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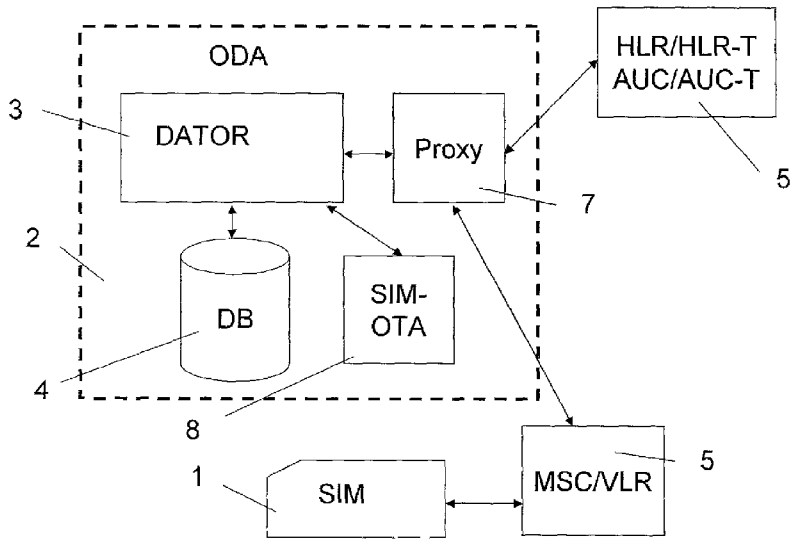
(54) **Title**: METHOD FOR ACTIVATING SIM CARDS

FIG 1



(57) **Abstract**: Method of activating a SIM card using an ODA (On Demand Activation) application, comprising a computer and an associated ODA database, for activating the SIM card in a mobile network. The invention is characterised in that, the ODA database (4) contains SIM card (1) information related to the cards that shall be activated, 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 a card definition file, 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.

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Method for activating SIM cards.

The present invention refers to a method for activating SIM cards for use in mobile telephones.

Every installed, inactive, subscription involving a SIM 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 a card is 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 (Home Location Register) and AUC (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. Manufacturing, handling, logistics and storage of SIM cards also represents costs to the mobile operator. This cost increases significantly when the amount of different SIM card types that are handled by the operator increases.

It is thus essential to the mobile operator to keep the amount of different SIM cars types to a minimum, ideally to one type only.

A multinational operator can e.g. have several PLMNs (Public Land Mobile Network) within a region all having own SIM cards with own IMSI series and/or different MSISDNs which are the catalogue number, i.e. the telephone number depending on which geographical area the subscriber belongs to.

In certain countries the operator may even be obliged to be able to provide at any point of sale in the country, an applicable, usable SIM card to a subscriber who has lost or broken the SIM card. This implies major costs to the operators.

The present invention solves the problem of having many inactive subscriptions in the system by activating the SIM cards when the subscriber is going active for the first time.

The present invention refers to a method of activating a SIM card using an ODA (On Demand Activation) application, comprising a computer and an associated ODA database, for activating the SIM card in a mobile network, characterised in that, the ODA database (4) contains SIM card (1) information related to the cards that shall be activated, 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 a card definition file, 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.

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 shall be activated, which data is stored in a database.

Thus, the present invention relates to a method of activating a SIM card 1 using an ODA (On Demand Activation) database 2, comprising a computer 3 and an associated ODA database 4, for activating the SIM card in a mobile network.

According to the invention there is an ODA (On Demand Activation) application 2, where the ODA application comprises a computer 3, and a database 4, that contains SIM card 1 information related to the SIM cards that shall be activated using the ODA application. The SIM cards are generic profile SIM cards manufactured with temporary subscription data. Such SIM card will support several different subscriptions at the time of provisioning. Data is fed into the database 4 relating to said SIM card with temporary subscription data.

When the SIM card 1 is inserted into a mobile equipment, not shown, and the mobile equipment is switched on, the SIM card is connected to the ODA 2. The ODA 2 is arranged to be connected to a HLR/AUC 5, in order to set up a subscription for the card and to attach the SIM card 1 to the network using the HLR/AUC 5. ODA 5 will then update both the SIM and the network, including the HLR/AUC 5 with the final subscription data.

