3GPP TSG CN Plenary Meeting #12 **Tdoc NP-010299**
Stockholm, Sweden, 13th - 15th June 2001

Source: TSG CN WG4

Title: CRs on R99 Work Item TEI

Agenda item: 7.22

Document for: APPROVAL

Introduction:

This document contains 10 CRs on R99 Work Item "TEI", that have been agreed by TSG CN WG4, and are forwarded to TSG CN Plenary meeting #12 for approval.

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.010	029		N4-010686	R99	Partial Roaming – restriction by Location area	F	3.5.0
29.010	030		N4-010687	Rel-4	Partial Roaming – restriction by Location area	A	4.0.0
23.116	001	4	N4-010779	R99	Essential drawbacks on services due to introduction of Super-Charger function	F	3.0.0
23.116	002	4	N4-010780	Rel-4	Essential drawbacks on services due to introduction of Super-Charger function	A	4.0.0
29.002	278	3	N4-010766	R99	Essential drawbacks on services due to introduction of Super-Charger function	F	3.8.0
29.002	279	3	N4-010767	Rel-4	Essential drawbacks on services due to introduction of Super-Charger function	A	4.3.0
23.067	009	1	N4-010769	R99	Remove the statement when MS receives no priority granted	F	3.2.0
23.067	010	1	N4-010770	Rel-4	Remove the statement when MS receives no priority granted	A	4.0.0
24.067	004		N4-010582	R99	Remove the statement when MS receives no priority granted	F	3.1.0
24.067	005		N4-010583	Rel-4	Remove the statement when MS receives no priority granted	A	4.0.0

3GPP TSG-CN WG4 Meeting #08 **Tdoc N4-010769**
Rio Grande, Puerto Rico, 14-18 May 2001

CR-Form-v3

CHANGE REQUEST

⌘ **23.067** **CR** **009** ⌘ rev **1** ⌘ Current version: **3.2.0** ⌘

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

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

Title:	⌘	Remove the statement when MS receives no priority granted
Source:	⌘	CN4
Work item code:	⌘	TEI
Date:	⌘	2001-05-08
Category:	⌘	**F** (critical correction)
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:	⌘	From the R99 network, "priority level" IE in the CALL PROCEEDING message is mandated when the network supports priority option. These modifications clarify the network's behaviour when the network supports priority option. But on the other hand, mobile station will get different treatment in old network, compared to R'99 network. Consecuently the mobile station does not know whether the network supports priority or not, even if no priority level is included in the CALL_PROCEEDING message.
Summary of change:	⌘	Removal of the sentence "If the MS has indicated the priority in the CM_SERVICE_REQUEST message and if no priority level is included in the CALL_PROCEEDING message, then the MS shall assume that the network doesn't support priority".
Consequences if not approved:	⌘	Mobile station may get incompatible situation.

Clauses affected:	⌘	11.3.1.6 and 11.6		
Other specs affected:	⌘	**X** Other core specifications	⌘	Rel-4 mirror CR 010, 24.067 CR 004 and 24.008 CR 417
		☐ Test specifications		
		☐ O&M Specifications		
Other comments:	⌘			

How to create CRs using this form:
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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.

******First Modified Section ******

11.3.1.6 Indication of priority to the Mobile Station

The network shall include the assigned priority level in a CALL_PROCEEDING message if the network supports priority.

~~If the network assigns a priority level to the call different to the one requested by the user for any reasons or if the Mobile Station does not know what priority level will be applied since no priority was included in the service request, the network can inform the Mobile Station on the assigned priority level by sending a CALL_PROCEEDING message including a priority information element.~~

The Mobile Station shall store the priority level requested by the user, possibly overridden by the level received by the network, to perform automatic answering of calls or pre-emption of on-going calls.

NOTE: When the mobile station connects to the R98 or older network, the mobile station may not receive priority granted even if the network supports priority. ~~For the R98 or older networks, only if the network assigns a priority level to the call different to the one requested by the user for any reasons or if the Mobile Station does not know what priority level will be applied since no priority was included in the service request, the network can inform the Mobile Station on the assigned priority level by sending a CALL_PROCEEDING message including a priority information element.~~

******Next Modified Section ******

11.6 Overview of call related signalling

In this overview, the message structure to implement the specified concept is identified, and brief details are given of each message.

A diagrammatic representation of the transport procedures to be used to carry the priority information in case of standard point-to-point calls are given in figures 1 to 6. The message flow is not represented completely.

The corresponding message flows in case of voice group calls or voice broadcast calls are given in GSM 03.68 and GSM 03.69, respectively.

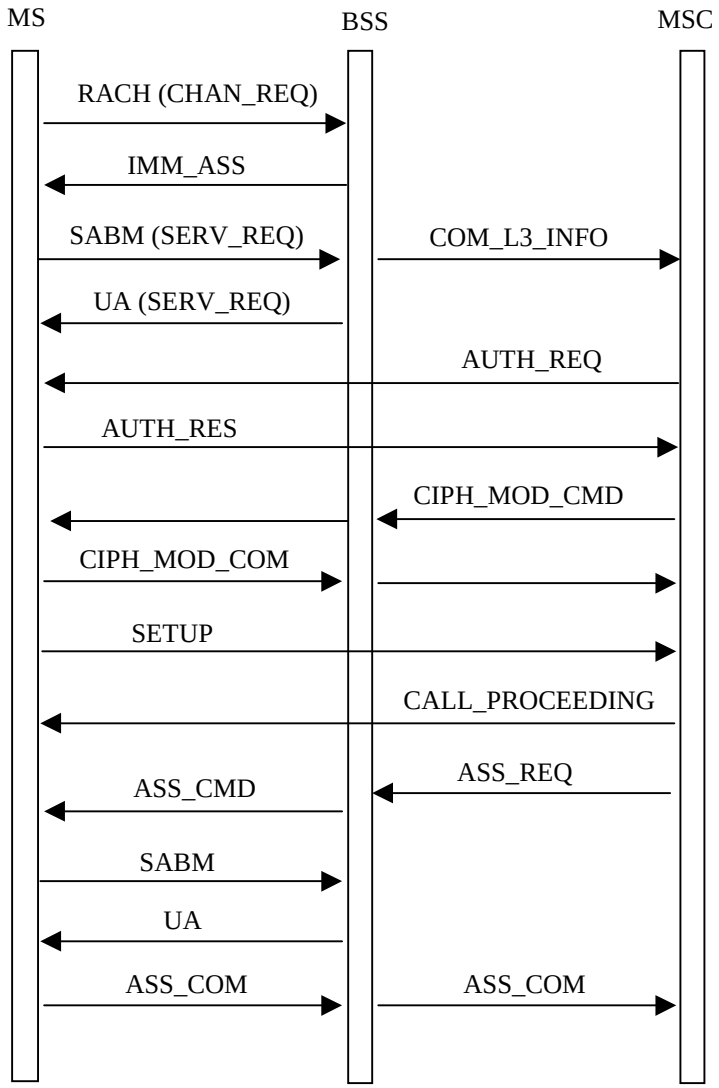

Figure 1: Signalling information required for the prioritisation at mobile originating call establishment without fast call set-up (for GSM)

Initial RACH CHAN_REQ: Standard message.

IMM_ASS: Standard message.

SABM (SERV_REQ): Modified form of the current L3-MM CM SERVICE REQUEST where the priority level is provided in addition if a priority selection is performed by the user. In case of no priority selection or use of a non-compatible Mobile Station the Mobile Station shall send a standard service request message and the network shall apply a default priority to their request.

UA (SERV_REQ): Standard message.

COM_L3_INFO: The MSC is provided with initial information about the requested service together with the selected priority level if applicable.

AUTH_REQ: Standard message.

AUTH_RES: Standard message.

CIPH_MOD_CMD: Standard message.

CIPH_MOD_COM: Standard message.

SETUP: Standard message.

CALL_PROCEEDING: The network shall include the assigned priority level in a CALL_PROCEEDING message when the network supports priority. ~~If the MS has indicated the priority in the CM_SERVICE_REQUEST message and if no priority level is included in the CALL_PROCEEDING message, then the MS shall assume that the network doesn't support priority.~~

ASS_REQ: This message is sent from the MSC to the BSC including the call priority and pre-emption capability to be applied as defined in GSM 08.08, according to the priority information the MSC has obtained from the service request or from the VLR data. In addition, the eMLPP level is included as explicit information.

ASS_CMD: Standard message.

SABM: Standard message.

UA: Standard message.

ASS_COM: Standard message.

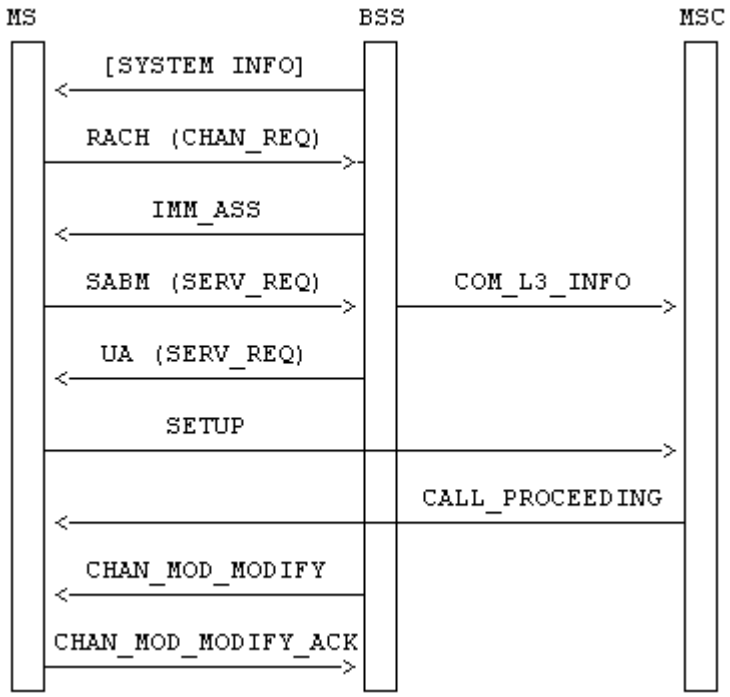

Figure 2: Signalling information required for the prioritisation at mobile originating call establishment with fast call set-up (for GSM)

SYSTEM INFO: *The network may provide information on the BCCH system information, that a MM connection is provisional granted after establishment of the main signalling link.*

If such information is provided on the BCCH and the user has selected a fast call set-up, the Mobile Station shall immediately send a SETUP message to the network after the main signalling link is established.

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UA (SERV_REQ): Standard message.

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If the network itself decides not to perform ciphering, it shall send an CM_SERV_ACC message.

SETUP: Standard message.

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CHAN_MOD_MODIFY: Standard message.

CHAN_MOD_MODIFY_ACK: Standard message.

