

Source: TSG CN WG1
Title: CRs to Rel-6 WI “TEI6” for TS 23.014, TS 23.122 and TS 24.008
Agenda item: 9.21
Document for: APPROVAL

This document contains **12 CRs on Rel-6 Work Item “TEI6”**, that have been agreed by TSG CN WG1 CN#36 meeting and forwarded to TSG CN Plenary meeting #26 for approval.

TDoc #	Tdoc Title	Spec	CR #	Rev	CAT	C_Ver	WI	Rel
N1-041805	Introduction of new references for DTMF	23.014	007		F	5.1.0	TEI6	Rel-6
N1-042079	Clarification on the use of the RAT during background scanning	23.122	084	1	F	6.2.0	TEI6	Rel-6
N1-042119	Correction of terminology - GSM and UMTS	24.008	910	2	F	6.6.0	TEI6	Rel-6
N1-042064	Paging for GPRS Services in GSM	24.008	911	1	F	6.6.0	TEI6	Rel-6
N1-042050	Service request conditions	24.008	912	1	F	6.6.0	TEI6	Rel-6
N1-042070	Service request - Abnormal cases in the MS	24.008	913	1	F	6.6.0	TEI6	Rel-6
N1-042121	No follow on proceed indication	24.008	914	2	F	6.6.0	TEI6	Rel-6
N1-042107	Mobile identity - No identity	24.008	915	3	F	6.6.0	TEI6	Rel-6
N1-042074	Correction of the description of causes #7 and #8 in Annex G.6	24.008	920	1	F	6.6.0	TEI6	Rel-6
N1-042076	CC cause reference correction	24.008	921	1	F	6.6.0	TEI6	Rel-6
N1-041800	Handling of zero T3312 timer value	24.008	923		C	6.6.0	TEI6	Rel-6
N1-041806	Introduction of new references for DTMF	24.008	924		F	6.6.0	TEI6	Rel-6

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CHANGE REQUEST

⌘ **24.008 CR 923** ⌘ rev **-** ⌘ Current version: **6.6.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Handling of zero T3312 timer value		
Source:	⌘ Nokia		
Work item code:	⌘ TEI6	Date:	⌘ 05/11/2004
Category:	⌘ C	Release:	⌘ Rel-6
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)

Reason for change:	⌘ Currently it is not defined what the UE should do when it receives a periodic update timer value zero. This is not a practical value, so it is proposed that not only the explicit indication of timer deactivation but also indicated timer value zero means deactivation of T3312
Summary of change:	⌘ UE requirement to consider both timer deactivation and timer value zero to mean that the periodic update timer is not used.
Consequences if not approved:	⌘ Ambiguity of the UE requirements for zero timer value.

Clauses affected:	⌘ 4.7.2.2										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications Test specifications O&M Specifications	⌘
Y	N										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
Other comments:	⌘										

How to create CRs using this form:

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4.7.2.2 Periodic routing area updating

Periodic routing area updating is used to periodically notify the availability of the MS to the network. The procedure is controlled in the MS by the periodic RA update timer, T3312. The value of timer T3312 is sent by the network to the MS in the messages ATTACH ACCEPT and ROUTING AREA UPDATE ACCEPT. The value of the timer T3312 shall be unique within a RA.

If the T3312 received by the MS contains an indication that the timer is deactivated or the timer value is zero, then the periodic routing area update timer is deactivated and the MS shall not perform periodic routing area updating.

In GSM, the timer T3312 is reset and started with its initial value, when the READY timer is stopped or expires. The timer T3312 is stopped and shall be set to its initial value for the next start when the READY timer is started. If after a READY timer negotiation the READY timer value is set to zero, timer T3312 is reset and started with its initial value. If the initial READY timer value is zero, the timer T3312 is reset and started with its initial value, when the ROUTING AREA UPDATE REQUEST message is transmitted.

In UMTS, the timer T3312 is reset and started with its initial value, when the MS goes from PMM-CONNECTED to PMM-IDLE mode. The timer T3312 is stopped when the MS enters PMM-CONNECTED mode.

When timer T3312 expires, the periodic routing area updating procedure shall be started and the timer shall be set to its initial value for the next start.

If the MS is in other state than GMM-REGISTERED.NORMAL-SERVICE when the timer expires the periodic routing area updating procedure is delayed until the MS returns to GMM-REGISTERED.NORMAL-SERVICE.

In GSM, if the MS in MS operation mode B is in the state GMM-REGISTERED.SUSPENDED when the timer expires the periodic routing area updating procedure is delayed until the state is left.

The network supervises the periodic routing area updating procedure by means of the Mobile Reachable timer. The Mobile Reachable timer shall be longer than the periodic RA update timer. When the Mobile Reachable timer expires, typically the network stops sending paging messages to the mobile and may take other appropriate actions.

In GSM, the Mobile Reachable timer is reset and started with its initial value, when the READY timer is stopped or expires. The Mobile Reachable timer is stopped and shall be set to its initial value for the next start when the READY timer is started.

In GSM, if after a READY timer negotiation the READY timer value is set to zero the Mobile Reachable timer is reset and started with its initial value. If the initial READY timer value is zero, the Mobile Reachable is reset and started with its initial value, when the ROUTING AREA UPDATE REQUEST message is received.

In UMTS, the Mobile Reachable timer is reset and started with its initial value, when the MS goes from PMM-CONNECTED to PMM-IDLE mode. The Mobile Reachable timer is stopped when the MS enters PMM-CONNECTED mode.

If the MS is both IMSI attached for GPRS and non-GPRS services, and if the MS lost coverage of the registered PLMN and timer T3312 expires, then:

- a) if the MS returns to coverage in a cell that supports GPRS and that indicates that the network is in network operation mode I, then the MS shall either perform the combined routing area update procedure indicating "combined RA/LA updating with IMSI attach"; or
- b) if the MS returns to coverage in a cell in the same RA that supports GPRS and that indicates that the network is in network operation mode II or III, then the MS shall perform the periodic routing area updating procedure indicating "Periodic updating"; or
- c) if the MS was both IMSI attached for GPRS and non-GPRS services in network operation mode I and the MS returns to coverage in a cell in the same LA that does not support GPRS, then the MS shall perform the periodic location updating procedure. In addition, the MS shall perform a combined routing area update procedure indicating "combined RA/LA updating with IMSI attach" when the MS enters a cell that supports GPRS and that indicates that the network is in network operation mode I; or
- d) if the MS returns to coverage in a new RA the description given in subclause 4.7.5 applies.

If the MS is both IMSI attached for GPRS and non-GPRS services in a network that operates in network operation mode I, and if the MS has camped on a cell that does not support GPRS, and timer T3312 expires, then the MS shall

start an MM location updating procedure. In addition, the MS shall perform a combined routing area update procedure indicating "combined RA/LA updating with IMSI attach" when the MS enters a cell that supports GPRS and indicates that the network is in operation mode I.

If timer T3312 expires during an ongoing CS connection, then a MS operating in MS operation mode B shall treat the expiry of T3312 when the MM state MM-IDLE is entered, analogous to the descriptions for the cases when the timer expires out of coverage or in a cell that does not support GPRS.

In GSM, timer T3312 shall not be stopped when a GPRS MS enters state GMM-REGISTERED.SUSPENDED.

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CHANGE REQUEST

⌘ **23.014 CR 007** ⌘ rev **-** ⌘ Current version: **5.1.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Introduction of new references for DTMF		
Source:	⌘ Siemens AG		
Work item code:	⌘ TEI6	Date:	⌘ 5/11/2004
Category:	⌘ F	Release:	⌘ Rel-6
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)

Reason for change:	⌘ Recently, CN1 was informed by ETSI AT WG Analogue that there is a new set of DTMF standards available, ES 201 235-1 .. 4, the contents of which is more up to date than ETR 204 and ETR 206 which are currently referenced by TS 23.014.
Summary of change:	⌘ References are changed from ETR 204 and ETR 206 to ES 201 235-1 .. 3.
Consequences if not approved:	⌘ References to old ETRs will stay in the standard.

Clauses affected:	⌘ 2, 4, 6.2, 6.3										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px;">X</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">X</td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">X</td> </tr> </table>	Y	N	X			X		X	Other core specifications	⌘ 24.008 CR 924
	Y	N									
	X										
	X										
	X										
	X	Test specifications									
	X	O&M Specifications									
Other comments:	⌘										

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1 Scope

The present document describes how Dual Tone Multi Frequency (DTMF) signals are supported in the 3GPP system.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] Void.

[1a] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 45.002: "Multiplexing and Multiple Access on the Radio Path".

~~[3] CEPT T/CS 34 08: "Automatic sender for push button multifrequency signalling".~~

~~[4] CEPT T/CS 46 02: "Multifrequency signalling system to be used for push button telephones".~~

~~[5] ETSI ETR 204: "Public Switched Telephone Network (PSTN); Automatic sender for push button multifrequency signalling [CEPT Recommendation T/CS 34 08 E (1985)]".~~

~~[6] ETSI ETR 206: "Public Switched Telephone Network (PSTN); Multifrequency signalling system to be used for push button telephones [CEPT Recommendation T/CS 46 02 E (1985)]".~~

[3] [ETSI ES 201 235-1, v1.1.1: "Specification of Dual Tone Multi-Frequency \(DTMF\); Transmitters and Receivers; Part 1: General"](#).

[4] [ETSI ES 201 235-2, v1.2.1: "Specification of Dual Tone Multi-Frequency \(DTMF\); Transmitters and Receivers; Part 2: Transmitters"](#).

[5] [ETSI ES 201 235-3, v1.2.1: "Specification of Dual Tone Multi-Frequency \(DTMF\); Transmitters and Receivers; Part 3: Receivers"](#).

3 Abbreviations

For the purposes of the present document, the abbreviations used in the present document are listed in 3GPP TR 21.905.

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 [ETSI ES 201 235 \[3, 4, 5\]](#) ~~ETR 204 (sender) and ETR 206 (receiver)~~ as detailed in [sub](#)clauses 6.2 and 6.3. For PCS 1900 for North America the Standards which apply are operator specific.

In the 3GPP 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 the present document.

6 Support of DTMF across the air interface

6.1 General

A message based signalling system is used across the 3GPP system 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 been received.

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

- Frequencies are defined in ETSI [ES 201 235-1 \[3\]](#) ~~Technical Report ETR-206~~ (for PCS 1900 for North America this is operator specific);
- Tone sending levels are defined [in ETSI ES 201 235-2 \[4\]](#) ~~nationally~~ (for PCS 1900 for North America this is operator specific);
- Durations as specified below.

6.3 Tone durations

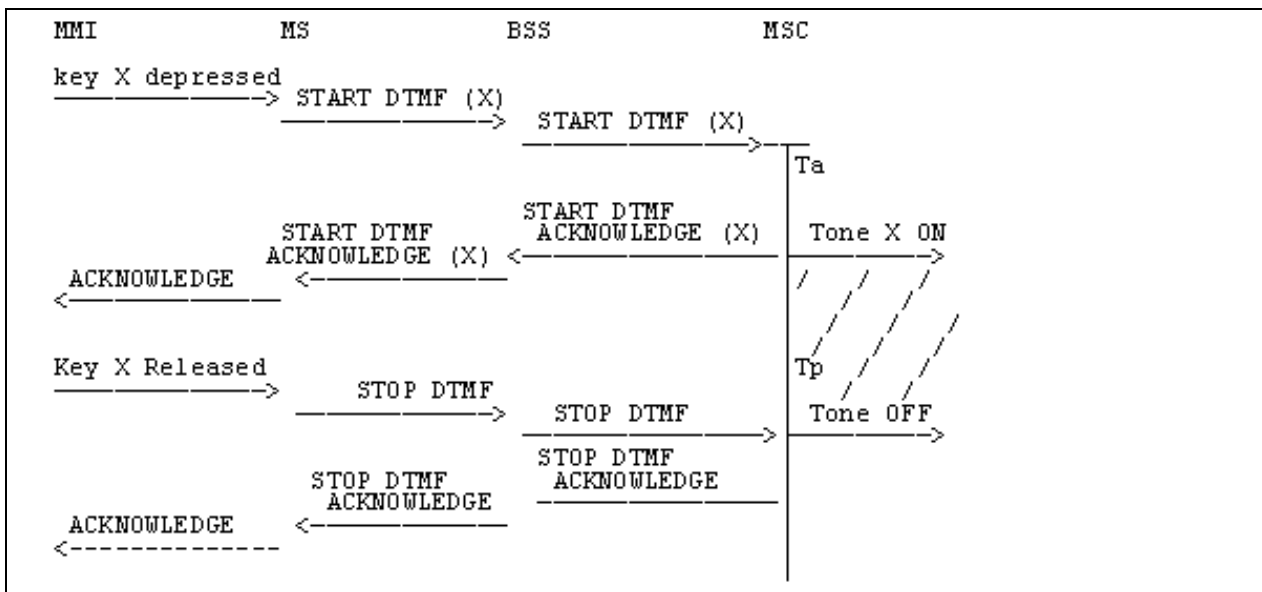
The network shall ensure that the minimum length of tone and the minimum gap between two subsequent tones (according to [ETSI ES 201 235-2 ETR-206](#)) is achieved. For PCS 1900 for North America this is operator specific.

NOTE 1: In [ETSI ES 201 235-2 ETR-206](#) the minimum duration of a DTMF tone is ~~70-65~~ ms ± 5 ms.

NOTE 2: In [ETSI ES 201 235-2 ETR-206](#) the minimum gap between DTMF tones is 65 ms.

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 clause 6.2.

Figures 1 to 3 show an overview of how the DTMF should operate.



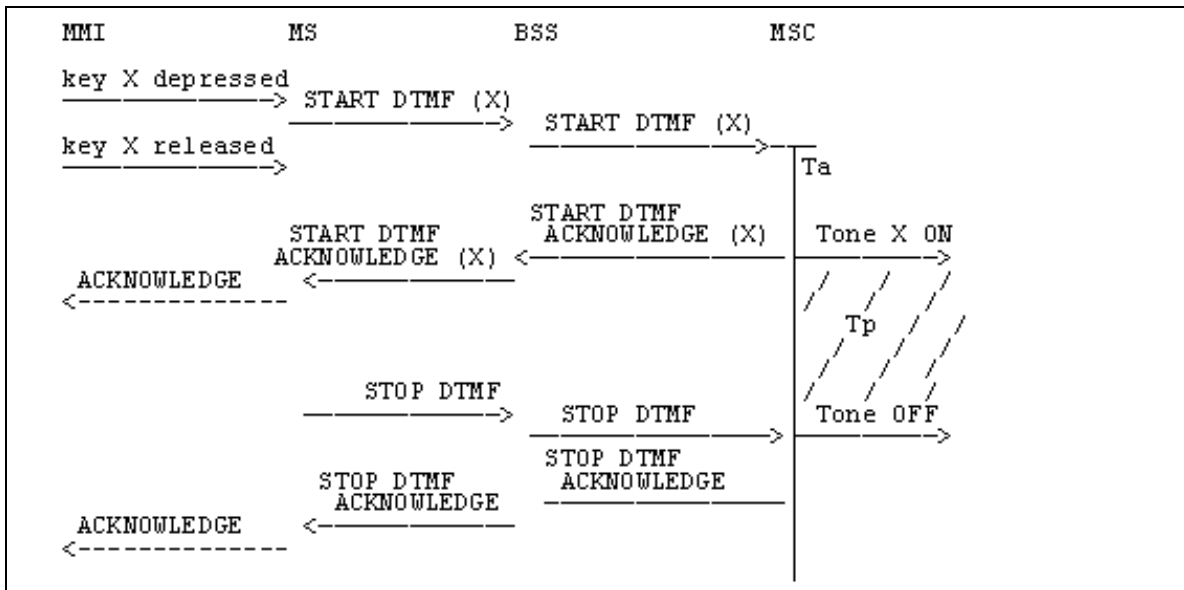
Ta Association time for DTMF Generator in MSC, implementation dependent but low.

Tp Pre-determined maximum tone length, operator option.

T₁ Minimum length of tone.

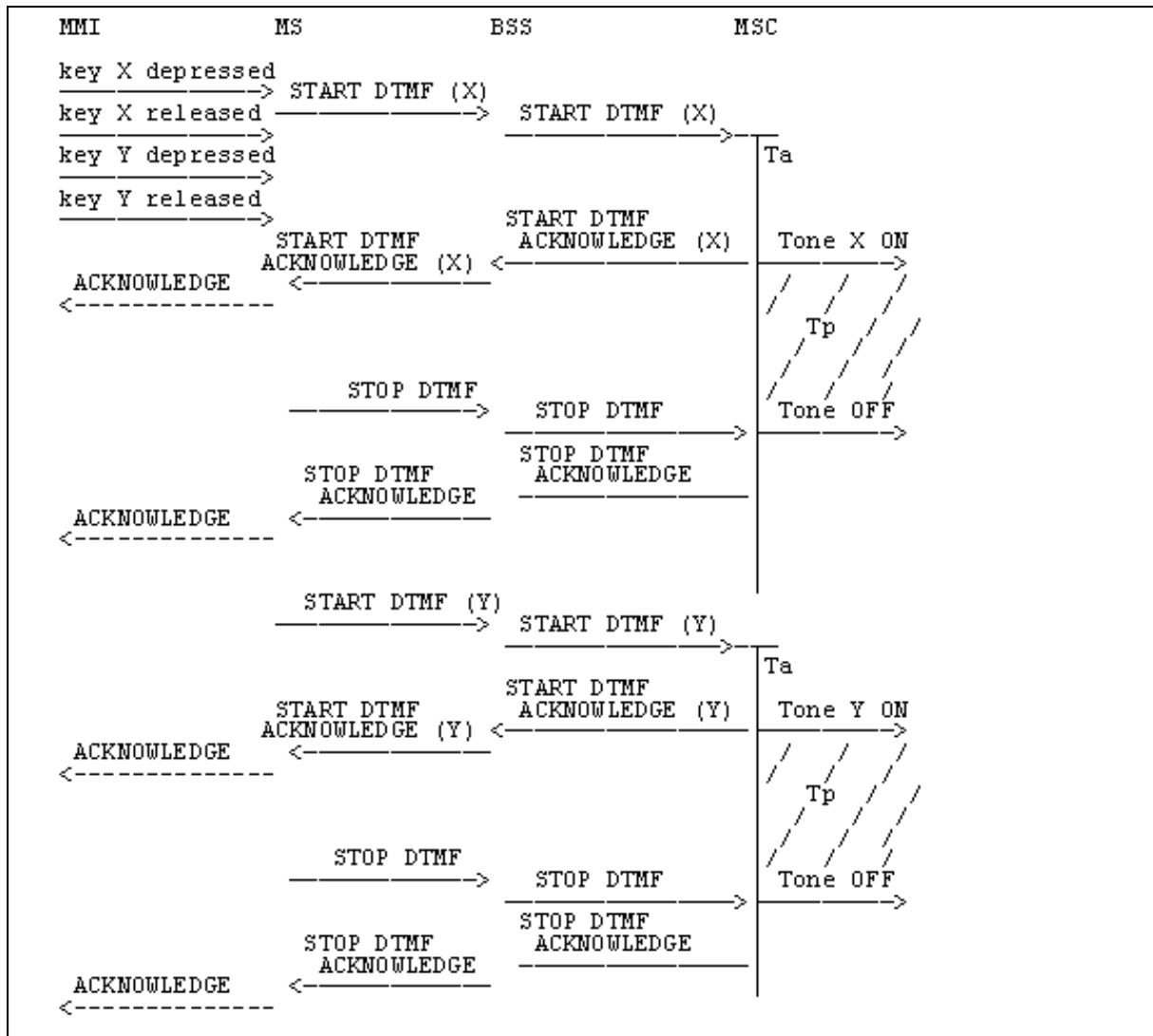
NOTE: If the Network operator implements the time limit option (see clause 6.2), then the tone ends if the timer expires before the 'Stop DTMF' is received.

Figure 1: Single DTMF Transmission



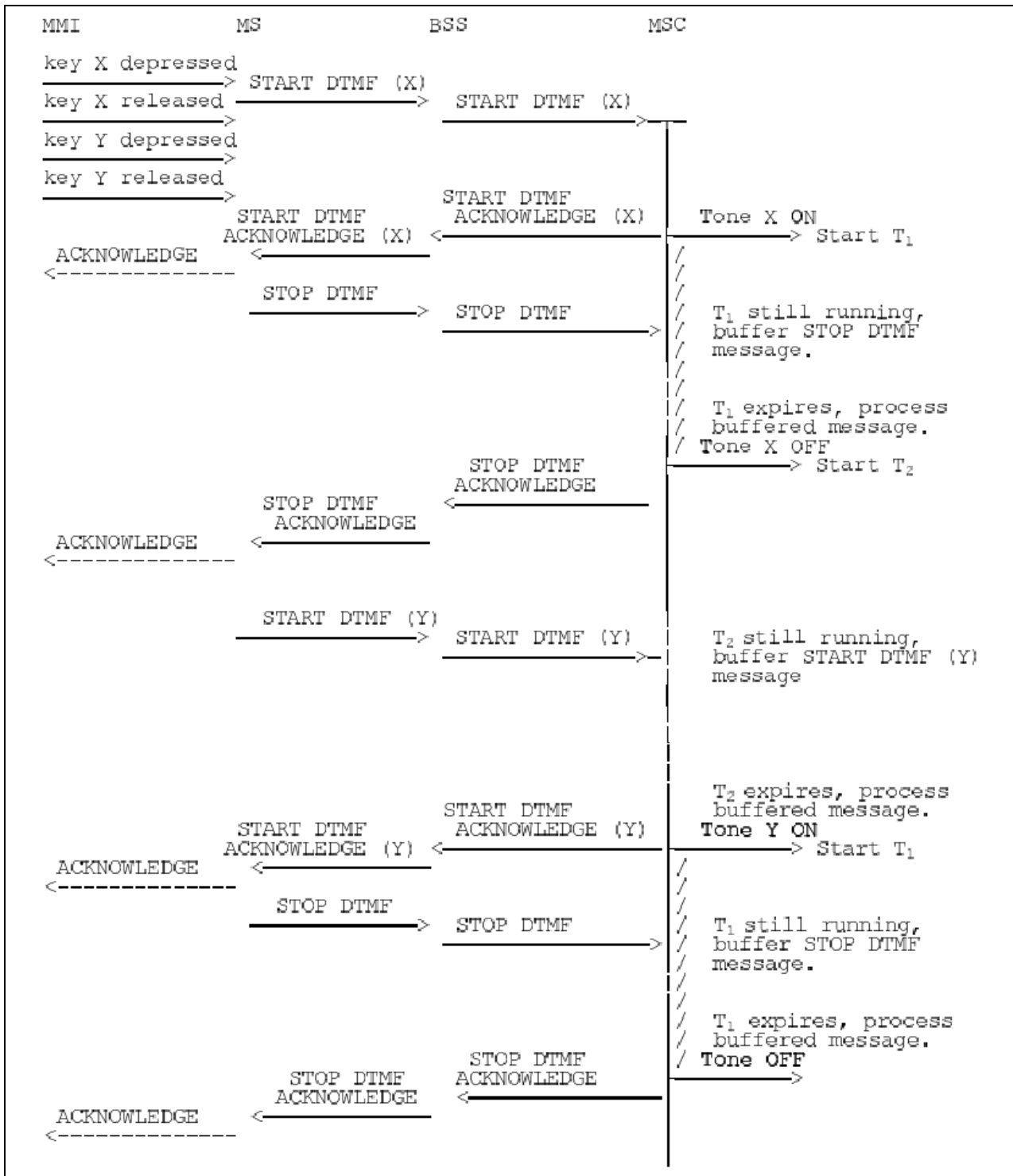
- Ta Association time for DTMF Generator in MSC, implementation dependent but low.
- Tp Pre-determined maximum tone length, operator option.
- T₁ Minimum length of tone.

Figure 2: Single DTMF Transmission, Short Key Press



- Ta Association time for DTMF Generation in MSC, implementation dependant but low.
- Tp Pre-determined maximum tone length, operator option.
- T₂ Minimum gap between tones.

Figure 3: Two Single DTMF Transmission



T₁ Minimum length of tones
 T₂ Minimum gap between tones.

Figure 4: Two Single DTMF Transmissions, Short Gap Between Key Presses

7 Effect of Handover

7.1 Internal Handover

There is unlikely to be any impact on DTMF due to internal handover.

7.2 External Handover

Depending on the exact moment when handover occurs, there may be a slight possibility of cutting short a DTMF tone.

For protocol reasons, in the case of an MSC receiving a STOP DTMF message when no tone is being sent, it should respond with an acknowledgement as usual.

No other impact is seen due to external handover.

Annex A (informative): Change history

Change history						
TSG CN#	Spec	Version	CR	<Phase>	New Version	Subject/Comment
Apr 1999	3GPP TS 03.14	7.0.0				Transferred to 3GPP CN1
CN#03	23.014				3.0.0	Approved at CN#03
CN#06	23.014	3.0.0	001r1	R99	3.1.0	Clarification of DTMF procedure
CN#11	23.014	3.1.0		Rel-4	4.0.0	TSG CN#11 decided to issue this specification as Release 4 on 03-2001
NP-16	23.014	4.0.0		Rel-5	5.0.0	TSG CN#16 decided to issue this specification as part of release 5 on June 2002. ETSI/MCC updated this version with references and editorials.
NP-17 NP-020365	23.014 N1-021655 (wrongly used N1-021654 inside the CR itself)	5.0.0	006	Rel-5	5.1.0	Dual Tone Multi-Frequency signalling : Support in the whole 3GPP system, and editorial modifications. Cat A CR

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CHANGE REQUEST

⌘ **24.008 CR 924** ⌘ rev **-** ⌘ Current version: **6.6.0** ⌘

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Reason for change:	⌘ Recently, CN1 was informed by ETSI AT WG Analogue that there is a new set of DTMF standards available, ES 201 235-1 .. 4, the contents of which is more up to date than ETR 206 which is currently referenced by TS 24.008.
Summary of change:	⌘ Reference is changed from ETR 206 to ES 201 235-2
Consequences if not approved:	⌘ References to old ETR will stay in the standard.

Clauses affected:	⌘ 2, 5.5.7, 5.5.7.4, 5.5.7.5										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px;">X</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">X</td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">X</td> </tr> </table>	Y	N	X			X		X	Other core specifications	⌘ 23.014 CR 007
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	X	Test specifications									
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- [1] Void.
- [2] Void.
- [2a] 3GPP TR 21.905 "Vocabulary for 3GPP Specifications"
- [3] 3GPP TS 22.002: "Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)".
- [4] 3GPP TS 22.003: "Teleservices supported by a Public Land Mobile Network (PLMN)".
- [5] 3GPP TS 42.009: "Security aspects".
- [5a] 3GPP TS 33.102: "3G security; Security architecture".
- [6] 3GPP TS 22.011: "Service accessibility".
- [7] 3GPP TS 42.017: "Subscriber Identity Modules (SIM); Functional characteristics".
- [8] 3GPP TS 22.101: "Service aspects; Service principles".
- [8a] 3GPP TS 22.001: "Principles of circuit telecommunication services supported by a Public Land Mobile Network (PLMN)".
- [8b] 3GPP TS 23.038: "Alphabets and language-specific information".
- [9] 3GPP TS 23.101: "General UMTS Architecture".
- [9a] 3GPP TS 23.108: "Mobile radio interface layer 3 specification core network protocols; Stage 2 (structured procedures)".
- [10] 3GPP TS 23.003: "Numbering, addressing and identification".
- [11] 3GPP TS 43.013: "Discontinuous Reception (DRX) in the GSM system".
- [12] 3GPP TS 23.014: "Support of Dual Tone Multi-Frequency (DTMF) signalling".
- [12a] [ETSI ES 201 235-2, v1.2.1: "Specification of Dual Tone Multi-Frequency \(DTMF\); Transmitters and Receivers; Part 2: Transmitters"](#) ~~Void~~.
- [13] 3GPP TS 43.020: "Security-related network functions".
- [14] 3GPP TS 23.122: "Non-Access-Stratum functions related to Mobile Station (MS) in idle mode".
- [15] 3GPP TS 24.002: "GSM-UMTS Public Land Mobile Network (PLMN) access reference configuration".
- [16] 3GPP TS 44.003: "Mobile Station - Base Station System (MS - BSS) interface; Channel structures and access capabilities".
- [17] 3GPP TS 44.004: "Layer 1; General requirements".

- [18] 3GPP TS 44.005: "Data Link (DL) layer; General aspects".
- [19] 3GPP TS 44.006: "Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) layer specification".
- [19a] 3GPP TS 25.321: "Medium Access Control (MAC) protocol specification".
- [19b] 3GPP TS 25.322: "Radio Link Control (RLC) protocol specification".
- [19c] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".
- [20] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".
- [21] 3GPP TS 24.010: "Mobile radio interface layer 3; Supplementary services specification; General aspects".
- [22] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".
- [23] 3GPP TS 24.012: "Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".
- [23a] 3GPP TS 44.071: "Location Services (LCS); Mobile radio interface layer 3 specification."
- [23b] 3GPP TS 44.031 "Location Services LCS); Mobile Station (MS) - Serving Mobile Location Centre (SMLC); Radio Resource LCS Protocol (RRLP)".
- [23c] 3GPP TS 25.331: "Radio Resource Control (RRC) protocol specification"
- [24] 3GPP TS 24.080: "Mobile radio Layer 3 supplementary service specification; Formats and coding".
- [25] 3GPP TS 24.081: "Line identification supplementary services; Stage 3".
- [26] 3GPP TS 24.082: "Call Forwarding (CF) supplementary services; Stage 3".
- [27] 3GPP TS 24.083: "Call Waiting (CW) and Call Hold (HOLD) supplementary services; Stage 3".
- [28] 3GPP TS 24.084: "MultiParty (MPTY) supplementary services; Stage 3".
- [29] 3GPP TS 24.085: "Closed User Group (CUG) supplementary services; Stage 3".
- [30] 3GPP TS 24.086: "Advice of Charge (AoC) supplementary services; Stage 3".
- [31] 3GPP TS 24.088: "Call Barring (CB) supplementary services; Stage 3".
- [32] 3GPP TS 45.002: "Multiplexing and multiple access on the radio path".
- [33] 3GPP TS 45.005: "Radio transmission and reception".
- [34] 3GPP TS 45.008: "Radio subsystem link control".
- [35] 3GPP TS 45.010: "Radio subsystem synchronization".
- [36] 3GPP TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".
- [36a] 3GPP TS 27.060: "Mobile Station (MS) supporting Packet Switched Services ".
- [37] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [38] 3GPP TS 29.007: "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] 3GPP TS 51.010: "Mobile Station (MS) conformance specification".
- [40] 3GPP TS 51.021: "GSM radio aspects base station system 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 technology -- Open Systems Interconnection -- Network Service Definition".
- [44] ITU-T Recommendation E.163: "Numbering plan for the international telephone service".
- [45] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".
- [46] ITU-T Recommendation E.212: "The international identification plan for mobile terminals and mobile users".
- [47] ITU-T Recommendation F.69 (1993): "The international telex service - Service and operational provisions of telex destination codes and telex network identification codes".
- [48] ITU-T Recommendation I.330: "ISDN numbering and addressing principles".
- [49] ITU-T Recommendation I.440 (1989): "ISDN user-network interface data link layer - General aspects".
- [50] ITU-T Recommendation I.450 (1989): "ISDN user-network interface layer 3 General aspects".
- [51] ITU-T Recommendation I.500 (1993): "General structure of the ISDN interworking recommendations".
- [52] ITU-T Recommendation T.50: "International Reference Alphabet (IRA) (Formerly International Alphabet No. 5 or IA5) - Information technology - 7-bit coded character set for information interchange".
- [53] ITU Recommendation Q.931: ISDN user-network interface layer 3 specification for basic control".
- [54] ITU-T Recommendation V.21: "300 bits per second duplex modem standardized for use in the general switched telephone network".
- [55] ITU-T Recommendation V.22: "1200 bits per second duplex modem standardized for use in the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".
- [56] ITU-T Recommendation V.22bis: "2400 bits per second duplex modem using the frequency division technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".
- [57] Void.
- [58] ITU-T Recommendation V.26ter: "2400 bits per second duplex modem using the echo cancellation technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".
- [59] ITU-T Recommendation V.32: "A family of 2-wire, duplex modems operating at data signalling rates of up to 9600 bit/s for use on the general switched telephone network and on leased telephone-type circuits".
- [60] ITU-T Recommendation V.110: "Support by an ISDN of data terminal equipments with V-Series type interfaces".
- [61] ITU-T Recommendation V.120: "Support by an ISDN of data terminal equipment with V-Series type interfaces with provision for statistical multiplexing".
- [62] ITU-T Recommendation X.21: "Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for synchronous operation on public data networks".
- [63] Void.
- [64] Void.

- [65] ITU-T Recommendation X.30: "Support of X.21, X.21 bis and X.20 bis based Data Terminal Equipments (DTEs) by an Integrated Services Digital Network (ISDN)".
- [66] ITU-T Recommendation X.31: "Support of packet mode terminal equipment by an ISDN".
- [67] Void.
- [68] Void.
- [69] ITU-T Recommendation X.121: "International numbering plan for public data networks".
- [70] ETSI ETS 300 102-1: "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control".
- [71] ETSI ETS 300 102-2: "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control; Specification Description Language (SDL) diagrams".
- [72] ISO/IEC 10646: "Information technology -- Universal Multiple-Octet Coded Character Set (UCS)".
- [73] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service Description; Stage 1".
- [74] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".
- [75] 3GPP TS 43.064: "General Packet Radio Service (GPRS); Overall description of the GPRS radio interface; Stage 2".
- [76] 3GPP TS 44.060: "General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol".
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- [78] 3GPP TS 44.065: "Mobile Station (MS) - Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDTCP)".
- [78a] 3GPP TS 44.064: "Mobile Station - Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) Layer Specification".
- [79] ITU Recommendation I.460: "Multiplexing, rate adaption and support of existing interfaces".
- [80] 3GPP TS 26.111: "Codec for Circuit Switched Multimedia Telephony Service; Modifications to H.324".
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- [83] 3GPP TS 26.103: "Speech Codec List for GSM and UMTS".
- [84] 3GPP TS 44.018: "Mobile radio interface layer 3 specification, Radio Resource Control Protocol".
- [85] 3GPP TS 48.008: "Mobile-services Switching Centre – Base Station System (MSC – BSS) interface; layer 3 specification".
- [86] 3GPP TS 48.018: "General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".
- [87] 3GPP TS 43.055: "Dual Transfer Mode (DTM); Stage 2".
- [88] 3GPP TS 23.067: "enhanced Multi-Level Precedence and Pre-emption service (eMLPP); Stage 2".
- [88a] 3GPP TS 23.093: "Technical realization of Completion of Calls to Busy Subscriber (CCBS); Stage 2".
- [89] 3GPP TS 22.042: "Network Identity and Time Zone (NITZ), Stage 1".

- [90] 3GPP TS 23.040: "Technical realization of Short Message Service (SMS)".
- [91] 3GPP TS 44.056: "GSM Cordless Telephony System (CTS), (Phase 1) CTS Radio Interface Layer 3 Specification".
- [92] 3GPP TS 23.226: "Global Text Telephony; Stage 2 "
- [93] 3GPP TS 26.226: "Cellular Text Telephone Modem (CTM), General Description "
- [94] 3GPP TS 23.236: "Intra Domain Connection of RAN Nodes to Multiple CN Nodes"
- [95] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP"
- [96] 3GPP TS 23.205: "Bearer-independent circuit-switched core network; Stage 2".
- [97] 3GPP TS 23.172: "UDI/RDI Fallback and Service Modification; Stage 2".
- [98] 3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode"
- [99] RFC 3513 (April 2003): "Internet Protocol Version 6 (IPv6) Addressing Architecture".
- [100] 3GPP TS 29.207: "Policy control over Gs interface".
- [101] 3GPP TS 21.111: "USIM and IC card requirements".
- [102] RFC 1661 (July 1994): "The Point-to-Point Protocol (PPP)".
- [103] RFC 3232 (January 2002): "Assigned Numbers: RFC 1700 is Replaced by an On-line Database".
- [104] 3GPP TS 23.034: "High Speed Circuit Switched Data (HSCSD) – Stage 2".
- [105] 3GPP TS 23.271: "Functional stage 2 description of LCS".
- [106] 3GPP TS 23.246: "Multimedia Broadcast/Multicast Service (MBMS); Architecture and Functional Description".
- [107] RFC 2236 (November 1997): "Internet Group Management Protocol, Version 2".
- [108] RFC 2710 (October 1999): "Multicast Listener Discovery (MLD) for IPv6".
- [109] 3GPP TS 23.251: "Network Sharing; Architecture and Functional Description".

***** NEXT MODIFIED SECTION *****

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 3GPP TS 23.014 [\[12\]](#).

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: The present document 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 has been sent, another START DTMF message shall only be sent by the MS following receipt of its STOP DTMF ACKNOWLEDGE message (see subclause 5.5.7.4) or a START DTMF REJECT message from the network (see subclause 5.5.7.2) or following the expiry of timers T336 and T337.

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

5.5.7.2 Start DTMF response by the network

Upon receiving the START DTMF message the network shall either:

- convert the received digit into a DTMF tone which is applied toward the remote user, or
- send the DTMF digit as an out-of-band message (see 3GPP TS 23.205 [96])

and return 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 subclause 5.5.7.2).

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

5.5.7.4 Stop DTMF response by the network

Upon receiving the STOP DTMF message the network shall either:

- stop sending the DTMF tone if applied by the network, or
- initiate a suitable out-of-band message (see [3GPP TS 23.205 \[96\]](#))

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

If the network is generating DTMF tones it shall ensure that the minimum length of tone and the minimum gap between two subsequent tones (according to [ETSI ES 201 235-2 \[12a\] ETR-206](#)) is achieved.

NOTE 1: In [ETSI ES 201 235-2 \[12a\] ETR-206](#) the minimum duration of a DTMF tone is ~~7065ms~~ $\pm 5ms$.

NOTE 2: In [ETSI ES 201 235-2 \[12a\] ETR-206](#) the minimum gap between DTMF tones is 65ms.

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 3: 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.

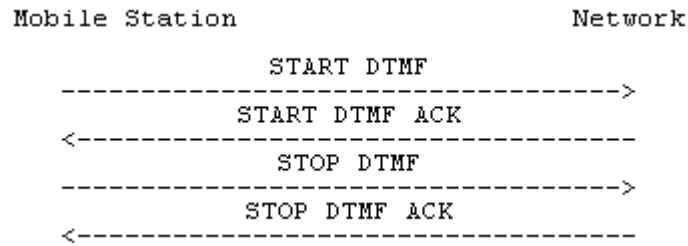


Figure 5.8/3GPP TS 24.008 Single DTMF transmission

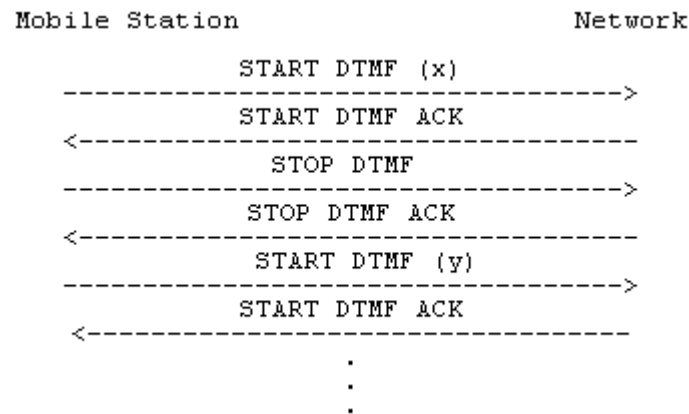


Figure 5.9/3GPP TS 24.008 Multiple DTMF transmission

CR-Form-v7.1

CHANGE REQUEST

⌘ **24.008 CR 912** ⌘ rev **1** ⌘ Current version: **6.6.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Service Request conditions	
Source:	⌘ Ericsson, Siemens	
Work item code:	⌘ TEI6	Date: ⌘ 17/11/2004
Category:	⌘ F	Release: ⌘ Rel-6
	<p>Use <u>one</u> of the following categories:</p> <p>F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>	<p>Use <u>one</u> of the following releases:</p> <p>Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)</p>

Reason for change:	⌘ Even though TS 24.008 contains the criteria to invoke the Service request procedure in the sub-clause 4.7.13, TS 24.008 lacks a clear requirement on when the Service request procedure can be initiated by the MS. This kind of requirement exists for other procedures described by TS 24.008 such as location updating. For the location updating procedure the initiation conditions of the procedure are stated in the sub-clause 4.1.1.1.
	The Service request procedure can only be initiated by the MS when the GPRS status is GU1 UPDATED and no other GMM specific procedure is ongoing.
	Additionally, with the introduction of the "follow-on proceed" indication the sub-clause 4.7.13 contains conditions on when a service request pending has to be sent and which type of Service Type IE has to be included in the SERVICE REQUEST message. However, there are no conditions specified at all to indicate when a Service request procedure is delayed by the MS. This lack of conditions for the delayed Service request procedure makes it unclear for the MS implementors when a service request pending scenario occurs.
Summary of change:	⌘ The Service request conditions are introduced in the appropriate sub-clause into TS 24.008.
Consequences if not approved:	⌘ No complete requirements on the Service request procedure. Lack of requirement on when the Service request procedure can be initiated by the MS remains.

Additionally, there is no conditions specified to know when the MS should delay the Service request procedure, even though the actions to follow when a Service request pending exists in the MS are specified by TS 24.008.

All the above results in undesirable effects; for instance, different MS implementations of the Service request procedure.

Clauses affected:	⌘	4.1.1.1, 4.7.13										
Other specs affected:	⌘	<table border="1"><tr><td>Y</td><td>N</td></tr><tr><td></td><td>X</td></tr><tr><td></td><td>X</td></tr><tr><td></td><td>X</td></tr></table>	Y	N		X		X		X	Other core specifications	⌘
		Y	N									
			X									
	X											
	X											
		Test specifications										
		O&M Specifications										
Other comments:	⌘											

How to create CRs using this form:

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

- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

1 st Change

4.1.1.1 Types of MM and GMM procedures

Depending on how they can be initiated, three types of MM procedures can be distinguished:

1) MM common procedures:

A MM common procedure can always be initiated whilst a RR connection exists. The procedures belonging to this type are:

Initiated by the network:

- TMSI reallocation procedure;
- authentication procedure;
- identification procedure;
- MM information procedure;
- abort procedure.

However, abort procedure is used only if an MM connection is being established or has already been established i.e. not during MM specific procedures or during IMSI detach procedure, see subclause 4.3.5.

Initiated by the mobile station:

- IMSI detach procedure (with the exceptions specified in subclause 4.3.4).

2) MM specific procedures:

A MM specific procedure can only be initiated if no other MM specific procedure is running or no MM connection exists. The procedures belonging to this type are:

- normal location updating procedure;
- periodic updating procedure;
- IMSI attach procedure.

3) MM connection management procedures:

These procedures are used to establish, maintain and release a MM connection between the mobile station and the network, over which an entity of the upper CM layer can exchange information with its peer. A MM connection establishment can only be performed if no MM specific procedure is running. More than one MM connection may be active at the same time.

Depending on how they can be initiated, three types of GMM procedures can be distinguished:

1) GMM common procedures:

In Iu mode, a GMM common procedure can always be initiated whilst a PS signalling connection exists.

The procedures belonging to this type are:

Initiated by the network when a GMM context has been established:

- P-TMSI (re-) allocation;
- GPRS authentication and ciphering;
- GPRS identification;
- GPRS information.

2) GMM specific procedures:

Initiated by the network and used to detach the IMSI in the network for GPRS services and/or non-GPRS services and to release a GMM context:

- GPRS detach.

Initiated by the MS and used to attach or detach the IMSI in the network for GPRS services and/or non-GPRS services and to establish or release a GMM context:

- GPRS attach and combined GPRS attach;
- GPRS detach and combined GPRS detach.

Initiated by the MS when a GMM context has been established:

- normal routing area updating and combined routing area updating;
- periodic routing area updating.

3) GMM connection management procedures (Iu mode only):

Initiated by the MS and used to establish a secure connection to the network and/or to request the resource reservation for sending data:

- Service Request.

The Service Request procedure can only be initiated if no MS initiated GMM specific procedure is ongoing.

Next Change

4.7.13 Service Request procedure (UMTS only)

The purpose of this procedure is to transfer the PMM mode from PMM-IDLE to PMM-CONNECTED mode, and/or to assign radio access bearer in case of PDP contexts are activated without radio access bearer assigned. In latter case, the PMM mode may be PMM-IDLE mode or may alternatively be the PMM-CONNECTED mode if the MS requires radio access bearer re-establishment. This procedure is used for;

- the initiation of CM layer service (e.g. SM or SMS) procedure from the MS in PMM-IDLE mode,
- the network to transfer down link signalling,
- uplink (in PMM-IDLE or PMM CONNECTED) and downlink (only in PMM-IDLE) user data,
- counting the number of mobile stations in a cell which are interested in a specific MBMS multicast service.

For downlink transfer of signalling or user data in PMM-IDLE mode, the trigger is given from the network by the paging request procedure, which is out of scope of the present document.

For pending downlink user data in PMM-CONNECTED mode, the re-establishment of radio access bearers for all active PDP contexts is done without paging.

For counting the number of mobile stations in PMM-IDLE mode interested in a specific MBMS service, the trigger is given from the network by the MBMS notification procedure (see 3GPP TS 25.331 [23c]).

Service type can take either of the following values; "signalling", "data", "paging response" or "MBMS notification response". Each of the values shall be selected according to the criteria to initiate the Service request procedure.

The criteria to invoke the Service request procedure are when;

- a) the MS has any signalling messages except GMM messages (e.g. for SM or SMS) to be sent to the network in PMM-IDLE mode (i.e., no secure PS signalling connection has been established). In this case, the service type shall be set to "signalling".

- b) the MS, either in PMM-IDLE or PMM-CONNECTED mode, has pending user data to be sent and no radio access bearer is established for the corresponding PDP context. The procedure is initiated by an indication from the lower layers (see 3GPP TS 24.007 [20]). In this case, the service type shall be set to "data". If in PMM-CONNECTED mode, a Service Request with service type "data" was already accepted by the network the MS shall not issue a second Service Request with service type "data" unless the PMM-IDLE state is entered again.
- c) the MS receives a paging request for PS domain from the network in PMM-IDLE mode. In this case, the service type shall be set to "paging response".
- d) the MS is in PMM-IDLE, receives an MBMS notification for an MBMS multicast service for which the MS has activated an MBMS context, and is prompted by the contents of the notification to establish a PS signalling connection (see 3GPP TS 25.331 [23c]). In this case, the service type shall be set to "MBMS notification response".

If one of the above criteria to invoke the Service request procedure is fulfilled, then the Service request procedure may only be initiated by the MS when the following conditions are fulfilled:

- its GPRS update status is GU1 UPDATED; and
- no GMM specific procedure is ongoing (see subclause 4.1.1.1).

If a GMM specific procedure is ongoing at the time a request from CM sublayer, the RRC or the RABM (see 3GPP TS 24.007 [20]) is received and the ATTACH REQUEST or ROUTING AREA UPDATE REQUEST message has been sent, then, depending on implementation, the MS shall abort the received request or delay it until the GMM specific procedure is completed. If the ATTACH REQUEST or ROUTING AREA UPDATE REQUEST message has not been sent, the MS may indicate "follow-on request pending" in the message (i.e. the MS wishes to prolong the established PS signalling connection after the GMM specific procedure). Then, the MS shall delay the Service request procedure until the GMM specific procedure is completed.

If the network indicates "follow-on proceed" in the ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message and the MS has a service request pending, the MS shall react depending on the service type. If the service type is:

- "signalling": the MS shall abort the Service request procedure and send the pending signalling messages immediately;
- "data": the MS shall immediately perform the pending Service request procedure using the current PS signalling connection;
- "paging response": the MS shall abort the Service request procedure. No further specific action is required from the MS.

If the network indicates "follow-on proceed" and the MS has no service request pending, then no specific action is required from the MS.

If the network indicates "no follow-on proceed" in the ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message, the MS shall not initiate the pending Service request procedure until the current PS signalling connection is released.

NOTE: The "follow-on proceed" indication was not defined in earlier versions of the protocol. A network that is compliant with the earlier versions of the protocol will always encode the respective bit as zero, i.e. as "follow-on proceed", even if it does not prolong the PS signalling connection.

After completion of a Service request procedure but before re-establishment of radio access bearer, if the PDP context status information element is included, then the network shall deactivate all those PDP contexts locally (without peer to peer signalling between the MS and the network), which are not in SM state PDP-INACTIVE on network side but are indicated by the MS as being in state PDP-INACTIVE.

After completion of a Service request procedure, the pending service is resumed and uses then the connection established by the procedure. If the service type is indicating "data", then the radio access bearers for all activated PDP contexts are re-established by the network, except for those activated PDP contexts having maximum bit rate value set to 0 kbit/s for both uplink and downlink. The re-establishment of radio access bearers for those PDP contexts is specified in subclause 6.1.3.3.

The selective re-assignment capability is not supported for the simplicity of the function.

CR-Form-v7.1

CHANGE REQUEST

⌘ **24.008 CR 911** ⌘ rev **1** ⌘ Current version: **6.6.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Paging for GPRS Services in GSM		
Source:	⌘ Ericsson		
Work item code:	⌘ TEI6	Date:	⌘ 17/11/2004
Category:	⌘ F	Release:	⌘ Rel-6
Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:	
F (correction)		Ph2 (GSM Phase 2)	
A (corresponds to a correction in an earlier release)		R96 (Release 1996)	
B (addition of feature),		R97 (Release 1997)	
C (functional modification of feature)		R98 (Release 1998)	
D (editorial modification)		R99 (Release 1999)	
Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-4 (Release 4)	
		Rel-5 (Release 5)	
		Rel-6 (Release 6)	
		Rel-7 (Release 7)	

Reason for change: ⌘ According to the sub-clause 4.7.9.1.1 of TS 24.008 the MS can respond to paging for GPRS in GSM with **any** LLC frame. Furthermore, in the same section is stated that:

In GSM, when a response is received from the MS, **the network shall start the READY timer.**

However, the stage 2 on GPRS (i.e. TS 23.060) says that the MS shall not use the LLC NULL frame as a page response.

