3GPP TSG CN Plenary Meeting #16 **NP-020223**
5th - 7th June 2002. Marco Island, USA.

Source: **TSG CN WG 1**

Title: **CRs to R99 (with mirror CRs) on Work Item TEI towards 24.008 and 29.018**

Agenda item: **7.11**

Document for: **APPROVAL**

Introduction:

This document contains **10** CRs on **R99 including mirror CRs on** Work Item **"TEI"**, that have been agreed by **TSG CN WG1**, and are forwarded to TSG CN Plenary meeting #16 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Version Current	Version-New	Meeting-2nd-Level	Doc-2nd-Level
24.008	576	4	R99	Authentication not accepted by MS	F	3.11.0	3.12.0	N1-24	N1-021389
24.008	577	4	Rel-4	Authentication not accepted by MS	A	4.6.0	4.7.0	N1-24	N1-021390
24.008	578	2	Rel-5	Authentication not accepted by MS	A	5.3.0	5.4.0	N1-24	N1-021278
24.008	593		R99	Correction of repeat indicator IE	F	3.11.0	3.12.0	N1-23	N1-020725
24.008	594		Rel-4	Correction of repeat indicator IE	A	4.6.0	4.7.0	N1-23	N1-020726
24.008	595		Rel-5	Correction of repeat indicator IE	A	5.3.0	5.4.0	N1-23	N1-020727
24.008	596		R99	Removal of the coding rules of type 4 IEs	F	3.11.0	3.12.0	N1-23	N1-020728
24.008	597		Rel-4	Removal of the coding rules of type 4 IEs	A	4.6.0	4.7.0	N1-23	N1-020729
24.008	598		Rel-5	Removal of the coding rules of type 4 IEs	A	5.3.0	5.4.0	N1-23	N1-020730
29.018	029		R99	Various clean-up of wrong references, as eg 24.008 instead of 04.18	F	3.9.0	3.10.0	N1-23	N1-020853

3GPP TSG-CN1 Meeting #24
Budapest, Hungary, 13. – 17. May 2002

Tdoc N1-021389
Revision of N1-021276

CR-Form-v5

CHANGE REQUEST

⌘ **24.008** **CR** **576** ⌘ **rev** **4** ⌘ Current version: **3.11.0** ⌘

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

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

Title:	⌘	Authentication not accepted by MS
Source:	⌘	Siemens
Work item code:	⌘	TEI
Date:	⌘	02.05.2002
Category:	⌘	**F**
Release:	⌘	R99

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

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

Reason for change:	⌘	There are two alternative criteria for the MS to reject the network during authentication, MAC failure and invalid SQN. The network is only given two attempts and after that the MS marks the cell as barred. According to 4.7.7.5.1 f) and g), if one of these is met, then the MS shall start a timer to await for a new authentication and then see if the second try was successful. But only the case of two subsequent errors being similar is covered. There is no specification about MAC failure after invalid SQN or vice versa. Note that the sequence 'MAC failure', 'invalid SQN' should not be taken as an indication of a fake network, because it is a possible scenario in a regular network and the 3rd authentication attempt might well be successful.
Summary of change:	⌘	1) Specify that the MS may consider a cell as barred if three faulty authentication challenges are received, never mind which type. 2) If the MS considers a cell as barred, it should abort the RR connection and the PS signalling connection.
Consequences if not approved:	⌘	Security is compromised, because repeated authentication requests become possible.

Clauses affected:	⌘	4.3.2.6.1, 4.7.7.6.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ 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.

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

In addition to the cases specified in subclause 4.3.2.6, the MS may deem that the network has failed the authentication check after any combination of three consecutive authentication failures, regardless whether 'MAC failure', 'invalid SQN', or 'GSM authentication unacceptable' was diagnosed. The authentication failures 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.

If the MS deems that the network has failed the authentication check, then it should abort the RR connection and the PS signalling connection. Additionally, the MS shall treat the cell where the first failed AUTHENTICATION REQUEST message ~~which lead to sending of AUTHENTICATION FAILURE~~ was received as barred, until refresh of system information data. 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..

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

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

In addition to the cases specified in subclause 4.7.7.6, the MS may deem that the network has failed the authentication check after any combination of three consecutive authentication failures, regardless whether 'MAC failure', 'invalid SQN', or 'GSM authentication unacceptable' was diagnosed. The authentication failures 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.

If the MS deems that the network has failed the authentication check, then it should abort the RR connection and the PS signalling connection. Additionally, the MS shall treat the cell where the first failed AUTHENTICATION & CIPHERING REQUEST message was received as barred, until refresh of system information data. 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.

3GPP TSG-CN1 Meeting #24
Budapest, Hungary, 13. – 17. May 2002

Tdoc N1-021390
Revision of N1-021277

CR-Form-v5

CHANGE REQUEST

⌘ **24.008** **CR** **577** ⌘ **rev** **4** ⌘ Current version: **4.6.0** ⌘

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

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

Title:	⌘	Authentication not accepted by MS
Source:	⌘	Siemens
Work item code:	⌘	TEI
Date:	⌘	02.05.2002
Category:	⌘	**A**
Release:	⌘	Rel-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
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Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	There are two alternative criteria for the MS to reject the network during authentication, MAC failure and invalid SQN. The network is only given two attempts and after that the MS marks the cell as barred. According to 4.7.7.5.1 f) and g), if one of these is met, then the MS shall start a timer to await for a new authentication and then see if the second try was successful. But only the case of two subsequent errors being similar is covered. There is no specification about MAC failure after invalid SQN or vice versa. Note that the sequence 'MAC failure', 'invalid SQN' should not be taken as an indication of a fake network, because it is a possible scenario in a regular network and the 3rd authentication attempt might well be successful.
Summary of change:	⌘	1) Specify that the MS may consider cell barred if three faulty authentication challenges are received, never mind which type. 2) If the MS considers a cell as barred, it should abort the RR connection and the PS signalling connection.
Consequences if not approved:	⌘	Security is compromised, because repeated authentication requests become possible.

Clauses affected:	⌘	4.3.2.6.1, 4.7.7.6.1
Other specs affected:	⌘	☐ 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.

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

In addition to the cases specified in subclause 4.3.2.6, the MS may deem that the network has failed the authentication check after any combination of three consecutive authentication failures, regardless whether 'MAC failure', 'invalid SQN', or 'GSM authentication unacceptable' was diagnosed. The authentication failures 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.

If the MS deems that the network has failed the authentication check, then ~~the~~ it should abort the RR connection and the PS signalling connection. Additionally, the MS shall treat the cell where the first failed AUTHENTICATION REQUEST message ~~which lead to sending of AUTHENTICATION FAILURE~~ was received as barred, until refresh of system information data. 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.

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

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

In addition to the cases specified in subclause 4.7.7.6, the MS may deem that the network has failed the authentication check after any combination of three consecutive authentication failures, regardless whether 'MAC failure', 'invalid SQN', or 'GSM authentication unacceptable' was diagnosed. The authentication failures 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.

If the MS deems that the network has failed the authentication check, then it should abort the RR connection and the PS signalling connection. Additionally, the MS shall treat the cell where the first failed AUTHENTICATION & CIPHERING REQUEST message was received as barred, until refresh of system information data. 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.