******End of document******

3GPP TSG-CN WG4 Meeting #08 **Tdoc N4-010770**
Rio Grande, Puerto Rico, 14-18 May 2001

CR-Form-v3

CHANGE REQUEST

⌘ **23.067** **CR** **010** ⌘ rev **1** ⌘ Current version: **4.0.0** ⌘

*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:	⌘	Remove the statement when MS receives no priority granted
Source:	⌘	CN4
Work item code:	⌘	TEI
Date:	⌘	2001-05-08
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),*
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R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	From the R99 network, "priority level" IE in the CALL PROCEEDING message is mandated when the network supports priority option. These modifications clarify the network's behaviour when the network supports priority option. But on the other hand, mobile station will get different treatment in old network, compared to R'99 network. Consecuently the mobile station does not know whether the network supports priority or not, even if no priority level is included in the CALL_PROCEEDING message.
Summary of change:	⌘	Removal of the sentence "If the MS has indicated the priority in the CM_SERVICE_REQUEST message and if no priority level is included in the CALL_PROCEEDING message, then the MS shall assume that the network doesn't support priority".
Consequences if not approved:	⌘	Mobile station may get incompatible situation.

Clauses affected:	⌘	11.3.1.6 and 11.6		
Other specs affected:	⌘	**X** Other core specifications	⌘	R99 mirror CR 009, 24.067 CR 005 and 24.008 CR 418
		☐ Test specifications		
		☐ O&M Specifications		
Other comments:	⌘			

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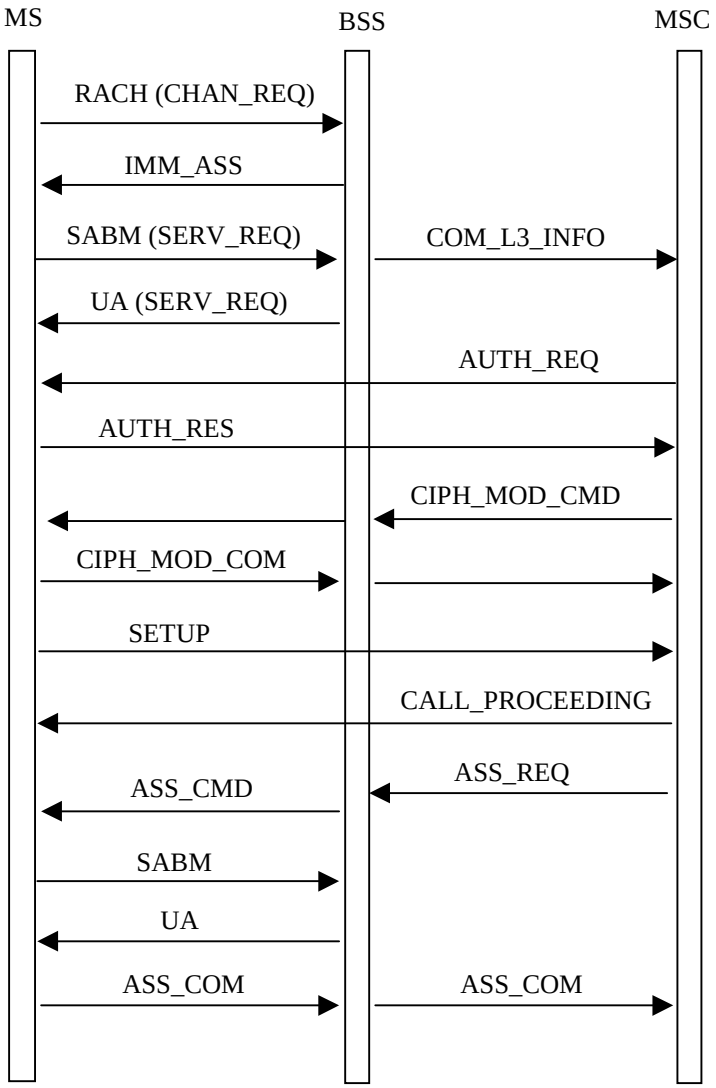

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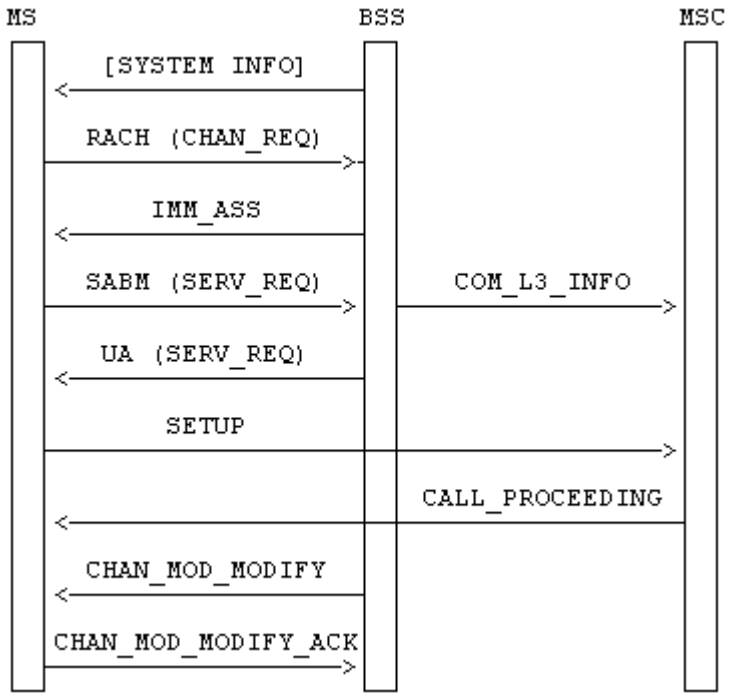

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CHAN_MOD_MODIFY: Standard message.

CHAN_MOD_MODIFY_ACK: Standard message.

******End of document******

3GPP TSG-CN4 Meeting #08
Puerto Rico, US, 14-18 May.

Tdoc N4-010779

CR-Form-v3

CHANGE REQUEST

⌘ **23.116** **CR** **001** ⌘ rev **4** ⌘ Current version: **3.0.0** ⌘

*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:	⌘	Essential drawbacks on services due to introduction of Super-Charger function.
Source:	⌘	CN4
Work item code:	⌘	TEI
Date:	⌘	02/05/2001
Category:	⌘	**F** (essential correction)
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)*
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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: ⌘

In the existing standards, there is a possibility that during a roaming/handover scenario the serving network entity (i.e. new SGSN/MSC) is not able to do any signalling against previous network entity (i.e. old SGSN/MSC).

An example could be the case of inter PLMN roaming where the address of previous network entity can not always be derived by the serving network entity. Even for intra PLMN there are scenarios where the address of previous network entity can not be derived by the serving network entity.
(I.e. for GPRS this means that SGSN CONTEXT REQUEST can not be sent if old SGSN address can not be derived due to old RAI not known in new SGSN)

In these situations the only indication the previous network entity receives to be able to decide that the MS has moved to another network entity, is the Cancel Location message from HLR.

In case the Super-Charger functionality is supported in the network, the Cancel Location message will not be sent.

The lack of any indication in previous network entity saying that MS has moved to another network entity leads to problems for different services that requires such an indication to be able to close down the existing connections.
The only way to clean up these hanging connections is after timeout, but this would anyway be too late as the timers could be running for hours.

The identified services so far that will get problems due to this are CAMEL, Charging, Location Services and Lawful Interception.

For Charging this could lead to that the subscriber is charged for x hours extra since the time based charging in previous network entity is still active whiles the MS actually has moved to another network entity and even started a new charging record.

Even CAMEL will have two parallel session ongoing at the same time.

	For LCS this means that the LCS Client will not be informed about the position of the subscriber as the Location Request can not be re-initiated against new network entity.
Summary of change: ⌘	This contribution proposes to remove the weakness in the Super-Charger function by introducing a mechanism that makes it possible to notify the previous network entity that MS has moved to another network entity. It is proposed that HLR will still send the Cancel Location message when there is a need to inform the previous network entity. The advantage introduced by Super-Charger to not remove the subscription date in previous network entity is still kept, i.e. the main advantage by not re-sending Insert Subscriber Data is not changed.
Consequences if not approved: ⌘	There is a risk that services like Charging, CAMEL, LCS, Lawful Intercept, and maybe other will not work properly, and for some services even the subscriber will be affected, ex. over charged.

Clauses affected: ⌘	5.2.3, 6.1, 6.3			
Other specs affected: ⌘	X	Other core specifications	⌘	29.002 CR 278
		Test specifications		
		O&M Specifications		
Other comments: ⌘				

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* *FIRST MODIFICATION* *

5.2.3 Cancel Location

The cancel location procedures are normally not used within and between Super-Charged networks as part of the location update procedure, as described 3G TS 23.012. However, Super-Charged networks shall support the cancel location procedure to provide interworking for location update procedures with GSM & UMTS networks that do not support the Super-Charger functionality. The cancel location procedure shall also be used within a Super-Charged network as a notification when there is a need to inform the previous network entity that the connections for the subscriber can be released, due to the fact that the MS has moved to another network entity. Subscription data may still be kept in the previous network entities that support Super-Charger.

The mechanism used to determine which network entities the cancel location message shall be sent to is outside the scope of this specification. However, it is recommended that the HLR store an indication if the serving network entity supports the Super-Charger functionality. It is also recommended that an HLR supporting the Super-Charger functionality have mechanisms to decide when a notification, as described above, needs to be sent against previous network entity or not. Without such a mechanism, Cancel Location shall always be sent. The mechanism is triggered by the indication received from serving network entity during location update procedure saying that previous network entity must be notified.

* *NEXT MODIFICATION* *

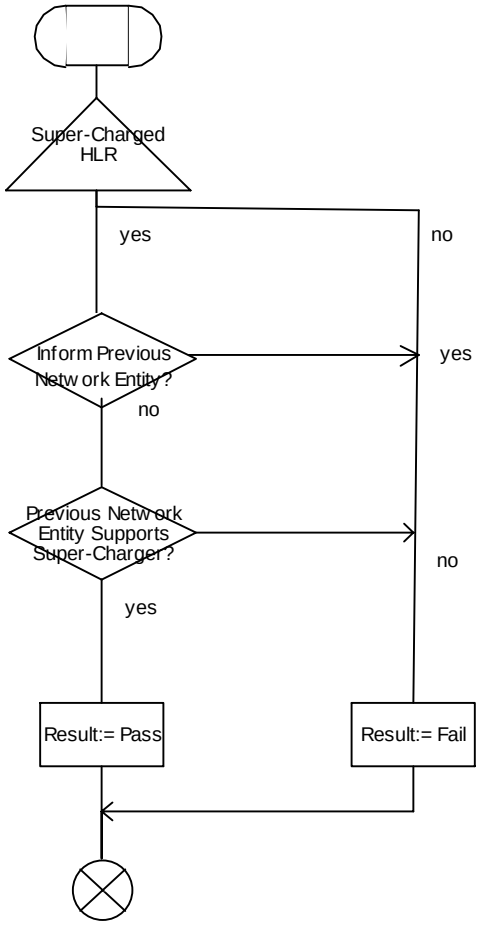
5.2.3.2 Detailed procedures in the HLR

The procedure Super_Charged_Cancel_Location_HLR determines to whether a Super-Charged HLR shall send the cancel location message to the previous network entity during location updating as described in 3G TS 23.012.

If the previous network entity does support the Super-Charger functionality, the HLR shall not send the cancel location message during location updating except in the conditions described in section 5.2.3. This is indicated by the "Result:= Pass" exit in figure 7.