4) Upon receipt of a GPRS Paging Request message, the MS shall respond with either any single valid LLC frame (e.g. a Receive Ready or Information frame) that implicitly is interpreted as a page response message by the SGSN. **The MS shall not use the LLC NULL frame as a page response.** When responding, the MS changes MM state to READY. The Packet Channel Request precedes the response and Packet Immediate Assignment procedures as described in GSM 03.64.

Additionally, the sub-clause 4.7.2.1.1 'READY timer behaviour (GSM only) of TS 24.008 states the following:

The **READY timer is started:**

- in the MS when the GMM entity receives an indication from lower layers that an LLC frame other than LLC NULL frame has been transmitted on the radio interface; and

	<p>- in the network when the GMM entity receives an indication from lower layers that an LLC frame other than LLC NULL frame has been successfully received by the network.</p> <p>All the above implies that firstly, TS 24.008 is not compliant with the stage 2 specification on GPRS (i.e. TS 23.060). Secondly, TS 24.008 contradicts itself in sub-clauses 4.7.2.1.1 and 4.7.9.1.1.</p>
Summary of change: ⌘	The sub-clause 4.7.9.1.1 is corrected to prohibit to use the LLC NULL frame as a page response.
Consequences if not approved: ⌘	<p>Misalignment among 3GPP specifications remains.</p> <p>Additionally, TS 24.008 contradicts itself on the sending of LLC frame as a page response. It says that in GSM, any LCC frame can be sent as a page response and the READY timer shall be started in the network when a page response is received from the MS, while the LLC NULL frame cannot start the READY timer.</p>

Clauses affected: ⌘	4.7.9.1.1												
Other specs affected:	<table border="1"> <thead> <tr> <th>Y</th> <th>N</th> <th></th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>Other core specifications ⌘</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>Test specifications</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>O&M Specifications</td> </tr> </tbody> </table>	Y	N		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications ⌘	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Test specifications	<input type="checkbox"/>	<input checked="" type="checkbox"/>	O&M Specifications
Y	N												
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications ⌘											
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Test specifications											
<input type="checkbox"/>	<input checked="" type="checkbox"/>	O&M Specifications											
Other comments: ⌘													

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

1 st Change

4.7.9.1.1 Paging for GPRS services using P-TMSI

The network shall initiate the paging procedure for GPRS services using P-TMSI when GMM signalling messages or user data is pending to be sent to the MS while the Mobile Reachable timer is running. The network may page only GPRS MSs which are GMM-REGISTERED and identified by a local P-TMSI.

In UMTS, to initiate the procedure the GMM entity in the network requests the lower layer to start paging (see 3GPP TS 25.331 [23c] and 3GPP TS 25.413) and starts timer T3313. Upon reception of a paging indication, the MS shall respond to the paging with a SERVICE REQUEST message with service type "paging response" (see 3GPP TS 24.007 [20], 3GPP TS 23.060 [74], 3GPP TS 25.331 [23c] and 3GPP TS 25.413). If the paging request for GPRS services was received during an ongoing MS initiated GMM specific procedure, then the MS shall progress the GMM specific procedure, and the network shall proceed with the GMM specific procedure.

In GSM, to initiate the procedure the GMM entity requests the RR sublayer to start paging (see 3GPP TS 44.018 [84], 3GPP TS 44.060 [76], and starts timer T3313). Upon reception of a paging indication, the MS shall respond to the paging with any LLC frame (see [3GPP TS 44.064 \[78a\]](#), 3GPP TS 24.007 [20], 3GPP TS 23.060 [74]).

At intersystem change, an MS not having the READY timer running in GSM or an MS in PMM-IDLE mode in UMTS, being paged in a different access network as when it last sent user data or signalling message, uses ROUTING AREA UPDATE REQUEST message as paging response, i.e. the RA update procedure shall be performed instead according to the selective routing area update procedure.

The network shall stop timer T3313 when a response is received from the MS. When the timer T3313 expires the network may reinitiate paging.

In UMTS, when a response is received from the MS, the network shall change from PMM-IDLE mode to PMM-CONNECTED mode.

In GSM, when a response [different from an LLC NULL frame](#) is received from the MS, the network shall start the READY timer.

CR-Form-v7.1

CHANGE REQUEST

⌘ **24.008 CR 913** ⌘ rev **1** ⌘ Current version: **6.6.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Service Request – Abnormal cases in the MS	
Source:	⌘ Ericsson	
Work item code:	⌘ TEI6	Date: ⌘ 17/11/2004
Category:	⌘ F	Release: ⌘ Rel-6
	<p>Use <u>one</u> of the following categories:</p> <ul style="list-style-type: none"> F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>	<p>Use <u>one</u> of the following releases:</p> <ul style="list-style-type: none"> Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)

Reason for change:	⌘ The sub-clause 4.7.13.5 'Abnormal cases in the MS' states as follows: c) T3317 expired The MS shall enter GMM-REGISTERED state. If the MS is in PMM-IDLE mode then the procedure shall be aborted and the MS shall initiate a PS signalling connection release . If the MS is in PMM-CONNECTED mode, then the procedure shall be aborted. According to TS 23.060 if the MS is in PMM-IDLE state the PS signalling connection does not exist. However, the MS enters the PMM-CONNECTED mode when the PS signalling connection is established between the MS and the SGSN. All this means that the current text in the sub-clause 4.7.13.5 is incorrect, due to the fact that if the MS is in PMM-IDLE mode, the PS signalling connection does not exist, so the MS cannot initiate a PS signalling connection release as mandated by TS 24.008.
Summary of change:	⌘ The sub-clause 4.7.13.5 is corrected in case of T3317 expired, i.e. bullet c). In such a case, the MS shall abort the Service request procedure.
Consequences if not approved:	⌘ The MS, in PMM-IDLE state, cannot comply with the text stated in the bullet c) of the sub-clause 4.7.13. There is no PS signalling connection to be released.

Clauses affected: ⌘ 4.7.13.5

Other specs affected:		Y	N		
	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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

1 st Change

4.7.13.5 Abnormal cases in the MS

The following abnormal cases can be identified:

- a) Access barred because of access class control

The Service request procedure shall not be started. The MS stays in the current serving cell and applies normal cell reselection process. The Service request procedure may be started by CM layer if it is still necessary, i.e. when access is granted or because of a cell change.

- b) Lower layer failure before the security mode control procedure is completed, SERVICE ACCEPT or SERVICE REJECT message is received

The procedure shall be aborted.

- c) T3317 expired

The MS shall enter GMM-REGISTERED state.

If the MS is in PMM-IDLE mode then the procedure shall be aborted and the MS shall ~~initiate a PS signalling connection~~ release [locally any resources allocated for the service request procedure](#).

If the MS is in PMM-CONNECTED mode, then the procedure shall be aborted.

- d) SERVICE REJECT received, other causes than those treated in subclause 4.7.13.4

The procedure shall be aborted.

- e) Routing area update procedure is triggered

If a cell change into a new routing area occurs and the necessity of routing area update procedure is determined before the security mode control procedure is completed, a SERVICE ACCEPT or SERVICE REJECT message has been received, the Service request procedure shall be aborted and the routing area updating procedure is started immediately. Follow-on request pending may be indicated in the ROUTING AREA UPDATE REQUEST for the service, which was the trigger of the aborted Service request procedure, to restart the pending service itself or the Service request procedure after the completion of the routing area updating procedure. If the Service type of the aborted SERVICE REQUEST was indicating "data", then the routing area update procedure may be followed by a re-initiated Service request procedure indicating "data", if it is still necessary. If the Service type was indicating "MBMS notification response", the Service request procedure shall be aborted.

- f) Power off

If the MS is in state GMM-SERVICE-REQUEST-INITIATED at power off, the GPRS detach procedure shall be performed.

- g) Procedure collision

If the MS receives a DETACH REQUEST message from the network in state GMM-SERVICE-REQUEST-INITIATED, the GPRS detach procedure shall be progressed and the Service request procedure shall be aborted. If the cause IE, in the DETACH REQUEST message, indicated a "reattach request", the GPRS attach procedure shall be performed.

CR-Form-v7.1

CHANGE REQUEST

⌘ **24.008** **CR 920** ⌘ rev **1** ⌘ Current version: **6.6.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Correction of the description of causes #7 and #8 in Annex G.6		
Source:	⌘ NEC Technologies		
Work item code:	⌘ TEI6	Date:	⌘ 15/10/2004
Category:	⌘ F	Release:	⌘ Rel-6
	<i>Use <u>one</u> of the following categories:</i> F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		<i>Use <u>one</u> of the following releases:</i> Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)

Reason for change:	⌘ The actual description given in annex G.6. for the causes #7 and #8 is not aligned with the protocol implementation as specified in previous clauses of the TS24.008. The description gives the meaning of the causes, but it intends also to list the procedures over which the causes can be sent to the MS. The list of the GMM procedures is incomplete and useless for the reader comprehension. Only the meaning of the causes is needed.
Summary of change:	⌘ Make the description of the causes #7 and #8 independent from the protocol implementation by removing the procedures from the text.
Consequences if not approved:	⌘ Limits the use of causes #7 and #8 by the CN. leads to misinterpretations of the specification. I.e. it is understood as if the CN can invalidate the MS for either GPRS services or both GPRS and non GPRS services only when the MS attaches to the CN and not afterward.

Clauses affected:	⌘ Annex G.6										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> </table>	Y	N		X		X		X	⌘ Other core specifications ⌘ Test specifications ⌘ O&M Specifications	⌘
Y	N										
	X										
	X										
	X										
Other comments:	⌘										

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***** **Start of changes** *****

G.6 Additional cause codes for GMM

Cause value = 7 GPRS services not allowed

This cause is sent to the MS ~~if when~~ it ~~requests an IMSI attach for GPRS services, but~~ is not allowed to operate GPRS services.

Cause value = 8 GPRS services and non-GPRS services not allowed

This cause is sent to the MS ~~if when~~ it ~~requests a combined IMSI attach for GPRS and non-GPRS services, but~~ is not allowed to operate either ~~of them~~ GPRS or non-GPRS services.

Cause value = 9 MS identity cannot be derived by the network

This cause is sent to the MS when the network cannot derive the MS's identity from the P-TMSI in case of inter-SGSN routing area update.

Cause value = 10 Implicitly detached

This cause is sent to the MS either if the network has implicitly detached the MS, e.g. some while after the Mobile reachable timer has expired, or if the GMM context data related to the subscription does not exist in the SGSN e.g. because of a SGSN restart.

Cause value = 14 GPRS services not allowed in this PLMN

This cause is sent to the MS which requests GPRS service in a PLMN which does not offer roaming for GPRS services to that MS.

Cause value = 16 MSC temporarily not reachable

This cause is sent to the MS if it requests a combined GPRS attach or routing area updating in a PLMN where the MSC is temporarily not reachable via the GPRS part of the GSM network.

Cause value = 40 No PDP context activated

This cause is sent to the MS if the MS requests an establishment of the radio access bearers for all active PDP contexts by sending a SERVICE REQUEST message indicating "data" to the network, but the SGSN does not have any active PDP context(s).

***** **End of changes** *****

CR-Form-v7.1

CHANGE REQUEST

⌘ **24.008 CR 921** ⌘ rev **1** ⌘ Current version: **6.6.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ CC cause reference correction		
Source:	⌘ Nokia		
Work item code:	⌘ TEI6	Date:	⌘ 16/10/2004
Category:	⌘ F	Release:	⌘ Rel-6
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)

Reason for change:	⌘ CC cause value definition points to the wrong table within 24.008. The referenced table 10.86 must be a pointer to some old numbering as that table does not exist at all in the present version.
Summary of change:	⌘ Reference has been corrected and also one typo corrected.
Consequences if not approved:	⌘ Unnecessary difficulties in finding the complete definition of CC cause coding.

Clauses affected:	⌘ 10.5.4.11										
Other specs affected:	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: center;">Y</td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Other core specifications	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	⌘	
Y	N										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
Other comments:	⌘										

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10.5.4.11 Cause

The purpose of the cause information element is to describe the reason for generating certain messages, to provide diagnostic information in the event of procedural errors and to indicate the location of the cause originator.

The cause information element is coded as shown in figure 10.5.95/3GPP TS 24.008 and tables 10.5.122 and 10.5.123/3GPP TS 24.008.

The cause is a type 4 information element with a minimum length of 4 octets and a maximum length of 32 octets.

The cause information element may be repeated in a message.

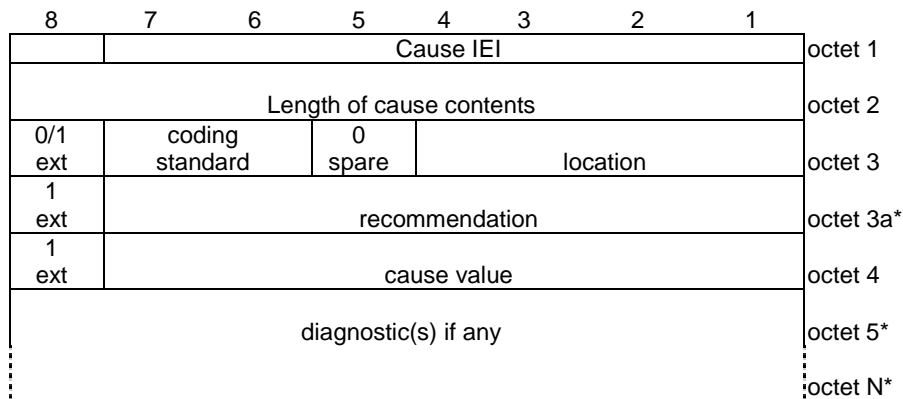


Figure 10.5.95/3GPP TS 24.008 Cause information element

If the default value applies for the recommendation field, octet 3a shall be omitted.

Table 10.5.122/3GPP TS 24.008: Cause information element

Coding standard (octet 3)			
Bits			
7	6		
0 0	Coding as specified in ITU-T Rec. Q.931		
0 1	Reserved for other international standards		
1 0	National standard		
1 1	Standard defined for the GSM PLMNS as described below and in table 40.86 10.5.123/3GPP TS 24.008		
Coding standards other than "1 1 - Standard defined for the GSM PLMNS" shall not be used if the cause can be represented with the GSM standardized coding.			
The mobile station or network need not support any other coding standard than "1 1 - Standard defined for the GSM PLMNS".			
If a cause IE indicating a coding standard not supported by the receiver is received, cause "interworking, unspecified" shall be assumed.			
Location (octet 3)			
Bits			
4	3	2	1
0 0 0 0	user		
0 0 0 1	private network serving the local user		
0 0 1 0	public network serving the local user		
0 0 1 1	transit network		
0 1 0 0	public network serving the remote user		
0 1 0 1	private network serving the remote user		
0 1 1 1	international network		
1 0 1 0	network beyond interworking point		
All other values are reserved.			
Recommendation (octet 3a)			
Octet 3a shall not be included if the coding standard is coded as "1 1 - Standard defined for GSM PLMNS".			
If the coding standard is different from "1 1 - Standard defined for GSM PLMNS", the coding of octet 3a, if included, and octets 4 to N is according to that coding standard.			

Table 10.5.122/3GPP TS 24.008: Cause information element (continued)

Cause value (octet 4)	
The cause value is divided in two fields: a class (bits 5 through 7) and a value within the class (bits 1 through 4).	
The class indicates the general nature of the event.	
Class (000):	normal event
Class (001):	normal event
Class (010):	resource unavailable
Class (011):	service or option not available
Class (100):	service or option not implemented
Class (101):	invalid message (e.g. parameter out of range)
Class (110):	protocol error (e.g. unknown message)
Class (111):	interworking
The cause values are listed in Table 10.86 10.5.123/GSM-3GPP TS 24.008 below and defined in Annex H.	
Diagnostic(s) (octet 5)	
Diagnostic information is not available for every cause, see Table 10.86 10.5.123/3GPP TS 24.008 below.	
When available, the diagnostic(s) is coded in the same way as the corresponding information element in clause 10.	
The inclusion of diagnostic(s) is optional.	

Table 10.5.123/3GPP TS 24.008: Cause information element values

Cause value							Cause num.	Cause	Diag-nostic	Remarks
Class			Value							
7	6	5	4	3	2	1				
0	0	0	0	0	0	1	1.	Unassigned (unallocated) number	Note 9	
0	0	0	0	0	1	1	3.	No route to destination	Note 9	
0	0	0	0	1	1	0	6.	Channel unacceptable	-	
0	0	0	1	0	0	0	8.	Operator determined barring	-	
0	0	1	0	0	0	0	16.	Normal call clearing	Note 9	
0	0	1	0	0	0	1	17.	User busy	Note 1	
0	0	1	0	0	1	0	18.	No user responding	-	
0	0	1	0	0	1	1	19.	User alerting, no answer	-	
0	0	1	0	1	0	1	21.	Call rejected	Note 9 - user supplied diagnostic (note 4)	
0	0	1	0	1	1	0	22.	Number changed	New destination(note 5)	
0	0	1	1	0	0	1	25.	Pre-emption		
0	0	1	1	0	1	0	26.	Non selected user clearing	-	
0	0	1	1	0	1	1	27.	Destination out of order	-	
0	0	1	1	1	0	0	28.	Invalid number format (incomplete number)	-	
0	0	1	1	1	0	1	29.	Facility rejected	Note 1	
0	0	1	1	1	1	0	30.	Response to STATUS ENQUIRY	-	
0	0	1	1	1	1	1	31.	Normal, unspecified	-	
0	1	0	0	0	1	0	34.	No circuit/channel available	Note 1	
0	1	0	0	1	1	0	38.	Network out of order	-	
0	1	0	1	0	0	1	41.	Temporary failure	-	
0	1	0	1	0	1	0	42.	Switching equipment congestion	-	
0	1	0	1	0	1	1	43.	Access information discarded	Discarded information element identifiers (note 6)	
0	1	0	1	1	0	0	44.	requested circuit/channel not available	-	
0	1	0	1	1	1	1	47.	Resources unavailable, unspecified	-	
0	1	1	0	0	0	1	49.	Quality of service unavailable	Note 9	
0	1	1	0	0	1	0	50.	Requested facility not subscribed	Note 1	
0	1	1	0	1	1	1	55.	Incoming calls barred within the CUG	Note 1	
0	1	1	1	0	0	1	57.	Bearer capability not authorized	Note 3	
0	1	1	1	0	1	0	58.	Bearer capability not presently available	Note 3	
0	1	1	1	1	1	1	63.	Service or option not available, unspecified	-	
1	0	0	0	0	0	1	65.	Bearer service not implemented	Note 3	

(continued)

Table 10.5.123/3GPP TS 24.008 (concluded): Cause information element values

Cause value							Cause num.	Cause	Diag-nostic	Remarks
Class	Value									
7	6	5	4	3	2	1				
1	0	0	0	1	0	0	68.	ACM equal to or greater than ACMmax		
1	0	0	0	1	0	1	69.	Requested facility not implemented	Note 1	
1	0	0	0	1	1	0	70.	Only restricted digital information bearer capability is available		
1	0	0	1	1	1	1	79.	Service or option not implemented, unspecified	-	
1	0	1	0	0	0	1	81.	Invalid transaction identifier value	-	
1	0	1	0	1	1	1	87.	User not member of CUG	Note 1	
1	0	1	1	0	0	0	88.	Incompatible destination	Incompatible parameter (Note 2)	
1	0	1	1	0	1	1	91.	Invalid transit network selection	-	
1	0	1	1	1	1	1	95.	Semantically incorrect message	-	
1	1	0	0	0	0	0	96.	Invalid mandatory information	Information element identifier(s)	
1	1	0	0	0	0	1	97.	Message type non-existent or not implemented	Message type	
1	1	0	0	0	1	0	98.	Message type not compatible with protocol state	Message type	
1	1	0	0	0	1	1	99.	Information element non-existent or not implemented	Information element identifier(s) (notes 6,7)	
1	1	0	0	1	0	0	100.	Conditional IE error	Information element identifier(s) (note 6)	
1	1	0	0	1	0	1	101.	Message not compatible with protocol state	Message type	
1	1	0	0	1	1	0	102.	Recovery on timer expiry	Timer number (note 8)	
1	1	0	1	1	1	1	111.	Protocol error, unspecified	-	
1	1	1	1	1	1	1	127.	Interworking, unspecified	-	

All other values in the range 0 to 31 shall be treated as cause 31.

All other values in the range 32 to 47 shall be treated as cause 47.

All other values in the range 48 to 63 shall be treated as cause 63.

All other values in the range 64 to 79 shall be treated as cause 79.

All other values in the range 80 to 95 shall be treated as cause 95.

All other values in the range 96 to 111 shall be treated as cause 111.

All other values in the range 112 to 127 shall be treated as cause 127.

NOTE 1: Diagnostics for supplementary services are handled as follows:

octet 5, bit 8:

This is an extension bit as defined in the preliminary part of subclause 10.5. In this version of this protocol, this bit shall be set to 1. If it is set to zero, the contents of the following octets shall be ignored.

octet 5, bit 7-1:

- 0000001 - Outgoing calls barred within CUG
- 0000010 - No CUG selected
- 0000011 - Unknown CUG index
- 0000100 - CUG index incompatible with requested basic service
- 0000101 - CUG call failure, unspecified
- 0000110 - CLIR not subscribed

0000111 - CCBS possible

0001000 - CCBS not possible

All other values shall be ignored.

NOTE 2: The incompatible parameter is composed of the incompatible information element identifier.

NOTE 3: The format of the diagnostic field for cause numbers 57, 58 and 65 is as shown in figure 10.5.88/3GPP TS 24.008 and tables 10.5.102/3GPP TS 24.008 to 10.5.115/3GPP TS 24.008.

NOTE 4: The user supplied diagnostics field is encoded according to the user specification, subject to the maximum length of the cause information element. The coding of user supplied diagnostics should be made in such a way that it does not conflict with the coding described in note 9 below.

NOTE 5: The new destination is formatted as the called party BCD number information element, including information element identifier.

NOTE 6: Locking and non-locking shift procedures described in subclause 10.5.4.2 and clause 3 are applied. In principle, information element identifiers are ordered in the same order as the information elements in the received message.

NOTE 7: When only the locking shift information element is included and no information element identifier follows, it means that the codeset in the locking shift itself is not implemented.

NOTE 8: The timer number is coded in IA5 characters, e.g., T308 is coded as "3" "0" "8". The following coding is used in each octet:

bit 8: spare "0"

bits 7-1: IA5 character

Octet 5 carries "3", octet 5a carries "0", etc.

NOTE 9: The following coding is used for octet 5:

bit 8 : 1

bits 7-3: 00000

bits 2-1: condition as follows:

00 - unknown

01 – permanent

10 - transient

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.122** **CR 084** ⌘ rev **1** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Clarification on the use of the RAT during background scanning		
Source:	⌘ mmO2		
Work item code:	⌘ TEI6	Date:	⌘ 15/11/2004
Category:	⌘ F	Release:	⌘ Rel-6
	<i>Use <u>one</u> of the following categories:</i> F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		<i>Use <u>one</u> of the following releases:</i> Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)

Reason for change:	⌘ During the background scan the terminal shall identify if the highest priority PLMN/Access technology combination is available. If not available the terminal shall move to the next highest priority PLMN/Access technology combination. Current text is un-clear.
Summary of change:	⌘ It is clarified that during the background scan the terminal checks the availability of the highest PLMN/Access technology combination.
Consequences if not approved:	⌘ If not approved, the current text may result in implementation errors or different terminal implementations. The terminal may always stay on the wrong PLMN.

Clauses affected:	⌘ Clause 4.4.3.3										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">⌘</td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;">⌘</td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;">⌘</td> <td style="text-align: center;">X</td> </tr> </table> Other core specifications Test specifications O&M Specifications	Y	N	⌘	X	⌘	X	⌘	X	⌘	
Y	N										
⌘	X										
⌘	X										
⌘	X										
Other comments:	⌘										

How to create CRs using this form:

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

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

- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

4.4.3.3 In VPLMN

If the MS is in a VPLMN, the MS shall periodically attempt to obtain service on its HPLMN or higher priority PLMN/access technology combination listed in "user controlled PLMN selector" or "operator controlled PLMN selector" by scanning in accordance with the requirements that are applicable to i), ii) and iii) as defined in the Automatic Network Selection Mode in clause 4.4.3.1.1. In the case that the mobile has a stored "Equivalent PLMNs" list the mobile shall only select a PLMN if it is of a higher priority than those of the same country as the current serving PLMN which are stored in the "Equivalent PLMNs" list. For this purpose, a value T minutes may be stored in the SIM, T is either in the range 6 minutes to 8 hours in 6 minute steps or it indicates that no periodic attempts shall be made. If no value is stored in the SIM, a default value of 60 minutes is used.

The attempts to access the HPLMN or higher priority PLMN shall be as specified below:

- a) The periodic attempts shall only be performed in automatic mode when the MS is roaming;
- b) After switch on, a period of at least 2 minutes and at most T minutes shall elapse before the first attempt is made;
- c) The MS shall make an attempt if the MS is on the VPLMN at time T after the last attempt;
- d) Periodic attempts shall only be performed by the MS while in idle mode;
- e) If the HPLMN or higher priority PLMN is not found, the MS shall remain on the VPLMN.
- f) In steps i), ii) and iii) the MS shall limit its attempts to access higher priority PLMN/access technology combinations to PLMN/access technology combinations of the same country as the current serving VPLMN, as defined in Annex B.
- g) Only the priority levels of Equivalent PLMNs of the same country as the current serving VPLMN, as defined in Annex B, shall be taken into account to compare with the priority level of a selected PLMN.
- h) If the PLMN of the highest priority PLMN/access technology combination [available](#) is the current VPLMN, or one of the PLMNs in the "Equivalent PLMNs" list, the MS shall remain on the current PLMN/access technology combination.

CR-Form-v7.1

CHANGE REQUEST

⌘ **24.008 CR 915** ⌘ rev **3** ⌘ Current version: **6.6.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Mobile identity – “No Identity”		
Source:	⌘ Ericsson		
Work item code:	⌘ TEI6	Date:	⌘ 19/11/2004
Category:	⌘ F	Release:	⌘ Rel-6
	<p>Use <u>one</u> of the following categories:</p> <p>F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>		<p>Use <u>one</u> of the following releases:</p> <p>Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)</p>

Reason for change:	⌘ At CN1#34, the CR on 'Identity request for identity that is not available' in N1-041098 was agreed and now, implemented in TS 24.008. This CR introduces the possibility for the MS to indicate the identity type “No identity” to the network when the network request for an identity which is not available in the MS.
	The Mobile Identity Information Element (IE) is a type 4 IE with a maximum length of 11 octets. The octet 3 carries the Type of identity, the odd/even indicator and the Identity digit bits.
	Even though, the CR in N1-041098 introduces the way to code the Type of identity parameter of the Mobile Identity IE, it was not specified which is the length that the Mobile Identity IE has to have and the way to code the Identity digit bits. The MS needs to know this information in order to code the Mobile identity IE when the identity types indicates “No identity”.
Summary of change:	⌘ It is clarified that if the Type of identity indicates "No Identity", the Mobile Identity IE shall have a length of 2 octets and the Identity digit bits shall be coded with all zeroes.
Consequences if not approved:	⌘ Lack of requirement on how the MS has to code the Mobile Identity Information Element (IE) when the identity type indicates “No identity”.

Clauses affected:	⌘ 10.5.1.4
	<input type="checkbox"/> Y <input type="checkbox"/> N

Other specs affected:	⌘	<input checked="" type="checkbox"/>	Other core specifications	⌘	
		<input checked="" type="checkbox"/>	Test specifications		
		<input checked="" type="checkbox"/>	O&M Specifications		
Other comments:	⌘				

How to create CRs using this form:

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Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

1 st Change

10.5.1.4 Mobile Identity

The purpose of the *Mobile Identity* information element is to provide either the international mobile subscriber identity, IMSI, the temporary mobile subscriber identity, TMSI/P-TMSI, the international mobile equipment identity, IMEI or the international mobile equipment identity together with the software version number, IMEISV.

The IMSI shall not exceed 15 digits, the TMSI/P-TMSI is 4 octets long, and the IMEI is composed of 15 digits, the IMEISV is 16 digits (see 3GPP TS 23.003 [10]).

For packet paging the network shall select the mobile identity type with the following priority:

- 1- P-TMSI: The P-TMSI shall be used if it is available.
- 2- IMSI: The IMSI shall be used in cases where no P-TMSI is available.

For all other transactions except emergency call establishment, emergency call re-establishment, mobile terminated call establishment, the identification procedure, the GMM identification procedure, the GMM authentication and ciphering procedure and the ciphering mode setting procedure, the mobile station and the network shall select the mobile identity type with the following priority:

- 1- TMSI: The TMSI shall be used if it is available.
- 2- IMSI: The IMSI shall be used in cases where no TMSI is available.

For mobile terminated call establishment the mobile station shall select the same mobile identity type as received from the network in the PAGING REQUEST message.

For emergency call establishment and re-establishment the mobile station shall select the mobile identity type with the following priority:

- 1- TMSI: The TMSI shall be used if it is available and if the location update status is UPDATED, and the stored LAI is equal to the one received on the BCCH from the current serving cell.
- 2- IMSI: The IMSI shall be used in cases where no TMSI is available or TMSI is available but either the update status is different from UPDATED, or the stored LAI is different from the one received on the BCCH from the current serving cell.
- 3- IMEI: The IMEI shall be used in cases where no SIM/USIM is available or the SIM/USIM is considered as not valid by the mobile station or no IMSI or TMSI is available.

In the identification procedure and in the GMM identification procedure the mobile station shall select the mobile identity type which was requested by the network, if available. If the requested identity is not available, then the mobile station shall indicate the identity type "No Identity".

In the ciphering mode setting procedure and in the GMM authentication and ciphering procedure the mobile shall select the IMEISV.

The *Mobile Identity* information element is coded as shown in figure 10.5.4/3GPP TS 24.008 and table 10.5.4/3GPP TS 24.008.

The *Mobile Identity* is a type 4 information element with a minimum length of 3 octet and 11 octets length maximal. Further restriction on the length may be applied, e.g. number plans.

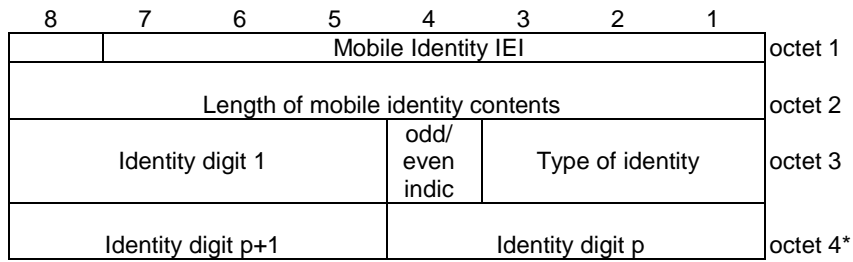


Figure 10.5.4/3GPP TS 24.008 Mobile Identity information element

Table 10.5.4/3GPP TS 24.008: Mobile Identity information element

Type of identity (octet 3)	
Bits	
3 2 1	
0 0 1	IMSI
0 1 0	IMEI
0 1 1	IMEISV
1 0 0	TMSI/P-TMSI
0 0 0	No Identity note 1)
All other values are reserved.	
Odd/even indication (octet 3)	
Bit	
4	
0	even number of identity digits and also when the TMSI/P-TMSI is used
1	odd number of identity digits
Identity digits (octet 3 etc)	
For the IMSI, IMEI and IMEISV this field is coded using BCD coding. If the number of identity digits is even then bits 5 to 8 of the last octet shall be filled with an end mark coded as "1111".	
For Type of identity "No Identity", the Identity digit bits shall be encoded with all 0s and the Length of mobile identity contents parameter shall be set to 1.	
If the mobile identity is the TMSI/P-TMSI then bits 5 to 8 of octet 3 are coded as "1111" and bit 8 of octet4 is the most significant bit and bit 1 of the last octet the least significant bit. The coding of the TMSI/P-TMSI is left open for each administration.	

NOTE 1: This can be used in the case when a fill paging message without any valid identity has to be sent on the paging subchannel and when the requested identity is not available at the mobile station during the identity request procedure.

CHANGE REQUEST

⌘ **24.008 CR 910** ⌘ rev **2** ⌘ Current version: **6.6.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Correction of terminology – GSM and UMTS		
Source:	⌘ Ericsson		
Work item code:	⌘ TEI6	Date:	⌘ 18/11/2004
Category:	⌘ F	Release:	⌘ Rel-6
	<p>Use <u>one</u> of the following categories:</p> <p>F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>		<p>Use <u>one</u> of the following releases:</p> <p>Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)</p>

Reason for change:	⌘ At present, TS 24.008 contains the terms and labels; in GSM, in UMTS, GSM only and UMTS only. However, from the introduction of the GERAN lu mode into 3GPP specifications it has become unclear whether the GSM and UMTS related terms and labels, as used by TS 24.008, refer to (i) either A/Gb mode (ii) or A/Gb mode and GERAN lu mode (iii) or UTRAN lu mode (iv) or GERAN lu mode and UTRAN lu mode (lu mode).
	<p>Additionally, 3GPP specifications such as TS 23.060 and others already have replaced the ambiguous GSM and UMTS related terms and labels by A/Gb mode, lu mode, GERAN lu mode and UTRAN lu mode.</p>
Summary of change:	⌘ The GSM and UMTS related terms and labels are replaced by A/Gb mode, lu mode, GERAN lu mode and UTRAN lu mode.
Consequences if not approved:	⌘ Misalignment among 3GPP specifications on terminology. No correct terms and labels used (e.g. in GSM, in UMTS) when the GERAN lu mode already has been introduced into 3GPP specifications.

Clauses affected:	⌘ 1.7, 1.7.2.1, 1.7.2.2, 2, 2.2.2, 4.1.1.1.1, 4.1.1.1.1a, 4.1.1.3, 4.1.1.4, 4.1.2.3, 4.1.3.1.2.8, 4.1.3.1.3.2, 4.1.3.3.2.2, 4.2.4.2.8, 4.2.5.1.2, 4.3.2a, 4.3.2b, 4.3.2.4, 4.3.2.5, 4.3.2.7, 4.3.2.7a, 4.3.2.8, 4.3.4, 4.4.2, 4.4.3, 4.4.4.1a, 4.4.4.4, 4.5.1.1, 4.5.1.3.1, 4.5.1.3.2, 4.5.1.3.3, 4.5.1.6.1, 4.7.1.2, 4.7.1.4, 4.7.1.4.1, 4.7.1.5.1, 4.7.1.5.2, 4.7.1.6, 4.7.1.6.1, 4.7.1.6.2, 4.7.1.6.3, 4.7.1.6.4, 4.7.1.7, 4.7.2.1.1, 4.7.2.1.2, 4.7.2.2, 4.7.2.3, 4.7.2.4, 4.7.2.5, 4.7.3.1.1, 4.7.3.1.3, 4.7.3.1.5, 4.7.3.2.1, 4.7.3.2.3, 4.7.4, 4.7.4.1.2, 4.7.4.1.3, 4.7.4.1.4, 4.7.5, 4.7.5.1, 4.7.5.1.1,
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4.7.5.1.2, 4.7.5.1.3, 4.7.5.1.5, 4.7.5.2.1, 4.7.5.2.3, 4.7.6.3, 4.7.7a, 4.7.7b, 4.7.7.1, 4.7.7.2, 4.7.7.3, 4.7.7.4, 4.7.7.5, 4.7.7.5.1, 4.7.7.6, 4.7.7.7, 4.7.7.8, 4.7.7.9, 4.7.9.1, 4.7.9.1.1, 4.7.9.1.2, 4.7.9.2, 4.7.13, 5.1.1, 5.1.2.1, 5.1.2.2, 5.2.1, 5.2.1.2, 5.2.1.11, 5.2.2.3.1, 5.2.2.3.2, 5.2.3.2, 5.2.3.3, 5.3.4.3.2, 5.3.5, 5.3.6.1, 6.1.1, 6.1.3.1.1, 6.1.3.2.1, 6.1.3.3.1, 6.1.3.3.2, 6.1.3.4.1, 6.1.3.4.2, 9.2.15.3, 9.3.2.2, 9.4.2.7, 9.4.9, 9.4.14.3, 9.4.15.8, 10.5.1.3, 10.5.3.2, 10.5.3.2.1, 10.5.3.2.2, 10.5.4.4a, 10.5.4.5, 10.5.4.5.1, 10.5.4.17, 10.5.4.32, 10.5.5.1, 10.5.5.2, 10.5.5.6, 10.5.5.7, 10.5.5.17, 10.5.5.18, 10.5.6.6, 10.5.6.14, 11.2.2, Annex G, G.3, Annex H, Annex E, Annex F, G.6, I.1.

Other specs affected:

	Y	N
⌘		X
	X	
	X	

Other core specifications ⌘

Test specifications

O&M Specifications

Other comments: ⌘

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

1.7.1 Voice Group Call Service (VGCS) and Voice Broadcast Service (VBS)

Voice Group Call Service and Voice Broadcast Service are applicable in [A/Gb mode](#)~~GSM~~ only.

For mobile stations supporting the Voice Group Call Service or the Voice Broadcast Service, it is explicitly mentioned throughout the present document if a certain procedure is applicable only for such a service and, if necessary, how mobile stations not supporting such a service shall behave.

For VGCS and VBS, the following possible mobile station implementations exist:

- support of listening to voice broadcast calls (VBS listening);
- support of originating a voice broadcast call (VBS originating);
- support of listening to voice group calls (VGCS listening);
- support of talking in voice group calls (VGCS talking. This always includes the implementation for VGCS listening);
- support of originating a voice group call (VGCS originating. This always includes the implementation for VGCS talking).

Apart from the explicitly mentioned combinations, all possible combinations are optional and supported by the present document.

The related terms are used in the present document, if information on these implementation options is required.

1.7.2 General Packet Radio Service (GPRS)

1.7.2.1 Packet services in GSM ([A/Gb mode](#)~~GSM~~ only)

For mobile stations supporting the General Packet Radio Service (GPRS), it is explicitly mentioned throughout the technical specification if a certain procedure is applicable only for such a service and, if necessary, how mobile stations not supporting such a service shall behave.

A GPRS MS may operate in one of the following MS operation modes, see 3GPP TS 23.060 [74]:

- MS operation mode A;
- MS operation mode B; or
- MS operation mode C.

The MS operation mode depends on the services that the MS is attached to, i.e., only GPRS or both GPRS and non-GPRS services, and upon the MS's capabilities to operate GPRS and other GSM services simultaneously. Mobile stations that are capable to operate GPRS services are referred to as GPRS MSs.

NOTE: Other GSM technical specifications may refer to the MS operation modes A, B, and C as GPRS class-A MS, GPRS class-B MS, and GPRS class-C MS.

It should be noted that it is possible that for a GPRS MS, the GMM procedures currently described in the ETS do not support combinations of VGCS, VBS and GPRS. The possible interactions are not studied yet.

1.7.2.2 Packet services in [lu mode](#)~~UMTS~~ ([lu mode](#)~~UMTS~~ only)

An MS attached to packet switched domain may operate in one of the following MS operation modes, see 23.060 [74]:

- PS/CS mode of operation; or

- PS mode of operation.

The terms 'PS/CS mode of operation' and 'PS mode of operation' are not used in the present document with some exceptions. Instead the terms 'MS operation mode A' and 'MS operation mode C' are used.

In network operation mode I and II (see 3GPP TS 23.060 [74]), an MS in PS/CS mode of operation shall use the same procedures as for a GPRS MS operating in MS operation mode A, unless it is explicitly stated for [A/Gb mode GSM](#) only or [Iu mode UMTS](#) only.

In network operation mode I and II, an MS in PS mode of operation shall use the same procedures as for a GPRS MS operating in MS operation mode C, unless it is explicitly stated for [A/Gb mode GSM](#) only or [Iu mode UMTS](#) only.

NOTE: Network operation mode III is not applicable for [Iu mode UMTS](#), see 3GPP TS 23.060 [74].

Next Change

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] Void.
- [2] Void.
- [2a] 3GPP TR 21.905 "Vocabulary for 3GPP Specifications"
- [3] 3GPP TS 22.002: "Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)".
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- [5] 3GPP TS 42.009: "Security aspects".
- [5a] 3GPP TS 33.102: "3G security; Security architecture".
- [6] 3GPP TS 22.011: "Service accessibility".
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- [9a] 3GPP TS 23.108: "Mobile radio interface layer 3 specification core network protocols; Stage 2 (structured procedures)".
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- [12] 3GPP TS 23.014: "Support of Dual Tone Multi-Frequency (DTMF) signalling".
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- [13] 3GPP TS 43.020: "Security-related network functions".
- [14] 3GPP TS 23.122: "Non-Access-Stratum functions related to Mobile Station (MS) in idle mode".
- [15] 3GPP TS 24.002: "GSM-UMTS Public Land Mobile Network (PLMN) access reference configuration".
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- [17] 3GPP TS 44.004: "Layer 1; General requirements".
- [18] 3GPP TS 44.005: "Data Link (DL) layer; General aspects".
- [19] 3GPP TS 44.006: "Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) layer specification".
- [19a] 3GPP TS 25.321: "Medium Access Control (MAC) protocol specification".
- [19b] 3GPP TS 25.322: "Radio Link Control (RLC) protocol specification".
- [19c] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".
- [20] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".
- [21] 3GPP TS 24.010: "Mobile radio interface layer 3; Supplementary services specification; General aspects".
- [22] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".
- [23] 3GPP TS 24.012: "Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".
- [23a] 3GPP TS 44.071: "Location Services (LCS); Mobile radio interface layer 3 specification."
- [23b] 3GPP TS 44.031 "Location Services LCS); Mobile Station (MS) - Serving Mobile Location Centre (SMLC); Radio Resource LCS Protocol (RRLP)".
- [23c] 3GPP TS 25.331: "Radio Resource Control (RRC) protocol specification"
- [24] 3GPP TS 24.080: "Mobile radio Layer 3 supplementary service specification; Formats and coding".
- [25] 3GPP TS 24.081: "Line identification supplementary services; Stage 3".
- [26] 3GPP TS 24.082: "Call Forwarding (CF) supplementary services; Stage 3".
- [27] 3GPP TS 24.083: "Call Waiting (CW) and Call Hold (HOLD) supplementary services; Stage 3".
- [28] 3GPP TS 24.084: "MultiParty (MPTY) supplementary services; Stage 3".
- [29] 3GPP TS 24.085: "Closed User Group (CUG) supplementary services; Stage 3".
- [30] 3GPP TS 24.086: "Advice of Charge (AoC) supplementary services; Stage 3".
- [31] 3GPP TS 24.088: "Call Barring (CB) supplementary services; Stage 3".
- [32] 3GPP TS 45.002: "Multiplexing and multiple access on the radio path".
- [33] 3GPP TS 45.005: "Radio transmission and reception".

- [34] 3GPP TS 45.008: "Radio subsystem link control".
- [35] 3GPP TS 45.010: "Radio subsystem synchronization".
- [36] 3GPP TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".
- [36a] 3GPP TS 27.060: "Mobile Station (MS) supporting Packet Switched Services".
- [37] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [38] 3GPP TS 29.007: "General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".
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- [44] ITU-T Recommendation E.163: "Numbering plan for the international telephone service".
- [45] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".
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- [52] ITU-T Recommendation T.50: "International Reference Alphabet (IRA) (Formerly International Alphabet No. 5 or IA5) - Information technology - 7-bit coded character set for information interchange".
- [53] ITU Recommendation Q.931: ISDN user-network interface layer 3 specification for basic control".
- [54] ITU-T Recommendation V.21: "300 bits per second duplex modem standardized for use in the general switched telephone network".
- [55] ITU-T Recommendation V.22: "1200 bits per second duplex modem standardized for use in the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".
- [56] ITU-T Recommendation V.22bis: "2400 bits per second duplex modem using the frequency division technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".
- [57] Void.
- [58] ITU-T Recommendation V.26ter: "2400 bits per second duplex modem using the echo cancellation technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

- [59] ITU-T Recommendation V.32: "A family of 2-wire, duplex modems operating at data signalling rates of up to 9600 bit/s for use on the general switched telephone network and on leased telephone-type circuits".
- [60] ITU-T Recommendation V.110: "Support by an ISDN of data terminal equipments with V-Series type interfaces".
- [61] ITU-T Recommendation V.120: "Support by an ISDN of data terminal equipment with V-Series type interfaces with provision for statistical multiplexing".
- [62] ITU-T Recommendation X.21: "Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for synchronous operation on public data networks".
- [63] Void.
- [64] Void.
- [65] ITU-T Recommendation X.30: "Support of X.21, X.21 bis and X.20 bis based Data Terminal Equipments (DTEs) by an Integrated Services Digital Network (ISDN)".
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- [71] ETSI ETS 300 102-2: "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control; Specification Description Language (SDL) diagrams".
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- [75] 3GPP TS 43.064: "General Packet Radio Service (GPRS); Overall description of the GPRS radio interface; Stage 2".
- [76] 3GPP TS 44.060: "General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol".
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- [78] 3GPP TS 44.065: "Mobile Station (MS) - Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDCCP)".
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- [79] ITU Recommendation I.460: "Multiplexing, rate adaption and support of existing interfaces".
- [80] 3GPP TS 26.111: "Codec for Circuit Switched Multimedia Telephony Service; Modifications to H.324".
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- [85] 3GPP TS 48.008: "Mobile-services Switching Centre – Base Station System (MSC – BSS) interface; layer 3 specification".
- [86] 3GPP TS 48.018: "General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".
- [87] 3GPP TS 43.055: "Dual Transfer Mode (DTM); Stage 2".
- [88] 3GPP TS 23.067: "enhanced Multi-Level Precedence and Pre-emption service (eMLPP); Stage 2".
- [88a] 3GPP TS 23.093: "Technical realization of Completion of Calls to Busy Subscriber (CCBS); Stage 2".
- [89] 3GPP TS 22.042: "Network Identity and Time Zone (NITZ), Stage 1".
- [90] 3GPP TS 23.040: "Technical realization of Short Message Service (SMS)".
- [91] 3GPP TS 44.056: "GSM Cordless Telephony System (CTS), (Phase 1) CTS Radio Interface Layer 3 Specification".
- [92] 3GPP TS 23.226: "Global Text Telephony; Stage 2 "
- [93] 3GPP TS 26.226: "Cellular Text Telephone Modem (CTM), General Description "
- [94] 3GPP TS 23.236: "Intra Domain Connection of RAN Nodes to Multiple CN Nodes"
- [95] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP"
- [96] 3GPP TS 23.205: "Bearer-independent circuit-switched core network; Stage 2".
- [97] 3GPP TS 23.172: "UDI/RDI Fallback and Service Modification; Stage 2".
- [98] 3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode"
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- [100] 3GPP TS 29.207: "Policy control over Gs interface".
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- [110] [3GPP TS 44.118: "Radio Resource Control \(RRC\) protocol; Iu mode"](#).

2.2.2 Vocabulary

For the purposes of the present document, the following terms and definitions apply:

- A **GSM security context** is established and stored in the MS and the network as a result of a successful execution of a GSM authentication challenge. The GSM security context consists of the GSM ciphering key and the ciphering key sequence number.
- A **UMTS security context** is established and stored in the MS and the network as a result of a successful execution of a UMTS authentication challenge. The UMTS security context consists of the UMTS ciphering key, the UMTS integrity key, the GSM ciphering key and the cipher key sequence number.
- **idle mode:** In this mode, the mobile station is not allocated any dedicated channel; it listens to the CCCH and the BCCH;
- **group receive mode:** (only applicable for mobile stations supporting VGCS listening or VBS listening) In this mode, the mobile station is not allocated a dedicated channel with the network; it listens to the downlink of a voice broadcast channel or voice group call channel allocated to the cell. Occasionally, the mobile station has to listen to the BCCH of the serving cell as defined in 3GPP TS 43.022 [82] and 3GPP TS 45.008 [34];
- **dedicated mode:** In this mode, the mobile station is allocated at least two dedicated channels, only one of them being a SACCH;
- **group transmit mode:** (only applicable for mobile stations supporting VGCS talking) In this mode, one mobile station of a voice group call is allocated two dedicated channels, one of them being a SACCH. These channels can be allocated to one mobile station at a time but to different mobile stations during the voice group call;
- **packet idle mode:** (only applicable for mobile stations supporting GPRS) In this mode, mobile station is not allocated any radio resource on a packet data physical channel; it listens to the PBCCH and PCCCH or, if those are not provided by the network, to the BCCH and the CCCH, see 3GPP TS 44.060 [76].
- **packet transfer mode:** (only applicable for mobile stations supporting GPRS) In this mode, the mobile station is allocated radio resource on one or more packet data physical channels for the transfer of LLC PDUs.
- **main DCCH:** In Dedicated mode and group transmit mode, only two channels are used as DCCH, one being a SACCH, the other being a SDCCH or a FACCH; the SDCCH or FACCH is called here "the main DCCH";
- A channel is **activated** if it can be used for transmission, in particular for signalling, at least with UI frames. On the SACCH, whenever activated, it must be ensured that a contiguous stream of layer 2 frames is sent;
- A TCH is **connected** if circuit mode user data can be transferred. A TCH cannot be connected if it is not activated. A TCH which is activated but not connected is used only for signalling, i.e. as a DCCH;
- The data link of SAPI 0 on the main DCCH is called the **main signalling link**. Any message specified to be sent on the main signalling link is sent in acknowledged mode except when otherwise specified;
- The term "**to establish**" a link is a short form for "**to establish the multiframe mode**" on that data link. It is possible to send UI frames on a data link even if it is not established as soon as the corresponding channel is activated. Except when otherwise indicated, a data link layer establishment is done without an information field.
- "**channel set**" is used to identify TCHs that carry related user information flows, e.g., in a multislot configuration used to support circuit switched connection(s), which therefore need to be handled together.
- A **temporary block flow** (TBF) is a physical connection used by the two RR peer entities to support the uni-directional transfer of LLC PDUs on packet data physical channels, see 3GPP TS 44.060 [76].
- **RLC/MAC block:** A RLC/MAC block is the protocol data unit exchanged between RLC/MAC entities, see 3GPP TS 44.060 [76].
- A **GMM context** is established when a GPRS attach procedure is successfully completed.
- **Network operation mode**

The three different network operation modes I, II, and III are defined in 3GPP TS 23.060 [74].

The network operation mode shall be indicated as system information. For proper operation, the network operation mode should be the same in each cell of one routing area.

