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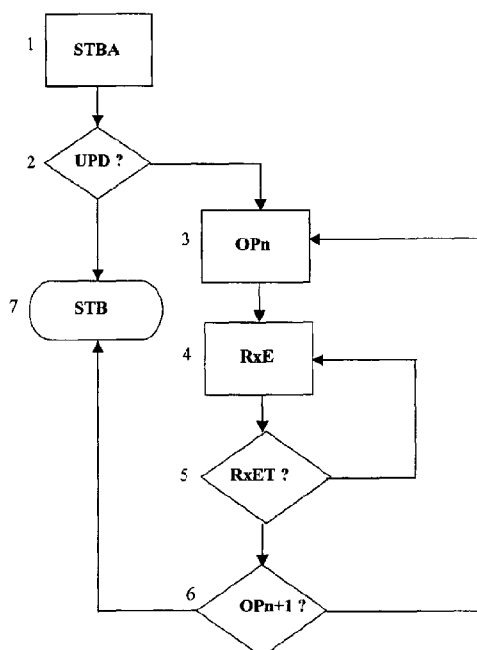
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(54) Title: METHOD AND DEVICE FOR UPDATING RECEPTION RIGHTS IN A MULTIPLE OPERATOR SYSTEM

(54) Titre : METHODE ET DISPOSITIF DE MISE A JOUR DES DROITS DE RECEPTION DANS UN SYSTEME DE RECEPTION MULTI-OPERATEURS



- 1...STANDBY ACTIVATION  
2...UPDATE TEST?  
3...PREFERRED OPERATOR  
4...EMM RECEPTION AND PROCESSING  
5...TEST?  
6...OTHER OPERATOR  
7...STANDBY

(57) Abstract: The invention concerns a method for updating a multiple operator reception system by administration and updating messages (EMM), between a subscriber management system and one or several pay television decoders, the operating conditions of the decoder being dependent upon the reception of administration (EMM) and updating messages from at least a preferred operator, said decoder having in certain conditions to pass through a standby state. If the subscriber uses for the major part an operator not requiring subscriber rights, the decoder does not receive any longer the necessary updates. When it is desired to switch said decoder into standby state, the inventive method carries out the following operations: switching the reception onto the preferred operator(s), receiving and processing the rights management messages (EMM), determining the end of a complete message reception cycle, switching to standby state.

(57) Abrégé : L'invention se rapporte à une méthode de mise à jour d'un système de réception multi-opérateurs par des messages d'administration (EMM) et de mise à jour, entre un système de gestion d'abonné et un ou plusieurs décodeurs de télévision à péage, le fonctionnement du décodeur étant tributaire de la réception de messages d'administration (EMM) et de mise à jour de la part d'au moins un opérateur préférentiel, ce décodeur devant dans certaines conditions passer en état de veille. Si l'abonné utilise majoritairement un opérateur ne requérant pas de droits d'abonnement, le décodeur ne reçoit plus les mises à jour nécessaires. Lorsque l'on souhaite commuter ce décodeur en état de veille, la méthode selon l'invention effectue les opérations suivantes: commuter la réception sur le ou les opérateurs préférentiels, recevoir et traiter les messages de gestion des droits (EMM), déterminer la fin d'un cycle complet de réception de messages, commuter à l'état de veille.

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*En ce qui concerne les codes à deux lettres et autres abréviations, se référer aux "Notes explicatives relatives aux codes et abréviations" figurant au début de chaque numéro ordinaire de la Gazette du PCT.*

## **Method and device for updating reception rights in a multiple operator system**

The present invention concerns the field of pay television.

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Distributed systems are known in which an operator transmits to a group of subscribers one or several services called pay television. These services can be coded or in clear, and they are received and eventually decoded by means of a decoder or Integrated Receiver Decoder (IRD) installed in the subscriber's unit of said services.

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In these known systems the subscriber's decoder changes automatically to a function mode called stand-by in order to save energy in agreement with regulations for this purpose such as EPA 2000, defining the maximum consumption of an electric device in stand-by mode. The subscriber also voluntarily disconnects his/her decoder frequently for the same reason.

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The present trend is to multiply the offer of services proposed to the subscriber, said services using the same physical supports, notably the satellite. The transports used by these physical supports are based on the choice of a particular frequency associated to the transport. On this particular frequency associated to the transport we can include several services of the same operator in the numerical technology of pay television.