Procedure Super_Charged_Cancel_Location_HLR 1(1)

Figure 7: The procedure Super_Charged_Cancel_Location_HLR determines whether a Super-Charged HLR shall send the cancel location message to the previous network entity during location updating.



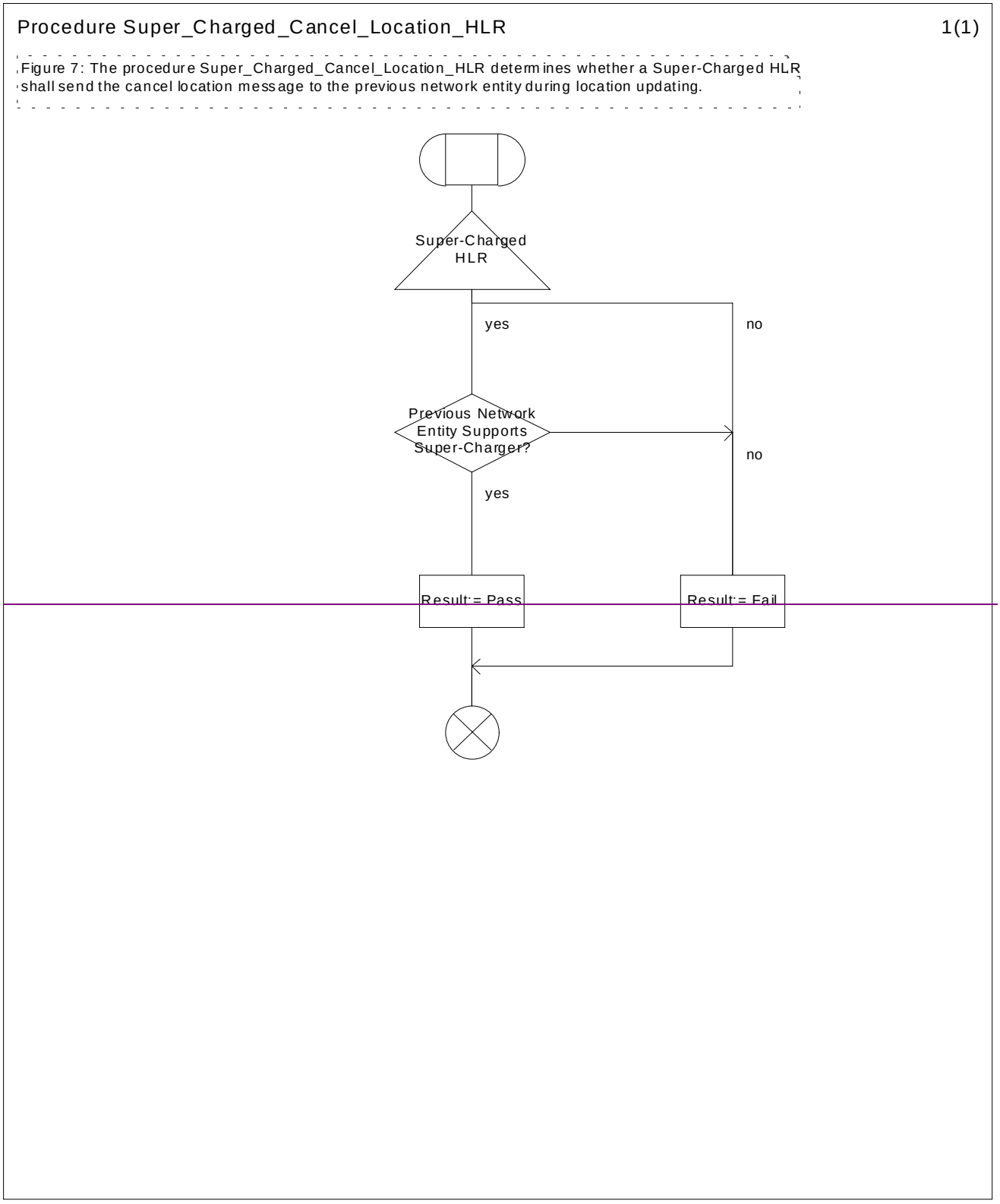


Figure 7: Procedure Super_Charged_Cancel_Location_HLR

* *NEXT MODIFICATION* * * * * * * * * * * * * * * * * * * * * * * * *

6.1 Update Location

The contents of this message are specified in 3G TS 29.002. In the case when the originating entity supports the Super-Charger functionality, the following Super-Charger specific information is defined:

Information element name	Required	Description
Super-Charger Supported In Serving Network Entity	C	When included, this parameter indicates that the originating entity supports the Super-Charger functionality. In addition, this parameter shall indicate either that subscription data is required or the date and time of the last known subscriber data modification.
Inform Previous Network Entity	C	When included, this parameter indicates that the previous network entity needs to be informed about the update location. The parameter shall be included only if Send Identification has not been sent to the previous network entity.

6.2 Update Location ack

The contents of this message are specified in 3G TS 29.002.

6.3 Update GPRS Location

The contents of this message are specified in 3G TS 29.002. In the case when the originating entity supports the Super-Charger functionality, the following Super-Charger specific information is defined:

Information element name	Required	Description
Super-Charger Supported In Serving Network Entity	C	When included, this parameter indicates that the originating entity supports the Super-Charger functionality. In addition, this parameter shall indicate either that subscription data is required or the date and time of the last known subscriber data modification.
Inform Previous Network Entity	C	When included, this parameter indicates that the previous network entity needs to be informed about the update location. The parameter shall be included only if SGSN Context Request has not been sent to the previous network entity.

6.4 Update GPRS Location ack

The contents of this message are specified in 3G TS 29.002.

3GPP TSG-CN4 Meeting #08
Puerto Rico, US, 14-18 May.

Tdoc N4-010780

CR-Form-v3

CHANGE REQUEST

⌘ **23.116** **CR** **002** ⌘ rev **4** ⌘ Current version: **4.0.0** ⌘

*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:	⌘	Essential drawbacks on services due to introduction of Super-Charger function.
Source:	⌘	CN4
Work item code:	⌘	TEI
Date:	⌘	02/05/2001
Category:	⌘	**A**
Release:	⌘	Rel4

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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: ⌘

In the existing standards, there is a possibility that during a roaming/handover scenario the serving network entity (i.e. new SGSN/MSC) is not able to do any signalling against previous network entity (i.e. old SGSN/MSC).

An example could be the case of inter PLMN roaming where the address of previous network entity can not always be derived by the serving network entity. Even for intra PLMN there are scenarios where the address of previous network entity can not be derived by the serving network entity.
(I.e. for GPRS this means that SGSN CONTEXT REQUEST can not be sent if old SGSN address can not be derived due to old RAI not known in new SGSN)

In these situations the only indication the previous network entity receives to be able to decide that the MS has moved to another network entity, is the Cancel Location message from HLR.

In case the Super-Charger functionality is supported in the network, the Cancel Location message will not be sent.

The lack of any indication in previous network entity saying that MS has moved to another network entity leads to problems for different services that requires such an indication to be able to close down the existing connections.
The only way to clean up these hanging connections is after timeout, but this would anyway be too late as the timers could be running for hours.

The identified services so far that will get problems due to this are CAMEL, Charging, Location Services and Lawful Interception.

For Charging this could lead to that the subscriber is charged for x hours extra since the time based charging in previous network entity is still active whiles the MS actually has moved to another network entity and even started a new charging record.

Even CAMEL will have two parallel session ongoing at the same time.

		For LCS this means that the LCS Client will not be informed about the position of the subscriber as the Location Request can not be re-initiated against new network entity.
Summary of change:	⌘	This contribution proposes to remove the weakness in the Super-Charger function by introducing a mechanism that makes it possible to notify the previous network entity that MS has moved to another network entity. It is proposed that HLR will still send the Cancel Location message when there is a need to inform the previous network entity. The advantage introduced by Super-Charger to not remove the subscription date in previous network entity is still kept, i.e. the main advantage by not re-sending Insert Subscriber Data is not changed.
Consequences if not approved:	⌘	There is a risk that services like Charging, CAMEL, LCS, Lawful Intercept, and maybe other will not work properly, and for some services even the subscriber will be affected, ex. over charged.

Clauses affected:	⌘	5.2.3, 6.1, 6.3		
Other specs affected:	⌘	[X] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘	29.002 CR 279
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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

* *FIRST MODIFICATION* *

5.2.3 Cancel Location

The cancel location procedures are normally not used within and between Super-Charged networks as part of the location update procedure, as described 3G TS 23.012. However, Super-Charged networks shall support the cancel location procedure to provide interworking for location update procedures with GSM & UMTS networks that do not support the Super-Charger functionality. The cancel location procedure shall also be used within a Super-Charged network as a notification when there is a need to inform the previous network entity that the connections for the subscriber can be released, due to the fact that the MS has moved to another network entity. Subscription data may still be kept in the previous network entities that support Super-Charger.

The mechanism used to determine which network entities the cancel location message shall be sent to is outside the scope of this specification. However, it is recommended that the HLR store an indication if the serving network entity supports the Super-Charger functionality. It is also recommended that an HLR supporting the Super-Charger functionality have mechanisms to decide when a notification as described above needs to be sent against previous network entity or not. Without such a mechanism, Cancel Location shall always be sent. The mechanism is triggered by the indication received from serving network entity during location update procedure saying that previous network entity must be notified.

* *NEXT MODIFICATION* *

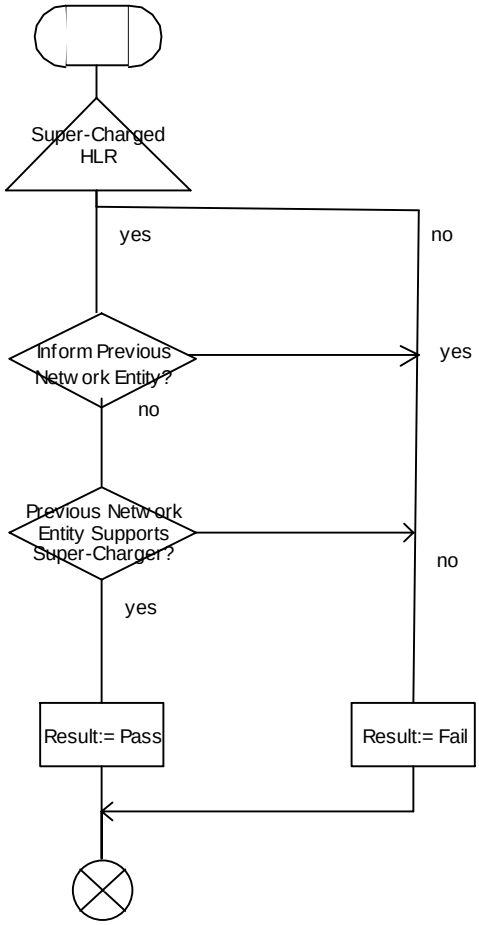
5.2.3.2 Detailed procedures in the HLR

The procedure Super_Charged_Cancel_Location_HLR determines to whether a Super-Charged HLR shall send the cancel location message to the previous network entity during location updating as described in 3G TS 23.012.