- **GPRS MS operation mode**

The three different GPRS MS operation modes A, B, and C are defined in 3GPP TS 23.060 [74].

- **RR connection:** A RR connection is a dedicated physical circuit switched domain connection used by the two RR or RRC peer entities to support the upper layers' exchange of information flows.
- **PS signalling connection** is a peer to peer Iu mode ~~UMTS~~ connection between MS and CN packet domain node.
- **Inter-System change** is a change of an MS from A/Gb mode to Iu mode of operation or vice versa, ~~radio access between different radio access technologies such as GSM and UMTS.~~
- **GPRS:** Packet Services for systems which operate the Gb ~~GSM~~ or Iu-PS interfaces. ~~UMTS system.~~
- The label (**A/Gb mode** ~~GSM only~~) indicates this section or paragraph applies only to a system which operates in A/Gb mode ~~GSM system~~, i.e. with a functional division that is in accordance with the use of an A or a Gb interface between the radio access network and the core network. For multi system case this is determined by the current serving radio access network.
- The label (**Iu mode** ~~UMTS only~~) indicates this section or paragraph applies only to a system which operates in Iu mode. The Iu mode includes UTRAN and GERAN Iu modes ~~UMTS system~~, i.e. with a functional division that is in accordance with the use of an Iu-CS or Iu-PS interface between the radio access network and the core network. For multi system case this is determined by the current serving radio access network.
- The label (A/Gb mode and GERAN Iu mode only) indicates this section or paragraph applies only to a system which operates in A/Gb mode or GERAN Iu mode. For multi system case this is determined by the current serving radio access network.
- **In A/Gb mode** ~~GSM~~,... Indicates this paragraph applies only to a system which operates in A/Gb mode ~~GSM System~~. For multi system case this is determined by the current serving radio access network.
- **In Iu mode** ~~UMTS~~,... Indicates this paragraph applies only to a system which operates in Iu mode. The Iu mode includes both UTRAN Iu mode and GERAN Iu mode ~~UMTS System~~. For multi system case this is determined by the current serving radio access network.
- In A/Gb mode and GERAN Iu mode,... Indicates this paragraph applies only to a system which operates in A/Gb mode or GERAN Iu mode. For multi system case this is determined by the current serving radio access network.
- In UTRAN Iu mode,... Indicates this paragraph applies only to a system which operates in UTRAN Iu mode. For multi system case this is determined by the current serving radio access network.
- **SIM**, Subscriber Identity Module (see 3GPP TS 42.017 [7]).
- **USIM**, Universal Subscriber Identity Module (see 3GPP TS 21.111 [101]).
- **MS**, Mobile Station. The present document makes no distinction between MS and UE.
- **Cell Notification** is an (optimised) variant of the Cell Update Procedure which uses the LLC NULL frame for cell change notification which does not trigger the restart of the READY timer
- **DTM:** dual transfer mode, see 3GPP TS 44.018 [84] and 3GPP TS 43.055 [87]

Next Change

4.1.1.1.1 Integrity Checking of Signalling Messages in the Mobile Station (~~UMTS~~ [lu mode](#) only)

In [lu mode](#)~~UMTS~~ only, integrity protected signalling is mandatory with one exception regarding emergency calls (see subclause 4.1.1.1.1a). In ~~UMTS~~ [lu mode](#) only, all layer 3 protocols shall use integrity protected signalling once the security mode procedure has been successfully activated in the network and the MS. Integrity protection of all layer 3 signalling messages is the responsibility of lower layers. It is the network which activates integrity protection. This is done using the security mode control procedure (3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)).

The supervision that integrity protection is activated shall be the responsibility of the MM and GMM layer in the MS (see 3GPP TS 33.102 [5a]). In order to do this, the lower layers shall provide the MM and GMM layer with an indication on when the integrity protection is activated in the MS (i.e. one indication to the MM layer when a security mode control procedure for the CS domain is processed successfully and one indication to the GMM layer when a security mode control procedure for the PS domain is processed successfully).

The CS and PS domains in the network and the MM and GMM layers in the MS, are not aware of whether integrity protection has been started in the lower layers by the other domain. It is mandatory for the network to initiate one security mode control procedure for the CS domain and one for the PS domain.

Except the messages listed below, no layer 3 signalling messages shall be processed by the receiving MM and GMM entities or forwarded to the CM entities, unless the security mode control procedure is activated for that domain.

- MM messages:
 - AUTHENTICATION REQUEST
 - AUTHENTICATION REJECT
 - IDENTITY REQUEST
 - LOCATION UPDATING ACCEPT (at periodic location update with no change of location area or temporary identity)
 - LOCATION UPDATING REJECT
 - CM SERVICE ACCEPT, if the following two conditions apply:
 - no other MM connection is established; and
 - the CM SERVICE ACCEPT is the response to a CM SERVICE REQUEST with CM SERVICE TYPE IE set to 'emergency call establishment'
 - CM SERVICE REJECT
 - ABORT
- GMM messages:
 - AUTHENTICATION & CIPHERING REQUEST
 - AUTHENTICATION & CIPHERING REJECT
 - IDENTITY REQUEST
 - ATTACH REJECT
 - ROUTING AREA UPDATE ACCEPT (at periodic routing area update with no change of routing area or temporary identity)
 - ROUTING AREA UPDATE REJECT
 - SERVICE REJECT

- DETACH ACCEPT (for non power-off)

CC messages:

- all CC messages, if the following two conditions apply:
 - no other MM connection is established; and
 - the MM entity in the MS has received a CM SERVICE ACCEPT message with no ciphering or integrity protection applied as response to a CM SERVICE REQUEST message, with CM SERVICE TYPE set to 'Emergency call establishment' sent to the network.

The receiving layer 3 entity in the MS shall not process any other layer 3 signalling messages unless they have been successfully integrity checked by the lower layers once integrity protection is activated. If any signalling messages, having not successfully passed the integrity check, are received, then the lower layers in the MS shall discard that message (see 3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)). If any layer 3 signalling message is received, in either PS or CS domains, as not integrity protected even though the integrity protection has been activated in the MS by that domain in the network, then the lower layers shall discard this message (see 3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)).

Integrity checking on the network side is performed by the RNC and is described in 3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#).

4.1.1.1.1a Integrity protection for emergency call (~~UMTS-lu mode~~ only)

The network should initiate the security mode procedure for an emergency call, in the same way as it would for any other call except in the cases defined in sub-clause "Security Procedures Not Applied" in 3GPP TS 33.102 [5a].

For the establishment of a MM connection for an emergency call when no other MM connection is established (e.g. for an emergency call initiated without a SIM/USIM no other MM connections can exist) the decision on whether or not to apply the security procedures shall be made by the network as defined in the sub-clause "Emergency Call Handling" in 3GPP TS 33.102 [5a].

4.1.1.2 MM-GMM co-ordination for GPRS MS's

4.1.1.2.1 GPRS MS operating in mode A or B in a network that operates in mode I

If the network operates in mode I, GPRS MSs that operate in mode A or B and wish to be or are simultaneously IMSI attached for GPRS and non-GPRS services, shall use the combined GPRS attach and the combined and periodic routing area updating procedures instead of the corresponding MM specific procedures IMSI attach and normal and periodic location area updating.

NOTE: A GPRS MS operating in mode A or B in a network that operates in mode I, shall perform the combined GPRS attach or routing area update procedure regardless the value of the ATT flag.

If a GPRS MS is operating in mode A or B in a network that operates in mode I the IMSI detach shall be performed by the GMM using the combined GPRS detach procedure.

NOTE: A GPRS MS operating in mode A or B in a network that operates in mode I, shall perform the combined GPRS detach procedure regardless the value of the ATT flag.

A GPRS MS operating in mode A or B in network that operates in mode I, shall use the combined GMM specific procedures in place of the MM specific procedures unless the re-activation of the MM specific procedures is explicitly described, so all conditions describing when to trigger a MM specific procedure listed in subclauses 4.3 and 4.4 shall not apply.

A GPRS MS operating in mode A or B in a network that operates in mode I should not use any MM timers relating to MM specific procedures, (e.g T3210, T3211, T3212, T3213) unless the re-activation of the MM specific procedures is explicitly described. If the MM timers are already running, the MS should not react on the expiration of the timers.

NOTE: Whenever GMM performs a combined GMM procedure, a GPRS MS enters the MM state MM LOCATION UPDATING PENDING in order to prevent the MM to perform a location update procedure.

If the authentication procedure is performed by MM and the authentication is rejected by the network (i.e upon receive of AUTHENTICATION REJECT), the MS shall in addition set the GPRS update status to GU3 ROAMING NOT ALLOWED and shall, if available, delete the P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number stored. The SIM/USIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM/USIM is removed. The MS shall abort any GMM procedure and shall enter state GMM-DEREGISTERED.

4.1.1.2.2 GPRS MS operating in mode A or B in a network that operates in mode II or III

If the network operates in mode II or III, a GPRS MSs that operate in mode A or B and wish to be or are simultaneously IMSI attached for GPRS and non-GPRS services, shall use the MM specific procedures listed in subclauses 4.3 and 4.4 and the GMM specific procedures listed in subclauses 4.7.3, 4.7.4 and 4.7.5. The applicability of periodic location updating is further specified in subclause 4.4.2 and the periodic routing area updating is specified in subclause 4.7.2.2.

If the authentication procedure is performed by MM and the authentication is rejected by the network (i.e upon receive of AUTHENTICATION REJECT), the MS shall in addition set the GPRS update status to GU3 ROAMING NOT ALLOWED and shall, if available, delete the P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number stored. The SIM/USIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM/USIM is removed. The MS shall abort any GMM procedure and shall enter state GMM-DEREGISTERED.

4.1.1.3 Core Network System Information for MM (~~UMTS~~ [lu mode](#) only)

In the network broadcast system information some of the system information is used by MM.

At reception of new system information, the RRC layer in the MS delivers the contents of the CN common system information and the CS domain specific system information to the MM layer in the MS.

The Core Network system information is included in specific information elements within some RRC messages sent to MS; (see 3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)). In the Core Network system information the Common system information part and the CS domain specific system information part contains settings of parameters controlling MM functionality. No MM messages contain the Core Network System Information.

4.1.1.4 Core Network System Information for GMM (~~UMTS~~ [lu mode](#) only)

In the network broadcast system information some of the system information is used by GMM.

At reception of new system information, the RRC layer in the MS delivers the contents of the CN common system information and the PS domain specific system information to the GMM layer in the MS.

The Core Network system information is included in specific information elements within some RRC messages sent to MS; (see 3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)). In the Core Network system information the Common system information part and the PS domain specific system information part contains settings of parameters controlling GMM functionality. No GMM messages contain the Core Network System Information.

Next Change

4.1.2.3 MM sublayer states on the network side

1. IDLE

The MM sublayer is not active except possibly when the RR sublayer is in Group Receive mode.

2. WAIT FOR RR CONNECTION

The MM sublayer has received a request for MM connection establishment from the CM layer. A RR connection to the mobile station is requested from the RR sublayer (i.e. paging is performed).

3. MM CONNECTION ACTIVE

The MM sublayer has a RR connection to a mobile station. One or more MM connections are active, or no MM connection is active but an RRLP procedure or LCS procedure over RRC is ongoing.

4. IDENTIFICATION INITIATED

The identification procedure has been started by the network. The timer T3270 is running.

5. AUTHENTICATION INITIATED

The authentication procedure has been started by the network. The timer T3260 is running.

6. TMSI REALLOCATION INITIATED

The TMSI reallocation procedure has been started by the network. The timer T3250 is running.

7. SECURITY MODE INITIATED

In [Iu mode](#) **UMTS**, the security mode setting procedure has been requested to the RR sublayer. In [A/Gb mode](#) **GSM**, the cipher mode setting procedure has been requested to the RR sublayer.

8a. WAIT FOR MOBILE ORIGINATED MM CONNECTION

A CM SERVICE REQUEST message is received and processed, and the MM sublayer awaits the "opening message" of the MM connection.

8b. WAIT FOR NETWORK ORIGINATED MM CONNECTION

A CM SERVICE PROMPT message has been sent by the network and the MM sublayer awaits the "opening message" of the MM connection \$(CCBS)\$.

9. WAIT FOR REESTABLISHMENT

The RR connection to a mobile station with one or more active MM connection has been lost. The network awaits a possible re-establishment request from the mobile station.

10. WAIT OF A GROUP CALL

Only applicable in case for mobile station supporting VGCS talking. The MM sublayer has received a request for establishing a VGCS from the GCC sublayer. The request for establishing a VGCS channels is given to the RR sublayer.

11. GROUP CALL ACTIVE

Only applicable in case of mobile station supporting VGCS talking. A VGCS channel is established by the RR sublayer. An RR connection to the talking mobile station can be established by the RR sublayer on the VGCS channel. The MM sublayer is active but no sending of MM message between the network and the mobile station has occurred.

12. MM CONNECTION ACTIVE (GROUP CALL)

Only applicable in case of mobile station supporting VGCS talking. The MM sublayer has a RR connection to the talking mobile station on the VGCS channel. Only one MM connection is active.

13. WAIT FOR BROADCAST CALL

Only applicable in case of VBS. The MM sublayer has received a request for a VBS establishment from the BCC sublayer. The request for establishment of VBS channels is given to the RR sublayer.

14. BROADCAST CALL ACTIVE

Only applicable in case of VBS. A VBS channel is established by the RR sublayer. The MM sublayer is active but no explicit MM establishment between the Network and the mobile station has occurred.

Next Change

4.1.3.1.2.8 GMM-DEREGISTERED.SUSPENDED ([A/Gb mode](#)GSM only)

The MS shall enter this substate when entering dedicated mode and the MS limitations make it unable to communicate on GPRS channels. The MS shall leave this substate when leaving dedicated mode.

4.1.3.1.3 Substates of state GMM-REGISTERED

The state GMM-REGISTERED is subdivided into several substate as explained below. The substates pertain to the whole MS (ME alone if no SIM/USIM is inserted, or ME plus SIM/USIM).

4.1.3.1.3.1 GMM-REGISTERED.NORMAL-SERVICE

User data and signalling information may be sent and received.

4.1.3.1.3.2 GMM-REGISTERED.SUSPENDED ([A/Gb mode](#)GSM only)

The MS shall enter this substate when entering dedicated mode and when the MS limitations makes it unable to communicate on GPRS channels. In this substate, no user data should be sent and no signalling information shall be sent. The MS shall leave this substate when leaving dedicated mode.

Next Change

4.1.3.3.2.2 GMM-REGISTERED.SUSPENDED ([A/Gb mode](#)GSM only)

In this substate, the lower layers shall be prevented of sending user data or signalling information.

Next Change

4.2.4.2.8 Substate, SUSPENDED ([A/Gb mode](#)GSM only)

The MS:

- shall not send any user data; and
- shall not send any signalling information.

Next Change

4.2.5.1.2 Substate, SUSPENDED ([A/Gb mode](#)GSM only)

The MS:

- shall not send any user data;
- shall not send any signalling information; and
- shall not perform cell-updates.

4.3.2 Authentication procedure

4.3.2a Authentication procedure used for a UMTS authentication challenge

The purpose of the authentication procedure is fourfold (see 3GPP TS 33.102 [5a]):

- First to permit the network to check whether the identity provided by the mobile station is acceptable or not;
- Second to provide parameters enabling the mobile station to calculate a new UMTS ciphering key;
- Third to provide parameters enabling the mobile station to calculate a new UMTS integrity key;
- Fourth to permit the mobile station to authenticate the network.

The cases where the authentication procedure should be used are defined in 3GPP TS 33.102 [5a].

The UMTS authentication procedure is always initiated and controlled by the network. However, there is the possibility for the MS to reject the UMTS authentication challenge sent by the network.

The MS shall support the UMTS authentication challenge, if a USIM is inserted.

A UMTS security context is established in the MS and the network when a UMTS authentication challenge is performed in [A/Gb mode](#)~~GSM~~ or in [Iu mode](#)~~UMTS~~. After a successful UMTS authentication, the UMTS ciphering key, the UMTS integrity key, the GSM ciphering key and the ciphering key sequence number, are stored both in the network and the MS.

4.3.2b Authentication Procedure used for a GSM authentication challenge

The purpose of the authentication procedure is twofold (see 3GPP TS 43.020 [13]):

- First to permit the network to check whether the identity provided by the mobile station is acceptable or not;
- Second to provide parameters enabling the mobile station to calculate a new GSM ciphering key.

The cases where the authentication procedure should be used are defined in 3GPP TS 42.009 [5].

The authentication procedure is always initiated and controlled by the network. GSM authentication challenge shall be supported by a ME supporting [GERAN](#)~~GSM~~ or [UTRAN](#)~~UMTS radio access~~.

A GSM security context is established in the MS and the network when a GSM authentication challenge is performed in [A/Gb mode](#)~~GSM~~ or in [Iu mode](#)~~UMTS~~. However, in [Iu mode](#)~~UMTS~~ the MS shall not accept a GSM authentication challenge, if a USIM is inserted. After a successful GSM authentication, the GSM ciphering key and the ciphering key sequence number, are stored both in the network and the MS.

4.3.2.1 Authentication request by the network

The network initiates the authentication procedure by transferring an AUTHENTICATION REQUEST message across the radio interface and starts the timer T3260. The AUTHENTICATION REQUEST message contains the parameters necessary to calculate the response parameters (see 3GPP TS 43.020 [13] (in case of GSM authentication challenge) and 3GPP TS 33.102 [5a] (in case of an UMTS authentication challenge)). In a GSM authentication challenge, the AUTHENTICATION REQUEST message also contains the GSM ciphering key sequence number allocated to the key which may be computed from the given parameters. In a UMTS authentication challenge, the AUTHENTICATION REQUEST message also contains the ciphering key sequence number allocated to the key set of UMTS ciphering key, UMTS integrity key and GSM ciphering key which may be computed from the given parameters.

4.3.2.2 Authentication response by the mobile station

The mobile station shall be ready to respond upon an AUTHENTICATION REQUEST message at any time whilst a RR connection exists. With exception of the cases described in subclause 4.3.2.5.1, it shall process the challenge information and send back an AUTHENTICATION RESPONSE message to the network.

If a SIM is inserted in the MS, the MS shall ignore the Authentication Parameter AUTN IE if included in the AUTHENTICATION REQUEST message and shall proceed as in case of a GSM authentication challenge. It shall not perform the authentication of the network described in subclause 4.3.2.5.1.

In a GSM authentication challenge, the new GSM ciphering key calculated from the challenge information shall overwrite the previous GSM ciphering key and any previously stored UMTS ciphering key and UMTS integrity key shall be deleted. The new GSM ciphering key shall be stored on the SIM/USIM together with the ciphering key sequence number.

In a UMTS authentication challenge, the new UMTS ciphering key, the new GSM ciphering key and the new UMTS integrity key calculated from the challenge information shall overwrite the previous UMTS ciphering key, GSM ciphering key and UMTS integrity key. The new UMTS ciphering key, GSM ciphering key and UMTS integrity key are stored on the USIM together with the ciphering key sequence number.

The SIM/USIM will provide the mobile station with the authentication response, based upon the authentication challenge given from the ME. A UMTS authentication challenge will result in the USIM passing a RES to the ME. A GSM authentication challenge will result in the SIM/USIM passing a SRES to the ME.

A ME supporting UMTS authentication challenge may support the following procedure:

In order to avoid a synchronisation failure, if the same RAND is received twice, the mobile station shall store the received RAND together with the RES returned from the USIM in the volatile memory and compare it with any subsequently received RAND values, until the RAND value stored in the mobile station is deleted. If the stored RAND value is equal to the new received value in the AUTHENTICATION REQUEST message, then the mobile station shall not pass the RAND to the USIM, but shall immediately send the AUTHENTICATION RESPONSE message with the stored RES. If there is no valid stored RAND in the mobile station or the stored RAND is different from the new received value in the AUTHENTICATION REQUEST message, the mobile station shall pass the RAND to the USIM, shall override any previously stored RAND and RES with the new ones and start, or reset and restart timer T3218.

The RAND and RES values stored in the mobile station shall be deleted and timer T3218, if running, shall be stopped:

- upon receipt of a SECURITY MODE COMMAND (Iu mode only),
CIPHERING MODE COMMAND (A/Gb mode only),
CM_SERVICE_ACCEPT,
CM_SERVICE_REJECT,
LOCATION_UPDATING_ACCEPT
or AUTHENTICATION REJECT message;
- upon expiry of timer T3218; or
- if the mobile station enters the MM state MM IDLE or NULL.

4.3.2.3 Authentication processing in the network

Upon receipt of the AUTHENTICATION RESPONSE message, the network stops the timer T3260 and checks the validity of the response (see 3GPP TS 43.020 [13] in case of a GSM authentication challenge respective 3GPP TS 33.102 [5a] in case of an UMTS authentication challenge).

Upon receipt of the AUTHENTICATION FAILURE message, the network stops the timer T3260. In Synch failure case, the core network may renegotiate with the HLR/AuC and provide the MS with new authentication parameters.

4.3.2.4 Ciphering key sequence number

The security parameters for authentication and ciphering are tied together in sets. In a GSM authentication challenge, from a challenge parameter RAND both the authentication response parameter SRES and the GSM ciphering key can be computed given the secret key associated to the IMSI. In a UMTS authentication challenge, from a challenge parameter RAND, the authentication response parameter RES and the UMTS ciphering key and the UMTS integrity

key can be computed given the secret key associated to the IMSI. In addition, a GSM ciphering key can be computed from the UMTS ciphering key and the UMTS integrity key by means of an unkeyed conversion function.

In order to allow start of ciphering on a RR connection without authentication, the ciphering key sequence numbers are introduced. The ciphering key sequence number is managed by the network in the way that the AUTHENTICATION REQUEST message contains the ciphering key sequence number allocated to the GSM ciphering key (in case of a GSM authentication challenge) or the UMTS ciphering key and the UMTS integrity key (in case of a UMTS authentication challenge) which may be computed from the RAND parameter carried in that message.

The mobile station stores the ciphering key sequence number with the GSM ciphering key (in case of a GSM authentication challenge) and the UMTS ciphering key and the UMTS integrity key (in case of a UMTS authentication challenge) and indicates to the network in the first message (LOCATION UPDATING REQUEST, CM SERVICE REQUEST, PAGING RESPONSE, CM RE-ESTABLISHMENT REQUEST) which ciphering key sequence number the stored GSM ciphering key (in case of a GSM authentication challenge) or set of UMTS ciphering, UMTS integrity and derived GSM ciphering keys (in case of a UMTS authentication challenge) has.

When the deletion of the ciphering key sequence number is described this also means that the associated GSM ciphering key, the UMTS ciphering key and the UMTS integrity key shall be considered as invalid (i.e. the established GSM security context or the UMTS security context is no longer valid).

In [A/Gb mode GSM](#), the network may choose to start ciphering with the stored GSM ciphering key (under the restrictions given in 3GPP TS 42.009 [5]) if the stored ciphering key sequence number and the one given from the mobile station are equal.

In [Iu mode UMTS](#), the network may choose to start ciphering and integrity with the stored UMTS ciphering key and UMTS integrity key (under the restrictions given in 3GPP TS 42.009 [5] and 3GPP TS 33.102 [5a]) if the stored ciphering key sequence number and the one given from the mobile station are equal.

NOTE: In some specifications the term KSI (Key Set Identifier) might be used instead of the term ciphering key sequence number.

4.3.2.5 Authentication not accepted by the network

If authentication fails, i.e. if the response is not valid, the network may distinguish between the two different ways of identification used by the mobile station:

- the TMSI was used;
- the IMSI was used.

If the TMSI has been used, the network may decide to initiate the identification procedure. If the IMSI given by the mobile station then differs from the one the network had associated with the TMSI, the authentication should be restarted with the correct parameters. If the IMSI provided by the MS is the expected one (i.e. authentication has really failed), the network should proceed as described below.

If the IMSI has been used, or the network decides not to try the identification procedure, an AUTHENTICATION REJECT message should be transferred to the mobile station.

After having sent this message, all MM connections in progress (if any) are released and the network should initiate the RR connection release procedure described in subclause 3.5. of 3GPP TS 44.018 [84] ([A/Gb mode only GSM](#)), ~~or in~~ 3GPP TS 25.331 [23c] ([UTRAN Iu mode only UMTS](#)), ~~or in~~ 3GPP TS 44.118 [110] ([GERAN Iu mode only](#)).

Upon receipt of an AUTHENTICATION REJECT message, the mobile station shall set the update status in the SIM/USIM to U3 ROAMING NOT ALLOWED, delete from the SIM/USIM the stored TMSI, LAI and ciphering key sequence number. The SIM/USIM shall be considered as invalid until switching off or the SIM/USIM is removed.

If the AUTHENTICATION REJECT message is received in the state IMSI DETACH INITIATED the mobile station shall follow subclause 4.3.4.3.

If the AUTHENTICATION REJECT message is received in any other state the mobile station shall abort any MM specific, MM connection establishment or call re-establishment procedure, stop any of the timers T3210 or T3230 (if running), release all MM connections (if any), start timer T3240 and enter the state WAIT FOR NETWORK COMMAND, expecting the release of the RR connection. If the RR connection is not released within a given time controlled by the timer T3240, the mobile station shall abort the RR connection. In both cases, either after a RR

connection release triggered from the network side or after a RR connection abort requested by the MS-side, the MS enters state MM IDLE, substate NO IMSI.

4.3.2.5.1 Authentication not accepted by the MS

In a UMTS authentication challenge, the authentication procedure is extended to allow the MS to check the authenticity of the core network. Thus allowing, for instance, detection of false base station.

Following a UMTS authentication challenge, the MS may reject the core network, on the grounds of an incorrect AUTN parameter (see 3GPP TS 33.102 [5a]). This parameter contains two possible causes for authentication failure:

a) MAC code failure:

If the MS considers the MAC code (supplied by the core network in the AUTN parameter) to be invalid, it shall send an AUTHENTICATION FAILURE message to the network, with the reject cause 'MAC failure'. The MS shall then follow the procedure described in subclause 4.3.2.6 (c).

b) SQN failure:

If the MS considers the SQN (supplied by the core network in the AUTN parameter) to be out of range, it shall send a AUTHENTICATION FAILURE message to the network, with the reject cause 'Synch failure' and a re-synchronization token AUTS provided by the USIM (see 3GPP TS 33.102 [5a]). The MS shall then follow the procedure described in subclause 4.3.2.6 (d).

In UMTS, an MS with a USIM inserted shall reject the authentication challenge if no Authentication Parameter AUTN IE was present in the AUTHENTICATION REQUEST message (i.e. a GSM authentication challenge has been received when the MS expects a UMTS authentication challenge). In such a case, the MS shall send the AUTHENTICATION FAILURE message to the network, with the reject cause "GSM authentication unacceptable". The MS shall then follow the procedure described in subclause 4.3.2.6 (c).

If the MS returns an AUTHENTICATION_FAILURE message to the network, the MS shall delete any previously stored RAND and RES and shall stop timer T3218, if running.

4.3.2.6 Abnormal cases

(a) RR connection failure:

Upon detection of a RR connection failure before the AUTHENTICATION RESPONSE is received, the network shall release all MM connections (if any) and abort any ongoing MM specific procedure.

(b) Expiry of timer T3260:

The authentication procedure is supervised on the network side by the timer T3260. At expiry of this timer the network may release the RR connection. In this case the network shall abort the authentication procedure and any ongoing MM specific procedure, release all MM connections if any, and initiate the RR connection release procedure described in subclause 3.5.

(c) Authentication failure (reject cause "MAC failure" or "GSM authentication unacceptable"):

The MS shall send an AUTHENTICATION FAILURE message, with reject cause "MAC failure" or "GSM authentication unacceptable" according to subclause 4.3.2.5.1, to the network and start timer T3214. Furthermore, the MS shall stop any of the retransmission timers that are running (e.g. T3210, T3220 or T3230). Upon the first receipt of an AUTHENTICATION FAILURE message from the MS with reject cause "MAC failure" or "GSM authentication unacceptable", the network may initiate the identification procedure described in subclause 4.3.3. This is to allow the network to obtain the IMSI from the MS. The network may then check that the TMSI originally used in the authentication challenge corresponded to the correct IMSI. Upon receipt of the IDENTITY REQUEST message from the network, the MS shall send the IDENTITY RESPONSE message.

NOTE: Upon receipt of an AUTHENTICATION FAILURE message from the MS with reject cause "MAC failure" or "GSM authentication unacceptable", the network may also terminate the authentication procedure (see subclause 4.3.2.5).

If the TMSI/IMSI mapping in the network was incorrect, the network should respond by sending a new AUTHENTICATION REQUEST message to the MS. Upon receiving the new AUTHENTICATION REQUEST

message from the network, the MS shall stop the timer T3214, if running, and then process the challenge information as normal.

If the network is validated successfully (an AUTHENTICATION REQUEST that contains a valid SQN and MAC is received), the MS shall send the AUTHENTICATION RESPONSE message to the network and shall start any retransmission timers (e.g. T3210, T3220 or T3230), if they were running and stopped when the MS received the first failed AUTHENTICATION REQUEST message.

If the MS receives the second AUTHENTICATION REQUEST while T3214 is running, and the MAC value cannot be resolved or the message contains a GSM authentication challenge, the MS shall follow the procedure specified in this subclause (c), starting again from the beginning. If the SQN is invalid, the MS shall proceed as specified in (d).

It can be assumed that the source of the authentication challenge is not genuine (authentication not accepted by the MS) if any of the following occur:

- after sending the AUTHENTICATION FAILURE message with the reject cause "MAC failure" or "GSM authentication unacceptable" the timer T3214 expires;
- the MS detects any combination of the authentication failures: "MAC failure", "invalid SQN", and "GSM authentication unacceptable", during three consecutive authentication challenges. The authentication challenges shall be considered as consecutive only, if the authentication challenges causing the second and third authentication failure are received by the MS, while the timer T3214 or T3216 started after the previous authentication failure is running.

When it has been deemed by the MS that the source of the authentication challenge is not genuine (i.e. authentication not accepted by the MS), the MS shall behave as described in subclause 4.3.2.6.1.

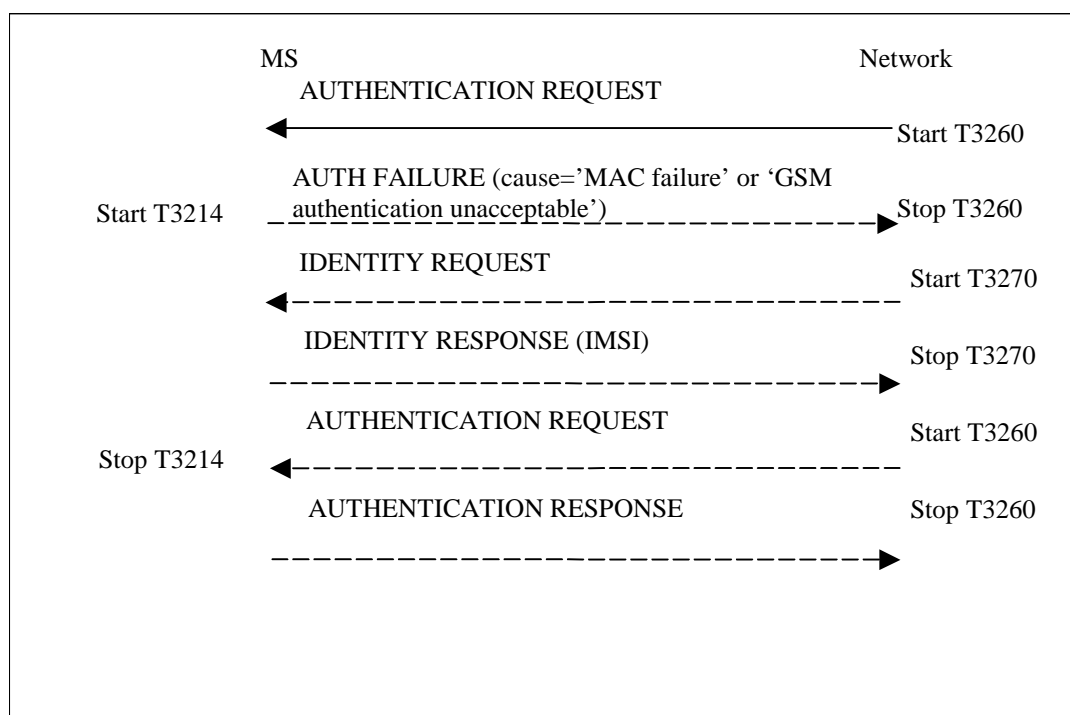


Figure 4.2/3GPP TS 24.008: Authentication Failure Procedure (reject cause "MAC failure" or "GSM authentication unacceptable")

(d) Authentication failure (reject cause "synch failure"):

The MS shall send an AUTHENTICATION FAILURE message, with reject cause "synch failure", to the network and start the timer T3216. Furthermore, the MS shall stop any of the retransmission timers that are running (e.g. T3210, T3220 or T3230). Upon the first receipt of an AUTHENTICATION FAILURE message from the MS with the reject cause "synch failure", the network shall use the returned AUTS parameter from the

authentication failure parameter IE in the AUTHENTICATION FAILURE message, to re-synchronise. The re-synchronisation procedure requires the VLR/MS to delete all unused authentication vectors for that IMSI and obtain new vectors from the HLR. When re-synchronisation is complete, the network shall initiate the authentication procedure. Upon receipt of the AUTHENTICATION REQUEST message, the MS shall stop the timer T3216, if running.

NOTE: Upon receipt of two consecutive AUTHENTICATION FAILURE messages from the MS with reject cause "synch failure", the network may terminate the authentication procedure by sending an AUTHENTICATION REJECT message.

If the network is validated successfully (a new AUTHENTICATION REQUEST is received which contains a valid SQN and MAC) while T3216 is running, the MS shall send the AUTHENTICATION RESPONSE message to the network and shall start any retransmission timers (e.g. T3210, T3220 or T3230), if they were running and stopped when the MS received the first failed AUTHENTICATION REQUEST message.

If the MS receives the second AUTHENTICATION REQUEST while T3216 is running, and the MAC value cannot be resolved or the message contains a GSM authentication challenge, the MS shall proceed as specified in (c); if the SQN is invalid, the MS shall follow the procedure specified in this subclause (d), starting again from the beginning.

The MS shall deem that the network has failed the authentication check and behave as described in subclause 4.3.2.6.1, if any of the following occurs:

- the timer T3216 expires;
- the MS detects any combination of the authentication failures: "MAC failure", "invalid SQN", and "GSM authentication unacceptable", during three consecutive authentication challenges. The authentication challenges shall be considered as consecutive only, if the authentication challenges causing the second and third authentication failure are received by the MS, while the timer T3214 or T3216 started after the previous authentication failure is running.

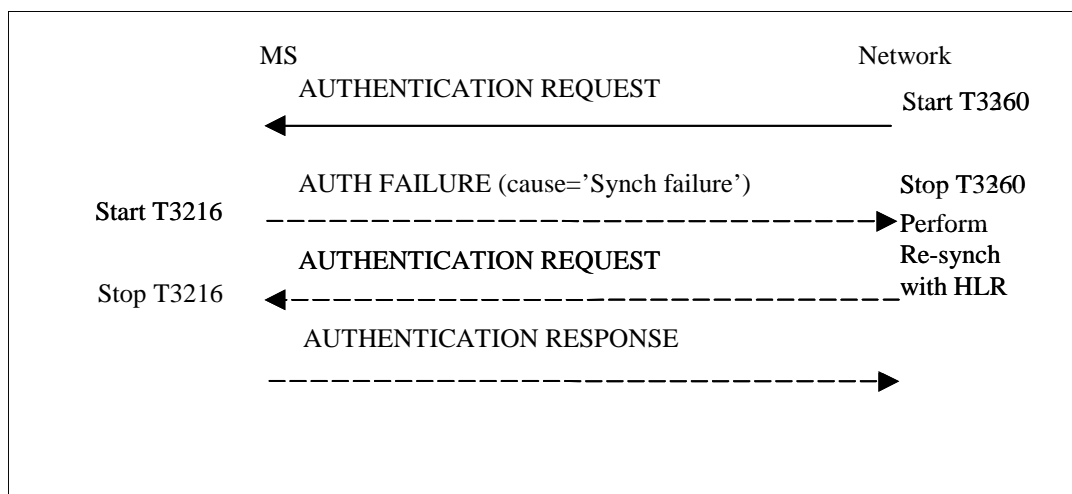


Figure 4.2a/3GPP TS 24.008: Authentication Failure Procedure (reject cause "Synch failure")

4.3.2.6.1 MS behaviour towards a network that has failed the authentication procedure

If the MS deems that the network has failed the authentication check, then it shall request RR or RRC to release the RR connection and the PS signalling connection, if any, and bar the active cell or cells (see 3GPP TS 25.331 and 3GPP TS 44.018). The MS shall start any retransmission timers (e.g. T3210, T3220 or T3230), if they were running and stopped when the MS received the first AUTHENTICATION REQUEST message containing an invalid MAC or invalid SQN, or no AUTN when a UMTS authentication challenge was expected.

4.3.2.7 Handling of keys at intersystem change from [lu modeUMTS](#) to [A/Gb modeGSM](#)

At inter-system change from [lu modeUMTS](#) to [A/Gb modeGSM](#), ciphering may be started (see 3GPP TS 44.018 [86]) without any new authentication procedure. Deduction of the appropriate security key for ciphering in [A/Gb modeGSM](#), depends on the current GSM/UMTS security context stored in the MS and the network.

The ME shall handle the GSM ciphering key according to table 4.3.2.7.1.

Table 4.3.2.7.1/3GPP TS 24.008: Inter-system change from [lu modeUMTS](#) to [A/Gb modeGSM](#)

Security context established in MS and network in lu modeUMTS	At inter-system change to A/Gb modeGSM :
GSM security context	An ME shall apply the stored GSM cipher key that was received from the GSM security context residing in the SIM/USIM during the latest successful ciphering mode setting or security mode control procedure before the inter-system change.
UMTS security context	An ME shall apply the stored GSM cipher key that was derived by the USIM from the UMTS cipher key and the UMTS integrity key and provided by the USIM during the latest successful ciphering mode setting or security mode control procedure before the inter-system change.

NOTE: A USIM with UMTS security context, passes the UMTS cipher key, the UMTS integrity key and the derived GSM cipher key to the ME independent on the current radio access being [UTRANUMTS](#) or [GERANGSM](#).

4.3.2.7a Use of established security contexts

In [A/Gb modeGSM](#), in the case of an established GSM security context, the GSM ciphering key shall be loaded from the SIM/USIM and taken into use by the ME when any valid CIPHERING MODE COMMAND is received during an RR connection (the definition of a valid CIPHERING MODE COMMAND message is given in 3GPP TS 44.018 [84] subclause 3.4.7.2).

In [A/Gb modeGSM](#), in the case of an established UMTS security context, the GSM ciphering key shall be loaded from the USIM and taken into use by the MS when a valid CIPHERING MODE COMMAND is received during an RR connection (the definition of a valid CIPHERING MODE COMMAND message is given in 3GPP TS 44.018 [84] subclause 3.4.7.2). The network shall derive a GSM ciphering key from the UMTS ciphering key and the UMTS integrity key by using the conversion function named "c3" defined in 3GPP TS 33.102 [5a].

In [lu modeUMTS](#), in the case of an established GSM security context, the ME shall derive a UMTS ciphering key and a UMTS integrity key from the GSM ciphering key by using the conversion functions named "c4" and "c5" defined in 3GPP TS 33.102 [5a]. The GSM ciphering key shall be loaded from the SIM/USIM and the derived UMTS ciphering key and UMTS integrity key shall be taken into use by the MS when a valid SECURITY MODE COMMAND indicating CS domain is received during an RR connection (the definition of a valid SECURITY MODE COMMAND message is given in 3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)). The network shall derive a UMTS ciphering key and a UMTS integrity key from the GSM ciphering key by using the conversion functions named "c4" and "c5" defined in 3GPP TS 33.102 [5a].

In [lu modeUMTS](#), in the case of an established UMTS security context, the UMTS ciphering key and UMTS integrity key shall be loaded from the USIM and taken into use by the MS when a valid SECURITY MODE COMMAND indicating CS domain is received during a RR connection (the definition of a valid SECURITY MODE COMMAND message is given in 3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)).

In [lu modeUMTS](#) and [A/Gb modeGSM](#), if the MS received a valid SECURITY MODE COMMAND indicating CS domain in [lu modeUMTS](#) or a valid CIPHERING MODE COMMAND in [A/Gb modeGSM](#) before the network initiates a new Authentication procedure and establishes a new GSM/UMTS security context, the new keys are taken into use in the MS when a new valid SECURITY MODE COMMAND indicating CS domain in [lu modeUMTS](#), or a new valid CIPHERING MODE COMMAND in [A/Gb modeGSM](#), is received during the RR connection. In case of [lu modeUMTS](#) to [lu modeUMTS](#) handover, [A/Gb modeGSM](#) to [A/Gb modeGSM](#) handover, or inter-system change to [A/Gb modeGSM](#), the MS and the network shall continue to use the key from the old key set until a new valid

SECURITY MODE COMMAND indicating CS domain in [lu modeUMTS](#), or a new valid CIPHERING MODE COMMAND in GSM, is received during the RR connection. In case of inter-system change to [lu modeUMTS](#), the MS and the network shall continue to use the keys from the old key set until the second valid SECURITY MODE COMMAND indicating CS domain is received during the RR connection.

NOTE 1: If the MS received a valid SECURITY MODE COMMAND indicating CS domain in [lu modeUMTS](#) or a valid CIPHERING MODE COMMAND in [A/Gb modeGSM](#) before the inter-system change to [lu modeUMTS](#) occurs, the first SECURITY MODE COMMAND message after the inter-system change, which indicates CS domain and includes only an Integrity protection mode IE, is initiated by the UTRAN without receipt of a corresponding RANAP security mode control procedure from the MSC/VLR. The only purpose of this SECURITY MODE COMMAND message is to activate the integrity protection, but not to load a new key set from the SIM/USIM (see 3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)).

NOTE 2: If the MS received a valid SECURITY MODE COMMAND indicating CS domain in [lu modeUMTS](#) or a valid CIPHERING MODE COMMAND in [A/Gb modeGSM](#) before the inter-system change to [lu modeUMTS](#) occurs, the first SECURITY MODE COMMAND message after the inter-system change, which indicates CS domain, is initiated by the UTRAN on receipt of a RANAP security mode control procedure from the MSC/VLR. The purpose of this SECURITY MODE COMMAND message is to load a key set from the SIM/USIM and to activate either integrity protection or ciphering and integrity protection (see 3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)).

4.3.2.8 Handling of keys at intersystem change from [A/Gb modeGSM](#) to [lu modeUMTS](#)

At inter-system change from [A/Gb modeGSM](#) to [lu modeUMTS](#), ciphering and integrity may be started (see 3GPP TS 25.331 [23c]) without any new authentication procedure. Deduction of the appropriate security keys for ciphering and integrity check in [lu modeUMTS](#), depends on the current GSM/UMTS security context stored in the MS and the network.

The ME shall handle the UMTS cipher key and the UMTS integrity key according to table 4.3.2.8.1.

Table 4.3.2.8.1/3GPP TS 24.008: Inter-system change from [A/Gb modeGSM](#) to [lu modeUMTS](#)

Security context established in MS and network in A/Gb modeGSM	At inter-system change to lu modeUMTS :
GSM security context	An ME shall derive the UMTS cipher key and the UMTS integrity key from the stored GSM cipher key that was provided by the SIM/USIM during the latest successful ciphering mode setting or security mode control procedure before the inter-system change. The conversion functions named "c4" and "c5" in 3GPP TS 33.102 [5a] are used for this purpose.
UMTS security context	An ME shall apply the stored UMTS ciphering key and the stored UMTS integrity key that were received from the UMTS security context residing in the USIM during the latest successful ciphering mode setting or security mode control procedure before the inter-system change.

NOTE: A USIM with UMTS security context, passes the UMTS cipher key, the UMTS integrity key and the derived GSM cipher key to the ME independent on the current radio access being [UTRANUMTS](#) or [GERANGSM](#).

Next Change

4.3.4 IMSI detach procedure

The IMSI detach procedure may be invoked by a mobile station if the mobile station is deactivated or if the Subscriber Identity Module (see 3GPP TS 42.017 [7] and 3GPP TS 31.102) is detached from the mobile station.

In [A/Gb mode and GERAN Iu mode](#) **GSM**, a flag (ATT) broadcast in the L3-RR SYSTEM INFORMATION TYPE 3 message on the BCCH is used by the network to indicate whether the detach procedure is required. The value of the ATT flag to be taken into account shall be the one broadcast when the mobile station was in MM idle.

In [UTRAN Iu mode](#) **UMTS**, a flag (ATT) in the CS domain specific system information element is used by the network to indicate whether the detach procedure is required. The value of the ATT flag to be taken into account shall be the one received when the mobile station was in MM idle.

The procedure causes the mobile station to be indicated as inactive in the network.

Next Change

4.4.2 Periodic updating

Periodic updating may be used to notify periodically the availability of the mobile station to the network. Periodic updating is performed by using the location updating procedure. The location updating type information element in the LOCATION UPDATING REQUEST message shall indicate periodic updating.

The procedure is controlled by the timer T3212 in the mobile station. If the timer is not already started, the timer is started each time the mobile station enters the MM IDLE substate NORMAL SERVICE or ATTEMPTING TO UPDATE. When the MS leaves the MM Idle State the timer T3212 shall continue running until explicitly stopped.

The timer is stopped (shall be set to its initial value for the next start) when:

- a LOCATION UPDATING ACCEPT or LOCATION UPDATING REJECT message is received;
- an AUTHENTICATION REJECT message is received;
- the first MM message is received, or security mode setting is completed in the case of MM connection establishment, except when the most recent service state is LIMITED SERVICE;
- the mobile station has responded to paging and thereafter has received the first correct layer 3 message except RR message;
- the mobile station is deactivated (i.e. equipment powered down or SIM/USIM removed).

When the timer T3212 expires, the location updating procedure is started and the timer shall be set to its initial value for the next start. If the mobile station is in other state than MM Idle when the timer expires the location updating procedure is delayed until the MM Idle State is entered.

The conditions under which the periodic location updating procedure is used by a mobile station in the MM IDLE state are defined for each service state in subclause 4.2.2.

If the mobile station is in service state NO CELL AVAILABLE, LIMITED SERVICE, PLMN SEARCH or PLMN SEARCH-NORMAL SERVICE when the timer expires the location updating procedure is delayed until this service state is left.

In [A/Gb mode and GERAN Iu mode](#) **GSM**, the (periodic) location updating procedure is not started if the BCCH information at the time the procedure is triggered indicates that periodic location shall not be used. The timeout value is broadcasted in the L3-RR SYSTEM INFORMATION TYPE 3 message on the BCCH, in the Control channel description IE, see 3GPP TS 44.018 [84] subclause 10.5.2.11.

In [UTRAN Iu mode](#) **UMTS**, the (periodic) location updating procedure is not started if the information on BCCH or in the last received dedicated system information at the time the procedure is triggered indicates that periodic location shall not be used. The timeout value is included in the CS domain specific system information element.

The T3212 timeout value shall not be changed in the NO CELL AVAILABLE, LIMITED SERVICE, PLMN SEARCH and PLMN SEARCH-NORMAL SERVICE states.

When a change of the T3212 timeout value has to be taken into account and the timer is running (at change of the serving cell or, change of the broadcast value of T3212), the MS shall behave as follows:

Let t_1 be the new T3212 timeout value and let t be the current timer value at the moment of the change to the new T3212 timeout value; then the timer shall be restarted with the value t modulo t_1 .

When the mobile station is activated, or when a change of the T3212 timeout value has to be taken into account and the timer is not running, the mobile station shall behave as follows:

Let t_1 be the new T3212 timeout value, the new timer shall be started at a value randomly, uniformly drawn between 0 and t_1 .

4.4.3 IMSI attach procedure

The IMSI attach procedure is the complement of the IMSI detach procedure (see subclause 4.3.4). It is used to indicate the IMSI as active in the network.

In [A/Gb mode](#) and [GERAN Iu mode](#) **GSM**, a flag (ATT) is broadcast in the L3-RR SYSTEM INFORMATION TYPE 3 message. It indicates whether the attach and detach procedures are required to be used or not.

In [UTRAN mode](#) **UMTS**, a flag (ATT) is included in the CS domain specific system information element. It indicates whether the attach and detach procedures are required to be used or not.

The IMSI attach procedure is invoked if the detach/attach procedures are required by the network and an IMSI is activated in a mobile station (i.e. activation of a mobile station with plug-in SIM/USIM, insertion of a card in a card-operated mobile station etc.) within coverage area from the network or a mobile station with an IMSI activated outside the coverage area enters the coverage area. The IMSI attach procedure is used only if the update status is UPDATED and if the stored Location Area Identification is the same as the one which is actually broadcasted on the BCCH of the current serving cell. Otherwise a normal location updating procedure (see subclause 4.4.1) is invoked independently of the ATT flag indication.

IMSI attach is performed by using the location updating procedure. The location updating type information element in the LOCATION UPDATING REQUEST message shall in this case indicate IMSI attach.

Next Change

4.4.4.1a Network Request for Additional mobile station Capability Information

In [A/Gb mode](#) **GSM**, the network may initiate the classmark interrogation procedure, for example, to obtain further information on the mobile station's encryption capabilities.

Next Change

4.4.4.4 Security mode setting by the network

In [A/Gb mode](#) **GSM**, the security mode setting procedure (see 3GPP TS 44.018 [84] subclause 3.4.7) may be initiated by the network, e.g., if a new TMSI has to be allocated.

In [Iu mode](#) **UMTS**, the security mode control procedure (see 3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)) may be initiated by the network, e.g., if a new TMSI has to be allocated.

Next Change

4.5.1.1 MM connection establishment initiated by the mobile station

Upon request of a CM entity to establish an MM connection the MM sublayer first decides whether to accept, delay, or reject this request:

- An MM connection establishment may only be initiated by the mobile station when the following conditions are fulfilled:

- Its update status is UPDATED.
- The MM sublayer is in one of the states MM IDLE, RR CONNECTION RELEASE NOT ALLOWED or MM connection active but not in MM connection active (Group call).

An exception from this general rule exists for emergency calls (see subclause 4.5.1.5). A further exception is defined in the following clause.

