of the world may have their own recommendations that they wish to observe. The requirement will therefore be on the individual networks to ensure that the relevant recommendations are followed.

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4   Requirement

Dual Tone Multi Frequency (DTMF) is an inband one out of four plus one out of four signalling system, primarily used from terminal instruments in telecommunication networks. The international recommendations which apply are ~~CEPT recommendations T/CS 34-08~~ ETSI Technical Report ETR 204 (sender) and ~~T/CS 46-02~~ ETSI Technical Report ETR 206 (receiver) as detailed in sections 6.2 and 6.3. For PCS 1900 for North America the Standards which apply are operator specific.

In the GSM system the MSC must support DTMF in the mobile to land direction.

The support of this facility in the land to mobile direction is for further study.

The use of DTMF is only permitted when the speech teleservice is being used or during the speech phase of alternate speech/data and alternate speech/facsimile teleservices. The responsibility for checking this lies in the MS.

5   Cause of DTMF generation

A user may cause a DTMF tone to be generated by depression of a key in the Mobile Station (MS). Optionally (on a MS basis) manufacturers of mobile equipment may choose to allow DTMF to be controlled from a remote terminal.

The man-machine interface questions associated with this facility are not discussed further in this GTS.

6   Support of DTMF across the air interface

6.1   General

A message based signalling system is used across the GSM air interface.

This requires that the relevant user action (e.g. a key depression) is interpreted by the MS as a requirement for a DTMF digit to be sent, this is converted by the MS into a message, the message is transmitted across the air interface, and is converted by the MSC into a DTMF tone which is applied towards the network, which should then respond with an acknowledgement. When the user completes the key depression, an message that the DTMF sending should cease is also passed to the MSC, which again will respond with an acknowledgement.

6.2   Specific

The messages to be sent across the air interface will use the frame stealing mode of transmission.

The messages when sent across the air interface should contain the following information:

a)   START DTMF : Containing the digit value (0-9,A,B,C,D,*,#);

b)   START DTMF ACKNOWLEDGE: Containing the digit value (0-9,A,B,C,D,*,#) corresponding to the DTMF tone that the network applies towards the remote user;

c)   STOP DTMF : No further info;

d)   STOP DTMF ACKNOWLEDGE: No further info.

Only a single digit will be passed in each START DTMF and START DTMF ACKNOWLEDGE message.

The messages will be passed transparently through the base station and interpreted at the MSC.

On receipt of a START DTMF message, the MSC will connect the correct dual-tone to line. This tone will remain connected until either the call is cleared or a STOP DTMF message is received.
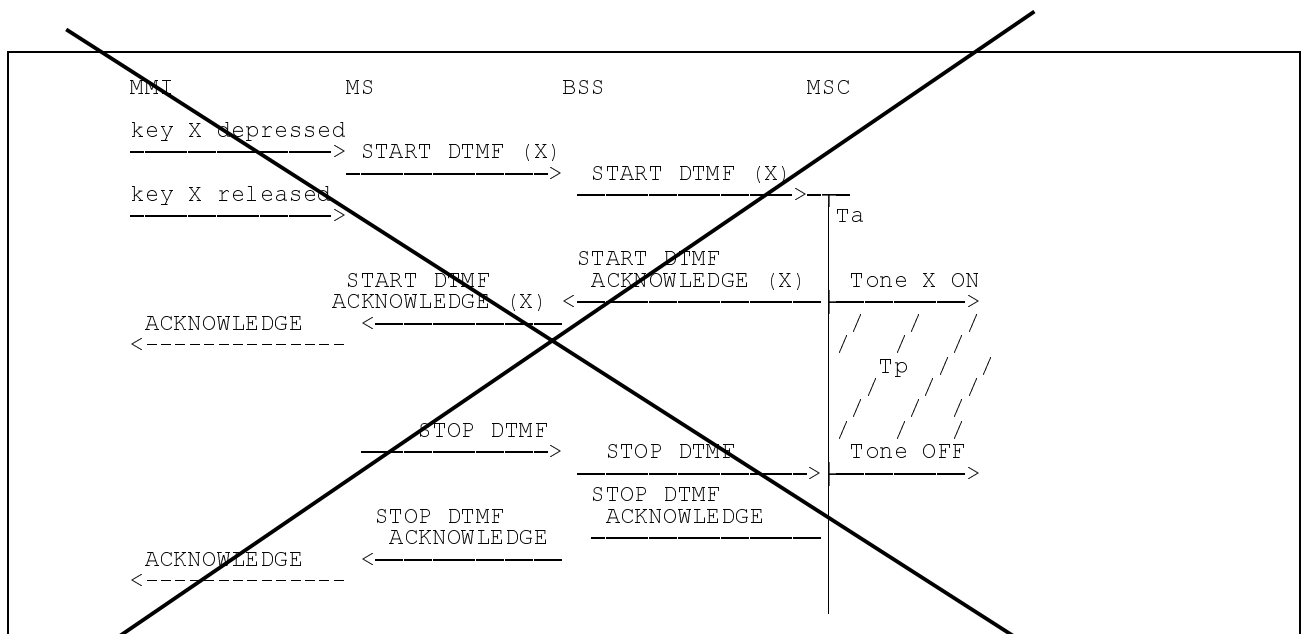
As an operator option, the tone may be ceased after a pre-determined time whether or not a STOP DTMF message has a been received.

The tones that are to be generated by the MSC are specified as follows:

- Frequencies are defined in ~~CEPT Recommendation T/CS 34-08~~ ETSI Technical Report ETR 206 (for PCS 1900 for North America this is operator specific);

- Tone sending levels are defined nationally (for PCS 1900 for North America this is operator specific);

- Durations as specified below.

6.3 Tone durations

~~The minimum length of tone generated by the switch should be according to CEPT recommendation T/CS 46-02.~~ The network shall ensure that the minimum length of tone and the minimum gap between two subsequent tones (according to ETR 206) is achieved. For PCS 1900 for North America this is operator specific.

NOTE 1: In ETR 206 the minimum duration of a DTMF tone is 70ms ±5ms.
NOTE 2: In ETR 206 the minimum gap between DTMF tones is 65ms.

~~The minimum gap between two subsequent tones should be according to CEPT recommendation T/CS 46-02. For PCS 1900 for North America this is operator specific.~~
There is no defined maximum length to the tone, which will normally cease when a STOP DTMF message is received from the MS. However, the operator may choose to put a pre-defined time limit on the duration of tones sent to line as mentioned in 6.2.
Figures 1 to 3 show an overview of how the DTMF should operate.

~~NOTE: The transmission time of the messages over the air interface on FACCH/F or FACCH/H, see GSM 05.02, ensures that the minimum length of tones and minimum gap between tones according to T/CS 46-02 are fulfilled. This does not apply to PCS 1900 for North America.~~

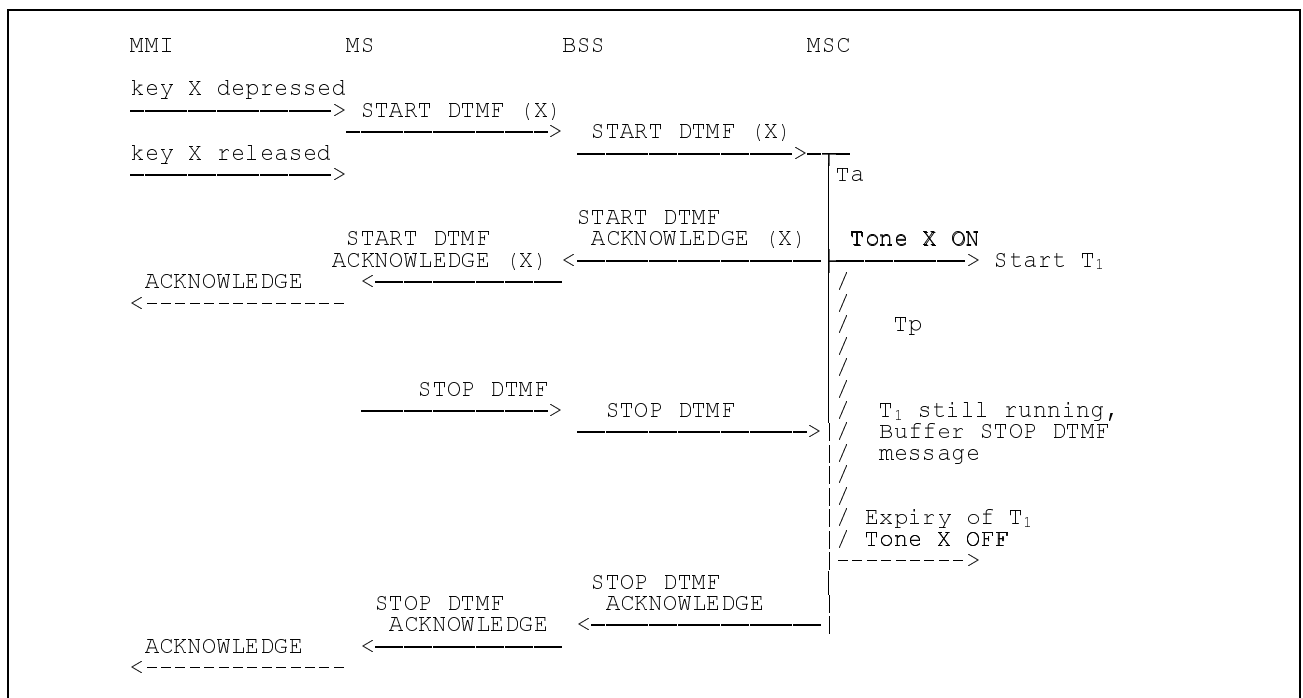**Figure 1: Single DTMF Transmission**

Ta   Association time for DTMF Generator in MSC, implementation dependent but low.