If the previous network entity does support the Super-Charger functionality, the HLR shall not send the cancel location message during location updating except in the conditions described in section 5.2.3.. This is indicated by the "Result:= Pass" exit in figure 7.

Procedure Super_Charged_Cancel_Location_HLR 1(1)

Figure 7: The procedure Super_Charged_Cancel_Location_HLR determines whether a Super-Charged HLR shall send the cancel location message to the previous network entity during location updating.



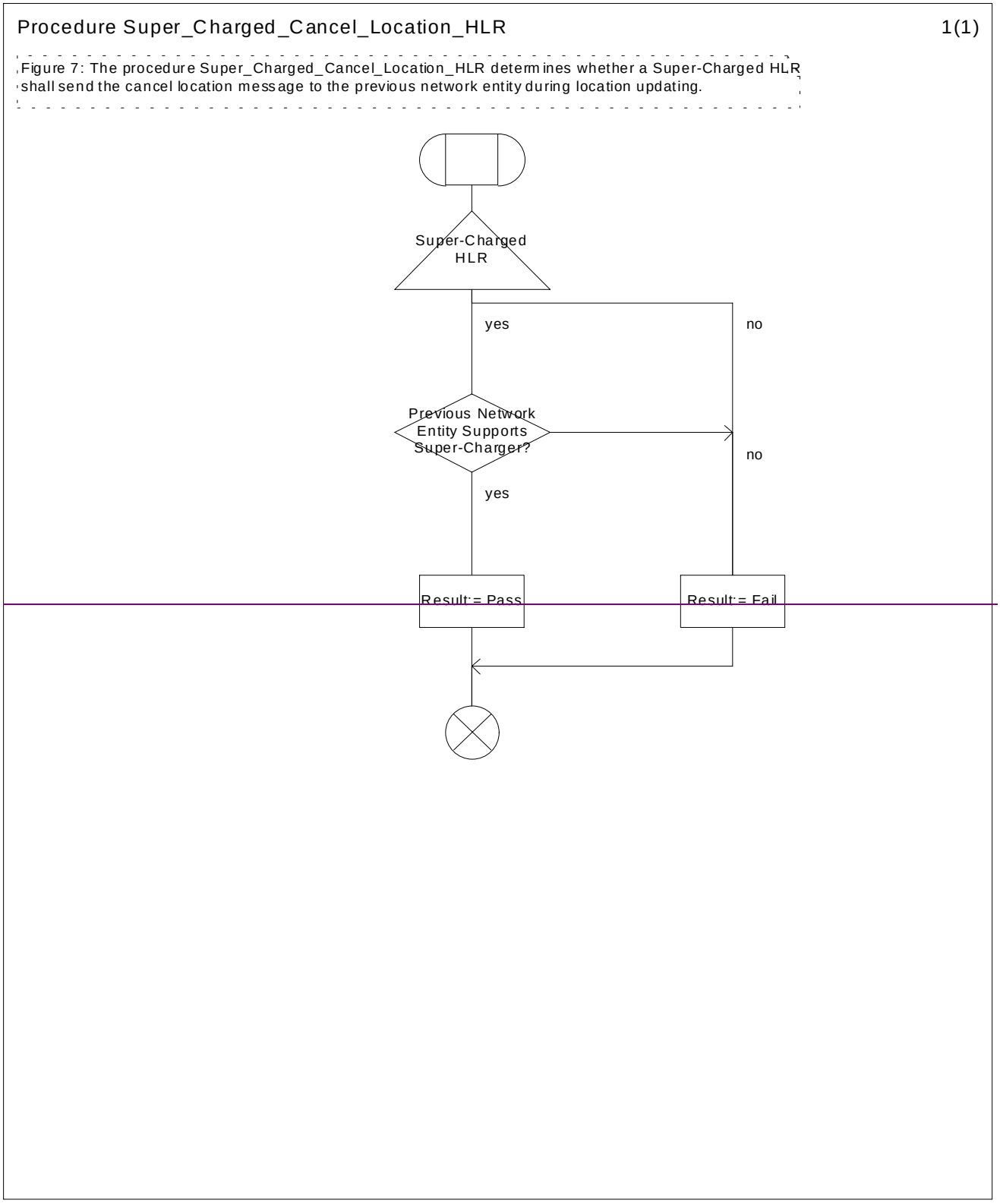


Figure 7: Procedure Super_Charged_Cancel_Location_HLR

* *NEXT MODIFICATION* * * * * * * * * * * * * * * * * * * * * * * *

6.1 Update Location

The contents of this message are specified in 3G TS 29.002. In the case when the originating entity supports the Super-Charger functionality, the following Super-Charger specific information is defined:

Information element name	Required	Description
Super-Charger Supported In Serving Network Entity	C	When included, this parameter indicates that the originating entity supports the Super-Charger functionality. In addition, this parameter shall indicate either that subscription data is required or the date and time of the last known subscriber data modification.
Inform Previous Network Entity	C	When included, this parameter indicates that the previous network entity needs to be informed about the update location. The parameter shall be included only if Send Identification has not been sent to the previous network entity.

6.2 Update Location ack

The contents of this message are specified in 3G TS 29.002.

6.3 Update GPRS Location

The contents of this message are specified in 3G TS 29.002. In the case when the originating entity supports the Super-Charger functionality, the following Super-Charger specific information is defined:

Information element name	Required	Description
Super-Charger Supported In Serving Network Entity	C	When included, this parameter indicates that the originating entity supports the Super-Charger functionality. In addition, this parameter shall indicate either that subscription data is required or the date and time of the last known subscriber data modification.
Inform Previous Network Entity	C	When included, this parameter indicates that the previous network entity needs to be informed about the update location. The parameter shall be included only if SGSN Context Request has not been sent to the previous network entity.

6.4 Update GPRS Location ack

The contents of this message are specified in 3G TS 29.002.

3GPP TSG-CN WG4 Meeting #08 **Tdoc N4-010582**
Rio Grande, Puerto Rico, 14-18 May 2001

CR-Form-v3

CHANGE REQUEST

⌘ **24.067** **CR** **004** ⌘ rev **-** ⌘ Current version: **3.1.0** ⌘

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

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

Title:	⌘	Remove the statement when MS receives no priority granted
Source:	⌘	CN4
Work item code:	⌘	TEI
Date:	⌘	2001-05-08
Category:	⌘	**F** (Critical correction)
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:	⌘	From the R99 network, "priority level" IE in the CALL PROCEEDING message is mandated when the network supports priority option. These modifications clarify the network's behaviour when the network supports priority option. But on the other hand, mobile station will get different treatment in old network, compared to R'99 network. Consecuently the mobile station does not know whether the network supports priority or not, even if no priority level is included in the CALL_PROCEEDING message.
Summary of change:	⌘	Remove the sentence that "If the MS has indicated the priority in the CM_SERVICE_REQUEST message and if no priority level is included in the CALL_PROCEEDING message, then the MS shall assume that the network doesn't support priority".
Consequences if not approved:	⌘	Mobile station may get incompatible situation.

Clauses affected:	⌘	4.1.1		
Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	Rel-4 mirror CR 005, 23.067 CR 009 and 24.008 CR 417
Other comments:	⌘			

How to create CRs using this form:
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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.

******First Modified Section ******

4.1.1 Mobile originated calls

The mobile station can indicate the priority of each call initiated. If no priority is indicated by the user or a non-compatible mobile station is used then the default priority level shall be applied which is stored in the VLR. The selection of priority shall be an MMI function.

For mobile originated calls, the corresponding message flows are shown in figure 1.

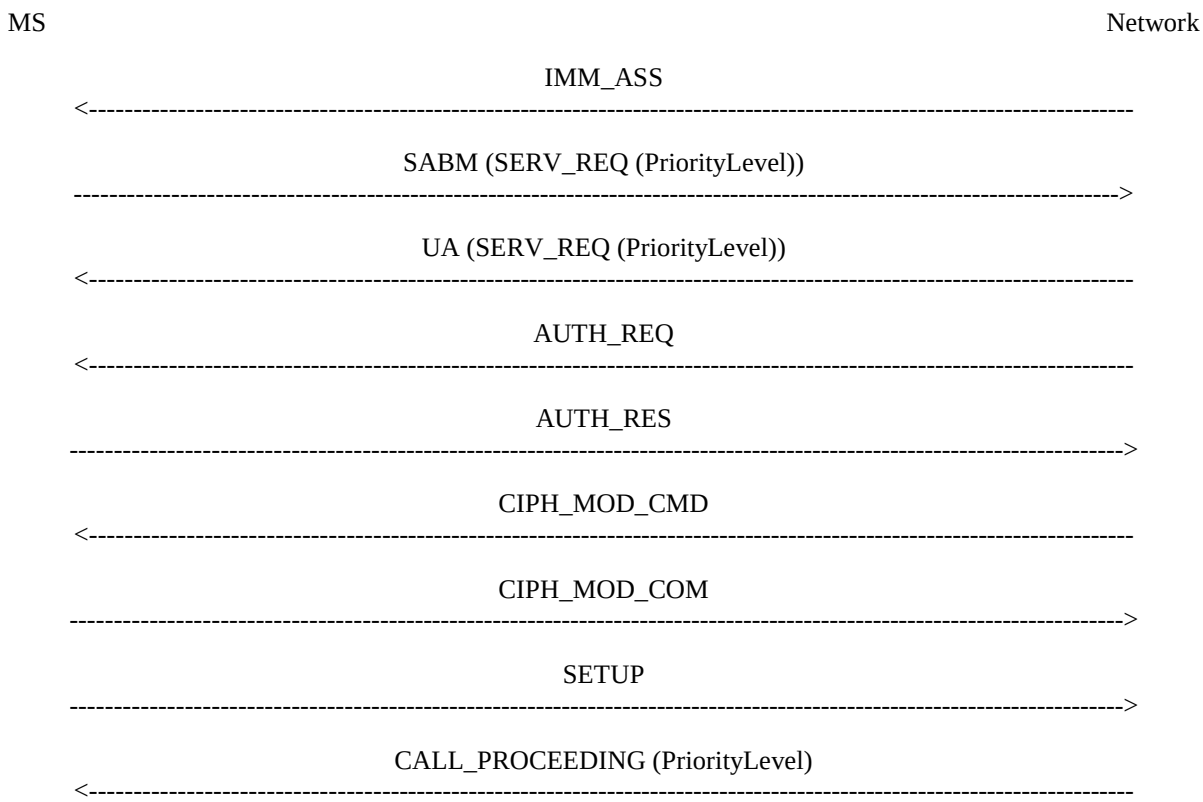

Figure 1: Signalling information required for the prioritisation at mobile originating call establishment

IMM_ASS: Standard message which is sent if no RR connection was already established.

SABM (SERV_REQ (PriorityLevel)): L3-MM CM SERVICE REQUEST where the priority level information element is provided in addition if a priority selection is performed by the user. In case of no priority selection or use of a non-compatible mobile station the mobile station shall send a service request message without priority level information element and the network shall apply a default priority to the request. The message may be piggybacked in a SABM if no RR connection was already established.

UA (SERV_REQ (PriorityLevel): Standard message to acknowledge the layer 2 link which is sent if no RR connection was already established. The priority level is the same as received by the network.