3GPP TSG-CN1 Meeting #24
Budapest, Hungary, 13. – 17. May 2002

Tdoc N1-021278
Revision of N1-020880

CR-Form-v5

CHANGE REQUEST

⌘ **24.008** **CR** **578** ⌘ **rev** **2** ⌘ Current version: **5.3.0** ⌘

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

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

Title:	⌘	Authentication not accepted by MS
Source:	⌘	Siemens
Work item code:	⌘	TEI
Date:	⌘	11.4.2002
Category:	⌘	**A**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
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Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘

1) There are two alternative criteria for the MS to reject the network during authentication, MAC failure and invalid SQN. The network is only given two attempts and after that the MS marks the cell as barred.

According to 4.7.7.5.1 f) and g), if one of these is met, then the MS shall start a timer to await for a new authentication and then see if the second try was successful. But only the case of two subsequent errors being similar is covered. There is no specification about MAC failure after invalid SQN or vice versa.

Note that the sequence 'MAC failure', 'invalid SQN' should not be taken as an indication of a fake network, because it is a possible scenario in a regular network and the 3rd authentication attempt might well be successful.

2) In 4.3.2.6 c) and 4.7.7.6 f), the retransmission timers need to be stopped also if the MS detects an unacceptable GSM authentication.

3) In 4.7.7.6 f) and g), the error type "GSM authentication unacceptable" can occur also as a result of the second AUTHENTICATION & CIPHERING REQUEST.

Summary of change: ⌘

- Specify that the MS shall consider cell barred if three faulty authentication challenges are received, never mind which type.
- The condition that the MS shall consider the cell as barred, if two authentication errors of the same type were diagnosed, is removed.
- Clarify that the new AUTHENTICATION & CIPHERING REQUEST has to contain a UMTS authentication challenge, when it is sent to an MS supporting UMTS authentication roaming in a UMTS cell.
- Clarify that the MS aborts the RR connection, if the network fails the authentication.

Consequences if not approved: ⌘

Security is compromised because repeated authentication requests become possible.

Clauses affected:	⌘	4.3.2.6, 4.3.2.6.1, 4.7.7.6, 4.7.7.6.1		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

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

~~When the first AUTHENTICATION REQUEST message containing an invalid MAC has been received by the MS from the network, the MS shall stop any of the retransmission timers that are running (i.e. T3210, T3220 or T3230).~~

~~Upon successfully validating~~ 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 ~~containing an invalid MAC~~.

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 fom 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:

- ~~A~~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.

~~Upon receipt of the second AUTHENTICATION REQUEST while T3214 is running and the MAC value cannot be resolved.~~

~~The second AUTHENTICATION REQUEST which is received while T3214 is running is GSM authentication challenge (i.e. no AUTN parameter was received).~~

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.

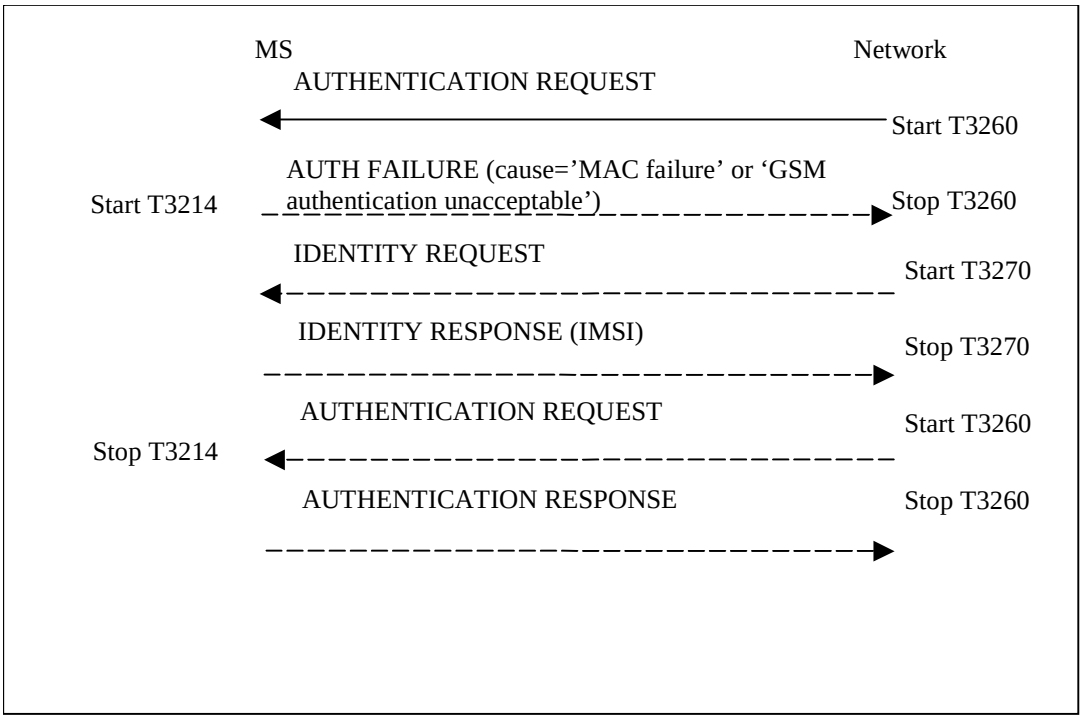

Figure 4.2/3GPP TS 24.008: Authentication Failure Procedure
(reject cause "MAC failure" or "GSM authentication unacceptable")

(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/MSC 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.

~~When the first AUTHENTICATION REQUEST message containing an invalid SQN has been received by the MS from the network, the MS shall stop any of the retransmission timers that are running (i.e. T3210, T3220 or T3230).~~

~~Upon successfully validating~~ If the network is validated successfully (a new~~second~~ 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 ~~containing an invalid SQN~~.

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 fom 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:

~~If the MS receives a second AUTHENTICATION REQUEST which contains an invalid SQN or GSM AUTHENTICATION REQUEST while T3216 is running, then the MS shall behave as described in subclause 4.3.2.6.1.~~

- ~~If~~ the timer T3216 expires;~~, then the MS shall behave as described in subclause 4.3.2.6.1.~~

- 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.

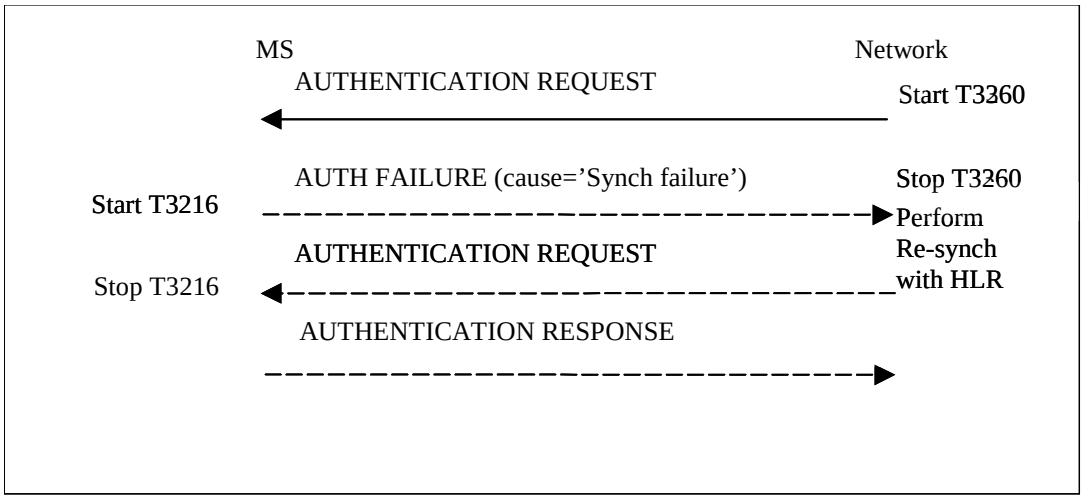

Figure 4.2a/3GPP TS 24.008: Authentication Failure Procedure (reject cause "Synch failure")

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 ~~the~~ it shall abort the RR connection and the PS signalling connection and treat the cell where the first failed AUTHENTICATION REQUEST message ~~which lead to sending of AUTHENTICATION FAILURE~~ was received as barred, until refresh of system information data. 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.

