3GPP TSG-CN Meeting #25 **NP-040375**
8th – 10th September 2004. Palm Springs, USA.

Source: **TSG CN WG1**

Title: **CRs on Rel-6 WI NTShar towards TS 23.122, TS 29.018, TS 24.008 and TS 24.007**

Agenda item: **9.19**

Document for: **APPROVAL**

This document contains **4 CRs on Rel-6 Work Item "NTShar"**, that have been agreed by TSG CN WG1 CN#35 meeting and forwarded to TSG CN Plenary meeting #25 for approval.

TDoc #	Tdoc Title	Spec	CR #	Rev	CAT	Current version	WI	Rel
N1-041611	Clarification on the registered PLMN for UEs that support network sharing in a shared network	23.122	76	2	B	6.1.0	NTShar	Rel-6
N1-041615	Transfer of selected core network operator id across Gs interface	29.018	42	2	B	6.0.0	NTShar	Rel-6
N1-041640	Clarification on the registered PLMN for UEs that support network sharing in a shared network	24.008	901	3	B	6.5.0	NTShar	Rel-6
N1-041645	Sequence number handling during redirection in MOCN sharing scenario	24.007	67	4	B	6.1.0	NTShar	Rel-6

3GPP TSG-CN1 Meeting #35
Sophia Antipolis, France, 16-20 August 2004

Tdoc N1-041611
(Revision of N1-041542)

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.122** **CR** **076** ⌘ **rev** **2** ⌘ Current version: **6.1.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [ ]

Title:	⌘	Clarification on the registered PLMN for Network Sharing supporting UEs in a shared network
Source:	⌘	TeliaSonera
Work item code:	⌘	NTShar
Date:	⌘	14/07/2004
Category:	⌘	**B**
Release:	⌘	Rel-6

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:
Ph2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*
Rel-7 *(Release 7)*

Reason for change:	⌘	Network Sharing supporting UEs shall register with one of the core network operators behind a shared network. In the GWCN configuration where the MSC/SGSN are also shared, there is a need to clarify that the actually registered network for a Network Sharing supporting UE is the core network operator, not the shared network where the MSC/SGSN are located. A Network Sharing supporting UE shall also consider the ePLMN list is sent by the core network operator that the UE has registered on.
Summary of change:	⌘	Clarify that it is the actually registered network who sends the equivalent PLMNs list to a UE in a shared network. Also require that in a shared network the PLMN code of the registered network is the PLMN identity of the CN operator that has accepted the LR. And in a shared network a cell belongs to multiple PLMNs given in the system information transmitted on the BCCH.
Consequences if not approved:	⌘	Incorrect PLMN might be considered as the equivalent PLMN to be stored by the UE in a shared network.

Clauses affected:	⌘	1.2, 4.4.3

		Y	N			
Other specs Affected:	⌘	X		Other core specifications	⌘	TS 24.008 (CR#901)
			X	Test specifications		

	X	O&M Specifications

Other comments: ⌘

How to create CRs using this form:

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********** One more change before the First Change **********

1.2 Definitions and abbreviations

For the purposes of the present document, the abbreviations defined in 3GPP TR 21.905 [36] apply.

(A/Gb mode only): Indicates this clause applies only to GSM system. For multi system case this is determined by the current serving radio access network.

(Iu mode only): Indicates this clause applies only to UMTS system. For multi system case this is determined by the current serving radio access network.

Acceptable Cell: This is a cell that the MS may camp on to make emergency calls. It must satisfy criteria which is defined for A/Gb mode in 3GPP TS 43.022 and for Iu mode in 3GPP TS 25.304.

Access Technology: The access technology associated with a PLMN. The MS uses this information to determine what type of radio carrier to search for when attempting to select a specific PLMN (e.g., GSM, UMTS or GSM COMPACT). A PLMN may support more than one access technology.

Allowable PLMN: In the case of a MS operating in MS operation mode A or B, **t**his is a PLMN which is not in the list of "forbidden PLMNs" in the MS. In the case of a MS operating in MS operation mode C, this is a PLMN which is not in the list of "forbidden PLMNs" or in the list of "forbidden PLMNs for GPRS service" in the MS

Available PLMN: For GERAN A/Gb mode see 3GPP TS 43.022. For UMTS see 3GPP TS 25.304.

Available PLMN/access technology combination**:** This is an available PLMN in a specific access technology.

Camped on a cell: The MS (ME if there is no SIM) has completed the cell selection/reselection process and has chosen a cell from which it plans to receive all available services. Note that the services may be limited, and that the PLMN may not be aware of the existence of the MS (ME) within the chosen cell.

Current serving cell: This is the cell on which the MS is camped.

CTS MS: An MS capable of CTS services is a CTS MS.

GPRS MS: An MS capable of GPRS services is a GPRS MS.

MS operation mode: See 3GPP TS 23.060 [27].

High quality signal: The high quality signal limit is used in the PLMN selection procedure. It is defined in the appropriate AS specification: 3GPP TS 43.022 for the GSM radio access technology, 3GPP TS 25.304 for the UMTS radio access technology (FDD or TDD mode).

Home PLMN: This is a PLMN where the MCC and MNC of the PLMN identity match the MCC and MNC of the IMSI. Matching criteria are defined in Annex A.

In A/Gb mode,...: Indicates this clause applies only to GSM System. For multi system case this is determined by the current serving radio access network.

In Iu mode,...: Indicates this clause applies only to UMTS System. For multi system case this is determined by the current serving radio access network.

Localised Service Area (LSA): A localised service area consists of a cell or a number of cells. The cells constituting a LSA may not necessarily provide contiguous coverage.