AUTH_REQ: Standard message which is sent if the network applies authentication as shown in figure 1. If not, the network will sent a standard CM_SERVICE_ACCEPT message.

AUTH_RES: Standard message which is sent if the network applies authentication.

CIPH_MOD_CMD: Standard message which is sent if the network applies ciphering as shown in figure 1.

CIPH_MOD_COM: Standard message which is sent if the network applies ciphering.

SETUP: Standard message.

CALL_PROCEEDING: The network shall include the assigned priority level in a CALL_PROCEEDING message, when the network supports priority. ~~If the MS has indicated the priority in the CM_SERVICE_REQUEST message and if no priority level is included in the CALL_PROCEEDING message, then the MS shall assume that the network doesn't support priority.~~

******End of document******

3GPP TSG-CN WG4 Meeting #08 **Tdoc N4-010583**
Rio Grande, Puerto Rico, 14-18 May 2001

CR-Form-v3

CHANGE REQUEST

⌘ **24.067** **CR** **005** ⌘ rev **-** ⌘ Current version: **4.0.0** ⌘

*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:	⌘	Remove the statement when MS receives no priority granted
Source:	⌘	CN4
Work item code:	⌘	TEI
Date:	⌘	2001-05-08
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:	⌘	From the R99 network, "priority level" IE in the CALL PROCEEDING message is mandated when the network supports priority option. These modifications clarify the network's behaviour when the network supports priority option. But on the other hand, mobile station will get different treatment in old network, compared to R'99 network. Consecuently the mobile station does not know whether the network supports priority or not, even if no priority level is included in the CALL_PROCEEDING message.
Summary of change:	⌘	Remove the sentence that "If the MS has indicated the priority in the CM_SERVICE_REQUEST message and if no priority level is included in the CALL_PROCEEDING message, then the MS shall assume that the network doesn't support priority".
Consequences if not approved:	⌘	Mobile station may get incompatible situation.

Clauses affected:	⌘	4.1.1		
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	R99 mirror CR 004, 23.067 CR 010 and 24.008 CR 418
Other comments:	⌘			

How to create CRs using this form:
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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.

******First Modified Section ******

4.1.1 Mobile originated calls

The mobile station can indicate the priority of each call initiated. If no priority is indicated by the user or a non-compatible mobile station is used then the default priority level shall be applied which is stored in the VLR. The selection of priority shall be an MMI function.

For mobile originated calls, the corresponding message flows are shown in figure 1.

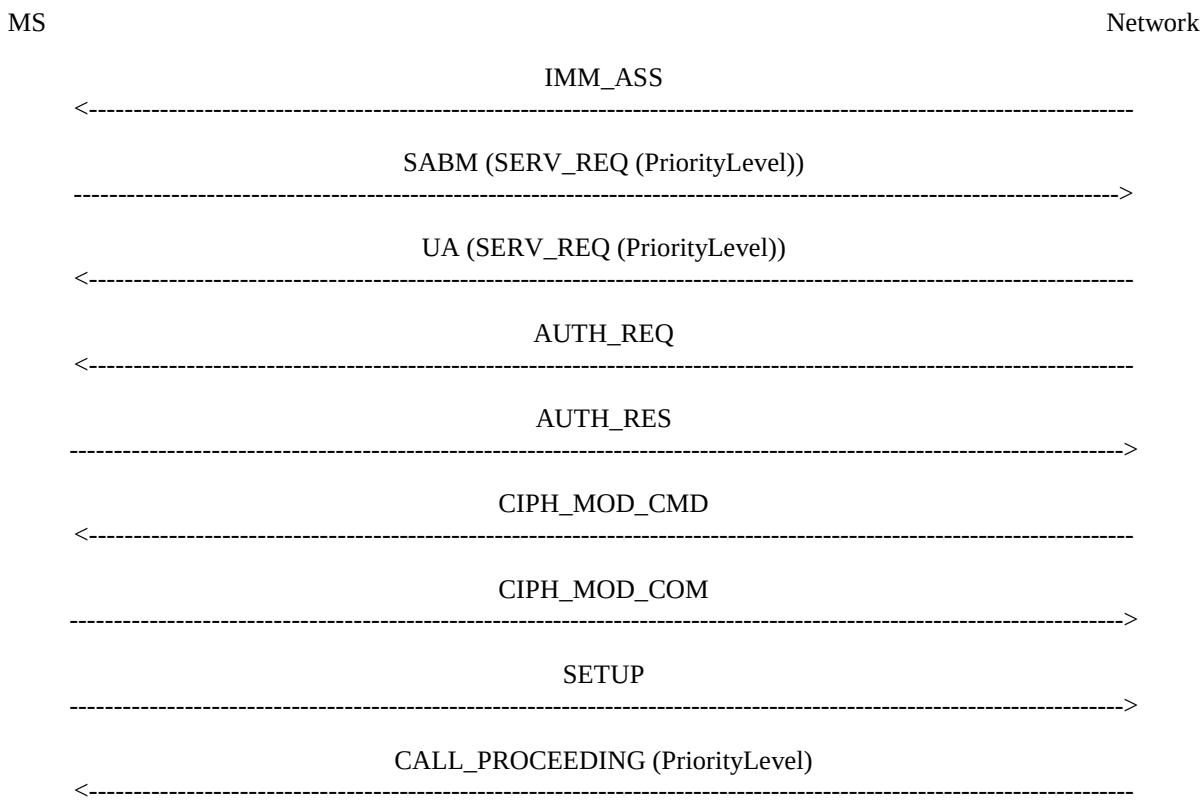

Figure 1: Signalling information required for the prioritisation at mobile originating call establishment

IMM_ASS: Standard message which is sent if no RR connection was already established.

SABM (SERV_REQ (PriorityLevel)): L3-MM CM SERVICE REQUEST where the priority level information element is provided in addition if a priority selection is performed by the user. In case of no priority selection or use of a non-compatible mobile station the mobile station shall send a service request message without priority level information element and the network shall apply a default priority to the request. The message may be piggybacked in a SABM if no RR connection was already established.

UA (SERV_REQ (PriorityLevel): Standard message to acknowledge the layer 2 link which is sent if no RR connection was already established. The priority level is the same as received by the network.

AUTH_REQ: Standard message which is sent if the network applies authentication as shown in figure 1. If not, the network will sent a standard CM_SERVICE_ACCEPT message.

AUTH_RES: Standard message which is sent if the network applies authentication.

CIPH_MOD_CMD: Standard message which is sent if the network applies ciphering as shown in figure 1.

CIPH_MOD_COM: Standard message which is sent if the network applies ciphering.

SETUP: Standard message.

CALL_PROCEEDING: The network shall include the assigned priority level in a CALL_PROCEEDING message, when the network supports priority. ~~If the MS has indicated the priority in the CM_SERVICE_REQUEST message and if no priority level is included in the CALL_PROCEEDING message, then the MS shall assume that the network doesn't support priority.~~

******End of document******

3GPP TSG-CN4 Meeting #08
Puerto Rico, US, 14-18 May.

Tdoc N4-010766

CR-Form-v3

CHANGE REQUEST

⌘ **29.002** **CR** **278** ⌘ rev **3** ⌘ Current version: **3.8.0** ⌘

*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:	⌘	Essential drawbacks on services due to introduction of Super-Charger function.
Source:	⌘	
Work item code:	⌘	TEI
Date:	⌘	02/05/2001
Category:	⌘	**F** *(essential correction)*
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: ⌘

In the existing standards, there is a possibility that during a roaming/handover scenario the serving network entity (i.e. new SGSN/MSC) is not able to do any signalling against previous network entity (i.e. old SGSN/MSC).

An example could be the case of inter PLMN roaming where the address of previous network entity can not always be derived by the serving network entity. Even for intra PLMN there are scenarios where the address of previous network entity can not be derived by the serving network entity.
(I.e. for GPRS this means that SGSN CONTEXT REQUEST can not be sent if old SGSN address can not be derived due to old RAI not known in new SGSN)

In these situations the only indication the previous network entity receives to be able to decide that the MS has moved to another network entity, is the Cancel Location message from HLR.

In case the Super-Charger functionality is supported in the network, the Cancel Location message will not be sent.

The lack of any indication in previous network entity saying that MS has moved to another network entity leads to problems for different services that requires such an indication to be able to close down the existing connections.
The only way to clean up these hanging connections is after timeout, but this would anyway be too late as the timers could be running for hours.

The identified services so far that will get problems due to this are CAMEL, Charging, Location Services and Lawful Interception.

For Charging this could lead to that the subscriber is charged for x hours extra since the time based charging in previous network entity is still active whiles the MS actually has moved to another network entity and even started a new charging record.

Even CAMEL will have two parallel session ongoing at the same time.

		For LCS this means that the LCS Client will not be informed about the position of the subscriber as the Location Request can not be re-initiated against new network entity.
Summary of change:	⌘	This contribution proposes to remove the weakness in the Super-Charger function by introducing a mechanism that makes it possible for the new network entity to, via HLR, notify the previous network entity that MS has moved to another network entity, even when Super-Charger is supported. It is proposed to add an indication in the location update procedure to make the new network entity able to request the HLR to inform the previous network entity. HLR shall then when this is requested by new network entity still send the Cancel Location message as an indication to inform the previous network entity that subscriber has moved.
Consequences if not approved:	⌘	There is a risk that services like Charging, CAMEL, LCS, Lawful Intercept, and maybe other will not work properly, and for some services even the subscriber will be affected, ex. over charged.

Clauses affected:	⌘	8.1.2.3, 8.1.7.3, 17.7.1		
Other specs affected:	⌘	[X] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘	23.116 CR 001
Other comments:	⌘			

How to create CRs using this form:

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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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

* *FIRST MODIFICATION* *

8.1.2 MAP_UPDATE_LOCATION service

8.1.2.1 Definition

This service is used by the VLR to update the location information stored in the HLR.

The MAP_UPDATE_LOCATION service is a confirmed service using the service primitives given in table 8.1/2.

8.1.2.2 Service primitives

Table 8.1/2: MAP_UPDATE_LOCATION

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	M	M(=)		
MSC Address	M	M(=)		
VLR number	M	M(=)		
LMSI	U	C(=)		
Supported CAMEL Phases	C	C(=)		
SoLSA Support Indicator	C	C(=)		
IST Support Indicator	C	C(=)		
Super-Charger Supported in Serving Network Entity	C	C(=)		
Long FTN Supported	C	C(=)		
Inform Previous Network Entity	C	C(=)		
HLR number			C	C(=)
User error			C	C(=)
Provider error				O

8.1.2.3 Parameter definitions and use

* *TEXT REMOVED* *
*< **text removed, for readability***>
* *TEXT REMOVED* *

Super-Charger Supported in Serving Network Entity

This parameter is used by the VLR to indicate to the HLR that the VLR supports the Super-Charger functionality and whether subscription data has been retained by the VLR. If subscription data has been retained by the VLR the age indicator shall be included. Otherwise the VLR shall indicate that subscriber data is required.

If this parameter is absent then the VLR does not support the Super-Charger functionality.