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

4.7.7.6 Abnormal cases ~~on the network side~~

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.

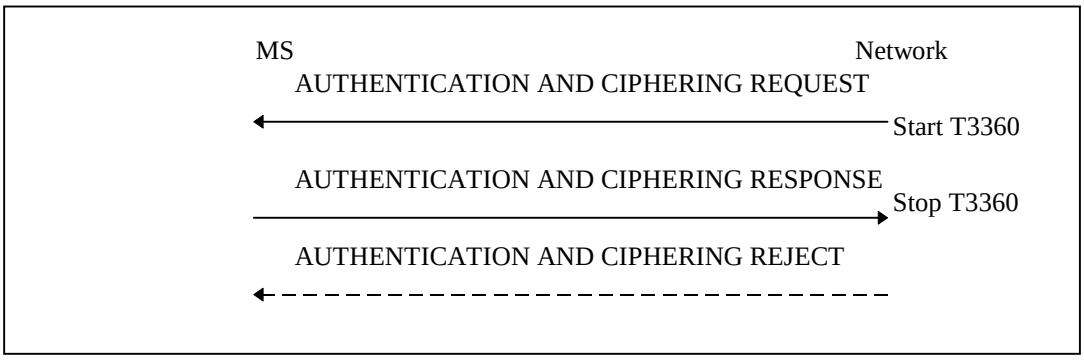

Figure 4.7.7/1 3GPP TS 24.008: Authentication and ciphering procedure

(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~~second~~ AUTHENTICATION & CIPHERING REQUEST message from the network, the MS shall stop timer T3318, if running, and then process the challenge information as normal.

~~When the first AUTHENTICATION & CIPHERING REQUEST message containing an invalid MAC has been received by the MS from the network, the MS shall stop any of the retransmission timers that are running (e.g. T3310, T3321, T3330 or T3317).~~

~~Upon successfully validating~~ 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 (~~i.~~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 ~~containing an invalid MAC~~.

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 fom 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:

- ~~A~~after sending the AUTHENTICATION & CIPHERING FAILURE message with GMM cause ‘MAC failure’ or ‘GSM authentication unacceptable’ the timer T3318 expires;

~~Upon receipt of the second AUTHENTICATION & CIPHERING REQUEST message from the network while the T3318 is running and the MAC value cannot be resolved;~~

~~The second AUTHENTICATION REQUEST & CIPHERING REQUEST which is received in UMTS while T3318 is running is a GSM authentication challenge (i.e. no AUTN parameter was received).~~

- 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.

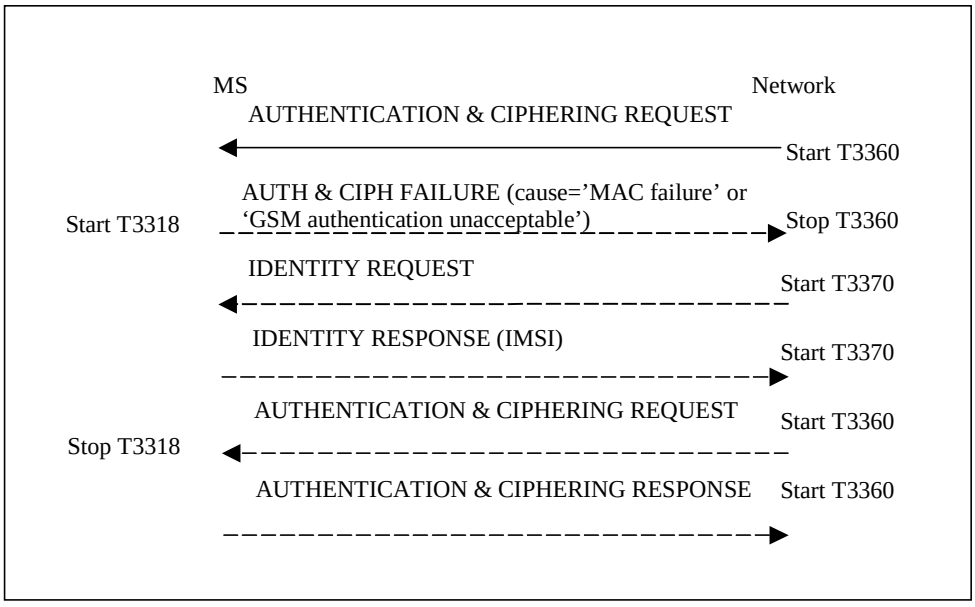

Figure 4.7.7a/1 3GPP TS 24.008: Authentication failure cause "MAC failure" or "GSM authentication unacceptable"

(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.

~~When the first AUTHENTICATION & CIPHERING REQUEST message containing an invalid SQN has been received by the MS from the network, the MS shall stop any of the retransmission timers that are running (e.g. T3310, T3321, T3330 or T3317).~~

~~Upon successfully validating~~ If the network, is validated successfully (a new~~second~~ 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 ~~containing an invalid SQN~~.

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 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 fom 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:

~~If the MS receives a second AUTHENTICATION & CIPHERING REQUEST message which contains an invalid SQN while T3320 is running, then the MS shall behave as described in subclause 4.7.7.6.1.~~

- If the timer T3320 expires;, the MS shall behave as described in subclause 4.7.7.6.1.

- 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.

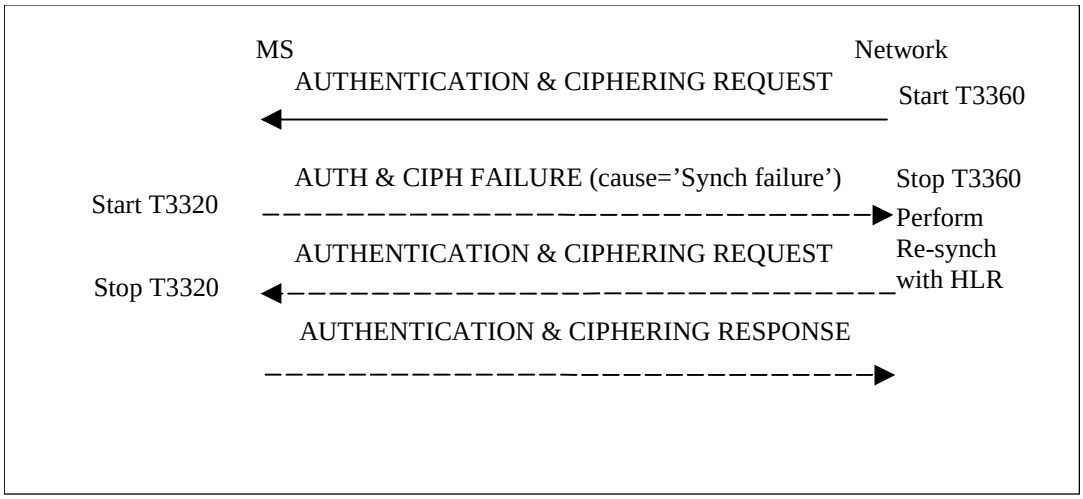

Figure 4.7.7b/1 3GPP TS 24.008: Authentication failure cause 'Synch failure'

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 abort the RR connection and the PS signalling connection and treat the cell where the first failed AUTHENTICATION & CIPHERING REQUEST message was received as barred, until refresh of system information data. 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.

