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- (71) **Applicant (for all designated States except US):**  
**SMARTTRUST AB** [SE/SE]; Box 47154, S-100 74 Stockholm (SE).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** **ERIKSSON, Alf** [SE/SE]; Mosstorpsvägen 46A, S-183 30 Täby (SE). **FREESE, Esko** [SE/SE]; Rimbervägen 3, S-126 50 Hägersten (SE).
- (74) **Agents:** **ÖRTENBLAD, Bertil** et al.; Noréns Patentbyrå AB, P.O. Box 10198, S-100 55 Stockholm (SE).
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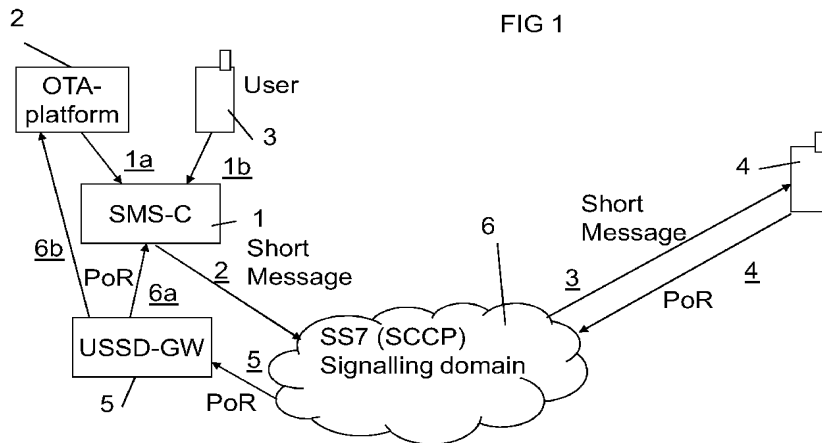
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WO 2010/125056 A1

(54) **Title:** METHOD FOR PROVIDING PROOF OF RECEIPT IN A MOBILE TELECOMMUNICATION NETWORK.



(57) **Abstract:** A method in mobile telecommunication networks deploying Over- The-Air (OTA) provisioning of a SIM or an USIM or a Mobile Equipment (ME), in need to receive a trusted acknowledgement or Proof-of Receipt from the ME or SIM upon an OTA provisioning which is made over the existing signalling interfaces. The invention is characterised in, that the SIM or USIM or ME is generating a standards based USSD-command (Unstructured supplementary Services Data) as a result of successful or unsuccessful OTA provisioning, in that the serving mobile network will be caused to route the MAP (Mobile Application Part) -USSD message over an existing, configured SS7 domain to the home network (HPLMN), in which it exist a trusted USSD Gateway entity which is caused to relay the acknowledgement to the OTA platform.

Method for providing Proof of Receipt in a mobile telecommunication network.

The present invention refers to a method for providing a  
5 cost-efficient Proof of Receipt (PoR) in a mobile telecommunication network. Such Proof of Receipt (PoR) can be issued upon successful Over-The-Air (OTA) provisioning of a PLMN (Public Land Mobile Network) mobile device or SIM (Subscriber Identity Module), or implementing a delivery- or read receipt  
10 of an User Short Message (SMS).

The present invention concerns a method for following-up mobile operator services using over-the-air management of data and applications on mobile subscriber's devices or SIM  
15 respectively USIM (Universal Mobile Telephony System) SIM cards, in a Home Network (HPLMN) or in a Visited Network.

Mobile Equipment (ME), i.e. mobile telephones, using the Global System for Mobile communication (GSM) and 3<sup>rd</sup> Generation Partnership program (3GPP) as standards for digital  
20 wireless communication are called GSM-3G phones, below called mobile devices. Additional services nowadays allow a great flexibility in where and when mobile devices are used. One of the greatest service of GSM and 3GPP networks is the seamless  
25 roaming into networks other than the Home Network (HPLMN). The present invention also refers to other mobile communication standards such as LTE (3<sup>rd</sup> Generation Partnership Long Term Evolution).

30 Traditional GSM roaming is defined in GSM Association Permanent Reference Document AA.39 as the ability for a mobile subscriber to automatically make and receive voice calls, send and receive data, or to have access to other services

when travelling outside the geographical coverage area of the HPLMN, by means of using a visited network (VPLMN), with the very same mobile telephone and subscriber procedures used when attaching the HPLMN.