Location Registration (LR): An MS which is IMSI attached to non-GPRS services only performs location registration by the Location Updating procedure. A GPRS MS which is IMSI attached to GPRS services or to GPRS and non-GPRS services performs location registration by the Routing Area Update procedure only when in a network of network operation mode I. Both procedures are performed independently by the GPRS MS when it is IMSI attached to GPRS and non-GPRS services in a network of network operation mode II or III (see 3GPP TS 23.060).

MS: Mobile Station. The present document makes no distinction between MS and UE.

Network Type: The network type associated with HPLMN or a PLMN on the PLMN selector (see 3GPP TS 31.102). The MS uses this information to determine what type of radio carrier to search for when attempting to select a specific PLMN. A PLMN may support more than one network type.

Registered PLMN (RPLMN): This is the PLMN on which certain LR outcomes have occurred (see table 1). In a shared network the RPLMN is the PLMN defined by the PLMN identity of the CN operator that has accepted the LR.

Registration: This is the process of camping on a cell of the PLMN and doing any necessary LRs.

Registration Area: A registration area is an area in which mobile stations may roam without a need to perform location registration. The registration area corresponds to location area (LA) for performing location updating procedure and it corresponds to routing area for performing the routing area update procedure.

The PLMN to which a cell belongs (PLMN identity) is given in the system information transmitted on the BCCH (MCC + MNC part of LAI). In a shared network a cell belongs to all PLMNs given in the system information transmitted on the BCCH.

Selected PLMN: This is the PLMN that has been selected according to clause 3.1, either manually or automatically.

SIM: Subscriber Identity Module (see 3GPP TS 21.111). The present document makes no distinction between SIM and USIM.

SoLSA exclusive access: Cells on which normal camping is allowed only for MS with Localised Service Area (LSA) subscription.

Suitable Cell: This is a cell on which an MS may camp. It must satisfy criteria which is defined for A/Gb mode in 3GPP TS 43.022 and for Iu mode in 3GPP TS 25.304.

Visited PLMN of home country: This is a PLMN, different from the home PLMN, where the MCC part of the PLMN identity is the same as the MCC of the IMSI.

Visited PLMN: This is a PLMN, different from the home PLMN.

********** End of the change before the First Change **********

********** First Change **********

4.4 PLMN selection process

4.4.1 Introduction

There are two modes for PLMN selection, automatic and manual. These are described in clauses 4.4.3 below and illustrated in figures 2a to 2b in clause 5.

4.4.2 Registration on a PLMN

The MS shall perform registration on the PLMN if the MS is capable of services which require registration. In both automatic and manual modes, the concept of registration on a PLMN is used. An MS successfully registers on a PLMN if:

a) The MS has found a suitable cell of the PLMN to camp on; and

b) An LR request from the MS has been accepted in the registration area of the cell on which the MS is camped (see table 1).

4.4.3 PLMN selection

The registration on the selected PLMN and the location registration are only necessary if the MS is capable of services which require registration. Otherwise, the PLMN selection procedures are performed without registration.

The "HPLMN Selector with Access Technology", "User Controlled PLMN Selector with Access Technology" and "Operator Controlled PLMN Selector with Access Technology" data files in the SIM include associated access technologies for each PLMN entry, see 3GPP TS 31.102. The PLMN/access technology combinations are listed in priority order. If an entry indicates more than one access technology, then no priority is defined for the access technologies within this entry and the priority applied to each access technology within this entry is an implementation issue. If no particular access technology is indicated in an entry, it shall be assumed that all access technologies supported by the ME apply to the entry. If an entry only indicates access technologies not supported by the ME, the entry shall be ignored. If an entry indicates at least one access technology supported by the ME, the entry shall be used in the PLMN selection procedures if the other criteria defined for the specific PLMN selection procedures are fulfilled.

The Mobile Equipment stores a list of "equivalent PLMNs". This list is replaced or deleted at the end of each location update procedure, routing area update procedure and GPRS attach procedure. The stored list consists of a list of equivalent PLMNs as downloaded by the network plus the PLMN code of the registered ~~network~~ PLMN that downloaded the list. All PLMNs in the stored list, in all access technologies supported by the PLMN, are regarded as equivalent to each other for PLMN selection, cell selection/re-selection and handover.

********** End of First Change **********

3GPP TSG-CN1 Meeting #35
Sophia Antipolis, France, August 16-20, 2004

Tdoc ⌘N1-041615
(Revision of N1-041546)

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.018** **CR** **042** ⌘**rev** **2** ⌘ Current version: **6.0.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Transfer of selected core network operator identity across Gs interface
Source:	⌘	TeliaSonera
Work item code:	⌘	NTShar
Date:	⌘	20/07/04
Category:	⌘	**B**
Release:	⌘	Rel-6

Use one of the following categories:
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Use one of the following releases:

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R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*
Rel-7	*(Release 7)*

Reason for change:	⌘	In a shared networks, the Gs interface may be used to ensure CS and PS registration coordination. The VLR therefore needs to be informed by the SGSN about the selected core network operator.
Summary of change:	⌘	Reference to TS23.251 inserted among normative references. Also require that in a shared network the PLMN identity contained in the service area identification shall be the selected core network operator ID.
Consequences if not approved:	⌘	CS and PS registration coordination can not be achieved in a shared network.

Clauses affected:	⌘	2.1, 17.1.11.2, 17.1.11.5

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

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**********START OF CHANGE**********

2 References

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

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

2.1 Normative references

[1] [Void]

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

[2] [Void]

[3] [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".

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

[9] 3GPP TS 43.064: "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".

[11a] 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol".

