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LS on UE/MS idle mode operation.

S1 thanks SMG2 for their LS on UE/MS idle mode operation. S1 understands the concern of SMG2 that all relevant ETSI and 3GPP groups are not using the same basic assumptions for the work on idle mode (and handover).

S1 would like to clarify the following points:

1. The PLMN selection and the handover requirements do not appear in the same Stage 1 document. PLMN selection is described in 22.011 and handover in 22.129.

On the conclusions of the Workshop on Handover and Cell Selection held on 9 - 10 June in Sophia Antipolis, S1 would like to clarify the following points:

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.

2. S1 would like to stress the fact that two different technologies corresponding to two licenses belonging to the same operator in the same country might (following a regulatory choice) be accessed via two different PLMN.

3. S1 would also like to clarify the fact that the PLMN selection procedure for Release 99 was modified. The modifications were accepted during SA#6 and are reflected in 22.011 v3.1. Among these modifications, a technology flag was introduced for each entry in the PLMN selector fields which allows for selection of a preferred technology along with the selection of a

preferred PLMN. Thus PLMN selection is not performed prior to the mode selection, but concurrently.

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).

4. Correct.

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'.

5. These mechanisms are currently discussed for Release 2000.

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.

6. The user shall be able to modify the "User preferred PLMN selector list" as required in the previous releases. The user cannot modify the "Operator preferred PLMN list" which can be updated using downloading procedures like other SIM/USIM fields.

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.

7. Is there anything planned in the case when an operator has two licenses (GSM and UMTS) resulting in two different PLMN for which the inter-system handover would actually be an inter-system inter-network handover?

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.

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.