3GPP TSG-CN Meeting #26 **NP-040513**
8th – 10th December 2004. Athens, Greece.

Source: **TSG CN WG1**

Title: **CRs to Rel-6 WI "NTShar" for TS 23.122 and TS 24.008**

Agenda item: **9.19**

Document for: **APPROVAL**

This document contains **3 CRs on Rel-6 Work Item "NTShar"**, that have been agreed by TSG CN WG1 CN#36 meeting and forwarded to TSG CN Plenary meeting #26 for approval.

TDoc #	Tdoc Title	Spec	CR #	Rev	CAT	C_Ver	WI	Rel
N1-042118	Clarifiaction of PLMN selection in shared networks	23.122	086	1	B	6.2.0	NTShar	Rel-6
N1-042004	Location registration in a shared network when multiple PLMNs are broadcast	24.008	926	2	B	6.6.0	NTShar	Rel-6
N1-042005	Reject cause ranking during rerouting in MOCN	24.008	927	1	B	6.6.0	NTShar	Rel-6

3GPP TSG-CN1 Meeting #36
Seoul, Korea, 15-19 November 2004

Tdoc N1-042004
Revision of N1-041953

CR-Form-v7.1

CHANGE REQUEST

⌘ **24.008** **CR** **926** ⌘**rev** **2** ⌘ Current version: **6.6.0** ⌘

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

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

Title:	⌘	Location registration in a shared network when multiple PLMNs are broadcast
Source:	⌘	TeliaSonera
Work item code:	⌘	NTShar
Date:	⌘	14/09/2004
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:	⌘	In a shared network, when multiple PLMNs are broadcast, the LR handling for the network sharing supporting UEs needs to be specified, e.g. when to initiate the LR request and how to handle the case that the LR request is rejected.
Summary of change:	⌘	When multiple PLMNs are broadcast, the network sharing supporting UE shall select one of the PLMNs according to 23.122 and then register on the chosen PLMN if required. Whenever a LR reject message with the cause “PLMN not allowed” is received, the chosen PLMN code shall be stored in the “forbidden PLMN” list. Whenever a LR reject message is received with the cause "Roaming not allowed in this location area" or "Location Area not allowed" or "No suitable cells in Location Area" the LAI/RAI which triggered the LR request shall be stored in the suitable list. Addition of definition of in a shared network in section 2.2.2
Consequences if not approved:	⌘	Incomplete specification on Network Sharing.

Clauses affected:	⌘	2.2.2, 4.4.1, 4.4.3, 4.7.1.8, 4.7.3, 4.7.5

	Y	N			
Other specs Affected:	X		Other core specifications	⌘	TS 23.122 CR 086
		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.

********** The change before First Change **********

2.2.2 Vocabulary

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

- A **GSM security context** is established and stored in the MS and the network as a result of a successful execution of a GSM authentication challenge. The GSM security context consists of the GSM ciphering key and the ciphering key sequence number.

- A **UMTS security context** is established and stored in the MS and the network as a result of a successful execution of a UMTS authentication challenge. The UMTS security context consists of the UMTS ciphering key, the UMTS integrity key, the GSM ciphering key and the cipher key sequence number.

- **idle mode:** In this mode, the mobile station is not allocated any dedicated channel; it listens to the CCCH and the BCCH;

- **group receive mode:** (only applicable for mobile stations supporting VGCS listening or VBS listening) In this mode, the mobile station is not allocated a dedicated channel with the network; it listens to the downlink of a voice broadcast channel or voice group call channel allocated to the cell. Occasionally, the mobile station has to listen to the BCCH of the serving cell as defined in 3GPP TS 43.022 [82] and 3GPP TS 45.008 [34];

- **dedicated mode:** In this mode, the mobile station is allocated at least two dedicated channels, only one of them being a SACCH;

- **group transmit mode:** (only applicable for mobile stations supporting VGCS talking) In this mode, one mobile station of a voice group call is allocated two dedicated channels, one of them being a SACCH. These channels can be allocated to one mobile station at a time but to different mobile stations during the voice group call;

- **packet idle mode**: (only applicable for mobile stations supporting GPRS) In this mode, mobile station is not allocated any radio resource on a packet data physical channel; it listens to the PBCCH and PCCCH or, if those are not provided by the network, to the BCCH and the CCCH, see 3GPP TS 44.060 [76].