5

Traditional and simplest OTA updates of the mobile device or SIM or USIM take place by using a standards-based Short Message as the bearer technology, to send OTA-information or update over a mobile network to the device or SIM. The use of Short Message Service (SMS) for carrying such data essentially works well, especially from a costs-point of view as the Mobile Terminating Short Messages are not typically accounted between the roaming partners, or charges from the subscribers.

15

Many OTA updates would require an acknowledgement from the device or from the SIM-card. Standards-based acknowledgement PoR (Proof-of-Receipt) concept has been specified by ETSI/3GPP for GSM 03.48 Remote File Management, to send a dedicated PoR from SIM towards the SIM-OTA platform, using a new Short Message in opposite direction, as bearer for the PoR. This PoR can be also be encrypted as per the specification 03.48, to ensure security.

25

The issue with using a standards-based Short Message as bearer for PoR is its generated costs, especially in international roaming scenarios when the cost of originating a Short Message abroad might be substantially high, and hence it is preventing use of PoR for OTA updates. This implies that successfulness of OTA provisioning made cannot be secured, on end-to-end level and e.g. faults in the OTA-chain cannot be identified and traced.

30

The present invention solves this problem

The present invention refers to a method in mobile telecommu-  
nication networks deploying Over-The-Air (OTA) provisioning  
5 of a SIM or an USIM or a Mobile Equipment (ME), in need to  
receive a trusted acknowledgement or Proof-of Receipt from  
the ME or SIM upon an OTA provisioning which is made over the  
existing signalling interfaces, and is characterised in, that  
the SIM or USIM or ME is generating a standards based USSD-  
10 command (Unstructured Supplementary Services Data) as a re-  
sult of successful or unsuccessful OTA provisioning, in that  
the serving mobile network will be caused to route the MAP  
(Mobile Application Part)-USSD message over an existing,  
configured SS7 domain to the home network (HPLMN) and USSD  
15 Gateway entity which is caused to relay the acknowledgement  
to the OTA platform.

The present invention thus relates to a method where an en-  
crypted or non-encrypted Proof-of-Receipt can be conveyed  
20 from the mobile device in a low-cost manner, back towards the  
Home PLMN and eventually the OTA platform that made the OTA  
provisioning using Short Message as bearer for the OTA. The  
invention uses the same SS7 SCCP signalling domain with its  
connectivity and routing services and standards-based MAP  
25 (Mobile Application Part) messages - all being already imple-  
mented and in place for the 3G/GSM subscribers mobility,  
roaming and Short Message Service.

The present invention will be described in more detail below  
30 together with exemplifying embodiments of the invention and  
the attached drawings, where

- Figure 1 illustrates the present invention.

Figure 1 illustrates a method in a mobile telecommunication networks deploying Over-The-Air (OTA) provisioning of SIM or USIM or mobile Equipment (ME), in need to receive a trusted acknowledgement or Proof-of Receipt (PoR) from the ME or SIM  
5 upon an OTA provisioning which is made over the existing signalling interfaces.

The PoR can for example be an acknowledgement of a successful roaming that has been carried out. It could also be a ques-  
10 tion of get a PoR after having sent a measurement value or some other information or data.

According to the present invention the SIM or USIM or ME is generating a standards based USSD-command (Unstructured supplementary Services Data) as a result of successful or unsuccessful OTA provisioning. The serving mobile network will be  
15 caused to route the MAP (Mobile Application Part)-USSD message over an existing, configured SS7 domain to the home network (HPLMN) and USSD Gateway entity which is caused to  
20 relay the acknowledgement to the OTA platform.

In Figure 1 reference numeral 1 designates a SMS-C (Short message Service centre), numeral 2 designates an OTA platform, 3 designates a users mobile device, 4 designates another users mobile device or a stationary mounted device  
25 capable of communicating over the mobile telecommunication network, 5 designates a trusted USSD-GateWay and reference numeral 6 designates a SS7 Signalling domain.

30 According to a preferred embodiment of the invention the USSD-acknowledgement is caused to be sent back by the ME, upon successful reception, or upon selection and successful read of an ordinary message to the mobile subscriber or user.

According to another preferred embodiment of the invention the sending conditions for sending or not sending said acknowledgement is pre-configured in the ME or SIM or USIM.

5

Alternatively it is preferred that the sending conditions for sending or not sending said acknowledgement is caused to come as a part of the actual message content on the OTA-protocol level, or as part message on the bearer message protocol level.