[12] 3GPP TS 44.064: "Mobile Station - Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) layer specification".

[13] 3GPP TS 44.065: "Mobile Station (MS) - Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDCP)".

[14] 3GPP TS 48.008: "Mobile-services Switching Centre - Base Station System (MSC-BSS) interface; Layer 3 specification".

[15] 3GPP TS 48.018: "Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".

[16] 3GPP TS 48.060: "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 49.008: "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)".

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

[21] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

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

[23] 3GPP TS 23.195: "Provision of UE Specific Behaviour Information to Network Entities".

[23A] 3GPP TS 22.101: "Service Principles".

[X] 3GPP TS 23.251: "Network sharing; Architecture and functional description".

2.2 Informative references

[22A] 3GPP TS 41.061: "GPRS ciphering algorithm requirements".

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

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

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

[26] [Void]

[27] 3GPP TS 42.009: "Security aspects".

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

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

[30] 3GPP TS 42.017: "Subscriber Identity Modules (SIM); Functional characteristics".

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

[32] [Void]

[33] [Void]

[34] 3GPP TS 44.001: "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 44.003: "Mobile Station - Base Station System (MS - BSS) interface; Channel structures and access capabilities".

[37] 3GPP TS 44.004: "Layer 1 General requirements".

[38] 3GPP TS 44.005: "Data Link (DL) layer General aspects".

[39] 3GPP TS 44.006: "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 24.022: "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".

[43] 3GPP TS 48.006: "Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS-MSC) interface".

[44] 3GPP TS 48.014: "General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) interface; Gb interface layer 1".

[45] 3GPP TS 48.016: "General Packet Radio Service (GPRS); Base Station System (BSS); Serving GPRS Support Node (SGSN) interface; 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)".

[48] [Void]

[49] [Void]

[50] [Void]

[51] [Void]

[52] [Void]

[53] [Void]

[54] [Void]

[55] [Void]

[56] ITU-T Recommendations I.130: "Method for the characterization 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".

[58] ITU-T Recommendation Q.702: "Signalling data link".

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

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

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

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

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

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

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

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

********** END OF CHANGE **********

********** START OF CHANGE **********

17.1.11 BSSAP+-LOCATION-UPDATE-REQUEST message

This message is sent by the SGSN to the VLR either to request update of its location file (normal update) or to request IMSI attach.

Table 17.1.11/3GPP TS 29.018: BSSAP+-LOCATION-UPDATE-REQUEST message content

Information Element	Type/Reference	Presence	Format	Length
Message type	Message type 18.2	M	V	1
IMSI	IMSI 18.4.10	M	TLV	6-10
SGSN number	SGSN number 18.4.22	M	TLV	5-11
Update type	GPRS location update type 18.4.6	M	TLV	3
New Cell global identity	Cell global identity 18.4.1	M	TLV	10
Mobile station classmark	Mobile station classmark 1 18.4.18	M	TLV	3
Old location area identifier	Location area identifier 18.4.14	O	TLV	7
TMSI status	TMSI status 18.4.24	O	TLV	3
New service area identification	Service area identification 18.4.21b	O	TLV	9
IMEISV	IMEISV 18.4.9	O	TLV	10

17.1.11.1 Old location area identifier

This information element should be included. It is derived from the old routing area identification received in the ROUTING AREA UPDATING REQUEST message defined in 3GPP TS 24.008.

17.1.11.2 New cell global identity

In A/Gb mode, the cell global identity which shall be included is the one where the MS is in the current radio contact.

In Iu mode, the cell global identity which shall be included indicates where the MS is in the current location area. The cell identity part of this information shall be ignored by the VLR.

In a shared network, the PLMN identity contained in the cell global identity shall be the PLMN identity of the selected core network operator (see 3GPP TS 23.251 [X]).

17.1.11.3 TMSI status

This information element shall be included if the TMSI status received in the ATTACH REQUEST or ROUTING AREA UPDATING REQUEST message from the MS indicates, that no valid TMSI is available in the MS.

17.1.11.4 Mobile station classmark

This information element does not serve any useful purpose, but shall be included for reasons of compatibility with earlier versions of the protocol. To ease interworking with old VLR equipment, the SGSN shall encode the contents of this information element as: revision level 'GSM phase 2', 'early classmark sending supported', 'encryption algorithm A5/1 supported', and RF power capability 'class 1'.

17.1.11.5 New service area identification

In Iu mode, the service area identification which should be included is the one where the MS is in the current radio contact.

In a shared network, the PLMN identity contained in the service area identification shall be the PLMN identity of the selected core network operator (see 3GPP TS 23.251 [X]).

17.1.11.6 IMEISV

This information element shall be included, if the SGSN supports the "Provision of UE Specific Behaviour Information to Network Entities" or the "Automatic Device Detection".

********** **END OF CHANGE** **********

3GPP TSG-CN1 Meeting #35
Sophia Antipolis, France, 16-20 August 2004

Tdoc N1-041640
(Revision of N1-041612)

CR-Form-v7.1

CHANGE REQUEST

⌘ **24.008** **CR** **901** ⌘**rev** **3** ⌘ Current version: **6.5.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	Clarification on the registered PLMN for Network Sharing supporting UEs in a shared network
Source:	⌘	TeliaSonera
Work item code:	⌘	NTShar
Date:	⌘	16/07/2004
Category:	⌘	**B**
Release:	⌘	Rel-6

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Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*
Rel-7	*(Release 7)*

