METHOD FOR DEACTIVATING AND POSSIBLY REACTIVATING SIM CARDS

FIG 1

% (57) Abstract: Method of deactivating and possibly reactivating a SIM card and a subscription using an ODA (On Demand Activation) application characterized in that the SIM card is connected to the ODA database, in that information in the memory of the SIM card, such as the IMSI (International Mobile Subscriber Identity) of the SIM is transferred to the ODA, in that the ODA is arranged to be connected to the HLR/AUC to retrieve the subscription information, in that the ODA replaces the IMSI of the SIM card with a temporary IMSI (IMSI-T), in that the ODA stores said retrieved information together with the IMSI-T in said ODA database, in that the ODA transfers to the network, including the HLR/AUC, an instruction to cancel the subscription in the network including HLR/AUC, and in that the SIM card may be reactivated using and the information stored in the ODA database and on the SIM card including said IMSI-T.
Method for deactivating and possibly reactivating SIM cards.

The present invention refers to a method for deactivating and possibly reactivating SIM cards for use in mobile telephones.

Every installed, inactive, subscription involving a SIM (Subscriber Identity Module) card generates license costs and other costs for resources consumed for the operators of mobile networks. This is also true for SIM cards not activated for some time or even cards that are not activated at all. This is especially true for cards that are used for prepaid mobile telephone services. Such cards, prepaid cards, are stored in large amounts at non-controllable point-of-sales locations, waiting to get sold. When manufactured such cards are provided with information in order to make it possible to use the card immediately after that the card has been sold. Therefore, also the mobile telephone operator stores information related to each card in the operators HLR/AUC (Home Location Register/Authentication Center), such as the cards IMSI (International Mobile Subscriber Identity).

The cost for an operator is dependent on the number of cards registered in the mobile system.

The present invention solves the problem of having many inactive subscriptions in the system by deactivating the SIM cards when not sold or not used.

The present invention refers to a method of deactivating and possibly reactivating a SIM card (1) and a subscription using an ODA (2) (On Demand Activation) application, comprising a computer (3) and an associated ODA database (4), for deactivating and reactivating the subscription and SIM card in a
mobile network, characterised in that, when deactivating a subscription and SIM card (1) the SIM card is connected to the ODA database (4), in that an instruction to deactivate the SIM card and to cancel the subscription is transferred to the ODA (2), in that information in the memory of the SIM card, such as the card definition files comprising the IMSI (International Mobile Subscriber Identity) of the SIM card, are transferred to the ODA (2), in that the ODA (2) is arranged to be connected to the network, including a HLR/AUC (5), in that the ODA retrieves the subscription information, in that the ODA (2) replaces the IMSI of the SIM card with a temporary IMSI called IMSI-T, in that the ODA stores said information in the memory of the SIM card together with the IMSI-T in said database (4), in that the ODA (2) also stores said information together with the IMSI-T and in that the ODA transfers to the network, including the HLR/AUC (5), an instruction to cancel the subscription in the network including HLR/AUC (5) and in that the SIM card (1) may be reactivated using and the information stored in the ODA database (4) and on the SIM card including said IMSI-T.

The present invention is described in more detail below, partially with reference to drawings showing an exemplary embodiment of the invention, where

- Figure 1 shows a block diagram illustrating the present invention
- Figure 2 shows a table which is an example of data, relating to SIM cards that has been deactivated, which data is stored in a database.

Thus, the present invention relates to a method of deactivating and possibly reactivating a SIM card and a subscription using an ODA (On Demand Activation) application, comprising a
According to the invention the SIM card is connected to the ODA database and an instruction to deactivate the SIM card and to cancel the subscription is transferred to the ODA. Information in the memory of the SIM card, such as the card definition files comprising the IMSI (International Mobile Subscriber Identity) of the SIM card, are transferred to the ODA. Thereafter, the ODA (2) is arranged to be connected to the network, including a HLR/AUC (5). The ODA then retrieves the subscription information and replaces the IMSI of the SIM card with a temporary IMSI called IMSI-T. Further, the ODA stores said information in the memory of the SIM card together with the IMSI-T.

The ODA also stores said information in said database. Finally, the ODA transfers to the network an instruction to cancel the subscription in the network and including the HLR/AUC. The SIM card may be reactivated using the information stored in the ODA database and on the SIM card including said IMSI-T.

The ODA application 2 is connected to a SIM-OTA platform 8 to be able to make OTA provisioning of the SIM card.

As described in more detail below the SIM card may be reactivated using the information stored and in that the SIM card may be reactivated using the information stored in the ODA database and on the SIM card including said IMSI-T.