Thereafter, the mobile phone is ready for use. The ODA application 2 is also connected to a SIM-OTA platform 8 to be able to make OTA provisioning of the SIM card.

Thus, a point-of-sale sells the SIM card with said temporary subscription data, where after it is inserted in a mobile phone which is switched on. Thereafter, the present ODA application updates the SIM card with all necessary data, received from the ODA application, in order to make the mobile phone work, without the customer doing anything.

According to a preferred embodiment of the invention the ODA 2 is connected to a proxy, such as an SS7 SCCP Application 7 logically located between a HLR/AUC 5 and a MSC/VLR 5 (Mobile Services Switching Centre/Visitor Location Register). Further, the memory of the SIM cards 1 contains a code which, when a SIM card is inserted into a mobile equipment and the mobile equipment is switched on, a message is received by the Proxy 7, which Proxy is arranged to direct a message, containing said code, from the mobile phone via said MSC/VLR 5 to said ODA application.

According to a very much preferred embodiment of the invention, said code is a temporary IMSI (IMSI-T). However, the code for directing the signal to the Proxy could be another special code than IMSI-T.

Still further, according to a much preferred embodiment of the invention the SIM cards 1 thus includes said temporary IMSI (IMSI-T). 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. As said above the ODA 2 comprises said

Proxy 7 located between a HLR/AUC 5 and the mobile equipment. When a SIM card 1 is inserted in a mobile equipment and the mobile equipment is switched on, the said IMSI-T is sent to said Proxy 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. The SAI (Send Authentication Information) signal is then halted in the Proxy 7. The halted message can instead be a Map UL (Update Location) message.

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 Proxy 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 equipment is ready for full use. Lastly the IMSI-T is deleted in the HLR-T/AUC-T.

In Figure 2 the data in the ODA database 4 is exemplified. In the upper table there is stated a number of IMSI-T´s. 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 4. At time of activation, subscription parameters are set based on business logic, selection criteria and available resource

pools, e.g. MSISDN pool, as exemplified three other tables in Figure 2.

It is apparent that the present invention is preferably used for SIM cards for prepaid telephone service. By means of the invention prepaid SIM cards can be made and stored without being designated to a certain operator or company. This means that it is enough that a point-of-sale only has one type of SIM card. Further, a purchased SIM card can be activated anywhere regardless of operator due to the interoperability of IMSI-T.

However, the present invention can also be used regarding post paid subscriptions.

The present invention thus solves the problem mentioned in the introduction and makes it possible to cut costs related to not sold SIM cards and the corresponding subscriptions.

The present invention has been described above exemplified with a GSM mobile system. However, the present invention can be used for other mobile telephone systems, such as 3G.

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 activating a SIM card using an ODA (On Demand Activation) application, comprising a computer and an associated ODA database, for activating the SIM card in a mobile network, characterised in that, the ODA database (4) contains SIM card (1) information related to the cards that shall be activated, 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 a card definition file, 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.

2. Method according to claim 1, characterised in, that the ODA (2) includes a Proxy (7) logically located between a HLR/AUC (5) and a MSC/VLR (6) (Mobile Services Switching Centre) , in that the memory of the SIM cards (1) contains a code, in that said Proxy (7), when a SIM card is inserted into a mobile equipment and the mobile equipment is switched on, is arranged to direct a message, containing said code, from the mobile phone via said MSC/VLR (5) to said ODA application (2,4).

3. Method according to claim 2, characterised in, that said code is a temporary IMSI (IMSI-T).

4. Method according to claim 1, 2 or 3, characterised in that, the SIM cards (1) includes said temporary IMSI (IMSI-T), in that said ODA (2) comprises in its memory for each SIM card (1) a IMSI-T and a card definition file, in that the ODA