Reason for change:	⌘	Network Sharing supporting UEs shall register with one of the core network operators behind a shared network. In the GWCN configuration where the MSC/SGSN are also shared, there is a need to clarify that the actually registered network for a Network Sharing supporting UE is the core network operator, not the shared network where the MSC/SGSN are located. Upon successful registration the UE receives a LAI that indicates the registered PLMN. In a shared network, the received LAI shall indicate the PLMN ID of the core network operator for Network Sharing supporting UEs. A Network Sharing supporting UE shall also consider the ePLMN list is sent by the core network operator that the UE has registered on.
Summary of change:	⌘	Defined that the received Location Area Identification upon successful location updating shall indicate the PLMN ID of the actually registered network for UEs in a shared network. Also it is clarified that it is the actually registered network who sends the equivalent PLMNs list to a UE in a shared network. Addition of reference to TS23.251
Consequences if not approved:	⌘	Inconsistency between the registered PLMN and the selected PLMN in Network Sharing supporting UEs in a shared network. And incorrect PLMN might be considered as the equivalent PLMN to be stored by the UE in a shared network.

Clauses affected:	⌘	2, 4.4.1, 4.4.4.6, 4.7.3.1.3, 4.7.5.1.3				
		Y	**N**			
Other specs Affected:	⌘	**X**		Other core specifications	⌘	TS 23.122 (CR#076)
			X	Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

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

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

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

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

********** One more change before the First Change **********

2 References

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

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

[1] Void.

[2] Void.

[2a] 3GPP TR 21.905 "Vocabulary for 3GPP Specifications"

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

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

[5] 3GPP TS 42.009: "Security aspects".

[5a] 3GPP TS 33.102: "3G security; Security architecture".

[6] 3GPP TS 22.011: "Service accessibility".

[7] 3GPP TS 42.017: "Subscriber Identity Modules (SIM); Functional characteristics".

[8] 3GPP TS 22.101: "Service aspects; Service principles".

[8a] 3GPP TS 22.001: "Principles of circuit telecommunication services supported by a Public Land Mobile Network (PLMN)".

[8b] 3GPP TS 23.038: "Alphabets and language-specific information".

[9] 3GPP TS 23.101: "General UMTS Architecture".

[9a] 3GPP TS 23.108: "Mobile radio interface layer 3 specification core network protocols; Stage 2 (structured procedures)".

[10] 3GPP TS 23.003: "Numbering, addressing and identification".

[11] 3GPP TS 43.013: "Discontinuous Reception (DRX) in the GSM system".

[12] 3GPP TS 23.014: "Support of Dual Tone Multi-Frequency (DTMF) signalling".

[12a] Void.

[13] 3GPP TS 43.020: "Security-related network functions".

[14] 3GPP TS 23.122: "Non-Access-Stratum functions related to Mobile Station (MS) in idle mode".

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

[16] 3GPP TS 44.003: "Mobile Station - Base Station System (MS - BSS) interface; Channel structures and access capabilities".

[17] 3GPP TS 44.004: "Layer 1; General requirements".

[18] 3GPP TS 44.005: "Data Link (DL) layer; General aspects".

[19] 3GPP TS 44.006: "Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) layer specification".

[19a] 3GPP TS 25.321: "Medium Access Control (MAC) protocol specification".

[19b] 3GPP TS 25.322: "Radio Link Control (RLC) protocol specification".

[19c] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".

[20] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".

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

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

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

[23a] 3GPP TS 44.071: "Location Services (LCS); Mobile radio interface layer 3 specification."

[23b] 3GPP TS 44.031 "Location Services LCS); Mobile Station (MS) - Serving Mobile Location Centre (SMLC); Radio Resource LCS Protocol (RRLP)".

[23c] 3GPP TS 25.331: "Radio Resource Control (RRC) protocol specification"

[24] 3GPP TS 24.080: "Mobile radio Layer 3 supplementary service specification; Formats and coding".

[25] 3GPP TS 24.081: "Line identification supplementary services; Stage 3".

[26] 3GPP TS 24.082: "Call Forwarding (CF) supplementary services; Stage 3".

[27] 3GPP TS 24.083: "Call Waiting (CW) and Call Hold (HOLD) supplementary services; Stage 3".

[28] 3GPP TS 24.084: "MultiParty (MPTY) supplementary services; Stage 3".

[29] 3GPP TS 24.085: "Closed User Group (CUG) supplementary services; Stage 3".

[30] 3GPP TS 24.086: "Advice of Charge (AoC) supplementary services; Stage 3".

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

[32] 3GPP TS 45.002: "Multiplexing and multiple access on the radio path".

[33] 3GPP TS 45.005: "Radio transmission and reception".

[34] 3GPP TS 45.008: "Radio subsystem link control".

[35] 3GPP TS 45.010: "Radio subsystem synchronization".

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

[36a] 3GPP TS 27.060: "Mobile Station (MS) supporting Packet Switched Services ".

[37] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

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

[39] 3GPP TS 51.010: "Mobile Station (MS) conformance specification".

[40] 3GPP TS 51.021: "GSM radio aspects base station system equipment specification".

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

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

[43] ISO 8348 (1987): "Information technology -- Open Systems Interconnection -- Network Service Definition".

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

[45] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

[46] ITU-T Recommendation E.212: "The international identification plan for mobile terminals and mobile users".

[47] ITU-T Recommendation F.69 (1993): "The international telex service - Service and operational provisions of telex destination codes and telex network identification codes".

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

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

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

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

[52] ITU-T Recommendation T.50: "International Reference Alphabet (IRA) (Formerly International Alphabet No. 5 or IA5) - Information technology - 7-bit coded character set for information interchange".

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

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

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

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

[57] Void.

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

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

[60] ITU-T Recommendation V.110: "Support by an ISDN of data terminal equipments with V-Series type interfaces".