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In order to increase the offer of services proposed to the subscriber certain decoder manufacturers propose scanning methods (we understand by scanning the means of analysis of the video flux entering in the subscriber's material) that allow the subscriber to select the group of emissions transmitted in clear, that is, free of charge, in addition to any pay channel or service. This scanning selection allows the subscriber to view the services other than the preferential service. These services other than the preferential service form part of the same reception space, for example they pass through the same satellite. Consequently, the transports that use these physical supports can be

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associated with different operators. Some of these operators can transmit television emissions free of charge, others can transmit pay selections with a certain type of access control called preferential, and others can transmit using a different access control to the preferential access control. In this context each  
5 operator has one or several transports or frequencies that are reserved for him/her.

This situation presents certain inconveniences. On the one hand, when the subscriber is receiving programmes from a non-preferential operator (that is,  
10 only using corresponding transports or frequencies) and rarely chooses to receive the services of this preferential operator the decoder or IRD stops receiving management and updating messages, commonly named EMM in the profession, that are transmitted with the video flux and normally are interpreted by the decoder. On the other hand this inconvenience occurs equally when the  
15 decoder is stopped: in fact, a decoder stopped by the subscriber ceases to receive the messages transmitted with the video flux.

These EMM messages are important for the functioning of the above-mentioned distributed system. The consequence is that the subscriber will not  
20 receive the updating of his/her rights as well as the logical updating linked in most cases to a security module that is compatible with the decoder that is generally presented in the form of a smart card.

When the subscriber has selected a service subject to a subscription the EMM  
25 are sent to the decoder in a cyclic way, each cycle having a duration of about several minutes. This duration depends on the pass bands agreed with the EMM and on the number of EMM to be transmitted, but it normally does not exceed one hour. If the decoder is disconnected, inoperative, or in stand-by mode for a very long time, for example if the subscriber leaves his/her home for  
30 several weeks, this subscriber is normally not surprised to have his/her rights degraded, especially if he/she has not paid a bill during this period of time. On the contrary, if the subscriber uses his/her decoder to view channels of a non-preferential operator, for example channels free of charge, during several hours or even several days, it is not acceptable for him/her to find a loss of rights, or

degraded rights when he/she wants to view again the services of the preferential operator.

Thus, there is at present a problem that has not been solved in a satisfactory way in order to ensure a correct functioning of the system when the decoder of the subscriber is not used for viewing pay channels of a preferential operator during a relatively long period of time.

Throughout this specification the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element, integer or step, or group of elements, integers or steps, but not the exclusion of any other element, integer or step, or group of elements, integers or steps.

Any discussion of documents, acts, materials, devices, articles or the like which has been included in the present specification is solely for the purpose of providing a context for the present invention. It is not to be taken as an admission that any or all of these matters form part of the prior art base or were common general knowledge in the field relevant to the present invention as it existed before the priority date of each claim of this application.

According to a first aspect of the invention there is provided a method of updating a multi-operator reception system by administration and updating messages (EMM) between a subscriber management system and one or several pay television decoders, said messages (EMM) are aimed to update rights and parameters in a security module associated with the decoder, the functioning of the decoder being dependant on the reception of administration (EMM) and updating messages from at least one preferential operator, the decoder having to pass into a stand-by state under certain conditions, characterised in that the method comprises the following steps when activating the stand-by mode:

- switching the reception to the preferential operator or operators,
- receiving and processing of the administration (EMM) and updating messages,
- determining the end of a complete cycle of reception of the administration and updating messages,

- switching to the stand-by state.

According to a second aspect of the invention there is provided a decoder of pay television comprising a stand-by device that can be activated by the user, a  
5 reception unit capable of receiving a plurality of channels, of which at least one part contains administration and updating messages (EMM), which update rights and parameters in a security module associated with the reception unit, characterised in that the decoder comprises means that, when activating the stand-by device, switches the reception unit on the channel that contains the  
10 administration and updating messages (EMM), means for receiving and processing the administration and updating messages, means for determining the end of a complete cycle of reception of the administration and updating messages, and means for switching into the stand-by state.