- **packet transfer mode**: (only applicable for mobile stations supporting GPRS) In this mode, the mobile station is allocated radio resource on one or more packet data physical channels for the transfer of LLC PDUs.

- **main DCCH:** In Dedicated mode and group transmit mode, only two channels are used as DCCH, one being a SACCH, the other being a SDCCH or a FACCH; the SDCCH or FACCH is called here "the main DCCH";

- A channel is **activated** if it can be used for transmission, in particular for signalling, at least with UI frames. On the SACCH, whenever activated, it must be ensured that a contiguous stream of layer 2 frames is sent;

- A TCH is **connected** if circuit mode user data can be transferred. A TCH cannot be connected if it is not activated. A TCH which is activated but not connected is used only for signalling, i.e. as a DCCH;

- The data link of SAPI 0 on the main DCCH is called the **main signalling link**. Any message specified to be sent on the main signalling link is sent in acknowledged mode except when otherwise specified;

- The term **"to establish"** a link is a short form for **"to establish the multiframe mode"** on that data link. It is possible to send UI frames on a data link even if it is not established as soon as the corresponding channel is activated. Except when otherwise indicated, a data link layer establishment is done without an information field.

- **"channel set"** is used to identify TCHs that carry related user information flows, e.g., in a multislot configuration used to support circuit switched connection(s), which therefore need to be handled together.

- A **temporary block flow** (TBF) is a physical connection used by the two RR peer entities to support the uni-directional transfer of LLC PDUs on packet data physical channels, see 3GPP TS 44.060 [76].

- **RLC/MAC block:** A RLC/MAC block is the protocol data unit exchanged between RLC/MAC entities, see 3GPP TS 44.060 [76].

- A **GMM context** is established when a GPRS attach procedure is successfully completed.

- **Network operation mode**

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

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

- **GPRS MS operation mode**

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

- **RR connection:** A RR connection is a dedicated physical circuit switched domain connection used by the two RR or RRC peer entities to support the upper layers' exchange of information flows.
- **PS signalling connection** is a peer to peer UMTS connection between MS and CN packet domain node.
- **Inter-System change** is a change of radio access between different radio access technologies such as GSM and UMTS.
- **GPRS:** Packet Services for GSM and UMTS system.
- The label **(GSM only)** indicates this section or paragraph applies only to GSM system. For multi system case this is determined by the current serving radio access network.
- The label **(UMTS only)** indicates this section or paragraph applies only to UMTS system. For multi system case this is determined by the current serving radio access network.
- **In GSM,...** Indicates this paragraph applies only to GSM System. For multi system case this is determined by the current serving radio access network.
- **In UMTS,...** Indicates this paragraph applies only to UMTS System. For multi system case this is determined by the current serving radio access network.
- **In a shared network,...** Indicates this paragraph applies only to a shared network. For the definition of shared network see 3GPP TS 23.122 [14].
- **SIM,** Subscriber Identity Module (see 3GPP TS 42.017 [7]).
- **USIM,** Universal Subscriber Identity Module (see 3GPP TS 21.111 [101]).
- **MS,** Mobile Station. The present document makes no distinction between MS and UE.
- **Cell Notification** is an (optimised) variant of the Cell Update Procedure which uses the LLC NULL frame for cell change notification which does not trigger the restart of the READY timer
- **DTM:** dual transfer mode, see 3GPP TS 44.018 [84] and 3GPP TS 43.055 [87]

********** 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 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.

In a shared network, the MS shall choose one of the PLMN identities as specified in 3GPP TS 23.122 [14]. The MS shall construct the Location Area Identification of the cell from this chosen PLMN identity and the LAC received on the BCCH. If the constructed LAI is different from the stored LAI, the MS shall initiate the location updating procedure. The chosen PLMN identity shall be indicated to the RAN in the RRC INITIAL DIRECT TRANSFER message (see 3GPP TS 25.331 [23c]). Whenever a LOCATION UPDATING REJECT message with the cause "PLMN not allowed" is received by the MS, the PLMN identity used to construct the LAI which triggered the location updating procedure shall be stored in the "forbidden PLMN list". Whenever a LOCATION UPDATING REJECT message is received by the MS with the cause "Roaming not allowed in this location area", "Location Area not allowed", or "No suitable cells in Location Area", the constructed LAI which triggered the location updating procedure shall be stored in the suitable list.