Tp   Pre-determined maximum tone length, operator option.
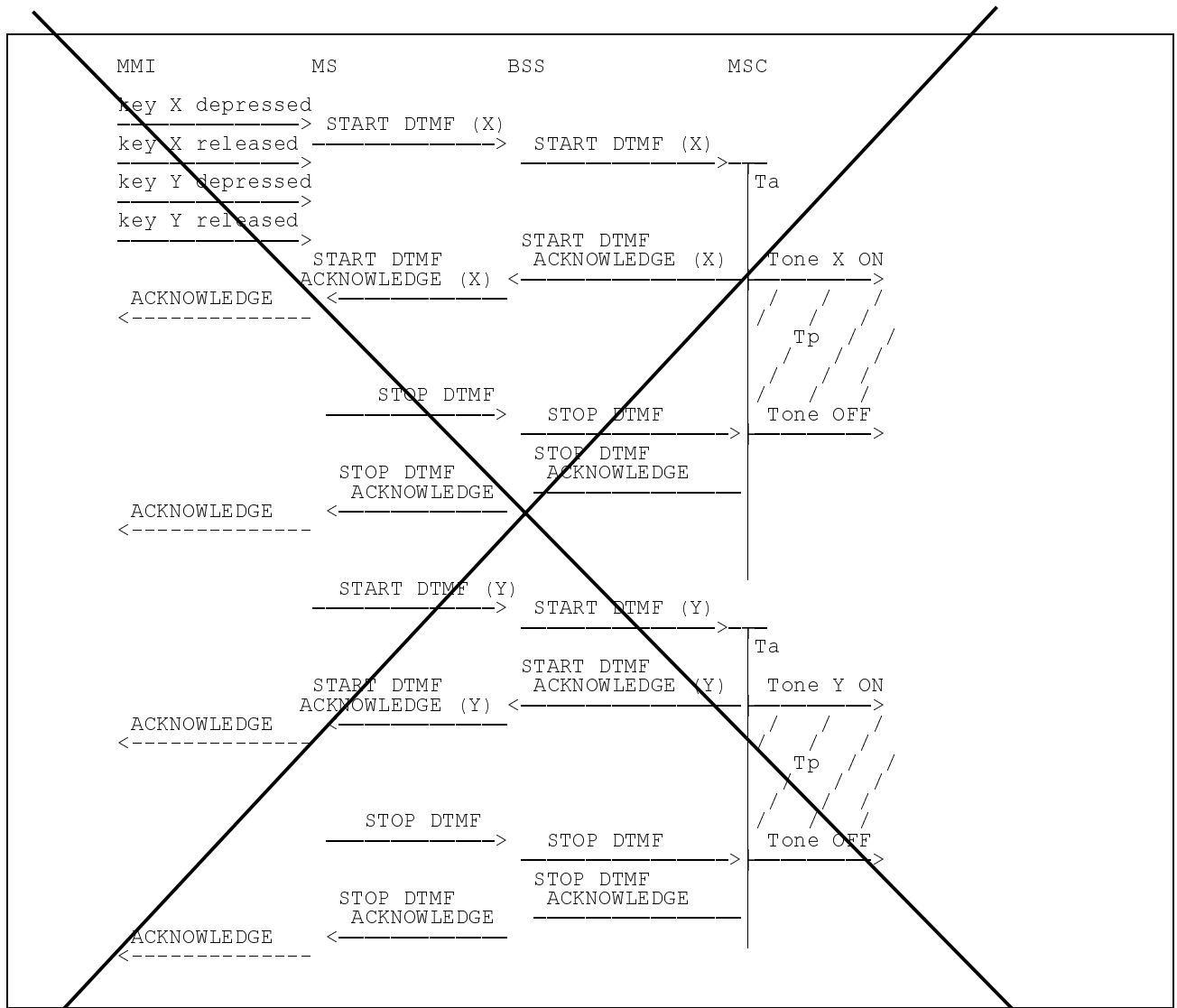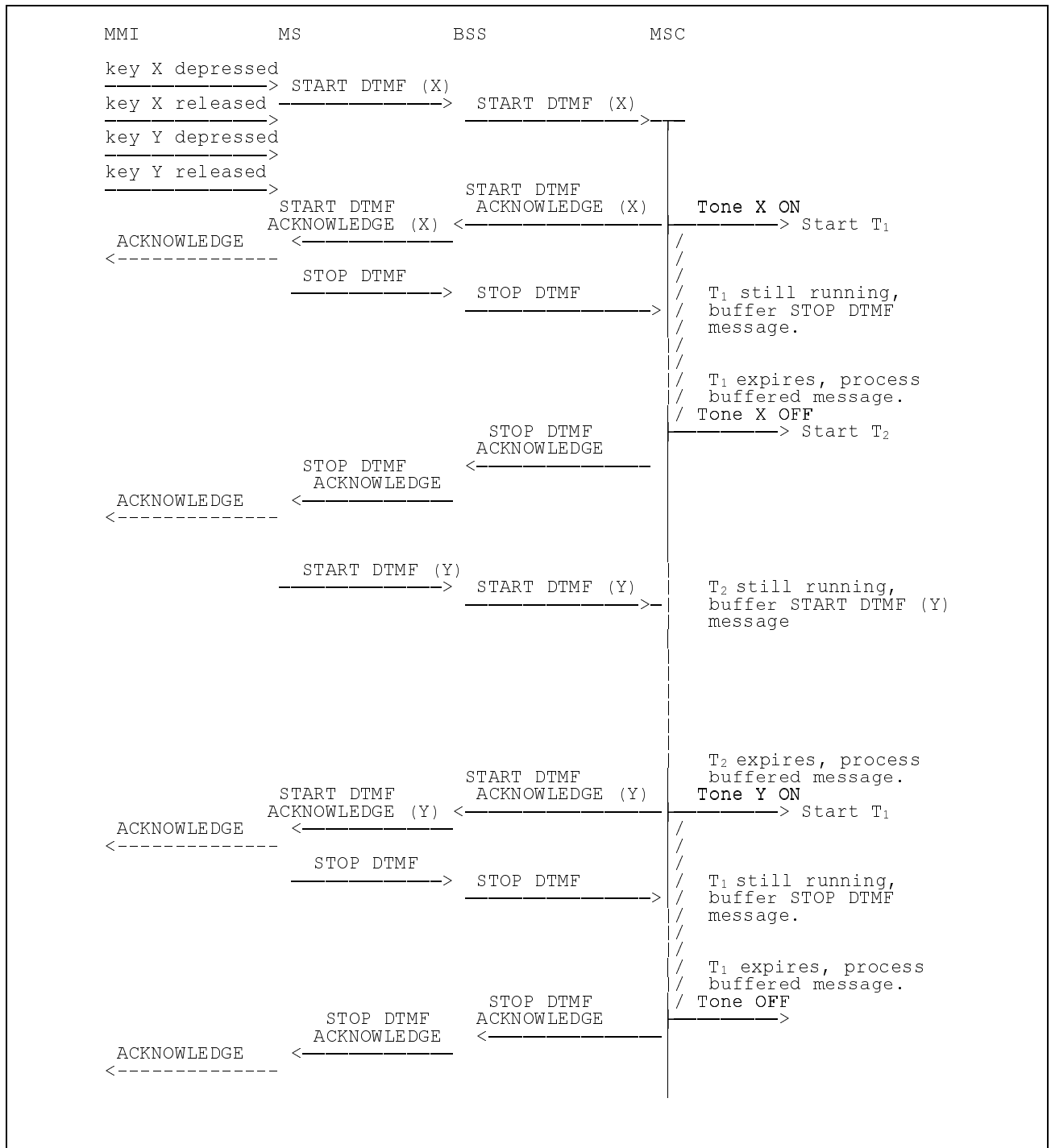
T_1 Minimum length of tone

NOTE: If the Network operator implements the time limit option (see section 6.2), then the tone ends if the timer expires before the 'Stop DTMF' is received.

```
MMI              MS              BSS             MSC
key X depressed
---------------> START DTMF (X)
               ---------------->  START DTMF (X)
key X released
--------------->                ---------------->--
                                                  |Ta
                                START DTMF
               START DTMF       ACKNOWLEDGE (X)   Tone X ON
               ACKNOWLEDGE (X) <---------------------------->
ACKNOWLEDGE    <-------------                      / / /
<-------------                                    / / /
                                                    Tp
                                                  / / /
                                                 / / /
               STOP DTMF                         / / /
               ---------------->  STOP DTMF      Tone OFF
                                ---------------->---------->
                                STOP DTMF
               STOP DTMF        ACKNOWLEDGE
               ACKNOWLEDGE     <---------------
ACKNOWLEDGE    <-------------
<-------------
```

~~**Figure 2: Single DTMF Transmission, short key depression**~~

```
MMI              MS              BSS             MSC
key X depressed
---------------> START DTMF (X)
               ---------------->  START DTMF (X)
key X released
--------------->                ---------------->--
                                                  |Ta
                                START DTMF
               START DTMF       ACKNOWLEDGE (X)   Tone X ON
               ACKNOWLEDGE (X) <---------------------------->  Start T1
ACKNOWLEDGE    <-------------                      /
<-------------                                     /
                                                   /    Tp
                                                   /
                                                   /
               STOP DTMF                           /
               ---------------->  STOP DTMF        /  T1 still running,
                                ---------------->|/  Buffer STOP DTMF
                                                 |/  message
                                                 |/
                                                 ||
                                                 |/ Expiry of T1
                                                 |/ Tone X OFF
                                                 |--------->
                                STOP DTMF        |
               STOP DTMF        ACKNOWLEDGE      |
               ACKNOWLEDGE     <----------------|
ACKNOWLEDGE    <-------------
<-------------
```

Figure 2: Single DTMF Transmission, Short Key Press

Ta   Association time for DTMF Generator in MSC, implementation dependent but low.

Tp   Pre-determined maximum tone length, operator option.

T_1 Minimum length of tone

```
       MMI              MS              BSS             MSC
     key X depressed
     ──────────────> START DTMF (X)
     key X released  ──────────────>  START DTMF (X)
     ──────────────>                ──────────────────>┐
     key Y depressed                                   │ Ta
     ──────────────>                                    
     key Y released               START DTMF
     ──────────────>           ACKNOWLEDGE (X)     Tone X ON
                  START DTMF   ──────────────────>──────────────>
                ACKNOWLEDGE (X) <─────────────────      / /  /
       ACKNOWLEDGE <────────────                       / /  /
     <──────────────                                  / Tp / /
                                                     / /  /  /
                                                    / /  /  /
                STOP DTMF                          / / /  /
              ──────────────>    STOP DTMF        Tone OFF
                              ──────────────────>──────────────>
                                  STOP DTMF
                 STOP DTMF       ACKNOWLEDGE
                ACKNOWLEDGE    ──────────────────
       ACKNOWLEDGE <────────────
     <──────────────

                START DTMF (Y)
              ──────────────>    START DTMF (Y)
                              ──────────────────>┐
                                                 │ Ta
                              START DTMF
                START DTMF  ACKNOWLEDGE (Y)    Tone Y ON
              ACKNOWLEDGE (Y) <─────────────────
       ACKNOWLEDGE <────────────                  / /  /
     <──────────────                             / /  /
                                                / Tp / /
                                               / /  /  /
                STOP DTMF                      / /  /  /
              ──────────────>   STOP DTMF     Tone OFF
                              ──────────────────>──────────────>
                                 STOP DTMF
                STOP DTMF       ACKNOWLEDGE
              ACKNOWLEDGE    ──────────────────
       ACKNOWLEDGE <────────────
     <──────────────
```

Figure 3: Two single DTMF Transmissions, short key depressions

Ta   Association time for DTMF Generator in MSC, implementation dependent but low.