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

[62] ITU-T Recommendation X.21: "Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for synchronous operation on public data networks".

[63] Void.

[64] Void.

[65] ITU-T Recommendation X.30: "Support of X.21, X.21 bis and X.20 bis based Data Terminal Equipments (DTEs) by an Integrated Services Digital Network (ISDN)".

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

[67] Void.

[68] Void.

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

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

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

[72] ISO/IEC 10646: "Information technology -- Universal Multiple-Octet Coded Character Set (UCS)".

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

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

[75] 3GPP TS 43.064: "General Packet Radio Service (GPRS); Overall description of the GPRS radio interface; Stage 2".

[76] 3GPP TS 44.060: "General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol".

[77] IETF RFC 1034: "Domain names - concepts and facilities".

[78] 3GPP TS 44.065: "Mobile Station (MS) - Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDCP)".

[78a] 3GPP TS 44.064: "Mobile Station - Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) Layer Specification".

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

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

[81] 3GPP TS 23.107: "Quality of Service (QoS) concept and architecture".

[82] 3GPP TS 43.022: "Functions related to Mobile Station (MS) in idle mode and group receive mode".

[83] 3GPP TS 26.103: "Speech Codec List for GSM and UMTS".

[84] 3GPP TS 44.018: "Mobile radio interface layer 3 specification, Radio Resource Control Protocol".

[85] 3GPP TS 48.008: "Mobile-services Switching Centre – Base Station System (MSC – BSS) interface; layer 3 specification".

[86] 3GPP TS 48.018: "General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".

[87] 3GPP TS 43.055: "Dual Transfer Mode (DTM); Stage 2".

[88] 3GPP TS 23.067: "enhanced Multi-Level Precedence and Pre-emption service (eMLPP); Stage 2".

[88a] 3GPP TS 23.093: "Technical realization of Completion of Calls to Busy Subscriber (CCBS); Stage 2".

[89] 3GPP TS 22.042: "Network Identity and Time Zone (NITZ), Stage 1".

[90] 3GPP TS 23.040: "Technical realization of Short Message Service (SMS)".

[91] 3GPP TS 44.056: "GSM Cordless Telephony System (CTS), (Phase 1) CTS Radio Interface Layer 3 Specification".

[92] 3GPP TS 23.226: "Global Text Telephony; Stage 2 "

[93] 3GPP TS 26.226: "Cellular Text Telephone Modem (CTM), General Description "

[94] 3GPP TS 23.236: "Intra Domain Connection of RAN Nodes to Multiple CN Nodes"

[95] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP"

[96] 3GPP TS 23.205: "Bearer-independent circuit-switched core network; Stage 2".

[97] 3GPP TS 23.172: "UDI/RDI Fallback and Service Modification; Stage 2".

[98] 3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode"

[99] RFC 3513 (April 2003): "Internet Protocol Version 6 (IPv6) Addressing Architecture".

[100] 3GPP TS 29.207: "Policy control over Go interface".

[101] 3GPP TS 21.111: "USIM and IC card requirements".

[102] RFC 1661 (July 1994): "The Point-to-Point Protocol (PPP)".

[103] RFC 3232 (January 2002): "Assigned Numbers: RFC 1700 is Replaced by an On-line Database".

[104] 3GPP TS 23.034: "High Speed Circuit Switched Data (HSCSD) – Stage 2".

[105] 3GPP TS 23.271: "Functional stage 2 description of LCS".

[X] 3GPP TS 23.251: "Network Sharing; Architecture and Functional Description".

********** **End of the change before the First Change** **********

********** **First Change** **********

4.4.1 Location updating procedure

The location updating procedure is a general procedure which is used for the following purposes:

- normal location updating (described in this subclause);
- periodic updating (see subclause 4.4.2);
- IMSI attach (see subclause 4.4.3).

The normal location updating procedure is used to update the registration of the actual Location Area of a mobile station in the network. The location updating type information element in the LOCATION UPDATING REQUEST message shall indicate normal location updating. The conditions under which the normal location updating procedure is used by a mobile station in the MM IDLE state are defined for each service state in subclause 4.2.2.

Only applicable for mobile stations supporting VGCS listening or VBS listening: A mobile station in RR group receive mode is in the MM IDLE state, substate RECEIVING GROUP CALL (NORMAL SERVICE) or RECEIVING GROUP CALL (LIMITED SERVICE). To perform a location updating, the MS in RR group receive mode shall leave the group receive mode, establish an independent dedicated RR connection to perform the location updating as described above and return to the RR group receive mode afterwards.

The normal location updating procedure shall also be started if the network indicates that the mobile station is unknown in the VLR as a response to MM connection establishment request.

To limit the number of location updating attempts made, where location updating is unsuccessful, an attempt counter is used. The attempt counter is reset when a mobile station is switched on or a SIM/USIM card is inserted.

Upon successful location updating the mobile station sets the update status to UPDATED in the SIM/USIM, and stores the ~~received~~ Location Area Identification received in the LOCATION UPDATING ACCEPT message in the SIM/USIM. The attempt counter shall be reset.

The detailed handling of the attempt counter is described in subclauses 4.4.4.6 to 4.4.4.9.

The Mobile Equipment shall contain a list of "forbidden location areas for roaming", as well as a list of "forbidden location areas for regional provision of service". These lists shall be erased when the MS is switched off or when the SIM/USIM is removed, and periodically (with period in the range 12 to 24 hours). The location area identification received on the BCCH that triggered the location updating request shall be added to the suitable list whenever a location update reject message is received with the cause "Roaming not allowed in this location area" or with the cause "Location Area not allowed". The lists shall accommodate each 10 or more location area identifications. When the list is full and a new entry has to be inserted, the oldest entry shall be deleted.