10

According to still another preferred embodiment the message from an OTA-Platform or a users ME for provisioning of a SIM or an USIM or a Mobile Equipment (ME) is a Short Message (SM).

15

In Figure 1 the present invention is exemplified step by step.

20

The reference numerals designating arrows are underlined and refers to the order according to which the present method works.

25

The first step is that an OTA-Platform or a subscriber with a mobile device sends 1a a data message respectively 1b a message to a recipient via a SMS-C 1. The second step is that the SMS-C transfers a Short Message (SM) 2, 3 over a SS7 Signalling domain 6 to a receiving subscribers mobile device 4. The receiving mobile device 4 or its SIM generates a PoR in the form of a standards based USSD-command and transfers 4, 5, in a third step, the generated PoR over the SS/ Signalling domain to a USSD-GW 5. The trusted USSD-GW 5 transfers the PoR to 6a said SMS-C 1 or alternatively to 6b the said OTA-Platform.

30

In this way, for example, a successful OTA-provisioning of roaming parameters in a roaming situation can be confirmed, irrespectively of a long or short chain of trusted or non  
5 trusted SS7 SCCP carriers between the HPLMN and VPLMN.

Since the SIM or USIM or ME is generating a standards based USSD-command (MAP-USSD message being not accounted) as, for example, a result of successful or unsuccessful OTA provi-  
10 sioning the cost will be kept low, which solves the initially mentioned problem.