Tp   Pre-determined maximum tone length, operator option.

```
      MMI                 MS                BSS                 MSC

   key X depressed
   ─────────────────────> START DTMF (X)
                          ─────────────────>  START DTMF (X)
                                              ──────────────────>──┐
                                                                   │ Ta
                                                                   │
                                              START DTMF           │
                              START DTMF      ACKNOWLEDGE (X)       │ Tone X ON
                              ACKNOWLEDGE (X) <──────────────────── │ ──────────────>
    ACKNOWLEDGE          <──────────────               /
    <─────────────                                     /
                                                       /   Tp
    key X released                                     /
    ─────────────────>                                 /
                          STOP DTMF                    /
                          ─────────────────> STOP DTMF │ / Tone X OFF
                                             ──────────────────────> ─────────> Start T₂
                                             STOP DTMF
                              STOP DTMF      ACKNOWLEDGE
                              ACKNOWLEDGE    ───────────────
    ACKNOWLEDGE          <──────────────
    <─────────────                                        Expiry of T₂

    key Y depressed
    ─────────────────────>START DTMF (Y)
                          ─────────────────> START DTMF (Y)
                                             ──────────────────>──┐ (T₂ has expired)
                                                                  │ Ta
                                             START DTMF           │
                              START DTMF     ACKNOWLEDGE (Y)      │ Tone Y ON
                              ACKNOWLEDGE (Y) <──────────────────── │ ──────────────>
    ACKNOWLEDGE          <──────────────               /
    <─────────────                                     /
    key Y released                                     /   Tp
    ─────────────────>                                 /
                                                       /
                          STOP DTMF                    /
                          ─────────────────> STOP DTMF │ / Tone Y OFF
                                             ──────────────────────> ──────────────>
                                             STOP DTMF
                              STOP DTMF      ACKNOWLEDGE
                              ACKNOWLEDGE    ───────────────
    ACKNOWLEDGE          <──────────────
    <─────────────
```

Figure 3: Two Single DTMF Transmission

Ta   Association time for DTMF Generation in MSC, implementation dependant but low

Tp   Pre-determined maximum tone length, operator option

T_2 Minimum gap between tones

```
        MMI               MS              BSS              MSC

     key X depressed
     ──────────────> START DTMF (X)
     key X released ───────────────>  START DTMF (X)
     ──────────────>                 ───────────────>──
     key Y depressed
     ──────────────>
     key Y released                 START DTMF
     ──────────────>   START DTMF   ACKNOWLEDGE (X)  │  Tone X ON
                     ACKNOWLEDGE (X) <─────────────── ─────────────> Start T₁
      ACKNOWLEDGE   <───────────────                 │/
     <──────────────                                 │/
                         STOP DTMF                   │/
                     ───────────────>   STOP DTMF    │/  T₁ still running,
                                      ───────────────>/  buffer STOP DTMF
                                                      │/  message.
                                                      │/
                                                      │/
                                                      │/  T₁ expires, process
                                                      │/  buffered message.
                                                      / Tone X OFF
                                        STOP DTMF     ───────────> Start T₂
                                       ACKNOWLEDGE    │
                        STOP DTMF     <───────────────│
                      ACKNOWLEDGE                     │
      ACKNOWLEDGE    <───────────────                 │
     <──────────────                                  │

                       START DTMF (Y)                 │
                     ───────────────> START DTMF (Y)  │
                                      ───────────────>─│  T₂ still running,
                                                      │  buffer START DTMF (Y)
                                                      │  message
                                                      │
                                                      │
                                                      │
                                                      │
                                                      │
                                                      │
                                                      │
                                                      │
                                                      │  T₂ expires, process
                                        START DTMF    │  buffered message.
                        START DTMF     ACKNOWLEDGE (Y)│  Tone Y ON
                     ACKNOWLEDGE (Y)  <─────────────── ─────────────> Start T₁
      ACKNOWLEDGE    <───────────────                 │/
     <──────────────                                  │/
                         STOP DTMF                    │/
                     ───────────────>   STOP DTMF     │/  T₁ still running,
                                      ───────────────>│/  buffer STOP DTMF
                                                      │/  message.
                                                      │/
                                                      │/
                                                      │/  T₁ expires, process
                                                      │/  buffered message.
                                        STOP DTMF     / Tone OFF
                        STOP DTMF     ACKNOWLEDGE     ───────────>
                      ACKNOWLEDGE    <───────────────
      ACKNOWLEDGE    <───────────────
     <──────────────
```

<u>Figure 4: Two Single DTMF Transmissions, Short Gap Between Key Presses</u>

T_1 _____ Minimum length of tones

T_2 _____ Minimum gap between tones

CHANGE REQUEST

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24.008	CR	**003r3**	Current Version:	3.1.0

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

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

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

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

Source:	Vodafone, Siemens	**Date:**	08/10/1999

Subject:	Clarification of DTMF procedure

Work item:	TEI

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

Reason for change:	Phase 1 of GSM 04.08 specified two timers in the MS to ensure that the recommended minimum length of a DTMF tone and the minimum gap between DTMF tones were achieved. These timers were later removed because the transmission time of the DTMF messages across the radio interface ensures that the recommended minimum times are met. With the introduction of a faster radio interface for UMTS (UTRAN), the minimum length of a DTMF tone and minimum gap between tones need to be maintained and the sequence of DTMF messages should be specified more clearly. Therefore, this CR proposes that: a) Individual networks (rather than the MS) shall be responsible for ensuring that the recommended minimum times are achieved. b) To make sure that there is a strict order in which DTMF messages can be sent between the MS and the network. This is aided by the introduction of 2 new timer mechanisms in the MS.

Clauses affected:	5.5.7.1, 5.5.7.2, 5.5.7.3, 5.5.7.4, 5.5.7.5, 11.3

Other specs affected:	Other 3G core specifications	**X**	→ List of CRs:	CR001r1 to 23.014
	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:	References to old CEPT documents in this specification have now been updated to refer to the equivalent ETSI Technical Report. These recommendations are European. Other regions of the world may have their own recommendations that they wish to observe. The requirement will therefore be on the individual networks to ensure that the relevant recommendations are followed.

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

5.5.7 DTMF protocol control procedure

Dual Tone Multi Frequency (DTMF) is an inband one out of four plus one out of four signalling system primarily used from terminal instruments in telecommunication networks. The support of DTMF in the network is described in GSM 03.14.

The mobile station shall be capable of transmitting DTMF messages if and only if the mobile station has the user connection for speech attached and an appropriate channel is available.

The transaction identifier used by the DTMF messages shall be that of the attached speech call.

  NOTE 1: This specification means that DTMF messages can generally be sent in the active state of a call in speech transmission mode or when a traffic channel is available during setup or release and the *progress indicator* IE has been received.

  NOTE 2: Since the DTMF protocol messages are sent in a store and forward mode on the signalling channels the control of the device at the far end may be delayed dependent on the load or quality of the channels.

  NOTE 3: The procedures described in this paragraph support DTMF only in the direction mobile station to network.

5.5.7.1 Start DTMF request by the mobile station

A user may cause a DTMF tone to be generated e.g. by depression of a key in the mobile station. The relevant action is interpreted by the mobile station as a requirement for a DTMF digit to be sent in a START DTMF message on an established FACCH. This message contains the value of the digit to be transmitted (0, 1, ..., 9, A, B, C, D, *, #).

Only a single digit will be transferred in each START DTMF message.

On sending a START DTMF message the MS shall start timer T336.

Where a previous START DTMF message~~s~~ has~~ve~~ been sent, another START DTMF message shall only be sent by the MS following receipt of ~~a~~its STOP DTMF ACKNOWLEDGE message (see section 5.5.7.4) or a START DTMF REJECT message from the network (see section 5.5.7.2) or following the expiry of timers T336 and T337~~7~~.

If timer T336 expires, the MS shall ~~consider~~terminate the ongoing DTMF procedure without any retransmissions, and is free to begin another DTMF procedure (e.g. another START DTMF message).~~as completed.~~

5.5.7.2 Start DTMF response by the network

Upon receiving the START DTMF message the network will reconvert the received digit back into a DTMF tone which is applied toward the remote user and returns a START DTMF ACKNOWLEDGE message to the mobile station. This acknowledgement may be used in the mobile station to generate an indication as a feedback for a successful transmission.

If the network cannot accept the START DTMF message a START DTMF REJECT message will be sent to the mobile station. Upon receipt of a START DTMF ACK message or a START DTMF REJECT message , the MS shall stop timer T336.

5.5.7.3 Stop DTMF request by the mobile station

When the user indicates that the DTMF sending should cease e.g. by releasing the key the mobile station will send a STOP DTMF message to the network.

On sending a STOP DTMF message the MS shall start timer T337.

The MS shall only send a STOP DTMF message if a START DTMF ACKNOWLEDGE message has been received from the network (see section 5.5.7.2) ~~or following the expiry of timer T336~~.

If timer T337 expires, the MS shall ~~consider~~terminate the ongoing DTMF procedure without any retransmissions, and is free to begin another DTMF procedure. (e.g. another START DTMF message).~~as completed.~~

5.5.7.4 Stop DTMF response by the network

Upon receiving the STOP DTMF message the network will stop sending the DTMF tone and return a STOP DTMF ACKNOWLEDGE message to the mobile station. Upon receipt of a STOP DTMF ACKNOWLEDGE message, the MS shall stop timer T337.

5.5.7.5 Sequencing of subsequent start DTMF requests by the mobile station

~~The minimum length of tone generated by the network should be according to CEPT recommendation T/CS 46 02.~~ The network shall ensure that the minimum length of tone and the minimum gap between two subsequent tones (according to ETR 206) is achieved.

   NOTE 1: In ETR 206 the minimum duration of a DTMF tone is 70ms ±5ms.
   NOTE 2: In ETR 206 the minimum gap between DTMF tones is 65ms.

~~The minimum gap between two subsequent tones should be according to CEPT recommendation T/CS 46 02.~~

There is no defined maximum length to the tone, which will normally cease when a STOP DTMF message is received from the MS. However, the operator may choose to put a pre-defined time limit on the duration of tones sent.

The appropriate sequencing of DTMF control messages is shown in figures 5.8 and 5.9.

   NOTE 1: The network may implement the time limit option where the DTMF tone duration is controlled by the network irrespective of the receipt of a STOP DTMF message from the mobile station.

   NOTE 2: ~~The transmission time of the messages over the~~ GSM ~~radio interface on FACCH/F or FACCH/H, see GSM 05.02, ensures that the minimum length of tones and minimum gap between tones according to T/CS 46 02~~ ETR 206 ~~are fulfilled.~~

```
Mobile Station                              Network
                       START DTMF
       --------------------------------->
                     START DTMF ACK
       <---------------------------------
                       STOP DTMF                          ß
       --------------------------------->
                     STOP DTMF ACK
       <---------------------------------
```
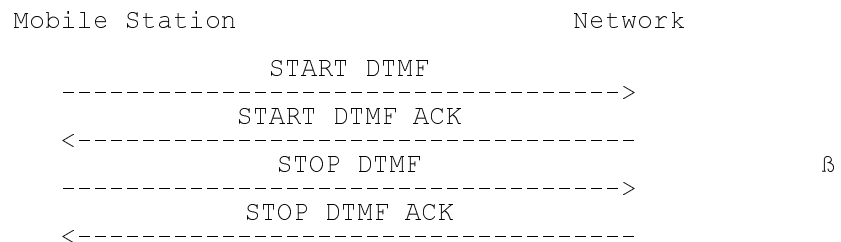
Figure 5.8/GSM 04.08 Single DTMF transmission
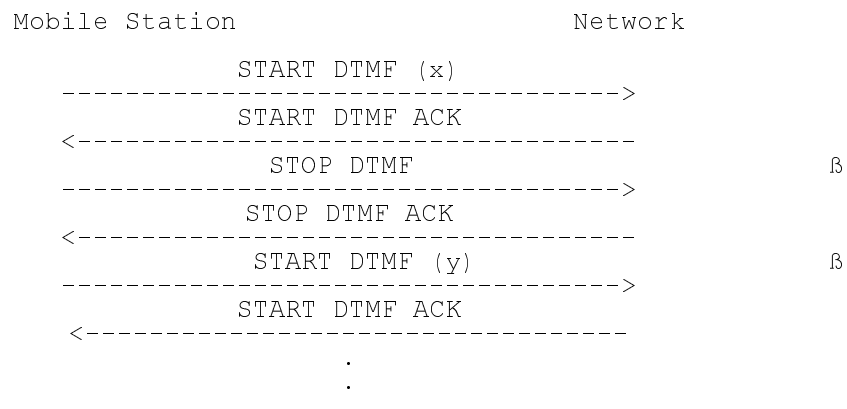
```
Mobile Station                          Network
                     START DTMF (x)
       --------------------------------->
                   START DTMF ACK
       <---------------------------------
                       STOP DTMF                        ß
       --------------------------------->
                   STOP DTMF ACK
       <---------------------------------
                     START DTMF (y)                      ß
       --------------------------------->
                   START DTMF ACK
        <--------------------------------
                          .
                          .
                          .
```
Figure 5.9/GSM 04.08 Multiple DTMF transmission