15 The way in which the method works is the following. When the normal conditions of functioning of the decoder are met for a passage in stand-by mode, for example for saving electric energy, this passage is delayed during a transitory phase of functioning whose duration is chosen in order to ensure the reception of the EMM during at least one cycle of transmission of the EMM  
20 related to one of the access controls used by one of the operators. During this transitory phase the IRD decoder is automatically switched to the preferential operator.

In a particular embodiment of the invention, the access control system installed  
25 in the operator's unit calculates the duration of the transitory phase notably but not exclusively depending on the pass band agreed with the EMM and the number of EMM to be sent in a cycle and sends the result of the calculation to the group of decoders of the distributed system. Particularly, the number of EMM to be sent can depend greatly on certain conditions linked to the calendar  
30 day. Thus, at the end of a given month, many subscribers are likely to renew their subscription to any given service. In these conditions of seasonality we know that the average number of EMM to be transmitted will be greater at the end of the month than for example at the middle of the month. The access control system can then foresee a supplementary security margin linked to this  
35 seasonality.

In this embodiment the head-end of the sending installation, for example five days before the end of the month, sends the following sequence of messages to the decoders installed in the subscribers' units:

- 5 1) High priority message sent during five minutes to the decoders whose number is comprised between  $m$  and  $n$ , where  $n$  minus  $m$  equals for example a thousand: pass the duration of the transitory phase of functioning from one hour to three hours.
- 10 2) High priority message sent to the decoders whose number is comprised between  $n$  and  $p$ , where  $p$  minus  $n$  equals also a thousand: pass the duration of the transitory phase of functioning from one hour to three hours, and so on until the totality of the decoders has received such a high priority message.
- 15 This way of proceeding allows not to disturb the functioning of the system by a high priority message transmitted to all the decoders without exception. Such a message called universal can generate problems because its high priority character makes it interfere with other routine messages that do not benefit from the same priority but whose execution is however important; the
- 20 abovementioned way of proceeding allows to limit these problems to a certain segment of number of decoders, which allows to optimise the later management and solving of such problems.

When the peak of the end of the month is passed, the head-end of the installation sends a message, for example three days after the beginning of the next month, according to the same modalities, returning the duration of the transitory phase of functioning to a smaller value such as one hour. The operator can thus decide to benefit this return message of a normal lower priority.

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The invention also concerns a decoder that functions following the abovementioned method. Hereinafter the state of the decoder corresponding to the transitory phase of functioning will be called transitory state.



In the transitory state the decoder does not decode the flux of video and consequently does not send any signal to the television; it only carries out operations of reception of associated messages such as ECM and EMM. In the absence of reception of a television programme the ECM messages are particularly useful to maintain the time in the conditional access sub-system, that is, the smart card inserted in the decoder.

The stand-by state is normally the state in which the decoder passes to the end of the transitory phase of functioning according to the invention. When it has been stopped manually by the subscriber, without the device being switched off, this is the state normally known as "Off", for example on the start switch of the decoder or on the remote control. In the stand-by state the decoder does not ensure the display, decoding, nor the reception of associated messages.

In case we wish to avoid that disconnecting the decoder from the current source affects negatively the efficiency of the method according to the invention it is necessary to foresee an autonomous energy source for the decoder. This source of energy has to have a duration long enough to ensure the desired functioning during the transitory phase. Such an energy source can in a known way consist of a battery.

In a first embodiment of the invention the passage to transitory phase of functioning can be carried out with a classic electromechanical relay subject to a temporisation. These relays command in a known way the passage to the transitory state.

In another embodiment the passage and the maintenance in the transitory state is ensured only by software functions, the electronic components present in the decoders being in charge of the passage to the transitory state, the duration of this transitory state, and finally the passage of the decoder to the stand-by state when the prescribed duration for the transitory state is reached.

This embodiment particularly concerns the decoders supplied with special equipment commonly named "timer" that commands in a programmable way

the starting of the decoder. In this type of decoders the invention preferably uses the functions of this timer.

5 According to an embodiment of the invention, when the subscriber has previously selected the preferential operator for a duration at least equal to the period, the transitory phase is simply eliminated, the decoder having received all the necessary information to be updated.

10 In an intermediate embodiment, if the duration of normal functioning of the preferential operator is lower than the period, the duration of the transitory phase will be adjusted so that the addition of the duration of use and the transitory phase correspond to the period.