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 registeredPLMN 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** **********

4.4.3 IMSI attach procedure

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

In GSM, a flag (ATT) is broadcast in the L3-RR SYSTEM INFORMATION TYPE 3 message. It indicates whether the attach and detach procedures are required to be used or not.

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

The IMSI attach procedure is invoked if the detach/attach procedures are required by the network and an IMSI is activated in a mobile station (i.e. activation of a mobile station with plug-in SIM/USIM, insertion of a card in a card-operated mobile station etc.) within coverage area from the network or a mobile station with an IMSI activated outside the coverage area enters the coverage area. The IMSI attach procedure is used only if the update status is UPDATED and if the stored Location Area Identification is the same as the one which is actually broadcasted on the BCCH of the current serving cell. In a shared network, the MS shall choose one of the PLMN identities as specified in 3GPP TS 23.122 [14]. The MS shall use the IMSI attach procedure only if the update status is UPDATED and the stored Location Area Identification is equal to the combination of the chosen PLMN identity and the LAC received on the BCCH. Otherwise a normal location updating procedure (see subclause 4.4.1) is invoked independently of the ATT flag indication.

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

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

4.7.1.8 List of forbidden PLMNs for GPRS service

The Mobile Equipment shall contain a list of "forbidden PLMNs for GPRS service". This list~~s~~ shall be erased when the MS is switched off or when the SIM/USIM is removed. The PLMN identification received on the BCCH shall be added to the list whenever a GPRS attach~~, GPRS detach~~ or routing area update is rejected by the network with the cause "GPRS services not allowed in this PLMN" or whenever a GPRS detach is initiated by the network with the cause "GPRS services not allowed in this PLMN".

In a shared network, the MS shall choose one of the PLMN identities as specified in 3GPP TS 23.122 [14]. The PLMN identity chosen for a GPRS attach procedure, or the PLMN identity used to construct the RAI that triggered the routing area updating procedure shall be added to the list of "forbidden PLMNs for GPRS service" whenever such a procedure is rejected by the network with the cause "GPRS services not allowed in this PLMN". Whenever a GPRS detach is initiated by the network with the cause "GPRS services not allowed in this PLMN", the chosen PLMN identity shall be added to the list of "forbidden PLMNs for GPRS service".

The maximum number of possible entries in this list is implementation depende~~a~~nt, but must be at least one entry. When the list is full and a new entry has to be inserted, the oldest entry shall be deleted.

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

4.7.3 GPRS attach procedure

The GPRS attach procedure is used for two purposes:

- normal GPRS attach, performed by the MS to IMSI attach for GPRS services only. The normal GPRS attach procedure shall be used by GPRS MSs in MS operation mode C, independent of the network operation mode. It shall also be used by GPRS MSs in MS operation modes A or B if the network operates in network operation mode II or III;

- combined GPRS attach procedure, used by GPRS MSs in MS operation modes A or B to attach the IMSI for GPRS and non-GPRS services provided that the network operates in network operation mode I.

With a successful GPRS attach procedure a GMM context is established.

Subclause 4.7.3.1 describes the GPRS attach procedure to attach the IMSI only for GPRS services. The combined GPRS attach procedure used to attach the IMSI for both GPRS and non-GPRS services is described in subclause 4.7.3.2.

If an IMSI attach for non-GPRS services is requested and a GMM context exists, the routing area updating procedure shall be used as described in subclause 4.7.5.2.