11.3 Timers of circuit-switched call control

Table 11.3/TS 24.008: Call control timers - MS side

TIM. NUM.	TIM VAL	STATE OF CALL	CAUSE OF START	NORMAL STOP	AT FIRST EXPIRY	AT SECOND EXPIRY
T303	30s	Call initiated	CM SER RQ sent	CALL PROC, or REL COMP received	Clear the call	Timer is not restarted
T305	30s	Disconnect Request	DISC sent	REL or DISC received	REL sent.	Timer is not restarted
T308	30s	Release request	REL sent	REL COMP or REL received	Retrans. RELEASE restart T308	Call ref. release
T310 Note 1	30s	Outgoing call Proceeding	CALL PROC received	ALERT,CONN, DISC or PROG rec.	Send DISC	Timer is not restarted
T313	30s	Connect Request	CONN sent	CONNect ACKnowledge received	Send DISC	Timer is not restarted
T323	30s	Modify Request	MOD sent	MOD COMP or MOD REJ received	Clear the call	Timer is not restarted
T332	30s	Wait for network info.	START_CC sent	CC-EST. received	Clear the call	Timer is not restarted
T3345	30s	CC-Est. Confirmed	CC-EST CONF.sent	RECALL received	Clear the call	Timer is not restarted
T336	10s		START DTMF sent	START DTMF ACK or START DTMF REJECT received	~~MS sends a STOP DTMF~~ The MS considers the DTMF Procedure (for the digit) to be ~~completed~~ terminated	Timer is not restarted
T337	10s		STOP DTMF sent	STOP DTMF ACK received	The MS considers the DTMF procedure (for the current digit) to be ~~complete~~ terminated	Timer is not restarted

NOTE 1: T310 is not started if progress indicator #1, #2, or #64 has been delivered in the CALL PROCEEDING message or in a previous PROGRESS message.

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Bad Aibling, GERMANY, 30 Nov – 03 Dec 1999

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

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

24.008	**CR**	**074r1**	Current Version:	**3.1.0**

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

For submission to: **TSG-N1 #9** for approval **X**   strategic   (for SMG
list expected approval meeting # here ↑ for information   non-strategic   use only)

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

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

Source: Ericsson   **Date:**   01 Dec 1999

Subject: GSM cleanup

Work item: TEI

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

Reason for change: TS 24.008 needs to include all BC IE related impacts due to GSM cleanup.

Clauses affected: 5.3.4, 10.5.4.5, 10.5.4.22

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

Other comments:

help.doc

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

TS 24.008 V3.1.0 (1999-10)

Technical Specification

3rd Generation Partnership Project;
Universal Mobile Telecommunications System;
Mobile radio interface layer 3 specification,
Core Network Protocols - Stage 3
(TS 24.008 version 3.1.0)

Reference
DTS/TSGN-0124008U

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5 Elementary procedures for circuit-switched Call Control

5.3.4 Support of Dual Services

The behaviour described in this section is used to realize the following required services throughout section 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 section 8.4. If the mobile station is already prepared to support the procedure in both directions, it shall act as described in this section.

a) Alternate Speech/Data (BS 61 according to TS 02.02);

b) Speech followed by Data (BS 81 according to TS 02.02);

c) Alternate Speech/Group 3 fax (Teleservice 61 according to GSM 02.03).

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 section 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; or

mode 1 "and then" mode 2.

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 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/data or alternate speech/facsimile group 3 service (refer to section 5.3.4) the old resources may still be kept reserved, in case of speech followed by data service they may be released.

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.

10.5.4   Call control information elements.

10.5.4.5   Bearer capability

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

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

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

```
  8       7       6       5       4       3       2       1
+-------------------------------------------------------+
|    |   |              Bearer capability IEI           |  octet 1
+-------------------------------------------------------+
|                                                       |
|        Length of the bearer capability contents       |  octet 2
+-------------------------------------------------------+
| 0/1 |  radio    | co- |trans|      information         |
| ext | channel   |ding | fer |      transfer            |  octet 3
|     |requirement| std |mode |      capability          |
+-----+-----------+-----+-----+--------------------------+
| 0/1 | 0    0     0    |                                |
| ext | co-    spare    |     speech version             | octet 3a etc*
|     | ding           |          indication             |
+-----+-----+----------+-----+------+------+------+-------+
|  1  |comp-|          |dupl.|confi | NIRR |esta- |
| ext |ress.| structure|mode |gur.  |      |bli.  |  octet 4*
+-----+-----+----------+-----+------+------+------+-------+
| 0/1 | 0    0   |  rate     |      signalling           |
| ext |access id.| adaption  |   access protocol         |  octet 5*
+-----+----------+-----------+---------------------------+
| 0/1 |          |Other rate | 0      0       0           |
| ext | Other ITC| adaption  |       Spare               |  octet 5a*
+-----+----------+-----------+-----+------+------+--------+
|  1  |Hdr/ |Multi|Mode | LLI |Assig|Inb. |   0          |
| ext |noHdr|frame|     |     |nor/e|neg  | Spare        |  octet 5b*
+-----+-----+-----+-----+-----+-----+-----+-------+------+
| 0/1 | 0    1   |  User information         | sync/|
| ext |layer 1 id.| layer 1 protocol         | async|  octet 6*
+-----+-----+-----+--------------------------+------+
| 0/1 |numb.|nego-|numb.|                           |
| ext |stop |tia- |data |       user rate           |  octet 6a*
|     |bits |tion |bits |                           |
+-----+-----+-----+-----+---------------------------+
| 0/1 | intermed. | NIC | NIC |                     |
| ext |    rate   |on TX|on RX|      Parity         |  octet 6b*
+-----+-----------+-----+-----+---------------------+
| 0/1 |connection |                               |
| ext |  element  |       modem type              |  octet 6c*
+-----+-----------+-------------------------------+
| 0/1 |  Other    |  Fixed network user rate      |  octet 6d*
| ext |modem type |                               |
+-----+-----------+----------------+--------------+
| 0/1 |  Acceptable |Maximum number of           |  octet 6e*
| ext |   channel   |traffic channels            |
|     |   codings   |                            |
+-----+-------------+----------------------------+
| 0/1 |    UIMI     | Wanted air interface       |  octet 6f*
| ext |             | user rate                  |
+-----+-------------+----------------------------+
|  1  | Acceptable  |     |  |  0    0  | | ext | channel codings |
| ext | Asymmetry   |     |  |          | |     |                 |
|     |  extended   |     |Indication| Spare | octet 6g*
+-----+-------------+-----+----------+-------+
|  1  |  1    0  |   User information           |
| ext |layer 2 id.|   layer 2 protocol         |  octet 7*
+-------------------------------------------------------+
```

Figure 10.5.88/TS 24.008 Bearer capability information element

NOTE: The coding of the octets of the bearer capability information element is not conforming to TS CCITT Q.931.

Table 10.5.102/TS 24.008: Bearer capability information element

Radio channel requirement (octet 3), network to MS direction

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

Radio channel requirement (octet 3) MS to network direction

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

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

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

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

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

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

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

(continued...)

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

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

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

All other values are reserved

Table 10.5.103/TS 24.008 Bearer capability information element

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

Coding

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

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

Bits 5 and 6 are spare.

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

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

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

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

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

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

Table 10.5.104/TS 24.008: Bearer capability information element

Compression (octet 4), network to MS direction:
Bit
7
0   data compression not possible
1   data compression possible

Compression (octet 4), MS to network direction:
Bit
7
0   data compression not allowed
1   data compression allowed

Structure (octet 4)

Bits
6 5
0 0 service data unit integrity
1 1 unstructured

All other values are reserved.

Duplex mode (octet 4)
Bit
4
0   half duplex
1   full duplex

Configuration (octet 4)
Bit
3
0   point-to-point

All other values are reserved.

NIRR (octet 4)
 (Negotiation of Intermediate Rate Requested)
Bit
2
0   No meaning is associated with this value.
1   Data up to and including 4.8 kb/s, full rate, non-transparent, 6 kb/s radio   interface rate is requested.

Establishment (octet 4)
Bit
1
0   demand

All other values are reserved

Table 10.5.105/TS 24.008: Bearer capability information element

```
Access identity (octet 5)
Bits
7 6
0 0 octet identifier

All other values are reserved


Rate adaption (octet 5)
Bits
5 4
0 0 no rate adaption
0 1 V.110/X.30 rate adaptation
1 0 CCITT X.31 flag stuffing
1 1 Other rate adaption (see octet 5a)

Signalling access protocol (octet 5)

Bits
3 2 1
0 0 1   I.440/450
0 1 0   X.21
0 1 1   X.28 - dedicated PAD, individual NUI reserved: was allocated in earlier phases of the
protocol
1 0 0   X.28 - dedicated PAD, universal NUI reserved: was allocated in earlier phases of the
protocol
1 0 1   X.28 - non dedicated PAD
1 1 0   X.32

All other values are reserved.
```

Table 10.5.106/TS 24.008: Bearer capability information element

```
Other ITC (octet 5a)
If the value "Other ITC" is not signalled in the field "ITC" then the contents of this field shall be
ignored.

Bit
7 6
0 0 restricted digital information

All other values are reserved


Other rate adaption (octet 5a)
If the value " Other rate adaption" is not signalled in the field "Rate adaption" then the contents of
this field shall be ignored.

Bit
5 4
0 0 V.120

All other values are reserved.
```

Table 10.5.107/TS 24.008: Bearer capability information element

Rate adaption header/no header (octet 5b)

Bit
7
0 Rate adaption header not included
1 Rate adaption header included

Multiple frame establishment support in data link (octet 5b)

Bit
6
0 Multiple frame establishment not supported, only UI frames allowed
1 Multiple frame establishment supported

Mode of operation (octet 5b)

Bit
5
0 Bit transparent mode of operation
1 Protocol sensitive mode of operation

Logical link identifier negotiation (octet 5b)

Bit
4
0 Default, LLI=256 only
1 Full protocol negotiation, (note: A connection over which protocol negotiation will
  be executed is indicated in bit 2 of octet 5b)

Assignor/Assignee (octet 5b)

Bit
3
0 Message originator is "default assignee"
1 Message originator is "assignor only"

In band/Out of band negotiation (octet 5b)

Bit
2
0 Negotiation is done in-band using logical link zero
1 Negotiation is done with USER INFORMATION messages on a temporary
  signalling connection

Bit 1 is spare and set to the value "0"

Table 10.5.108/TS 24.008: Bearer capability information element

```
Layer 1 identity (octet 6)
Bits
7 6
0 1 octet identifier

All other values are reserved

User information layer 1 protocol (octet 6)
Bits
5 4 3 2
0 0 0 0 default layer 1 protocol

All other values reserved.

Synchronous/asynchronous (octet 6)
Bit
1
0    synchronous
1    asynchronous
```

Table 10.5.109/TS 24.008: Bearer capability information element

```
Number of Stop Bits (octet 6a)
Bit
7
0    1 bit (This value is also used in the case of synchronous mode)
1    2 bits

Negotiation (octet 6a)
Bit
6
0    in-band negotiation not possible

NOTE: See Rec. V.110 and X.30

All other values are reserved

Number of data bits excluding parity bit if present (octet 6a)
Bit
5
0    7 bits
1    8 bits (this value is also used in the case of bit oriented protocols)

User rate (octet 6a)
Bits
4 3 2 1
0 0 0 0 0.3 kbit/s Recommendation X.1 and V.110
0 0 0 1 1.2 kbit/s Recommendation X.1 and V.110
0 0 1 0 2.4 kbit/s Recommendation X.1 and V.110
0 0 1 1 4.8 kbit/s Recommendation X.1 and V.110
0 1 0 0 9.6 kbit/s Recommendation X.1 and V.110
0 1 0 1 12.0 kbit/s transparent (non compliance with X.1 and V.110)
0 1 1 1 1.2 kbit/s/75 bit/s Recommendation V.23, (asymmetric) X.1,V.110 reserved: was allocated
in earlier phases of the protocol

All other values are reserved.

For facsimile group 3 calls the user rate indicates the first and maximum speed the mobile station
is using.
```

Table 10.5.110/TS 24.008: Bearer capability information element

Octet 6b for V.110/X.30 rate adaptation Intermediate rate (octet 6b)

Bits
7 6
0 0 reserved
0 1 reserved
1 0 8 kbit/s
1 1 16 kbit/s

Network independent clock (NIC) on transmission (Tx) (octet 6b) (See Rec. V.110 and X.30)

Bit
5
0   does not require to send data with network independent clock
1   requires to send data with network independent clock

Network independent clock (NIC) on reception (Rx) (octet 6b) (See Rec. V.110 and X.30)

Bit
4
0   cannot accept data with network independent clock (i.e. sender does not   support this
optional procedure)
1   can accept data with network independent clock (i.e. sender does support this   optional
procedure)

Parity information (octet 6b)
Bits
3 2 1
0 0 0   odd
0 1 0   even
0 1 1   none
1 0 0   forced to 0
1 0 1   forced to 1

All other values are reserved.