15 This invention is not limited only to the reception of the EMM messages from a preferential operator but can be applied to several operators needing the updating of the rights referring to them. During the transitory phase the decoder will scan the respective channels of the operators in order to update the data of each one before switching to the stand-by state.

20 According to another embodiment of the invention the decoder is in itself capable of determining the period. This period is defined as the time that separates the repetition of the EMM messages. It is the decoder, when entering in transitory mode, who will memorise the first EMM message and will wait to declare the end of the period when the same EMM message will be sent again.  
25 The transitory duration will be just the necessary duration for the updating of the rights. In case the duration of the repetition of the message exceeds the pre-defined maximum period the decoder passes into the stand-by state at the end of this period.

30 The invention will be better understood with the help of the following detailed description that refers to the only figure, which is given as a non-limiting example and in which a flow chart of the functioning of the invention is described.

This figure shows the different stages of the procedure of stand-by of the decoder mentioned in the invention as well as their succession in the different possible cases:

5 Case 1: no reception of rights is necessary.

When the stand-by is activated by the entrance in the STBA block, and the UPD test of the necessity of an updating is carried out on the base of the previous functioning of the decoder. In fact, if the decoder was already on a  
10 channel delivering management information the decoder will be able to pass directly to the stand-by state STB.

Case 2: a reception of rights is necessary.

15 When the stand-by is activated (STBA) and the UPD test has shown that the decoder was not on a channel that delivered management information, then it switches the reception on the preferential operator OP<sub>n</sub>; it receives and processes the messages of administration and updating EMM (Rx<sub>E</sub>) until the complete cycle is finished according to the criteria defined above, this test is  
20 represented by the rhomb Rx<sub>ET</sub>.

Once the end of the cycle is established the decoder carries out a test of the necessity of an updating for another operator (OP<sub>n</sub> +1), and if this test is negative it passes to the stand-by state (STB).  
25

Case 3: an updating is necessary for another operator.

If the OP<sub>n</sub>+1 test is positive the decoder switches the reception on the next preferential operator (n+1) and begins again the procedure of reception and  
30 processing of the administration and updating messages EMM until the complete cycle is finished for this operator.

When all the preferential operators have been processed the decoder then passes to the stand-by state.

According to an embodiment, in each entrance in the procedure of stand-by only one preferential operator will be processed before passing into the stand-by state. The processing of all the preferential operators is then carried out by

5 changing the operator when entering in the procedure of stand-by.

## THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method of updating a multi-operator reception system by administration and updating messages (EMM) between a subscriber management system and one or several pay television decoders, said messages (EMM) are aimed to update rights and parameters in a security module associated with the decoder, the functioning of the decoder being dependant on the reception of administration (EMM) and updating messages from at least one preferential operator, the decoder having to pass into a stand-by state under certain conditions, characterised in that the method comprises the following steps when activating the stand-by mode:
- switching the reception to the preferential operator or operators,
  - receiving and processing of the administration (EMM) and updating messages,
  - 15 - determining the end of a complete cycle of reception of the administration and updating messages,
  - switching to the stand-by state.
2. A method according to Claim 1 when the decoder is connected to more than one preferential operator, characterised in that the method comprises repeating the operations of switching, receiving, processing, and determining the end of the cycle for each operator.
3. A method according to Claim 1, characterised in that the determination of the end of a complete cycle is defined according to pre-defined duration.
4. A method according to Claim 3, characterised in that the duration is determined by the subscriber management system and transmitted to the decoder.
5. A method according to Claim 1, characterised in that the determination of the end of a complete cycle is defined according to the following stages:
- reception of a first message of management of rights,
  - reception of messages until the repetition of the first message.

6. A method according to Claim 5, characterised in that the switching to the stand-by state is activated when the duration of waiting for the repetition of the first message exceeds a pre-defined period.

5 7. A method according to Claim 1, characterised in that the determination of the end of a complete cycle is defined according to the duration during which the decoder has been connected to the preferential operator previously to the activation of the stand-by mode.

