TSG-RAN Meeting #26 **RP-040494**
Athen, Greece, 08-10 December 2004 **Agenda item 8.6**

Source: TSG-RAN WG2.

Title: CR to 25.304. Enhancement of the support of network sharing in the UTRAN (agenda item 8.6)

The following CR is in RP-040494:

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Doc-2nd-Level	Workitem
25.304	124	-	Rel-6	Network Sharing and multiple PLMN identities	B	6.3.0	6.4.0	R2-042665	NTShar-UTRANEnh

3GPP TSG-RAN Working Group 2 Meeting #45
Yokohama, Japan, 15th – 19th November 2004

Tdoc ⌘ R2-042665

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.304** **CR** **124** ⌘ **rev** **-** ⌘ Current version: **6.3.0** ⌘

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

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

Title:	⌘	Network Sharing and multiple PLMN identities
Source:	⌘	RAN WG2
Work item code:	⌘	NTShar-UTRANEnh
Date:	⌘	Nov/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:	⌘	As a part of the Work Item "Enhancement of the support of network sharing in the UTRAN" the SA1 requirement that the UEs shall know what CN operators are available behind a shared RAN has to be fulfilled. Hence, the UE needs to be able to select between the multiple PLMN identities that are inserted for network sharing. In a cell broadcasting multiple PLMN identities, each PLMN identity has its own LAI/RAI. The LAIs/RAIs of the cell has the same LAC/RAC but different PLMN identities. This implies that there is a need to clarify the suitable cell definition and the forwarding of LAI/RAI to NAS for evaluation of LA/RA update necessity.
Summary of change:	⌘	1. The definition of a suitable cell is update. 2. It is stated that the UE can receive several PLMN identities from the system information on the broadcast channel. 3. The UE shall find out which PLMN identities the cell belongs to. Each found PLMN shall be reported to NAS for PLMN selection. 4. The quality criterion reported to NAS at PLMN selection is unchanged, and the quality measure shall be the same for each PLMN of a shared network cell. 5. The PLMN identities that fullfill the suitable cell criterias shall be forwarded to NAS as registration area information.
Consequences if not approved:	⌘	The UE will not be able to select between all broadcasted PLMN identities in a shared network. Hence, the SA1 requirement is not fulfilled.

Clauses affected:	⌘	4.3, 5.1.1, 5.1.2.2, 5.5

		Y	N			
Other specs	⌘	**X**		Other core specifications	⌘	25.331 CR 2487(rev1). 25.413 CR 701 and CR 715r2
affected:			**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.

---------- First Modified Section ----------

4.3 Service type in Idle and Connected Mode

This clause defines the level of service that may be provided by the network to a UE in Idle mode and Connected Mode.

The action of camping on a cell is necessary to get access to some services. Three levels of services are defined for UE:

- Limited service (emergency calls on an acceptable cell)
- Normal service (for public use on a suitable cell)
- Operator service (for operators only on a reserved cell)

Furthermore, the cells are categorised according to which services they offer:

acceptable cell:

An "acceptable cell" is a cell on which the UE may camp to obtain limited service (originate emergency calls). Such a cell shall fulfil the following requirements, which is the minimum set of requirements to initiate an emergency call in a UTRAN network:

- The cell is not barred, see subclause 5.3.1.1;
- The cell selection criteria are fulfilled, see subclause 5.2.3.1.2;

suitable cell:

A "suitable cell" is a cell on which the UE may camp on to obtain normal service. Such a cell shall fulfil all the following requirements.

- The cell is part of the selected PLMN or, of a PLMN considered as equivalent by the UE according to the information provided by the NAS.
- The cell is not barred, see subclause 5.3.1.1;
- The cell is part of at least one LA that is not part of the list of "forbidden LAs for roaming" [9], which belongs to a PLMN that fulfills the first bullet above;
- The cell selection criteria are fulfilled, see subclause 5.2.3.1.2.

If the IE “Multiple PLMN List” [4] is broadcast in the cell, the cell is considered to be part of all LAs with LAIs constructed from the PLMN identities in the “Multiple PLMN List” and the LAC broadcast in the cell.

barred cell:

A cell is barred if it is so indicated in the system information [4].

reserved cell:

A cell is reserved if it is so indicated in system information [4].

Exceptions to these definitions are applicable for UEs during emergency calls.

If a UE has an ongoing emergency call, all acceptable cells of that PLMN are treated as suitable for cell reselection for the duration of the emergency call.

5 Process and procedure descriptions

5.1 PLMN selection

5.1.1 General

In the UE, the AS shall report available PLMNs to the NAS on request from the NAS or autonomously.