Table 10.5.111/TS 24.008: Bearer capability information element

```
Connection element (octet 6c)
Bit
7 6
0 0 transparent
0 1 non transparent (RLP)
1 0 both, transparent preferred
1 1 both, non transparent preferred

The requesting end (e.g. the one sending the SETUP message) should use the 4 values
depending on its capabilities to support the different modes. The answering party shall only use
the codings 00 or 01, based on its own capabilities and the proposed choice if any. If both MS and
network support both transparent and non transparent, priority should be given to the MS
preference.

Modem type (octet 6c)
Bits
5 4 3 2 1
0 0 0 0 0   none
0 0 0 0 1   V.21
0 0 0 1 0   V.22
0 0 0 1 1   V.22 bis
0 0 1 0 0   V.23
0 0 1 0 1   V.26 ter
0 0 1 1 0   V.32
0 0 1 1 1   modem for undefined interface
0 1 0 0 0   autobauding type 1

All other values are reserved.
```

Table 10.5.112/TS 24.008: Bearer capability information element

```
Other modem type (octet 6d)
Bits
7 6
0 0 no other modem type specified in this field
0 1 V.32bis
1 0 V.34

All other values are reserved.

Fixed network user rate (octet 6d)
Bit
5 4 3 2 1
0 0 0 0 0   Fixed network user rate not applicable/No meaning is associated
            with this value.
0 0 0 0 1   9.6 kbit/s Recommendation X.1 and V.110
0 0 0 1 0   14.4 kbit/s Recommendation X.1 and V.110
0 0 0 1 1   19.2 kbit/s Recommendation X.1 and V.110
0 0 1 0 0   28.8 kbit/s Recommendation X.1 and V.110
0 0 1 0 1   38.4 kbit/s Recommendation X.1 and V.110
0 0 1 1 0   48.0 kbit/s Recommendation X.1 and V.110(synch)
0 0 1 1 1   56.0 kbit/s Recommendation X.1 and V.110(synch) /bit transparent
0 1 0 0 0   64.0 kbit/s bit transparent

All other values are reserved.
```

Table 10.5.113/TS 24.008: Bearer capability information element

Acceptable channel codings (octet 6e), mobile station to network direction:

Bit
7
0   TCH/F14.4 not acceptable
1   TCH/F14.4 acceptable

Bit
6
0   Spare

Bit
5
0   TCH/F9.6 not acceptable
1   TCH/F9.6 acceptable

Bit
4
0   TCH/F4.8 not acceptable
1   TCH/F4.8 acceptable

Acceptable channel codings (octet 6e), network to MS direction:
Bits 4 to 7 are spare and shall be set to "0".

Maximum number of traffic channels (octet 6e), MS to network direction:

Bits
3 2 1
0 0 0   1 TCH
0 0 1   2 TCH
0 1 0   3 TCH
0 1 1   4 TCH
1 0 0   5 TCH
1 0 1   6 TCH
1 1 0   7 TCH
1 1 1   8 TCH

Maximum number of traffic channels (octet 6e), network to MS direction:
Bits 1 to 3 are spare and shall be set to "0".

Table 10.5.114/TS 24.008: Bearer capability information element

UIMI, User initiated modification indication (octet 6f),

7 6 5
0 0 0   User initiated modification not allowed/required/applicable
0 0 1   User initiated modification up to 1 TCH/F allowed/may be requested
0 1 0   User initiated modification up to 2 TCH/F allowed/may be requested
0 1 1   User initiated modification up to 3 TCH/F allowed/may be requested
1 0 0   User initiated modification up to 4 TCH/F allowed/may be requested

All other values shall be interpreted as "User initiated modification up to 4 TCH/F may be requested".

User initiated modification indication is not applicable for transparent connection.

Wanted air interface user rate (octet 6f), MS to network direction:
Bits
4 3 2 1
0 0 0 0 Air interface user rate not applicable/No meaning associated with this value
0 0 0 1 9.6 kbit/s
0 0 1 0 14.4 kbit/s
0 0 1 1 19.2 kbit/s
0 1 0 1 28.8 kbit/s
0 1 1 0   38.4 kbit/s
0 1 1 1 43.2 kbit/s
1 0 0 0 57.6 kbit/s
1 0 0 1 interpreted by the network as 38.4 kbit/s in this version of the protocol
1 0 1 0 interpreted by the network as 38.4 kbit/s in this version of the protocol
1 0 1 1 interpreted by the network as 38.4 kbit/s in this version of the protocol
1 1 0 0 interpreted by the network as 38.4 kbit/s in this version of the protocol

All other values are reserved.

Wanted air interface user rate (octet 6f), network to MS direction:
Bits 1 to 4 are spare and shall be set to "0".

Table 10.5.115/TS 24.008: Bearer capability information element

```
Layer 2 identity (octet 7)
Bits
7 6
1 0 octet identifier

All other values are reserved

User information layer 2 protocol (octet 7)

Bits
5 4 3 2 1
0 0 1 1 0   recommendation X.25, link level
0 1 0 0 0   ISO 6429, codeset 0 (DC1/DC3)
0 1 0 0 1   reserved: was allocated but never used in earlier phases of the protocol
0 1 0 1 0   videotex profile 1
0 1 1 0 0   COPnoFlCt (Character oriented Protocol with no Flow Control
            mechanism)
0 1 1 0 1   X.75 layer 2 modified (CAPI)

All other values are reserved.
```

Table 10.5.115a/TS 24.008: Bearer capability information element

```
Acceptable Channel Codings extended (octet 6g) mobile station to network direction:

Bit
7
0 TCH/F28.8 not acceptable
1 TCH/F28.8 acceptable

Bit
6
0 TCH/F32.0 not acceptable
1 TCH/F32.0 acceptable

Bit
5
0 TCH/F43.2 not acceptable
1 TCH/F43.2 acceptable
Channel Coding Asymmetry Indication

Bits
4 3
0 0     Channel coding symmetry preferred
1 0     Downlink biased channel coding asymmetry is preferred
0 1     Uplink biased channel coding asymmetry is preferred
1 1     Unused, if received it shall be interpreted as "Channel coding symmetry preferred"


EDGE Channel Codings (octet 6g), network to MS direction:
Bits 3 to 7 are spare and shall be set to "0".

Bits 2 and 1 are spare.
```

10.5.4.22   Repeat indicator

The purpose of the repeat indicator information element is to indicate how the associated repeated information elements shall be interpreted, when included in a message. The repeat indicator information element is included immediately before the first occurrence of the associated information element which will be repeated in a message. "Mode 1" refers to the first occurrence of that information element, "mode 2" refers to the second occurrence of that information element in the same message.

The repeat indicator information element is coded as shown in figure 10.5.109/TS 24.008 and table 10.5.129/TS 24.008.

The repeat indicator is a type 1 information element.

```
   8     7     6     5     4     3     2     1
+-----------------------------------------------+
|     |  repeat indicator   |  repeat indication  | octet 1
|     |         IEI         |                     |
+-----------------------------------------------+
```
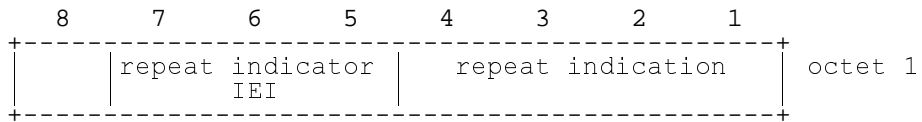
Figure 10.5.109/TS 24.008 Repeat indicator information element

Table 10.5.129/TS 24.008: Repeat indicator information element

```
+---------------------------------------------------------------+
| Repeat indication (octet 1)                                   |
| Bits                                                          |
| 4 3 2 1                                                       |
| 0 0 0 1  Circular for successive selection                   |
|          "mode 1 alternate mode 2"                           |
| 0 0 1 1  Sequential for successive selection                 |
|          "mode 1 and then mode 2"                           |
|          reserved: was allocated in earlier phases of the protocol |
|                                                               |
| All other values are reserved.                                |
|                                                               |
+---------------------------------------------------------------+
```

3GPP TSG-N WG1 #9   *Document*   ***N1-99F54***
Bad Aibling, GERMANY, 30 Nov – 03 Dec 1999

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

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

24.008	**CR**	**075r2**	Current Version:	3.1.0

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

For submission to: TSGN#6   for approval   ☒   strategic   ☐ *(for SMG use only)*
list expected approval meeting # here ↑   for information   non-strategic

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

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

Source:	Ericsson	**Date:**	03 Dec 1999

Subject:	UMTS cleanup

Work item:	TEI

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

Reason for change:	TS 24.008 needs to include all BC IE related impacts due to UMTS. Impacts resulting from agreed CRs N1-9973, N1-99C98

Clauses affected:	2, 5.3.5, 9.3.13, 9.3.14, 9.3.15, 9.3.23, 10.5.4.5, 10.5.4.16, 10.5.4.18

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

Other comments:	

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

TS 24.008 V3.1.0 (1999-10)

Technical Specificatio

**3rd Generation Partnership Projec
Universal Mobile Telecommunications System
Mobile radio interface layer 3 specification
Core Network Protocols - Stage
(TS 24.008 version 3.1.0**

The present document has been developed within the 3rd Generation Partnership Project (3GPP TM) and may be further elaborated for purposes of 3GPP.

The present document has not been subject to any approval process by the 3GPP Organisational Partners and shall not be implemented.

This Specification is provided for future development work within 3GPP only. The Organisational Partners accept no liability for any use of t Specification.

Specifications and reports for implementation of the 3GPP TM system should be obtained via the 3GPP Organisational Partners' Publicatio Offices.

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2 Normative references

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies.

- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

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

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

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

[4] GSM 02.03: "Digital cellular telecommunications system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

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

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

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

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

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

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

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

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

[12a] TS 23.071: "Digital cellular telecommunications system (Phase 2+); Location Services; Functional description – Stage 2".

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

[14] TS 23.022: "Digital cellular telecommunications system (Phase 2+); Functions related to Mobile Station (MS) in idle mode".

[15] GSM 04.02: "Digital cellular telecommunications system (Phase 2+); GSM Public Land Mobile Network (PLMN) access reference configuration".