To limit the number of subsequently rejected attach attempts, a GPRS attach attempt counter is introduced. The GPRS attach attempt counter shall be incremented as specified in subclause 4.7.3.1.5. Depending on the value of the GPRS attempt counter, specific actions shall be performed. The GPRS attach attempt counter shall be reset when:

- the MS is powered on;
- a SIM/USIM is inserted;
- a GPRS attach procedure is successfully completed;
- a combined GPRS attach procedure is completed for GPRS services only with cause #2, #16, #17 or #22; or
- a GPRS attach procedure is completed with cause #11, #12, #13 or #15,

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

- expiry of timer T3302;
- a new routing area is entered; or
- an attach is triggered by CM sublayer requests.

The mobile equipment shall contain a list of "forbidden location areas for roaming", as well as a list of "forbidden location areas for regional provision of service". The handling of these lists is described in subclause 4.4.1; the same lists are used by GMM and MM procedures.

The Mobile Equipment shall contain a list of "equivalent PLMNs". The handling of this list is described in subclause 4.4.1, the same list is used by GMM and MM procedures.

In a shared network, the MS shall choose one of the PLMN identities as specified in 3GPP TS 23.122 [14]. The MS shall construct the Routing Area Identification of the cell from this chosen PLMN identity, and the LAC and the RAC received on the BCCH. The chosen PLMN identity shall be indicated to the RAN in the RRC INITIAL DIRECT TRANSFER message (see 3GPP TS 25.331 [23c]). Whenever an ATTACH REJECT message with the cause "PLMN not allowed" is received by the MS, the chosen PLMN indentity shall be stored in the "forbidden PLMN list". Whenever an ATTACH REJECT message is received by the MS with the cause "Roaming not allowed in this location area", "Location Area not allowed", or "No suitable cells in Location Area", the constructed RAI shall be stored in the suitable list.

The network informs the MS about the support of specific features, such as LCS-MOLR, in the “Network feature support” Information Element. The information is either explicitly given by sending the “Network feature support” IE or implicitly by not sending it. The handling in the network is described in subclause 9.4.2.9. The MS may use the indication to inform the user about the availability of the appropriate services and it shall not request services that have not been indicated as available.

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

4.7.5 Routing area updating procedure

This procedure is used for:

- normal routing area updating to update the registration of the actual routing area of an MS in the network. This procedure is used by GPRS MSs in MS operation mode C and by GPRS MSs in MS operation modes A or B that are IMSI attached for GPRS and non-GPRS services if the network operates in network operation mode II or III;

- combined routing area updating to update the registration of the actual routing and location area of an MS in the network. This procedure is used by GPRS MSs in MS operation modes A or B that are IMSI attached for GPRS and non-GPRS services provided that the network operates in network operation mode I;

- periodic routing area updating. This procedure is used by GPRS MSs in MS operation mode C and by GPRS MSs in MS operation modes A or B that are IMSI attached for GPRS or for GPRS and non-GPRS services independent of the network operation mode;

- IMSI attach for non-GPRS services when the MS is IMSI attached for GPRS services. This procedure is used by GPRS MSs in MS operation modes A or B, if the network operates in network operation mode I;

  - in GSM, resuming GPRS services when the RR sublayer indicated a resumption failure after dedicated mode was left, see 3GPP TS 44.018 [84];

  - in GSM, updating the network with the new MS Radio Access Capability IE when the content of the IE has changed;

  - updating the network with the new DRX parameter IE when the content of the IE has changed;

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

- UMTS to GSM and for GSM to UMTS intersystem change, see subclause 4.7.1.7; or

- in UMTS, to re-synchronize the PMM mode of MS and network after RRC connection release with cause "Directed signalling connection re-establishment", see subclause 4.7.2.5.

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

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

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

To limit the number of subsequently rejected routing area update attempts, a routing area updating attempt counter is introduced. The routing area updating attempt counter shall be incremented as specified in subclause 4.7.5.1.5. Depending on the value of the routing area updating attempt counter, specific actions shall be performed. The routing area updating attempt counter shall be reset when:

- a GPRS attach procedure is successfully completed; or

- a routing area updating procedure is successfully completed;

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

- a new routing area is entered;

- expiry of timer T3302; or

- at request from registration function.