The Mobile Equipment shall store a list of "equivalent PLMNs". This list is replaced or deleted at the end of each location update procedure, routing area update procedure and GPRS attach procedure. The stored list consists of a list of equivalent PLMNs as downloaded by the network plus the PLMN code of the registered~~network~~ PLMN that downloaded the list. The stored list shall not be deleted when the MS is switched off. The stored list shall be deleted if the SIM/USIM is removed. The maximum number of possible entries in the stored list is 16.

The cell selection processes in the different states are described in 3GPP TS 43.022 [82] and 3GPP TS 45.008 [34].

The location updating procedure is always initiated by the mobile station.

In the case that the mobile station is initiating an emergency call but, due to cell re-selection or redirection by the network, it moves to a different LAI then the mobile station may delay the location updating procedure in the new LA until after the emergency call is completed.

********** **Next Change** **********

4.4.4.6 Location updating accepted by the network

If the location updating is accepted by the network a LOCATION UPDATING ACCEPT message is transferred to the mobile station.

In case the identity confidentiality service is active (see subclauses 4.3.1 and 4.4.4.4), the TMSI reallocation may be part of the location updating procedure. The TMSI allocated is then contained in the LOCATION UPDATING ACCEPT message together with the location area identifier LAI. The network shall in this case start the supervision timer T3250 as described in subclause 4.3.1.

In a shared network, the network shall indicate in the LAI the PLMN identity of the CN operator that has accepted the location updating (see 3GPP TS 23.251 [x]).

If the network wishes to prolong the RR connection to allow the mobile station to initiate MM connection establishment (for example if the mobile station has indicated in the LOCATION UPDATING REQUEST that it has a follow-on request pending) the network shall send "follow on proceed" in the LOCATION UPDATING ACCEPT and start timer T3255.

The mobile station receiving a LOCATION UPDATING ACCEPT message shall store the received location area identification LAI, stop timer T3210, reset the attempt counter and set the update status in the SIM/USIM to UPDATED. If the message contains an IMSI, the mobile station is not allocated any TMSI, and shall delete any TMSI in the SIM/USIM accordingly. If the message contains a TMSI, the mobile station is allocated this TMSI, and shall store this TMSI in the SIM/USIM and a TMSI REALLOCATION COMPLETE shall be returned to the network. If neither IMSI nor TMSI is received in the LOCATION UPDATING ACCEPT message, the old TMSI if any available shall be kept.

If the LAI or PLMN identity contained in the LOCATION UPDATING ACCEPT message is a member of any of the "forbidden lists" then any such entries shall be deleted.

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

After that, the mobile station shall act according to the presence of the "Follow-on proceed" information element in the LOCATION UPDATING ACCEPT; if this element is present and the mobile station has a CM application request pending, it shall send a CM SERVICE REQUEST to the network and proceed as in subclause 4.5.1.1. Otherwise, it shall start timer T3240 and enter state WAIT FOR NETWORK COMMAND.

Furthermore, the network may grant authorisation for the mobile station to use GSM-Cordless Telephony System (CTS) in the Location Area and its immediate neighbourhood. The mobile should memorise this permission in non-volatile memory. If the "CTS permission" IE is not present in the message, the mobile is not authorised to use GSM-CTS, and shall accordingly delete any memorised permission.

NOTE 1: the interaction between CTS and GPRS procedures are not yet defined.

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

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

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

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

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

********** Next Change **********

4.7.3.1.3 GPRS attach accepted by the network

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

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

In a shared network, the network shall indicate the PLMN identity of the CN operator that has accepted the GPRS attach request in the RAI contained in the ATTACH ACCEPT message (see 3GPP TS 23.251 [x]).

In GSM, the Cell Notification information element shall be included in the ATTACH ACCEPT message by the network which indicates that the Cell Notification is supported by the network.

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

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

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

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

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

After that in UMTS, if the mobile station has indicated follow-on request pending and has a CM application request pending, it shall send an appropriate message (for example ACTIVATE PDP CONTEXT REQUEST) to the network.

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

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

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

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

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

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

********** Next Change **********

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

If the routing area updating request has been accepted by the network, a ROUTING AREA UPDATE ACCEPT message shall be sent to the MS. The network may assign a new P-TMSI and/or a new P-TMSI signature for the MS. If a new P-TMSI and/or P-TMSI signature have been assigned to the MS, it/they shall be included in the ROUTING AREA UPDATE ACCEPT message together with the routing area identification.

In a shared network the network shall indicate the PLMN identity of the CN operator that has accepted the routing area updating request in the RAI contained in the ROUTING AREA UPDATE ACCEPT message (see 3GPP TS 23.251 [x]).

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

In GSM the Cell Notification information element shall be included in the ROUTING AREA UPDATE ACCEPT message in order to indicate the ability of the network to support the Cell Notification.

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

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

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

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

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

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

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

In GSM, if the ROUTING AREA UPDATE ACCEPT message contains the Cell Notification information element, then the MS shall start to use the LLC NULL frame to perform cell updates.

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

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

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

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

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

After that in UMTS, if the mobile station has indicated follow-on request pending and has a CM application request pending, it shall send an appropriate message (for example ACTIVATE PDP CONTEXT REQUEST) to the network.

