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      ETSI SMG

From: ETSI SMG2

Proposed **LS on UE/MS idle mode operation.**

SMG2 has received Liaison statements from 3GPP CN1 (TDoc. N1-99D27: Response on LS on Information about current status on UE idle mode operation) and 3GPP RAN2 (TSGR2 #8 (99)G85 LS on UMTS PLMN selection).

SMG2 can endorse that a new technical specification is started on PLMN selection under the responsibility of CN1, if the scope is restricted to the selection of a PLMN and/or a Radio Access Technology, and the MM related procedures as e.g. registration, priorities, forbidden PLMN, etc. This scope shall NOT include PLMN selection based on a service. Lower layer procedures, as e.g. the (radio) detection of PLMNs are within the responsibility of the radio groups.

SMG2 is not convinced that all relevant ETSI and 3GPP groups are using the same basic assumptions for the work on idle mode (and handover). In order to harmonise the views and set some initial requirements a joint Workshop between 3GPP SA, RAN, CN and ETSI SMG2 and SMG3 on Handover and Cell Selection was held on 9 - 10 June in Sophia Antipolis. SMG2 still sees the results of this Workshop as the basis for the work, and until now has not been informed of any changes to the recommendations of that WS.

SMG2 suggests that S1 collects both the idle mode as well as the handover requirements in their Stage 1 document, and that this TS is then used by all groups. Any changes could than be coordinated in a single group, and this group, 3 GPP TSG S1, would then be tasked to inform all other relevant groups of any changes.

The conclusions from the Workshop are copied here from the meeting report to allow checking whether this aligns with the current Stage 1, and working assumptions in the different groups:

Conclusions on cell selection

Establishing priorities between PLMN selection, mode selection and cell selection

There was a common agreement that the PLMN selection should be performed prior to the mode selection and the cell selection, i.e. the PLMN is chosen first and, once the PLMN is selected, the choice of the mode has to be decided among the ones offered by the chosen PLMN. This second step is under the control of the selected operator.
The meeting agreed that PLMN selection can be decided by the user/application, but once the PLMN selected, the user only provides wishes of the requested services and has no capability to actually choose the serving cell nor the RAN.

PLMN selection mechanisms

No specific conclusion for UMTS was reached: it was mentioned that the same mechanisms as for GSM can apply (automatic or manual selection).
Some improvements compared to GSM were proposed, like deducing the potentially available PLMNs from the MCC, or introducing a periodic search for a PLMN in the 'preferred PLMN list'. Some mechanisms for updating the 'preferred PLMN list' were discussed. GSM 02.11 is still providing the basic procedure for PLMN selection, but other methods should be allowed by downloading procedures to the MS.

Mode and Cell selection mechanisms

There was a common agreement that the serving operator might decide the mode (UMTS, GSM,…) supporting a multi-mode MS in idle mode.
For dual mode terminals, the cell selection is proposed to be made in two steps: the mode selection (UMTS or GSM), and the actual cell selection (which cell in a given mode), which can be made just like for a single mode terminal once the mode selection has been performed.
For mode selection, an approach based on a threshold was proposed: if the signal level received from the other system is above this threshold (eventually during a certain time), then the MS should commute to the corresponding mode.
It was particularly stressed that the cell selection procedure applies to select the most suitable cell for initial access, not to provide the actual service: if, once the initial access is performed, the user indicates he wants to use a service not supported by the mode used during idle mode, then the actual call establishment can be made with the other mode or an inter-system HO can occur. A possible exception might be for SoLSA.
A set of tools should be developed by TSG RAN to help the operator in deciding on which mode (GSM or UMTS) and cell the MS has to camp, so as to minimise the occurrences for a MS to change of mode once the initial access is performed. One basic principle should be that a network shall indicate all the modes it can support in each of its individual mode.
It was stressed that the comparison between GSM and UMTS cells is the only new task not fitting within the classical approach, but GSM cell selection specification has to be used as unchanged as possible when in GSM mode. Some further discussions should take place within SMG2 and RAN groups and between them.