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

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

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

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

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

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

[22]   GSM 04.11: "Digital cellular telecommunications system (Phase 2); Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[23]   GSM 04.12: "Digital cellular telecommunications system (Phase 2+); Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".

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

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

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

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

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

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

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

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

[31]   GSM 04.88: "Digital cellular telecommunications system (Phase 2+); Call Barring (CB) supplementary services - Stage 3".

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

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

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

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

[36]   TS 27.001TS 27.001: "Digital cellular telecommunications system (Phase 2+); General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

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

[38]   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]   CCITT Recommendation E.163: "Numbering plan for the international telephone service".

[45]   CCITT Recommendation E.164: "Numbering plan for the ISDN era".

[46]   CCITT Recommendation E.212: "Identification plan for land mobile stations".

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

[48]   CCITT Recommendation I.330: "ISDN numbering and addressing principles".

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

[50]   CCITT 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]   CCITT Recommendation T.50: "International Alphabet No. 5".

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

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

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

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

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

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

[63]   CCITT 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]   CCITT 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]   CCITT 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]   CCITT Recommendation X.31: "Support of packet mode terminal equipment by an ISDN".

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

[69]   CCITT 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]   TS 22.060: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Service Description; Stage 1".

[74]   TS 23.060: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Service Description; Stage 2".

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

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

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

5   Elementary procedures for circuit-switched Call Control

5.3.5   User initiated service level up- and downgrading (GSM only)

The user initiated service level up- and downgrading is applicable for non-transparent multislot data, only. By means of this procedure the user can request a change of the "maximum number of traffic channels" and/or "wanted air interface user rate" parameters, to be assigned by the network.

The user initiated service level up- and downgrading is not applicable for UMTS.

9.3 Messages for circuit-switched call control

9.3.13 Modify

This message is sent by the mobile station to the network or by the network to the mobile station to request a change in bearer capability for a call.

See table 9.63/TS 24.008.

Message type: MODIFY

Significance: global

Direction: both

Table 9.63/TS 24.008: MODIFY 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
	Modify message type	Message type 10.4	M	V	1
	Bearer capability	Bearer capability 10.5.4.5	M	LV	2-15
7C	Low layer comp.	Low layer comp. 10.5.4.18	O	TLV	2-~~15~~18
7D	High layer comp.	High layer comp. 10.5.4.16	O	TLV	2-5
A3	Reverse call setup direction	Reverse call setup direction 10.5.4.22a	O	T	1

9.3.13.1 Low layer compatibility

This information element shall be included if it was included in the initial SETUP message.

9.3.13.2 High layer compatibility

This information element shall be included if it was included in the initial SETUP message.

9.3.13.3   Reverse call setup direction

This information element is included or omitted in the mobile to network direction according to the rules defined in section 5.3.4.3.1.

9.3.14   Modify complete

This message is sent by the mobile station to the network or by the network to the mobile station to indicate completion of a request to change bearer capability for a call.

See table 9.64/TS 24.008.

   Message type: MODIFY COMPLETE

   Significance: global

   Direction: both

Table 9.64/TS 24.008: MODIFY COMPLETE 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
	Modify complete message type	Message type 10.4	M	V	1
	Bearer capability	Bearer capability 10.5.4.5	M	LV	2-15
7C	Low layer comp.	Low layer comp. 10.5.4.18	O	TLV	2-~~15~~18
7D	High layer comp.	High layer comp. 10.5.4.16	O	TLV	2-5
A3	Reverse call setup direction	Reverse call setup direction 10.5.4.22a	O	T	1

9.3.14.1   Low layer compatibility

This information element shall be included if it was included in the initial SETUP message.

9.3.14.2   High layer compatibility

This information element shall be included if it was included in the initial SETUP message.

9.3.14.3   Reverse call setup direction

This information element is included or omitted according to the rules defined in section 5.3.4.3.2.

9.3.15   Modify reject

This message is sent by the mobile station to the network or by the network to the mobile station to indicate failure of a request to change the bearer capability for a call.

See table 9.65/TS 24.008.

    Message type: MODIFY REJECT

    Significance: global

    Direction: both

Table 9.65/TS 24.008: MODIFY REJECT 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
	Modify reject message type	Message type 10.4	M	V	1
	Bearer capability	Bearer capability 10.5.4.5	M	LV	2-15
	Cause	Cause 10.5.4.11	M	LV	3-31
7C	Low layer comp.	Low layer comp. 10.5.4.18	O	TLV	2-~~15~~18
7D	High layer comp.	High layer comp. 10.5.4.16	O	TLV	2-5

9.3.15.1 Low layer compatibility

This information element shall be included if it was included in the initial SETUP message.

9.3.15.2 High layer compatibility

This information element shall be included if it was included in the initial SETUP message.

9.3.23 Setup

9.3.23.1 Setup (mobile terminated call establishment)

This message is sent by the network to the mobile station to initiate a mobile terminated call establishment.

See table 9.70/TS 24.008.

    Message type: SETUP

    Significance: global

    Direction: network to mobile station

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

IEI	Information element	Type / Reference	Presence	Format	Length
	Call control	Protocol discriminator	M	V	1/2

	protocol discriminator	10.2			
	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	O	TLV	3-16
04	Bearer capability 2	Bearer capability 10.5.4.5	O	TLV	3-16
1C	Facility	Facility 10.5.4.15	O	TLV	2-?
1E	Progress indicator	Progress indicator 10.5.4.21	O	TLV	4
34	Signal	Signal 10.5.4.23	O	TV	2
5C	Calling party BCD number	Calling party BCD num. 10.5.4.9	O	TLV	3-14
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	O	TLV	3-19
6D	Called party sub-address	Called party subaddr. 10.5.4.8	O	TLV	2-23
74	Redirecting party BCD number	Redirecting party BCD num. 10.5.4.21a	O	TLV	3-19
75	Redirecting party sub-address	Redirecting party subaddress. 10.5.4.21b	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-~~15~~18
7C	Low layer compatibility II	Low layer comp. 10.5.4.18	C	TLV	2-~~15~~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	C	TLV	2-5
7E	User-user	User-user 10.5.4.25	O	TLV	3-35
8-	Priority	Priority Level 10.5.1.11	O	TV	1
19	Alert	Alerting Pattern 10.5.4.26	O	TLV	3

9.3.23.1.1 BC repeat indicator

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

9.3.23.1.2 Bearer capability 1 and bearer capability 2

The *bearer capability 1* information element may be omitted in the case where the mobile subscriber is allocated only one directory number for all services (ref.: TS 29.007). The *bearer capability 2* IE is missing at least if the *bearer capability 1* IE is missing.

9.3.23.1.3 Facility

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

9.3.23.1.4 Progress indicator

This information element is included by the network

- in order to pass information about the call in progress e.g. in the event of interworking and/or

- to make the MS attach the user connection for speech.

9.3.23.1.4a Called party BCD number

For all bands except for PCS1900, the maximum length of this IE sent by the network shall be 13 octets

9.3.23.1.5 Called party subaddress

Included in the Network-to-mobile station direction if the calling user includes a *called party subaddress* information element in the SETUP message.

9.3.23.1.6 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.

9.3.23.1.7 Low layer compatibility I

Included in the network-to-mobile station direction if the calling user specified a low layer compatibility.

9.3.23.1.8 Low layer compatibility II

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

9.3.23.1.9 HLC repeat indicator

The *HLC repeat indicator* information element is included if and only 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.

9.3.23.1.10 High layer compatibility i

Included in the network-to-mobile station direction if the calling user specified a high layer compatibility.

9.3.23.1.11 High layer compatibility ii

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

9.3.23.1.12 User-user

May be included in the network to called mobile station direction when the calling remote user included a user-user information element in the SETUP message.

9.3.23.1.13 Redirecting party BCD number

May be included in the network to called mobile station direction when the call has been redirected.

9.3.23.1.14 Redirecting party subaddress

May be included in the network to called mobile station direction when the calling remote user included a called party subaddress in the SETUP message and the call has been redirected

9.3.23.1.15 Priority

May be included by the network to indicate the priority of the incoming call if eMLPP is used.

9.3.23.1.16 Alert $(Network Indication of Alerting in the MS)$

May be included by the network to give some indication about alerting (category or level). If supported in the MS, this optional indication is to be used by the MS as specified in GSM 02.07.

9.3.23.2 Setup (mobile originating call establishment)

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

See table 9.70a/TS 24.008.

   Message type: SETUP

   Significance: global

   Direction: mobile station to network

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

IEI	Information element	Type / Reference	Presence	Format	Length
	Call control	Protocol discriminator	M	V	1/2

	protocol discriminator	10.2			
	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-~~15~~18
7C	Low layer compatibility II	Low layer comp. 10.5.4.18	O	TLV	2-~~15~~18
D-	HLC repeat indicator	Repeat indicator 10.5.4.22	O	TV	1
7D	High layer compatibility i	High layer comp. 10.5.4.16	O	TLV	2-5
7D	High layer compatibility ii	High layer comp. 10.5.4.16	O	TLV	2-5
7E	User-user	User-user 10.5.4.25	O	TLV	3-35
7F	SS version	SS version indicator 10.5.4.24	O	TLV	2-3
A1	CLIR suppression	CLIR suppression 10.5.4.11a	C	T	1

A2	CLIR invocation	CLIR invocation 10.5.4.11b	C	T	1
15	CC capabilities	Call Control Capabilities 10.5.4.5a	O	TLV	3
1D	Facility $(CCBS)$ (advanced recall alignment)	Facility 10.5.4.15	O	TLV	2-?
1B	Facility (recall alignment Not essential) $(CCBS)$	Facility 10.5.4.15	O	TLV	2-?

9.3.23.2.1   BC repeat indicator

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

9.3.23.2.2   Facility

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

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

9.3.23.2.3   LLC repeat indicator

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

-   The *BC repeat indicator* IE is contained in the message.

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

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

9.3.23.2.4   Low layer compatibility I

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

9.3.23.2.5   Low layer compatibility II

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

9.3.23.2.6   HLC repeat indicator

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

-   The *BC repeat indicator* IE is contained in the message.