- If an MM specific procedure is running at the time the request from the CM sublayer is received, and the LOCATION UPDATING REQUEST message has been sent, the request will either be rejected or delayed, depending on implementation, until the MM specific procedure is finished and, provided that the network has not sent a "follow-on proceed" indication, the RR connection is released. If the LOCATION UPDATING REQUEST message has not been sent, the mobile station may include a "follow-on request" indicator in the message. The mobile station shall then delay the request until the MM specific procedure is completed, when it may be given the opportunity by the network to use the RR connection: see subclause 4.4.4.6.

In order to establish an MM connection, the mobile station proceeds as follows:

- a) If no RR connection exists, the MM sublayer requests the RR sublayer to establish an RR connection and enters MM sublayer state WAIT FOR RR CONNECTION (MM CONNECTION). This request contains an establishment cause and a CM SERVICE REQUEST message. When the establishment of an RR connection is indicated by the RR sublayer, the MM sublayer of the mobile station starts timer T3230, gives an indication to the CM entity that requested the MM connection establishment, and enters MM sublayer state WAIT FOR OUTGOING MM CONNECTION.
- b) If an RR connection is available, the MM sublayer of the mobile station sends a CM SERVICE REQUEST message to the network, starts timer T3230, stops and resets timer T3241, gives an indication to the CM entity that requested the MM connection establishment, and enters:
 - MM sublayer state WAIT FOR OUTGOING MM CONNECTION, if no MM connection is active;
 - MM sublayer state WAIT FOR ADDITIONAL OUTGOING MM CONNECTION, if at least one MM connection is active;
 - If an RR connection exists but the mobile station is in the state WAIT FOR NETWORK COMMAND then any requests from the CM layer that are received will either be rejected or delayed until this state is left.
- c) Only applicable for mobile stations supporting VGCS talking:

If a mobile station which is in the MM sublayer state MM IDLE, service state RECEIVING GROUP CALL (NORMAL SERVICE), receives a request from the GCC sublayer to perform an uplink access, the MM sublayer requests the RR sublayer to perform an uplink access procedure and enters MM sublayer state WAIT FOR RR CONNECTION (GROUP TRANSMIT MODE).

When a successful uplink access is indicated by the RR sublayer, the MM sublayer of the mobile station gives an indication to the GCC sublayer and enters MM sublayer state MM CONNECTION ACTIVE (GROUP TRANSMIT MODE).

When an uplink access reject is indicated by the RR sublayer, the MM sublayer of the mobile station gives an indication to the GCC sublayer and enters the MM sublayer state MM IDLE, service state RECEIVING GROUP CALL (NORMAL SERVICE).

In the network, if an uplink access procedure is performed, the RR sublayer in the network provides an indication to the MM sublayer together with the mobile subscriber identity received in the TALKER INDICATION message. The network shall then enter the MM sublayer state MM CONNECTION ACTIVE (GROUP TRANSMIT MODE).

The CM SERVICE REQUEST message contains the:

- mobile identity according to subclause 10.5.1.4;
- mobile station classmark 2;
- ciphering key sequence number; and

- CM service type identifying the requested type of transaction (e.g. mobile originating call establishment, emergency call establishment, short message service, supplementary service activation, location services).

A MS supporting eMLPP may optionally include a priority level in the CM SERVICE REQUEST message.

A collision may occur when a CM layer message is received by the mobile station in MM sublayer state WAIT FOR OUTGOING MM CONNECTION or in WAIT FOR ADDITIONAL OUTGOING MM CONNECTION. In this case the MM sublayer in the MS shall establish a new MM connection for the incoming CM message as specified in subclause 4.5.1.3.

Upon receiving a CM SERVICE REQUEST message, the network shall analyse its content. The type of semantic analysis may depend on other on going MM connection(s). Depending on the type of request and the current status of the RR connection, the network may start any of the MM common procedures and RR procedures.

In [A/Gb mode GSM](#), the network may initiate the classmark interrogation procedure, for example, to obtain further information on the mobile station's encryption capabilities.

The identification procedure (see subclause 4.3.3) may be invoked for instance if a TMSI provided by the mobile station is not recognized.

The network may invoke the authentication procedure (see subclause 4.3.2) depending on the CM service type.

In [A/Gb mode GSM](#), the network decides also if the ciphering mode setting procedure shall be invoked (see subclause 3.4.7 in 3GPP TS 44.018 [84]).

In [Iu mode UMTS](#), the network decides also if the security mode control procedure shall be invoked (see 3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)).

NOTE: If the CM_SERVICE_REQUEST message contains a priority level the network may use this to perform queuing and pre-emption as defined in 3GPP TS 23.067 [88].

In [A/Gb mode GSM](#), an indication from the RR sublayer that the ciphering mode setting procedure is completed, or reception of a CM SERVICE ACCEPT message, shall be treated as a service acceptance indication by the mobile station.

In [Iu mode UMTS](#), an indication from the RR sublayer that the security mode control procedure is completed, or reception of a CM SERVICE ACCEPT message, shall be treated as a service acceptance indication by the mobile station. The procedures in subclause 4.1.1.1.1 shall always have precedence over this subclause.

In [Iu mode UMTS](#), during a MM connection establishment for all services, except for emergency call (see subclause 4.1.1.1.1), the security mode control procedure with activation of integrity protection shall be invoked by the network unless integrity protection is already started (see subclause 4.1.1.1.1).

The MM connection establishment is completed, timer T3230 shall be stopped, the CM entity that requested the MM connection shall be informed, and MM sublayer state MM CONNECTION ACTIVE is entered. The MM connection is considered to be active.

If the service request cannot be accepted, the network returns a CM SERVICE REJECT message to the mobile station.

The reject cause information element (see subclause 10.5.3.6 and annex G) indicates the reason for rejection. The following cause values may apply:

- #4: IMSI unknown in VLR
- #6: Illegal ME
- #17: Network failure
- #22: Congestion
- #32: Service option not supported
- #33: Requested service option not subscribed
- #34: Service option temporarily out of order

If no other MM connection is active, the network may start the RR connection release (see subclause 3.5) when the CM SERVICE REJECT message is sent.

If a CM SERVICE REJECT message is received by the mobile station, timer T3230 shall be stopped, the requesting CM sublayer entity informed. Then the mobile station shall proceed as follows:

- If the cause value is not #4 or #6 the MM sublayer returns to the previous state (the state where the request was received). Other MM connections shall not be affected by the CM SERVICE REJECT message.
- If cause value #4 is received, the mobile station aborts any MM connection, deletes any TMSI, LAI and ciphering key sequence number in the SIM/USIM, changes the update status to NOT UPDATED (and stores it in the SIM/USIM according to subclause 4.1.2.2), and enters the MM sublayer state WAIT FOR NETWORK COMMAND. If subsequently the RR connection is released or aborted, this will force the mobile station to initiate a normal location updating). Whether the CM request shall be memorized during the location updating procedure, is a choice of implementation.
- If cause value #6 is received, the mobile station aborts any MM connection, deletes any TMSI, LAI and ciphering key sequence number in the SIM/USIM, changes the update status to ROAMING NOT ALLOWED (and stores it in the SIM/USIM according to subclause 4.1.2.2), and enters the MM sublayer state WAIT FOR NETWORK COMMAND. The mobile station shall consider the SIM/USIM as invalid for non-GPRS services until switch-off or the SIM/USIM is removed.

Next Change

4.5.1.3.1 Mobile Terminating CM Activity

When a CM sublayer entity in the network requests the MM sublayer to establish a MM connection, the MM sublayer will request the establishment of an RR connection to the RR sublayer if no RR connection to the desired mobile station exists. The MM sublayer is informed when the paging procedure is finished (see 3GPP TS 44.018 [84] subclause 3.3.2 and 3GPP TS 25.331 [23c]) and the mobile station shall enter the MM state WAIT FOR NETWORK COMMAND.

In [A/Gb mode](#)**GSM**, when an RR connection is established (or if it already exists at the time the request is received), the MM sublayer may initiate any of the MM common procedures (except IMSI detach); it may request the RR sublayer to perform the RR classmark interrogation procedure, and/or the security mode setting procedure.

In [Iu mode](#)**UMTS**, when an RR connection is established (or if it already exists at the time the request is received), the MM sublayer may initiate any of the MM common procedures (except IMSI detach); it may request the RR sublayer to perform the security mode control procedure.

When all MM and RR procedures are successfully completed which the network considers necessary, the MM sublayer will inform the requesting mobile terminating CM sublayer entity on the success of the MM connection establishment.

If an RR connection already exists and no MM specific procedure is running, the network may also establish a new mobile terminating MM connection by sending a CM message with a new PD/TI combination.

If the MS receives the first CM message in the MM states WAIT FOR NETWORK COMMAND or RR CONNECTION RELEASE NOT ALLOWED, the MS shall stop and reset the timers T3240 and T3241 and shall enter the MM state MM CONNECTION ACTIVE.

In [A/Gb mode](#)**GSM**, if the establishment of an RR connection is unsuccessful, or if any of the MM common procedures or the security mode setting fail, this is indicated to the CM layer with an appropriate error cause.

In [Iu mode](#)**UMTS**, if the establishment of an RR connection is unsuccessful, or if any of the MM common procedures or the security mode control fail, this is indicated to the CM layer with an appropriate error cause.

If an RR connection used for a MM specific procedure exists to the mobile station, the CM request may be rejected or delayed depending on implementation. When the MM specific procedure has been completed, the network may use the same RR connection for the delayed CM request.

Only applicable in case of VGCS talking:

In the MM CONNECTION ACTIVE (GROUP TRANSMIT MODE) the mobile station is in RR Group transmit mode. There shall be only one MM connection active.

When in MM CONNECTION ACTIVE (GROUP TRANSMIT MODE) state, the MM sublayer in the network shall reject the request for the establishment of another MM connection by any CM layer.

If the RR sublayer in the network indicates a request to perform a transfer of the mobile station from RR connected mode to RR Group transmit mode which will result in a transition from MM CONNECTION ACTIVE state to MM CONNECTION ACTIVE (GROUP TRANSMIT MODE) state in the MM sublayer, the MM sublayer shall not allow the transition if more than one MM connection is active with the mobile station.

4.5.1.3.2 Mobile Originating CM Activity \$(CCBS)\$

When a CM sublayer entity in the network requests the MM sublayer to establish a MM connection, the MM sublayer will request the establishment of an RR connection to the RR sublayer if no RR connection to the desired mobile station exists. The MM sublayer is informed when the paging procedure is finished (see 3GPP TS 44.018 [84] subclause 3.3.2 and 3GPP TS 25.331 [23c]) and the mobile station shall enter the MM state WAIT FOR NETWORK COMMAND.

In A/Gb mode^{GSM}, when an RR connection is established (or if it already exists at the time the request is received), the MM sublayer may initiate any of the MM common procedures (except IMSI detach), it may request the RR sublayer to perform the RR classmark interrogation procedure and/or the security mode setting procedure.

In Iu mode^{UMTS}, when an RR connection is established (or if it already exists at the time the request is received), the MM sublayer may initiate any of the MM common procedures (except IMSI detach), it may request the RR sublayer to perform the security mode control procedure.

The network should use the information contained in *the Mobile Station Classmark Type 2* IE on the mobile station's support for "Network Initiated MO CM Connection Request" to determine whether to:

- not start this procedure (eg if an RR connection already exists), or,
- to continue this procedure, or,
- to release the newly established RR connection.

In the case of a "Network Initiated MO CM Connection Request" the network shall use the established RR connection to send a CM SERVICE PROMPT message to the mobile station.

If the mobile station supports "Network Initiated MO CM Connection Request", the MM sublayer of the MS gives an indication to the CM entity identified by the CM SERVICE PROMPT message and enters the MM sublayer state PROCESS CM SERVICE PROMPT. In the state PROCESS CM SERVICE PROMPT the MM sublayer waits for either the rejection or confirmation of the recall by the identified CM entity. Any other requests from the CM entities shall either be rejected or delayed until this state is left.

When the identified CM entity informs the MM sublayer, that it has send the first CM message in order to start the CM recall procedure the MM sublayer enters the state MM CONNECTION ACTIVE.

If the identified CM entity indicates that it will not perform the CM recall procedure and all MM connections are released by their CM entities the MS shall proceed according to subclause 4.5.3.1.

If the CM SERVICE PROMPT message is received by the MS in MM sublayer states WAIT FOR OUTGOING MM CONNECTION or in WAIT FOR ADDITIONAL OUTGOING MM CONNECTION then the mobile station shall send an MM STATUS message with cause " Message not compatible with protocol state".

A mobile that does not support "Network Initiated MO CM Connection Request" shall return an MM STATUS message with cause #97 "message type non-existent or not implemented" to the network.

If the mobile station supports "Network Initiated MO CM Connection Request" but the identified CM entity in the mobile station does not provide the associated support, then the mobile station shall send an MM STATUS message with cause "Service option not supported". In the case of a temporary CM problem (eg lack of transaction identifiers) then the mobile station shall send an MM STATUS message with cause "Service option temporarily out of order".

If an RR connection already exists and no MM specific procedure is running, the network may use it to send the CM SERVICE PROMPT message.

In GSM, if the establishment of an RR connection is unsuccessful, or if any of the MM common procedures or the security mode setting fail, this is indicated to the CM layer in the network with an appropriate error cause.

In [lu modeUMTS](#), if the establishment of an RR connection is unsuccessful, or if any of the MM common procedures or the security mode control fail, this is indicated to the CM layer in the network with an appropriate error cause.

If an RR connection used for a MM specific procedure exists to the mobile station, the "Network Initiated MO CM Connection Request" may be rejected or delayed depending on implementation. When the MM specific procedure has been completed, the network may use the same RR connection for the delayed "Network Initiated MO CM Connection Request".

4.5.1.3.3 Paging response in [lu modeUMTS](#) ([lu modeUMTS](#) only)

The network may initiate the paging procedure for CS services when the MS is IMSI attached for CS services. To initiate the procedure, the MM entity requests the RR sublayer to initiate paging (see 3GPP TS 25.331 [23c], ~~and~~ 3GPP TS 25.413 [and 3GPP TS 44.118 \[110\]](#)) for CS services.

At reception of a paging message, the RR sublayer in the MS shall deliver a paging indication to the MM sublayer if the paging was initiated by the MM entity in the network (see 3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)). The MS shall respond with the PAGING RESPONSE message defined in 3GPP TS 44.018 [84], subclause 9.1.25. For reasons of backward compatibility the paging response shall use the RR protocol discriminator.

If the MS receives a paging request for CS services during an ongoing MM procedure, and the MS has already requested the establishment of a radio connection, the MS shall ignore the paging request and the MS and the network shall continue the MM procedure.

Next Change

4.5.1.6.1 Call re-establishment, initiation by the mobile station

NOTE: The network is unable to initiate call re-establishment.

If at least one request to re-establish an MM connection is received from a CM entity as a response to the indication that the MM connection is interrupted (see subclause 4.5.2.3.) the mobile station initiates the call re-establishment procedure. If several CM entities request re-establishment only one re-establishment procedure is initiated. If any CM entity requests re-establishment, then re-establishment of all transactions belonging to all Protocol Discriminators that permit Call Re-establishment shall be attempted.

Upon request of a CM entity to re-establish an MM connection the MM sublayer requests the RR sublayer to establish an RR connection and enters MM sublayer state WAIT FOR REESTABLISH. This request contains an establishment cause and a CM RE-ESTABLISHMENT REQUEST message. When the establishment of an RR connection is indicated by the RR sublayer, the MM sublayer of the mobile station starts timer T3230, gives an indication to all CM entities that are being re-established, and remains in the MM sublayer state WAIT FOR REESTABLISH.

The CM RE-ESTABLISHMENT REQUEST message contains the

- mobile identity according to subclause 10.5.1.4;
- mobile station classmark 2;
- ciphering key sequence number.

NOTE: Whether or not a CM entity can request re-establishment depends upon the Protocol Discriminator. The specifications for Short Message Service (3GPP TS 24.011), Call Independent Supplementary Services (3GPP TS 24.010 [21]) and Location Services (3GPP TS 44.071 [23a]) do not currently specify any re-establishment procedures.

Upon receiving a CM RE-ESTABLISHMENT REQUEST message, the network shall analyse its content. Depending on the type of request, the network may start any of the MM common procedures and RR procedures.

The network may initiate the classmark interrogation procedure, for example, to obtain further information on the mobile station's encryption capabilities.

The identification procedure (see subclause 4.3.3) may be invoked.

The network may invoke the authentication procedure (see subclause 4.3.2).

In [A/Gb mode GSM](#), the network decides if the security mode setting procedure shall be invoked (see 3GPP TS 44.018 [84] subclause 3.4.7).

An indication from the RR sublayer that the security mode setting procedure is completed, or reception of a CM SERVICE ACCEPT message, shall be treated as a service acceptance indication by the mobile station.

In [Iu mode UMTS](#), the network decides if the security mode control procedure shall be invoked (see 3GPP TS 25.331 [23c] and [3GPP TS 44.118 \[110\]](#)). An indication from the RR sublayer that the security mode control procedure is completed, or reception of a CM SERVICE ACCEPT message, shall be treated as a service acceptance indication by the mobile station.

The MM connection re-establishment is completed, timer T3230 shall be stopped, all CM entities associated with the re-establishment shall be informed, and MM sublayer state MM CONNECTION ACTIVE is re-entered. All the MM connections are considered to be active.

If the network cannot associate the re-establishment request with any existing call for that mobile station, a CM SERVICE REJECT message is returned with the reject cause:

#38 "call cannot be identified"

If call re-establishment cannot be performed for other reasons, a CM SERVICE REJECT is returned, the appropriate reject cause may be any of the following (see annex G):

4 "IMSI unknown in VLR";

6 "illegal ME";

#17 "network failure";

#22 "congestion";

#32 "service option not supported";

#34 "service option temporarily out of order".

Whatever the reject cause a mobile station receiving a CM SERVICE REJECT as a response to the CM RE-ESTABLISHMENT REQUEST shall stop T3230, release all MM connections and proceed as described in subclause 4.5.3.1. In addition:

- if cause value #4 is received, the mobile station deletes any TMSI, LAI and ciphering key sequence number in the SIM/USIM, changes the update status to NOT UPDATED (and stores it in the SIM/USIM according to subclause 4.1.2.2), and enters the MM sublayer state WAIT FOR NETWORK COMMAND. If subsequently the RR connection is released or aborted, this will force the mobile station to initiate a normal location updating). The CM re-establishment request shall not be memorized during the location updating procedure.
- if cause value #6 is received, the mobile station deletes any TMSI, LAI and ciphering key sequence number in the SIM/USIM, changes the update status to ROAMING NOT ALLOWED (and stores it in the SIM/USIM according to subclause 4.1.2.2), and enters the MM sublayer state WAIT FOR NETWORK COMMAND. The MS shall consider the SIM/USIM as invalid for non-GPRS services until switch-off or the SIM/USIM is removed.

Next Change

4.7.1.2 Ciphering of messages ([A/Gb mode GSM](#) only)

If ciphering is to be applied on a GMM context, all GMM messages shall be ciphered except the following messages:

- ATTACH REQUEST;
- ATTACH REJECT;
- AUTHENTICATION AND CIPHERING REQUEST;
- AUTHENTICATION AND CIPHERING RESPONSE;

- AUTHENTICATION AND CIPHERING FAILURE;
- AUTHENTICATION AND CIPHERING REJECT;
- IDENTITY REQUEST;
- IDENTITY RESPONSE;
- ROUTING AREA UPDATE REQUEST; and
- ROUTING AREA UPDATE REJECT.

Next Change

4.7.1.4 Radio resource sublayer address handling

In [A/Gb mode](#)~~GSM~~, while a packet TMSI (P-TMSI) is used in the GMM sublayer for identification of an MS, a temporary logical link identity (TLLI) is used for addressing purposes at the RR sublayer..

In [Iu mode](#)~~UMTS~~ a Radio Network Temporary Identity (RNTI) identifies a ~~UMTS~~ user between the MS and the UTRAN [or GERAN](#). The relationship between RNTI and IMSI is known only in the MS and in the UTRAN, see 3GPP TS 25.301[10].

4.7.1.4.1 Radio resource sublayer address handling ([A/Gb mode](#)~~GSM~~ only)

This subclause describes how the RR addressing is managed by GMM. For the detailed coding of the different TLLI types and how a TLLI can be derived from a P-TMSI, see 3GPP TS 23.003 [10].

Two cases can be distinguished:

- a valid P-TMSI is available in the MS; or
- no valid P-TMSI is available in the MS.

i) valid P-TMSI available

If the MS has stored a valid P-TMSI, the MS shall derive a foreign TLLI from that P-TMSI and shall use it for transmission of the:

- ATTACH REQUEST message of any GPRS combined/non-combined attach procedure; other GMM messages sent during this procedure shall be transmitted using the same foreign TLLI until the ATTACH ACCEPT message or the ATTACH REJECT message is received; and
- ROUTING AREA UPDATE REQUEST message of a combined/non-combined RAU procedure if the MS has entered a new routing area, or if the GPRS update status is not equal to GU1 UPDATED. Other GMM messages sent during this procedure shall be transmitted using the same foreign TLLI, until the ROUTING AREA UPDATE ACCEPT message or the ROUTING AREA UPDATE REJECT message is received.

After a successful GPRS attach or routing area update procedure, independent whether a new P-TMSI is assigned, if the MS has stored a valid P-TMSI then the MS shall derive a local TLLI from the stored P-TMSI and shall use it for addressing at lower layers.

NOTE: Although the MS derives a local TLLI for addressing at lower layers, the network should not assume that it will receive only LLC frames using a local TLLI. Immediately after the successful GPRS attach or routing area update procedure, the network must be prepared to continue accepting LLC frames from the MS still using the foreign TLLI.

ii) no valid P-TMSI available

When the MS has not stored a valid P-TMSI, i.e. the MS is not attached to GPRS, the MS shall use a randomly selected random TLLI for transmission of the:

- ATTACH REQUEST message of any combined/non-combined GPRS attach procedure.

The same randomly selected random TLLI value shall be used for all message retransmission attempts and for the cell updates within one attach attempt.

Upon receipt of an ATTACH REQUEST message, the network shall assign a P-TMSI to the MS. The network derives a local TLLI from the assigned P-TMSI, and transmits the assigned P-TMSI to the MS.

Upon receipt of the assigned P-TMSI, the MS shall derive the local TLLI from this P-TMSI and shall use it for addressing at lower layers.

NOTE: Although the MS derives a local TLLI for addressing at lower layers, the network should not assume that it will receive only LLC frames using a local TLLI. Immediately after the successful GPRS attach, the network must be prepared to continue accepting LLC frames from the MS still using the random TLLI.

In both cases, the MS shall acknowledge the reception of the assigned P-TMSI to the network. After receipt of the acknowledgement, the network shall use the local TLLI for addressing at lower layers.

4.7.1.5 P-TMSI handling

4.7.1.5.1 P-TMSI handling in [A/Gb mode](#)~~GSM~~

If a new P-TMSI is assigned by the network the MS and the network shall handle the old and the new P-TMSI as follows:

Upon receipt of a GMM message containing a new P-TMSI the MS shall consider the new P-TMSI and new RAI and also the old P-TMSI and old RAI as valid in order to react to paging requests and downlink transmission of LLC frames. For uplink transmission of LLC frames the new P-TMSI shall be used.

The MS shall consider the old P-TMSI and old RAI as invalid as soon as an LLC frame is received with the local TLLI derived from the new P-TMSI.

Upon the transmission of a GMM message containing a new P-TMSI the network shall consider the new P-TMSI and new RAI and also the old P-TMSI and old RAI as valid in order to be able to receive LLC frames from the MS.

The network shall consider the old P-TMSI and old RAI as invalid as soon as an LLC frame is received with the local TLLI derived from the new P-TMSI.

4.7.1.5.2 P-TMSI handling in [lu mode](#)~~UMTS~~

If a new P-TMSI is assigned by the network the MS and the network shall handle the old and the new P-TMSI as follows:

Upon receipt of a GMM message containing a new P-TMSI the MS shall consider the new P-TMSI and new RAI as valid. Old P-TMSI and old RAI are regarded as invalid.

The network shall consider the old P-TMSI and old RAI as invalid as soon as an acknowledge message (e.g. ATTACH COMPLETE, ROUTING AREA UPDATE COMPLETE and P-TMSI REALLOCATION COMPLETE) is received.

4.7.1.6 Change of network mode of operation

In the following tables below the abbreviations '[A/Gb mode](#)~~GSM~~ I', '[A/Gb mode](#)~~GSM~~ II' and '[A/Gb mode](#)~~GSM~~ III' are used for network operation mode I, II and III in [A/Gb mode](#)~~GSM~~.

In the following tables below the abbreviations '[lu mode](#)~~UMTS~~ I' and '[lu mode](#)~~UMTS~~ II' are used for network operation modes I and II in [lu mode](#)~~UMTS~~.

4.7.1.6.1 Change of network mode of operation in [A/Gb mode](#)~~GSM~~ ([A/Gb mode](#)~~GSM~~ only)

Whenever an MS moves to a new RA, the procedures executed by the MS depend on the network mode of operation in the old and new routing area.

In case the MS is in state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED and is in operation mode:

- a) A or B (with the exceptions in b and c below), the MS shall execute:

Table 4.7.1.6.1/3GPP TS 24.008: Mode A or B

Network operation mode change	Procedure to execute
I → II or I → III	Normal Location Update(*), followed by a Normal Routing Area Update
II → III or III → II	Normal Location Update (see subclause 4.2.2) if a new LA is entered, followed by a Normal Routing Area Update
II → I or III → I	Combined Routing Area Update with IMSI attach(**)

- b) B which reverts to operation mode C in network operation mode III, the MS shall execute:

Table 4.7.1.6.2/3GPP TS 24.008: Mode B which reverts into mode C in network operation mode III

Network operation mode change	Procedure to execute
I → II	Normal Location Update(*), followed by a Normal Routing Area Update
I → III or II → III	IMSI Detach (see subclause 4.3.4), followed by a Normal Routing Area Update
II → I or III → I	Combined Routing Area Update with IMSI attach(**)
III → II	IMSI attach (see subclause 4.4.3), followed by a Normal Routing Area Update

- c) B which reverts to IMSI attached for CS services only in network operation mode III, the MS shall execute:

Table 4.7.1.6.3/3GPP TS 24.008: Mode B which reverts into IMSI attached for CS services only in network operation mode III

Network operation mode change	Procedure to execute
I → II	Normal Location Update(*), followed by a Normal Routing Area Update
I → III	Normal Location Update(*), followed by a GPRS Detach with type indicating "GPRS Detach"
II → III	Normal Location Update (see subclause 4.2.2) if a new LA is entered, followed by a GPRS Detach with detach type indicating "GPRS Detach"
II → I	Combined Routing Area Update with IMSI attach(**)
III → I	Combined GPRS Attach(**)
III → II	Normal Location Update (see subclause 4.2.2) if a new LA is entered, followed by a Normal GPRS Attach

(*) Intended to remove the Gs association in the MSC/VLR.

(**) Intended to establish the Gs association in the MSC/VLR.

Further details are implementation issues.

4.7.1.6.2 Change of network mode of operation in [lu modeUMTS](#) ([lu modeUMTS](#) only)

Whenever an MS moves to a new RA, the procedures executed by the MS depend on the network mode of operation in the old and new routing area.

In case the MS is in state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED and is in operation mode A, the MS shall execute:

Table 4.7.1.6.4/3GPP TS 24.008: Mode A

Network operation mode change	Procedure to execute
I → II	Normal Location Update(*), followed by a Normal Routing Area Update
II → I	Combined Routing Area Update with IMSI attach(**)

(*) Intended to remove the Gs association in the MSC/VLR.

(**) Intended to establish the Gs association in the MSC/VLR.

Further details are implementation issues.

4.7.1.6.3 Change of network mode of operation at lu modeUMTS to A/Gb modeGSM inter-system change

Whenever an MS moves to a new RA supporting the A/Gb modeGSM radio interface, the procedures executed by the MS depend on the network mode of operation in the old and new routing area.

In case the MS is in state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED and is in operation mode:

- a) A in lu modeUMTS, an MS that changes to GPRS operation mode A or B in A/Gb modeGSM shall execute:

Table 4.7.1.6.5/3GPP TS 24.008: Mode A in lu modeUMTS changing to GPRS mode A or B in A/Gb modeGSM

Network operation mode change	Procedure to execute
<u>lu modeUMTS</u> I → <u>A/Gb modeGSM</u> I	Combined Routing Area Update
<u>lu modeUMTS</u> II → <u>A/Gb modeGSM</u> I	Combined Routing Area Update with IMSI attach(**)
<u>lu modeUMTS</u> I → <u>A/Gb modeGSM</u> II or <u>lu modeUMTS</u> I → <u>A/Gb modeGSM</u> III	Normal Location Update(*), followed by a Normal Routing Area Update

- b) A in lu modeUMTS, an MS that changes due to MS specific characteristics to GPRS operation mode C in network operation mode III in GSM-A/Gb mode shall execute:

Table 4.7.1.6.6/3GPP TS 24.008: Mode A in lu modeUMTS changing to GPRS mode C in A/Gb modeGSM

Network operation mode change	Procedure to execute
<u>lu modeUMTS</u> I → <u>A/Gb modeGSM</u> III or <u>lu modeUMTS</u> II → <u>A/Gb modeGSM</u> III	IMSI detach (see subclause 4.3.4), followed by a Normal Routing Area Update

- c) A in Iu modeUMTS, an MS that changes due to MS specific characteristics to IMSI attached for CS services only in network operation mode III in A/Gb modeGSM shall execute:

Table 4.7.1.6.7/3GPP TS 24.008: Mode A in Iu modeUMTS changing to IMSI attached for CS services only in A/Gb modeGSM

Network operation mode change	Procedure to execute
<u>Iu mode</u> UMTS I → <u>A/Gb mode</u> GSM III	Normal Location Update (see subclause 4.4.1)(*), followed by a GPRS Detach with detach type indicating "GPRS Detach"
<u>Iu mode</u> UMTS II → <u>A/Gb mode</u> GSM III	Normal Location Update (see subclause 4.4.1) if a new LA is entered, followed by a GPRS Detach with detach type indicating "GPRS Detach"

- d) C in Iu modeUMTS, the MS shall change to GPRS operation mode C in A/Gb modeGSM and shall execute the normal Routing Area Update procedure.
- e) CS in Iu modeUMTS, the MS shall execute the normal Location Update procedure.

(*) Intended to remove the Gs association in the MSC/VLR.

(**) Intended to establish the Gs association in the MSC/VLR.

Further details are implementation issues.

4.7.1.6.4 Change of network mode of operation at A/Gb modeGSM to Iu modeUMTS inter-system change

Whenever an MS moves to a new RA supporting the Iu modeUMTS radio interface, the procedures executed by the MS depend on the network mode of operation in the old and new routing area.

In case the MS is in state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED and is in operation mode:

- a) A or B in A/Gb modeGSM, the MS shall change to operation mode A in Iu modeUMTS and shall execute:

Table 4.7.1.6.8/3GPP TS 24.008: Mode A or B in A/Gb modeGSM changing to mode A in Iu modeUMTS

Network operation mode change	Procedure to execute
<u>A/Gb mode</u> GSM I → <u>Iu mode</u> UMTS I	Combined Routing Area Update
<u>A/Gb mode</u> GSM II → <u>Iu mode</u> UMTS I	Combined Routing Area Update with IMSI attach(**)
<u>A/Gb mode</u> GSM I → <u>Iu mode</u> UMTS II	Normal Location Update(*), followed by a Normal Routing Area Update
<u>A/Gb mode</u> GSM II → <u>Iu mode</u> UMTS II or <u>A/Gb mode</u> GSM III → <u>Iu mode</u> UMTS II	Normal Location Update if a new LA is entered, followed by a Normal Routing Area Update

- b) C in A/Gb modeGSM, an MS that changes to operation mode C in Iu modeUMTS shall execute a Normal Routing Area Update.

- c) C in [A/Gb modeGSM](#), an MS that, due to MS specific characteristics operated in GPRS operation mode C in network operation mode III in GSM changes to operation mode A in [lu modeUMTS](#) shall execute:

Table 4.7.1.6.9/3GPP TS 24.008: Mode C changing to mode A in [lu modeUMTS](#)

Network operation mode change	Procedure to execute
A/Gb modeGSM III → lu modeUMTS I	Combined Routing Area Update with IMSI attach(**)
A/Gb modeGSM III → lu modeUMTS II	IMSI attach (see subclause 4.4.3), followed by a Normal Routing Area Update

- d) IMSI attached for non-GPRS services only, an MS that, due to MS specific characteristics, operated in network operation mode III in GSM and changes to operation mode A in [lu modeUMTS](#) shall execute:

Table 4.7.1.6.10/3GPP TS 24.008: IMSI attached for non-GPRS services only changing to mode A in [lu modeUMTS](#)

Network operation mode change	Procedure to execute
A/Gb modeGSM III → lu modeUMTS I	Combined GPRS Attach for GPRS and non-GPRS services(**)
A/Gb modeGSM III → lu modeUMTS II	GPRS Attach

(*) Intended to remove the Gs association in the MSC/VLR.

(**) Intended to establish the Gs association in the MSC/VLR.

Further details are implementation issues.

4.7.1.7 Intersystem change between GSM and [lu modeUMTS](#)

For the [lu modeUMTS](#) to [A/Gb modeGSM](#) and [A/Gb modeGSM](#) to [lu modeUMTS](#) intersystem change the following cases can be distinguished:

- a) Intersystem change between cells belonging to different RA's:

The procedures executed by the MS depends on the network mode of operation in the old and new RA. If a change of the network operation mode has occurred in the new RA, then the MS shall behave as specified in subclause 4.7.1.6. If no change of the network operation mode has occurred in the new RA, then the MS shall initiate the normal or combined RA update procedure depending on the network operation mode in the current RA.

- b) Intersystem change between cells belonging to the same RA:

If the READY timer is running in the MS in GSM or the MS is in PMM-CONNECTED mode in [lu modeUMTS](#), then the MS shall perform a normal or combined RA update procedure depending on the network mode of operation in the current RA.

If the READY timer is not running in the MS in GSM or the MS is in PMM-IDLE mode in [lu modeUMTS](#), then the MS shall not perform a RA update procedure (as long as the MS stays within the same RA) until up-link user data or signalling information needs to be sent from the MS to the network, except case c) is applicable.

- If the MS is in the same access network, [A/Gb modeGSM](#) or [lu modeUMTS](#), as when it last sent user data or signalling messages, the procedures defined for that access system shall be followed. This shall be sending of an LLC PDU in a [A/Gb modeGSM](#) cell or initiating the SERVICE REQUEST procedure in an [lu modeUMTS](#) cell.
- If the MS is in a different access network, [A/Gb modeGSM](#) or [lu modeUMTS](#), as when it last sent user data or signalling messages, the normal or combined RA update procedure shall be performed depending on the network operation mode in the current RA, before the sending of user data or signalling messages. If the

signalling message is a DETACH REQUEST containing cause "power off", the RA update procedure need not to be performed.

- If the periodic routing area update timer expires the MS shall initiate the periodic RA update procedure.

If the READY timer is not running in the network in [A/Gb modeGSM](#) or the network is in PMM-IDLE mode in [Iu modeUMTS](#), then the network shall page the MS if down-link user data or signalling information needs to be sent from the network to the MS. This shall include both [A/Gb modeGSM](#) and [Iu modeUMTS](#) cells.

- If the MS receives the paging indication in the same access network, [A/Gb modeGSM](#) or [Iu modeUMTS](#), as when it last sent user data or signalling information, the MS shall send any LLC PDU in a [A/Gb modeGSM](#) cell or shall initiate the SERVICE REQUEST procedure indicating service type "paging response" in an [Iu modeUMTS](#) cell.
- If the MS receives the paging indication in a different access network, [A/Gb modeGSM](#) or [Iu modeUMTS](#), as when it last sent user data or signalling information, the normal or combined RA update procedure shall be performed depending on the network operation mode in the current RA.

- c) Intersystem handover from [A/Gb modeGSM](#) to [Iu modeUMTS](#) during a CS connection:

After the successful completion of the handover from an [A/Gb modeGSM](#) cell to an [Iu modeUMTS](#) cell, an MS which has performed the GPRS suspension procedure in Gb mode (see 3GPP TS 44.018 [84]) (i.e. an MS in MS operation mode B or an DTM MS in a [A/Gb modeGSM](#) cell that does not support DTM) shall perform a normal RA update procedure in the [Iu modeUMTS](#) cell in order to resume the GPRS services in the network, before sending any other signalling messages or user data.

Next Change

4.7.2.1.1 READY timer behaviour ([A/Gb modeGSM](#) only)

The READY timer, T3314 is used in the MS and in the network per each assigned P-TMSI to control the cell updating procedure.

When the READY timer is running or has been deactivated the MS shall perform cell update each time a new cell is selected (see 3GPP TS 43.022 [82]). If a routing area border is crossed, a routing area updating procedure shall be performed instead of a cell update.

When the READY timer has expired the MS shall:

- perform the routing area updating procedure when a routing area border is crossed;
- not perform a cell update when a new cell is selected.

All other GMM procedures are not affected by the READY timer.

The READY timer is started:

- in the MS when the GMM entity receives an indication from lower layers that an LLC frame other than LLC NULL frame has been transmitted on the radio interface; and
- in the network when the GMM entity receives an indication from lower layers that an LLC frame other than LLC NULL frame has been successfully received by the network.

Within GMM signalling procedures the network includes a "force to standby" information element, in order to indicate whether or not the READY timer shall be stopped when returning to the GMM-REGISTERED state. If the "force to standby" information element is received within more than one message during a ongoing GMM specific procedure, the last one received shall apply. If the READY timer is deactivated and the network indicates "force to standby" with the "force to standby" information element, this shall not cause a modification of the READY timer.

The READY timer is not affected by state transitions to and from the GMM-REGISTERED.SUSPENDED sub-state.

The value of the READY timer may be negotiated between the MS and the network using the GPRS attach or GPRS routing area updating procedure.

- If the MS wishes to indicate its preference for a READY timer value it shall include the preferred values into the ATTACH REQUEST and/or ROUTING AREA UPDATE REQUEST messages. The preferred values may be smaller, equal to or greater than the default values or may be equal to the value requesting the READY Timer function to be deactivated.
- Regardless of whether or not a timer value has been received by the network in the ATTACH REQUEST or ROUTING AREA UPDATE REQUEST messages, the network may include a timer value for the READY timer (different or not from the default value) into the ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT messages, respectively. If the READY Timer value was included, it shall be applied for the GMM context by the network and by the MS.
- When the MS proposes a READY Timer value and the Network does not include any READY Timer Value in its answer, then the value proposed by the MS shall be applied for the GMM context by the Network and by the MS.
- When neither the MS nor the Network proposes a READY Timer value into the ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message, then the default value shall be used.

If the negotiated READY timer value indicates that the ready timer function is deactivated, the READY timer shall always run without expiry. If the negotiated READY timer value indicates that the ready timer function is deactivated, and within the same procedure the network indicates "force to standby" with the "force to standby" information element, the READY timer shall always run without expiry. If the negotiated READY timer value is set to zero, READY timer shall be stopped immediately.

To account for the LLC frame uplink transmission delay, the READY timer value should be slightly shorter in the network than in the MS. This is a network implementation issue.

If a new READY timer value is negotiated, the MS shall upon the reception of the ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message perform a initial cell update (either by transmitting a LLC frame or, if required, a ATTACH COMPLETE or ROUTING AREA UPDATE COMPLETE message), in order to apply the new READY timer value immediately. If both the network and the MS supports the Cell Notification, the initial cell update shall use any LLC frame except the LLC NULL frame. If the new READY timer value is set to zero or if the network indicates "force to standby" with the "force to standby" IE, the initial cell update should not be done.

4.7.2.1.2 Handling of READY timer in [lu modeUMTS](#) ([lu modeUMTS](#) only)

The READY timer is not applicable for [lu modeUMTS](#).

An MS may indicate a READY timer value to the network in the ATTACH REQUEST and the ROUTING AREA UPDATE REQUEST messages.

If a READY timer value is received by an MS capable of both [lu modeUMTS](#) and [A/Gb modeGSM](#) in the ATTACH ACCEPT or the ROUTING AREA UPDATE ACCEPT messages, then the received value shall be stored by the MS in order to be used at an intersystem change from [lu modeUMTS](#) to [A/Gb modeGSM](#).

4.7.2.2 Periodic routing area updating

Periodic routing area updating is used to periodically notify the availability of the MS to the network. The procedure is controlled in the MS by the periodic RA update timer, T3312. The value of timer T3312 is sent by the network to the MS in the messages ATTACH ACCEPT and ROUTING AREA UPDATE ACCEPT. The value of the timer T3312 shall be unique within a RA.

In [A/Gb modeGSM](#), the timer T3312 is reset and started with its initial value, when the READY timer is stopped or expires. The timer T3312 is stopped and shall be set to its initial value for the next start when the READY timer is started. If after a READY timer negotiation the READY timer value is set to zero, timer T3312 is reset and started with its initial value. If the initial READY timer value is zero, the timer T3312 is reset and started with its initial value, when the ROUTING AREA UPDATE REQUEST message is transmitted.

In [lu modeUMTS](#), the timer T3312 is reset and started with its initial value, when the MS goes from PMM-CONNECTED to PMM-IDLE mode. The timer T3312 is stopped when the MS enters PMM-CONNECTED mode.

When timer T3312 expires, the periodic routing area updating procedure shall be started and the timer shall be set to its initial value for the next start.

If the MS is in other state than GMM-REGISTERED.NORMAL-SERVICE when the timer expires the periodic routing area updating procedure is delayed until the MS returns to GMM-REGISTERED.NORMAL-SERVICE.

In [A/Gb mode GSM](#), if the MS in MS operation mode B is in the state GMM-REGISTERED.SUSPENDED when the timer expires the periodic routing area updating procedure is delayed until the state is left.

The network supervises the periodic routing area updating procedure by means of the Mobile Reachable timer. The Mobile Reachable timer shall be longer than the periodic RA update timer. When the Mobile Reachable timer expires, typically the network stops sending paging messages to the mobile and may take other appropriate actions.

In [A/Gb mode GSM](#), the Mobile Reachable timer is reset and started with its initial value, when the READY timer is stopped or expires. The Mobile Reachable timer is stopped and shall be set to its initial value for the next start when the READY timer is started.

In [A/Gb mode GSM](#), if after a READY timer negotiation the READY timer value is set to zero the Mobile Reachable timer is reset and started with its initial value. If the initial READY timer value is zero, the Mobile Reachable is reset and started with its initial value, when the ROUTING AREA UPDATE REQUEST message is received.

In [Iu mode UMTS](#), the Mobile Reachable timer is reset and started with its initial value, when the MS goes from PMM-CONNECTED to PMM-IDLE mode. The Mobile Reachable timer is stopped when the MS enters PMM-CONNECTED mode.

If the MS is both IMSI attached for GPRS and non-GPRS services, and if the MS lost coverage of the registered PLMN and timer T3312 expires, then:

- a) if the MS returns to coverage in a cell that supports GPRS and that indicates that the network is in network operation mode I, then the MS shall either perform the combined routing area update procedure indicating "combined RA/LA updating with IMSI attach"; or
- b) if the MS returns to coverage in a cell in the same RA that supports GPRS and that indicates that the network is in network operation mode II or III, then the MS shall perform the periodic routing area updating procedure indicating "Periodic updating"; or
- c) if the MS was both IMSI attached for GPRS and non-GPRS services in network operation mode I and the MS returns to coverage in a cell in the same LA that does not support GPRS, then the MS shall perform the periodic location updating procedure. In addition, the MS shall perform a combined routing area update procedure indicating "combined RA/LA updating with IMSI attach" when the MS enters a cell that supports GPRS and that indicates that the network is in network operation mode I; or
- d) if the MS returns to coverage in a new RA the description given in subclause 4.7.5 applies.

If the MS is both IMSI attached for GPRS and non-GPRS services in a network that operates in network operation mode I, and if the MS has camped on a cell that does not support GPRS, and timer T3312 expires, then the MS shall start an MM location updating procedure. In addition, the MS shall perform a combined routing area update procedure indicating "combined RA/LA updating with IMSI attach" when the MS enters a cell that supports GPRS and indicates that the network is in operation mode I.

If timer T3312 expires during an ongoing CS connection, then a MS operating in MS operation mode B shall treat the expiry of T3312 when the MM state MM-IDLE is entered, analogous to the descriptions for the cases when the timer expires out of coverage or in a cell that does not support GPRS.

In [A/Gb mode GSM](#), timer T3312 shall not be stopped when a GPRS MS enters state GMM-REGISTERED.SUSPENDED.

4.7.2.3 PMM-IDLE mode and PMM-CONNECTED mode ([Iu mode UMTS](#) only)

An MS shall enter PMM-CONNECTED mode when a PS signalling connection for packet switched domain is established between the MS and the network. The MS shall not perform periodic routing area update in PMM-CONNECTED mode.

An MS shall enter PMM-IDLE mode when the PS signalling connection for packet switched domain between the MS and the network has been released. The MS shall perform periodic routing area update in PMM-IDLE mode.

4.7.2.4 Handling of *Force to standby* in [lu modeUMTS](#) ([lu modeUMTS](#) only)

Force to standby is not applicable for [lu modeUMTS](#).

The network shall always indicate *Force to standby not indicated* in the *Force to standby* information element.

The *Force to standby* information element shall be ignored by the MS.

4.7.2.5 RA Update procedure for Signalling Connection Re-establishment ([lu modeUMTS](#) only)

When the MS receives an indication from the lower layers that the RRC connection has been released with cause "Directed signalling connection re-establishment", see 3GPP TS 25.331 [23c] and 3GPP TS 44.118 [110], then the MS shall enter PMM-IDLE mode and initiate immediately a normal routing area update procedure (the use of normal or combined procedure depends on the network operation mode in the current serving cell) regardless whether the routing area has been changed since the last update or not. This routing area update procedure shall also be performed or continued if the MS has performed an inter-system change towards GSM, irrespective whether the READY timer is running or the MS is in PMM-IDLE or PMM-CONNECTED mode.

Next Change

4.7.3.1.1 GPRS attach procedure initiation

In state GMM-DEREGISTERED, the MS initiates the GPRS attach procedure by sending an ATTACH REQUEST message to the network, starts timer T3310 and enters state GMM-REGISTERED-INITIATED.

The MS capable of both [lu modeUMTS](#) and [A/Gb modeGSM](#) or only of [A/Gb modeGSM-system](#) shall include a valid P-TMSI, if any is available, the P-TMSI signature associated with the P-TMSI and the routing area identity associated with the P-TMSI in the ATTACH REQUEST message. If there is no valid P-TMSI available, the IMSI shall be included instead of the P-TMSI and P-TMSI signature.

The MS shall also indicate within the DRX parameters whether it supports the split pg cycle option on CCCH. The optional support of the split pg cycle on CCCH by the network is indicated in SI13 or PSII. Split pg cycle on CCCH is applied by both the network and the MS when the split pg cycle option is supported by both (see 3GPP TS 45.002 [32]).

In [lu modeUMTS](#), if the MS wishes to prolong the established PS signalling connection after the GPRS attach procedure (for example, the MS has any CM application request pending), it may set a follow-on request pending indicator on (see subclause 4.7.13).

Next Change

4.7.3.1.3 GPRS attach accepted by the network

If the GPRS attach request is accepted by the network, an ATTACH ACCEPT message is sent to the MS.

The P-TMSI reallocation may be part of the GPRS attach procedure. When the ATTACH REQUEST includes the IMSI, the SGSN shall allocate the P-TMSI. The P-TMSI that shall be allocated is then included in the ATTACH ACCEPT message together with the routing area identifier. The network shall, in this case, change to state GMM-COMMON-PROCEDURE-INITIATED and shall start timer T3350 as described in subclause 4.7.6. Furthermore, the network may assign a P-TMSI signature for the GMM context which is then also included in the ATTACH ACCEPT message. If the LAI or PLMN identity that has been transmitted in the ATTACH ACCEPT message is a member of any of the "forbidden" lists, any such entry shall be deleted. Additionally, the network shall include the radio priority level to be used by the MS for mobile originated SMS transfer in the ATTACH ACCEPT message. In a shared network, the network shall indicate the PLMN identity of the CN operator that has accepted the GPRS attach request in the RAI contained in the ATTACH ACCEPT message (see 3GPP TS 23.251 [109]).

In [A/Gb modeGSM](#), the Cell Notification information element shall be included in the ATTACH ACCEPT message by the network which indicates that the Cell Notification is supported by the network.

In [Iu mode UMTS](#), the network should prolong the PS signalling connection if the mobile station has indicated a follow-on request pending in ATTACH REQUEST. The network may also prolong the PS signalling connection without any indication from the mobile terminal.

The MS, receiving an ATTACH ACCEPT message, stores the received routing area identification, stops timer T3310, reset the GPRS attach attempt counter, reset the routing area updating attempt counter, enters state GMM-REGISTERED and sets the GPRS update status to GU1 UPDATED.

If the message contains a P-TMSI, the MS shall use this P-TMSI as the new temporary identity for GPRS services. In this case, an ATTACH COMPLETE message is returned to the network. The MS shall delete its old P-TMSI and shall store the new one. If no P-TMSI has been included by the network in the ATTACH ACCEPT message, the old P-TMSI, if any available, shall be kept.

If the message contains a P-TMSI signature, the MS shall use this P-TMSI signature as the new temporary signature for the GMM context. The MS shall delete its old P-TMSI signature, if any is available, and shall store the new one. If the message contains no P-TMSI signature, the old P-TMSI signature, if available, shall be deleted.

The network may also send a list of "equivalent PLMNs" in the ATTACH ACCEPT message. Each entry of the list contains a PLMN code (MCC+MNC). The mobile station shall store the list, as provided by the network, except that any PLMN code that is already in the "forbidden PLMN" list shall be removed from the "equivalent PLMNs" list before it is stored by the mobile station. In addition the mobile station shall add to the stored list the PLMN code of the registered PLMN that sent the list. All PLMNs in the stored list shall be regarded as equivalent to each other for PLMN selection, cell selection/re-selection and handover. The stored list in the mobile station shall be replaced on each occurrence of the ATTACH ACCEPT message. If no list is contained in the message, then the stored list in the mobile station shall be deleted. The list shall be stored in the mobile station while switched off so that it can be used for PLMN selection after switch on.