10 8. A decoder of pay television comprising a stand-by device that can be activated by the user, a reception unit capable of receiving a plurality of channels, of which at least one part contains administration and updating messages (EMM), which update rights and parameters in a security module associated with the reception unit, characterised in that the decoder comprises  
15 means that, when activating the stand-by device, switches the reception unit on the channel that contains the administration and updating messages (EMM), means for receiving and processing the administration and updating messages, means for determining the end of a complete cycle of reception of the administration and updating messages, and means for switching into the stand-  
20 by state.

9. A decoder of pay television according to Claim 8, characterised in that the means for determining the end of a complete cycle of reception comprise a clock.  
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10. A decoder of pay television according to Claim 8, characterised in that the means for determining the end of a complete cycle comprise means for memorising a first updating message, and means for detecting the repetition of the first updating message of the end of updating.  
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11. A method of updating a multi-operator reception system substantially as hereinbefore described with reference to any method steps or with reference to the accompanying drawings.

12. A decoder of pay television substantially as hereinbefore described with reference to the accompanying drawings.

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Dated this fourth day of October 2005

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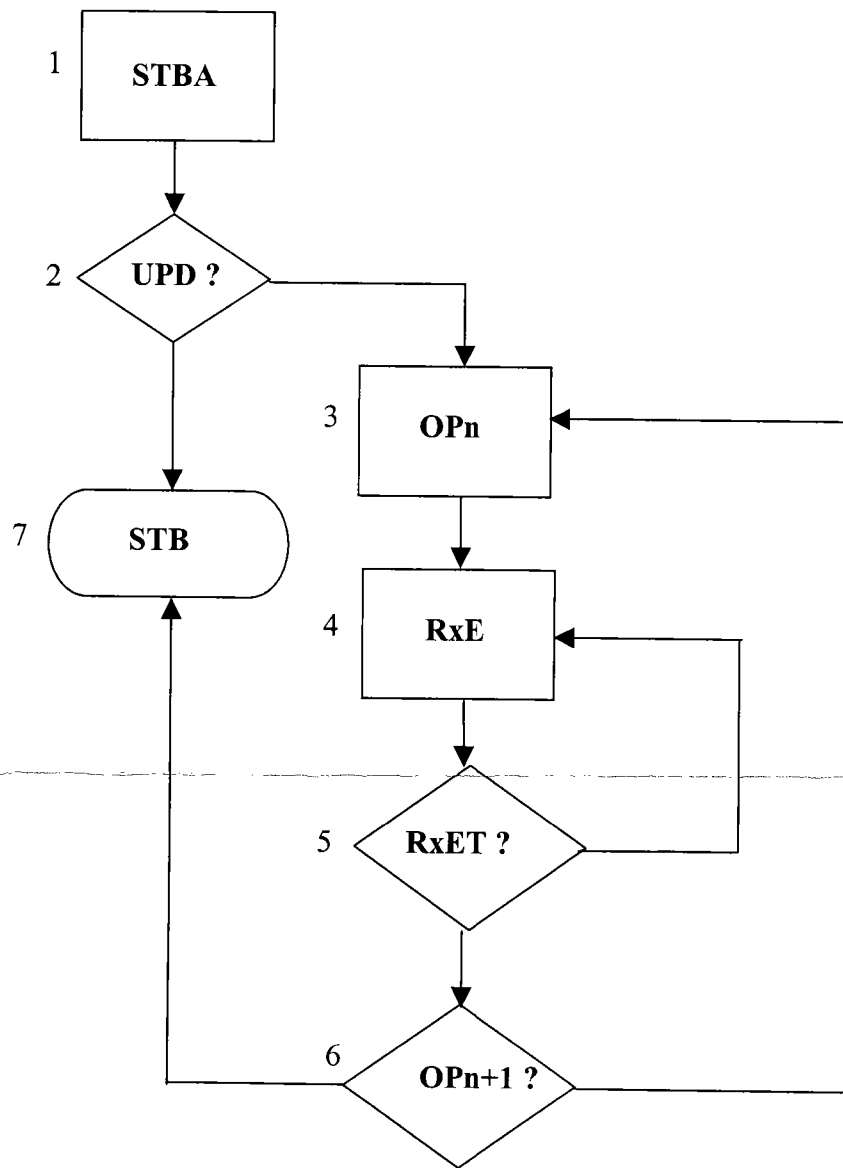


Fig. 1