3GPP TSG-CN1 Meeting #23 ***Tdoc N1-020725***
Fort Lauderdale, Florida, USA 08. - 12. April 2002

CR-Form-v5

CHANGE REQUEST

⌘ **24.008** **CR** **593** ⌘ **rev** **-** ⌘ Current version: **3.11.0** ⌘

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

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

Title:	⌘	Correction of repeat indicator IE
Source:	⌘	Siemens AG
Work item code:	⌘	TEI
Date:	⌘	02.04.02
Category:	⌘	**F**
Release:	⌘	R99

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

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

Reason for change:	⌘	During implementation of CR 074 r1, the sentence “All other values are reserved.” was deleted by mistake.
Summary of change:	⌘	Re-introduction of the sentence.
Consequences if not approved:	⌘	If an entity receives a new codepoint specified in a later version of the protocol, its reaction will be unpredictable.

Clauses affected:	⌘	10.5.4.22
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ 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.

10.5.4.22 Repeat indicator

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

The repeat indicator information element is coded as shown in figure 10.5.109/3GPP TS 24.008 and table 10.5.129/3GPP TS 24.008.

The repeat indicator is a type 1 information element.

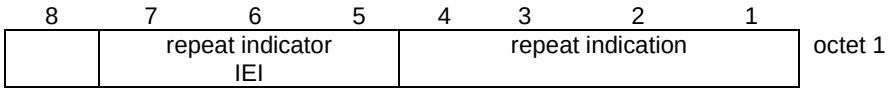

Figure 10.5.109/3GPP TS 24.008 Repeat indicator information element

Table 10.5.129/3GPP TS 24.008: Repeat indicator information element

Repeat indication (octet 1)				
Bits				
4	**3**	**2**	**1**	
0	0	0	1	Circular for successive selection "mode 1 alternate mode 2"
0	0	1	0	Support of fallback – mode 1 preferred, mode 2 selected if setup of mode 1 fails
0	0	1	1	reserved: was allocated in earlier phases of the protocol
All other values are reserved.				

3GPP TSG-CN1 Meeting #23 ***Tdoc N1-020726***
Fort Lauderdale, Florida, USA 08. - 12. April 2002

CR-Form-v5

CHANGE REQUEST

⌘ **24.008** **CR** **594** ⌘ **rev** **-** ⌘ Current version: **4.6.0** ⌘

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

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

Title:	⌘	Correction of repeat indicator IE
Source:	⌘	Siemens AG
Work item code:	⌘	TEI
Date:	⌘	02.04.02
Category:	⌘	**A**
Release:	⌘	REL-4

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

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

Reason for change:	⌘	During implementation of CR 074 r1, the sentence “All other values are reserved.” was deleted by mistake.
Summary of change:	⌘	Re-introduction of the sentence.
Consequences if not approved:	⌘	If an entity receives a new codepoint specified in a later version of the protocol, its reaction will be unpredictable.

Clauses affected:	⌘	10.5.4.22
Other specs affected:	⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
Other comments:	⌘	

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

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ 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.

10.5.4.22 Repeat indicator

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

The repeat indicator information element is coded as shown in figure 10.5.109/3GPP TS 24.008 and table 10.5.129/3GPP TS 24.008.

The repeat indicator is a type 1 information element.

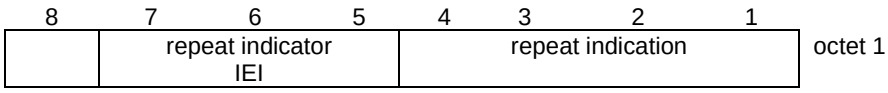

Figure 10.5.109/3GPP TS 24.008 Repeat indicator information element

Table 10.5.129/3GPP TS 24.008: Repeat indicator information element

Repeat indication (octet 1)				
Bits				
4	**3**	**2**	**1**	
0	0	0	1	Circular for successive selection "mode 1 alternate mode 2"
0	0	1	0	Support of fallback – mode 1 preferred, mode 2 selected if setup of mode 1 fails
0	0	1	1	reserved: was allocated in earlier phases of the protocol
All other values are reserved.				

3GPP TSG-CN1 Meeting #23 ***Tdoc N1-020727***
Fort Lauderdale, Florida, USA 08. - 12. April 2002

CR-Form-v5

CHANGE REQUEST

⌘ **24.008** **CR** **595** ⌘ **rev** **-** ⌘ Current version: **5.3.0** ⌘

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

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

Title:	⌘	Correction of repeat indicator IE
Source:	⌘	Siemens AG
Work item code:	⌘	TEI
Date:	⌘	02.04.02
Category:	⌘	**A**
Release:	⌘	REL-5

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	During implementation of CR 074 r1, the sentence “All other values are reserved.” was deleted by mistake.
Summary of change:	⌘	Re-introduction of the sentence.
Consequences if not approved:	⌘	If an entity receives a new codepoint specified in a later version of the protocol, its reaction will be unpredictable.

Clauses affected:	⌘	10.5.4.22		
Other specs affected:	⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘	
Other comments:	⌘			

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

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ 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.

10.5.4.22 Repeat indicator

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

The repeat indicator information element is coded as shown in figure 10.5.109/3GPP TS 24.008 and table 10.5.129/3GPP TS 24.008.

The repeat indicator is a type 1 information element.

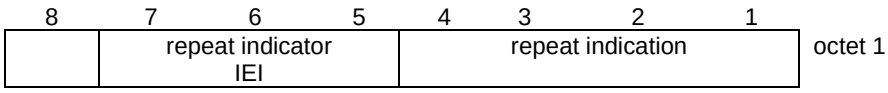

Figure 10.5.109/3GPP TS 24.008 Repeat indicator information element

Table 10.5.129/3GPP TS 24.008: Repeat indicator information element

Repeat indication (octet 1)				
Bits				
4	**3**	**2**	**1**	
0	0	0	1	Circular for successive selection "mode 1 alternate mode 2"
0	0	1	0	Support of fallback – mode 1 preferred, mode 2 selected if setup of mode 1 fails
0	0	1	1	reserved: was allocated in earlier phases of the protocol
All other values are reserved.				

3GPP TSG-CN1 Meeting #23 **Tdoc N1-020728**
Fort Lauderdale, Florida, USA 08. - 12. April 2002

CR-Form-v5

CHANGE REQUEST

⌘ **24.008** **CR** **596** ⌘ **rev** **-** ⌘ Current version: **3.11.0** ⌘

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

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

Title:	⌘	Removal of the coding rules of type 4 IEs
Source:	⌘	Siemens AG
Work item code:	⌘	TEI
Date:	⌘	02.04.02
Category:	⌘	**F**
Release:	⌘	R99

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Starting with GSM R96, the rules for the coding of type 4 IEs were copied from GSM 04.08/TS 24.008 to GSM 04.07/TS 24.007, subclause 11.2.2.1, but were not removed from GSM 04.08/TS 24.008. It is proposed to remove the coding rules from TS 24.008 to avoid duplicate specification in the standard that may lead to contradicting requirements.
Summary of change:	⌘	Remove the coding rules of type 4 IEs from TS 24.008.
Consequences if not approved:	⌘	Duplicate specification in the standard that may lead to contradicting requirements, if only TS 24.007 or TS 24.008 is changed by a CR of category F.