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

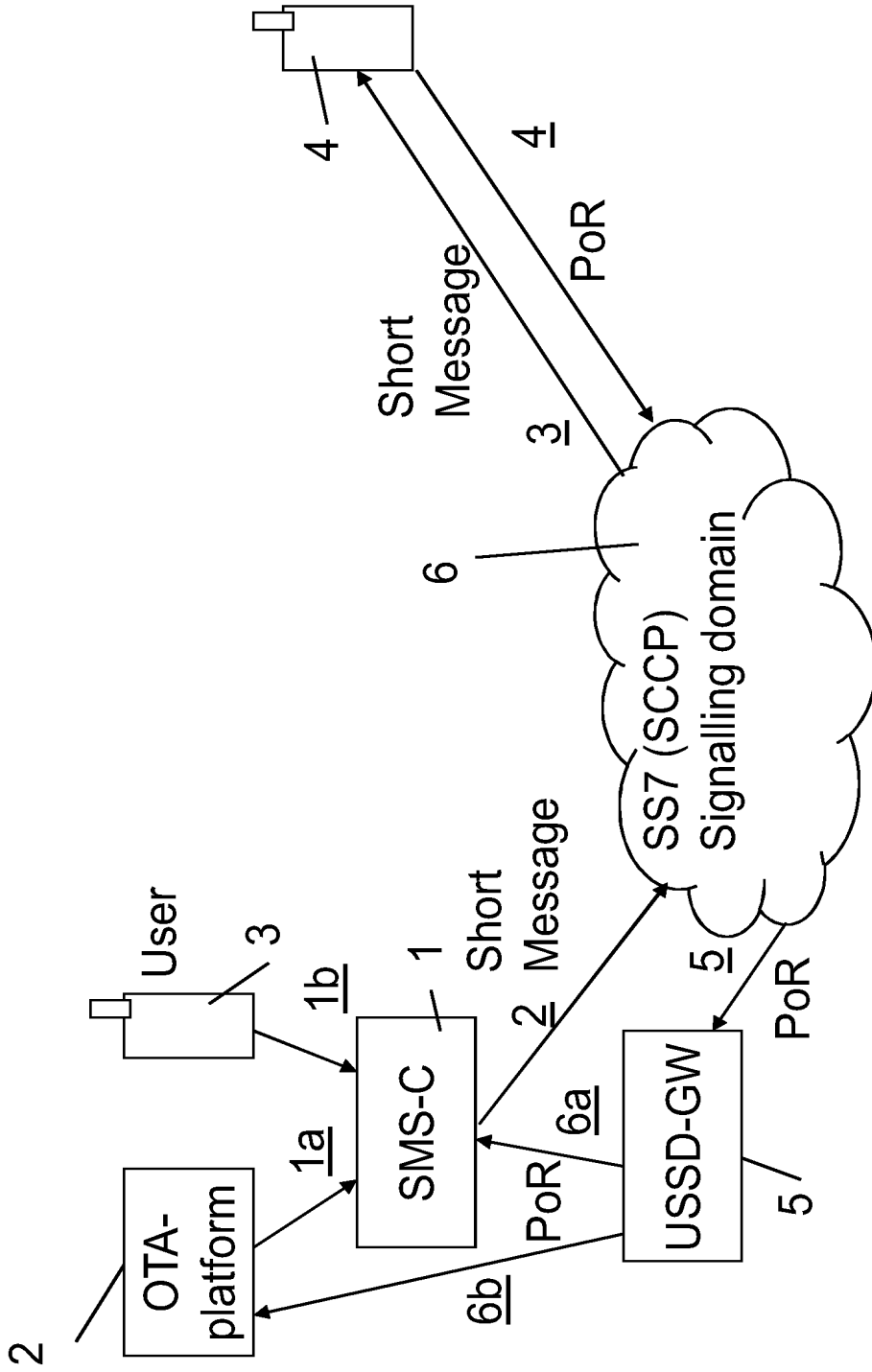
**Claims**

1. A method in mobile telecommunication networks deploying Over-The-Air (OTA) provisioning of a SIM or an USIM or a Mobile Equipment (ME), in need to receive a trusted acknowledgement or Proof-of Receipt from the ME or SIM upon an OTA provisioning which is made over the existing signalling interfaces, characterised in, that the SIM or USIM or ME is generating a standards based USSD-command (Unstructured supplementary Services Data) as a result of successful or unsuccessful OTA provisioning, in that the serving mobile network will be caused to route the MAP (Mobile Application Part)-USSD message over an existing, configured SS7 domain to the home network (HPLMN) and USSD Gateway entity which is caused to relay the acknowledgement to the OTA platform.  
5  
10  
15
2. Method according to claim 1, characterised in, that the USSD-acknowledgement is caused to be sent back by the ME, upon successful reception, or upon selection and successful read of an ordinary message to the mobile subscriber or user.  
20
3. Method according to claim 1, characterised in, that the sending conditions for sending or not sending said acknowledgement is pre-configured in the ME or SIM or USIM.  
25
4. Method according to claim 1, characterised in, that the sending conditions for sending or not sending said acknowledgement is caused to come as a part of the actual message content on the OTA-protocol level, or as part message on the bearer message protocol level.  
30
5. Method according to claim 1, 2, 3 or 4, characterised in, that the message from an OTA-Platform or a



users ME for provisioning of a SIM or an USIM or a mobile  
Equipment (ME) is a Short Message (SM).

FIG 1



**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/EP2010/055615

**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. H04L29/08 H04W4/14  
ADD.

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)  
H04L H04W

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

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

EPO-Internal, COMPENDEX, INSPEC, IBM-TDB, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2008/139180 A1 (MILLS JAMES L [US]) 12 June 2008 (2008-06-12) * abstract paragraph [0001] - paragraph [0072] figures 1-5	1-5
X	US 6 834 196 B1 (TARNANEN TEEMU [FI] ET AL) 21 December 2004 (2004-12-21) * abstract column 1, line 7 - column 5, line 32 figures 1-3	1-5
X	WO 02/30084 A1 (ORGA KARTENSYSTEME GMBH [DE]; SCHUCHART GOETZ [DE]) 11 April 2002 (2002-04-11) * abstract page 1, line 13 - page 16, line 20 figures 1-4	1-5
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Further documents are listed in the continuation of Box C.

See patent family annex.

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- "A" document defining the general state of the art which is not considered to be of particular relevance
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European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040,  
Fax: (+31-70) 340-3016

Authorized officer

Körbler, Günther

## INTERNATIONAL SEARCH REPORT

International application No  
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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.
X	<p>WO 2004/014090 A1 (EYLES CHRISTOPHER DAVID [GB]; BREDEKAMP KAREL FRANCOIS [ZA]) 12 February 2004 (2004-02-12) * abstract page 1, line 9 - page 26, line 8 figures 1-6</p> <p style="text-align: center;">-----</p>	1-5
X	<p>"3rd Generation Partnership Project; Technical Specification Group Core Network; Unstructured Supplementary Service Data (USSD); Stage 2 (Release 8)" 3GPP STANDARD; 3GPP TS 23.090, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, no. V8.0.0, 1 December 2008 (2008-12-01), pages 1-32, XP050362563 * abstract sections 1 - 6</p> <p style="text-align: center;">-----</p>	1-5

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/EP2010/055615
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