Inform Previous Network Entity

This parameter is used by the VLR to ask the HLR to inform the previous network entity about the update. It is used in case Super-Charger is supported in the network and the serving network entity has not been able to inform itself the previous network entity that MS has moved, that is if it has not sent Send Identification to the previous serving entity.

User error

In case of unsuccessful updating, an error cause shall be returned by the HLR. The following error causes defined in subclause 7.6.1 may be used, depending on the nature of the fault:

- unknown subscriber;
- roaming not allowed;

This cause will be sent if the MS is not allowed to roam into the PLMN indicated by the VLR number. The cause is qualified by the roaming restriction reason "PLMN Not Allowed" or "Operator Determined Barring". If no qualification is received (HLR with MAP Version 1), "PLMN Not Allowed" is taken as default.

- system failure;
- unexpected data value.

Provider error

For definition of provider errors see subclause 7.6.1.

* *NEXT MODIFICATION* * * * * * * * * * * * * * * * * * * * * * * * * *

8.1.7 MAP_UPDATE_GPRS_LOCATION service

8.1.7.1 Definition

This service is used by the SGSN to update the location information stored in the HLR.

The MAP_UPDATE_GPRS_LOCATION service is a confirmed service using the service primitives given in table 8.1/7.

8.1.7.2 Service primitives

Table 8.1/7: MAP_UPDATE_GPRS_LOCATION

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	M	M(=)		
SGSN number	M	M(=)		
SGSN address	M	M(=)		
Supported CAMEL Phases	C	C(=)		
SoLSA Support Indicator	C	C(=)		
Super-Charger Supported in Serving Network Entity	C	C(=)		
GPRS enhancements support indicator	C	C(=)		
Inform Previous Network Entity	C	C(=)		
HLR number			C	C(=)
User error			C	C(=)
Provider error				O

8.1.7.3 Parameter definitions and use

* *TEXT REMOVED* * * * * * * * * * * * * * * * * * * * * * * * * *
*< **text removed, for readability***>
* *TEXT REMOVED* * * * * * * * * * * * * * * * * * * * * * * * * *

Super-Charger Supported in Serving Network Entity

This parameter is used by the SGSN to indicate to the HLR that the SGSN supports the Super-Charger functionality and whether subscription data has been retained by the SGSN. If subscription data has been retained by the SGSN the age indicator shall be included. Otherwise the SGSN shall indicate that subscriber data is required.

If this parameter is absent then the SGSN does not support the Super-Charger functionality.

GPRS enhancements support indicator

This parameter is used by the SGSN to indicate to the HLR in the Update GPRS Location indication that GPRS enhancements are supported. If this parameter is included in the Update GPRS Location indication the HLR may send the extensible QoS in the PDP contexts to the SGSN.

Inform Previous Network Entity

This parameter is used by the SGSN to ask the HLR to inform the previous network entity about the update. It is used in case Super-Charger is supported in the network and the serving network entity has not been able to inform itself the previous network entity that MS has moved, that is if it has not sent SGSN Context Request to the previous serving entity.

HLR number

See definition in subclause 7.6.2. The presence of this parameter is mandatory in case of successful HLR updating.

User error

In case of unsuccessful updating, an error cause shall be returned by the HLR. The following error causes defined in subclause 7.6.1 may be used, depending on the nature of the fault:

- unknown subscriber;
- roaming not allowed.

  This cause will be sent if the MS is not allowed to roam into the PLMN indicated by the SGSN number. The cause is qualified by the roaming restriction reason "PLMN Not Allowed" or "Operator Determined Barring".
- system failure;
- unexpected data value.

The diagnostic in the Unknown Subscriber may indicate “Imsi Unknown” or “Gprs Subscription Unknown”.

Provider error

For definition of provider errors see subclause 7.6.1.

* *NEXT MODIFICATION* *

17.7.1 Mobile Service data types

* *TEXT REMOVED* *

*< **text removed, for readability**>*

* *TEXT REMOVED* *

```
-- location registration types

UpdateLocationArg ::= SEQUENCE {
    imsi                                IMSI,

    msc-Number                          [1] ISDN-AddressString,
    vlr-Number                          ISDN-AddressString,
    lmsi                                [10] LMSI OPTIONAL,
    extensionContainer                  ExtensionContainer              OPTIONAL,
    ... ,
    vlr-Capability                      [6] VLR-Capability              OPTIONAL,
    informPreviousNetworkEntity         [11] NULL                       OPTIONAL }
```

```
VLR-Capability ::= SEQUENCE{
     supportedCamelPhases                 [0] SupportedCamelPhases          OPTIONAL,
     extensionContainer                   ExtensionContainer                OPTIONAL,
     ... ,
     solsaSupportIndicator                [2] NULL                          OPTIONAL,
     istSupportIndicator                  [1] IST-SupportIndicator          OPTIONAL,
     superChargerSupportedInServingNetworkEntity   [3] SuperChargerInfo     OPTIONAL,
     longFTN-Supported                    [4]  NULL                         OPTIONAL }
```

```
SuperChargerInfo ::= CHOICE {
     sendSubscriberData                   [0] NULL,
     subscriberDataStored                 [1] AgeIndicator
 }
```

```
AgeIndicator ::= OCTET STRING (SIZE (1..6))
     -- The internal structure of this parameter is implementation specific.
```

-- gprs location registration types

```
UpdateGprsLocationArg ::= SEQUENCE {
     imsi                                 IMSI,
     sgsn-Number                          ISDN-AddressString,
     sgsn-Address                         GSN-Address,
     extensionContainer                   ExtensionContainer                OPTIONAL,
     ... ,
     sgsn-Capability                      [0] SGSN-Capability               OPTIONAL,
     informPreviousNetworkEntity          [1]  NULL                         OPTIONAL }
```

```
SGSN-Capability ::= SEQUENCE{
     solsaSupportIndicator                NULL                              OPTIONAL,
     extensionContainer                   [1] ExtensionContainer            OPTIONAL,
     ... ,
     superChargerSupportedInServingNetworkEntity   [2] SuperChargerInfo     OPTIONAL ,
     gprsEnhancementsSupportIndicator     [3] NULL                          OPTIONAL,
     supportedCamelPhases                 [4] SupportedCamelPhases          OPTIONAL }
```

```
GSN-Address ::= OCTET STRING (SIZE (5..17))
     -- Octets are coded according to TS GSM 03.03
```

```
UpdateGprsLocationRes ::= SEQUENCE {
     hlr-Number                           ISDN-AddressString,
     extensionContainer                   ExtensionContainer                OPTIONAL,
     ...}
```

3GPP TSG-CN4 Meeting #08
Puerto Rico, US, 14-18 May.

Tdoc N4-010767

CR-Form-v3

CHANGE REQUEST

⌘ **29.002** **CR** **279** ⌘ rev **3** ⌘ Current version: **4.3.0** ⌘

*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:	⌘	Essential drawbacks on services due to introduction of Super-Charger function.
Source:	⌘	CN4
Work item code:	⌘	TEI
Date:	⌘	02/05/2001
Category:	⌘	**A**
Release:	⌘	Rel4

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: ⌘

In the existing standards, there is a possibility that during a roaming/handover scenario the serving network entity (i.e. new SGSN/MSC) is not able to do any signalling against previous network entity (i.e. old SGSN/MSC).

An example could be the case of inter PLMN roaming where the address of previous network entity can not always be derived by the serving network entity. Even for intra PLMN there are scenarios where the address of previous network entity can not be derived by the serving network entity.
(I.e. for GPRS this means that SGSN CONTEXT REQUEST can not be sent if old SGSN address can not be derived due to old RAI not known in new SGSN)

In these situations the only indication the previous network entity receives to be able to decide that the MS has moved to another network entity, is the Cancel Location message from HLR.

In case the Super-Charger functionality is supported in the network, the Cancel Location message will not be sent.

The lack of any indication in previous network entity saying that MS has moved to another network entity leads to problems for different services that requires such an indication to be able to close down the existing connections.
The only way to clean up these hanging connections is after timeout, but this would anyway be too late as the timers could be running for hours.

The identified services so far that will get problems due to this are CAMEL, Charging, Location Services and Lawful Interception.

For Charging this could lead to that the subscriber is charged for x hours extra since the time based charging in previous network entity is still active whiles the MS actually has moved to another network entity and even started a new charging record.

Even CAMEL will have two parallel session ongoing at the same time.

	For LCS this means that the LCS Client will not be informed about the position of the subscriber as the Location Request can not be re-initiated against new network entity.
Summary of change: ⌘	This contribution proposes to remove the weakness in the Super-Charger function by introducing a mechanism that makes it possible for the new network entity to, via HLR, notify the previous network entity that MS has moved to another network entity, even when Super-Charger is supported. It is proposed to add an indication in the location update procedure to make the new network entity able to request the HLR to inform the previous network entity. HLR shall then when this is requested by new network entity still send the Cancel Location message as an indication to inform the previous network entity that subscriber has moved.
Consequences if not approved: ⌘	There is a risk that services like Charging, CAMEL, LCS, Lawful Intercept, and maybe other will not work properly, and for some services even the subscriber will be affected, ex. over charged.

Clauses affected:	⌘	8.1.2.3, 8.1.7.3, 17.7.1		
Other specs affected:	⌘	[X] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘	23.116 CR 002
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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

8.1.2 MAP_UPDATE_LOCATION service

8.1.2.1 Definition

This service is used by the VLR to update the location information stored in the HLR.

The MAP_UPDATE_LOCATION service is a confirmed service using the service primitives given in table 8.1/2.

8.1.2.2 Service primitives

Table 8.1/2: MAP_UPDATE_LOCATION

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	M	M(=)		
MSC Address	M	M(=)		
VLR number	M	M(=)		
LMSI	U	C(=)		
Supported CAMEL Phases	C	C(=)		
SoLSA Support Indicator	C	C(=)		
IST Support Indicator	C	C(=)		
Super-Charger Supported in Serving Network Entity	C	C(=)		
Long FTN Supported	C	C(=)		
Supported LCS Capability Sets	C	C(=)		
Inform Previous Network Entity	C	C(=)		
HLR number			C	C(=)
User error			C	C(=)
Provider error				O

8.1.2.3 Parameter definitions and use

* *TEXT REMOVED* * * * * * * * * * * * * * * * * *

*< **text removed, for readability***>

* *TEXT REMOVED* * * * * * * * * * * * * * * * * *

Supported LCS Capability Sets

This parameter indicates by its presence that LCS is supported and the capability sets of LCS which are supported.

Inform Previous Network Entity

This parameter is used by the VLR to ask the HLR to inform the previous network entity about the update. It is used in case Super-Charger is supported in the network and the serving network entity has not been able to inform itself the previous network entity that MS has moved, that is if it has not sent Send Identification to the previous serving entity.

User error

In case of unsuccessful updating, an error cause shall be returned by the HLR. The following error causes defined in subclause 7.6.1 may be used, depending on the nature of the fault:

- unknown subscriber;
- roaming not allowed;

  This cause will be sent if the MS is not allowed to roam into the PLMN indicated by the VLR number. The cause is qualified by the roaming restriction reason "PLMN Not Allowed" or "Operator Determined Barring". If no qualification is received (HLR with MAP Version 1), "PLMN Not Allowed" is taken as default.