Clauses affected:	⌘	10.5
Other specs affected:	⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
Other comments:	⌘	If CR 24.007–048 is agreed, then either the present CR or a 'mirror CR' of CR 24.007-048 to TS 24.008 is necessary.

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

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

10.5 Other information elements

The different formats (V, LV, T, TV, TLV) and the four categories of information elements (type 1, 2, 3, and 4) are defined in 3GPP TS 24.007.

The first octet of an information element in the non-imperative part contains the IEI of the information element. If this octet does not correspond to an IEI known in the message, the receiver shall determine whether this IE is of type 1 or 2 (i.e. it is an information element of one octet length) or an IE of type 4 (i.e. that the next octet is the length indicator indicating the length of the remaining of the information element) (see 3GPP TS 24.007).

This allows the receiver to jump over unknown information elements and to analyse any following information elements.

The information elements which are common for at least two of the three protocols Radio Resources management, Mobility Management and Call Control, are listed in clause 10.5.1.

The information elements for the protocols Mobility Management and Call Control are listed in clauses 10.5.3 and 10.5.4 respectively. Default information element identifiers are listed in annex K.

NOTE: Different information elements may have the same default information element identifier if they belong to different protocols.

The descriptions of the information element types in clauses 10.5.1, 10.5.3, and 10.5.4 are organized in alphabetical order of the IE types. Each IE type is described in one clause.

The clause may have an introduction:

- possibly explaining the purpose of the IE;
- possibly describing whether the IE belongs to type 1, 2, 3, 4 or 5;
- possibly indicating the length that the information element has if it is either type 5 or if it is used in format TV (type 1 and 3) or TLV (type 4).

A figure of the clause defines the structure of the IE indicating:

- possibly the position and length of the IEI. (However it depends on the message in which the IE occurs whether the IE contains an IEI.);
- the fields the IE value part is composed of;
- possibly the position and length of the length indicator. (However it depends on the IE type whether the IE contains a length indicator or not.);
- possibly octet numbers of the octets that compose the IE (see clause a) below).

Finally, the clause contains tables defining the structure and value range of the fields that compose the IE value part. The order of appearance for information elements in a message is defined in clause 9.

The order of the information elements within the imperative part of messages has been chosen so that information elements with 1/2 octet of content (type 1) go together in succession. The first type 1 information element occupies bits 1 to 4 of octet N, the second bits 5 to 8 of octet N, the third bits 1 to 4 of octet N + 1 etc. If the number of type 1 information elements is odd then bits 5 to 8 of the last octet occupied by these information elements contains a spare half octet IE in format V.

Where the description of information elements in the present document contains bits defined to be "spare bits", these bits shall set to the indicated value (0 or 1) by the sending side, and their value shall be ignored by the receiving side. With few exceptions, spare bits are indicated as being set to "0" in 3GPP TS 24.008.

~~The following rules apply for the coding of type 4 information elements:~~

a) The octet number of an octet (which is defined in the figure of a clause) consists of a positive integer, possibly of an additional letter, and possibly of an additional asterisk, see clause f). The positive integer identifies one octet or a group of octets.

b) Each octet group is a self contained entity. The internal structure of an octet group may be defined in alternative ways.

c) An octet group is formed by using some extension mechanism. The preferred extension mechanism is to extend an octet (N) through the next octet(s) (Na, Nb, etc.) by using bit 8 in each octet as an extension bit.

The bit value "0" indicates that the octet group continues through to the next octet. The bit value "1" indicates that this octet is the last octet of the group. If one octet (Nb) is present, the preceding octets (N and Na) shall also be present.

In the format descriptions appearing in clause 10.5.1 to 10.5.4, bit 8 is marked "0/1 ext" if another octet follows. Bit 8 is marked "1 ext" if this is the last octet in the extension domain.

Additional octets may be defined in later versions of the protocols ("1 ext" changed to "0/1 ext") and equipments shall be prepared to receive such additional octets; the contents of these octets shall be ignored. However the length indicated in clauses 9 and 10 only takes into account this version of the protocols.

d) In addition to the extension mechanism defined above, an octet (N) may be extended through the next octet(s) (N+1, N+2 etc.) by indications in bits 7-1 (of octet N).

e) The mechanisms in c) and d) may be combined.

f) Optional octets are marked with asterisks (*).

3GPP TSG-CN1 Meeting #23 **Tdoc N1-020729**
Fort Lauderdale, Florida, USA 08. - 12. April 2002

CR-Form-v5

CHANGE REQUEST

⌘ **24.008** **CR** **597** ⌘ **rev** **-** ⌘ Current version: **4.6.0** ⌘

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

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

Title:	⌘	Removal of the coding rules of type 4 IEs
Source:	⌘	Siemens AG
Work item code:	⌘	TEI
Date:	⌘	02.04.02
Category:	⌘	**A**
Release:	⌘	REL-4

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Starting with GSM R96, the rules for the coding of type 4 IEs were copied from GSM 04.08/TS 24.008 to GSM 04.07/TS 24.007, subclause 11.2.2.1, but were not removed from GSM 04.08/TS 24.008. It is proposed to remove the coding rules from TS 24.008 to avoid duplicate specification in the standard that may lead to contradicting requirements.
Summary of change:	⌘	Remove the coding rules of type 4 IEs from TS 24.008.
Consequences if not approved:	⌘	Duplicate specification in the standard that may lead to contradicting requirements, if only TS 24.007 or TS 24.008 is changed by a CR of category F.

Clauses affected:	⌘	10.5
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	If CR 24.007–049 is agreed, then either the present CR or a 'mirror CR' of CR 24.007-049 to TS 24.008 is necessary.

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

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

10.5 Other information elements

The different formats (V, LV, T, TV, TLV) and the four categories of information elements (type 1, 2, 3, and 4) are defined in 3GPP TS 24.007 [20].

The first octet of an information element in the non-imperative part contains the IEI of the information element. If this octet does not correspond to an IEI known in the message, the receiver shall determine whether this IE is of type 1 or 2 (i.e. it is an information element of one octet length) or an IE of type 4 (i.e. that the next octet is the length indicator indicating the length of the remaining of the information element) (see 3GPP TS 24.007 [20]).

This allows the receiver to jump over unknown information elements and to analyse any following information elements.

The information elements which are common for at least two of the three protocols Radio Resources management, Mobility Management and Call Control, are listed in subclause 10.5.1.

The information elements for the protocols Mobility Management and Call Control are listed in subclauses 10.5.3 and 10.5.4 respectively. Default information element identifiers are listed in annex K.

NOTE: Different information elements may have the same default information element identifier if they belong to different protocols.

The descriptions of the information element types in subclauses 10.5.1, 10.5.3, and 10.5.4 are organized in alphabetical order of the IE types. Each IE type is described in one subclause.

The subclause may have an introduction:

- possibly explaining the purpose of the IE;
- possibly describing whether the IE belongs to type 1, 2, 3, 4 or 5;
- possibly indicating the length that the information element has if it is either type 5 or if it is used in format TV (type 1 and 3) or TLV (type 4).

A figure of the subclause defines the structure of the IE indicating:

- possibly the position and length of the IEI. (However it depends on the message in which the IE occurs whether the IE contains an IEI.);
- the fields the IE value part is composed of;
- possibly the position and length of the length indicator. (However it depends on the IE type whether the IE contains a length indicator or not.);
- possibly octet numbers of the octets that compose the IE (see clause a) below).

Finally, the subclause contains tables defining the structure and value range of the fields that compose the IE value part. The order of appearance for information elements in a message is defined in clause 9.