In [Iu mode UMTS](#), if the network wishes to prolong the PS signalling connection (for example, if the mobile station has indicated "follow-on request pending" in ATTACH REQUEST message) the network shall indicate the "follow-on proceed" in the ATTACH ACCEPT message.

After that in [Iu mode UMTS](#), the mobile station shall act according to the follow-on proceed flag included in the Attach result information element in the ATTACH ACCEPT message (see subclause 4.7.13).

In [A/Gb mode GSM](#), if the ATTACH ACCEPT message contains the Cell Notification information element, then the MS shall start to use the LLC NULL frame to perform cell updates. The network receiving an ATTACH COMPLETE message stops timer T3350, changes to GMM-REGISTERED state and considers the P-TMSI sent in the ATTACH ACCEPT message as valid.

The network may also send a list of local emergency numbers in the ATTACH ACCEPT, by including the Emergency Number List IE. The mobile equipment shall store the list, as provided by the network, except that any emergency number that is already stored in the SIM/USIM shall be removed from the list before it is stored by the mobile equipment. If there are no emergency numbers stored on the SIM/USIM, then before storing the received list the mobile equipment shall remove from it any emergency number stored permanently in the ME for use in this case (see 3GPP TS 22.101 [8]). The list stored in the mobile equipment shall be replaced on each receipt of a new Emergency Number List IE.

The emergency number(s) received in the Emergency Number List IE are valid only in networks with the same MCC as in the cell on which this IE is received. If no list is contained in the ATTACH ACCEPT message, then the stored list in the mobile equipment shall be kept, except if the mobile equipment has successfully registered to a PLMN with an MCC different from that of the last registered PLMN.

The mobile equipment shall use the stored list of emergency numbers received from the network in addition to the emergency numbers stored on the SIM/USIM or ME to detect that the number dialled is an emergency number.

NOTE: The mobile equipment may use the emergency numbers list to assist the end user in determining whether the dialled number is intended for an emergency service or for another destination, e.g. a local directory service. The possible interactions with the end user are implementation specific.

The list of emergency numbers shall be deleted at switch off and removal of the SIM/USIM. The mobile equipment shall be able to store up to ten local emergency numbers received from the network.

Next Change

4.7.3.1.5 Abnormal cases in the MS

The following abnormal cases can be identified:

- a) Access barred because of access class control

The GPRS attach procedure shall not be started. The MS stays in the current serving cell and applies normal cell reselection process. The GPRS attach procedure is started as soon as possible, i.e. when access is granted or because of a cell change.

- b) Lower layer failure before the ATTACH ACCEPT or ATTACH REJECT message is received

The procedure shall be aborted. The MS shall proceed as described below.

- c) T3310 time-out

On the first expiry of the timer, the MS shall reset and restart timer T3310 and shall retransmit the ATTACH REQUEST message. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3310, the MS shall abort the GPRS attach procedure and, in Iu modeUMTS, release the PS signalling connection (see 3GPP TS 25.331 [23c]). The MS shall proceed as described below.

- d) ATTACH REJECT, other causes than those treated in subclause 4.7.3.1.4

Upon reception of the cause codes # 95, # 96, # 97, # 99 and # 111 the MS should set the GPRS attach attempt counter to 5. The MS shall proceed as described below.

- e) Change of cell within the same RA (A/Gb modeGSM-only)

If a cell change occurs within the same RA when the MS is in state GMM-REGISTERED-INITIATED, then the cell update procedure shall be performed before completion of the attach procedure.

- f) Change of cell into a new routing area

If a cell change into a new routing area occurs before an ATTACH ACCEPT or ATTACH REJECT message has been received, the GPRS attach procedure shall be aborted and re-initiated immediately. If a routing area border is crossed when the ATTACH ACCEPT message is received but before an ATTACH COMPLETE message is sent, the GPRS attach procedure shall be aborted and the routing area updating procedure shall be initiated. If a P-TMSI was allocated during the GPRS attach procedure, this P-TMSI shall be used in the routing area updating procedure. If a P-TMSI signature was allocated together with the P-TMSI during the GPRS attach procedure, this P-TMSI signature shall be used in the routing area updating procedure.

- g) Mobile originated detach required

If the MS is in state GMM-REGISTERED-INITIATED, the GPRS attach procedure shall be aborted and the GPRS detach procedure shall be performed (see subclause 4.7.4.1).

- h) Procedure collision

If the MS receives a DETACH REQUEST message from the network in state GMM-REGISTERED-INITIATED with type of detach 're-attach not required', the GPRS detach procedure shall be progressed and the GPRS attach procedure shall be aborted. Otherwise the GPRS attach procedure shall be progressed and the DETACH REQUEST message shall be ignored.

In cases b, c and d the MS shall proceed as follows. Timer T3310 shall be stopped if still running. The GPRS attach attempt counter shall be incremented.

If the GPRS attach attempt counter is less than 5:

- timer T3311 is started and the state is changed to GMM-DEREGISTERED.ATTEMPTING-TO-ATTACH.

If the GPRS attach attempt counter is greater than or equal to 5:

- the MS shall delete any RAI, P-TMSI, P-TMSI signature, list of equivalent PLMNs, and GPRS ciphering key sequence number, shall set the GPRS update status to GU2 NOT UPDATED, shall start timer T3302. The state is changed to GMM-DEREGISTERED. ATTEMPTING-TO-ATTACH or optionally to GMM-DEREGISTERED.PLMN-SEARCH (see subclause 4.2.4.1.2) in order to perform a PLMN selection according to 3GPP TS 23.122 [14].

Next Change

4.7.3.2.1 Combined GPRS attach procedure initiation

If the MS is in GMM state GMM-DEREGISTERED and in MM state MM IDLE, the MS initiates the combined GPRS attach procedure by sending an ATTACH REQUEST message to the network, starts timer T3310 and enters state GMM-REGISTERED-INITIATED and MM LOCATION UPDATING PENDING.

The MS shall include a valid P-TMSI, if available, the P-TMSI signature associated with the P-TMSI and the routing area identity associated with the P-TMSI in the ATTACH REQUEST message. If there is no valid P-TMSI available, the IMSI shall be included instead of the P-TMSI and P-TMSI signature. Furthermore the MS shall include the TMSI status IE if no valid TMSI is available.

In [Iu mode UMTS](#), if the MS wishes to prolong the established PS signalling connection after the GPRS attach (for example, the MS has any CM application request pending), it may set a follow-on request pending indicator on (see subclause 4.7.13).

Next Change

4.7.3.2.3 Combined GPRS attach accepted by the network

Depending on the value of the attach result IE received in the ATTACH ACCEPT message, two different cases can be distinguished:

- Case 1) The attach result IE value indicates "combined GPRS attach": IMSI attach for GPRS and non-GPRS services have been successful.
- Case 2) The attach result IE value indicates "GPRS only": IMSI attach for GPRS services has been successful but IMSI attach for non-GPRS services has not been successful.

In [Iu mode UMTS](#), if the network wishes to prolong the PS signalling connection (for example, if the mobile station has indicated "follow-on request pending" in ATTACH REQUEST message) the network shall indicate the "follow-on proceed" in the ATTACH ACCEPT message.

After that in [Iu mode UMTS](#), the mobile station shall act according to the follow-on proceed flag included in the Attach result information element in the ATTACH ACCEPT message (see subclause 4.7.13).

Next Change

4.7.4 GPRS detach procedure

The GPRS detach procedure is used:

- to detach the IMSI for GPRS services only. Independent of the network operation mode, this procedure is used by all kind of GPRS MSs;
- as a combined GPRS detach procedure used by GPRS MSs operating in MS operation mode A or B to detach the IMSI for GPRS and non-GPRS services or for non-GPRS services only, if the network operates in network operation mode I; or

- in the case of a network failure condition to indicate to the MS that a re-attach with successive activation of previously active PDP contexts shall be performed. In this case, the MS may also perform the procedures needed in order to activate any previously active multicast service(s).

After completion of a GPRS detach procedure or combined GPRS detach procedure for GPRS and non-GPRS services the GMM context is released.

The GPRS detach procedure shall be invoked by the MS if the MS is switched off, the SIM/USIM card is removed from the MS or if the GPRS or non-GPRS capability of the MS is disabled. The procedure may be invoked by the network to detach the IMSI for GPRS services. The GPRS detach procedure causes the MS to be marked as inactive in the network for GPRS services, non-GPRS services or both services.

In [A/Gb mode GSM](#), if the GPRS detach procedure is performed, the PDP contexts and the MBMS contexts, if any, are deactivated locally without peer to peer signalling between the SM and LLC entities in the MS and the network.

In [Iu mode UMTS](#), if the GPRS detach procedure is performed, the PDP contexts and the MBMS contexts, if any, are deactivated locally without peer to peer signalling between the SM entities in the MS and the network.

Next Change

4.7.4.1.2 MS initiated GPRS detach procedure completion for GPRS services only

When the DETACH REQUEST message is received by the network, the network shall send a DETACH ACCEPT message to the MS, if the detach type IE value indicates that the detach request has not been sent due to switching off. If switching off was indicated, the procedure is completed when the network receives the DETACH REQUEST message. The network and the MS shall deactivate the PDP contexts, the MBMS contexts and deactivate the logical link(s), if any.

The MS is marked as inactive in the network for GPRS services; state GMM-DEREGISTERED is entered in the MS and the network.

In [Iu mode UMTS](#), if the detach has been sent due to switching off, then the network shall release the resources in the lower layers for this MS (see 3GPP TS 25.331 [23c]).

NOTE: When the DETACH REQUEST message is received by the network, and if the detach type IE value indicates that the detach is not due to power off, the authentication and ciphering procedure as well as the identification procedure may be performed.

4.7.4.1.3 MS initiated combined GPRS detach procedure completion

When the DETACH REQUEST message is received by the network, a DETACH ACCEPT message shall be sent to the MS, if the detach type IE value indicates that the detach request has not been sent due to switching off. Depending on the value of the detach type IE the following applies:

GPRS/IMSI detach:

The MS is marked as inactive in the network for GPRS and for non-GPRS services. The network and the MS shall deactivate the PDP contexts, the MBMS contexts and deactivate the logical link(s), if any. The States GMM-DEREGISTERED and MM NULL are entered in both the MS and the network.

In [Iu mode UMTS](#), if the detach has been sent due to switching off, then the network shall release the resources in the lower layers for this MS (see 3GPP TS 25.331 [23c]).

IMSI detach:

The MS is marked as inactive in the network for non-GPRS services. State MM NULL is entered in the MS and the network.

4.7.4.1.4 Abnormal cases in the MS

The following abnormal cases can be identified:

- a) T3321 time-out

On the first expiry of the timer, the MS shall retransmit the DETACH REQUEST message and shall reset and restart timer T3321. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3321, the GPRS detach procedure shall be aborted, the MS shall change to state:

- MM-NULL if "IMSI detach" was requested;
- GMM-REGISTERED.NORMAL-SERVICE if "IMSI Detach" was requested;
- GMM-DEREGISTERED if "GPRS detach" was requested;
- GMM-DEREGISTERED and MM-NULL if "GPRS/IMSI" detach was requested.

b) Lower layer failure before reception of DETACH ACCEPT message

The detach procedure is aborted and the MS shall change to state:

- MM-NULL if "IMSI detach" was requested;
- GMM-REGISTERED.NORMAL-SERVICE if "IMSI Detach" was requested;
- GMM-DEREGISTERED if "GPRS detach" was requested;
- GMM-DEREGISTERED and MM-NULL if "IMSI/GPRS" detach was requested.

c) Detach procedure collision

If the MS receives a DETACH REQUEST message before the MS initiated GPRS detach procedure has been completed, a DETACH ACCEPT message shall be sent to the network.

d) Detach and GMM common procedure collision

GPRS detach containing cause "power off":

- If the MS receives a message used in a GMM common procedure before the GPRS detach procedure has been completed, this message shall be ignored and the GPRS detach procedure shall continue.

GPRS detach containing other causes than "power off":

- If the MS receives a P-TMSI REALLOCATION COMMAND, a GMM STATUS, or a GMM INFORMATION message before the GPRS detach procedure has been completed, this message shall be ignored and the GPRS detach procedure shall continue.
- If the MS receives an AUTHENTICATION AND CIPHERING REQUEST or IDENTITY REQUEST message, before the GPRS detach procedure has been completed, the MS shall respond to it as described in subclause 4.7.7 and 4.7.8 respectively.

e) Change of cell within the same RA ([A/Gb mode](#)~~GSM~~ only)

If a cell change occurs within the same RA before a DETACH ACCEPT message has been received, then the cell update procedure shall be performed before completion of the detach procedure.

f) Change of cell into a new routing area

If a cell change into a new routing area occurs before a DETACH ACCEPT message has been received, the GPRS detach procedure shall be aborted and re-initiated after successfully performing a routing area updating procedure. If the detach procedure is performed due to the removal of the SIM/USIM the MS shall abort the detach procedure and enter the state GMM-DEREGISTERED.

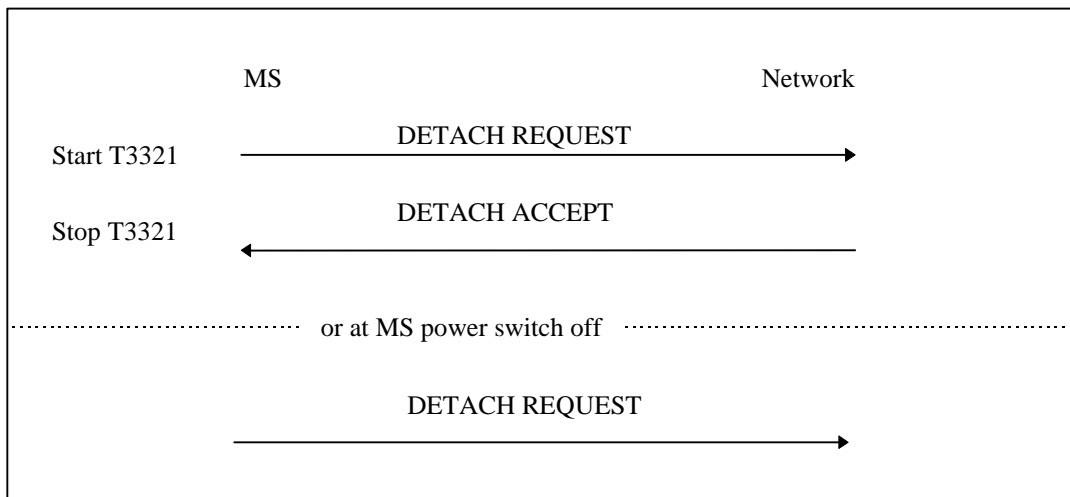


Figure 4.7.4/1 3GPP TS 24.008: MS initiated GPRS detach procedure

Next Change

4.7.5 Routing area updating procedure

This procedure is used for:

- normal routing area updating to update the registration of the actual routing area of an MS in the network. This procedure is used by GPRS MSs in MS operation mode C and by GPRS MSs in MS operation modes A or B that are IMSI attached for GPRS and non-GPRS services if the network operates in network operation mode II or III;
- combined routing area updating to update the registration of the actual routing and location area of an MS in the network. This procedure is used by GPRS MSs in MS operation modes A or B that are IMSI attached for GPRS and non-GPRS services provided that the network operates in network operation mode I;
- periodic routing area updating. This procedure is used by GPRS MSs in MS operation mode C and by GPRS MSs in MS operation modes A or B that are IMSI attached for GPRS or for GPRS and non-GPRS services independent of the network operation mode;
- IMSI attach for non-GPRS services when the MS is IMSI attached for GPRS services. This procedure is used by GPRS MSs in MS operation modes A or B, if the network operates in network operation mode I;
- in [A/Gb mode GSM](#), resuming GPRS services when the RR sublayer indicated a resumption failure after dedicated mode was left, see 3GPP TS 44.018 [84];
- in [A/Gb mode GSM](#), updating the network with the new MS Radio Access Capability IE when the content of the IE has changed;
- updating the network with the new DRX parameter IE when the content of the IE has changed;

NOTE 1: Such changes can be used e.g. when the MS activates a PDP context with service requirements that cannot be met with the current DRX parameter. As PDP context(s) are activated and deactivated, the GMM context will be updated with an appropriate DRX parameter;

- [Iu mode UMTS](#) to [A/Gb mode GSM](#) and for [A/Gb mode GSM](#) to [Iu mode UMTS](#) intersystem change, see subclause 4.7.1.7; or
- in [Iu mode UMTS](#), to re-synchronize the PMM mode of MS and network after RRC connection release with cause "Directed signalling connection re-establishment", see subclause 4.7.2.5.

The routing area updating procedure shall also be used by a MS which is attached for GPRS services if a new PLMN is entered (see 3GPP TS 23.122 [14]).

Subclause 4.7.5.1 describes the routing area updating procedures for updating the routing area only. The combined routing area updating procedure used to update both the routing and location area is described in subclause 4.7.5.2.

The routing area updating procedure is always initiated by the MS. It is only invoked in state GMM-REGISTERED.

To limit the number of subsequently rejected routing area update attempts, a routing area updating attempt counter is introduced. The routing area updating attempt counter shall be incremented as specified in subclause 4.7.5.1.5.

Depending on the value of the routing area updating attempt counter, specific actions shall be performed. The routing area updating attempt counter shall be reset when:

- a GPRS attach procedure is successfully completed; or
- a routing area updating procedure is successfully completed;

and additionally when the MS is in substate ATTEMPTING-TO-UPDATE:

- a new routing area is entered;
- expiry of timer T3302; or
- at request from registration function.

The mobile equipment shall contain a list of "forbidden location areas for roaming", as well as a list of "forbidden location areas for regional provision of service". The handling of these lists is described in subclause 4.4.1.

The Mobile Equipment shall contain a list of "equivalent PLMNs". The handling of this list is described in subclause 4.4.1.

In [A/Gb mode GSM](#), user data transmission in the MS shall be suspended during the routing area updating procedure; user data reception shall be possible. User data transmission in the network may be suspended during the routing area updating procedure.

In [Iu mode UMTS](#), user data transmission and reception in the MS shall not be suspended during the routing area updating procedure. User data transmission in the network shall not be suspended during the routing area updating procedure.

In [Iu mode UMTS](#), when a ROUTING AREA UPDATE REQUEST is received by the SGSN over a new PS signalling connection while there is an ongoing PS signalling connection (network is already in mode PMM-CONNECTED) for this UE, the network shall progress the routing area update procedure as normal and release the previous PS signalling connection when the routing area update procedure has been accepted by the network.

NOTE 2: The re-establishment of the radio bearers of active PDP contexts is done as described in subclause "Service Request procedure".

The network informs the MS about the support of specific features, such as LCS-MOLR, in the "Network feature support" Information Element. The information is either explicitly given by sending the "Network feature support" IE or implicitly by not sending it. The handling in the network is described in subclause 9.4.15.11. The MS may use the indication to inform the user about the availability of the appropriate services and it shall not request services that have not been indicated as available.

4.7.5.1 Normal and periodic routing area updating procedure

Periodic routing area updating is used to periodically notify the availability of the MS to the network. The value of the update type IE in the ROUTING AREA UPDATE REQUEST message shall indicate "periodic updating". The procedure is controlled in the MS by timer T3312. When timer T3312 expires, the periodic routing area updating procedure is started. Start and reset of timer T3312 is described in subclause 4.7.2.2.

In [A/Gb mode GSM](#), the normal routing area updating procedure is initiated:

- when the MS detects a change of the routing area in state GMM-REGISTERED;
- when the MS determines that GPRS resumption shall be performed;
- when the MS needs to update the network with the new MS Radio Access Capability IE; or
- when the MS needs to update the network with the new DRX parameter IE.

The ROUTING AREA UPDATE REQUEST message shall always be the first data sent by the MS when a routing area border is crossed. The routing area identification is broadcast on the broadcast channel(s).

In [Iu mode UMTS](#), the normal routing area updating procedure is initiated when the MS detects a change of the routing area in state GMM-REGISTERED. The ROUTING AREA UPDATE REQUEST message shall always be the first GMM message sent by the MS when a routing area border is crossed.

A normal routing area updating shall abort any ongoing GMM procedure. Aborted GMM procedures may be repeated after the normal routing area updating procedure has been successfully performed. The value of the update type IE included in the message shall indicate "normal routing area updating".

4.7.5.1.1 Normal and periodic routing area updating procedure initiation

To initiate the normal routing area updating procedure, the MS sends the message ROUTING AREA UPDATE REQUEST to the network, starts timer T3330 and changes to state GMM-ROUTING-AREA-UPDATING-INITIATED. The message ROUTING AREA UPDATE REQUEST shall contain the P-TMSI signature when received within a previous ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message.

In [Iu mode UMTS](#), if the MS wishes to prolong the established PS signalling connection after the normal routing area updating procedure (for example, the MS has any CM application request pending), it may set a follow-on request pending indicator on (see subclause 4.7.13).

4.7.5.1.2 GMM Common procedure initiation

The network may initiate GMM common procedures, e.g. the GMM authentication and ciphering procedure.

4.7.5.1.3 Normal and periodic routing area updating procedure accepted by the network

If the routing area updating request has been accepted by the network, a ROUTING AREA UPDATE ACCEPT message shall be sent to the MS. The network may assign a new P-TMSI and/or a new P-TMSI signature for the MS. If a new P-TMSI and/or P-TMSI signature have been assigned to the MS, it/they shall be included in the ROUTING AREA UPDATE ACCEPT message together with the routing area identification. In a shared network the network shall indicate the PLMN identity of the CN operator that has accepted the routing area updating request in the RAI contained in the ROUTING AREA UPDATE ACCEPT message (see 3GPP TS 23.251 [109]).

If a new DRX parameter was included in the ROUTING AREA UPDATE REQUEST message, the network shall store the new DRX parameter and use it for the downlink transfer of signalling and user data.

In [A/Gb mode GSM](#) the Cell Notification information element shall be included in the ROUTING AREA UPDATE ACCEPT message in order to indicate the ability of the network to support the Cell Notification.

The network shall change to state GMM-COMMON-PROCEDURE-INITIATED and shall start the supervision timer T3350 as described in subclause 4.7.6.

If the LAI or PLMN identity contained in the ROUTING AREA UPDATE ACCEPT message is a member of any of the "forbidden" lists then any such entry shall be deleted.

In [Iu mode UMTS](#), the network should prolong the PS signalling connection if the mobile station has indicated a follow-on request pending in ROUTING AREA UPDATE REQUEST. The network may also prolong the PS signalling connection without any indication from the mobile terminal.

If the PDP context status information element is included in ROUTING AREA UPDATE REQUEST message, then the network shall deactivate all those PDP contexts locally (without peer to peer signalling between the MS and the network), which are not in SM state PDP-INACTIVE on network side but are indicated by the MS as being in state PDP-INACTIVE.

Upon receipt of a ROUTING AREA UPDATE ACCEPT message, the MS stores the received routing area identification, stops timer T3330, shall reset the routing area updating attempt counter and sets the GPRS update status to GU1 UPDATED. If the message contains a P-TMSI, the MS shall use this P-TMSI as new temporary identity for GPRS services and shall store the new P-TMSI. If no P-TMSI was included by the network in the ROUTING AREA UPDATING ACCEPT message, the old P-TMSI shall be kept. Furthermore, the MS shall store the P-TMSI signature if received in the ROUTING AREA UPDATING ACCEPT message. If no P-TMSI signature was included in the message, the old P-TMSI signature, if available, shall be deleted.

If the ROUTING AREA UPDATE REQUEST message was used to update the network with a new DRX parameter IE, the MS shall start using the new DRX parameter upon receipt of the ROUTING AREA UPDATE ACCEPT message.

If the PDP context status information element is included in ROUTING AREA UPDATE ACCEPT message, then the MS shall deactivate all those PDP contexts locally (without peer to peer signalling between the MS and network), which are not in SM state PDP-INACTIVE in the MS but are indicated by the network as being in state PDP-INACTIVE.

In [A/Gb mode GSM](#), if the ROUTING AREA UPDATE ACCEPT message contains the Cell Notification information element, then the MS shall start to use the LLC NULL frame to perform cell updates.

The network may also send a list of "equivalent PLMNs" in the ROUTING AREA UPDATE ACCEPT message. Each entry of the list contains a PLMN code (MCC+MNC). The mobile station shall store the list, as provided by the network, except that any PLMN code that is already in the "forbidden PLMN" list shall be removed from the "equivalent PLMNs" list before it is stored by the mobile station. In addition the mobile station shall add to the stored list the PLMN code of the registered PLMN that sent the list. All PLMNs in the stored list shall be regarded as equivalent to each other for PLMN selection, cell selection/re-selection and handover. The stored list in the mobile station shall be replaced on each occurrence of the ROUTING AREA UPDATE ACCEPT message. If no list is contained in the message, then the stored list in the mobile station shall be deleted. The list shall be stored in the mobile station while switched off so that it can be used for PLMN selection after switch on.

A ROUTING AREA UPDATE COMPLETE message shall be returned to the network if the ROUTING AREA UPDATE ACCEPT message contained:

- a P-TMSI; and/or
- Receive N-PDU Numbers (see 3GPP TS 44.065 [78] and 3GPP TS 25.322).

In the latter case the Receive N-PDU Numbers values valid in the MS, shall be included in the ROUTING AREA UPDATE COMPLETE message.

NOTE 1: In [Iu mode UMTS](#), after a routing area updating procedure, the mobile station can initiate Service Request procedure to request the resource reservation for the active PDP contexts if the resources have been released by the network or send upper layer message (e.g. ACTIVATE PDP CONTEXT REQUEST) to the network via the existing PS signalling connection.

In [Iu mode UMTS](#), if the network wishes to prolong the PS signalling connection (for example, if the mobile station has indicated "follow-on request pending" in ROUTING AREA UPDATE REQUEST message) the network shall indicate the "follow-on proceed" in the ROUTING AREA UPDATE ACCEPT message.

After that in [Iu mode UMTS](#), the mobile station shall act according to the follow-on proceed flag included in the Update result information element in the ROUTING AREA UPDATE ACCEPT message (see subclause 4.7.13).

The network may also send a list of local emergency numbers in the ROUTING AREA UPDATE ACCEPT, by including the Emergency Number List IE. The mobile equipment shall store the list, as provided by the network, except that any emergency number that is already stored in the SIM/USIM shall be removed from the list before it is stored by the mobile equipment. If there are no emergency numbers stored on the SIM/USIM, then before storing the received list the mobile equipment shall remove from it any emergency number stored permanently in the ME for use in this case (see 3GPP TS 22.101 [8]). The list stored in the mobile equipment shall be replaced on each receipt of a new Emergency Number List IE.

The emergency number(s) received in the Emergency Number List IE are valid only in networks with the same MCC as in the cell on which this IE is received. If no list is contained in the ROUTING AREA UPDATE ACCEPT message, then the stored list in the mobile equipment shall be kept, except if the mobile equipment has successfully registered to a PLMN with an MCC different from that of the last registered PLMN.

The mobile equipment shall use the stored list of emergency numbers received from the network in addition to the emergency numbers stored on the SIM/USIM or ME to detect that the number dialled is an emergency number.

NOTE 2: The mobile equipment may use the emergency numbers list to assist the end user in determining whether the dialled number is intended for an emergency service or for another destination, e.g. a local directory service. The possible interactions with the end user are implementation specific.

The list of emergency numbers shall be deleted at switch off and removal of the SIM/USIM. The mobile equipment shall be able to store up to ten local emergency numbers received from the network.

Next Change

4.7.5.1.5 Abnormal cases in the MS

The following abnormal cases can be identified:

- a) Access barred because of access class control

The routing area updating procedure shall not be started. The MS stays in the current serving cell and applies the normal cell reselection process. The procedure is started as soon as possible and if still necessary, i.e. when the barred state is removed or because of a cell change.

- b) Lower layer failure before the ROUTING AREA UPDATE ACCEPT or ROUTING AREA UPDATE REJECT message is received

The procedure shall be aborted. The MS shall proceed as described below.

- c) T3330 time-out

The procedure is restarted four times, i.e. on the fifth expiry of timer T3330, the MS shall abort the procedure and, in [lu mode](#) **UMTS**, release the PS signalling connection (see 3GPP TS 25.331 [23c]). The MS shall proceed as described below.

- d) ROUTING AREA UPDATE REJECT, other causes than those treated in subclause 4.7.5.1.4

Upon reception of the cause codes # 95, # 96, # 97, # 99 and # 111 the MS should set the routing area updating attempt counter to 5. The MS shall proceed as described below.

- e) If a routing area border is crossed, when the MS is in state GMM-ROUTING-AREA-UPDATE-INITIATED, the routing area updating procedure shall be aborted and re-initiated immediately. The MS shall set the GPRS update status to GU2 NOT UPDATED.

- f) In [A/Gb mode](#) **GSM**, if a cell change occurs within the same RA, when the MS is in state GMM-ROUTING-AREA-UPDATE-INITIATED, the cell update procedure is performed, before completion of the routing area updating procedure.

- g) Routing area updating and detach procedure collision

GPRS detach containing detach type "re-attach required" or "re-attach not required":

If the MS receives a DETACH REQUEST message before the routing area updating procedure has been completed, the routing area updating procedure shall be aborted and the GPRS detach procedure shall be progressed.

GPRS detach containing detach type "IMSI detach":

If the MS receives a DETACH REQUEST message before the routing area updating procedure has been completed, the routing area updating procedure shall be progressed, i.e. the DETACH REQUEST message shall be ignored.

- h) Routing area updating and P-TMSI reallocation procedure collision

If the MS receives a P-TMSI REALLOCATION REQUEST message before the routing area updating procedure has been completed, the P-TMSI reallocation procedure shall be aborted and the routing area updating procedure shall be progressed.

In cases b, c and d the MS shall proceed as follows:

Timer T3330 shall be stopped if still running. The routing area updating attempt counter shall be incremented.

If the routing area updating attempt counter is less than 5, and the stored RAI is equal to the RAI of the current serving cell and the GMM update status is equal to GU1 UPDATED:

- the MS shall keep the GMM update status to GU1 UPDATED and changes state to GMM-REGISTERED.NORMAL-SERVICE. The MS shall start timer T3311. When timer T3311 expires the routing area updating procedure is triggered again.

If the routing area updating attempt counter is less than 5, and the stored RAI is different to the RAI of the current serving cell or the GMM update status is different to GU1 UPDATED:

- the MS shall start timer T3311, shall set the GPRS update status to GU2 NOT UPDATED and changes state to GMM-REGISTERED.ATTEMPTING-TO-UPDATE.

If the routing area updating attempt counter is greater than or equal to 5:

- the MS shall start timer T3302, shall delete the list of equivalent PLMNs, shall set the GPRS update status to GU2 NOT UPDATED and shall change to state GMM-REGISTERED.ATTEMPTING-TO-UPDATE or optionally to GMM-REGISTERED.PLMN-SEARCH(see subclause 4.2.5.1.8) in order to perform a PLMN selection according to 3GPP TS 23.122 [14].

Next Change

4.7.5.2.1 Combined routing area updating procedure initiation

The combined routing area updating procedure is initiated only by a GPRS MS operating in MS operation modes A or B, if the MS is in state GMM-REGISTERED and MM-IDLE, and if the network operates in network operation mode I:

- when a GPRS MS that is IMSI attached for GPRS and non-GPRS services detects a change of the routing area in state GMM-REGISTERED and MM-IDLE;
- when a GPRS MS that is IMSI attached for GPRS services wants to perform an IMSI attach for non-GPRS services;
- after termination of a non-GPRS service via non-GPRS channels to update the association if the MS has changed the RA during that non-GPRS service transaction;
- after termination of non-GPRS service via non-GPRS channels to update the association if GPRS services were suspended during the non-GPRS service but no resume is received. See 3GPP TS 23.060 subclause 16.2.1;
- after a CM SERVICE REJECT message with cause value #4 is received by the mobile station (see subclause 4.5.1.1); in this case the update type IE shall be set to "Combined RA/LA updating with IMSI attach";
- when a GPRS MS needs to update the network with the new MS Radio Access Capability IE;
- when a GPRS MS needs to update the network with a new DRX parameter IE; or
- in [Iu mode UMTS](#), to re-synchronize the PMM mode of MS and network after RRC connection release with cause "Directed signalling connection re-establishment", see subclause 4.7.2.5.

In [A/Gb mode GSM](#), the routing and location area identification are broadcast on the broadcast channel(s). A combined routing area updating procedure shall abort any ongoing GMM procedure. Aborted GMM procedures shall be repeated after the combined routing area updating procedure has been successfully performed. The ROUTING AREA UPDATE REQUEST message shall always be the first message sent from the MS in the new routing area after routing area change.

In [Iu mode UMTS](#), the routing and location area identification are broadcast on the broadcast channel(s) or sent to the MS via the PS signaling connection. A combined routing area updating procedure shall abort any ongoing GMM procedure. Aborted GMM procedures may be repeated after the combined routing area updating procedure has been successfully performed. The ROUTING AREA UPDATE REQUEST message shall always be the first GMM message sent from the MS in the new routing area after routing area change.

To initiate a combined routing area updating procedure the MS sends the message ROUTING AREA UPDATE REQUEST to the network, starts timer T3330 and changes to state GMM-ROUTING-UPDATING-INITIATED and MM LOCATION UPDATING PENDING. The value of the update type IE in the message shall indicate "combined RA/LA updating". If for the last attempt to update the registration of the location area a MM specific procedure was performed, the value of the update type IE in the ROUTING AREA UPDATE REQUEST message shall indicate

"combined RA/LA updating with IMSI attach". Furthermore the MS shall include the TMSI status IE if no valid TMSI is available.

A GPRS MS in MS operation modes A or B that is in an ongoing circuit-switched transaction, shall initiate the combined routing area updating procedure after the circuit-switched transaction has been released, if the MS has changed the RA during the circuit-switched transaction and if the network operates in network operation mode I.

A GPRS MS in MS operation mode A shall initiate the combined routing area updating procedure with IMSI attach after the circuit-switched transaction has been released if a GPRS attach was performed during the circuit-switched transaction and provided that the network operates in network operation mode I.

A GPRS MS in MS operation mode A shall perform the normal routing area update procedure during an ongoing circuit-switched transaction.

| In [Iu modeUMTS](#), if the MS wishes to prolong the established PS signalling connection after the normal routing area updating procedure (for example, the MS has any CM application request pending), it may set a follow-on request pending indicator on (see subclause 4.7.13).

| In [Iu modeUMTS](#), when a ROUTING AREA UPDATE REQUEST is received by the SGSN over a new PS signalling connection while there is an ongoing PS signalling connection (network is already in mode PMM-CONNECTED) for this UE, the network shall progress the routing area update procedure as normal and release the previous PS signalling connection when the routing area update procedure has been accepted by the network.

NOTE: The re-establishment of the radio bearers of active PDP contexts is done as described in subclause "Service Request procedure".

4.7.5.2.2 GMM Common procedure initiation

The network may initiate GMM common procedures, e.g. the GMM authentication and ciphering procedure.

4.7.5.2.3 Combined routing area updating procedure accepted by the network

Depending on the value of the update result IE received in the ROUTING AREA UPDATE ACCEPT message, two different cases can be distinguished:

- Case 1) The update result IE value indicates "combined RA/LA": Routing and location area updating is successful;
- Case 2) The update result IE value indicates "RA only": Routing area updating is successful, but location area updating is not successful.

A ROUTING AREA UPDATE COMPLETE message shall be returned to the network if the ROUTING AREA UPDATE ACCEPT message contains:

- a P-TMSI and/or a TMSI; and/or
- Receive N-PDU Numbers (see 3GPP TS 44.065 [78] and 3GPP TS 25.322).

In the latter case, the Receive N-PDU Numbers that are valid in the MS shall be included in the ROUTING AREA UPDATE COMPLETE message.

| In [Iu modeUMTS](#), if the network wishes to prolong the PS signalling connection (for example, if the mobile station has indicated "follow-on request pending" in ROUTING AREA UPDATE REQUEST message) the network shall indicate the "follow-on proceed" in the ROUTING AREA UPDATE ACCEPT message.

| After that in [Iu modeUMTS](#), the mobile station shall act according to the follow-on proceed flag included in the Update result information element in the ROUTING AREA UPDATE ACCEPT message (see subclause 4.7.13).

Next Change

4.7.6.3 P-TMSI reallocation completion by the network

Upon receipt of the P-TMSI REALLOCATION COMPLETE message, the network stops the timer T3350 and considers both the old and the new P-TMSI and the corresponding P-TMSI signatures as valid until the old P-TMSI can be considered as invalid by the network (see subclause 4.7.1.5).

In [A/Gb mode GSM](#), the GMM layer shall notify the LLC layer that the P-TMSI has been changed (see 3GPP TS 44.064 [78a]).

Next Change

4.7.7a Authentication and ciphering procedure used for UMTS authentication challenge.

The purpose of the authentication and ciphering procedure is fourfold (see 3GPP TS 33.102 [5a]):

- to permit the network to check whether the identity provided by the MS is acceptable or not;
- to provide parameters enabling the MS to calculate a new GPRS UMTS ciphering key and a new GPRS UMTS integrity key;
- to let the network set the GSM ciphering mode (ciphering /no ciphering) and GSM ciphering algorithm; and
- to permit the mobile station to authenticate the network.

In [Iu mode UMTS](#), and in the case of a UMTS authentication challenge, the authentication and ciphering procedure can be used for authentication only.

The cases in which the authentication and ciphering procedure shall be used are defined in 3GPP TS 33.102 [5a] and 3GPP TS 42.009 [5].

The authentication and ciphering procedure is always initiated and controlled by the network. However, in the case of a UMTS authentication challenge, there is the possibility for the MS to reject the network.

The MS shall support the UMTS authentication challenge, if a USIM is inserted.

The authentication and ciphering procedure can be used for either:

- authentication only;
- setting of the GSM ciphering mode and the GSM ciphering algorithm only; or
- authentication and the setting of the GSM ciphering mode and the GSM ciphering algorithm.

In [A/Gb mode GSM](#), the network should not send any user data during the authentication and ciphering procedure.

A UMTS security context is established in the MS and the network when a UMTS authentication challenge is performed in [A/Gb mode GSM](#) or in [Iu mode UMTS](#). After a successful UMTS authentication, the GPRS UMTS ciphering key, the GPRS UMTS integrity key, the GPRS GSM ciphering key and the GPRS ciphering key sequence number, are stored both in the network and the MS.

4.7.7b Authentication and ciphering procedure used for GSM authentication challenge

The purpose of the authentication and ciphering procedure is threefold (see 3GPP TS 43.020 [13]):

- to permit the network to check whether the identity provided by the MS is acceptable or not;
- to provide parameters enabling the MS to calculate a new GPRS GSM ciphering key; and

- to let the network set the GSM ciphering mode (ciphering/no ciphering) and GSM ciphering algorithm.

The authentication and ciphering procedure can be used for either:

- authentication only;
- setting of the GSM ciphering mode and the GSM ciphering algorithm only; or
- authentication and the setting of the GSM ciphering mode and the GSM ciphering algorithm.

The cases in which the authentication and ciphering procedure shall be used are defined in 3GPP TS 42.009 [5].

In [A/Gb mode GSM](#), the authentication and ciphering procedure is always initiated and controlled by the network. It shall be performed in a non ciphered mode because of the following reasons:

- the network cannot decipher a ciphered AUTHENTICATION_AND_CIPHERING RESPONSE from an unauthorised MS and put it on the black list; and
- to be able to define a specific point in time from which on a new GPRS GSM ciphering key should be used instead of the old one.

GSM authentication challenge shall be supported by a ME supporting [GERAN GSM](#) or [UTRAN UMTS radio access](#).

In [A/Gb mode GSM](#), the network should not send any user data during the authentication and ciphering procedure.

A GSM security context is established in the MS and the network when a GSM authentication challenge is performed in [A/Gb mode GSM](#) or in [Iu mode UMTS](#). However, in [Iu mode UMTS](#) the MS shall not accept a GSM authentication challenge, if a USIM is inserted. After a successful GSM authentication challenge, the GPRS GSM ciphering key and the GPRS ciphering key sequence number, are stored both in the network and the MS.

4.7.7.1 Authentication and ciphering initiation by the network

The network initiates the authentication and ciphering procedure by transferring an AUTHENTICATION_AND_CIPHERING REQUEST message across the radio interface and starts timer T3360. The AUTHENTICATION_AND_CIPHERING REQUEST message shall contain all parameters necessary to calculate the response parameters when authentication is performed (see 3GPP TS 43.020 [13] and 3GPP TS 33.102 [5a]).

If authentication is requested, then the AUTHENTICATION_AND_CIPHERING REQUEST message shall contain either:

- In a GSM authentication challenge, the GPRS ciphering key sequence number, allocated to the GPRS GSM ciphering key and the RAND, or
- In a UMTS authentication challenge, the GPRS ciphering key sequence number, allocated to the GPRS UMTS ciphering and GPRS UMTS integrity keys, the RAND and the AUTN.

In [A/Gb mode GSM](#), if authentication is not requested, then the AUTHENTICATION_AND_CIPHERING REQUEST message shall not contain neither the GPRS ciphering key sequence number, the RAND nor the AUTN.

In [A/Gb mode GSM](#), if ciphering is requested, in a GSM authentication challenge or in a UMTS authentication challenge, then the AUTHENTICATION_AND_CIPHERING REQUEST message shall indicate the GPRS GSM ciphering algorithm.

The network includes the A&C reference number information element in the AUTHENTICATION_AND_CIPHERING REQUEST message. Its value is chosen in order to link an AUTHENTICATION_AND_CIPHERING REQUEST in a RA with its RESPONSE. The A&C reference number value might be based on the RA Colour Code value.

Additionally, the network may request the MS to include its IMEISV in the AUTHENTICATION_AND_CIPHERING RESPONSE message.

4.7.7.2 Authentication and ciphering response by the MS

In [A/Gb mode GSM](#), a MS that is attached to GPRS shall be ready to respond upon an AUTHENTICATION_AND_CIPHERING REQUEST message at any time.

In UMTS, an MS that is attached to GPRS shall be ready to respond upon an AUTHENTICATION_AND_CIPHERING REQUEST message at any time whilst a PS signalling connection exists.

If a SIM is inserted in the MS, the MS shall ignore the Authentication Parameter AUTN IE if included in the AUTHENTICATION_AND_CIPHERING REQUEST message and perform the GSM authentication challenge. It shall not perform the authentication of the network described in 4.7.7.5.1.

In a GSM authentication challenge, if the AUTHENTICATION_AND_CIPHERING REQUEST message includes the authentication parameters RAND and GPRS CKSN, then upon receipt of the message, the MS processes the challenge information and sends an AUTHENTICATION_AND_CIPHERING RESPONSE message to the network. The value of the received A&C reference number information element shall be copied into the A&C reference number information element in the AUTHENTICATION_AND_CIPHERING RESPONSE message. A GSM authentication challenge will result in the SIM/USIM passing a SRES and a GPRS GSM ciphering key to the ME. The new GPRS GSM ciphering key calculated from the challenge information shall overwrite the previous one and any previously stored GPRS UMTS ciphering and GPRS UMTS integrity keys shall be deleted. The calculated GSM ciphering key shall be stored on the SIM/USIM together with the GPRS ciphering key sequence number before the AUTHENTICATION_AND_CIPHERING RESPONSE message is transmitted.

In a UMTS authentication challenge, if the AUTHENTICATION_AND_CIPHERING REQUEST message includes the UMTS authentication parameters GPRS CKSN, RAND and AUTN, then upon receipt of the message, the MS verifies the AUTN parameter and if this is accepted, the MS processes the challenge information and sends an AUTHENTICATION_AND_CIPHERING RESPONSE message to the network. The value of the received A&C reference number information element shall be copied into the A&C reference number information element in the AUTHENTICATION_AND_CIPHERING RESPONSE message. A UMTS authentication challenge will result in the USIM passing a RES, a GPRS UMTS ciphering key, a GPRS UMTS integrity key and a GPRS GSM ciphering key to the ME. The new GPRS UMTS ciphering key, GPRS UMTS integrity key and GPRS GSM ciphering key calculated from the challenge information shall overwrite the previous ones. The new GPRS UMTS ciphering key, GPRS UMTS integrity key and GPRS GSM ciphering key shall be stored on the USIM together with the GPRS ciphering key sequence number before the AUTHENTICATION_AND_CIPHERING RESPONSE message is transmitted.

In [Iu mode UMTS](#), an MS capable of UMTS only shall ignore the Ciphering Algorithm IE in the AUTHENTICATION_AND_CIPHERING REQUEST message. An MS capable of both [Iu mode UMTS](#) and [A/Gb mode GSM](#) shall store the received value in the Ciphering Algorithm IE in the AUTHENTICATION_AND_CIPHERING REQUEST message in order to use it at an inter system change from [Iu mode UMTS](#) to [A/Gb mode GSM](#).

If the AUTHENTICATION_AND_CIPHERING REQUEST message does not include neither the GSM authentication parameters (RAND and GPRS CKSN) nor the UMTS authentication parameters (RAND, AUTN and GPRS CKSN), then upon receipt of the message, the MS replies by sending an AUTHENTICATION_AND_CIPHERING RESPONSE message to the network.

In [A/Gb mode GSM](#), the GMM layer shall notify the LLC layer if ciphering shall be used or not and if yes which GSM ciphering algorithm and GPRS GSM ciphering key that shall be used (see 3GPP TS 44.064 [78a]).

A ME supporting UMTS authentication challenge shall support the following procedure:

In order to avoid a synchronisation failure, if the same RAND is received twice, the mobile station shall store the received RAND together with the RES returned from the USIM in the volatile memory and compare it with any subsequently received RAND values, until the RAND value stored in the mobile station is deleted. If the stored RAND value is equal to the new received value in the AUTHENTICATION_AND_CIPHERING REQUEST message, then the mobile station shall not pass the RAND to the USIM, but shall immediately send the AUTHENTICATION_AND_CIPHERING RESPONSE message with the stored RES. If there is no valid stored RAND in the mobile station or the stored RAND is different from the new received value in the AUTHENTICATION_AND_CIPHERING REQUEST message, the mobile station shall pass the RAND to the USIM, shall override any previously stored RAND and RES with the new ones and start, or reset and restart timer T3316.

The RAND and RES values stored in the mobile station shall be deleted and timer T3316, if running, shall be stopped:

- upon receipt of a SECURITY MODE COMMAND (Iu mode only),
SERVICE_ACCEPT (Iu mode only),
SERVICE_REJECT (Iu mode only),
ROUTING_AREA_UPDATE_ACCEPT
or AUTHENTICATION_AND_CIPHERING REJECT message;

- upon expiry of timer T3316; or
- if the mobile station enters the GMM states GMM-DEREGISTERED or GMM-NULL.

4.7.7.3 Authentication and ciphering completion by the network

Upon receipt of the AUTHENTICATION AND CIPHERING RESPONSE message, the network stops the timer T3360 and checks the validity of the response (see 3GPP TS 43.020 [13] and 3GPP TS 33.102 [5a]). For this, it may use the A&C reference number information element within the AUTHENTICATION AND CIPHERING RESPONSE message to determine whether the response is correlating to the last request that was sent.

In [A/Gb mode GSM](#), the GMM layer shall notify the LLC sublayer if ciphering shall be used or not and if yes which algorithm and GPRS GSM ciphering key that shall be used (see 3GPP TS 44.064 [78a]).

Upon receipt of the AUTHENTICATION AND CIPHERING FAILURE message, the network stops the timer T3360. In Synch failure case, the core network may renegotiate with the HLR/AuC and provide the MS with new authentication parameters.

4.7.7.4 GPRS ciphering key sequence number

The security parameters for authentication and ciphering are tied together in sets. In a GSM authentication challenge, from a challenge parameter RAND both the authentication response parameter SRES and the GPRS GSM ciphering key can be computed given the secret key associated to the IMSI. In a UMTS authentication challenge, from a challenge parameter RAND, the authentication response parameter RES and the GPRS UMTS ciphering key and the GPRS UMTS integrity key can be computed given the secret key associated to the IMSI.

In order to allow start of ciphering on a logical link without authentication, GPRS ciphering key sequence numbers are introduced.

The GPRS ciphering key sequence number is managed by the network such that the AUTHENTICATION AND CIPHERING REQUEST message contains the GPRS ciphering key sequence number allocated to the GPRS GSM ciphering key (in case of a GSM authentication challenge) or the GPRS UMTS ciphering key and the GPRS UMTS integrity key (in case of a UMTS authentication challenge) which may be computed from the RAND parameter carried in that message.

The MS stores the GPRS ciphering key sequence number with the GPRS GSM ciphering key (in case of a GSM authentication challenge) and the GPRS UMTS ciphering key and the GPRS UMTS integrity key (in case of a UMTS authentication challenge), and includes the corresponding GPRS ciphering key sequence number in the ROUTING AREA UPDATE REQUEST, SERVICE REQUEST and ATTACH REQUEST messages.

If the GPRS ciphering key sequence number is deleted, the associated GPRS GSM ciphering key, GPRS UMTS ciphering key and GPRS UMTS integrity key shall be deleted (i.e. the established GSM security context or the UMTS security context is no longer valid).

In [Iu mode UMTS](#), the network may choose to start ciphering and integrity checking with the stored GPRS UMTS ciphering key and the stored GPRS UMTS integrity key (under the restrictions given in 3GPP TS 42.009 [5] and 3GPP TS 33.102 [5a]) if the stored GPRS ciphering key sequence number and the one given from the MS are equal.

In [A/Gb mode GSM](#), the network may choose to start ciphering with the stored GPRS GSM ciphering key (under the restrictions given in 3GPP TS 42.009 [5]) if the stored GPRS ciphering key sequence number and the one given from the MS are equal and the previously negotiated ciphering algorithm is known and supported in the network. When ciphering is requested at GPRS attach, the authentication and ciphering procedure shall be performed since the MS does not store the ciphering algorithm at detach.

Upon GPRS attach, if ciphering is to be used, an AUTHENTICATION AND CIPHERING REQUEST message shall be sent to the MS to start ciphering.

If the GPRS ciphering key sequence number stored in the network does not match the GPRS ciphering key sequence number received from the MS in the ATTACH REQUEST message, then the network should authenticate the MS.