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

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

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

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

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

********** End of Changes **********

3GPP TSG-CN1 Meeting #35
Sophia Antipolis, France, 16-20 August 2004

Tdoc N1-041645
(Revision of N1-041545, N1-041638)

CR-Form-v7.1

CHANGE REQUEST

⌘ **24.007** **CR** **067** ⌘ **rev** **4** ⌘ Current version: **6.1.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Sequence number handling during redirection in MOCN sharing scenario
Source:	⌘	TeliaSonera
Work item code:	⌘	NTShar
Date:	⌘	14/07/2004
Category:	⌘	**B**
Release:	⌘	Rel-6

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:
Ph2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*
Rel-7 *(Release 7)*

Reason for change: ⌘ When a UE performs an initial access to a shared network, one of available CN operators shall be selected to serve the UE. For Network Sharing non-supporting UEs, the shared network selects an operator from the available CN operators. In the MOCN network sharing scenario, a redirection to another CN operator may be required for these UEs until an operator is found that can serve the UE. The redirection is handled between the RAN and the CN nodes, which is transparent to the UE. And for each CN node, the redirected registration request is considered as a completely new registration. Therefore, when one CN node can't serve the UE and redirects the UE to another CN via the RAN, the second CN node could errorneously discard a layer 3 message from the UE, which is considered duplicated since the state of protocol machines are not synchronised between the UE and the second CN node.

Summary of change: ⌘ A paragragh is added to describe the sequence number handling during redirection in a MOCN. When one CN node can't serve a UE and redirects the UE to another CN via the RAN, the CN node shall forward to the second CN node the current value of N(SD) so that the second CN node can configue the send sequence counter using the received N(SD).

Also, the CN node of the CN operator that received the value of N(SD) during the redirection procedure must check if this N(SD) is identical with the send sequence number of first layer 3 message received from the UE. Otherwise, no duplication has occurred.

Inserted references to TS23.251 and TS25.413. Also the MOCN is added in the abbreviation.

Consequences if not approved:	⌘	The CN node could errorneously discard a message from the UE.

Clauses affected:	⌘	2, 3, 11.2.3.2.3, 11.2.3.2.3.2.2				
		Y	**N**			
Other specs Affected:	⌘	**X**		Other core specifications	⌘	TS 25.413
			X	Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

How to create CRs using this form:

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

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

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

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

********** One change before First Change **********

2 References

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

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

[1] GSM 01.02(R97): "Digital cellular telecommunications system (Phase 2+); General description of a GSM Public Land Mobile Network (PLMN)".

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

[2] 3GPP TS 23.101: "General UMTS Architecture".

[3] 3GPP TS 44.001: "Mobile Station - Base Station System (MS - BSS) interface; General aspects and principles".

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

[3b] GSM 03.56(R98): "Digital cellular telecommunications system (Phase 2+); GSM Cordless Telephony System (CTS), Phase 1; CTS Architecture Description; Stage 2".

[3c] 3GPP TS 23.271: "Functional stage 2 description of location services".

[4] 3GPP TS 44.005: "Data Link (DL) layer; General aspects".

[5] 3GPP TS 44.006: "Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) layer specification".

[5a] 3GPP TS 44.014: "Individual equipment type requirements and interworking; Special conformance testing functions".

[6] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification Core Network Protocols-Stage 3".

[6a] 3GPP TS 23.108: "Mobile radio interface Layer 3 specification Core Network Protocols Stage 2 (structured procedures)".

[6b] 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol".

[7] 3GPP TS 24.010: "Mobile radio interface Layer 3; Supplementary services specification; General aspects".

[8] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[8a] 3GPP TS 44.071: "Location Services (LCS); Mobile radio interface layer 3 LCS specification".

[9] 3GPP TS 24.080: "Mobile radio Layer 3 supplementary services specification; Formats and coding".

[10] 3GPP TS 24.081: "Line identification supplementary services; Stage 3".

[10a] 3GPP TS 44.060: "General Packet Radio Services (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol".

[10b] 3GPP TS 44.056: "GSM Cordless Telephony System (CTS), phase 1; CTS radio interface Layer 3 specification".

[11] 3GPP TS 24.082: "Call Forwarding (CF) supplementary services - Stage 3".

[11a] 3GPP TS 44.064: "General Packet Radio Service (GPRS); Mobile Station - Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) layer specification".

[12] 3GPP TS 24.083: "Call Waiting (CW) and Call Hold (HOLD) supplementary services; Stage 3".

[12a] 3GPP TS 44.065: "General Packet Radio Service (GPRS); Mobile Station (MS) - Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDCP)".

[13] 3GPP TS 24.084: "MultiParty (MPTY) supplementary services; Stage 3".

[14] 3GPP TS 24.085: "Closed User Group (CUG) supplementary services; Stage 3".

[15] 3GPP TS 24.086: "Advice of Charge (AoC) supplementary services; Stage 3".

[16] 3GPP TS 24.088: "Call Barring (CB) supplementary services; Stage 3".

[17] 3GPP TS 24.090: "Unstructured Supplementary Service Data (USSD) - Stage 3".

[17a] 3GPP TS 34.109: "Terminal logical test interface; Special conformance testing functions".

[18] ITU-T Recommendation X.200: "Information technology - Open Systems Interconnection - Basic Reference Model: The basic model".

[19] 3GPP TS 44.068: "Group Call Control (GCC) Protocol".

[20] 3GPP TS 23.110: "UMTS Access Stratum Services and Functions".

[21] 3GPP TS 24.030: "Location Services (LCS); Supplementary service operations – Stage 3".

[x] 3GPP TS 23.251: "Network Sharing; Architecture and functional description".