In Figure 2 the data stored in the ODA database 4 is exemplified. In the upper table there is stated a number of IMSI-
Further, for each IMSI-T a number of parameters such as ICCID (Integrated Circuit Card Identity), Ki, MISIDN, IMSI-P, Strategy Profile and status are stored in the database. The SIM cards are standard SIM cards which once have been activated and coupled to a subscription.

According to a preferred embodiment of the present invention said deactivation is carried out after the subscription has not been used for a predetermined period of time. This embodiment makes it possible for operators to make automatic cancellations of subscriptions that are not used in their system, thereby lowering the costs. Automatically cancelled subscriptions may be reactivated, for example after a request from a user.

According to another preferred embodiment of the present invention said deactivation is carried out after an approval from the user. This embodiment makes it possible for a user and/or operator to cancel a subscription due to some reason and later on reactivate the subscription if desirable.

According to another preferred embodiment of the present invention said deactivation and/or reactivation is carried out after a decision by the current operator or by a future operator or by an independent third party. This embodiment makes it possible for an operator or independent third party to cancel a subscription in order to reactivate it with another operator's subscription. One example is that a user wants to change to another operator. Another example is that a user wish to change the type of subscription, for example from a pre-paid to a post-paid subscription. A third example is that used SIM cards is recycled and used again.
The present invention thus solves the problem mentioned in the introduction and makes it possible to cut costs by deactivating activated SIM cards.

According to a preferred embodiment of the invention reactivation of the subscription and SIM is carried out after said deactivation is carried out.

According to a preferred embodiment of the invention a deactivated SIM card is reactivated using the information related to the SIM card to be activated in the ODA database 4, where, when a SIM card 1 is inserted into a mobile telephone and the telephone is switched on, the SIM card is connected to the ODA 2 for updating the SIM card with the information related to the SIM card, in that the ODA 2 is arranged to be connected to a HLR/AUC 5 in order to transfer information stored on said updated SIM card, and in that the HLR/AUC is arranged to set up a subscription for the SIM card.

An embodiment for reactivating a SIM card is described below in more detail.

According to this embodiment of the invention the ODA 2 is connected to a SS7 filter 7 located between a HLR/AUC 5 and a MSC 6 (Mobile Services Switching Centre). The memory of the SIM cards 1 contains a IMSI-T, given when deactivated.

Said ODA 2 comprises in its memory for each SIM card a IMSI-T and a card definition file. The IMSI-T received by the ODA from a SIM card matches with the IMSI-T in the database 4. The ODA 2 comprises a SS7 filter 7 located between a HLR/AUC 5 and the mobile telephone. When a SIM card 1 is inserted in
a mobile telephone and the telephone is switched on, the said IMSI-T is sent to said SS7 filter 7, which is adapted by means of said IMSI-T to direct information in the memory of the SIM card 1 to the database 4 of the ODA 2. A SAI (Send Authentication Information) signal is then halted in the SS7 filter 7.

Thereafter the IMSI-T is sent from the ODA 2 to a HLR-T/AUC-T (Temporary Home Location Register) of the mobile network. The HLR-T/AUC-T can be a separate HLR/AUC or it can be a part of a HLR/AUC in the network as illustrated in Figure 1. Thereafter a temporary subscription based on the IMSI-T is created in the HLR-T/AUC-T, and the HLR-T/AUC-T sends information to ODA that IMSI-T is ready for use. After that the IMSI-T is ready for use, the SS7 filter 7 switches the halted SAI signal to the HLR-T/AUC-T. Thereafter, a permanent IMSI (IMSI) together with additional information, such as MSISDN, subscription type, and a authentication key (Ki), billing information etc. is transferred from ODA 2 to said network, including a permanent HLR/AUC (HLR-P/AUC-P) and to the SIM card. Hereby the mobile telephone is thus reactivated and ready for full use. Lastly the IMSI-T is deleted in the HLR-T/AUC-T.

The present invention shall not be considered to be limited to the afore described embodiments, since variations can be made within the scope of the accompanying claims.
Claims.