In [A/Gb mode GSM](#), the MS starts ciphering after sending the AUTHENTICATION AND CIPHERING RESPONSE message. The network starts ciphering when a valid AUTHENTICATION AND CIPHERING RESPONSE is received from the MS.

| In [Iu mode UMTS](#), the MS starts ciphering and integrity checking according to the conditions specified in specification 3GPP TS 25.331 [23c].

| In [A/Gb mode GSM](#), as an option, the network may decide to continue ciphering without sending an AUTHENTICATION AND CIPHERING REQUEST message after receiving a ROUTING AREA UPDATE REQUEST message with a valid GPRS ciphering key sequence number. Both the MS and the network shall use the latest ciphering parameters. The network starts ciphering when sending the ciphered ROUTING AREA UPDATE ACCEPT message to the MS. The MS starts ciphering after receiving a valid ciphered ROUTING AREA UPDATE ACCEPT message from the network.

NOTE: In some specifications the term KSI (Key Set Identifier) is used instead of the term GPRS ciphering key sequence number.

4.7.7.5 Authentication not accepted by the network

If authentication and ciphering fails, i.e. if the response is not valid, the network considers whether the MS has used the P-TMSI or the IMSI for identification.

- If the P-TMSI has been used, the network may decide to initiate the identification procedure. If the IMSI given by the MS differs from the one the network had associated with the P-TMSI, the authentication should be restarted with the correct parameters. If the IMSI provided by the MS is the expected one (i.e. authentication has really failed), the network should proceed as described below.
- If the IMSI has been used, or the network decides not to try the identification procedure, an AUTHENTICATION AND CIPHERING REJECT message should be transferred to the MS.

Upon receipt of an AUTHENTICATION AND CIPHERING REJECT message, the MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED and shall delete the P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number stored. If available, also the TMSI, LAI and ciphering key sequence number shall be deleted and the update status shall be set to U3 ROAMING NOT ALLOWED. The SIM/USIM shall be considered as invalid until switching off or the SIM/USIM is removed.

If the AUTHENTICATION AND CIPHERING REJECT message is received, the MS shall abort any GMM procedure, shall stop the timers T3310, T3317 and T3330 (if running) and shall enter state GMM-DEREGISTERED.

4.7.7.5.1 Authentication not accepted by the MS

In a UMTS authentication challenge, the authentication procedure is extended to allow the MS to check the authenticity of the core network. Thus allowing, for instance, detection of false base station.

Following a UMTS authentication challenge, the MS may reject the core network, on the grounds of an incorrect AUTN parameter (see 3GPP TS 33.102 [5a]). This parameter contains two possible causes for authentication failure:

a) MAC code failure

If the MS considers the MAC code (supplied by the core network in the AUTN parameter) to be invalid, it shall send a AUTHENTICATION AND CIPHERING FAILURE message to the network, with the GMM cause 'MAC failure'. The MS shall then follow the procedure described in subclause 4.7.7.6 (f).

b) SQN failure

If the MS considers the SQN (supplied by the core network in the AUTN parameter) to be out of range, it shall send a AUTHENTICATION AND CIPHERING FAILURE message to the network, with the GMM cause 'Synch failure' and the re-synchronization token AUTS provided by the USIM (see 3GPP TS 33.102 [5a]). The MS shall then follow the procedure described in subclause 4.7.7.6 (g).

| In [Iu mode UMTS](#), an MS with a USIM inserted shall reject the authentication challenge if no Authentication Parameter AUTN IE was present in the AUTHENTICATION REQUEST message (i.e. a GSM authentication challenge has been received when the MS expects a UMTS authentication challenge). In such a case, the MS shall send the AUTHENTICATION AND CIPHERING FAILURE message to the network, with the GMM cause 'GSM authentication unacceptable'. The MS shall then follow the procedure described in subclause 4.7.7.6 (f).

If the MS returns an AUTHENTICATION_AND_CIPHERING_FAILURE message to the network, the MS shall delete any previously stored RAND and RES and shall stop timer T3316, if running.

4.7.7.6 Abnormal cases

The following abnormal cases can be identified:

a) Lower layer failure

Upon detection of a lower layer failure before the AUTHENTICATION AND CIPHERING RESPONSE is received, the network shall abort the procedure.

b) Expiry of timer T3360

The network shall, on the first expiry of the timer T3360, retransmit the AUTHENTICATION AND CIPHERING REQUEST and shall reset and start timer T3360. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3360, the procedure shall be aborted.

c) Collision of an authentication and ciphering procedure with a GPRS attach procedure

If the network receives an ATTACH REQUEST message before the ongoing authentication procedure has been completed and no GPRS attach procedure is pending on the network (i.e. no ATTACH ACCEPT/REJECT message has to be sent as an answer to an ATTACH REQUEST message), the network shall abort the authentication and ciphering procedure and proceed with the new GPRS attach procedure.

d) Collision of an authentication and ciphering procedure with a GPRS attach procedure when the authentication and ciphering procedure has been caused by a previous GPRS attach procedure

If the network receives an ATTACH REQUEST message before the ongoing authentication procedure has been completed and a GPRS attach procedure is pending (i.e. an ATTACH ACCEPT/REJECT message has still to be sent as an answer to an earlier ATTACH REQUEST message), then:

- If one or more of the information elements in the ATTACH REQUEST message differs from the ones received within the previous ATTACH REQUEST message, the network shall not treat the authentication any further and proceed with the GPRS attach procedure; or
- If the information elements do not differ, then the network shall not treat any further this new ATTACH REQUEST.

Collision of an authentication and ciphering procedure with a GPRS detach procedure

GPRS detach containing cause "power off":

If the network receives a DETACH REQUEST message before the ongoing authentication and ciphering procedure has been completed, the network shall abort the authentication and ciphering procedure and shall progress the GPRS detach procedure.

GPRS detach containing other causes than "power off":

If the network receives a DETACH REQUEST message before the ongoing authentication and ciphering procedure has been completed, the network shall complete the authentication and ciphering procedure and shall respond to the GPRS detach procedure as described in subclause 4.7.4.

e) Collision of an authentication and ciphering procedure with a routing area updating procedure

If the network receives a ROUTING AREA UPDATE REQUEST message before the ongoing authentication procedure has been completed, the network shall progress both procedures.

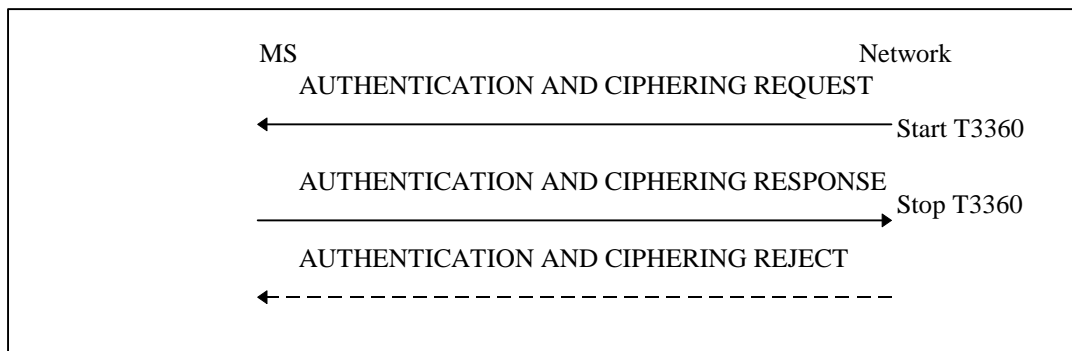


Figure 4.7.7/1 3GPP TS 24.008: Authentication and ciphering procedure

(f) Authentication failure (GMM cause "MAC failure" or "GSM authentication unacceptable")

The MS shall send an AUTHENTICATION & CIPHERING FAILURE message, with GMM cause 'MAC failure' or 'GSM authentication unacceptable' according to subclause 4.7.7.5.1, to the network and start timer T3318. Furthermore, the MS shall stop any of the retransmission timers that are running (e.g. T3310, T3321, T3330 or T3317). Upon the first receipt of an AUTHENTICATION & CIPHERING FAILURE message from the MS with GMM cause 'MAC failure' or 'GSM authentication unacceptable' the network may initiate the identification procedure described in subclause 4.7.8. This is to allow the network to obtain the IMSI from the MS. The network may then check that the P-TMSI originally used in the authentication challenge corresponded to the correct IMSI. Upon receipt of the IDENTITY REQUEST message from the network, the MS shall send the IDENTITY RESPONSE message.

NOTE: Upon receipt of an AUTHENTICATION & CIPHERING FAILURE message from the MS with reject cause "MAC failure" or "GSM authentication unacceptable", the network may also terminate the authentication procedure (see subclause 4.7.7.5).

If the P-TMSI/IMSI mapping in the network was incorrect, the network should respond by sending a new AUTHENTICATION & CIPHERING REQUEST message to the MS. Upon receiving the new AUTHENTICATION & CIPHERING REQUEST message from the network, the MS shall stop timer T3318, if running, and then process the challenge information as normal.

If the network is validated successfully (an AUTHENTICATION & CIPHERING REQUEST message that contains a valid SQN and MAC is received), the MS shall send the AUTHENTICATION & CIPHERING RESPONSE message to the network and shall start any retransmission timers (e.g. T3310, T3321, T3330 or T3317), if they were running and stopped when the MS received the first failed AUTHENTICATION AND CIPHERING REQUEST message.

If the MS receives the second AUTHENTICATION AND CIPHERING REQUEST while T3318 is running and

- the MAC value cannot be resolved; or
- the message was received in UMTS and contains a GSM authentication challenge,

the MS shall follow the procedure specified in this subclause (f), starting again from the beginning. If the SQN is invalid, the MS shall proceed as specified in (g).

It can be assumed that the source of the authentication challenge is not genuine (authentication not accepted by the MS) if any of the following occurs:

- after sending the AUTHENTICATION & CIPHERING FAILURE message with GMM cause 'MAC failure' or 'GSM authentication unacceptable' the timer T3318 expires;
- the MS detects any combination of the authentication failures: "MAC failure", "invalid SQN", and "GSM authentication unacceptable", during three consecutive authentication challenges. The authentication challenges shall be considered as consecutive only, if the authentication challenges causing the second and

third authentication failure are received by the MS, while the timer T3318 or T3320 started after the previous authentication failure is running.

When it has been deemed by the MS that the source of the authentication challenge is not genuine (authentication not accepted by the MS), the MS shall behave as described in subclause 4.7.7.6.1.

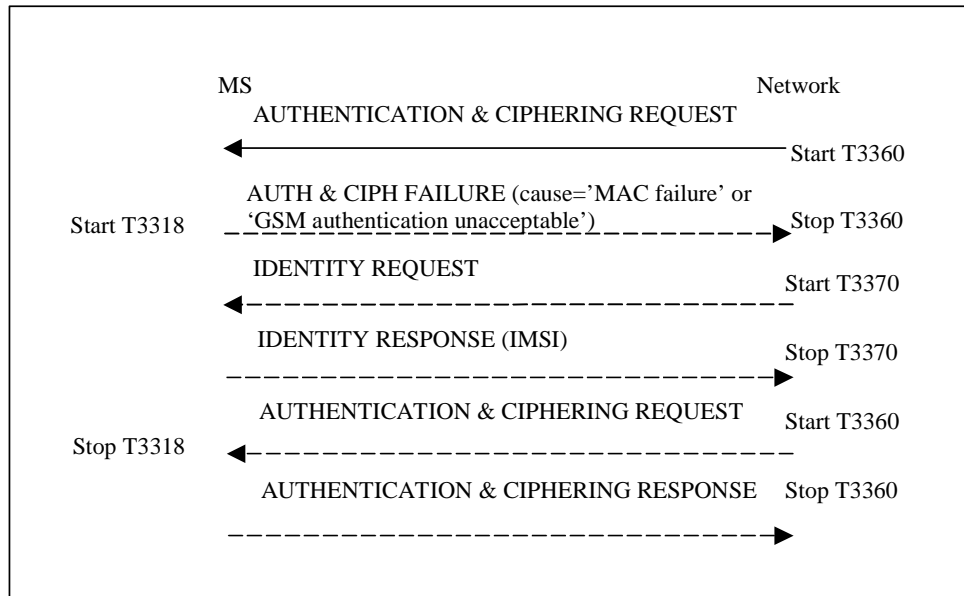


Figure 4.7.7a/1 3GPP TS 24.008: Authentication failure cause "MAC failure" or "GSM authentication unacceptable"

(g) Authentication failure (GMM cause "Synch failure"):

The MS shall send an AUTHENTICATION & CIPHERING FAILURE message, with the GMM cause "Synch failure", to the network and start the timer T3320. Furthermore, the MS shall stop any of the retransmission timers that are running (e.g. T3310, T3321, T3330 or T3317). Upon the first receipt of an AUTHENTICATION & CIPHERING message from the MS with the GMM cause "synch failure", the network shall use the returned AUTS parameter from the authentication & ciphering failure parameter IE in the AUTHENTICATION & CIPHERING FAILURE message, to re-synchronise. The re-synchronisation procedure requires the SGSN to delete all unused authentication vectors for that IMSI and obtain new vectors from the HLR. When re-synchronisation is complete, the network shall initiate the authentication & ciphering procedure. Upon receipt of the AUTHENTICATION & CIPHERING REQUEST message, the MS shall stop timer T3320, if running.

NOTE: Upon receipt of two consecutive AUTHENTICATION & CIPHERING FAILURE messages from the MS with reject cause "synch failure", the network may terminate the authentication procedure by sending an AUTHENTICATION & CIPHERING REJECT message.

If the network is validated successfully (a new AUTHENTICATION & CIPHERING REQUEST message is received which contains a valid SQN and MAC) while T3320 is running, the MS shall send the AUTHENTICATION & CIPHERING RESPONSE message to the network and shall start any retransmission timers (i.e. T3310, T3321, T3330 or T3317), if they were running and stopped when the MS received the first failed AUTHENTICATION AND CIPHERING REQUEST message.

If the MS receives the second AUTHENTICATION & CIPHERING REQUEST while T3320 is running and

- the MAC value cannot be resolved; or
- the message was received in [Iu mode-UMTS](#) and contains a GSM authentication challenge,

the MS shall proceed as specified in (f). If the SQN is invalid, the MS shall follow the procedure specified in this subclause (g), starting again from the beginning.

The MS shall deem that the network has failed the authentication check and behave as described in subclause 4.7.7.6.1, if any of the following occurs:

- the timer T3320 expires;
- the MS detects any combination of the authentication failures: "MAC failure", "invalid SQN", and "GSM authentication unacceptable", during three consecutive authentication challenges. The authentication challenges shall be considered as consecutive only, if the authentication challenges causing the second and third authentication failure are received by the MS, while the timer T3318 or T3320 started after the previous authentication failure is running.

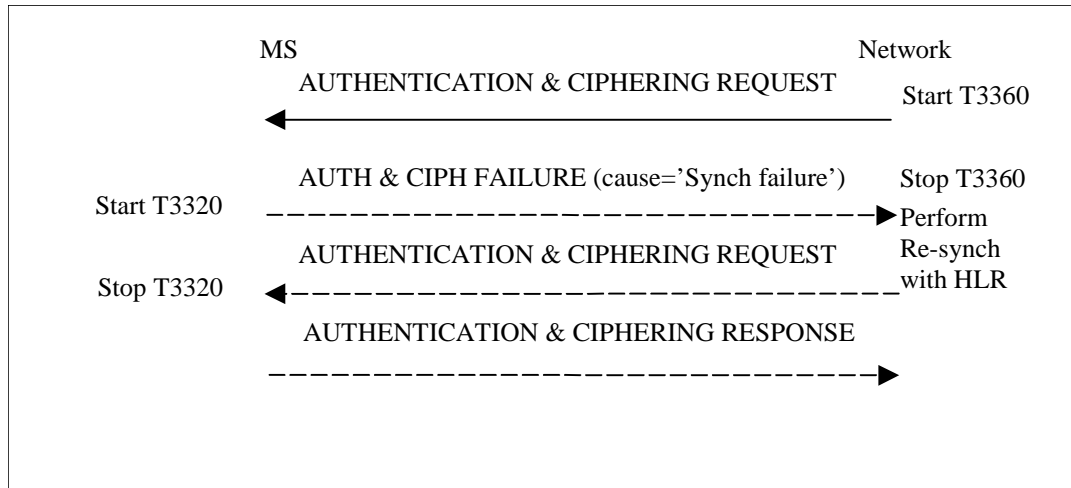


Figure 4.7.7b/1 3GPP TS 24.008: Authentication failure cause 'Synch failure'

4.7.7.6.1 MS behaviour towards a network that has failed the authentication procedure

If the MS deems that the network has failed the authentication check, then it shall request RR or RRC to release the RR connection and the PS signalling connection, if any, and bar the active cell or cells (see 3GPP TS 25.331 and 3GPP TS 44.018). The MS shall start any retransmission timers (i.e. T3310, T3321, T3330 or T3317), if they were running and stopped when the MS received the first AUTHENTICATION AND CIPHERING REQUEST message containing an invalid MAC or invalid SQN, or no AUTN when a UMTS authentication challenge was expected.

4.7.7.7 Use of established security contexts

- In [A/Gb mode GSM](#), in the case of an established GSM security context, the GPRS GSM ciphering key shall be taken into use by the MS before the AUTHENTICATION AND CIPHERING RESPONSE message is transmitted.
- In [A/Gb mode GSM](#), in the case of an established UMTS security context, the GPRS GSM ciphering key shall be taken into use by the MS before the AUTHENTICATION AND CIPHERING RESPONSE message is transmitted. The network shall derive a GPRS GSM ciphering key from the GPRS UMTS ciphering key and the GPRS UMTS integrity key, by using the conversion function named "c3" defined in 3GPP TS 33.102 [5a].
- In [A/Gb mode GSM](#), if during an ongoing, already ciphering protected RR connection, the network initiates a new Authentication and ciphering procedure, the new GPRS GSM ciphering key shall be taken into use by the MS before the AUTHENTICATION AND CIPHERING RESPONSE message is transmitted. In case of inter-system change to [lu mode UMTS](#) after receipt of the AUTHENTICATION AND CIPHERING REQUEST message, the MS and the network shall take the new keys into use immediately after the inter-system change.
- In [lu mode UMTS](#), in the case of an established GSM security context, the ME shall derive a GPRS UMTS ciphering key and a GPRS UMTS integrity key from the GPRS GSM ciphering key by using the conversion functions named "c4" and "c5" defined in 3GPP TS 33.102 [5a]. The derived GPRS UMTS ciphering key and GPRS UMTS integrity key shall be taken into use by the MS when a valid SECURITY MODE COMMAND indicating PS domain is received during an RR connection (the definition of a valid SECURITY MODE COMMAND message is given in 3GPP TS 25.331 [23c]). The network shall derive a GPRS UMTS ciphering key and a GPRS UMTS integrity key from the GPRS GSM ciphering key by using the conversion functions named "c4" and "c5" defined in 3GPP TS 33.102 [5a].

In [lu modeUMTS](#), in the case of an established UMTS security context, the GPRS UMTS ciphering key and the GPRS UMTS integrity key shall be taken into use by the MS when a valid SECURITY MODE COMMAND indicating PS domain is received during an PS signalling connection (the definition of a valid SECURITY MODE COMMAND message is given in 3GPP TS 25.331[23c]).

In [lu modeUMTS](#), if the MS received a valid SECURITY MODE COMMAND indicating PS domain in [lu modeUMTS](#) or a valid AUTHENTICATION AND CIPHERING REQUEST in [A/Gb modeGSM](#) before the network initiates a new Authentication and ciphering procedure and establishes a new GSM/UMTS security context, the new GPRS UMTS ciphering key and GPRS UMTS integrity key are taken into use by the MS, when a new valid SECURITY MODE COMMAND indicating PS domain is received during the PS signalling connection. In case of inter-system change to [A/Gb modeGSM](#), the MS and the network shall take the new keys into use immediately after the inter-system change.

4.7.7.8 Handling of keys at intersystem change from [lu modeUMTS](#) to [A/Gb modeGSM](#)

At an inter-system change from [lu modeUMTS](#) to [A/Gb modeGSM](#), ciphering may be started (see 3GPP TS 44.064 [78a]) without any new authentication and ciphering procedure. Deduction of the appropriate security key for ciphering in [A/Gb modeGSM](#), depends on the current GSM/UMTS security context stored in the MS and the network.

The ME shall handle the GPRS GSM ciphering key according to table 4.7.7.8.1.

Before any initial GMM message is sent in the new cell in [A/Gb modeGSM](#), the GMM layer in the MS shall notify the LLC layer if ciphering shall be used or not. If yes, the GPRS GSM ciphering key and the applicable ciphering algorithm according to the stored *Ciphering Algorithm IE* in the MS shall also be indicated to the LLC layer (see 3GPP TS 44.064 [78a]).

Table 4.7.7.8.1/3GPP TS 24.008: Inter-system change from [lu modeUMTS](#) to [A/Gb modeGSM](#)

Security context established in MS and network in lu modeUMTS	At inter-system change to A/Gb modeGSM :
GSM security context	An ME shall apply the GPRS GSM cipher key that was received from the GSM security context created in the SIM/USIM during the latest successful authentication procedure.
UMTS security context	An ME shall apply the GPRS GSM cipher key that was derived by the USIM from the GPRS UMTS cipher key and the GPRS UMTS integrity key during the latest successful authentication procedure.

NOTE: A USIM with UMTS security context, passes the GPRS UMTS ciphering key, the GPRS UMTS integrity key and the derived GPRS GSM ciphering key to the ME independent on the current radio access being [UTRANUMTS](#) or [GERANGSM](#).

4.7.7.9 Handling of keys at intersystem change from [A/Gb modeGSM](#) to [lu modeUMTS](#)

At an inter-system change from [A/Gb modeGSM](#) to [lu modeUMTS](#), ciphering and integrity may be started (see 3GPP TS 25.331) without any new authentication and ciphering procedure. Deduction of the appropriate security keys for ciphering and integrity check in [lu modeUMTS](#), depend on the current GSM/UMTS security context stored in the MS and the network.

The ME shall handle the GPRS UMTS cipher key and the GPRS UMTS integrity key according to table 4.7.7.9.1.

Table 4.7.7.9.1/3GPP TS 24.008: Inter-system change from [A/Gb modeGSM](#) to [lu modeUMTS](#)

Security context established in MS and network in A/Gb modeGSM	At inter-system change to lu modeUMTS :
GSM security context	An ME shall derive the GPRS UMTS cipher key and the GPRS UMTS integrity key from the GPRS GSM cipher key that was provided by the SIM/USIM during the latest successful authentication procedure. The conversion functions named "c4" and "c5" in 3GPP TS 33.102 [5a] are used for this purpose.
UMTS security context	An ME shall apply the GPRS UMTS ciphering key and the GPRS UMTS integrity key that were received from the UMTS security context created in the USIM during the latest successful authentication procedure.

NOTE: A USIM with UMTS security context, passes the GPRS UMTS ciphering key, the GPRS UMTS integrity key and the derived GPRS GSM ciphering key to the ME independent on the current radio access being [UTRANUMTS](#) or [GERANGSM](#).

Next Change

4.7.9 Paging procedure

4.7.9.1 Paging for GPRS services

In [A/Gb modeGSM](#), paging is used by the network to identify the cell the MS has currently selected, or to prompt the mobile to re-attach if necessary as a result of network failure. If the MS is not GPRS attached when it receives a paging for GPRS services, the MS shall ignore the paging.

In [lu modeUMTS](#), paging is used by the network to request the establishment of PS signalling connection or to prompt the mobile to re-attach if necessary as a result of network failure. If the MS is not GPRS attached when it receives a paging for GPRS services, the MS shall ignore the paging.

4.7.9.1.1 Paging for GPRS services using P-TMSI

The network shall initiate the paging procedure for GPRS services using P-TMSI when GMM signalling messages or user data is pending to be sent to the MS while the Mobile Reachable timer is running. The network may page only GPRS MSs which are GMM-REGISTERED and identified by a local P-TMSI.

In [lu modeUMTS](#), to initiate the procedure the GMM entity in the network requests the lower layer to start paging (see 3GPP TS 25.331 [23c] and 3GPP TS 25.413) and starts timer T3313. Upon reception of a paging indication, the MS shall respond to the paging with a SERVICE REQUEST message with service type "paging response" (see 3GPP TS 24.007 [20], 3GPP TS 23.060 [74], 3GPP TS 25.331 [23c] and 3GPP TS 25.413). If the paging request for GPRS services was received during an ongoing MS initiated GMM specific procedure, then the MS shall progress the GMM specific procedure, and the network shall proceed with the GMM specific procedure.

In [A/Gb modeGSM](#), to initiate the procedure the GMM entity requests the RR sublayer to start paging (see 3GPP TS 44.018 [84], 3GPP TS 44.060 [76], and starts timer T3313). Upon reception of a paging indication, the MS shall respond to the paging with any LLC frame (see 3GPP TS 24.007 [20], 3GPP TS 23.060 [74]).

At intersystem change, an MS not having the READY timer running in [A/Gb modeGSM](#) or an MS in PMM-IDLE mode in [lu modeUMTS](#), being paged in a different access network as when it last sent user data or signalling message, uses ROUTING AREA UPDATE REQUEST message as paging response, i.e. the RA update procedure shall be performed instead according to the selective routing area update procedure.

The network shall stop timer T3313 when a response is received from the MS. When the timer T3313 expires the network may reinitiate paging.

In [lu modeUMTS](#), when a response is received from the MS, the network shall change from PMM-IDLE mode to PMM-CONNECTED mode.

In [A/Gb modeGSM](#), when a response is received from the MS, the network shall start the READY timer.

4.7.9.1.2 Paging for GPRS services using IMSI

Paging for GPRS services using IMSI is an abnormal procedure used for error recovery in the network.

The network may initiate paging using IMSI if the P-TMSI is not available due to a network failure.

In [Iu modeUMTS](#), to initiate the procedure the GMM entity in the network requests the lower layer to start paging (see 3GPP TS 25.331 [23c] and 3GPP TS 25.413).

In [A/Gb modeGSM](#), to initiate the procedure the GMM entity in the network requests the RR sublayer to start paging (see 3GPP TS 44.018 [84], 3GPP TS 44.060 [76]).

Upon reception of a paging indication for GPRS services using IMSI, the MS shall locally deactivate any active PDP context(s), MBMS context(s) and locally detach from GPRS. The local detach includes deleting any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number stored, setting the GPRS update status to GU2 NOT UPDATED and changing state to GMM-DEREGISTERED.

In [Iu modeUMTS](#), when an MS receives a paging request for GPRS services using the IMSI from the network before an MS initiated GMM specific procedure has been completed, then the MS shall abort the GMM specific procedure, and the MS shall proceed according to the description in this clause.

After performing the local detach, the MS shall then perform a GPRS attach or combined GPRS attach procedure.

After performing the attach, the MS should activate PDP context(s) to replace any previously active PDP context(s). The MS should also perform the procedures needed in order to activate any previously active multicast service(s).

NOTE 1: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.

NOTE 2: The MS does not respond to the paging except with the Attach Request. Hence timer T3313 in the network is not used when paging with IMSI.

NOTE 3: Paging without DRX parameters may require a considerable extension of the paging duration.

4.7.9.2 Paging for non-GPRS services

The network may initiate the paging procedure for non-GPRS services when the MS is IMSI attached for non-GPRS services.

In [Iu modeUMTS](#), to initiate the procedure the GMM entity requests the lower layer to start paging (see 3GPP TS 25.331 [23c] and 3GPP TS 25.413) for non-GPRS services.

In [A/Gb modeGSM](#), to initiate the procedure the GMM entity requests the RR sublayer to start paging (see 3GPP TS 44.018 [84] and 3GPP TS 44.060 [76] for non-GPRS services).

The MS identity used for paging shall be the allocated TMSI if acknowledged by the MS, otherwise the IMSI.

Next Change

4.7.13 Service Request procedure ([Iu modeUMTS](#) only)

The purpose of this procedure is to transfer the PMM mode from PMM-IDLE to PMM-CONNECTED mode, and/or to assign radio access bearer in case of PDP contexts are activated without radio access bearer assigned. In latter case, the PMM mode may be PMM-IDLE mode or may alternatively be the PMM-CONNECTED mode if the MS requires radio access bearer re-establishment. This procedure is used for;

- the initiation of CM layer service (e.g. SM or SMS) procedure from the MS in PMM-IDLE mode,
- the network to transfer down link signalling,
- uplink (in PMM-IDLE or PMM CONNECTED) and downlink (only in PMM-IDLE) user data,

- counting the number of mobile stations in a cell which are interested in a specific MBMS multicast service.

For downlink transfer of signalling or user data in PMM-IDLE mode, the trigger is given from the network by the paging request procedure, which is out of scope of the present document.

For pending downlink user data in PMM-CONNECTED mode, the re-establishment of radio access bearers for all active PDP contexts is done without paging.

For counting the number of mobile stations in PMM-IDLE mode interested in a specific MBMS service, the trigger is given from the network by the MBMS notification procedure (see 3GPP TS 25.331 [23c]).

Service type can take either of the following values; "signalling", "data", "paging response" or "MBMS notification response". Each of the values shall be selected according to the criteria to initiate the Service request procedure.

The criteria to invoke the Service request procedure are when;

- a) the MS has any signalling messages except GMM messages (e.g. for SM or SMS) to be sent to the network in PMM-IDLE mode (i.e., no secure PS signalling connection has been established). In this case, the service type shall be set to "signalling".
- b) the MS, either in PMM-IDLE or PMM-CONNECTED mode, has pending user data to be sent and no radio access bearer is established for the corresponding PDP context. The procedure is initiated by an indication from the lower layers (see 3GPP TS 24.007 [20]). In this case, the service type shall be set to "data". If in PMM-CONNECTED mode, a Service Request with service type "data" was already accepted by the network the MS shall not issue a second Service Request with service type "data" unless the PMM-IDLE state is entered again.
- c) the MS receives a paging request for PS domain from the network in PMM-IDLE mode. In this case, the service type shall be set to "paging response".
- d) the MS is in PMM-IDLE, receives an MBMS notification for an MBMS multicast service for which the MS has activated an MBMS context, and is prompted by the contents of the notification to establish a PS signalling connection (see 3GPP TS 25.331 [23c]). In this case, the service type shall be set to "MBMS notification response".

If the network indicates "follow-on proceed" in the ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message and the MS has a service request pending, the MS shall react depending on the service type. If the service type is:

- "signalling": the MS shall abort Service request procedure and send the pending signalling messages immediately;
- "data": the MS shall immediately perform the pending Service request procedure using the current PS signalling connection;
- "paging response": the MS shall abort Service request procedure. No further specific action is required from the MS.

If the network indicates "follow-on proceed" and the MS has no service request pending, then no specific action is required from the MS.

If the network indicates "no follow-on proceed" in the ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message, the MS shall not initiate the pending Service request procedure until the current PS signalling connection is released.

NOTE: The "follow-on proceed" indication was not defined in earlier versions of the protocol. A network that is compliant with the earlier versions of the protocol will always encode the respective bit as zero, i.e. as "follow-on proceed", even if it does not prolong the PS signalling connection.

After completion of a Service request procedure but before re-establishment of radio access bearer, if the PDP context status information element is included, then the network shall deactivate all those PDP contexts locally (without peer to peer signalling between the MS and the network), which are not in SM state PDP-INACTIVE on network side but are indicated by the MS as being in state PDP-INACTIVE.

After completion of a Service request procedure, the pending service is resumed and uses then the connection established by the procedure. If the service type is indicating "data", then the radio access bearers for all activated PDP

contexts are re-established by the network, except for those activated PDP contexts having maximum bit rate value set to 0 kbit/s for both uplink and downlink. The re-establishment of radio access bearers for those PDP contexts is specified in subclause 6.1.3.3.

The selective re-assignment capability is not supported for the simplicity of the function.

Next Change

5.1.1 General

This subclause describes the call control (CC) protocol, which is one of the protocols of the Connection Management (CM) sublayer (see 3GPP TS 24.007 [20]).

Every mobile station must support the call control protocol. If a mobile station does not support any bearer capability at all then it shall respond to a SETUP message with a RELEASE COMPLETE message as specified in subclause 5.2.2.2.

In [lu mode](#) ~~UMTS~~ only, integrity protected signalling (see subclause 4.1.1.1.1 of the present document and in general, see 3GPP TS 33.102 [5a]) is mandatory. In [lu mode](#) ~~UMTS~~ only, all protocols shall use integrity protected signalling. Integrity protection of all CC signalling messages is the responsibility of lower layers. It is the network which activates integrity protection. This is done using the security mode control procedure (3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)).

In the call control protocol, more than one CC entity are defined. Each CC entity is independent from each other and shall communicate with the correspondent peer entity using its own MM connection. Different CC entities use different transaction identifiers.

With a few exceptions the present document describes the call control protocol only with regard to two peer entities. The call control entities are described as communicating finite state machines which exchange messages across the radio interface and communicate internally with other protocol (sub)layers. This description is only normative as far as the consequential externally observable behaviour is concerned.

Certain sequences of actions of the two peer entities compose "elementary procedures" which are used as a basis for the description in this subclause. These elementary procedures may be grouped into the following classes:

- call establishment procedures;
- call clearing procedures;
- call information phase procedures;
- miscellaneous procedures.

The terms "mobile originating" or "mobile originated" (MO) are used to describe a call initiated by the mobile station. The terms "mobile terminating" or "mobile terminated" (MT) are used to describe a call initiated by the network.

Figure 5.1a/3GPP TS 24.008 gives an overview of the main states and transitions on the mobile station side.

The MS side extension figure 5.1a.1/3GPP TS 24.008 shows how for the Network Initiated MO call the MS reaches state U1.0 from state U0 \$(CCBS)\$.

Figure 5.1b/3GPP TS 24.008 gives an overview of the main states and transitions on the network side.

The Network side extension figure 5.1b.1/3GPP TS 24.008 shows for Network Initiated MO Calls the Network reaches state N1.0 from state N0 \$(CCBS)\$.

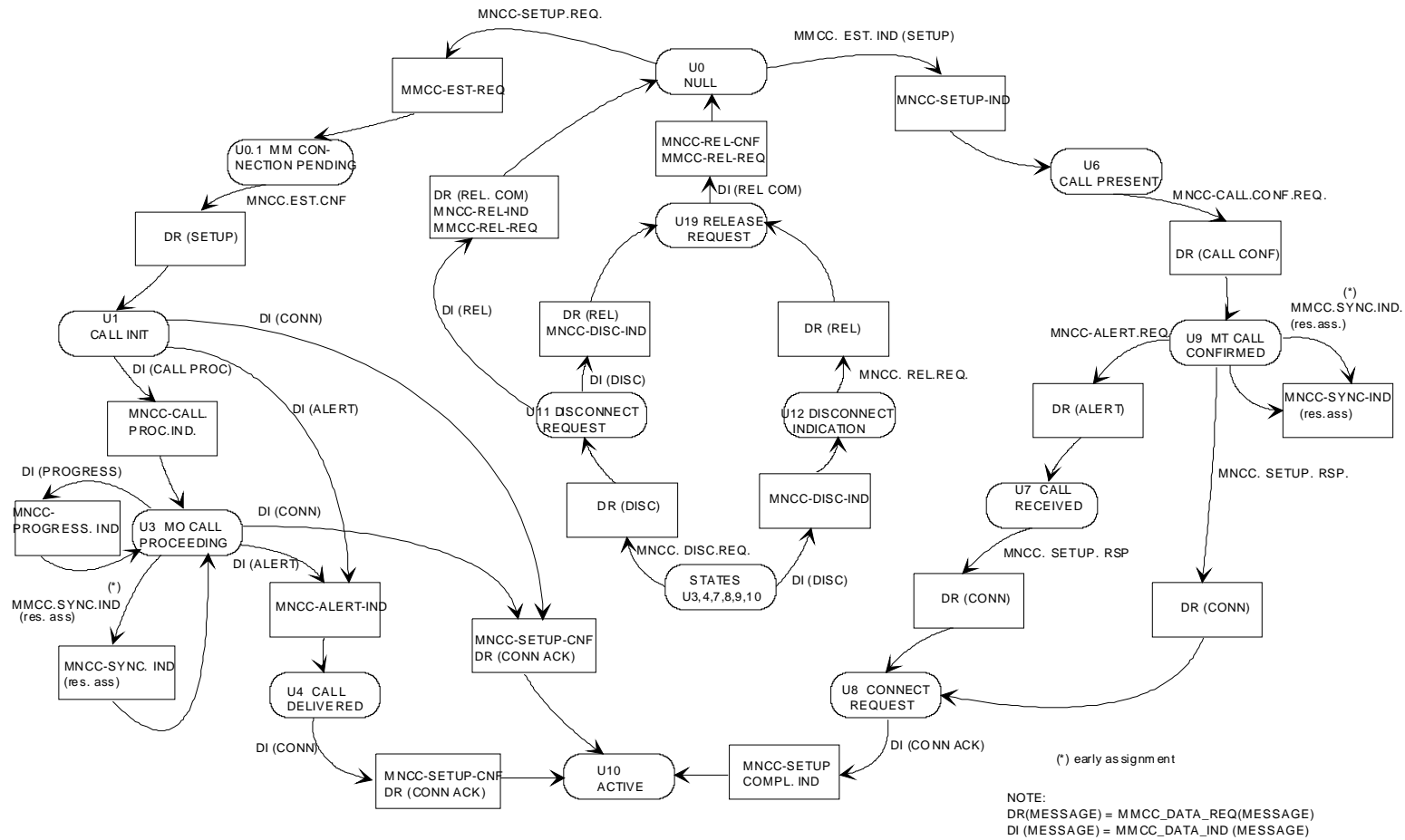


Figure 5.1a/3GPP TS 24.008: Overview call control protocol/MS side

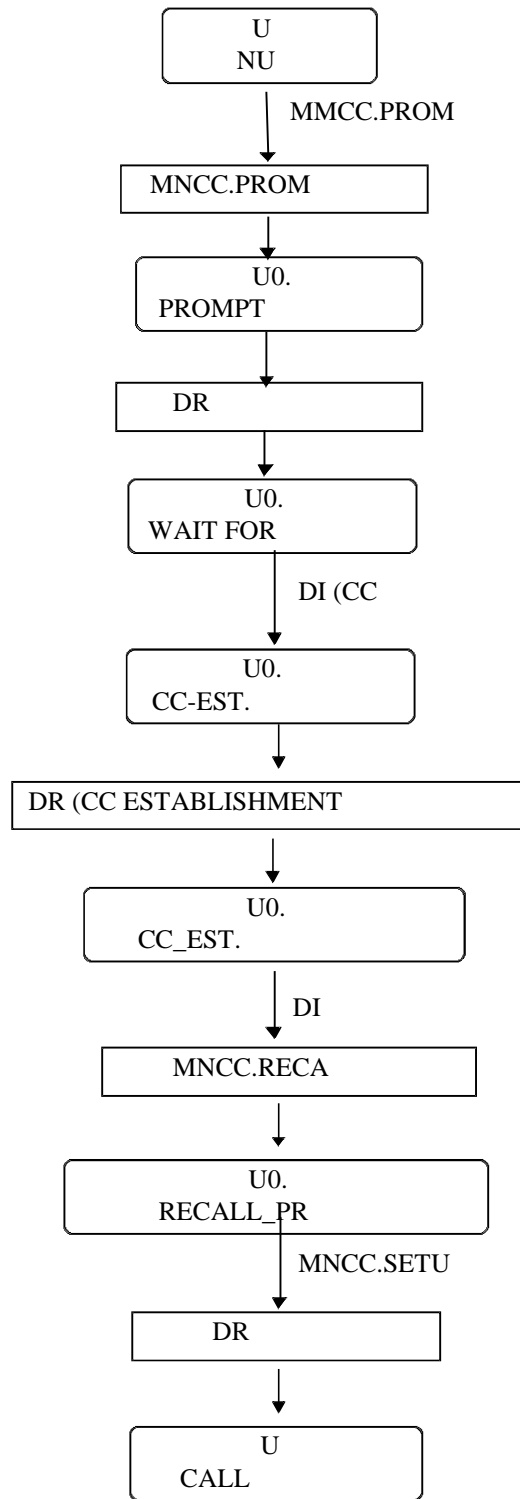


Figure5.1a.1/3GPP TS 24.008: Overview call control protocol/MS side, extension:

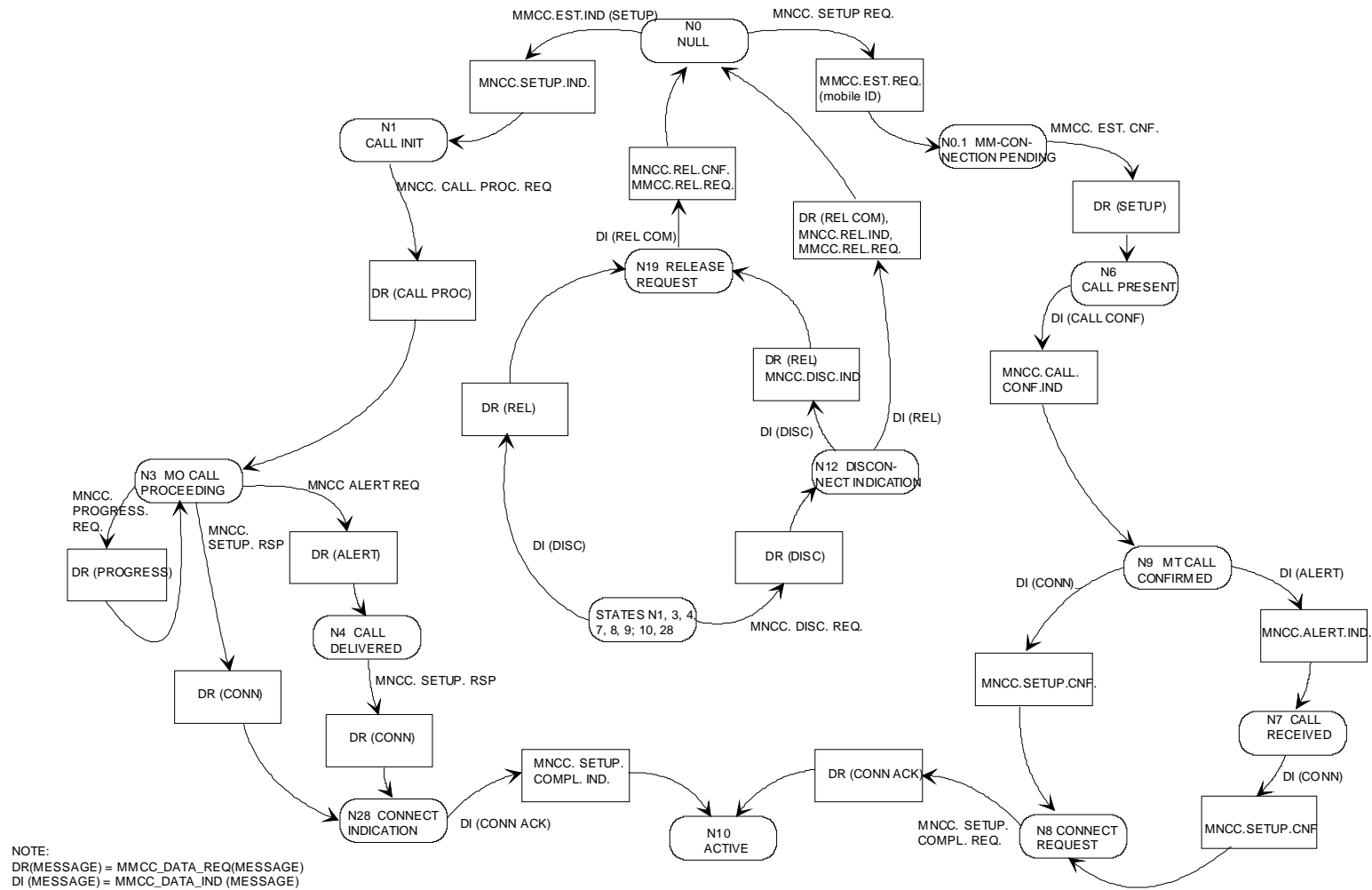


Figure 5.1b/3GPP TS 24.008 Overview call control protocol/Network side

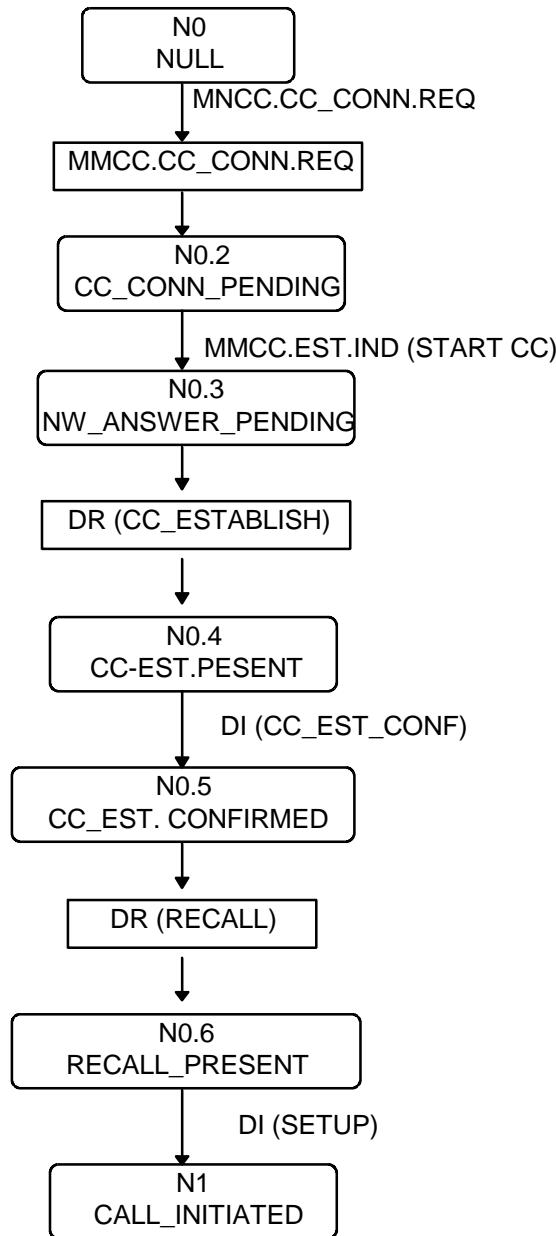


Figure 5.1b.1/3GPP TS 24.008 Overview call control protocol/Network side, extension

5.1.2.1 Call states at the mobile station side of the interface

The states which may exist on the mobile station side of the radio interface are defined in this subclause.

NOTE: States U0.1, U0.2, U0.3, U0.4, U0.5, U0.6, U26, and U27 are 3GPPGSM specific. All other states are ITU-T defined.

Next Change

5.1.2.2 Network call states

NOTE: States N0.1, N0.2, N0.3, N0.4, N0.5, N0.6, N26, N27, N28, N3a, N4,a, N7a, and N9a are 3GPPGSM specific. All other states are ITU-T defined.

The call states that may exist on the network side of the radio interface are defined in this subclause.

Next Change

5.2.1 Mobile originating call establishment

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

For mobile stations supporting eMLPP basic calls may optionally have an associated priority level as defined in 3GPP TS 23.067 [88]. This information may also lead to specified qualities of service to be provided by the MM sublayers.

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

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

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

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

The mobile station then enters the "call initiated" state. Timer T303 is not stopped.

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

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

For speech calls the mobile station shall indicate all codecs that it supports for [UTRANUMTS](#) in the *Supported Codec List* information element. Codecs for [GERANGSM](#) shall be indicated in the *Bearer Capability* information element, if this information element is included. Additionally, if the mobile station supports codecs for [GERANGSM](#) and [UTRANUMTS](#), it shall indicate the codecs for [GERANGSM](#) also in the *Supported Codec List* information element.

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

Next Change

5.2.1.2 Receipt of a setup message

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

In [lu modeUMTS](#), network shall include the SI received in the SETUP message into the RAB_id and send it back to the mobile station. For RAB_id see 3GPP TS 25.413 [and 3GPP TS 44.118 \[110\]](#). If the network receives the SETUP message with no SI, the network shall set the SI value to 1.

- i) If, following the receipt of the setup message, the call control entity of the network determines that the call information received from the mobile station is invalid (e.g. invalid number), then the network shall initiate call clearing as defined in subclause 5.4 with one of the following cause values:
- # 1 "unassigned (unallocated) number",
 - # 3 "no route to destination",
 - # 22 "number changed",
 - # 28 "invalid number format (incomplete number)".
- ii) If, following the receipt of the setup message, the call control entity of the network determines that a requested service is not authorized or is not available, it shall initiate call clearing in accordance with subclause 5.4.2 with one of the following cause values:
- # 8 "operator determined barring",
 - # 57 "bearer capability not authorized",
 - # 58 "bearer capability not presently available",
 - # 63 "service or option not available, unspecified", or
 - # 65 "bearer service not implemented".
- iii) Otherwise, the call control entity of the network shall either:
- send a CALL PROCEEDING message to its peer entity to indicate that the call is being processed; and enter the "mobile originating call proceeding" state;
 - or: send an ALERTING message to its peer entity to indicate that alerting has been started at the called user side; and enter the "call received" state;
 - or: send a CONNECT message to its peer entity to indicate that the call has been accepted at the called user side; and enter the "connect request" state.

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

The CALL_PROCEEDING message shall also contain the priority of the call in the case where the network supports eMLPP. Mobile stations supporting eMLPP shall indicate this priority level to higher sublayers and store this information for the duration of the call for further action. Mobile stations not supporting eMLPP shall ignore this information element if provided in a CALL PROCEEDING message.

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

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

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

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

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

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

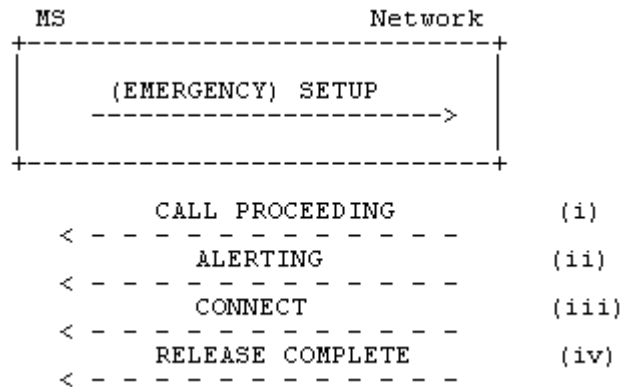


Figure 5.2/3GPP TS 24.008 Mobile originated call initiation and possible subsequent responses.