The order of the information elements within the imperative part of messages has been chosen so that information elements with 1/2 octet of content (type 1) go together in succession. The first type 1 information element occupies bits 1 to 4 of octet N, the second bits 5 to 8 of octet N, the third bits 1 to 4 of octet N + 1 etc. If the number of type 1 information elements is odd then bits 5 to 8 of the last octet occupied by these information elements contains a spare half octet IE in format V.

Where the description of information elements in the present document contains bits defined to be "spare bits", these bits shall set to the indicated value (0 or 1) by the sending side, and their value shall be ignored by the receiving side. With few exceptions, spare bits are indicated as being set to "0" in 3GPP TS 24.008.

~~The following rules apply for the coding of type 4 information elements:~~

a) The octet number of an octet (which is defined in the figure of a subclause) consists of a positive integer, possibly of an additional letter, and possibly of an additional asterisk, see clause f). The positive integer identifies one octet or a group of octets.

b) Each octet group is a self contained entity. The internal structure of an octet group may be defined in alternative ways.

c) An octet group is formed by using some extension mechanism. The preferred extension mechanism is to extend an octet (N) through the next octet(s) (Na, Nb, etc.) by using bit 8 in each octet as an extension bit.

The bit value "0" indicates that the octet group continues through to the next octet. The bit value "1" indicates that this octet is the last octet of the group. If one octet (Nb) is present, the preceding octets (N and Na) shall also be present.

In the format descriptions appearing in subclauses 10.5.1 to 10.5.4, bit 8 is marked "0/1 ext" if another octet follows. Bit 8 is marked "1 ext" if this is the last octet in the extension domain.

Additional octets may be defined in later versions of the protocols ("1 ext" changed to "0/1 ext") and equipments shall be prepared to receive such additional octets; the contents of these octets shall be ignored. However the length indicated in clauses 9 and 10 only takes into account this version of the protocols.

d) In addition to the extension mechanism defined above, an octet (N) may be extended through the next octet(s) (N+1, N+2 etc.) by indications in bits 7-1 (of octet N).

e) The mechanisms in c) and d) may be combined.

f) Optional octets are marked with asterisks (*).

3GPP TSG-CN1 Meeting #23 **Tdoc N1-020730**
Fort Lauderdale, Florida, USA 08. - 12. April 2002

CR-Form-v5

CHANGE REQUEST

⌘ **24.008** **CR** **598** ⌘ **rev** **-** ⌘ Current version: **5.3.0** ⌘

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

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

Title:	⌘	Removal of the coding rules of type 4 IEs
Source:	⌘	Siemens AG
Work item code:	⌘	TEI
Date:	⌘	02.04.02
Category:	⌘	**A**
Release:	⌘	REL-5

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

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

Reason for change:	⌘	Starting with GSM R96, the rules for the coding of type 4 IEs were copied from GSM 04.08/TS 24.008 to GSM 04.07/TS 24.007, subclause 11.2.2.1, but were not removed from GSM 04.08/TS 24.008. It is proposed to remove the coding rules from TS 24.008 to avoid duplicate specification in the standard that may lead to contradicting requirements.
Summary of change:	⌘	Remove the coding rules of type 4 IEs from TS 24.008.
Consequences if not approved:	⌘	Duplicate specification in the standard that may lead to contradicting requirements, if only TS 24.007 or TS 24.008 is changed by a CR of category F.

Clauses affected:	⌘	10.5
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ 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.

10.5 Other information elements

The different formats (V, LV, T, TV, TLV) and the four categories of information elements (type 1, 2, 3, and 4) are defined in 3GPP TS 24.007 [20].

The first octet of an information element in the non-imperative part contains the IEI of the information element. If this octet does not correspond to an IEI known in the message, the receiver shall determine whether this IE is of type 1 or 2 (i.e. it is an information element of one octet length) or an IE of type 4 (i.e. that the next octet is the length indicator indicating the length of the remaining of the information element) (see 3GPP TS 24.007 [20]).

This allows the receiver to jump over unknown information elements and to analyse any following information elements.

The information elements which are common for at least two of the three protocols Radio Resources management, Mobility Management and Call Control, are listed in subclause 10.5.1.

The information elements for the protocols Mobility Management and Call Control are listed in subclauses 10.5.3 and 10.5.4 respectively. Default information element identifiers are listed in annex K.

NOTE: Different information elements may have the same default information element identifier if they belong to different protocols.

The descriptions of the information element types in subclauses 10.5.1, 10.5.3, and 10.5.4 are organized in alphabetical order of the IE types. Each IE type is described in one subclause.

The subclause may have an introduction:

- possibly explaining the purpose of the IE;
- possibly describing whether the IE belongs to type 1, 2, 3, 4 or 5;
- possibly indicating the length that the information element has if it is either type 5 or if it is used in format TV (type 1 and 3) or TLV (type 4).

A figure of the subclause defines the structure of the IE indicating:

- possibly the position and length of the IEI. (However it depends on the message in which the IE occurs whether the IE contains an IEI.);
- the fields the IE value part is composed of;
- possibly the position and length of the length indicator. (However it depends on the IE type whether the IE contains a length indicator or not.);
- possibly octet numbers of the octets that compose the IE (see clause a) below).

Finally, the subclause contains tables defining the structure and value range of the fields that compose the IE value part. The order of appearance for information elements in a message is defined in clause 9.

The order of the information elements within the imperative part of messages has been chosen so that information elements with 1/2 octet of content (type 1) go together in succession. The first type 1 information element occupies bits 1 to 4 of octet N, the second bits 5 to 8 of octet N, the third bits 1 to 4 of octet N + 1 etc. If the number of type 1 information elements is odd then bits 5 to 8 of the last octet occupied by these information elements contains a spare half octet IE in format V.

Where the description of information elements in the present document contains bits defined to be "spare bits", these bits shall set to the indicated value (0 or 1) by the sending side, and their value shall be ignored by the receiving side. With few exceptions, spare bits are indicated as being set to "0" in 3GPP TS 24.008.

~~The following rules apply for the coding of type 4 information elements:~~

~~a) The octet number of an octet (which is defined in the figure of a subclause) consists of a positive integer, possibly of an additional letter, and possibly of an additional asterisk, see clause f). The positive integer identifies one octet or a group of octets.~~

b) Each octet group is a self contained entity. The internal structure of an octet group may be defined in alternative ways.

c) An octet group is formed by using some extension mechanism. The preferred extension mechanism is to extend an octet (N) through the next octet(s) (Na, Nb, etc.) by using bit 8 in each octet as an extension bit.

The bit value "0" indicates that the octet group continues through to the next octet. The bit value "1" indicates that this octet is the last octet of the group. If one octet (Nb) is present, the preceding octets (N and Na) shall also be present.

In the format descriptions appearing in subclauses 10.5.1 to 10.5.4, bit 8 is marked "0/1 ext" if another octet follows. Bit 8 is marked "1 ext" if this is the last octet in the extension domain.

Additional octets may be defined in later versions of the protocols ("1 ext" changed to "0/1 ext") and equipments shall be prepared to receive such additional octets; the contents of these octets shall be ignored. However the length indicated in clauses 9 and 10 only takes into account this version of the protocols.

d) In addition to the extension mechanism defined above, an octet (N) may be extended through the next octet(s) (N+1, N+2 etc.) by indications in bits 7-1 (of octet N).

e) The mechanisms in c) and d) may be combined.

f) Optional octets are marked with asterisks (*).