(2) comprises said Proxy (7) located between a HLR/AUC (5) and a MSC/VLR 5 (Mobile Services Switching Centre), in that, when a SIM card (1) is inserted in a mobile equipment and the mobile equipment is switched on, the said IMSI-T is sent to said Proxy (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), in that a message related to the registration procedure is halted in the Proxy (7), in that the IMSI-T is provisioned by ODA (2) in a HLR-T/AUC-T (5)(Temporary Home Location Register/Authentication Center) of the mobile network, in that the HLR-T/AUC-T sends information to ODA (2) that the temporary subscription is ready for use, in that the Proxy (7) switches the halted message to the HLR-T/AUC-T (5), in that a permanent subscription together with additional information, such as IMSI, MSISDN, subscription type, and a authentication key (Ki), billing information etc. is provisioned by ODA (2)in said or another network for permanent use as well as provisioned in the SIM card (1) and in that the IMSI-T is deleted in the HLR-T/AUC-T (5).

5. Method according to claim 4, characterised in, that a temporary subscription based on the IMSI-T is created in the HLR-T/AUC-T (5).

6. Method according to claim 1, 2, 3, 4 or 5, characterised in, that halted message is a MAP SAI (Send Authentication Information) message.

7. Method according to claim 1, 2, 3, 4 or 5, characterised in, that halted message is a Map UL (Update Location) message.

8. Method according to claim 1, 2, 3 or 4, characterised in, that the SIM cards (1) are cards for prepaid telephone service.

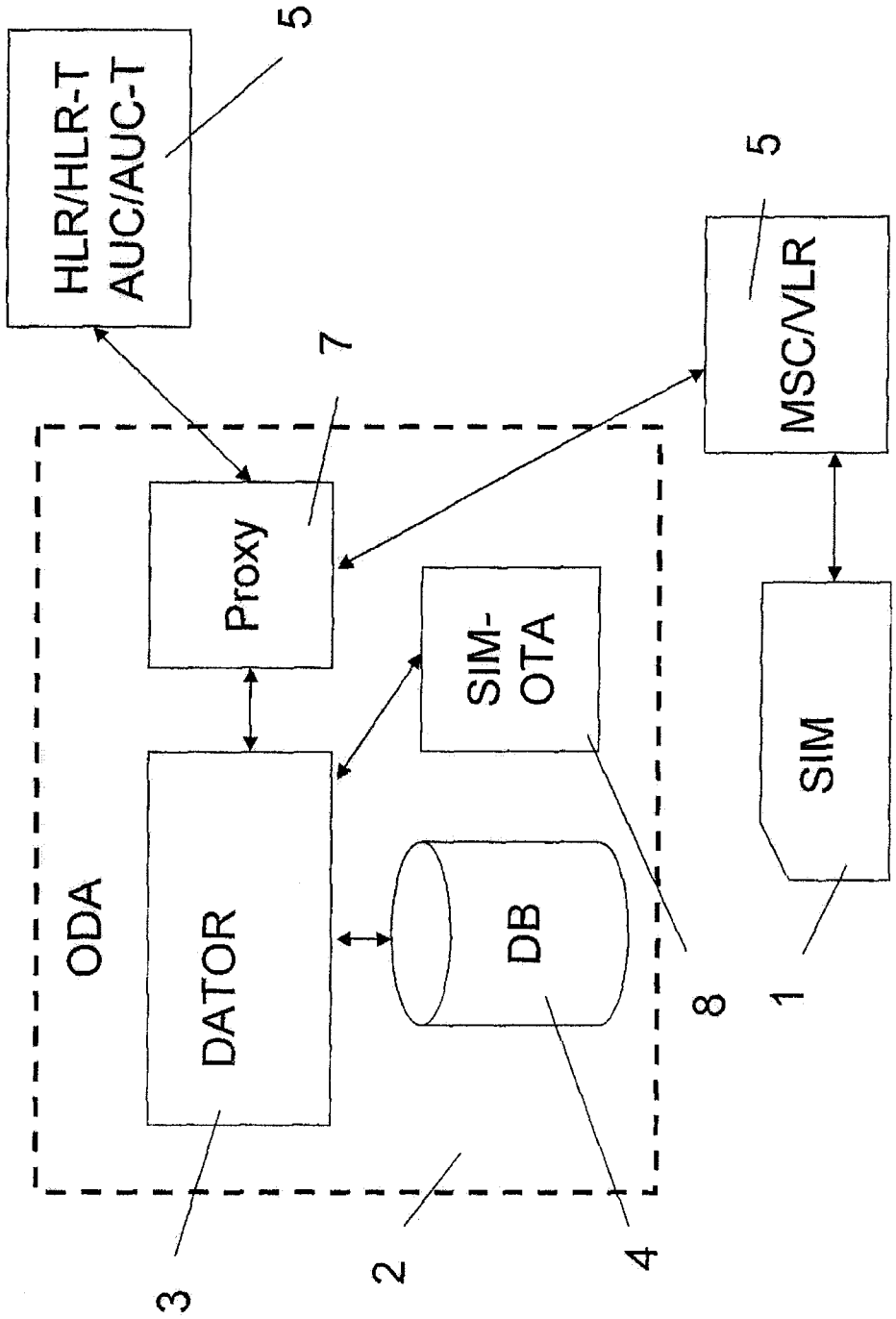
HLR/HLR-T
AUC/AUC-T
5
MSC/VLR
5
7
Proxy
SIM-
OTA
SIM
ODA
DATOR
DB
8
1
3
2
4