- system failure;

- unexpected data value.

Provider error

For definition of provider errors see subclause 7.6.1.

* *NEXT MODIFICATION* * * * * * * * * * * * * * * * * * * * * * * * *

8.1.7 MAP_UPDATE_GPRS_LOCATION service

8.1.7.1 Definition

This service is used by the SGSN to update the location information stored in the HLR.

The MAP_UPDATE_GPRS_LOCATION service is a confirmed service using the service primitives given in table 8.1/7.

8.1.7.2 Service primitives

Table 8.1/7: MAP_UPDATE_GPRS_LOCATION

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	M	M(=)		
SGSN number	M	M(=)		
SGSN address	M	M(=)		
Supported CAMEL Phases	C	C(=)		
SoLSA Support Indicator	C	C(=)		
Super-Charger Supported in Serving Network Entity	C	C(=)		
GPRS enhancements support indicator	C	C(=)		
Supported LCS Capability Sets	C	C(=)		
Inform Previous Network Entity	C	C(=)		
HLR number			C	C(=)
User error			C	C(=)
Provider error				O

8.1.7.3 Parameter definitions and use

* *TEXT REMOVED* * * * * * * * * * * * * * * * * * * * * * * * *

*< **text removed, for readability***>

* *TEXT REMOVED* * * * * * * * * * * * * * * * * * * * * * * * *

Supported LCS Capability Sets

This parameter indicates by its presence that LCS is supported and the capability sets of LCS which are supported.

Inform Previous Network Entity

This parameter is used by the SGSN to ask the HLR to inform the previous network entity about the update. It is used in case Super-Charger is supported in the network and the serving network entity has not been able to inform itself the previous network entity that MS has moved, that is if it has not sent SGSN Context Request to the previous serving entity.~~.~~

User error

In case of unsuccessful updating, an error cause shall be returned by the HLR. The following error causes defined in subclause 7.6.1 may be used, depending on the nature of the fault:

- unknown subscriber;
- roaming not allowed.

This cause will be sent if the MS is not allowed to roam into the PLMN indicated by the SGSN number. The cause is qualified by the roaming restriction reason "PLMN Not Allowed" or "Operator Determined Barring".

- system failure;
- unexpected data value.

The diagnostic in the Unknown Subscriber may indicate “Imsi Unknown” or “Gprs Subscription Unknown”.

Provider error

For definition of provider errors see subclause 7.6.1.

* *NEXT MODIFICATION* * * * * * * * * * * * * * * * * * * * * * * * *

17.7.1 Mobile Service data types

* *TEXT REMOVED* * * * * * * * * * * * * * * * * * * * * * * * *

< text removed, for readability>

* *TEXT REMOVED* * * * * * * * * * * * * * * * * * * * * * * * *

```
-- location registration types

UpdateLocationArg ::= SEQUENCE {
     imsi                                IMSI,

     msc-Number                          [1] ISDN-AddressString,
     vlr-Number                          ISDN-AddressString,
     lmsi                                [10] LMSI OPTIONAL,
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ... ,
     vlr-Capability                      [6] VLR-Capability                  OPTIONAL,
     informPreviousNetworkEntity         [11] NULL                           OPTIONAL }

VLR-Capability ::= SEQUENCE{
     supportedCamelPhases                [0] SupportedCamelPhases            OPTIONAL,
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ... ,
     solsaSupportIndicator               [2] NULL                            OPTIONAL,
     istSupportIndicator                 [1] IST-SupportIndicator            OPTIONAL,
     superChargerSupportedInServingNetworkEntity   [3] SuperChargerInfo      OPTIONAL,
     longFTN-Supported                   [4]  NULL                           OPTIONAL,
     supportedLCS-CapabilitySets         [5]  SupportedLCS-CapabilitySets    OPTIONAL }

SuperChargerInfo ::= CHOICE {
     sendSubscriberData                  [0] NULL,
     subscriberDataStored                [1] AgeIndicator }

AgeIndicator ::= OCTET STRING (SIZE (1..6))
     -- The internal structure of this parameter is implementation specific.


-- gprs location registration types

UpdateGprsLocationArg ::= SEQUENCE {
     imsi                                IMSI,
     sgsn-Number                         ISDN-AddressString,
     sgsn-Address                        GSN-Address,
     extensionContainer                  ExtensionContainer                  OPTIONAL,
     ... ,
     sgsn-Capability                     [0] SGSN-Capability                 OPTIONAL,
     informPreviousNetworkEntity         [1]  NULL                           OPTIONAL }
```

```
SGSN-Capability ::= SEQUENCE{
     solsaSupportIndicator                NULL                                 OPTIONAL,
     extensionContainer                   [1] ExtensionContainer               OPTIONAL,
     ... ,
     superChargerSupportedInServingNetworkEntity   [2] SuperChargerInfo        OPTIONAL ,
     gprsEnhancementsSupportIndicator     [3] NULL                             OPTIONAL,
     supportedCamelPhases                 [4] SupportedCamelPhases             OPTIONAL,
     supportedLCS-CapabilitySets          [5]  SupportedLCS-CapabilitySets     OPTIONAL }
```

```
GSN-Address ::= OCTET STRING (SIZE (5..17))
     -- Octets are coded according to TS GSM 03.03
```

```
UpdateGprsLocationRes ::= SEQUENCE {
     hlr-Number                           ISDN-AddressString,
     extensionContainer                   ExtensionContainer                   OPTIONAL,
     ...}
```

3GPP TSG- CN WG4 Meeting #08 ***Tdoc N4-010686***
Rio Grande, Puerto Rico, 14th-18th May 2001

CR-Form-v3

CHANGE REQUEST

⌘ **29.010** **CR** **29** ⌘ rev **-** ⌘ Current version: **3.5.0** ⌘

*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:	⌘	Partial Roaming – restriction by Location area
Source:	⌘	CN4
Work item code:	⌘	TEI
Date:	⌘	27-04-01
Category:	⌘	**F** (agreed by consensus)
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:	⌘	This was recognised as a potential problem in the UE Idle Mode Workshop in Helsinki earlier this year, but no changes have yet been proposed as companies have concentrated on other issues related to roaming, namely Equivalent PLMN codes and Idle Mode search procedures, which themselves were key changes to enable roaming in a 2G/3G environment. This change reflects the agreement reached in the CN1/SA1 Network Selection Joint Ad Hoc meeting held on 8th May 2001 in Helsinki. Partial roaming occurs when a mobile has access to a PLMN, but only to a limited set of location areas.
Summary of change:	⌘	The addition of 'No Suitable Cells In Location Area' is added to Location Update Reject and Routing Area Reject cause value mappings.
Consequences if not approved:	⌘	National and international roaming will not operate correctly when an operator uses a single PLMN code for both parts of network and partial or restricted roaming agreements are in place.

Clauses affected:	⌘	3.2, 3.4		
Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	22.011,23.122, 24.008
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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

3.2 Location area updating

	08.08/04.08	09.02	Notes
Forward message	COMPLETE LAYER 3 INFO (LOCATION UPDATING REQUEST)	MAP_UPDATE_LOCATION_AREA request	
	Location area id	Previous LA Id	
	Mobile identity	IMSI or TMSI	
	Mobile station classmark 1	-	4
	Ciphering key seq number	CKSN	
	Location update type	Location update type	3
	Cell identifier	Target LA Id	1
	Chosen channel	-	
Positive results	DTAP (LOCATION UPDATING ACCEPT)	MAP_UPDATE_LOCATION AREA response	
	Location area identity	-	
	Mobile identity	-	5
	Follow on proceed	-	
Negative results	DTAP (LOCATION UPDATING REJECT)	MAP_UPDATE_LOCATION AREA response	
	IMSI unknown in HLR	Unknown subscriber	6
	Network failure	Unknown LA	2
	PLMN not allowed	Roaming not allowed: PLMN not allowed	
	LA not allowed	LA not allowed	
	Roaming not allowed in this LA	National Roaming not allowed	
	No Suitable cells in location area	-	7
	PLMN not allowed	Operator determined barring	
	Illegal MS	Illegal subscriber	
	Illegal ME	Illegal equipment	
	Network failure	System Failure	
	Network failure	Unexpected data value	
	Network failure	MAP_U/P_ABORT	
	Network failure	MAP_NOTICE	
	Network failure	MAP_CLOSE	

NOTE 1: The Target LA Id parameter is derived by the MSC from the Cell identifier information element.

NOTE 2: The Unknown LA error is only generated as a result of incorrect information being inserted by the MSC or BSS.

NOTE 3: This parameter can be used by the VLR to decide whether (e.g.) Authentication or IMEI checking is needed.

NOTE 4 As the mobile station classmark (1 or 2) is received by the MSC at the establishment of every RR connection, this information need not be stored in the VLR, but it is stored in the MSC as long as the RR connection exists.

NOTE 5 The mobile identity is inserted by the MSC if it is received in a MAP_FORWARD_NEW_TMSI service. If a TMSI is included, the MS should respond with a TMSI REALLOCATION COMPLETE message.

NOTE 6 The HLR shall also send this error if there is an error in the type of subscription (i.e. VLR requests service for a GPRS only subscriber).

NOTE 7 The No Suitable cells in location area error is generated when the MS has access to only part of the PLMN, but where there may also be suitable location areas available. The MS retries on another location area.

3.3 Detach IMSI

	04.08	09.02	Notes
Forward message	IMSI DETACH INDICATION	MAP_DETACH_IMSI request	
	Mobile identity	IMSI or TMSI	
	Mobile Station classmark 1	-	
Positive result			1
Negative result			

NOTE 1: The forward message is not acknowledged.

Depending on the state of the MS, the IMSI DETACH INDICATION may be carried in either a DTAP message or a BSSMAP COMPLETE LAYER 3 INFORMATION message.

3.4 Routeing area updating

	04.08	09.02	Notes
Forward message	GMM (ROUTEING AREA UPDATE REQUEST)	MAP_UPDATE_GPRS_LOCATION request	
	MS classmark 1	-	
	MS classmark 4	-	
	GPRS Ciphering key seq number	-	
	Mobile station identity	IMSI	
	Old routeing area identification	-	
Positive results	GMM (ROUTEING AREA UPDATE ACCEPT)	MAP_UPDATE_GPRS_LOCATION response	
	Routeing area identification	-	
	Mobile station identity	-	1
C	Mobile station	-	2
C	Reject: IMSI unknown in HLR	-	3
C	Reject: MSC temporarily not reacheable	-	4
Negative results	GMM (ROUTEING AREA UPDATE REJECT)	MAP_UPDATE_GPRS_LOCATION response	
	Network failure	-	5
	GPRS services not allowed in this PLMN	Unknown HLR	
	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	6
	GPRS services and non GPRS services not allowed	Unknown subscriber (IMSI unknown)	7
C	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	8
C	GPRS services and non-GPRS services not allowed	Unknown subscriber (IMSI unknown)	9
	MS identity cannot be derived by the network	-	10
	GPRS services not allowed in this PLMN	Roaming not allowed: PLMN not allowed	
	LA not allowed	-	
	Roaming not allowed in this LA	-	
	No Suitable cells in location area	-	11
	GPRS services not allowed in this PLMN	Operator determined barring	
	Illegal MS	-	
	Illegal ME	-	
	Network failure	System Failure	
	Network failure	Unexpected data value	
	Network failure	MAP_U/P_ABORT	
	Network failure	MAP_NOTICE	
	Network failure	MAP_CLOSE	

NOTE 1: The mobile station identity is inserted by the SGSN if the SGSN wants to deallocate or re-allocate a P-TMSI. If the SGSN wants to deallocate the P-TMSI it shall include the IMSI. If the SGSN wants to re-allocate the P-TMSI it shall include the new P-TMSI. If a P-TMSI is included, the MS shall respond with a ROUTEING AREA UPDATE COMPLETE message.