3GPP TSG-CN1 Meeting #23 ***Tdoc N1-020853***
Fort Lauderdale, Florida, USA 08. - 12. April 2002

CR-Form-v5

CHANGE REQUEST

⌘ **29.018** **CR** **029** ⌘ **rev** **-** ⌘ Current version: **3.9.0** ⌘

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

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

Title:	⌘	Various clean-up of wrong references, as eg 24.008 instead of 04.18
Source:	⌘	CN1 secretary
Work item code:	⌘	TEI
Date:	⌘	01.04.2002
Category:	⌘	**F**
Release:	⌘	R99

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

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

Reason for change:	⌘	Wrong reference used, and several updates on references were missing.
Summary of change:	⌘	TS 01.04 replaced by TR 21.905. 02.06 stopped with R98 and transferred to 3GPP as 22.101 (Service aspects; Service principles),- but proposed deleted as 02.06 is not refered to in the text of 29.018). 02.07 stopped with R98 and transferred to 3GPP as 22.907 which is withdrawn from R99. 03.18 was not in the reference list, and is replaced by 23.018. 24.008 wrongly referenced,- 04.18 is introduced for “Channel needed” definition. 02.08 only existed for Phase 1, while 03.61 and 03.62 are withdrawn. 04.22 transferred to 3GPP as 24.022. 12.00, 12.01, 12.02, 12.13, 12.14, 12.20 and 12.22 existed only before R99 (phase 1 or 2).
Consequences if not approved:	⌘	Misleading text.

Clauses affected:	⌘	2, 3, 5, 14, 18
Other specs affected:	⌘	[ ] Other core specifications ⌘ [ ] Test specifications [ ] O&M Specifications
Other comments:	⌘	

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

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

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

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

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

2.1 Normative references

[1] ~~3GPP TS 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".~~[Void]

[1a] 3GPP T~~S~~R 21.905: "Vocabulary for 3GPP Specifications".

[2] ~~3GPP TS 02.06: "Digital cellular telecommunications system (Phase 2+); Types of Mobile Stations (MS)".~~[Void]

[3] ~~3GPP TS 02.07: "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) features".~~[Void]

[4] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service description; Stage 1".

[5] 3GPP TS 23.003: "Numbering, addressing and identification".

[6] 3GPP TS 23.007: "Restoration procedures".

[6a] 3GPP TS 23.018: "Basic Call Handling; Technical realization".

[7] 3GPP TS 23.122: " Non-Access-Stratum functions related to Mobile Station (MS) in idle mode".~~Functions related to Mobile Station (MS) in idle mode and group receive mode".~~

[8] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[9] 3GPP TS 03.64: "General Packet Radio Service (GPRS); Overall description of the GPRS radio interface; Stage 2".

[10] 3GPP TS 24.007: "~~-~~Mobile radio interface signalling layer 3; General aspects".

[11] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".~~Mobile radio interface Layer 3 specification (CC and MM parts)".~~

[11a] 3GPP TS 04.18: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol".

[12] 3GPP TS 04.64: "~~Digital cellular telecommunications system (Phase 2+),~~ General Packet Radio Service (GPRS); Mobile Station - Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) layer specification".~~Logical Link Control (LLC)".~~

[13] 3GPP TS 04.65: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Mobile Station (MS) - Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDCP)".~~Subnetwork Dependent Convergence Protocol (SNDCP)".~~

[14] 3GPP TS 08.08: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile-services Switching Centre - Base Station System (MSC-BSS) interface; Layer 3 specification".

[15] 3GPP TS 08.18: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN)~~Serving GPRS Support Node (SGSN) - Base Station System (BSS)~~; BSS GPRS Protocol (BSSGP)".

[16] 3GPP TS 08.60: "~~Digital cellular telecommunications system (Phase 2+);~~ Inband control of remote transcoders and rate adaptors for Enhanced Full Rate (EFR) and full rate traffic channels."

[17] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[18] 3GPP TS 09.08: "~~Digital cellular telecommunications system (Phase 2+);~~ Application of the Base Station System Application Part (BSSAP) on the E-interface".

[19] 3GPP TS 29.010: " Information Element Mapping between Mobile Station - Base Station System (MS-BSS) and Base Station System - Mobile-services Switching Centre (BSS-MCS) Signalling Procedures and the Mobile Application Part (MAP)".~~General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface Layer 2 specification".~~

[20] 3GPP TS 29.016: "Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface network service~~Layer 2~~ specification".

[21] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".~~CCITT Recommendation E.164: "Numbering plan for the ISDN era".~~

[22] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".

2.2 Informative references

[22A] 3GPP TS 01.61: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); GPRS ciphering algorithm requirements".

[23] 3GPP TS 22.001: "Principles of circuit telecommunication services supported by a ~~GSM~~ Public Land Mobile Network (PLMN)".

[24] 3GPP TS 22.002: "Circuit Bearer Services (BS) supported by a ~~GSM~~ Public Land Mobile Network (PLMN)".

[25] 3GPP TS 22.003: " Circuit Teleservices supported by a ~~GSM~~ Public Land Mobile Network (PLMN)".

[26] ~~3GPP TS 02.08: "Digital cellular telecommunications system (Phase 2+); Quality of Service".~~[Void]

[27] 3GPP TS 02.09: "~~Digital cellular telecommunications system (Phase 2+);~~ Security aspects".

[28] 3GPP TS 22.011: "Service accessibility".

[29] 3GPP TS 22.016: "International Mobile station Equipment Identities (IMEI)".

[30] 3GPP TS 02.17: "~~Digital cellular telecommunications system (Phase 2+);~~ Subscriber I~~i~~dentity M~~m~~odules (SIM); Functional characteristics".

[31] 3GPP TS 22.030: "Man-Machine Interface (MMI) of the User Equipment (UE)~~Mobile Station (MS)~~".

[32] ~~3GPP TS 03.61: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Multicast Service Description; Stage 2".~~[Void]

[33] ~~3GPP TS 03.62: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Point to Multipoint Group Call Service Description; Stage 2".~~[Void]

[34] 3GPP TS 04.01: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Station - Base Station System (MS-BSS) interface; General aspects and principles".

[35] 3GPP TS 24.002: "GSM - UMTS Public Land Mobile Network (PLMN) access reference configuration".

[36] 3GPP TS 04.03: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Station - Base Station System (MS-BSS) interface; Channel structures and access capabilities".

[37] 3GPP TS 04.04: "~~Digital cellular telecommunications system (Phase 2+);~~ Layer 1 General requirements".

[38] 3GPP TS 04.05: "~~Digital cellular telecommunications system (Phase 2+);~~ Data Link (DL) layer General aspects".

[39] 3GPP TS 04.06: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification".

[40] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[41] 3GPP TS ~~04.22~~24.022: "~~Digital cellular telecommunications system (Phase 2+);~~ Radio Link Protocol (RLP) for data and telematic services on the Mobile Station - Base Station System (MS-BSS) interface and the Base Station System - Mobile-services Switching Centre (BSS-MSC) interface".

[42] 3GPP TS 27.060: "Mobile Station (MS) supporting Packet Switched Services~~GPRS~~".

[43] 3GPP TS 08.06: "~~Digital cellular telecommunications system (Phase 2+);~~ Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS-MSC) interface".

[44] 3GPP TS 08.14: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) interface~~Serving GPRS Support Node (SGSN) - Base Station System (BSS)~~; Gb interface layer 1".