FIG 1

Fig 2

IMSI_T	ICCID	Ki	MSISDN_P	IMSI_P	STRATEGI_PROFIL	STATUS
240089900000001	5432100000001	Ki_1	PROFIL	PROFIL	STRAT_FörBet_20EUR_GULD	Definierad
240089900000002	5432100000002	Ki_2				Importerad
240089900000003	5432100000003	Ki_3	PROFIL	PROFIL	STRAT_FörBet_00EUR	Definierad
240089900000004	5432100000004	Ki_4	46733123432	240080207770002	STRAT_FörBet_00EUR	Provisionerad
240089900000007	5432100000007	Ki_7	46733123462	240080207770007	STRAT_FörBet_MobiltBredband	Provisionerad
240089900000008	5432100000008	Ki_8	46733123463	240080207770008	STRAT_FörBet_MobiltBredband	Definierad

STRATEGI_PROFIL	PROFIL	SERVICEORDER	SIM_FIL_DATA	PROFIL_DATA	STRAT_MSISDN_P	STRAT_IMSI_P
STRAT_FörBet_20EUR_GULD	USIM_FörBet_20EUR_GULD	XML_PP20EUR	0x12EF5643.....	20 EUR	MSISDN_P_POOL(GULD)	IMSI_P_POOL(*)
STRAT_FörBet_00EUR	USIM_FörBet_00EUR	XML_PP00EUR	0x8865346891.....	0 EUR	MSISDN_P_POOL(STAD)	IMSI_P_POOL(VLR)
STRAT_FörBet_MobiltBredband	USIM_FörBet_MobiltBredband	XML_MBB00EUR	0x1200BC643.....	50 GBYTE	FORCERAD	FORCERAD

IMSI_P	GRUPP ID
240080207770017	NORD
240080207770018	NORD
240080207770019	SYD
240080207770020	NORD

MSISDN_P	GRUPP ID
46733123468	STAD
46733111111	GULD
46733888888	GULD
46733123470	STAD
46733123471	STAD

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2010/050102

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, H04L, 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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 20060183500 A1 (S. CHOI), 17 August 2006 (17.08.2006), figure 1, abstract, paragraphs (0014), (0041)-(0055)	1-8
A	US 7266371 B1 (U.J. AMIN ET AL), 4 Sept 2007 (04.09.2007), column 9, line 3 - column 12, line 33, figures 2-5, claims 1-4, abstract	1-8
A	US 6879825 B1 (B.K. DALY), 12 April 2005 (12.04.2005), abstract	1-8
A	WO 0119118 A1 (ERICSSON, INC.), 15 March 2001 (15.03.2001), abstract	1-8

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

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Date of the actual completion of the international search	Date of mailing of the international search report
27 May 2010	02-06-2010
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	WO 2009141024 A1 (T-MOBILE INTERNATIONAL AG), 26 November 2009 (26.11.2009), abstract -- --------	1-8

International patent classification (IPC)

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US	7266371	B1	04/09/2007	NONE		
US	6879825	B1	12/04/2005	NONE		
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				WO	2009141035 A	26/11/2009