Documentation on idle mode

Now two documents exist on idle mode: CN groups have reused 03.22 for UMTS, and RAN groups (RAN2 in particular) have produced TS25.304 "UE Procedures in Idle Mode".
The resulting potential inconsistencies have to be solved as a priority task. It was stressed that 03.22 is mixing radio related with non radio related matters and has to be "cleaned up" for UMTS (the same on 03.09), and could be processed as 04.08, i.e. split it into RR/non RR parts.
Single mode UMTS, single mode GSM and bi-mode have to be studied and documented. This last specification can be a new stand-alone document, under joint responsibility of SMG2/RAN. It should be written as to become easily a multi-

mode document, i.e. expandable to modes other than GSM and UMTS. The TS 25.304 in document WHO-99016 can deal with single mode UMTS and refer to this new document for multi-mode.

Conclusions on the handover session

Classification of the inter-system HO cases

In this section, the following assumptions are made:
- One PLMN is identified only by the MCC+MNC fields,
- A 'one-to-one relationship' is a configuration where one unique target PLMN is possible for handover. For a 'one-to-multiple relationship', there are more than one potential target PLMNs, and some mechanisms shall allow to determine to which network the MS shall handover.

With these clarifications, the different scenario cases were classified as follow:
- The intra-PLMN case (by nature, it is always a one-to-one relationship: the GSM and the UMTS networks are the same PLMN)
- The inter-PLMN cases:
- non-overlapping networks
- one-to-one relationship
- on-to-multiple relationship
- overlapping networks
- one-to-one relationship
- on-to-multiple relationship

For all these cases and sub-cases, it was stressed that the one-to-one relationship was much easier to handle than the one-to-multiple cases. The following problems are avoided: there is no need to define some mechanisms to exchange information between networks and the number of channels the MS has to monitor might be much lower, so the technical complexity of the MS could be reduced.

It was then suggested (but not firmly concluded) to limit to the one-to-one relationship for UMTS phase 1.

However, this does not mean that all the customers moving e.g. from one country to another have to be handovered on the same network, as illustrated by the following example. Let's have A and B operating in country 1 and C operating in a border country 2, and let's assume that A and C have an agreement so that all the C customers preferably use A and not B when they are in country 1. The B customers who were previously roaming on C and coming back to country 1 still need to be redirected to their HPLMN and not to A. This might imply that the RAN needs to have some level of knowledge of the subscriber (like for SoLSA, but this might imply important changes on "classical" GSM, where the BSS has no knowledge of the subscriber identity).

Distinguish roaming from HO

It was discussed whether it should be allowed to HO towards a network where no roaming agreement is established. The decoupling of roaming agreement from HO was illustrated by the following example: let's have a user N from operator A roaming on a PLMN B (A has roaming agreement with B). If B has some agreements with C for HO (e.g. because B and C have complementary coverage in a given country, so all the B users are transferred to C at the limit between B and C coverages and reciprocally), N can be on C's network after a HO, even if there is no roaming agreement between A and C.

Here again, it was proposed, but not firmly concluded, that such a case should be possible. It was argued in favour of such feature that the fact that N uses the services provided by C results from an internal agreement between B and C and is totally hidden to A.

Items identified as requiring urgent further studies

The following topics (derived from document WHO-99026, where more information can be found) have been identified as requiring some urgent work:

- UMTS to GSM handover
- UMTS to GSM Call Reestablishment
- GPRS handover (GSM to GSM)
- GPRS handover (GSM to UMTS)
- Simultaneous mode mobiles
- inter-PLMN GSM-UMTS handover
- Re-authentication of the mobile at Inter-PLMN handover
- Inter-PLMN handover and PLMN selection
- handover/SRNS relocation between SGSNs
- Location/Routing area reject causes
- Call Ciphering

Indications for improvements on 22.129

The document 22.129, specifying the requirements for handover, needs some further improvements to be made according to the discussions and conclusions of this workshop. Among them, the group particularly stressed that the intra or inter PLMN HOs provide different constraints. The requirements applying on these different types of HOs should be clearly de-coupled.