[45] 3GPP TS 08.16: "~~Digital cellular telecommunications system (Phase 2+);~~ General Packet Radio Service (GPRS); Base Station System (BSS); Serving GPRS Support Node (SGSN) interface; Network Service".~~Serving GPRS Support Node (SGSN) - Base Station System (BSS): Network Service".~~

[46] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

[47] 3GPP TS 29.061: " Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based services and Packet Data Networks (PDN)".~~General requirements on interworking between the Public Land Mobile Network (PLMN) supporting General Packet Radio Service (GPRS) and Packet Data Networks (PDN)".~~

[48] ~~3GPP TS 12.00 (ETS 300 612-1): "Digital cellular telecommunications system (Phase 2+); Objectives and structure of Network Management (NM)".~~[Void]

[49] [Void] ~~3GPP TS 12.01 (ETS 300 612-2): "Digital cellular telecommunications system (Phase 2+); Common aspects of GSM Network Management (NM)".~~

[50] [Void]~~3GPP TS 12.02: "Digital cellular telecommunications system (Phase 2+); Subscriber, Mobile Equipment (ME) and services data administration".~~

[51] 3GPP TS 12.03: "~~Digital cellular telecommunications system (Phase 2+);~~ Security management".

[52] [Void]~~3GPP TS 12.13: "Digital cellular telecommunications system (Phase 2+); Maintenance of the Mobile-services Switching Centre (MSC)".~~

[53] [Void]~~3GPP TS 12.14: "Digital cellular telecommunications system (Phase 2+); Maintenance of location registers".~~

[54] [Void]~~3GPP TS 12.20: "Digital cellular telecommunications system (Phase 2+); Network Management (NM) procedures and messages".~~

[55] [Void] ~~3GPP TS 12.22: "Digital cellular telecommunications system (Phase 2+); Interworking of GSM Network Management (NM) procedures and messages at the Base Station Controller (BSC)".~~

[56] ITU-T Recommendations I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".~~CCITT Recommendations I.130: "General modelling methods - Method for the characterisation of telecommunication services supported by an ISDN and network capabilities of an ISDN".~~

[57] ITU-T Recommendation Q.65: "The unified functional methodology for the characterization of services and network capabilities".~~CCITT Recommendation Q.65: "Methodology - Stage 2 of the method for the characterization of services supported by an ISDN".~~

[58] ITU-T Recommendation Q.702: "Signalling data link".~~CCITT Recommendation Q.702: "Specifications of Signalling System No. 7 - Signalling data link".~~

[59] ITU-~~CCIT~~T Recommendation Q.703: "Signalling link".

[60] ITU-T~~CCITT~~ Recommendation Q.704: "Signalling network functions and messages".

[61] ITU-T~~CCITT~~ Recommendation Q.711 (03/93): "Functional description of the signalling connection control part".

[62] ITU-T~~CCITT~~ Recommendation Q.712 (03/93): "Definition and function of signalling connection control part~~SCCP~~ messages".

[63] ITU-T~~CCITT~~ Recommendation Q.713 (03/93): "Signalling connection control part~~SCCP~~ formats and codes".

[64] ITU-T~~CCITT~~ Recommendation Q.714 (03/93): "Signalling connection control part procedures".

[65] ANSI ~~Recommendation~~ T1.111 (1996): "Signalling System No.7 (SS7); Message Transfer Part ~~(MTP)~~".

[66] ANSI ~~Recommendation~~ T1.112 (1996): "Signalling System No.7 (SS7); Signalling Connection Control Part Functional Description ~~(SCCP)~~".

3 Definitions, symbols and abbreviations

For the purposes of the present document the definitions, symbols and abbreviations given in 3GPP TR~~S 01.04~~21.905 and in 3GPP TS 23.060 apply.

5.2.1 Paging Initiation

When a VLR has to page a GPRS MS it shall check whether the MSC has an SCCP connection for that MS. If no SCCP connection exists the VLR checks the state of the association to an SGSN and the value of the restoration indicators for that MS. The VLR sends BSSAP+-PAGING-REQUEST messages to the SGSN if the state of the association for the MS is Gs-ASSOCIATED, LA-UPDATE-PRESENT or if the state of the association is Gs-NULL and the 'Confirmed by Radio Contact' restoration indicator is set to 'false'. The sending of the BSSAP+-PAGING-REQUEST message does not change the state of the association with the SGSN.

If the 'Confirmed by Radio Contact' restoration indicator is set to 'true', the VLR shall include the Location area identifier IE into the BSSAP+-PAGING-REQUEST message, otherwise (i.e. after a VLR failure) the Location area identifier IE shall not be included. When sending the BSSAP+-PAGING-REQUEST message, the VLR shall start timer T5.

If the state of the association is Gs-NULL and the restoration indicator 'Confirmed by Radio Contact' is set to 'false', the VLR shall also perform a search procedure as specified in 3GPP TS ~~03.18~~23.018.

14.1 General description

The MS Information procedure is used by the VLR to request specific parameters about the MS. If the target MS for an MS Information procedure or a Provide Subscriber Info procedure (see 3GPP TS ~~03.18~~23.018 and 3GPP TS 29.002) is GPRS attached (i.e. the state of the association to Gs-ASSOCIATED) the VLR may decide to perform the procedure via GPRS. The outcome of the MS Information procedure does not change the state of the association at the VLR or SGSN.

18.4 Information elements

18.4.2 Channel needed

The purpose of the *Channel Needed* information element is to indicate which type of channel is needed for the transaction linked to the paging procedure.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3	The rest of the information element is coded as the IEI part and the value part of the Channel Needed IE defined in 3GPP TS ~~24.008~~04.18.							

Figure 18.4.2/3GPP TS 29.018: Channel needed IE

18.4.7 Gs cause

The purpose of the value part of the Gs Cause information element is to indicate an error to the receiving entity. This could be a protocol data error or to indicate to the VLR the reason why a paging procedure could not be performed.

	8	7	6	5	4	3	2	1
Octet 1	IEI							
Octet 2	Length indicator							
Octet 3	Gs Cause value							

Figure 18.4.7/3GPP TS 29.018: Gs Cause IE

Table 18.4.7/3GPP TS 29.018: Gs Cause IE value part

Gs Cause value (octet 3) Bits 8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	*Normal, unspecified* in this version of the protocol.
0 0 0 0 0 0 0 1	IMSI detached for GPRS services
0 0 0 0 0 0 1 0	IMSI detached for GPRS and non-GPRS services
0 0 0 0 0 0 1 1	IMSI unknown
0 0 0 0 0 1 0 0	IMSI detached for non-GPRS services
0 0 0 0 0 1 0 1	IMSI implicitly detached for non-GPRS services
0 0 0 0 0 1 1 0	MS unreachable
0 0 0 0 0 1 1 1	Message not compatible with the protocol state
0 0 0 0 1 0 0 0	Missing mandatory information element
0 0 0 0 1 0 0 1	Invalid mandatory information
0 0 0 0 1 0 1 0	Conditional IE error
0 0 0 0 1 0 1 1	Semantically incorrect message
0 0 0 0 1 1 0 0	Message unknown
0 0 0 0 1 1 0 1	Address error
0 0 0 0 1 1 1 0	TOM functionality not supported
0 0 0 0 1 1 1 1	Ciphering request cannot be accommodated
0 0 0 1 0 0 0 0 to 1 1 1 1 1 1 1 1	*Normal, unspecified* in this version of the protocol

NOTE: *'Normal, unspecified*' has the same meaning than in 3GPP TS 24.008, informative Annex H (~~GSM~~UMTS specific cause values for call control). It is used to report a normal event, and should not be interpreted as syntactically incorrect nor unknown if received.