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

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

In a shared network, the MS shall choose one of the PLMN identities as specified in 3GPP TS 23.122 [14]. The MS shall construct the Routing Area Identification of the cell from this chosen PLMN identity, and the LAC and the RAC received on the BCCH. If the constructed RAI is different from the stored RAI, the MS shall initiate the routing area updating procedure. The chosen PLMN identity shall be indicated to the RAN in the RRC INITIAL DIRECT TRANSFER message (see 3GPP TS 25.331 [23c]). Whenever a ROUTING AREA UPDATING REJECT message with the cause "PLMN not allowed" is received by the MS, the chosen PLMN identity shall be stored in the "forbidden PLMN list". Whenever a ROUTING AREA UPDATING REJECT message is received by the MS with the cause

"Roaming not allowed in this location area", "Location Area not allowed", or "No suitable cells in Location Area", the constructed RAI which triggered the routing area updating procedure shall be stored in the suitable list.

In GSM, user data transmission in the MS shall be suspended during the routing area updating procedure; user data reception shall be possible. User data transmission in the network may be suspended during the routing area updating procedure.

In UMTS, user data transmission and reception in the MS shall not be suspended during the routing area updating procedure. User data transmission in the network shall not be suspended during the routing area updating procedure.

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

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

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

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

3GPP TSG-CN1 Meeting #36
Seoul, Korea, 15-19 November 2004

Tdoc N1-042005
Revision of N1-041916

CR-Form-v7.1

CHANGE REQUEST

⌘ **24.008** **CR** **927** ⌘**rev** **1** ⌘ Current version: **6.6.0** ⌘

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

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

Title:	⌘	Reject cause ranking during rerouting in MOCN
Source:	⌘	TeliaSonera, Siemens
Work item code:	⌘	NTShar
Date:	⌘	18/10/2004
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: ⌘ In a shared network with the MOCN configuration, the shared RAN selects an operator from the available CN operators for Network Sharing non-supporting UEs. A redirection to another CN operator may be required for non-supporting UEs until an operator is found that can serve the UE. If one operator cannot accept a UE, a redirection indication is sent to the RNC. The RNC stores the reject message together with the reject cause from the attempted CN. If one operator accepts the UE, the RAN will forward the accept message to the UE and delete all information received from CN operators during rerouting. If all CN operators reject the UE, the RNC selects the most appropriate reject cause and sends the corresponding reject message to the UE. As per 24.008, there are 19 explicit reject causes used by the LAU/RAU/attach/combined attach procedures. It is likely that there will be different implementations on selecting the most appropriate reject cause. Since different reject cause can trigger different mobile actions, this may result in inconsistent mobile behaviours in a shared network, which maybe not desirable in a shared network. Furthermore, if the reject cause is related to the mobile identification and invalid message, the CN operator should send the reject message to the UE without initiating redirection for the purpose of optimisation of the redirection procedure. If the shared network is configured to have different sharing CN operators in different location areas identified by the same common PLMN identity, the RNC should send the reject message with the reject cause #15 to the UE.

Summary of change: ⌘ A new normative Annex N is added which gives the guideline for the reject cause ranking upon rerouting in a MOCN.

Consequences if not approved:	⌘	Inconsistent mobile behaviour due to different implementation of reject cause ranking upon rerouting in a shared network with the MOCN configuration.

Clauses affected:	⌘	A new Annex N is added.			
		Y	**N**		
Other specs Affected:	⌘	**X**		Other core specifications	⌘ TS 25.413 CR702
			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.

********** Start of Change **********

Annex M (normative): Additional Requirements for backward compatibility with PCS 1900 for NA revision 0 ME

Irrelevant text is not shown.