Next Change

5.2.1.11 Speech Codec Selection

For speech calls, a mobile station implementing this version of the protocol shall indicate all codecs that it supports for [UTRAN](#)[UMTS](#) in the *Supported Codec List* information element. Codecs for [GERAN](#)[GSM](#) shall be indicated in the *Bearer Capability* information element, if this information element is included. Additionally, if the mobile station supports codecs for [GERAN](#)[GSM](#) and [UTRAN](#)[UMTS](#), it shall indicate the codecs for [GERAN](#)[GSM](#) also in the *Supported Codec List* information element.

If the network does not receive a *Supported Codec List* information element then for speech calls in [UTRAN](#)[UMTS](#) it shall select the default UMTS speech codec.

For speech calls in [GERAN](#)[GSM](#), if the network does not receive a *Supported Codec List* information element nor a *Bearer Capability* information element, the network shall select GSM full rate speech version 1.

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

- i) If no GSM Speech Version codepoints are received in the *Supported Codec List* IE or in octet 3a etc. of the *Bearer Capabilities* IE then a "UMTS only" terminal is assumed and the default UMTS speech codec shall be UMTS_AMR.
- ii) If at least one GSM Speech Version codepoint is received in the *Supported Codec List* IE or in octet 3a etc. of the *Bearer Capabilities* IE then the ME supports GSM and UMTS and the default UMTS speech codec shall be UMTS_AMR_2.

NOTE 1: In case (ii), if the call is set up in [A/Gb or GERAN Iu mode](#)[GSM](#) by a R99 ME, call control in the core network may treat the ME as a "GSM only" ME. The default UMTS speech codec will only become relevant when an intersystem handover to [UTRAN Iu mode](#)[UMTS](#) is initiated by the radio access network, and can be determined when this procedure is started.

If the *Supported Codec List* IE is received, then the network shall use this list to select the codec for [Iu mode](#)[UMTS](#) and indicate the selected codec to the ME via RANAP and RRC protocol in the NAS Synchronisation Indicator IE. See 3GPP TS 25.413, ~~and~~ 3GPP TS 25.331 [32c], [and 3GPP TS 44.118 \[110\]](#).

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

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

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

If the mobile station does not receive the NAS Synchronisation Indicator IE (RRC protocol)

- during setup of a speech call;
- during inter-system handover of a speech call from [A/Gb or GERAN Iu mode GSM](#) to [UTRAN Iu mode UMTS](#); or
- during an in-call modification from data to speech,

then it shall select the UMTS_AMR_2 speech codec.

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

If the mobile station has selected a speech codec for [UTRAN Iu mode UMTS](#), it shall keep this codec until

- a new codec is requested by the network by sending a NAS Synchronisation Indicator IE (RRC protocol);
- a new codec is requested by the network during inter-system handover from [UTRAN Iu mode UMTS](#) to [A/Gb or GERAN Iu mode GSM](#); or
- an in-call modification from speech to data is performed.

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

Next Change

5.2.2.3.1 Response to SETUP

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

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

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

- SI="no bearer";
- SI=new value (not used by any of the existing bearers).

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

The call control entity of the mobile station may include in the CALL CONFIRMED message to the network one or two bearer capability information elements to the network, either preselected in the mobile station or corresponding to a service dependent directory number (see 3GPP TS 29.007 [38]). The mobile station may also use the *backup bearer capability* IE, if provided by the network, to deduce the requested service (see 3GPP TS 27.001, subclause 8.3.3.1). The mobile station may also include one or two bearer capabilities in the CALL CONFIRMED message to define the radio channel requirements. In any case the rules specified in subclause 9.3.2.2 shall be followed.

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

For speech calls the mobile station shall indicate all codecs that it supports for [UTRANUMTS](#) in the *Supported Codec List* information element. Codecs for [GERANGSM](#) shall be indicated in the *Bearer Capability* information element, if this information element is included. Additionally, if the mobile station supports codecs for [GERANGSM](#) and [UTRANUMTS](#), it shall indicate the codecs for [GERANGSM](#) also in the *Supported Codec List* information element.

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

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

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

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

5.2.2.3.2 Receipt of CALL CONFIRMED and ALERTING by the network

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

In [lu modeUMTS](#), network shall include the SI received in the CALL CONFIRMED message into the RAB_id and send it back to the mobile station. For RAB_id see 3GPP TS 25.413 [and 3GPP TS 44.118 \[110\]](#). If the network receives the CALL CONFIRMED message with no SI, the network shall set the SI value to 1.

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

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

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

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

Here, initiation of user alerting means:

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

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

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

Next Change

5.2.3.2 CC-Establishment present

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

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

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

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

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

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

- form and store the SETUP message for sending later in the "Recall present" state,
- acknowledge the CC-ESTABLISHMENT message with a CC-ESTABLISHMENT CONFIRMED message,
- start timer T335, and
- enter the "CC-establishment confirmed" state.

Exception:

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

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

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

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

Exceptions:

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

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

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

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

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

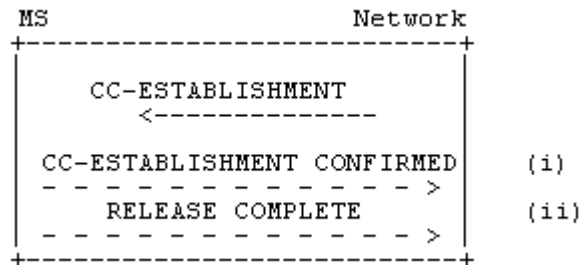


Figure 5.7a/3GPP TS 24.008 Call initiation and possible subsequent responses.

Next Change

5.2.3.3 CC-Establishment confirmation

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

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

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

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

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

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

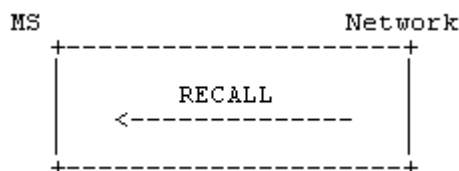


Figure 5.7b/3GPP TS 24.008 Recall

Next Change

5.3.4.3.2 Successful completion of in-call modification

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

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

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

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

If the in-call modification was originated by the mobile station, the mobile station and the network shall proceed as follows:

If the requested mode is not the actual one and can be supported by the network 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 (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.

Upon receipt of the MODIFY COMPLETE message the mobile station shall: initiate the alternation to those resources necessary to support the next call mode; stop timer T323; and enter the "active" state (mobile station side).

If the in-call modification was originated by the network, the mobile station and the network shall proceed as follows:

If the requested mode is not the actual one and can be supported by the mobile station it shall 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. The mobile station shall send a MODIFY COMPLETE message with the new call mode included and enter the "active" state (mobile station side). If the MODIFY message had contained a *reverse call setup direction* IE, the same IE shall be included in the MODIFY COMPLETE message.

Upon receipt of the MODIFY COMPLETE message the network shall: change the channel configuration, if required; after successful change of the channel configuration initiate the alternation to those resources necessary to support the next call mode; stop timer T323; and enter the "active" state (network side).

The mobile station shall start sending user information according to the next call mode and start interpreting received user channel information according to the next call mode as soon as a suitable channel for the new mode is available.

In both cases:

For an alternate speech/facsimile group 3 service (refer to subclause 5.3.4) the old resources may still be kept reserved.

The reaction of the originating side if it had included a reverse call setup direction IE in the MODIFY message, but the destination side did not include the IE in the MODIFY COMPLETE message is implementation dependent.

Next Change

5.3.5 User initiated service level up- and downgrading ([A/Gb mode and GERAN lu mode](#)~~GSM~~ only)

The user initiated service level up- and downgrading is applicable for non-transparent multislot data services, 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.

Next Change

5.3.6 Support of multimedia calls

5.3.6.1 Service description

The ~~GSM-UMTS~~[3GPP](#) circuit-switched multimedia call is based on the 3G-324M [26.111], which is a 3GPP-variant of the ITU-T H.324 recommendation. CS Multimedia telephony is a Bearer Service, which utilizes the Synchronous Transparent Data service (BS30) [3].

At the multimedia call setup the required call type, 3G-324M, is indicated, for the network to be able to invoke appropriate interworking functionality. In the peer end the H.324 information is used to invoke the terminal application. In addition to H.324 indication the terminal must select Information Transfer Capability (ITC) for the multimedia call. The 'correct' ITC depends on the peer end and the transporting networks; an all-ISDN call is a UDI/RDI call, and a call, which involves PSTN, is an analog "3.1 kHz audio" call.

For the case when the setup of a multimedia call is not successful, fallback to speech is specified.

Users may also request a service change between UDI/RDI multimedia and speech modes during a call (see 3GPP TS 23.172 [97]).

Next Change

6.1 GPRS Session management

6.1.1 General

The main function of the session management (SM) is to support PDP context handling of the user terminal. The SM comprises procedures for identified PDP context activation, deactivation and modification. SM procedures for identified access can only be performed if a GMM context has been established between the MS and the network. If no GMM context has been established, the MM sublayer has to initiate the establishment of a GMM context by use of the GMM procedures as described in chapter 4. After GMM context establishment, SM uses services offered by GMM (see 3GPP TS 24.007 [20]). Ongoing SM procedures are suspended during GMM procedure execution.

In [lu mode](#)~~UMTS~~ only, integrity protected signalling (see subclause 4.1.1.1.1 of the present document and in general, see 3GPP TS 33.102 [5a]) is mandatory. In [lu mode](#)~~UMTS~~ only, all protocols shall use integrity protected signalling. Integrity protection of all SM signalling messages is the responsibility of lower layers. It is the network which activates integrity protection. This is done using the security mode control procedure (3GPP TS 25.331 [23c] [and 3GPP TS 44.118 \[110\]](#)).

For the session management protocol, the extended TI mechanism may be used (see 3GPP TS 24.007 [20]).

Next Change

6.1.3.1.1 Successful PDP context activation initiated by the mobile station

In order to request a PDP context activation, the MS sends an ACTIVATE PDP CONTEXT REQUEST message to the network, enters the state PDP-ACTIVE-PENDING and starts timer T3380. The message contains the selected NSAPI, PDP type, requested QoS and, if the MS requests a static address, the PDP address. The MS shall ensure that the selected NSAPI is not currently being used by another Session Management entity in the MS.

Upon receipt of an ACTIVATE PDP CONTEXT REQUEST message, the network selects a radio priority level based on the QoS negotiated and may reply with an ACTIVATE PDP CONTEXT ACCEPT message. Upon receipt of the message ACTIVATE PDP CONTEXT ACCEPT the MS shall stop timer T3380, shall enter the state PDP-ACTIVE. If the offered QoS parameters received from the network differ from the QoS requested by the MS, the MS shall either accept the negotiated QoS or initiate the PDP context deactivation procedure.

NOTE 1: If the MS requested a value for a QoS parameter that is not within the range specified by 3GPP TS 23.107, the network should negotiate the parameter to a value that lies within the specified range.

In [A/Gb modeGSM](#), the MS shall initiate establishment of the logical link for the LLC SAPI indicated by the network with the offered QoS and selected radio priority level if no logical link has been already established for that SAPI. If the offered QoS parameters received from the network differ from the QoS requested by the MS, the MS shall either accept the negotiated QoS or initiate the PDP context deactivation procedure. If the LLC SAPI indicated by the network can not be supported by the MS, the MS shall initiate the PDP context deactivation procedure.

In [Iu modeUMTS](#), both the network and the MS shall store the LLC SAPI and the radio priority in the PDP context. If a [Iu modeUMTS](#) to [A/Gb modeGSM](#) system change is performed, the new SGSN shall initiate establishment of the logical link using the negotiated QoS profile, the negotiated LLC SAPI, and selected radio priority level stored in the PDP context as in a [A/Gb modeGSM](#) to [A/Gb modeGSM](#) Routing Area Update.

An MS, which is capable of operating in both [A/Gb modeGSM](#) and [Iu modeUMTS](#), shall use a valid LLC SAPI, while an MS which is capable of operating only in [Iu modeUMTS](#) shall indicate the LLC SAPI value as "LLC SAPI not assigned" in order to avoid unnecessary value range checking and any other possible confusion in the network. When the MS uses a valid LLC SAPI, the network shall return a valid LLC SAPI. The network shall return the "LLC SAPI not assigned" value only when the MS uses the "LLC SAPI not assigned" value.

NOTE 2: The radio priority level and the LLC SAPI parameters, though not used in [Iu modeUMTS](#), shall be included in the messages, in order to support handover between [Iu modeUMTS](#) and [A/Gb modeGSM](#) networks.

Next Change

6.1.3.2.1 Successful Secondary PDP Context Activation Procedure Initiated by the MS

In order to request a PDP context activation with the same PDP address and APN as an already active PDP context, the MS shall send an ACTIVATE SECONDARY PDP CONTEXT REQUEST message to the network, enter the state PDP-ACTIVE-PENDING and start timer T3380. The message shall contain the selected NSAPI. The MS shall ensure that the selected NSAPI is not currently being used by another Session Management entity in the MS. The message shall also include a QoS profile, a requested LLC SAPI and the Linked TI. The QoS profile is the requested QoS. If present, the TFT shall be sent transparently through the SGSN to the GGSN to enable packet classification and policing for downlink data transfer.

Upon receipt of an ACTIVATE SECONDARY PDP CONTEXT REQUEST, the network shall validate the message by verifying the TI given in the Linked TI IE to be any of the active PDP context(s). The same GGSN address shall be used by the SGSN as for the already established PDP context(s) for that PDP address. The network shall select a radio priority level based on the QoS negotiated and shall reply with an ACTIVATE SECONDARY PDP CONTEXT ACCEPT message, if the request can be accepted.

NOTE 1: If the MS requested a value for a QoS parameter that is not within the range specified by 3GPP TS 23.107, the network should negotiate the parameter to a value that lies within the specified range.

Upon receipt of the message ACTIVATE SECONDARY PDP CONTEXT ACCEPT, the MS shall stop timer T3380 and enter the state PDP-ACTIVE. If the offered QoS parameters received from the network differ from the QoS requested by the MS, the MS shall either accept the negotiated QoS or initiate the PDP context deactivation procedure.

In [A/Gb modeGSM](#) the MS shall initiate establishment of the logical link for the LLC SAPI indicated by the network with the offered QoS and selected radio priority level if no logical link has been already established for that SAPI. If the LLC SAPI indicated by the network can not be supported by the MS, the MS shall initiate the PDP context deactivation procedure.

In [Iu modeUMTS](#), both SGSN and MS shall store the LLC SAPI and the radio priority in the PDP context. If an [Iu modeUMTS](#) to [A/Gb modeGSM](#) Routing Area Update is performed, the new SGSN shall initiate establishment of the logical link using the negotiated LLC SAPI, the negotiated QoS profile and selected radio priority level stored in the PDP context as in an [A/Gb modeGSM](#) to [A/Gb modeGSM](#) Routing Area Update.

An MS, which is capable of operating in both [A/Gb modeGSM](#) and [Iu modeUMTS](#), shall use a valid LLC SAPI, while an MS which is capable of operating only in [Iu modeUMTS](#) shall indicate the LLC SAPI value as "LLC SAPI not assigned" in order to avoid unnecessary value range checking and any other possible confusion in the network. When the MS uses a valid LLC SAPI, the network shall return a valid LLC SAPI. The network shall return the "LLC SAPI not assigned" value only when the MS uses the "LLC SAPI not assigned" value.

NOTE 2: The radio priority level and the LLC SAPI parameters, though not used in [Iu modeUMTS](#), shall be included in the messages, in order to support handover between [Iu modeUMTS](#) and [A/Gb modeGSM](#) networks.

Next Change

6.1.3.3.1 Network initiated PDP Context Modification

In order to initiate the procedure, the network sends the MODIFY PDP CONTEXT REQUEST message to the MS and starts timer T3386. The message shall contain the new QoS and the radio priority level and LLC SAPI that shall be used by the MS in GSM at the lower layers for the transmission of data related to the PDP context.

Upon receipt of this message the MS shall reply with the MODIFY PDP CONTEXT ACCEPT message, if the MS accepts the new QoS and the indicated LLC SAPI.

If the MS does not accept the new QoS or the indicated LLC SAPI, the MS shall initiate the PDP context deactivation procedure for the PDP context - the reject cause IE value of the DEACTIVATE PDP CONTEXT REQUEST message shall indicate "QoS not accepted".

The network shall upon receipt of the MODIFY PDP CONTEXT ACCEPT message stop timer T3386.

In [A/Gb modeGSM](#), the network shall establish, reconfigure or continue using the logical link with the new QoS for the LLC SAPI indicated in the MODIFY PDP CONTEXT REQUEST message.

In [Iu modeUMTS](#), the network shall establish, reconfigure or continue using the Radio Access Bearer with the new QoS indicated in the MODIFY PDP CONTEXT REQUEST message.

6.1.3.3.2 MS initiated PDP Context Modification accepted by the network

In order to initiate the procedure, the MS sends the MODIFY PDP CONTEXT REQUEST message to the network, enters the state PDP-MODIFY-PENDING and starts timer T3381. The message may contain the requested new QoS and/or the TFT and the requested LLC SAPI (used in [A/Gb modeGSM](#)).

Upon receipt of the MODIFY PDP CONTEXT REQUEST message, the network may reply with the MODIFY PDP CONTEXT ACCEPT message in order to accept the context modification. The reply message may contain the negotiated QoS and the radio priority level based on the new QoS profile and the negotiated LLC SAPI, that shall be used in GSM by the logical link.

Upon receipt of the MODIFY PDP CONTEXT ACCEPT message, the MS shall stop the timer T3381. If the offered QoS parameters received from the network differs from the QoS requested by the MS, the MS shall either accept the negotiated QoS or initiate the PDP context deactivation procedure.

NOTE: When modification of QoS was requested by the MS, if the network does not accept the MS request, being unable to provide the requested QoS, it should maintain the QoS negotiated as previously negotiated or propose a new QoS. Therefore, the network would not reject the MS initiated PDP context modification request due to the unavailability of the required QoS. If the MS requested a value for a QoS parameter that is not within the range specified by 3GPP TS 23.107, the network should negotiate the parameter to a value that lies within the specified range.

Next Change

6.1.3.4.1 PDP context deactivation initiated by the MS

In order to deactivate a PDP context, the MS sends a DEACTIVATE PDP CONTEXT REQUEST message to the network, enters the state PDP-INACTIVE-PENDING and starts timer T3390. The message contains the transaction identifier (TI) in use for the PDP context to be deactivated and a cause code that typically indicates one of the following causes:

- # 25: LLC or SMDCP failure ([A/Gb mode](#)~~GSM~~ only);
- # 26: insufficient resources;
- # 36: regular deactivation; or
- # 37: QoS not accepted.

The network shall reply with the DEACTIVATE PDP CONTEXT ACCEPT message. Upon receipt of the DEACTIVATE PDP CONTEXT ACCEPT message, the MS shall stop timer T3390.

In [A/Gb mode](#)~~GSM~~, both the MS and the network shall initiate local release of the logical link if it is not used by another PDP context.

In [Iu mode](#)~~UMTS~~, the network shall initiate the release of Radio Access Bearer associated with this PDP context.

6.1.3.4.2 PDP context deactivation initiated by the network

In order to deactivate a PDP context, the network sends a DEACTIVATE PDP CONTEXT REQUEST message to the MS and starts timer T3395. The message contains the transaction identifier in use for the PDP context to be deactivated and a cause code that typically indicates one of the following causes:

- # 8: Operator Determined Barring;
- # 25: LLC or SMDCP failure ([A/Gb mode](#)~~GSM~~ only);
- # 36: regular deactivation;
- # 38: network failure; or
- # 39: reactivation requested.

The MS shall, upon receipt of this message, reply with a DEACTIVATE PDP CONTEXT ACCEPT message. Upon receipt of the DEACTIVATE PDP CONTEXT ACCEPT message, the network shall stop the timer T3395.

In [A/Gb mode](#)~~GSM~~, both the MS and the network shall initiate local release of the logical link if it is not used by another PDP context.

In [Iu mode](#)~~UMTS~~, the network shall initiate the release of Radio Access Bearer associated with this PDP context.

Next Change

9.2.15.3 Mobile Station Classmark for [lu mode](#)UMTS

This IE shall be included when the mobile station is in [lu mode](#)UMTS network. The IE shall not be included when the mobile station is in [A/Gb mode](#)GSM network.

Next Change

9.3.2.2 Bearer capability 1 and bearer capability 2

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

- the mobile station wishes another bearer capability than that given by the *bearer capability 1* information element of the incoming SETUP message;
- the *bearer capability 1* information element is missing or not fully specified in the SETUP message;
- the *bearer capability 1* information element received in the SETUP message is accepted and the "radio channel requirement" of the mobile station is other than "full rate support only mobile station";
- the *bearer capability 1* information element received in the SETUP message indicates speech and is accepted and the mobile station supports CTM text telephony;
- the *bearer capability 1* information element received in the SETUP message indicates speech and is accepted and the mobile station supports other [GSM](#) codecs [for GERAN](#) than GSM speech version 1;
- the *bearer capability 1* information element received in the SETUP message included the "fixed network user rate" parameter.

When the *bearer capability 1* information element is followed by the *bearer capability 2* IE in the SETUP, the above rules apply to both *bearer capability 1* IE and bearer capability 2 IE. Except those cases identified in 3GPP TS 27.001, if either *bearer capability* needs to be included, both shall be included.

Furthermore, both *bearer capability* information elements may be present if the mobile station wishes to reverse the order of occurrence of the *bearer capability* information elements (which is referred to in the *repeat indicator* information element, see subclause 10.5.4.22) in cases identified in 3GPP TS 27.001 [36].

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

Next Change

9.4.2.7 Cell Notification ([A/Gb mode](#)GSM only)

In [A/Gb mode](#)GSM, this IE shall be included by the SGSN in order to indicate the ability to support the Cell Notification

Next Change

9.4.9 Authentication and ciphering request

This message is sent by the network to the MS to initiate authentication of the MS identity. Additionally, the ciphering mode is set, indicating whether ciphering will be performed or not. See table 9.4.9/3GPP TS 24.008.

Message type: AUTHENTICATION AND CIPHERING REQUEST

Significance: dual

Direction: network to MS

Table 9.4.9/TSGSM 24.008: AUTHENTICATION AND CIPHERING REQUEST message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	Protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Skip indicator	Skip indicator 10.3.1	M	V	1/2
	Authentication and ciphering request message identity	Message type 10.4	M	V	1
	Ciphering algorithm	Ciphering algorithm 10.5.5.3	M	V	1/2
	IMEISV request	IMEISV request 10.5.5.10	M	V	1/2
	Force to standby	Force to standby 10.5.5.7	M	V	1/2
	A&C reference number	A&C reference number 10.5.5.19	M	V	1/2
21	Authentication parameter RAND	Authentication parameter RAND 10.5.3.1	O	TV	17
8-	GPRS ciphering key sequence number	Ciphering key sequence number 10.5.1.2	C	TV	1
28	Authentication parameter AUTN	Authentication parameter AUTN 10.5.3.1.1	O	TLV	18

Next Change

9.4.14.3 DRX parameter

This IE shall be included if the MS changes the access network from GSM to UMTS, or the MS wants to indicate new DRX parameters to the network.

Next Change

9.4.15.8 Cell Notification (A/Gb modeGSM only)

In GSM, this IE shall be included if by the SGSN in order to indicate the ability to support the Cell Notification.

Next Change

10.5.1.3 Location Area Identification

The purpose of the *Location Area Identification* information element is to provide an unambiguous identification of location areas within the area covered by the 3GPPGSM system.

The *Location Area Identification* information element is coded as shown in figure 10.5.3/3GPP TS 24.008 and table 10.5.3/3GPP TS 24.008.

The *Location Area Identification* is a type 3 information element with 6 octets length.

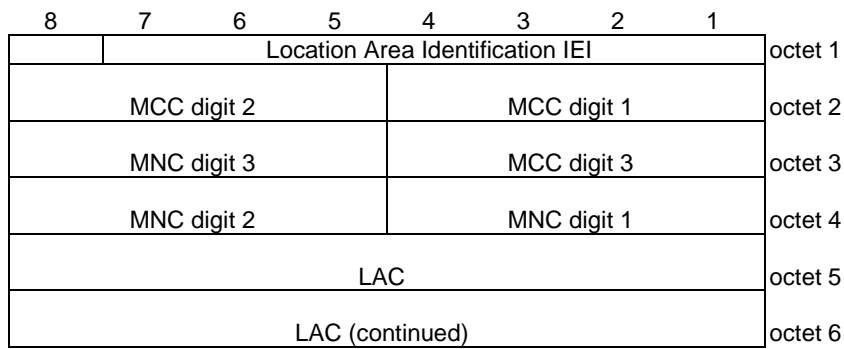


Figure 10.5.3/3GPP TS 24.008 *Location Area Identification* information element

Next Change

10.5.3.2 Authentication Response parameter

The purpose of the *authentication response parameter* information element is to provide the network with the authentication response calculated in the SIM/USIM.

The *Authentication Parameter SRES* information element is coded as shown in figure 10.5.76/3GPP TS 24.008 and tables 10.5.90 a & b /3GPP TS 24.008.

The *Authentication Response Parameter* is a type 3 information element with 5 octets length. In a GSM authentication challenge, the response calculated in the SIM/USIM (SRES) is 4 bytes in length, and is placed in the *Authentication Response Parameter* information element.

In a UMTS authentication challenge, the response calculated in the USIM (RES) may be up to 16 octets in length. The 4 most significant octets shall be included in the *Authentication Response Parameter* information element. The remaining part of the RES shall be included in the Authentication Response Parameter (extension) IE (see subclause 10.5.3.2.1)

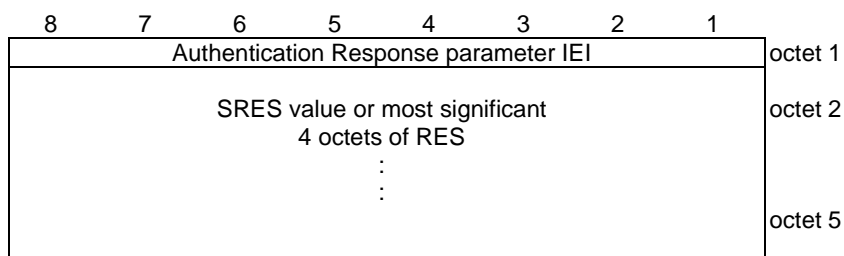


Figure 10.5.76/3GPP TS 24.008 *Authentication Response Parameter* information element

Table 10.5.90a/3GPP TS 24.008: *Authentication Response Parameter* information element (SRES) (GSM [authentication challenge](#) only)

SRES value (octet 2, 3, 4 and 5)
The SRES value consists of 32 bits. Bit 8 of octet 2 is the most significant bit while bit 1 of octet 5 is the least significant bit.

Table 10.5.90b/3GPP TS 24.008: Authentication Response Parameter information element (RES) (UMTS authentication challenge only)

RES value (octet 2, 3, 4 and 5) This contains the most significant 4 octets of RES If RES>4 octets, the remaining octets of RES shall appear in the Authentication Response Parameter (extension) IE (see subclause 10.5.3.2.1)

10.5.3.2.1 Authentication Response Parameter (extension) (UMTS authentication challenge only)

This IE is included if the authentication response parameter RES is longer than 4 octets (UMTS only) and therefore does not fit in the Authentication Response Parameter field (see 10.5.3.2).

The Authentication Response parameter (extension) IE is coded as shown in figure 10.5.76.1/3GPP TS 24.008 and table 10.5.90.1/3GPP TS 24.008.

The Authentication Response parameter (extension) IE is a type 4 information element with a minimum length of 3 octets and a maximum length of 14 octets.

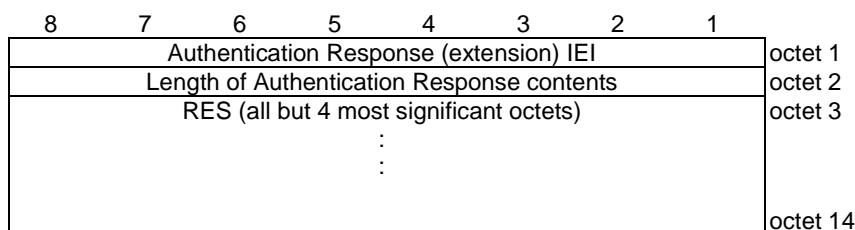


Figure 10.5.76.1/3GPP TS 24.008 Authentication Response Parameter (extension) information element (UMTS authentication challenge only)

Table 10.5.90.1/3GPP TS 24.008: Authentication Response Parameter (extension) information element (RES)

RES (extension) value (octet 3 to 14) This contains all but the 4 most significant octets of RES

10.5.3.2.2 Authentication Failure parameter (UMTS authentication challenge only)

The purpose of the *Authentication Failure parameter* information element is to provide the network with the necessary information to begin a re-authentication procedure (see 3GPP TS 33.102 [5a]) in the case of a 'Synch failure', following a UMTS authentication challenge.

The Authentication Failure parameter IE is coded as shown in figure 10.5.76.2/3GPP TS 24.008 and table 10.5.90.2/3GPP TS 24.008.

The Authentication Failure parameter IE is a type 4 information element with a length of 16 octets.

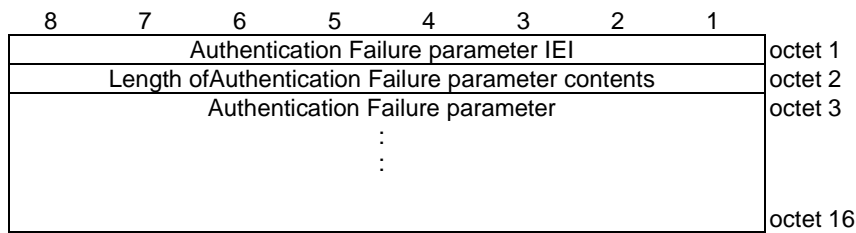


Figure 10.5.76.2/3GPP TS 24.008 Authentication Failure parameter information element (UMTS authentication challenge only)

Table 10.5.90.2/3GPP TS 24.008: Authentication Failure parameter information element

Authentication Failure parameter value (octet 3 to 16)
This contains AUTS (see 3GPP TS 33.102 [5a])

Next Change

10.5.4.4a Backup bearer capability

The purpose of the *backup bearer capability* IE is to indicate a requested service to a MS in case a complete description of the bearer service by a *bearer capability* IE is not available. The *backup bearer capability* information element is not subject to compatibility checking as described in annex B.

The *backup bearer capability* IE is coded as shown in figure 10.5.87a/3GPP TS 24.008 and tables 10.5.101a/3GPP TS 24.008 to 10.5.101m/3GPP TS 24.008.

The *backup bearer capability* is a type 4 information element with a minimum length of 3 octets and a maximum length of 15 octets.

	8	7	6	5	4	3	2	1		
	Backup bearer capability IEI								octet 1	
	Length of the backup bearer capability contents								octet 2	
1 ext	radio channel requirement		co- ding std	trans fer mode	information transfer capability				octet 3	
1 ext	comp -ress.	Structure		dupl. mode	confi gur.	NIRR	esta- bli.		octet 4*	
0/1 ext	0	0	rate adaption		signalling access protocol				octet 5*	
1 ext	Other IT C		Other rate adaption		0	0	0	Spare	octet 5a*	
0/1 ext	0	1	User information layer 1 protocol				sync/ async		octet 6*	
0/1 ext	numb. stop bits	nego- tia- tion	numb. data bits	user rate						octet 6a*
0/1 ext	intermed. rate		NIC on TX	NIC on RX	Parity				octet 6b*	
0/1 ext	connection element		modem type						octet 6c*	
0/1 ext	Other modem type		Fixed network user rate						octet 6d*	
0/1 ext	Acceptable channel codings				Maximum number of traffic channels				octet 6e*	
0/1 ext	UIMI			Wanted air interface user rate					octet 6f*	
1 ext	Acceptable channel codings Extended			Asymmetry Indication		0	0	Spare	octet 6g*	
1 ext	1	0	User information layer 2 protocol						octet 7*	

Figure 10.5.87a/3GPP TS 24.008 Backup bearer capability information element

NOTE: The coding of the octets of the *backup bearer capability* IE is not conforming to the coding of the *bearer capability* IE in ITU Q.931.

Table 10.5.101a/3GPP TS 24.008: Backup bearer capability information element

Radio channel requirement (octet 3)
In A/Gb mode and GERAN lu mode GSM , i.e. not applicable for UTRAN lu mode UMTS data services.
Bits 6 and 7 are spare bits. The sending side (i.e. the network) shall set bit 7 to value 0 and bit 6 to value 1.
Coding standard (octet 3)
Bit
5
0 GSM standardized coding as described below
1 reserved
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 10.5.101b/3GPP TS 24.008: Backup bearer capability information element

<p>Compression (octet 4) Bit 7 is spare and shall be set to "0".</p> <p>Structure (octet 4)</p> <p>Bits 6 5 0 0 service data unit integrity 1 1 unstructured</p> <p>All other values are reserved.</p> <p>Duplex mode (octet 4) Bit 4 0 half duplex 1 full duplex</p> <p>Configuration (octet 4) Bit 3 0 point-to-point</p> <p>All other values are reserved.</p> <p>NIRR (octet 4) (Negotiation of Intermediate Rate Requested) In A/Gb mode and GERAN Iu mode GSM, i.e. not applicable for UTRAN Iu mode UMTS data services. Bit 2 is spare and shall be set to "0".</p> <p>Establishment (octet 4) Bit 1 0 demand</p> <p>All other values are reserved</p>
--

Table 10.5.101c/3GPP TS 24.008: Backup 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 ITU-T 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
All other values are reserved.

Table 10.5.101d/3GPP TS 24.008: Backup 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 UTRAN Iu mode UMTS , PIAFS shall be considered. In A/Gb mode and GERAN Iu mode GSM , call shall be rejected if PIAFS requested.
Bit
5 4
0 0 V.120
0 1 H.223 & H.245
1 0 PIAFS
All other values are reserved.

Table 10.5.101e/3GPP TS 24.008: Backup 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 10.5.101f/3GPP TS 24.008: Backup 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 A/Gb mode and GERAN lu mode GSM only.
Bits
4 3 2 1
0 0 0 0 User rate unknown
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 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 10.5.101g/3GPP TS 24.008: Backup bearer capability information element

<p>Octet 6b for V.110/X.30 rate adaptation Intermediate rate (octet 6b) In A/Gb mode and GERAN lu modeGSM only. If the value "User rate unknown" is signalled in the field "User rate" then the contents of this field shall be ignored.</p> <p>Bits 7 6 0 0 reserved 0 1 reserved 1 0 8 kbit/s 1 1 16 kbit/s</p> <p>Network independent clock (NIC) on transmission (Tx) (octet 6b) (See Rec. V.110 and X.30). In A/Gb mode and GERAN lu modeGSM only.</p> <p>Bit 5 0 does not require to send data with network independent clock 1 requires to send data with network independent clock</p> <p>Network independent clock (NIC) on reception (Rx) (octet 6b) (See Rec. V.110 and X.30) In A/Gb mode and GERAN lu modeGSM only.</p> <p>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)</p> <p>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</p> <p>All other values are reserved.</p>

Table 10.5.101h/3GPP TS 24.008: Backup 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 network should use the 4 values depending on its capabilities to support the different modes.	
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	reserved: was allocated in earlier phases of the protocol
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 A/Gb mode and GERAN lu mode GSM only.	

Table 10.5.101i/3GPP TS 24.008: Backup bearer capability information element

Other modem type (octet 6d)	
Bits	
7 6	
0 0	no other modem type specified in this field
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) (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
0 1 0 0 1	33.6 kbit/s bit transparent (note 2)
0 1 0 1 0	32.0 kbit/s Recommendation I.460
0 1 0 1 1	31.2 kbit/s Recommendation V.34 (note 2)
The value 31.2 kbit/s Recommendation V.34 shall be used only by the network to inform the MS about FNUR modification due to negotiation between the modems in a 3.1 kHz multimedia call.	
All other values are reserved.	
Note 1: In A/Gb mode and GERAN lu mode GSM only.	
Note 2: In UTRAN lu mode UMTS only	

Table 10.5.101j/3GPP TS 24.008: Backup bearer capability information element

<p>Acceptable channel codings (octet 6e): Bits 4 to 7 are spare and shall be set to "0".</p> <p>Maximum number of traffic channels (octet 6e): Bits 1 to 3 are spare and shall be set to "0".</p>

Table 10.5.101k/3GPP TS 24.008: Backup bearer capability information element

<p>UIMI, User initiated modification indication (octet 6f),</p> <p>7 6 5</p> <p>0 0 0 User initiated modification not allowed/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</p> <p>All other values shall be interpreted as "User initiated modification up to 4 TCH/F may be requested".</p> <p>User initiated modification indication is not applicable for transparent connection.</p> <p>Wanted air interface user rate (octet 6f): Bits 1 to 4 are spare and shall be set to "0".</p>
--

Table 10.5.101l/3GPP TS 24.008: Backup bearer capability information element

<p>Layer 2 identity (octet 7)</p> <p>Bits</p> <p>7 6</p> <p>1 0 octet identifier</p> <p>All other values are reserved</p> <p>User information layer 2 protocol (octet 7)</p> <p>Bits</p> <p>5 4 3 2 1</p> <p>0 0 1 1 0 reserved: was allocated in earlier phases of the protocol 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 COPnoFICt (Character oriented Protocol with no Flow Control mechanism) 0 1 1 0 1 reserved: was allocated in earlier phases of the protocol</p> <p>All other values are reserved.</p>
--

Table 10.5.101m/3GPP TS 24.008: Backup bearer capability information element

Acceptable Channel Codings extended (octet 6g):
Bits 3 to 7 are spare and shall be set to "0".
Bits 2 and 1 are spare.

10.5.4.4a.1 Static conditions for the backup 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 the information transfer capability field (octet 3) indicates a value different from "speech", octets 4 and 5 shall be included, octets 6, 6a, 6b, 6c, 6d, 6e, 6f and 6g are optional. In case octet 6 is included, octets 6a, 6b, and 6c shall also be included. In case octet 6d is included, octets 6e, 6f and 6g may be included. If the information transfer capability field (octet 3) indicates "facsimile group 3" and octet 6c is included, 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.

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

10.5.4.5 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 10.5.88/3GPP TS 24.008 and tables 10.5.102/3GPP TS 24.008 to 10.5.115/3GPP 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 ext	radio channel requirement		co-ding std	trans fer mode	information transfer capability				octet 3
0/1 ext	0 co-ding	CTM spare		speech version indication				octet 3a *	
0/1 ext	0 co-ding	0 spare	0 spare	Speech version Indication				octet 3b etc*	
1 ext	comp-ress.	structure		dupl. mode	confi gur.	NIRR	esta-bli.	octet 4*	
0/1 ext	0	0	rate adaption		signalling access protocol			octet 5*	
0/1 ext	Other ITC		Other rate adaption		0	0	0	octet 5a*	
1 ext	Hdr/noHdr	Multi frame	Mode	LLI	Assig nor/e	Inb. neg	0 Spare	octet 5b*	
0/1 ext	0	1	User information layer 1 protocol				sync/async	octet 6*	
0/1 ext	numb. stop bits	nego-tia-tion	numb. data bits	user rate				octet 6a*	
0/1 ext	intermed. rate		NIC on TX	NIC on RX	Parity			octet 6b*	
0/1 ext	connection element		modem type					octet 6c*	
0/1 ext	Other modem type		Fixed network user rate					octet 6d*	
0/1 ext	Acceptable channel codings				Maximum number of traffic channels				octet 6e*
0/1 ext	UIMI			Wanted air interface user rate					octet 6f*
1 ext	Acceptable channel codings extended			Asymmetry Indication		0	0	octet 6g*	
1 ext	1	0	User information layer 2 protocol					octet 7*	

Figure 10.5.88/3GPP TS 24.008 Bearer capability information element

NOTE 1: The coding of the octets of the bearer capability information element is not conforming to ITU Q.931.

An MS shall encode the Bearer Capability information element according to A/Gb mode call control requirements also if it is requesting for a service in Iu mode, with the following exceptions:

1. A mobile station not supporting A/Gb [mode](#) and GERAN Iu mode shall set the following parameters to the value "0":
 - Maximum number of traffic channels (octet 6e, bits 1-3)
 - Acceptable Channel coding(s) (octet 6e, bits 4, 5 and 7)
2. Furthermore, a mobile station not supporting A/Gb [mode](#) and GERAN Iu mode shall also set the following parameters to the value "0", if the respective octets have to be included in the bearer capability information element according to subclause 10.5.4.5.1 and 3GPP TS 27.001 [36]:
 - UIMI, User initiated modification indication (octet 6f, bits 5-7)
 - Acceptable Channel Codings extended (octet 6g, bits 5-7)

For UTRAN Iu mode the following parameters are irrelevant for specifying the radio access bearer, because multiple traffic channels (multislot) are not deployed, see 3GPP TS 23.034 [104]. However, the parameters if received, shall be

stored in the MSC, and used for handover to A/Gb or GERAN Iu mode:

- Maximum number of traffic channels (octet 6e, bits 1-3)
- Acceptable Channel coding(s) (octet 6e, bits 4, 5 and 7)
- UIMI, User initiated modification indication (octet 6f, bits 5-7)
- Acceptable Channel Codings extended (octet 6g, bits 5-7)

NOTE 2: The following parameters are relevant in UTRAN Iu mode for non transparent data calls for deciding which RLP version to negotiate in order to avoid renegotiation of RLP version in case of inter-system handover from UTRAN Iu mode to A/Gb or GERAN Iu mode, see 3GPP TS 24.022 [9]:

- Maximum number of traffic channels (octet 6e, bits 1-3)
- Wanted air interface user rate (octet 6f, bits 1- 4)
- UIMI, User initiated modification indication (octet 6f, bits 5-7).

Table 10.5.102/3GPP TS 24.008: Bearer capability information element

<p>Radio channel requirement (octet 3), network to MS direction In <u>A/Gb mode and GERAN Iu mode</u> GSM, i.e. not applicable for <u>UTRAN Iu mode</u> UMTS data services.</p> <p>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.</p> <p>Radio channel requirement (octet 3) MS to network direction</p> <p>When information transfer capability (octet 3) indicates other values than speech:</p> <p>Bits</p> <table border="0"> <tr><td>7 6</td><td></td></tr> <tr><td>0 0</td><td>reserved</td></tr> <tr><td>0 1</td><td>full rate support only MS</td></tr> <tr><td>1 0</td><td>dual rate support MS/half rate preferred</td></tr> <tr><td>1 1</td><td>dual rate support MS/full rate preferred</td></tr> </table> <p>When information transfer capability (octet 3) indicates the value speech and no speech version indication is present in octet 3a etc.:</p> <p>Bits</p> <table border="0"> <tr><td>7 6</td><td></td></tr> <tr><td>0 0</td><td>reserved</td></tr> <tr><td>0 1</td><td>full rate support only MS/fullrate speech version 1 supported</td></tr> <tr><td>1 0</td><td>dual rate support MS/half rate speech version 1 preferred, full rate speech version 1 also supported</td></tr> <tr><td>1 1</td><td>dual rate support MS/full rate speech version 1 preferred, half rate speech version 1 also supported</td></tr> </table> <p>When information transfer capability (octet 3) indicates the value speech and speech version indication(s) is(are) present in octet 3a etc.:</p> <p>Bits</p> <table border="0"> <tr><td>7 6</td><td></td></tr> <tr><td>0 0</td><td>reserved</td></tr> <tr><td>0 1</td><td>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.</td></tr> <tr><td>1 0</td><td>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.</td></tr> <tr><td>1 1</td><td>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.</td></tr> </table>	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	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	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.
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																													
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																													
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.																													

(continued...)

Table 10.5.102/3GPP TS 24.008: Bearer capability information element (continued)

Coding standard (octet 3)	
Bit	
5	
0	GSM standardized coding as described below
1	reserved
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 10.5.103/3GPP TS 24.008 Bearer capability information element

<p>Octet(s) 3a etc. MS to network direction</p> <p>Octet(s) 3a etc., bits 1 to 4 shall only be used to convey speech coding information belonging to a A/Gb mode or GERAN lu modeGSM radio access. When included for a UTRAN lu modeUMTS call establishment they shall be used for handover to a-A/Gb mode or GERAN lu modeGSM Radio Access.</p> <p>A mobile station supporting CTM text telephony, but not supporting A/Gb or GERAN lu modeGSM radio access shall encode octet 3a, bits 1 to 4 as "no speech version supported for GERANGSM radio access".</p> <p>Coding</p> <p>Bit</p> <p>7</p> <p>0 octet used for extension of information transfer capability</p> <p>1 octet used for other extension of octet 3</p> <p>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:</p> <p>CTM text telephony indication (octet 3a)</p> <p>Bit</p> <p>6</p> <p>0 CTM text telephony is not supported</p> <p>1 CTM text telephony is supported</p> <p>Bit 6 in octet(s) 3b etc. is spare.</p> <p>Bit 5 in octet(s) 3a etc. is spare.</p> <p>Speech version indication (octet(s) 3a etc.)</p> <p>Bits</p> <p>4 3 2 1</p> <p>0 0 0 0 GSM full rate speech version 1 (note 2)</p> <p>0 0 1 0 GSM full rate speech version 2 (note 2)</p> <p>0 1 0 0 GSM full rate speech version 3 (note 2)</p> <p>0 1 1 0 GSM full rate speech version 4 (note 2)</p> <p>1 0 0 0 GSM full rate speech version 5 (note 2)</p> <p>0 0 0 1 GSM half rate speech version 1 (note 2)</p> <p>0 1 0 1 GSM half rate speech version 3 (note 2)</p> <p>0 1 1 1 GSM half rate speech version 4 (note 2)</p> <p>1 0 1 1 GSM half rate speech version 6 (note 2)</p> <p>1 1 1 1 no speech version supported for GSM radio accessGERAN (note 1)</p> <p>All other values have the meaning "speech version tbd" and shall be ignored when received.</p> <p>NOTE 1: This value shall only be used by an MS supporting CTM text telephony, but not supporting A/Gb or GERAN lu modeGSM radio access.</p> <p>NOTE 2: As defined in 3GPP TS 26.103 [83] and 3GPP TS 48.008 [85].</p> <p>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).</p> <p>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.</p> <p>Octet(s) 3a etc. network to MS direction</p> <p>The octet(s) 3a etc. shall be ignored by the MS.</p>
--

Table 10.5.104/3GPP 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 A/Gb mode and GERAN lu mode GSM , i.e. not applicable for UTRAN lu mode 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 10.5.105/3GPP 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 ITU-T 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 reserved: was allocated in earlier phases of the protocol
0 1 1 reserved: was allocated in earlier phases of the protocol
1 0 0 reserved: was allocated in earlier phases of the protocol.
1 0 1 reserved: was allocated in earlier phases of the protocol
1 1 0 reserved: was allocated in earlier phases of the protocol
All other values are reserved.

Table 10.5.106/3GPP 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 UTRAN Iu mode UMTS , PIAFS shall be considered. In A/Gb mode and GERAN Iu mode GSM , call shall be rejected if PIAFS requested.
Bit
5 4
0 0 V.120
0 1 H.223 & H.245
1 0 PIAFS
All other values are reserved.

Table 10.5.107/3GPP 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 10.5.108/3GPP 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 10.5.109/3GPP 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 A/Gb mode and GERAN lu mode 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 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 10.5.110/3GPP TS 24.008: Bearer capability information element

Octet 6b for V.110/X.30 rate adaptation Intermediate rate (octet 6b) In A/Gb mode and GERAN lu mode GSM only.
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). In A/Gb mode and GERAN lu mode 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 A/Gb mode and GERAN lu mode 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 10.5.111/3GPP TS 24.008: Bearer capability information element

<p>Connection element (octet 6c)</p> <p>Bit</p> <p>7 6</p> <p>0 0 transparent</p> <p>0 1 non transparent (RLP)</p> <p>1 0 both, transparent preferred</p> <p>1 1 both, non transparent preferred</p> <p>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.</p> <p>Modem type (octet 6c)</p> <p>Bits</p> <p>5 4 3 2 1</p> <p>0 0 0 0 0 none</p> <p>0 0 0 0 1 V.21 (note 1)</p> <p>0 0 0 1 0 V.22 (note 1)</p> <p>0 0 0 1 1 V.22 bis (note 1)</p> <p>0 0 1 0 0 reserved: was allocated in earlier phases of the protocol</p> <p>0 0 1 0 1 V.26 ter (note 1)</p> <p>0 0 1 1 0 V.32</p> <p>0 0 1 1 1 modem for undefined interface</p> <p>0 1 0 0 0 autobauding type 1</p> <p>All other values are reserved.</p> <p>Note 1: In A/Gb mode and GERAN lu mode GSM only.</p>

Table 10.5.112/3GPP 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
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) (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
0 1 0 0 1	33.6 kbit/s bit transparent (note 2)
0 1 0 1 0	32.0 kbit/s Recommendation I.460
0 1 0 1 1	31.2 kbit/s Recommendation V.34 (note 2)
The value 31.2 kbit/s Recommendation V.34 shall be used only by the network to inform the MS about FNUR modification due to negotiation between the modems in a 3.1 kHz multimedia call.	
All other values are reserved.	
Note 1: In A/Gb mode and GERAN lu mode GSM only.	
Note 2: In UTRAN lu mode UMTS only	

Table 10.5.113/3GPP 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 10.5.114/3GPP 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 10.5.115/3GPP TS 24.008: Bearer capability information element

<p>Layer 2 identity (octet 7)</p> <p>Bits</p> <p>7 6</p> <p>1 0 octet identifier</p> <p>All other values are reserved</p> <p>User information layer 2 protocol (octet 7)</p> <p>Bits</p> <p>5 4 3 2 1</p> <p>0 0 1 1 0 reserved: was allocated in earlier phases of the protocol</p> <p>0 1 0 0 0 ISO 6429, codeset 0 (DC1/DC3)</p> <p>0 1 0 0 1 reserved: was allocated but never used in earlier phases of the protocol</p> <p>0 1 0 1 0 videotex profile 1</p> <p>0 1 1 0 0 COPnoFICt (Character oriented Protocol with no Flow Control mechanism)</p> <p>0 1 1 0 1 reserved: was allocated in earlier phases of the protocol</p> <p>All other values are reserved.</p>
--

Table 10.5.115a/3GPP TS 24.008: Bearer capability information element

<p>Acceptable Channel Codings extended (octet 6g) mobile station to network direction:</p> <p>Bit</p> <p>7</p> <p>0 TCH/F28.8 not acceptable</p> <p>1 TCH/F28.8 acceptable</p> <p>Bit</p> <p>6</p> <p>0 TCH/F32.0 not acceptable</p> <p>1 TCH/F32.0 acceptable</p> <p>Bit</p> <p>5</p> <p>0 TCH/F43.2 not acceptable</p> <p>1 TCH/F43.2 acceptable</p> <p>Channel Coding Asymmetry Indication</p> <p>Bits</p> <p>4 3</p> <p>0 0 Channel coding symmetry preferred</p> <p>1 0 Downlink biased channel coding asymmetry is preferred</p> <p>0 1 Uplink biased channel coding asymmetry is preferred</p> <p>1 1 Unused, if received it shall be interpreted as "Channel coding symmetry preferred"</p> <p>EDGE Channel Codings (octet 6g), network to MS direction:</p> <p>Bits 3 to 7 are spare and shall be set to "0".</p> <p>Bits 2 and 1 are spare.</p>

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 the information transfer capability field (octet 3) indicates "speech", octet 3a etc. shall be included only if the mobile station supports CTM text telephony or if it supports at least one speech version for ~~GERAN~~~~SM-radio-access~~ 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", 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".