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

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

9.3.23.2.7   High layer compatibility i

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

9.3.23.2.8   High layer compatibility ii

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

9.3.23.2.9   User-user

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

9.3.23.2.10   SS version

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

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

9.3.23.2.11   CLIR suppression

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

9.3.23.2.12   CLIR invocation

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

9.3.23.2.13   CC Capabilities

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

10.5.4   Call control information elements.

10.5.4.5   Bearer capability

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

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

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

```
     8     7     6     5     4     3     2     1
   +-----------------------------------------------+
   |     |     |         Bearer capability IEI     | octet 1
   +-----------------------------------------------+
   |                                               |
   |     Length of the bearer capability contents  | octet 2
   +-----------------------------------------------+
   | 0/1 |  radio    | co- |trans|   information    |
   | ext | channel   |ding | fer |    transfer      | octet 3
   |     |requirement| std |mode |   capability     |
   +-----+-----+-----+-----+-------------------------+
   | 0/1 |  0  |  0     0  |                         |
   | ext | co- |   spare   |   speech version        |octet 3a etc*
   |     |ding |           |     indication          |
   +-----+-----+-----------+-----+------+------+------+
   |  1  |comp-|           |dupl.|confi | NIRR |esta- |
   | ext |ress.| structure |mode | gur. |      |bli.  | octet 4*
   +-----+-----+-----------+-----+------+------+------+
   | 0/1 |  0     0  |   rate    |    signalling      |
   | ext |access id. | adaption  |  access protocol   | octet 5*
   +-----+-----------+-----------+--------------------+
   | 0/1 |           |Other rate | 0     0     0      |
   | ext | Other ITC | adaption  |     Spare          | octet 5a*
   +-----+-----+-----+-----+-----+------+------+------+
   |  1  |Hdr/ |Multi|Mode | LLI |Assig |Inb.  |  0   |
   | ext |noHdr|frame|     |     |nor/e |neg   |Spare | octet 5b*
   +-----+-----+-----+-----+-----+------+------+------+
   | 0/1 |  0     1  | User information |    sync/     |
   | ext |layer 1 id.| layer 1 protocol |    async     | octet 6*
   +-----+-----+-----+-----+-------------------------+
   | 0/1 |numb.|nego-|numb.|                         |
   | ext |stop |tia- |data |       user rate         | octet 6a*
   |     |bits |tion |bits |                         |
   +-----+-----+-----+-----+-----+-------------------+
   | 0/1 | intermed. | NIC | NIC |                   |
   | ext |    rate   |on TX|on RX|      Parity        | octet 6b*
   +-----+-----------+-----+-----+-------------------+
   | 0/1 |connection |                               |
   | ext |  element  |         modem type             | octet 6c*
   +-----+-----------+-------------------------------+
   | 0/1 |   Other   |   Fixed network user rate      | octet 6d*
   | ext |modem type |                                |
   +-----+-----------+-------------------------------+
   | 0/1 |   Acceptable     |Maximum number of|        octet 6e*
   | ext |    channel       |traffic channels |
   |     |    codings       |                 |
   +-----+------------------+-----------------+
   | 0/1 |     UIMI         | Wanted air interface |  octet 6f*
   | ext |                  | user rate            |
   +-----+------------------+---------------------+
   |  1  | Acceptable |     |  |  0     0 |  | ext | channel codings |
 Asymmetry |          |     |  |          |  |     |
   |     |  extended  |     | Indication|  Spare  | octet 6g*
   +-----+------------+-----+-----------------------+
   |  1  |  1     0   | User information |           |
   | ext |layer 2 id. | layer 2 protocol |           octet 7*
   +-----------------------------------------------+
```

Figure 10.5.88/TS 24.008 Bearer capability information element

NOTE~~S~~: The coding of the octets of the bearer capability information element is not conforming to TS ~~CCITT~~ ITU Q.931.

~~The coding of the Bearer Capability information element shall be consistent according to GSM call control requirements for those parameters that are not applicable for UMTS.~~

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

Table 10.5.102/TS 24.008: Bearer capability information element

Radio channel requirement (octet 3), network to MS direction

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

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

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

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

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

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

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

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

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

(continued...)

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

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

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

All other values are reserved

Table 10.5.103/TS 24.008 Bearer capability information element

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

Coding

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

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

Bits 5 and 6 are spare.

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

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

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

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

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

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

Table 10.5.104/TS 24.008: Bearer capability information element

Compression (octet 4), network to MS direction:
Bit
7
0   data compression not possible
1   data compression possible

Compression (octet 4), MS to network direction:
Bit
7
0   data compression not allowed
1   data compression allowed

Structure (octet 4)

Bits
6 5
0 0 service data unit integrity
1 1 unstructured

All other values are reserved.

Duplex mode (octet 4)
Bit
4
0   half duplex
1   full duplex

Configuration (octet 4)
Bit
3
0   point-to-point

All other values are reserved.

NIRR (octet 4)
 (Negotiation of Intermediate Rate Requested)
In GSM, i.e. not applicable for UMTS data services.

Bit
2
0   No meaning is associated with this value.
1   Data up to and including 4.8 kb/s, full rate, non-transparent, 6 kb/s radio   interface rate is requested.

Establishment (octet 4)
Bit
1
0   demand

All other values are reserved

Table 10.5.105/TS 24.008: Bearer capability information element

Access identity (octet 5)
Bits
7 6
0 0 octet identifier

All other values are reserved

Rate adaption (octet 5)
Bits
5 4
0 0 no rate adaption
0 1 V.110, I.460/X.30 rate adaptation
1 0 CCITT X.31 flag stuffing
1 1 Other rate adaption (see octet 5a)

Signalling access protocol (octet 5)

Bits
3 2 1
0 0 1   I.440/450
0 1 0   X.21
0 1 1   X.28 - dedicated PAD, individual NUI
1 0 0   X.28 - dedicated PAD, universal NUI
1 0 1   X.28 - non dedicated PAD
1 1 0   X.32

All other values are reserved.

Table 10.5.106/TS 24.008: Bearer capability information element

Other ITC (octet 5a)
If the value "Other ITC" is not signalled in the field "ITC" then the contents of this field shall be
ignored.

Bit
7 6
0 0 restricted digital information

All other values are reserved

Other rate adaption (octet 5a)
If the value " Other rate adaption" is not signalled in the field "Rate adaption" then the contents of
this field shall be ignored.
In GSM, the value of H.223 and H.245 shall be interpreted as 'no rate adaptation'.
In UMTS, PIAFS shall be considered. In GSM, call shall be rejected if PIAFS requested.

Bit
5 4
0 0 V.120
0 1 H.223 and H.245 (note 1)
1 0 PIAFS (note 2)

All other values are reserved.
Note 1:
Note 2:

Table 10.5.107/TS 24.008: Bearer capability information element

Rate adaption header/no header (octet 5b)

Bit
7
0   Rate adaption header not included
1   Rate adaption header included

Multiple frame establishment support in data link (octet 5b)

Bit
6
0   Multiple frame establishment not supported, only UI frames allowed
1   Multiple frame establishment supported

Mode of operation (octet 5b)

Bit
5
0   Bit transparent mode of operation
1   Protocol sensitive mode of operation

Logical link identifier negotiation (octet 5b)

Bit
4
0   Default, LLI=256 only
1   Full protocol negotiation, (note: A connection over which protocol negotiation will
     be executed is indicated in bit 2 of octet 5b)

Assignor/Assignee (octet 5b)

Bit
3
0   Message originator is "default assignee"
1   Message originator is "assignor only"

In band/Out of band negotiation (octet 5b)

Bit
2
0   Negotiation is done in-band using logical link zero
1   Negotiation is done with USER INFORMATION messages on a temporary
     signalling connection

Bit 1 is spare and set to the value "0"

Table 10.5.108/TS 24.008: Bearer capability information element

Layer 1 identity (octet 6)
Bits
7 6
0 1 octet identifier

All other values are reserved

User information layer 1 protocol (octet 6)
Bits
5 4 3 2
0 0 0 0 default layer 1 protocol

All other values reserved.

Synchronous/asynchronous (octet 6)
Bit
1
0   synchronous
1   asynchronous

Table 10.5.109/TS 24.008: Bearer capability information element

Number of Stop Bits (octet 6a)
Bit
7
0   1 bit (This value is also used in the case of synchronous mode)
1   2 bits

Negotiation (octet 6a)
Bit
6
0   in-band negotiation not possible

NOTE: See Rec. V.110 and X.30

All other values are reserved

Number of data bits excluding parity bit if present (octet 6a)
Bit
5
0   7 bits
1   8 bits (this value is also used in the case of bit oriented protocols)

User rate (octet 6a)
In GSM only.

Bits
4 3 2 1
0 0 0 1 0.3 kbit/s Recommendation X.1 and V.110
0 0 1 0 1.2 kbit/s Recommendation X.1 and V.110
0 0 1 1 2.4 kbit/s Recommendation X.1 and V.110
0 1 0 0 4.8 kbit/s Recommendation X.1 and V.110
0 1 0 1 9.6 kbit/s Recommendation X.1 and V.110
0 1 1 0 12.0 kbit/s transparent (non compliance with X.1 and V.110)
0 1 1 1 1.2 kbit/s/75 bit/s Recommendation V.23, (asymmetric) X.1,V.110.

All other values are reserved.

For facsimile group 3 calls the user rate indicates the first and maximum speed the mobile station
is using.

Table 10.5.110/TS 24.008: Bearer capability information element

Octet 6b for V.110/X.30 rate adaptation Intermediate rate (octet 6b)
In GSM only.

Bits
7 6
0 0 reserved
0 1 reserved
1 0 8 kbit/s
1 1 16 kbit/s

~~In UMTS, bits 6 and 7 are spare and shall be encoded as 00 by the sending side.~~

Network independent clock (NIC) on transmission (Tx) (octet 6b) (See Rec. V.110 and X.30).
In GSM only.

Bit
5
0   does not require to send data with network independent clock
1   requires to send data with network independent clock

Network independent clock (NIC) on reception (Rx) (octet 6b) (See Rec. V.110 and X.30)
In GSM only.

Bit
4
0   cannot accept data with network independent clock (i.e. sender does not   support this optional procedure)
1   can accept data with network independent clock (i.e. sender does support this   optional procedure)

Parity information (octet 6b)
Bits
3 2 1
0 0 0   odd
0 1 0   even
0 1 1   none
1 0 0   forced to 0
1 0 1   forced to 1

All other values are reserved.

Table 10.5.111/TS 24.008: Bearer capability information element

Connection element (octet 6c)
Bit
7 6
0 0 transparent
0 1 non transparent (RLP)
1 0 both, transparent preferred
1 1 both, non transparent preferred

The requesting end (e.g. the one sending the SETUP message) should use the 4 values depending on its capabilities to support the different modes. The answering party shall only use the codings 00 or 01, based on its own capabilities and the proposed choice if any. If both MS and network support both transparent and non transparent, priority should be given to the MS preference.

Modem type (octet 6c)
Bits
5 4 3 2 1
0 0 0 0 0 none
0 0 0 0 1 V.21 (note 1)
0 0 0 1 0 V.22 (note 1)
0 0 0 1 1 V.22 bis (note 1)
0 0 1 0 0 V.23 (note 1)
0 0 1 0 1 V.26 ter (note 1)
0 0 1 1 0 V.32
0 0 1 1 1 modem for undefined interface
0 1 0 0 0 autobauding type 1

All other values are reserved.
Note 1: In GSM only.

Table 10.5.112/TS 24.008: Bearer capability information element

Other modem type (octet 6d)
Bits
7 6
0 0 no other modem type specified in this field
0 1 V.32bis
1 0 V.34

All other values are reserved.

Fixed network user rate (octet 6d)
Bit
5 4 3 2 1
0 0 0 0 0 Fixed network user rate not applicable/No meaning is associated
        with this value.
0 0 0 0 1 9.6 kbit/s Recommendation X.1 and V.110
0 0 0 1 0 14.4 kbit/s Recommendation X.1 and V.110
0 0 0 1 1 19.2 kbit/s Recommendation X.1 and V.110
0 1 0 1 0 32.0 kbit/s Recommendation I.460 (note 2)
0 1 0 0 1 33.6 kbit/s bit transparent (note 2)
0 0 1 0 0 28.8 kbit/s Recommendation X.1 and V.110
0 0 1 0 1 38.4 kbit/s Recommendation X.1 and V.110
0 0 1 1 0 48.0 kbit/s Recommendation X.1 and V.110(synch) (note 1)
0 0 1 1 1 56.0 kbit/s Recommendation X.1 and V.110(synch) /bit transparent
0 1 0 0 0 64.0 kbit/s bit transparent

All other values are reserved.
Note 1: In GSM only.
Note 2: In UMTS only (Alternative proposal: Only supported in UMTS; if requested by mobile in GSM, it may be downgraded by network)

Table 10.5.113/TS 24.008: Bearer capability information element

Acceptable channel codings (octet 6e), mobile station to network direction:
In GSM only.