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

3 Abbreviations

For the purposes of the present document, the abbreviations defined in 3GPP TR 21.905 [1a] and the following apply:

GMM	GPRS Mobility Management
MNS	Mobile Network Signalling
N-PDU	Network-Protocol Data Unit
SM	Session Management
UDT	User Data Transfer
CTS	Cordless Telephony System
LCS	LoCation Services
MOCN	Multi-Operator Core Network

********** end of the change before the First Change **********

********** First Change **********

11.2.3.2.3 Sequenced message transfer operation

Upper layer messages sent using the RR sub-layer transport service from the mobile station to the network can be duplicated by the data link layer in at least the following cases:

- in A/Gb mode, when a channel change of dedicated channels is required (assignment or handover procedure) and the last layer 2 frame has not been acknowledged by the peer data link layer before the mobile station leaves the old channel;
- in Iu mode, when an RLC re-establishment occurs (e.g. due to relocation) and the RLC layer has not acknowledged the last one or more RLC PDUs before RLC re-establishment;
- an inter-system change from Iu mode to A/Gb mode is performed and the RLC layer has not acknowledged the last one or more RLC PDUs;
- an inter-system change from A/Gb mode to Iu mode is performed and the the last layer 2 frame in A/Gb mode has not been acknowledged by the peer data link layer before the mobile station leaves the old channel.

In these cases, the mobile station does not know whether the network has received the messages correctly. Therefore, the mobile station has to send the messages again when the channel change is completed.

The network must be able to detect the duplicated received messages. Therefore, each concerned upper layer messages must be marked with a send sequence number.

To allow for different termination points in the infrastructure of the messages of different PDs, the sequence numbering is specific to each PD. For historical reasons, an exception is that messages sent with the CC, SS and MM PDs share the same sequence numbering. In the following, the phrase **upper layer message flow** refers to a flow of messages sharing the same sequence numbering. The different upper layer flows are MM+CC+SS, GCC, BCC and LCS. The GMM, SM, SMS and TC (Test Control, see 3GPP TS 44.014 [5a] and 3GPP TS 34.109 [17a]) protocols do not use layer 3 sequence numbering.

In a shared network with a MOCN configuration, Network Sharing non-supporting UEs can be redirected between CN operators (see 3GPP TS 23.251 [x]). When the redirection takes place, the CN node of the redirecting CN operator shall forward via the RAN the value of N(SD) of the last message received on the MM+CC+SS message flow to the CN node of the next CN operator (3GPP TS 25.413 [y]).

11.2.3.2.3.1 Variables and sequence numbers

11.2.3.2.3.1.1 Send state variable V(SD)

The mobile station shall have one associated send state variable V(SD) ("Send Duplicated") for each upper layer message flow. The send state variable denotes the sequence number of the next in sequence numbered message in the flow to be transmitted. The value of the corresponding send state variable shall be incremented by one with each numbered message transmission.

For the MM+CC+SS upper layer message flow, when the RR connection starts with a core network of release 98 or earlier, arithmetic operations on V(SD) are performed modulo 2. When the RR connection starts with a core network of Release 99 or later, arithmetic operations on V(SD) are performed modulo 4. The mobile station shall keep using the same modulo (2 or 4) for the duration of the RR connection.

For the GCC, BCC, and LCS upper layer message flows, arithmetic operations on V(SD) are performed modulo 2.

NOTE: In GSM, the release supported by the core network is indicated in the MSCR bit and in the SGSNR bit in the system information broadcast (see 3GPP TS 44.018 [6b] and 3GPP TS 44.060 [10a]).

11.2.3.2.3.1.2 Send sequence number N(SD)

At the time when such a message to be numbered is designated for transmission, the value of N(SD) for the message to be transferred is set equal to the value of the send state variable V(SD).

********** Second Change **********

11.2.3.2.3.2 Procedures for the initiation, transfer execution and termination of the sequenced message transfer operation

11.2.3.2.3.2.1 Initiation

The sequenced message transfer operation is initiated by establishing a RR connection. The send state variables V(SD) are set to 0.

11.2.3.2.3.2.2 Transfer Execution

The core network shall~~must~~ compare the send sequence numbers of pairs of subsequent messages in the same upper layer messages flow.

For the GCC, BCC, and LCS upper layer message flows, in case the send sequence numbers of two subsequent messages in a flow are not identical, no duplication has occurred. In case the send sequence numbers are identical, the network must ignore the second one of the received messages.

For the MM+CC+SS upper layer message flow:

- when accessed by a release 98 or earlier mobile station, in case the send sequence numbers of two subsequent messages in the flow are identical, the core network shall discard the second one of the received messages;

- when accessed by a release 99 or later mobile station, the core network shall discard any message whose N(SD) is not the increment by one (modulo 4) of~~than~~ the N(SD) of the last accepted message.

NOTE: The release supported by the mobile station is indicated by the revision level in *the Mobile Station Classmark 1* or *Mobile Station Classmark 2* information element, or by the revision level indicator in the *MS network capability* information element (see 3GPP TS 24.008, subclause 10.5).

In a shared network with a MOCN configuration, the core network node to which the mobile station was redirected shall compare the send sequence number of the first message received after the redirection in the MM+CC+SS message flow with the value of N(SD) received during the redirection procedure (see 3GPP TS 23.251 [x]):

- when accessed by a release 98 or earlier mobile station, if the two send sequence numbers are identical, the core network shall discard the received message from the mobile station;

- when accessed by a release 99 or later mobile station, the core network shall discard any message whose N(SD) is not the increment by one (modulo 4) of the N(SD) received during the redirection procedure.

11.2.3.2.3.2.3 Termination

The sequenced message transfer operation is terminated by the RR connection release procedure.

Inter system change from A/Gb mode to Iu mode or from Iu mode to A/Gb mode shall not terminate the sequenced message transfer. UMTS SRNC relocation shall not terminate the sequenced message transfer.

********** End of Change **********