1. Method of deactivating and possibly reactivating a SIM card (1) and a subscription using an ODA (2) (On Demand Activation) application, comprising a computer (3) and an associated ODA database (4), for deactivating and reactivating the subscription and SIM card in a mobile network, characterised in that, when deactivating a subscription and SIM card (1) the SIM card is connected to the ODA database (4), in that an instruction to deactivate the SIM card and to cancel the subscription is transferred to the ODA (2), in that information in the memory of the SIM card, such as the card definition files comprising the IMSI (International Mobile Subscriber Identity) of the SIM card, are transferred to the ODA (2), in that the ODA (2) is arranged to be connected to the network, including a HLR/AUC (5), in that the ODA retrieves the subscription information, in that the ODA (2) replaces the IMSI of the SIM card with a temporary IMSI called IMSI-T, in that the ODA stores said information in the memory of the SIM card together with the IMSI-T in said database (4), in that the ODA (2) also stores said information together with the IMSI-T and in that the ODA transfers to the network, including the HLR/AUC (5), an instruction to cancel the subscription in the network including HLR/AUC (5) and in that the SIM card (1) may be reactivated using and the information stored in the ODA database (4) and on the SIM card including said IMSI-T.

2. Method according to claim 1, characterised in, that said deactivation is carried out after the subscription has not been used for a predetermined period of time.
3. Method according to claim 1 or 2, characterised in, that said deactivation is carried out after an approval from the user.

4. Method according to claim 1 or 2 or 3, characterised in, that reactivation of the subscription and SIM card is carried out after said deactivation is carried out.

5. Method according to claim 1 or 2 or 3, characterised in, that a reactivation of a SIM card is carried out where the new subscription is a subscription which is different from the former, deactivated, subscription on the said SIM card.

6. Method according to claim 1, 2, 3, 4 or 5, characterised in that, a deactivated SIM card (1) is activated using the information related to the SIM card to be activated in the ODA database (4), in that, when a SIM card (1) is inserted into a mobile equipment, such as a mobile telephone, and the mobile equipment is switched on, the ODA (2) is connected to the SIM card for updating the SIM card with the information related to the SIM card, in that the ODA (2) is arranged to be connected to a HLR/AUC (5) in order to transfer information stored on said updated SIM card, and in that the HLR/AUC is arranged to set up a subscription for the SIM card.
INTERNATIONAL SEARCH REPORT

PCT/SE2010/050105

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: H04W, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>EP 0805609 A2 (HEWLETT-PACKARD COMPANY), 6 November 1997 (06.11.1997), abstract</td>
<td>1-6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>WO 2004105421 A2 (AXALTO SA), 2 December 2004 (02.12.2004), abstract</td>
<td>1-6</td>
</tr>
</tbody>
</table>

[ ] Further documents are listed in the continuation of Box C.  [ ] See patent family annex.

* Special categories of cited documents:
  "A" document defining the general state of the art which is not considered to be of particular relevance
  "E" earlier application or patent but published on or after the international filing date
  "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  "O" document referring to an oral disclosure, use, exhibition or other means
  "P" document published prior to the international filing date but later than the priority date claimed
  "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
  "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
  "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
  "&" document member of the same patent family

Date of the actual completion of the international search 27 May 2010
Date of mailing of the international search report 02-06-2010

Name and mailing address of the ISA
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer
Per Karlsson / MRo
Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (July 2009)
<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
</table>
International patent classification (IPC)

H04W 8/20 (2009.01)
H04W 8/26 (2009.01)

Download your patent documents at www.prv.se
The cited patent documents can be downloaded:
• From "Cited documents" found under our online services at www.prv.se (English version)
• From "Anförda dokument" found under "e-tjanster" at www.prv.se (Swedish version)
Use the application number as username. The password is FEMQONGHKF.

Paper copies can be ordered at a cost of 50 SEK per copy from PRV InterPat (telephone number 08-782 28 85).

Cited literature, if any, will be enclosed in paper form.
**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

<table>
<thead>
<tr>
<th>International application No.</th>
<th>PCT/SE2010/050105</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Patent Family Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>US 20050075137 A1 07/04/2005</td>
</tr>
<tr>
<td>US 7266371 B1 04/09/2007</td>
</tr>
<tr>
<td>EP 0805609 A2 06/11/1997</td>
</tr>
<tr>
<td>WO 2004105421 A2 02/12/2004</td>
</tr>
<tr>
<td>AT 379946 T 15/12/2007</td>
</tr>
<tr>
<td>BR PI0410361 A 30/05/2006</td>
</tr>
<tr>
<td>CN 1795692 A 28/06/2006</td>
</tr>
<tr>
<td>CN 100584076 C 20/01/2010</td>
</tr>
<tr>
<td>DE 602004010391 DJ 16/10/2008</td>
</tr>
<tr>
<td>JP 2007513534 T 24/05/2007</td>
</tr>
<tr>
<td>MX PA05012548 A 08/02/2006</td>
</tr>
<tr>
<td>US ..0070167161 A 19/07/2007</td>
</tr>
</tbody>
</table>

| DE 102008024798 A 17/12/2009 |
| WO 2009141035 A 26/11/2009 |