Bit
7
0 TCH/F14.4 not acceptable
1 TCH/F14.4 acceptable

Bit
6
0 Spare

Bit
5
0 TCH/F9.6 not acceptable
1 TCH/F9.6 acceptable

Bit
4
0 TCH/F4.8 not acceptable
1 TCH/F4.8 acceptable

Acceptable channel codings (octet 6e), network to MS direction:
Bits 4 to 7 are spare and shall be set to "0".

Maximum number of traffic channels (octet 6e), MS to network direction:
In GSM only.

Bits
3 2 1
0 0 0   1 TCH
0 0 1   2 TCH
0 1 0   3 TCH
0 1 1   4 TCH
1 0 0   5 TCH
1 0 1   6 TCH
1 1 0   7 TCH
1 1 1   8 TCH

Maximum number of traffic channels (octet 6e), network to MS direction:
Bits 1 to 3 are spare and shall be set to "0".

Table 10.5.114/TS 24.008: Bearer capability information element

UIMI, User initiated modification indication (octet 6f),
In GSM only.

7 6 5
0 0 0   User initiated modification not allowed/required/applicable
0 0 1   User initiated modification up to 1 TCH/F allowed/may be requested
0 1 0   User initiated modification up to 2 TCH/F allowed/may be requested
0 1 1   User initiated modification up to 3 TCH/F allowed/may be requested
1 0 0   User initiated modification up to 4 TCH/F allowed/may be requested

All other values shall be interpreted as "User initiated modification up to 4 TCH/F may be requested".

User initiated modification indication is not applicable for transparent connection.

Wanted air interface user rate (octet 6f), MS to network direction:
Bits
4 3 2 1
0 0 0 0 Air interface user rate not applicable/No meaning associated with this value
0 0 0 1 9.6 kbit/s
0 0 1 0 14.4 kbit/s
0 0 1 1 19.2 kbit/s
0 1 0 1 28.8 kbit/s
0 1 1 0 ——38.4 kbit/s
0 1 1 1 43.2 kbit/s
1 0 0 0 57.6 kbit/s
1 0 0 1 interpreted by the network as 38.4 kbit/s in this version of the protocol
1 0 1 0 interpreted by the network as 38.4 kbit/s in this version of the protocol
1 0 1 1 interpreted by the network as 38.4 kbit/s in this version of the protocol
1 1 0 0 interpreted by the network as 38.4 kbit/s in this version of the protocol

All other values are reserved.

Wanted air interface user rate (octet 6f), network to MS direction:
Bits 1 to 4 are spare and shall be set to "0".

Table 10.5.115/TS 24.008: Bearer capability information element

Layer 2 identity (octet 7)
Bits
7 6
1 0 octet identifier

All other values are reserved

User information layer 2 protocol (octet 7)

Bits
5 4 3 2 1
0 0 1 1 0 recommendation X.25, link level
0 1 0 0 0 ISO 6429, codeset 0 (DC1/DC3)
0 1 0 0 1 reserved: was allocated but never used in earlier phases of the protocol
0 1 0 1 0 videotex profile 1
0 1 1 0 0 COPnoFlCt (Character oriented Protocol with no Flow Control
        mechanism)
0 1 1 0 1 X.75 layer 2 modified (CAPI)

All other values are reserved.

Table 10.5.115a/TS 24.008: Bearer capability information element

Acceptable Channel Codings extended (octet 6g) mobile station to network direction:
In GSM only.

Bit
7
0 TCH/F28.8 not acceptable
1 TCH/F28.8 acceptable

Bit
6
0 TCH/F32.0 not acceptable
1 TCH/F32.0 acceptable

Bit
5
0 TCH/F43.2 not acceptable
1 TCH/F43.2 acceptable
Channel Coding Asymmetry Indication

Bits
4 3
0 0   Channel coding symmetry preferred
1 0   Downlink biased channel coding asymmetry is preferred
0 1   Uplink biased channel coding asymmetry is preferred
1 1   Unused, if received it shall be interpreted as "Channel coding symmetry preferred"

EDGE Channel Codings (octet 6g), network to MS direction:
In GSM only.

Bits 3 to 7 are spare and shall be set to "0".

Bits 2 and 1 are spare.

10.5.4.5.1   Static conditions for the bearer capability IE contents

If the information transfer capability field (octet 3) indicates "speech", octets 4, 5, 5a, 5b, 6, 6a, 6b, 6c, 6d, 6e, 6f, 6g and 7 shall not be included.

~~If~~ For GSM, if the information transfer capability field (octet 3) indicates "speech", octet 3a etc. shall be included only if the mobile station supports at least one speech version other than:

- GSM full rate speech version 1; or

- GSM half rate speech version 1.

If the information transfer capability field (octet 3) indicates a value different from "speech", octets 4, 5, 6, 6a, 6b, and 6c shall be included, octets 6d, 6e, 6f and 6g are optional. In the network to MS direction in case octet 6d is included, octets 6e, 6f and 6g may be included. In the MS to network direction in case octet 6d is included octet 6e shall also be included and 6f and 6g may be included.

If the information transfer capability field (octet 3) indicates "facsimile group 3", the modem type field (octet 6c) shall indicate "none".

If the information transfer capability field (octet 3) indicates "other ITC" or the rate adaption field (octet 5) indicates "other rate adaption", octet 5a shall be included.

If the rate adaption field (octet 5) indicates "other rate adaption" and the other rate adaption field (octet 5a) indicates "V.120" or "H.223 and H.245" or "PIAFS", octet 5b shall be included.

The modem type field (octet 6c) shall not indicate "autobauding type 1" unless the connection element field (octet 6c) indicates "non transparent".

10.5.4.16 High layer compatibility

The purpose of the high layer compatibility information element is to provide a means which should be used by the remote user for compatibility checking. See annex B.

The high layer compatibility information element is coded as shown in figure 10.5.102/TS 24.008 and table 10.5.125/TS 24.008.

The high layer compatibility is a type 4 information element with a minimum length of 2 octets and a maximum length of 5 octets.

NOTE: The high layer compatibility information element is transported transparently by a PLMN between a call originating entity (e.g. a calling user) and the addressed entity (e.g. a remote user or a high layer function network node addressed by the call originating entity). However, if explicitly requested by the user (at subscription time), a network which provides some capabilities to realize teleservices may interpret this information to provide a particular service.

```
   8      7      6      5      4      3      2      1
+------------------------------------------------+
|      |          High layer compatibility IEI   | octet 1
+------------------------------------------------+
|                                                |
|   Length of high layer compatibility contents  | octet 2
+------------------------------------------------+
|  1   | coding       |               | presentat.|
| ext  | standard     | interpretation| method of | octet 3*
|      |              |               | protocol  |
|      |              |               | profile   |
+------+-----------------------------------------+
| 0/1  |                                          | octet 4*
| ext  | High layer characteristics identification|
+------+-----------------------------------------+
|  1   |   Extended high layer characteristics    |octet 4a*
| ext  |            identification                | (note)
+------------------------------------------------+
```
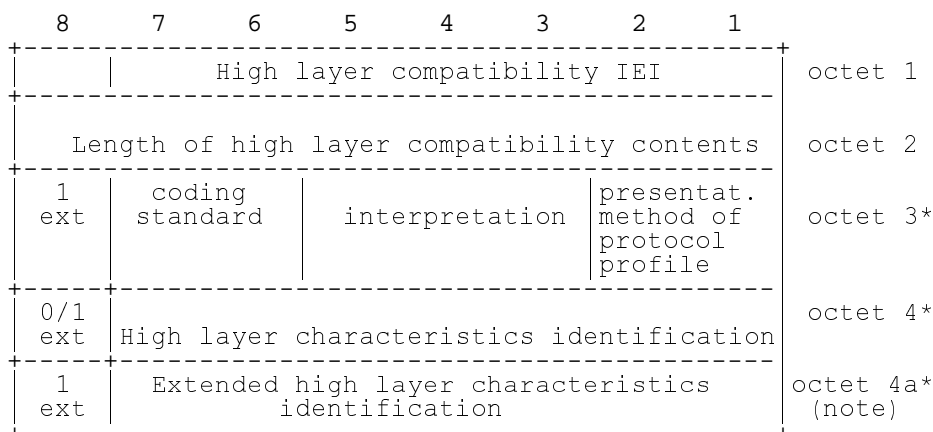
Figure 10.5.102/TS 24.008 High layer compatibility information element

If the value part of the IE is empty, the IE indicates "not applicable".

~~NOTE 1: Octet 4a~~ This octet may be present ~~e.g.~~ when octet 4 indicates Maintenance or Management.

NOTE: Octet 4a may be present e.g. when octet 4 indicates Maintenance or Management, or audio visual.

NOTE 2: This octet may be present when octet 4 indicates audio visual.

Table 10.5.125/TS 24.008: High layer compatibility information element

```
+---------------------------------------------------------+
| Coding standard (octet 3)                               |
| see CCITT ITU Recommendation Q.931.                     |
|                                                         |
|                                                         |
| Interpretation (octet 3)                                |
| see CCITT ITU Recommendation Q.931.                     |
|                                                         |
|                                                         |
| Presentation method of protocol profile (octet 3)      |
| see CCITT ITU Recommendation Q.931.                     |
|                                                         |
|                                                         |
| High layer characteristics identification (octet 4)    |
| see CCITT ITU Recommendation Q.931.                     |
|                                                         |
| Extended high layer characteristics identification     |
| (octet 4a)                                              |
| see CCITT ITU Recommendation Q.931.                     |
+---------------------------------------------------------+
```

10.5.4.18   Low layer compatibility

The purpose of the low layer compatibility information element is to provide a means which should be used for compatibility checking by an addressed entity (e.g., a remote user or an interworking unit or a high layer function network node addressed by the calling user). The low layer compatibility information element is transferred transparently by a PLMN between the call originating entity (e.g. the calling user) and the addressed entity.

Except for the information element identifier, the low layer compatibility information element is coded as in ETS 300 102-1 ITU recommendation Q.931.

The low layer compatibility is a type 4 information element with a minimum length of 2 octets and a maximum length of 15 18 octets.

```
      8     7     6     5     4     3     2     1
   +-----------------------------------------------+
   |     |     |  Low layer compatibility IEI      | octet 1
   +-----------------------------------------------+
   | Length of the low layer compatibility contents| octet 2
   +-----------------------------------------------+
   |                                               | octet 3*
   |        The following octets are coded         |   :
   |        as described in ETS 300 102-1          |   :
   |        ITU Recommendation Q.931               |   :
   +-----------------------------------------------+
```
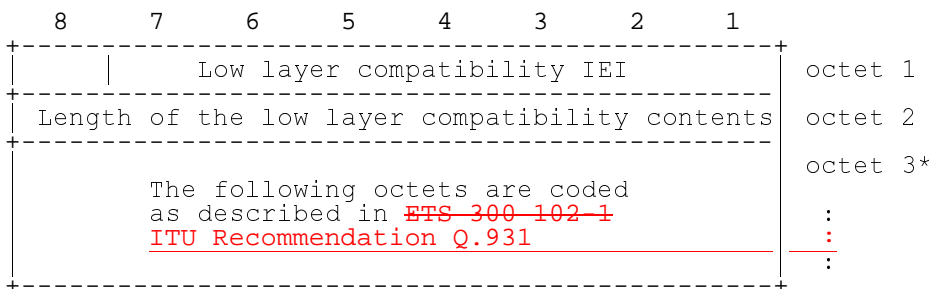
Figure 10.5.104/TS 24.008 Low layer compatibility information element

If the value part of the IE is empty, the IE indicates "not applicable".