NOTE 2: The mobile station identity is inserted by the SGSN if it is received in a BSSAP+ LOCATION UPDATE ACCEPT message from the VLR. If a TMSI is included, the MS shall respond with a ROUTEING AREA UPDATE COMPLETE message. Only used in the Combined Routeing and Location Area procedure.

NOTE 3: This reject cause is inserted on the positive response by the SGSN if the SGSN receives a BSSAP+ LOCATION UPDATE REJECT message from the VLR indicating in the reject cause IMSI unknown in HLR. Only used in the Combined Routeing and Location Area procedure.

NOTE 4: This reject cause is inserted on the positive response by the SGSN if the SGSN does not receive any response from the VLR to a previous BSSAP+ LOCATION UPDATE REQUEST message. Only used in the Combined Routeing and Location Area procedure.

NOTE 5: The Unknown RA error is only generated as a result of incorrect information being inserted by the BSS.

NOTE 6: The HLR shall send Unknown subscriber with diagnostic value No GPRS subscription if the HLR indicates that there is an error in the type of subscription (i.e. SGSN requests service for a non-GPRS only subscriber).

NOTE 7: The HLR shall send Unknown subscriber with diagnostic value IMSI unknown if the HLR indicates that the IMSI provided by the SGSN is unknown.

NOTE 8: The HLR shall send Unknown subscriber with diagnostic value No GPRS subscription if the HLR indicates that there is an error in the type of subscription (i.e. SGSN requests service for a non-GPRS only subscriber). Used in the Combined Routeing and Location Area procedure.

NOTE 9: This reject cause is inserted if the SGSN receives a MAP GPRS UPDATE LOCATION negative response message indicating IMSI unknown. Used in the Combined Routeing and Location Area procedure.

NOTE 10: This reject cause is inserted if the SGSN does not receive any response from the old SGSN to a previous SGSN CONTEXT REQUEST message.

NOTE 11 The 'No Suitable cells in location area' error is generated when the MS has access to only part of the PLMN, but where there may also be suitable location areas available. The MS retries on another location area.

3GPP TSG- CN WG4 Meeting #08 ***Tdoc N4-010687***
Rio Grande, Puerto Rico, 14th-18th May 2001

CR-Form-v3

CHANGE REQUEST

⌘ **29.010** **CR** **30** ⌘ rev **-** ⌘ Current version: **4.0.0** ⌘

*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:	⌘	Partial Roaming – restriction by Location area
Source:	⌘	CN4
Work item code:	⌘	TEI
Date:	⌘	27-04-01
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:	⌘	This was recognised as a potential problem in the UE Idle Mode Workshop in Helsinki earlier this year, but no changes have yet been proposed as companies have concentrated on other issues related to roaming, namely Equivalent PLMN codes and Idle Mode search procedures, which themselves were key changes to enable roaming in a 2G/3G environment. This change reflects the agreement reached in the CN1/SA1 Network Selection Joint Ad Hoc meeting held on 8th May 2001 in Helsinki. Partial roaming occurs when a mobile has access to a PLMN, but only to a limited set of location areas.
Summary of change:	⌘	The addition of 'No Suitable Cells In Location Area' is added to Location Update Reject and Routing Area Reject cause value mappings.
Consequences if not approved:	⌘	National and international roaming will not operate correctly when an operator uses a single PLMN code for both parts of network and partial or restricted roaming agreements are in place.

Clauses affected:	⌘	3.2, 3.4		
Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	22.011, 23.122, 24.008
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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

3.2 Location area updating

	08.08/04.08	09.02	Notes
Forward message	COMPLETE LAYER 3 INFO (LOCATION UPDATING REQUEST)	MAP_UPDATE_LOCATION_AREA request	
	Location area id	Previous LA Id	
	Mobile identity	IMSI or TMSI	
	Mobile station classmark 1	-	4
	Ciphering key seq number	CKSN	
	Location update type	Location update type	3
	Cell identifier	Target LA Id	1
	Chosen channel	-	
Positive results	DTAP (LOCATION UPDATING ACCEPT)	MAP_UPDATE_LOCATION AREA response	
	Location area identity	-	
	Mobile identity	-	5
	Follow on proceed	-	
Negative results	DTAP (LOCATION UPDATING REJECT)	MAP_UPDATE_LOCATION AREA response	
	IMSI unknown in HLR	Unknown subscriber	6
	Network failure	Unknown LA	2
	PLMN not allowed	Roaming not allowed: PLMN not allowed	
	LA not allowed	LA not allowed	
	Roaming not allowed in this LA	National Roaming not allowed	
	No Suitable cells in location area	-	7
	PLMN not allowed	Operator determined barring	
	Illegal MS	Illegal subscriber	
	Illegal ME	Illegal equipment	
	Network failure	System Failure	
	Network failure	Unexpected data value	
	Network failure	MAP_U/P_ABORT	
	Network failure	MAP_NOTICE	
	Network failure	MAP_CLOSE	

NOTE 1: The Target LA Id parameter is derived by the MSC from the Cell identifier information element.

NOTE 2: The Unknown LA error is only generated as a result of incorrect information being inserted by the MSC or BSS.

NOTE 3: This parameter can be used by the VLR to decide whether (e.g.) Authentication or IMEI checking is needed.

NOTE 4 As the mobile station classmark (1 or 2) is received by the MSC at the establishment of every RR connection, this information need not be stored in the VLR, but it is stored in the MSC as long as the RR connection exists.

NOTE 5 The mobile identity is inserted by the MSC if it is received in a MAP_FORWARD_NEW_TMSI service. If a TMSI is included, the MS should respond with a TMSI REALLOCATION COMPLETE message.

NOTE 6 The HLR shall also send this error if there is an error in the type of subscription (i.e. VLR requests service for a GPRS only subscriber).

NOTE 7 The No Suitable cells in location area error is generated when the MS has access to only part of the PLMN, but where there may also be suitable location areas available. The MS retries on another location area.

3.3 Detach IMSI

	04.08	09.02	Notes
Forward message	IMSI DETACH INDICATION	MAP_DETACH_IMSI request	
	Mobile identity	IMSI or TMSI	
	Mobile Station classmark 1	-	
Positive result			1
Negative result			

NOTE 1: The forward message is not acknowledged.

Depending on the state of the MS, the IMSI DETACH INDICATION may be carried in either a DTAP message or a BSSMAP COMPLETE LAYER 3 INFORMATION message.

3.4 Routeing area updating

	04.08	09.02	Notes
Forward message	GMM (ROUTEING AREA UPDATE REQUEST)	MAP_UPDATE_GPRS_LOCATION request	
	MS classmark 1	-	
	MS classmark 4	-	
	GPRS Ciphering key seq number	-	
	Mobile station identity	IMSI	
	Old routeing area identification	-	
Positive results	GMM (ROUTEING AREA UPDATE ACCEPT)	MAP_UPDATE_GPRS_LOCATION response	
	Routeing area identification	-	
	Mobile station identity	-	1
	C Mobile station	-	2
	C Reject: IMSI unknown in HLR	-	3
	C Reject: MSC temporarily not reacheable	-	4
Negative results	GMM (ROUTEING AREA UPDATE REJECT)	MAP_UPDATE_GPRS_LOCATION response	
	Network failure	-	5
	GPRS services not allowed in this PLMN	Unknown HLR	
	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	6
	GPRS services and non GPRS services not allowed	Unknown subscriber (IMSI unknown)	7
	C GPRS services not allowed	Unknown subscriber (no GPRS subscription)	8
	C GPRS services and non-GPRS services not allowed	Unknown subscriber (IMSI unknown)	9
	MS identity cannot be derived by the network	-	10
	GPRS services not allowed in this PLMN	Roaming not allowed: PLMN not allowed	
	LA not allowed	-	
	Roaming not allowed in this LA	-	
	No Suitable cells in location area	-	11
	GPRS services not allowed in this PLMN	Operator determined barring	
	Illegal MS	-	
	Illegal ME	-	
	Network failure	System Failure	
	Network failure	Unexpected data value	
	Network failure	MAP_U/P_ABORT	
	Network failure	MAP_NOTICE	
	Network failure	MAP_CLOSE	

NOTE 1: The mobile station identity is inserted by the SGSN if the SGSN wants to deallocate or re-allocate a P-TMSI. If the SGSN wants to deallocate the P-TMSI it shall include the IMSI. If the SGSN wants to re-allocate the P-TMSI it shall include the new P-TMSI. If a P-TMSI is included, the MS shall respond with a ROUTEING AREA UPDATE COMPLETE message.

NOTE 2: The mobile station identity is inserted by the SGSN if it is received in a BSSAP+ LOCATION UPDATE ACCEPT message from the VLR. If a TMSI is included, the MS shall respond with a ROUTEING AREA UPDATE COMPLETE message. Only used in the Combined Routeing and Location Area procedure.

NOTE 3: This reject cause is inserted on the positive response by the SGSN if the SGSN receives a BSSAP+ LOCATION UPDATE REJECT message from the VLR indicating in the reject cause IMSI unknown in HLR. Only used in the Combined Routeing and Location Area procedure.

NOTE 4: This reject cause is inserted on the positive response by the SGSN if the SGSN does not receive any response from the VLR to a previous BSSAP+ LOCATION UPDATE REQUEST message. Only used in the Combined Routeing and Location Area procedure.

NOTE 5: The Unknown RA error is only generated as a result of incorrect information being inserted by the BSS.

NOTE 6: The HLR shall send Unknown subscriber with diagnostic value No GPRS subscription if the HLR indicates that there is an error in the type of subscription (i.e. SGSN requests service for a non-GPRS only subscriber).

NOTE 7: The HLR shall send Unknown subscriber with diagnostic value IMSI unknown if the HLR indicates that the IMSI provided by the SGSN is unknown.

NOTE 8: The HLR shall send Unknown subscriber with diagnostic value No GPRS subscription if the HLR indicates that there is an error in the type of subscription (i.e. SGSN requests service for a non-GPRS only subscriber). Used in the Combined Routeing and Location Area procedure.

NOTE 9: This reject cause is inserted if the SGSN receives a MAP GPRS UPDATE LOCATION negative response message indicating IMSI unknown. Used in the Combined Routeing and Location Area procedure.

NOTE 10: This reject cause is inserted if the SGSN does not receive any response from the old SGSN to a previous SGSN CONTEXT REQUEST message.

NOTE 11 The 'No Suitable cells in location area' error is generated when the MS has access to only part of the PLMN, but where there may also be suitable location areas available. The MS retries on another location area.