UE shall maintain a list of allowed PLMN types. The allowed PLMN type can be GSM-MAP only, ANSI-41 only or both. During PLMN selection, based on the list of allowed PLMN types and a list of PLMN identities in priority order, the particular PLMN may be selected either automatically or manually. Each PLMN in the list of PLMN identities can be identified by either 'PLMN identity' (GSM-MAP) or 'SID'. In the system information on the broadcast channel, the UE can receive a 'PLMN identity' (GSM-MAP) or a 'SID' or a 'PLMN identity' (GSM-MAP) and a 'SID', in a given cell. For a given cell, the UE might receive several 'PLMN identities' from the system information on the broadcast channel. The result of the PLMN selection is an identifier of the chosen PLMN, the choice being based on the allowed PLMN types, UE capability or other factors. This identifier is one of either 'PLMN identity' for GSM-MAP type of PLMNs or 'SID' for ANSI-41 type of PLMNs.

In case that the list of allowed PLMN types includes GSM-MAP, the non-access part of the PLMN selection process is specified in [5]. In the case that list of allowed PLMN types includes ANSI-41, the non-access stratum part of the PLMN selection is specified in TIA/EIA/IS-2000.5 and TIA/EIA/IS-707.

5.1.2 Support for PLMN Selection

5.1.2.1 General

On request of the NAS the AS should perform a search for available PLMNs and report them to NAS.

5.1.2.2 UTRA case

The UE shall scan all RF channels in the UTRA bands according to its capabilities to find available PLMNs. On each carrier, the UE shall search for the strongest cell and read its system information, in order to find out which PLMN the cell belongs to. If the UE can read one or several~~the~~ PLMN identities~~y~~ in the strongest cell, ~~the~~each found PLMN (see the PLMN reading in [4]) shall be reported to the NAS as a high quality PLMN (but without the RSCP value), provided that the following high quality criterion is fulfilled:

1. For an FDD cell, the measured primary CPICH RSCP value shall be greater than or equal to -95 dBm.
2. For a TDD cell, the measured P-CCPCH RSCP shall be greater than or equal to -84 dBm.

Found PLMNs that do not satisfy the high quality criterion, but for which the UE has been able to read the PLMN identities are reported to the NAS together with the CPICH RSCP value for UTRA FDD cells and P-CCPCH RSCP for UTRA TDD cells. The quality measure reported by the UE to NAS shall be the same for each PLMN found in one cell.

The search for PLMNs on the rest of the carriers may be stopped on request of the NAS. The UE may optimise this search by using stored information of carrier frequencies and optionally also information on cell parameters, e.g. scrambling codes, from previously received measurement control information elements.

Once the UE has selected a PLMN, the cell selection procedure shall be performed in order to select a suitable cell of that PLMN to camp on.

5.1.2.3 GSM case

Support for network selection in GSM is described in [1].

5.2 Cell selection and reselection in idle mode

5.2.1 Introduction

As stated in clause 1, the present document applies to UEs that support at least UTRA.

Different types of measurements are used in different RATs and modes for the cell selection and reselection. The performance requirements for the measurements are specified in [10] and [11].

The NAS can control the RAT(s) in which the cell selection should be performed, for instance by indicating RAT(s) associated with the selected PLMN, and by maintaining a list of forbidden registration area(s) and a list of equivalent PLMNs. The UE shall select a suitable cell and the radio access mode based on idle mode measurements and cell selection criteria.

In order to speed up the cell selection process, stored information for several RATs may be available in the UE.

When camped on a cell, the UE shall regularly search for a better cell according to the cell reselection criteria. If a better cell is found, that cell is selected. The change of cell may imply a change of RAT. Details on performance requirements for cell reselection can be found in [10] and [11].

The NAS is informed if the cell selection and reselection results in changes in the received system information.

For normal service, the UE has to camp on a suitable cell, tune to that cell's control channel(s) so that the UE can:

- Receive system information from the PLMN;
  - Receive registration area information from the PLMN, e.g., location area and routing area; and
  - Receive other AS and NAS Information;
- If registered:
  - receive paging and notification messages from the PLMN; and
  - initiate call setup for outgoing calls or other actions from the UE.

---------- Next Modified Section ----------

5.5 Location Registration

In the UE, the AS shall report registration area information to the NAS.

If the UE reads more than one PLMN identity in the current cell, the UE shall report the found PLMN identities that make the cell suitable in the registration area information to NAS.

The non-access part of the location registration process is specified in [5].

Actions for the UE AS upon reception of Location Registration reject are specified in [9] and [16].

---------- End of Modifications ----------