Next Change

10.5.4.17 Keypad facility

The purpose of the keypad facility information element is to convey IA5 characters, e.g. entered by means of a terminal keypad (see note).

The keypad facility information element is coded as shown in figure 10.5.103/3GPP TS 24.008.

The keypad facility is a type 3 information element with 2 octets length.

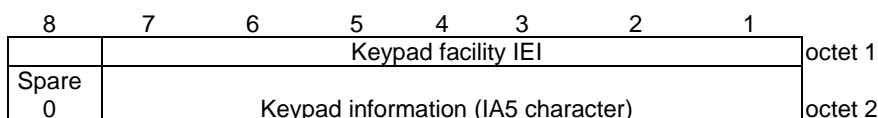


Figure 10.5.103/3GPP TS 24.008 Keypad facility information element

NOTE: In the ~~GSM~~~~3GPP~~ system this information element is only used to transfer one DTMF digit (0, 1, ... , 9, A, B, C, D, *, #) as one IA5 character.

Next Change

10.5.4.32 Supported codec list

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

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

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

Speech codec information belonging to GERAN~~SM~~ and UTRAN~~UMTS-radio-access~~ shall be conveyed by this information element.

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

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

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

<p>Octet 3, (j+1), m etc SysID indicates the radio access technology for which the proceeding codec types may be used. Coding of this Octet is defined in 3GPP TS 26.103.</p> <p>Octet 4, (j+2), m+1 etc Length Of Codec Bitmap for SysID indicates the number of octets included in the list for the given SysID.</p> <p>Octets (5 & 6), (J+2 & j+3), (m+2 & m+3) etc The coding of the Codec Bitmap is defined in 3GPP TS 26.103.</p>

Next Change

10.5.5.1 Attach result

The purpose of the *attach result* information element is to specify the result of a GPRS attach procedure.

The *attach result* is a type 1 information element.

The *attach result* information element is coded as shown in figure 10.5.117a/3GPP TS 24.008 and table 10.5.134a/3GPP TS 24.008.

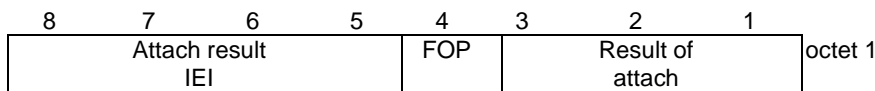


Figure 10.5.117a/3GPP TS 24.008: Attach result information element

Table 10.5.134a/3GPP TS 24.008: Attach result information element

Result of attach (octet 1)	
Bits	
3 2 1	
0 0 1	GPRS only attached
0 1 1	Combined GPRS/IMSI attached
All other values are reserved.	
Follow-on proceed (octet 1)	
Bit	
4	
0	Follow-on proceed
1	No follow-on proceed
Follow-on proceed is applicable only in lu modeUMTS . This indication shall be ignored if received in A/Gb modeGSM .	

10.5.5.2 Attach type

The purpose of the *attach type* information element is to indicate the type of the requested attach, i.e. whether the MS wants to perform a GPRS or combined GPRS attach.

The *attach type* is a type 1 information element.

The *attach type* information element is coded as shown in figure 10.5.117b/3GPP TS 24.008 and table 10.5.135b/3GPP TS 24.008.

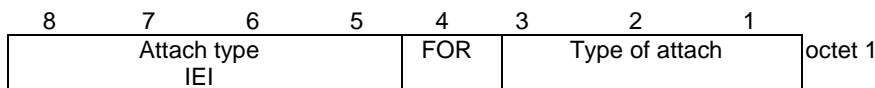


Figure 10.5.117b/3GPP TS 24.008: Attach type information element

Table 10.5.135b/3GPP TS 24.008: Attach type information element

Type of attach (octet 1, bit 1 to 3)	
Bits	
3 2 1	
0 0 1	GPRS attach
0 1 0	GPRS attach while IMSI attached
0 1 1	Combined GPRS/IMSI attach
All other values are interpreted as <i>GPRS attach</i> in this version of the protocol.	
Follow-on request (octet 1, bit 4)	
Bits	
4	
0	No follow-on request pending
1	Follow-on request pending
Follow-on request pending is applicable only in lu modeUMTS .	

Next Change

10.5.5.6 DRX parameter

The purpose of the *DRX parameter* information element is to indicate whether the MS uses DRX mode or not.

The *DRX parameter* is a type 3 information element with a length of 3 octets.

The value part of a *DRX parameter* information element is coded as shown in table 10.5.139/3GPP TS 24.008.

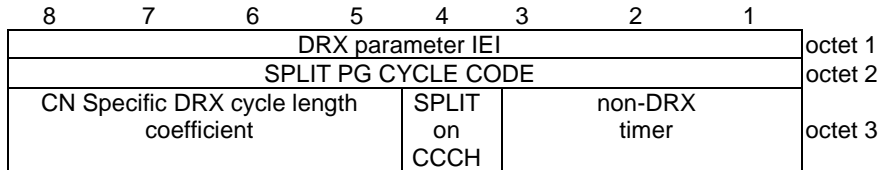


Figure 10.5.122/3GPP TS 24.008: DRX parameter information element

Table 10.5.139/3GPP TS 24.008: DRX parameter information element

SPLIT PG CYCLE CODE, octet 2	
The octet contains the binary coded value of the SPLIT PG CYCLE CODE. The SPLIT PG CYCLE value is derived from the SPLIT PG CYCLE CODE as follows:	
0	704 (equivalent to no DRX)
1 to 64	1 to 64, respectively
65	71
66	72
67	74
68	75
69	77
70	79
71	80
72	83
73	86
74	88
75	90
76	92
77	96
78	101
79	103
80	107
81	112
82	116
83	118
84	128
85	141
86	144
87	150
88	160
89	171
90	176
91	192
92	214
93	224
94	235
95	256
96	288
97	320
98	352

All other values are reserved and shall be interpreted as 1 by this version of the protocol.

SPLIT on CCCH, octet 3 (bit 4)

0	Split pg cycle on CCCH is not supported by the mobile station
1	Split pg cycle on CCCH is supported by the mobile station

non-DRX timer, octet 3

bit

3	2	1	
0	0	0	no non-DRX mode after transfer state
0	0	1	max. 1 sec non-DRX mode after transfer state
0	1	0	max. 2 sec non-DRX mode after transfer state
0	1	1	max. 4 sec non-DRX mode after transfer state
1	0	0	max. 8 sec non-DRX mode after transfer state
1	0	1	max. 16 sec non-DRX mode after transfer state
1	1	0	max. 32 sec non-DRX mode after transfer state
1	1	1	max. 64 sec non-DRX mode after transfer state

CN Specific DRX cycle length coefficient, octet 3

bit

8	7	6	5	lu modeUMTS specific
0	0	0	0	CN Specific DRX cycle length coefficient not specified by the MS, ie. the system information value 'CN domain specific DRX cycle length' is used. (Ref 3GPP TS 25.331)
0	1	1	0	CN Specific DRX cycle length coefficient 6
0	1	1	1	CN Specific DRX cycle length coefficient 7
1	0	0	0	CN Specific DRX cycle length coefficient 8
1	0	0	1	CN Specific DRX cycle length coefficient 9

All other values shall be interpreted as "CN Specific DRX cycle length coefficient not specified by the MS " by this version of the protocol.

NOTE: In lu modeUMTS this field (octet 3 bits 8 to 5) is used, but was spare in earlier versions of this protocol.

10.5.5.7 Force to standby

The purpose of the *force to standby* information element is to force the MS to stop the READY timer in order to prevent the MS to perform cell updates.

In lu modeUMTS, the network shall always indicate *force to standby not indicated* in the *force to standby* information element.

The *force to standby* is a type 1 information element.

The *force to standby* information element is coded as shown in figure 10.5.123/3GPP TS 24.008 and table 10.5.140/3GPP TS 24.008.

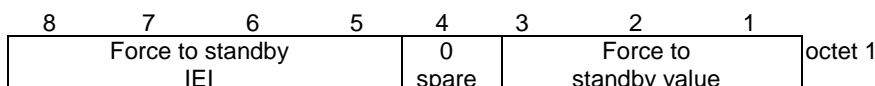


Figure 10.5.123/3GPP TS 24.008: Force to standby information element

Table 10.5.140/3GPP TS 24.008: Force to standby information element

Force to standby value (octet 1)			
Bits			
3	2	1	
0	0	0	Force to standby not indicated
0	0	1	Force to standby indicated
All other values are interpreted as <i>force to standby not indicated</i> by this version of the protocol.			

Next Change

10.5.5.17 Update result

The purpose of the *update result* information element is to specify the result of the associated updating procedure.

The *update result* is a type 1 information element.

The *update result* information element is coded as shown in figure 10.5.131/3GPP TS 24.008 and table 10.5.149/3GPP TS 24.008.

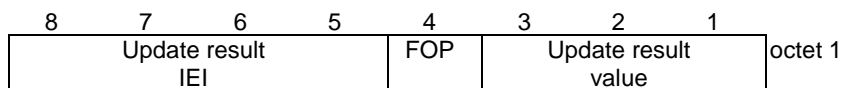


Figure 10.5.131/3GPP TS 24.008: Update result information element

Table 10.5.149/3GPP TS 24.008: Update result information element

Update result value (octet 1)			
Bits			
3	2	1	
0	0	0	RA updated
0	0	1	combined RA/LA updated
All other values are reserved.			
Follow-on proceed (octet 1, bit 4)			
Bit			
4			
0	Follow-on proceed		
1	No follow-on proceed		
Follow-on proceed is applicable only in lu mode UMTS. This indication shall be ignored if received in A/Gb mode GSM.			

10.5.5.18 Update type

The purpose of the *update type* information element is to specify the area the updating procedure is associated with.

The *update type* is a type 1 information element.

The *update type* information element is coded as shown in figure 10.5.132/3GPP TS 24.008 and table 10.5.150/3GPP TS 24.008.

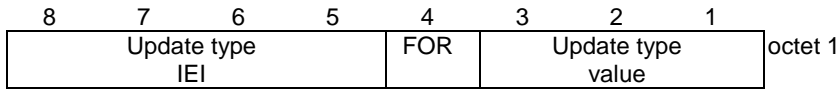


Figure 10.5.132/3GPP TS 24.008: Update type information element

Table 10.5.150/3GPP TS 24.008: Update type information element

Update type value (octet 1, bit 1 to 3)	
Bits	
3	2
1	
0 0 0	RA updating
0 0 1	combined RA/LA updating
0 1 0	combined RA/LA updating with IMSI attach
0 1 1	Periodic updating
All other values are reserved.	
Follow-on request (octet 1, bit 4)	
Bit	
4	
0	No follow-on request pending
1	Follow-on request pending
Follow-on request pending is applicable only in lu mode UMTS.	

Next Change

10.5.6.6 SM cause

The purpose of the *SM cause* information element is to indicate the reason why a session management request is rejected.

The *SM cause* is a type 3 information element with 2 octets length.

The *SM cause* information element is coded as shown in figure 10.5.139/3GPP TS 24.008 and table 10.5.157/3GPP TS 24.008.

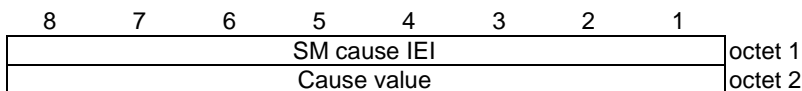


Figure 10.5.139/3GPP TS 24.008: SM cause information element

Table 10.5.157/3GPP TS 24.008: *SM cause information element*

Cause value (octet 2)	
Bits	
8	7 6 5 4 3 2 1
0 0 0 0 1 0 0 0	Operator Determined Barring
0 0 0 1 1 0 0 0	MBMS bearer capabilities insufficient for the service
0 0 0 1 1 0 0 1	LLC or SNDCP failure (A/Gb mode GSM only)
0 0 0 1 1 0 1 0	Insufficient resources
0 0 0 1 1 0 1 1	Missing or unknown APN
0 0 0 1 1 1 0 0	Unknown PDP address or PDP type
0 0 0 1 1 1 0 1	User authentication failed
0 0 0 1 1 1 1 0	Activation rejected by GGSN
0 0 0 1 1 1 1 1	Activation rejected, unspecified
0 0 1 0 0 0 0 0	Service option not supported
0 0 1 0 0 0 0 1	Requested service option not subscribed
0 0 1 0 0 0 1 0	Service option temporarily out of order
0 0 1 0 0 0 1 1	NSAPI already used (not sent)
0 0 1 0 0 1 0 0	Regular deactivation
0 0 1 0 0 1 0 1	QoS not accepted
0 0 1 0 0 1 1 0	Network failure
0 0 1 0 0 1 1 1	Reactivation required
0 0 1 0 1 0 0 0	Feature not supported
0 0 1 0 1 0 0 1	Semantic error in the TFT operation
0 0 1 0 1 0 1 0	Syntactical error in the TFT operation
0 0 1 0 1 0 1 1	Unknown PDP context
0 0 1 0 1 1 1 0	PDP context without TFT already activated
0 0 1 0 1 1 1 1	Multicast group membership time-out
0 0 1 0 1 1 0 0	Semantic errors in packet filter(s)
0 0 1 0 1 1 0 1	Syntactical errors in packet filter(s)
0 1 0 1 0 0 0 1	Invalid transaction identifier value
0 1 0 1 1 1 1 1	Semantically incorrect message
0 1 1 0 0 0 0 0	Invalid mandatory information
0 1 1 0 0 0 0 1	Message type non-existent or not implemented
0 1 1 0 0 0 1 0	Message type not compatible with the protocol state
0 1 1 0 0 0 1 1	Information element non-existent or not implemented
0 1 1 0 0 1 0 0	Conditional IE error
0 1 1 0 0 1 0 1	Message not compatible with the protocol state
0 1 1 0 1 1 1 1	Protocol error, unspecified
0 1 1 1 0 0 0 0	APN restriction value incompatible with active PDP context

Any other value received by the mobile station shall be treated as 0010 0010, "Service option temporarily out of order". Any other value received by the network shall be treated as 0110 1111, "Protocol error, unspecified".

NOTE: The listed cause values are defined in Annex I

Next Change

10.5.6.14 MBMS bearer capabilities

The purpose of the *MBMS bearer capabilities* information element is to indicate the maximum bit rate for downlink supported by the MS for an MBMS context.

NOTE: The information element indicates the static physical capabilities of the MS, independent of the radio access (UTRAN~~MTS~~ or GERAN~~SM~~), the radio conditions, or other CS or PS services possibly activated by the MS.

The *MBMS bearer capabilities* is a type 4 information element with a maximum length of 4 octets.

The *MBMS bearer capabilities* information element is coded as shown in figure 10.5.6.14/3GPP TS 24.008.

8	7	6	5	4	3	2	1	
MBMS bearer capabilities IEI								Octet 1
Length of MBMS bearer capabilities IE								Octet 2
Maximum bit rate for downlink								Octet 3
Maximum bit rate for downlink (extended)								Octet 4

Figure 10.5.6.14/3GPP TS 24.008: MBMS bearer capabilities information element

Table 10.5.6.14/3GPP TR 24.008: MBMS bearer capabilities information element

<p>Maximum bit rate for downlink, octet 3 (see 3GPP TS 23.107 [81])</p> <p>The coding is identical to that of the maximum bit rate for downlink, octet 9, in the <i>Quality of service</i> information element (see subclause 10.5.6.5).</p> <p>If the sending entity wants to indicate a maximum bit rate for downlink higher than 8640 kbps, it shall set octet 3 to "11111110", i.e. 8640 kbps, and shall encode the value for the maximum bit rate in octet 4.</p> <p>Maximum bit rate for downlink (extended), octet 4</p> <p>The coding is identical to that of the maximum bit rate for downlink (extended), octet 15, in the <i>Quality of service</i> information element (see subclause 10.5.6.5).</p>
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Next Change

11.2.2 Timers of GPRS mobility management

Table 11.3/3GPP TS 24.008: GPRS Mobility management timers - MS side

TIMER NUM.	TIMER VALUE	STATE	CAUSE OF START	NORMAL STOP	ON THE 1 st , 2 nd , 3 rd , 4 th EXPIRY Note 3
T3310	15s	GMM-REG-INIT	ATTACH REQ sent	ATTACH ACCEPT received ATTACH REJECT received	Retransmission of ATTACH REQ
T3311	15s	GMM-DEREG ATTEMPTING TO ATTACH or GMM-REG ATTEMPTING TO UPDATE	ATTACH REJ with other cause values as described in chapter 'GPRS Attach' ROUTING AREA UPDATE REJ with other cause values as described in chapter 'Routing Area Update' Low layer failure	Change of the routing area	Restart of the Attach or the RAU procedure with updating of the relevant attempt counter
T3316	30s	GMM-REG-INIT GMM-REG GMM-DEREG-INIT GMM-RA-UPDATING-INT GMM-SERV-REQ-INIT (lu mode only)	RAND and RES stored as a result of a UMTS authentication challenge	Security mode setting (lu mode only) SERVICE ACCEPT received. (lu mode only) SERVICE REJECT received (lu mode only) ROUTING AREA UPDATE ACCEPT received AUTHENTICATION AND CIPHERING REJECT received AUTHENTICATION_AND_CIPHERING_FAILURE sent Enter GMM-DEREG or GMM-NULL	Delete the stored RAND and RES
T3318	20s	GMM-REG-INIT GMM-REG GMM-DEREG-INIT GMM-RA-UPDATING-INT GMM-SERV-REQ-INIT (lu mode UMTS only)	AUTHENTICATION & CIPHERING FAILURE (cause='MAC failure' or 'GSM authentication unacceptable') sent	AUTHENTICATION & CIPHERING REQUEST received	On first expiry, the MS should consider the network as false (see 4.7.7.6.1)

T3320	15s	GMM-REG-INIT GMM-REG GMM-DEREG-INIT GMM-RA-UPDATING-INT GMM-SERV-REQ-INIT (<u>lu mode</u> UMTS only)	AUTHENTICATION & CIPHERING FAILURE (cause=synch failure) sent	AUTHENTICATION & CIPHERING REQUEST received	On first expiry, the MS should consider the network as false (see 4.7.7.6.1)
T3321	15s	GMM-DEREG-INIT	DETACH REQ sent	DETACH ACCEPT received	Retransmission of the DETACH REQ
T3330	15s	GMM-ROUTING-UPDATING-INITIATED	ROUTING AREA UPDATE REQUEST sent	ROUTING AREA UPDATE ACC received ROUTING AREA UPDATE REJ received	Retransmission of the ROUTING AREA UPDATE REQUEST message

Table 11.3a/3GPP TS 24.008: GPRS Mobility management timers – MS side

TIMER NUM.	TIMER VALUE	STATE	CAUSE OF START	NORMAL STOP	ON EXPIRY
T3302	Default 12 min Note 1	GMM-DEREG or GMM-REG	At attach failure and the attempt counter is greater than or equal to 5. At routing area updating failure and the attempt counter is greater than or equal to 5.	At successful attach At successful routing area updating	On every expiry, initiation of the GPRS attach procedure or RAU procedure
T3312	Default 54 min Note1	GMM-REG	In GSM, when READY state is left. In UMTS, when PMM-CONNECTED mode is left.	When entering state GMM-DEREG	Initiation of the Periodic RAU procedure
T3314 READY (<u>A/Gb mode</u> GSM only)	Default 44 sec Note 2	All except GMM-DEREG	Transmission of a PTP PDU	Forced to Standby	No cell-updates are performed
T3317 (<u>lu mode</u> UMTS only)	10s	GMM-SERVICE-REQUEST-INITIATED	SERVICE REQ sent	Security mode control procedure is completed, SERVICE ACCEPT received, or SERVICE REJECT received	Abort the procedure

NOTE 1: The value of this timer is used if the network does not indicate another value in a GMM signalling procedure.

NOTE 2: The default value of this timer is used if neither the MS nor the Network send another value, or if the Network sends this value, in a signalling procedure.

NOTE 3: Typically, the procedures are aborted on the fifth expiry of the relevant timer. Exceptions are described in the corresponding procedure description.

Table 11.4/3GPP TS 24.008: GPRS Mobility management timers - network side

TIMER NUM.	TIMER VALUE	STATE	CAUSE OF START	NORMAL STOP	ON THE 1 st , 2 nd , 3 rd , 4 th EXPIRY Note 3
T3322	6s	GMM- DEREG-INIT	DETACH REQ sent	DETACH ACCEPT received	Retransmission of DETACH REQUEST
T3350	6s	GMM- COMMON- PROC-INIT	ATTACH ACCEPT sent with P-TMSI and/or TMSI RAU ACCEPT sent with P-TMSI and/or TMSI P-TMSI REALLOC COMMAND sent	ATTACH COMPLETE received RAU COMPLETE received P-TMSI REALLOC COMPLETE received	Retransmission of the same message type, i.e. ATTACH ACCEPT, RAU ACCEPT or REALLOC COMMAND
T3360	6s	GMM- COMMON- PROC-INIT	AUTH AND CIPH REQUEST sent	AUTH AND CIPH RESPONSE received AUTHENT-AND CIPHER-FAILURE received	Retransmission of AUTH AND CIPH REQUEST
T3370	6s	GMM- COMMON- PROC-INIT	IDENTITY REQUEST sent	IDENTITY RESPONSE received	Retransmission of IDENTITY REQUEST

Table 11.4a/3GPP TS 24.008: GPRS Mobility management timers - network side

TIMER NUM.	TIMER VALUE	STATE	CAUSE OF START	NORMAL STOP	ON EXPIRY
T3313	Note1	GMM_REG	Paging procedure initiated	Paging procedure completed	Network dependent
T3314 READY (A/Gb modeGSM only)	Default 44 sec Note 2	All except GMM- DEREG	Receipt of a PTP PDU	Forced to Standby	The network shall page the MS if a PTP PDU has to be sent to the MS
Mobile Reachable	Default 4 min greater than T3312	All except GMM- DEREG	In GSM, change from READY to STANDBY state In UMTS, change from PMM- CONNECTED mode to PMM-IDLE mode.	PTP PDU received	Network dependent but typically paging is halted on 1st expiry

NOTE 1: The value of this timer is network dependent.

NOTE 2: The default value of this timer is used if neither the MS nor the Network send another value, or if the Network sends this value, in a signalling procedure. The value of this timer should be slightly shorter in the network than in the MS, this is a network implementation issue.

NOTE 3: Typically, the procedures are aborted on the fifth expiry of the relevant timer. Exceptions are described in the corresponding procedure description.

Next Change

Annex E (informative): Comparison between call control procedures specified in 3GPP TS 24.008 and ITU-T Recommendation Q.931

This annex summarizes a comparison of the procedures for call control as specified in ITU-T Recommendation Q.931 (blue book) and 3GPP TS 24.008.

If no comment is given, it means that the procedures specified in ITU-T Recommendation Q.931 and 3GPP TS 24.008 are similar. However, it should be noted that even in such cases the procedures may be described in slightly different ways in the two documents.

Table E.1/3GPP TS 24.008: Circuit-switched call control procedures

Procedure	Q.931	3GPP TS 24.008
Call establishment at the originating interface	5.1	5.2.1
- call request	5.1.1	5.2.1.1.1 en-bloc sending only
- B-channel selection originating	5.1.2	not applicable
- overlap sending	5.1.3	not supported
- invalid call information	5.1.4	5.2.1.1.2
- call proceeding, en-bloc sending	5.1.5.1	5.2.1.1.3
- call proceeding, overlap sending	5.1.5.2	not supported
- notification of interworking at the originating interf.	5.1.6	5.2.1.1.4
- call confirmation indication	5.1.7	5.2.1.1.5
- call connected	5.1.8	5.2.1.1.6
- call rejection	5.1.9	5.2.1.1.7
- transit network selection	5.1.10	5.2.1.1.8

Table E.1/3GPP TS 24.008: Circuit-switched call control procedures (continued)

Procedure	Q.931	3GPP TS 24.008
Call establishment at the destination interface	5.2	5.2.2
- call indication	5.2.1	5.2.2.1 procedure for multiple terminal configuration not required, i.e. delivery of SETUP messages on broadcast data links is not supported
- compatibility checking	5.2.2	5.2.2.2 equivalent, except that delivery of SETUP messages on broadcast data links is not supported
- B-channel selection destination	5.2.3	not applicable
- overlap receiving	5.2.4	not supported
- call confirmation information	5.2.5	5.2.2.3 equivalent, except that delivery of SETUP messages on broadcast data links is not supported
- notification of interworking at the terminating interf.	5.2.6	5.2.2.4
- call accept indication	5.2.7	5.2.2.5
- active indication	5.2.8	5.2.2.6 equivalent, except that SETUP messages are not sent on broadcast data links
- non-selected user clearing	5.2.9	not applicable

Table E.1/3GPP TS 24.008: Circuit-switched call control procedures (continued)

Procedure	Q.931	3GPP TS 24.008
Call clearing	5.3	5.4
- terminology	5.3.1	5.4.1 terminology adapted to A/Gb mode and GERAN lu mode GSM applications
- exception conditions	5.3.2	5.4.2 only case a) of clause 5.3.2 of Rec. Q.931 applies. All other exceptions apply to functions which are not relevant to A/Gb mode and GERAN lu mode GSM
- clearing initiated by the user/MS	5.3.3	5.4.3
- clearing initiated by the network	5.3.4	5.4.4
- clearing when tones/announcements are provided	5.3.4.1	5.4.4.1.1 and 5.4.4.2.1 exception: if not already connected, the traffic channel is connected in order to provide the tone/announcement
- clearing when tones/announcements are not provided	5.3.4.2	5.4.4.1.2 and 5.4.4.2.3
- completion of clearing	5.3.4.3	5.4.4.1.3 and 5.4.4.2.5
Clear collision	5.3.5	5.4.5

Table E.1/3GPP TS 24.008: Circuit-switched call control procedures (continued)

Procedure	Q.931	3GPP TS 24.008
In-band tones and announcements	5.4	5.5.1
Restart procedure	5.5	not supported
Call rearrangements	5.6	5.3.4 call suspension/call re-establishment not supported on the radio path. The functions, if required, are to be supported locally in the MS. On the radio interface, the notification procedure of Rec. Q.931 (clause5.6.7) applies
Call collisions	5.7	5.5.2 call collisions cannot occur
Emergency call establishment at the originating interface	not specified not supported	5.2.1.2
In-call modification	Annex O Rec. Q.931 is incomplete with regard to in-call modification procedures	5.3.4
DTMF protocol control procedures	not specified not supported	5.3.3
Call re-establishment	not specified not supported	5.5.4
Status enquiry procedure	5.8.10, 5.8.11	5.5.3
User-to-user signalling	7	3GPP TS 24.010
User notification procedure	5.9	5.3.1

Annex F (informative):

A/Gb mode~~GSM~~ specific cause values for radio resource management

See 3GPP TS 44.018 [84].

Next Change

Annex G (informative):

3GPP~~UMTS~~ specific cause values for mobility management

This annex describes the cause values for the mobility management procedures for non-GPRS services (MM) and GPRS services (GMM). Clauses G1 to G5 are valid for both MM and GMM. However, the following codes are applicable for non-GPRS services only:

#38 Call cannot be identified

Clause G.6 applies only for GMM procedures.

Next Change

G.3 Causes related to PLMN specific network failures and congestion/Authentication Failures

Cause value = 20 MAC failure

This cause is sent to the network if the USIM detects that the MAC in the AUTHENTICATION REQUEST or AUTHENTICATION_AND_CIPHERING REQUEST message is not fresh (see 3GPP TS 33.102 [5a]).

Cause value = 21 Synch failure

This cause is sent to the network if the USIM detects that the SQN in the AUTHENTICATION REQUEST or AUTHENTICATION_AND_CIPHERING REQUEST message is out of range (see 3GPP TS 33.102 [5a]).

Cause value = 17 Network failure

This cause is sent to the MS if the MSC cannot service an MS generated request because of PLMN failures, e.g. problems in MAP.

Cause value = 22 Congestion

This cause is sent if the service request cannot be actioned because of congestion (e.g. no channel, facility busy/congested etc.).

Cause value = 23 GSM authentication unacceptable

This cause is sent to the network in lu mode~~UMTS~~ if a USIM is inserted in the MS and there is no Authentication Parameter AUTN IE present in the AUTHENTICATION REQUEST or AUTHENTICATION_AND_CIPHERING REQUEST message.

Next Change

G.6 Additional cause codes for GMM

Cause value = 7 GPRS services not allowed

This cause is sent to the MS if it requests an IMSI attach for GPRS services, but is not allowed to operate GPRS services.

Cause value = 8 GPRS services and non-GPRS services not allowed

This cause is sent to the MS if it requests a combined IMSI attach for GPRS and non-GPRS services, but is not allowed to operate either of them.

Cause value = 9 MS identity cannot be derived by the network

This cause is sent to the MS when the network cannot derive the MS's identity from the P-TMSI in case of inter-SGSN routing area update.

Cause value = 10 Implicitly detached

This cause is sent to the MS either if the network has implicitly detached the MS, e.g. some while after the Mobile reachable timer has expired, or if the GMM context data related to the subscription does not exist in the SGSN e.g. because of a SGSN restart.

Cause value = 14 GPRS services not allowed in this PLMN

This cause is sent to the MS which requests GPRS service in a PLMN which does not offer roaming for GPRS services to that MS.

Cause value = 16 MSC temporarily not reachable

This cause is sent to the MS if it requests a combined GPRS attach or routing area updating in a PLMN where the MSC is temporarily not reachable via the GPRS part of the ~~GSM~~ network.

Cause value = 40 No PDP context activated

This cause is sent to the MS if the MS requests an establishment of the radio access bearers for all active PDP contexts by sending a SERVICE REQUEST message indicating "data" to the network, but the SGSN does not have any active PDP context(s).

Next Change

Annex H (informative):

~~UMTS~~3GPP specific cause values for call control

Next Change

Annex I (informative): GPRS specific cause values for GPRS Session Management and MBMS Session Management

I.1 Causes related to nature of request

Cause value = 8 Operator Determined Barring

This cause code is used by the network to indicate that the requested service was rejected by the SGSN due to Operator Determined Barring.

Cause value = 25 LLC or SNDCP failure ([A/Gb mode](#)**GSM** only)

This cause code is used by the MS indicate that a PDP context is deactivated because of a LLC or SNDCP failure (e.g. if the SM receives a *SNSM-STATUS.request* message with cause "DM received" or "invalid XID response", see 3GPP TS 44.065 [78])

Cause value = 26 Insufficient resources

This cause code is used by the MS or by the network to indicate that a PDP context activation request, secondary PDP context activation request, PDP context modification request, or MBMS context activation request cannot be accepted due to insufficient resources.

Cause value = 27 Unknown or missing access point name

This cause code is used by the network to indicate that the requested service was rejected by the external packet data network because the access point name was not included although required or if the access point name could not be resolved.

Cause value = 28 Unknown PDP address or PDP type

This cause code is used by the network to indicate that the requested service was rejected by the external packet data network because the PDP address or type could not be recognised.

Cause value = 29 User authentication failed

This cause code is used by the network to indicate that the requested service was rejected by the external packet data network due to a failed user authentication.

Cause value = 30 Activation rejected by GGSN

This cause code is used by the network to indicate that the requested service was rejected by the GGSN.

Cause value = 31 Activation rejected, unspecified

This cause code is used by the network to indicate that the requested service was rejected due to unspecified reasons.

Cause value = 32 Service option not supported

This cause code is used by the network when the MS requests a service which is not supported by the PLMN.

Cause value = 33 Requested service option not subscribed

See Annex G, clause 4.

Cause value = 34 Service option temporarily out of order

See Annex G, clause 4.

Cause value = 35 NSAPI already used

This cause code may be used by a network to indicate that the NSAPI requested by the MS in the PDP context activation request is already used by another active PDP context of this MS.

Never to be sent, but can be received from a R97/R98 network at PDP context activation

Cause value = 36 Regular deactivation

This cause code is used to indicate a regular MS or network initiated PDP context deactivation or a regular network initiated MBMS context deactivation.

Cause value = 37 QoS not accepted

This cause code is used by the MS if the new QoS cannot be accepted that were indicated by the network in the PDP Context Modification procedure.

Cause value = 38 Network failure

This cause code is used by the network to indicate that the PDP context deactivation or the MBMS context deactivation is caused by an error situation in the network.

Cause value = 39 Reactivation requested

This cause code is used by the network to request a PDP context reactivation after a GGSN restart.

Cause value = 40 Feature not supported

This cause code is used by the MS to indicate that the PDP context activation or the MBMS context activation initiated by the network is not supported by the MS.

Cause value = 41 semantic error in the TFT operation.

This cause code is used by the network to indicate that there is a semantic error in the TFT operation included in a secondary PDP context activation request or an MS-initiated PDP context modification.

Cause value = 42 syntactical error in the TFT operation.

This cause code is used by the network to indicate that there is a syntactical error in the TFT operation included in a secondary PDP context activation request or an MS-initiated PDP context modification.

Cause value = 43 unknown PDP context

This cause code is used by the network to indicate that the PDP context identified by the Linked TI IE the secondary PDP context activation request is not active.

Cause value = 44 semantic errors in packet filter(s)

This cause code is used by the network to indicate that there is one or more semantic errors in packet filter(s) of the TFT included in a secondary PDP context activation request or an MS-initiated PDP context modification.

Cause value = 45 syntactical error in packet filter(s)

This cause code is used by the network to indicate that there is one or more syntactical errors in packet filter(s) of the TFT included in a secondary PDP context activation request or an MS-initiated PDP context modification.

Cause value = 46 PDP context without TFT already activated

This cause code is used by the network to indicate that the network has already activated a PDP context without TFT.

Cause value = 112 APN restriction value incompatible with active PDP context.

This cause code is used by the network to indicate that a requested primary PDP context or an MBMS context has an APN restriction value that is not allowed in combination with a currently active PDP context. Restriction values are defined in 3GPP TS 23.060 [74], subclause 15.4.

CR-Form-v7.1

CHANGE REQUEST

⌘ **24.008 CR 914** ⌘ rev **2** ⌘ Current version: **6.6.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ No follow-on proceed indication		
Source:	⌘ Ericsson		
Work item code:	⌘ TEI6	Date:	⌘ 19/11/2004
Category:	⌘ F	Release:	⌘ Rel-6
	<i>Use <u>one</u> of the following categories:</i> F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		<i>Use <u>one</u> of the following releases:</i> Ph2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6) Rel-7 (Release 7)

Reason for change:	⌘ TS 24.008 lacks a clear requirement on the actions the network has to take when the network wishes to release the PS signalling connection.		
Summary of change:	⌘ Introduction into TS 24.008 of the requirement that if the network wishes to release the PS signalling connection, the network indicates "no follow-on proceed" in the ATTACH ACCEPT or ROUTING AREA UPDATE message.		
Consequences if not approved:	⌘ Unclear and unspecified actions for the network when "no follow-on proceed" is indicated to the MS.		

Clauses affected:	⌘ 4.7.3.1.3, 4.7.3.2.3, 4.7.5.1.3, 4.7.5.2.3										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications Test specifications O&M Specifications	⌘
Y	N										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
Other comments:	⌘										

How to create CRs using this form:

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

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

- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

1st Change

4.7.3.1.3 GPRS attach accepted by the network

If the GPRS attach request is accepted by the network, an ATTACH ACCEPT message is sent to the MS.

The P-TMSI reallocation may be part of the GPRS attach procedure. When the ATTACH REQUEST includes the IMSI, the SGSN shall allocate the P-TMSI. The P-TMSI that shall be allocated is then included in the ATTACH ACCEPT message together with the routing area identifier. The network shall, in this case, change to state GMM-COMMON-PROCEDURE-INITIATED and shall start timer T3350 as described in subclause 4.7.6. Furthermore, the network may assign a P-TMSI signature for the GMM context which is then also included in the ATTACH ACCEPT message. If the LAI or PLMN identity that has been transmitted in the ATTACH ACCEPT message is a member of any of the "forbidden" lists, any such entry shall be deleted. Additionally, the network shall include the radio priority level to be used by the MS for mobile originated SMS transfer in the ATTACH ACCEPT message. In a shared network, the network shall indicate the PLMN identity of the CN operator that has accepted the GPRS attach request in the RAI contained in the ATTACH ACCEPT message (see 3GPP TS 23.251 [109]).

In GSM, the Cell Notification information element shall be included in the ATTACH ACCEPT message by the network which indicates that the Cell Notification is supported by the network.

In UMTS, the network should prolong the PS signalling connection if the mobile station has indicated a follow-on request pending in ATTACH REQUEST. The network may also prolong the PS signalling connection without any indication from the mobile terminal.

The MS, receiving an ATTACH ACCEPT message, stores the received routing area identification, stops timer T3310, reset the GPRS attach attempt counter, reset the routing area updating attempt counter, enters state GMM-REGISTERED and sets the GPRS update status to GU1 UPDATED.

If the message contains a P-TMSI, the MS shall use this P-TMSI as the new temporary identity for GPRS services. In this case, an ATTACH COMPLETE message is returned to the network. The MS shall delete its old P-TMSI and shall store the new one. If no P-TMSI has been included by the network in the ATTACH ACCEPT message, the old P-TMSI, if any available, shall be kept.

If the message contains a P-TMSI signature, the MS shall use this P-TMSI signature as the new temporary signature for the GMM context. The MS shall delete its old P-TMSI signature, if any is available, and shall store the new one. If the message contains no P-TMSI signature, the old P-TMSI signature, if available, shall be deleted.

The network may also send a list of "equivalent PLMNs" in the ATTACH ACCEPT message. Each entry of the list contains a PLMN code (MCC+MNC). The mobile station shall store the list, as provided by the network, except that any PLMN code that is already in the "forbidden PLMN" list shall be removed from the "equivalent PLMNs" list before it is stored by the mobile station. In addition the mobile station shall add to the stored list the PLMN code of the registered PLMN that sent the list. All PLMNs in the stored list shall be regarded as equivalent to each other for PLMN selection, cell selection/re-selection and handover. The stored list in the mobile station shall be replaced on each occurrence of the ATTACH ACCEPT message. If no list is contained in the message, then the stored list in the mobile station shall be deleted. The list shall be stored in the mobile station while switched off so that it can be used for PLMN selection after switch on.

In UMTS, if the network wishes to prolong the PS signalling connection (for example, if the mobile station has indicated "follow-on request pending" in ATTACH REQUEST message) the network shall indicate the "follow-on proceed" in the ATTACH ACCEPT message. [If the network wishes to release the PS signalling connection, the network shall indicate "no follow-on proceed" in the ATTACH ACCEPT message.](#)

After that in UMTS, the mobile station shall act according to the follow-on proceed flag included in the Attach result information element in the ATTACH ACCEPT message (see subclause 4.7.13).

In GSM, if the ATTACH ACCEPT message contains the Cell Notification information element, then the MS shall start to use the LLC NULL frame to perform cell updates. The network receiving an ATTACH COMPLETE message stops timer T3350, changes to GMM-REGISTERED state and considers the P-TMSI sent in the ATTACH ACCEPT message as valid.

The network may also send a list of local emergency numbers in the ATTACH ACCEPT, by including the Emergency Number List IE. The mobile equipment shall store the list, as provided by the network, except that any emergency

number that is already stored in the SIM/USIM shall be removed from the list before it is stored by the mobile equipment. If there are no emergency numbers stored on the SIM/USIM, then before storing the received list the mobile equipment shall remove from it any emergency number stored permanently in the ME for use in this case (see 3GPP TS 22.101 [8]). The list stored in the mobile equipment shall be replaced on each receipt of a new Emergency Number List IE.

The emergency number(s) received in the Emergency Number List IE are valid only in networks with the same MCC as in the cell on which this IE is received. If no list is contained in the ATTACH ACCEPT message, then the stored list in the mobile equipment shall be kept, except if the mobile equipment has successfully registered to a PLMN with an MCC different from that of the last registered PLMN.

The mobile equipment shall use the stored list of emergency numbers received from the network in addition to the emergency numbers stored on the SIM/USIM or ME to detect that the number dialled is an emergency number.

NOTE: The mobile equipment may use the emergency numbers list to assist the end user in determining whether the dialled number is intended for an emergency service or for another destination, e.g. a local directory service. The possible interactions with the end user are implementation specific.

The list of emergency numbers shall be deleted at switch off and removal of the SIM/USIM. The mobile equipment shall be able to store up to ten local emergency numbers received from the network.

Next Change

4.7.3.2.3 Combined GPRS attach accepted by the network

Depending on the value of the attach result IE received in the ATTACH ACCEPT message, two different cases can be distinguished:

- Case 1) The attach result IE value indicates "combined GPRS attach": IMSI attach for GPRS and non-GPRS services have been successful.
- Case 2) The attach result IE value indicates "GPRS only": IMSI attach for GPRS services has been successful but IMSI attach for non-GPRS services has not been successful.

In UMTS, if the network wishes to prolong the PS signalling connection (for example, if the mobile station has indicated "follow-on request pending" in ATTACH REQUEST message) the network shall indicate the "follow-on proceed" in the ATTACH ACCEPT message. [If the network wishes to release the PS signalling connection, the network shall indicate "no follow-on proceed" in the ATTACH ACCEPT message.](#)

After that in UMTS, the mobile station shall act according to the follow-on proceed flag included in the Attach result information element in the ATTACH ACCEPT message (see subclause 4.7.13).

Next Change

4.7.5.1.3 Normal and periodic routing area updating procedure accepted by the network

If the routing area updating request has been accepted by the network, a ROUTING AREA UPDATE ACCEPT message shall be sent to the MS. The network may assign a new P-TMSI and/or a new P-TMSI signature for the MS. If a new P-TMSI and/or P-TMSI signature have been assigned to the MS, it/they shall be included in the ROUTING AREA UPDATE ACCEPT message together with the routing area identification. In a shared network the network shall indicate the PLMN identity of the CN operator that has accepted the routing area updating request in the RAI contained in the ROUTING AREA UPDATE ACCEPT message (see 3GPP TS 23.251 [109]).

If a new DRX parameter was included in the ROUTING AREA UPDATE REQUEST message, the network shall store the new DRX parameter and use it for the downlink transfer of signalling and user data.

In GSM the Cell Notification information element shall be included in the ROUTING AREA UPDATE ACCEPT message in order to indicate the ability of the network to support the Cell Notification.

The network shall change to state GMM-COMMON-PROCEDURE-INITIATED and shall start the supervision timer T3350 as described in subclause 4.7.6.

If the LAI or PLMN identity contained in the ROUTING AREA UPDATE ACCEPT message is a member of any of the "forbidden" lists then any such entry shall be deleted.

In UMTS, the network should prolong the PS signalling connection if the mobile station has indicated a follow-on request pending in ROUTING AREA UPDATE REQUEST. The network may also prolong the PS signalling connection without any indication from the mobile terminal.

If the PDP context status information element is included in ROUTING AREA UPDATE REQUEST message, then the network shall deactivate all those PDP contexts locally (without peer to peer signalling between the MS and the network), which are not in SM state PDP-INACTIVE on network side but are indicated by the MS as being in state PDP-INACTIVE.

Upon receipt of a ROUTING AREA UPDATE ACCEPT message, the MS stores the received routing area identification, stops timer T3330, shall reset the routing area updating attempt counter and sets the GPRS update status to GU1 UPDATED. If the message contains a P-TMSI, the MS shall use this P-TMSI as new temporary identity for GPRS services and shall store the new P-TMSI. If no P-TMSI was included by the network in the ROUTING AREA UPDATING ACCEPT message, the old P-TMSI shall be kept. Furthermore, the MS shall store the P-TMSI signature if received in the ROUTING AREA UPDATING ACCEPT message. If no P-TMSI signature was included in the message, the old P-TMSI signature, if available, shall be deleted.

If the ROUTING AREA UPDATE REQUEST message was used to update the network with a new DRX parameter IE, the MS shall start using the new DRX parameter upon receipt of the ROUTING AREA UPDATE ACCEPT message.

If the PDP context status information element is included in ROUTING AREA UPDATE ACCEPT message, then the MS shall deactivate all those PDP contexts locally (without peer to peer signalling between the MS and network), which are not in SM state PDP-INACTIVE in the MS but are indicated by the network as being in state PDP-INACTIVE.

In GSM, if the ROUTING AREA UPDATE ACCEPT message contains the Cell Notification information element, then the MS shall start to use the LLC NULL frame to perform cell updates.

The network may also send a list of "equivalent PLMNs" in the ROUTING AREA UPDATE ACCEPT message. Each entry of the list contains a PLMN code (MCC+MNC). The mobile station shall store the list, as provided by the network, except that any PLMN code that is already in the "forbidden PLMN" list shall be removed from the "equivalent PLMNs" list before it is stored by the mobile station. In addition the mobile station shall add to the stored list the PLMN code of the registered PLMN that sent the list. All PLMNs in the stored list shall be regarded as equivalent to each other for PLMN selection, cell selection/re-selection and handover. The stored list in the mobile station shall be replaced on each occurrence of the ROUTING AREA UPDATE ACCEPT message. If no list is contained in the message, then the stored list in the mobile station shall be deleted. The list shall be stored in the mobile station while switched off so that it can be used for PLMN selection after switch on.

A ROUTING AREA UPDATE COMPLETE message shall be returned to the network if the ROUTING AREA UPDATE ACCEPT message contained:

- a P-TMSI; and/or
- Receive N-PDU Numbers (see 3GPP TS 44.065 [78] and 3GPP TS 25.322).

In the latter case the Receive N-PDU Numbers values valid in the MS, shall be included in the ROUTING AREA UPDATE COMPLETE message.

NOTE 1: In UMTS, after a routing area updating procedure, the mobile station can initiate Service Request procedure to request the resource reservation for the active PDP contexts if the resources have been released by the network or send upper layer message (e.g. ACTIVATE PDP CONTEXT REQUEST) to the network via the existing PS signaling connection.

In UMTS, if the network wishes to prolong the PS signalling connection (for example, if the mobile station has indicated "follow-on request pending" in ROUTING AREA UPDATE REQUEST message) the network shall indicate the "follow-on proceed" in the ROUTING AREA UPDATE ACCEPT message. If the network wishes to release the PS signalling connection, the network shall indicate "no follow-on proceed" in the ROUTING AREA UPDATE ACCEPT message.

After that in UMTS, the mobile station shall act according to the follow-on proceed flag included in the Update result information element in the ROUTING AREA UPDATE ACCEPT message (see subclause 4.7.13).

The network may also send a list of local emergency numbers in the ROUTING AREA UPDATE ACCEPT, by including the Emergency Number List IE. The mobile equipment shall store the list, as provided by the network, except that any emergency number that is already stored in the SIM/USIM shall be removed from the list before it is stored by the mobile equipment. If there are no emergency numbers stored on the SIM/USIM, then before storing the received list the mobile equipment shall remove from it any emergency number stored permanently in the ME for use in this case (see 3GPP TS 22.101 [8]). The list stored in the mobile equipment shall be replaced on each receipt of a new Emergency Number List IE.

The emergency number(s) received in the Emergency Number List IE are valid only in networks with the same MCC as in the cell on which this IE is received. If no list is contained in the ROUTING AREA UPDATE ACCEPT message, then the stored list in the mobile equipment shall be kept, except if the mobile equipment has successfully registered to a PLMN with an MCC different from that of the last registered PLMN.

The mobile equipment shall use the stored list of emergency numbers received from the network in addition to the emergency numbers stored on the SIM/USIM or ME to detect that the number dialled is an emergency number.

NOTE 2: The mobile equipment may use the emergency numbers list to assist the end user in determining whether the dialled number is intended for an emergency service or for another destination, e.g. a local directory service. The possible interactions with the end user are implementation specific.

The list of emergency numbers shall be deleted at switch off and removal of the SIM/USIM. The mobile equipment shall be able to store up to ten local emergency numbers received from the network.

Next Change

4.7.5.2.3 Combined routing area updating procedure accepted by the network

Depending on the value of the update result IE received in the ROUTING AREA UPDATE ACCEPT message, two different cases can be distinguished:

- Case 1) The update result IE value indicates "combined RA/LA": Routing and location area updating is successful;
- Case 2) The update result IE value indicates "RA only": Routing area updating is successful, but location area updating is not successful.

A ROUTING AREA UPDATE COMPLETE message shall be returned to the network if the ROUTING AREA UPDATE ACCEPT message contains:

- a P-TMSI and/or a TMSI; and/or
- Receive N-PDU Numbers (see 3GPP TS 44.065 [78] and 3GPP TS 25.322).

In the latter case, the Receive N-PDU Numbers that are valid in the MS shall be included in the ROUTING AREA UPDATE COMPLETE message.

In UMTS, if the network wishes to prolong the PS signalling connection (for example, if the mobile station has indicated "follow-on request pending" in ROUTING AREA UPDATE REQUEST message) the network shall indicate the "follow-on proceed" in the ROUTING AREA UPDATE ACCEPT message. [If the network wishes to release the PS signalling connection, the network shall indicate "no follow-on proceed" in the ROUTING AREA UPDATE ACCEPT message.](#)

After that in UMTS, the mobile station shall act according to the follow-on proceed flag included in the Update result information element in the ROUTING AREA UPDATE ACCEPT message (see subclause 4.7.13).