Annex N (normative): Ranking of reject causes for Location Registration (MM and GMM) in a shared network

This annex describes how the reject cause is determined in a shared network with multi-operator core network (MOCN) configuration, when a location registration request from a Network Sharing non-supporting UE is redirected among CN operators via the shared RAN (see 3GPP TS 23.251 [109]) and is rejected by all core networks. In the following, the term 'location registration' is used for location area updating, GPRS attach, combined GPRS attach, routing area updating, and combined routing area updating.

i) If the location registration request was accepted, or if the location registration request was rejected with a reject cause different from #11, #12, #13, #14, and #15, the MSC or SGSN shall not include a redirection indication in the RANAP DIRECT TRANSFER message transmitting the location registration accept message or location registration reject message to the RNC. According to 3GPP TS 25.413 [19c], the RNC will then forward the location registration accept message or the location registration reject message to the MS.

ii) If the location registration request was rejected with one of the reject causes #11, #12, #13, #14, and #15, the MSC or SGSN shall include a redirection indication in the RANAP DIRECT TRANSFER message transmitting the location registration reject message to the RNC. According to 3GPP TS 25.413 [19c], the RNC will then initiate the redirection procedure towards the next CN operator and treat the response from the core network according to (i) and (ii).

iii) If the location registration request was rejected with one of the reject causes #11, #12, #13, #14, and #15 by all CN operators taking part in the network sharing, the RNC shall determine the reject cause with the highest rank from the received reject causes and send a location registration reject message containing this reject cause to the MS.

The ranking of the reject causes, from the lowest rank to the highest rank, is given by:

#11 < #12 < #13 < #14 < #15.

iv) If the location registration request was rejected with one of the reject causes #11, #12, #13, #14, and #15 by all CN operators taking part in the network sharing in a specific location area, but there is at least one additional CN operator taking part in the network sharing in another location area of the shared network defined by the same common PLMN identity, the RNC shall send a location registration reject message with the reject cause #15 to the MS.

Annex O~~N~~ (informative): Change Record

Irrelevant text is not shown.

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

3GPP TSG-CN1 Meeting #36
Seoul, Korea, 15-19 November 2004

Tdoc N1-042118
revision of N1-042015

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.122** **CR** **086** ⌘**rev** **1** ⌘ Current version: **6.2.0** ⌘

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

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

Title:	⌘	Clarification on PLMN selection in a shared network
Source:	⌘	TeliaSonera
Work item code:	⌘	NTShar
Date:	⌘	17/11/2004
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:	⌘	There could be multiple PLMNs that make a cell suitable in a shared network due to the ePLMN list. It needs to be specified that a MS should choose one of the PLMNs.
Summary of change:	⌘	If the RPLMN is valid and available among multiple PLMNs that make a cell suitable, the RPLMN shall be chosen. Addition of the definition of shared network.
Consequences if not approved:	⌘	The MS may have difficulty to register on a shared network due to multiple PLMNs are available in a suitable cell.

Clauses affected:	⌘	1.2, 4.4.3

		Y	N			
Other specs Affected:	⌘	X		Other core specifications	⌘	TS 24.008 CR926
			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.

********** Start of 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.

Shared Network: An MS considers a cell to be part of a shared network, when multiple PLMN identities are received on the BCCH.

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

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

********** Start of Second Change **********

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 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.

When the MS reselects to a cell in a shared network, the AS may indicate multiple PLMN identities to the NAS according to 3GPP TS 25.304 [32]. The MS shall choose one of these PLMNs. If the registered PLMN is available among these PLMNs, the MS shall not choose a different PLMN.

The MS shall not use the PLMN codes contained in the "HPLMN Selector with Access Technology" data file.

NOTE 1: To allow provision for multiple HPLMN codes, the HPLMN access technologies are stored on the SIM together with PLMN codes. This version of the specification does not support multiple HLPMN codes and the "HPLMN Selector with Access Technology" data file is only used by the MS to get the HPLMN access technologies. The HPLMN code is the PLMN code included in the IMSI.

NOTE 2: Different GSM frequency bands (e.g. 900, 1800, 1900, 400) are all considered GSM access technology. An MS supporting more than one band should scan all the bands it's supports when scanning for GSM frequencies. However GSM COMPACT systems which use GSM frequency bands but with the CBPCCH broadcast channel are considered as a separate access technology from GSM.

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