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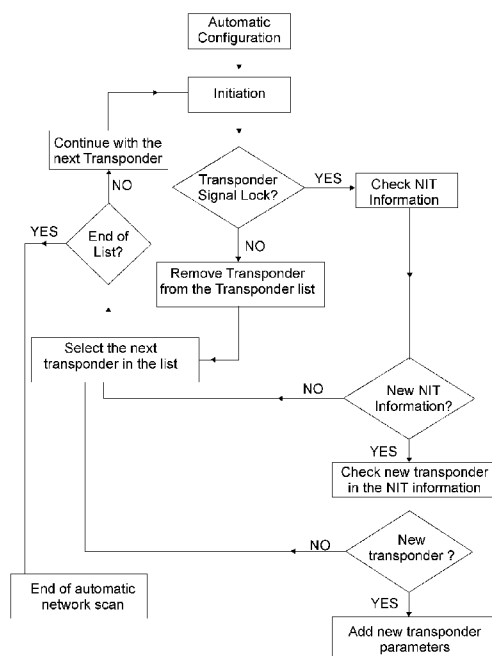
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(54) **Title:** IMAGE DISPLAY DEVICE WITH AUTOMATIC TRANSPONDER LIST UPDATE FUNCTION

Fig. 1



(57) **Abstract:** A method for operating an image display device, said method comprising a first step of verification during which each transponder in a preloaded transponder list in association with a satellite is successively verified such that a respective transponder's parameters are fed to a demodulator to verify whether signal lock is achievable, if signal lock is achieved, a first step of transponder information retrieval during which presence of network information tables (NIT) at the tuned frequency is checked and if transponder information is retrieved from the network information tables, a first step of transponder list update during which at least one transponder's parameters are compared to existing preloaded transponder parameters and at least one new transponder with new parameters is included in the transponder list in association with the given satellite.

Description**IMAGE DISPLAY DEVICE WITH AUTOMATIC TRANSPONDER LIST UPDATE FUNCTION**

- [0001] The present invention relates to an image display device having an automatic transponder list update function, said automatic transponder list update function, when called, effecting updating of the transponder list in a substantially reduced amount of time.
- [0002] Digital and interactive TV systems provide a comprehensive amount of TV channels and programs leading to the general outcome that conventional methods for configuring the operation of the image display device from among a plurality of setting parameters may become inefficient to the extent that it is unperformable in a time-saving manner.
- [0003] A transponder typically receives a television signal on the ground from satellite uplink stations and processes the signal by encoding, amplifying and rebroadcasting the same. Satellite receivers then transmit the same to a digital receiver of an end-user so that it is decoded and displayed on an image display device.
- [0004] Assuming that a TV service may have hundreds of channels, configuring transponder information for a significant number of channels on a manual basis might take some serious time. It is to be noted that an image display device can be factory-configured such that transponder information is preloaded for a plurality of channels. In this case, the image display device will already be ready for the first use.
- [0005] Alternatively, users can initiate auto-scan function to automatically retrieve channel-specific transponder information, also based on a preloaded transponder list. Since a satellite's actual transponder list can change in a non-negligible frequency, a channel whose transponder information is not updated will be viewed, when channel surfing, as a blank screen and the channel-specific transponder information will continually be maintained in the transponder list. The situation may typically lead to an extent that an extensive amount of transponder information is not usable but preserved in the list. Further, it is also to be noted that unused transponder information is not be replaced as new entries are recorded.

- [0006] Alternatively, if the auto-scan function is performed such that both the preloaded transponder list is checked and all the available frequencies, without inputting by the user any parameters, are scanned, a substantially longer amount of time is needed for completing this 'network scan'.
- [0007] Accordingly, configuration of transponder settings can be better managed and users can be offered a less troublesome viewing experience without having to manually delete and/or update unused transponder data on a continual basis or wait for a substantial amount of time for completion of the network scan task. The present invention therefore substantially accelerates maintenance of the transponder information by modifying or deleting inaccurate or outdated data in association with a satellite's transponder list in an automatic manner such that a given user needs not manually fiddle with the setting of each transponder.
- [0008] Among others, one of the prior art disclosures in the technical field of the present invention can be referred to as US6055431, which defines a method for controlling the operation of multiple beam antenna systems in communication with satellite transponders. The method controls the coverage area assignments, frequency assignments, transmitted power level assignments, and component allocation assignments of these multiple beam antenna transponders in response to the existing and time varying demands for satellite resources. The method manages the operation of the satellite transponders to optimize the overall capacity of the communication satellite.
- [0009] The present invention provides a system and method by which an image display device is operable so as to automatically manage configuration of transponder settings in a substantially accelerated and non-intrusive manner without requiring additional actions on the part of the user, as provided by the characterizing features defined in Claim 1.
- [0010] Primary object of the present invention is to provide a system and method by which management of transponder-related inaccurate or outdated data of an image display device is carried out automatically in a substantially reduced amount of time.
- [0011] The present invention proposes an automatic transponder list updating

method for an image display device. The method comprises a first step of transponder verification, a first step of transponder information retrieval, a first step of transponder list update and a second step of transponder verification.

- [0012] The first step of verification comprises a verification operation in relation with each transponder in a preloaded transponder list in a successive manner so as to determine whether signal lock is achieved using a respective transponder's specific parameters and if signal lock is achieved, a first step of transponder information retrieval is performed during which it is checked whether network information tables (NIT) are receivable from the broadcast service provider. And again, if additional information is available, a first step of transponder list update is applied such that at least one new transponder is added to the transponder list so as to obtain an updated transponder list.
- [0013] During a second step of verification, functionality of each transponder in said updated transponder list is verified in the manner to determine whether signal lock is achievable.
- [0014] Further, a second step of transponder information retrieval is performed during which the image display receives network information tables each time a new channel is selected during channel changing. This step is also followed by a second step of transponder list update during which at least one new transponder obtained from the network information tables during channel changing is added to the transponder list so as to obtain a further updated transponder list. Preferably, the second step of verification is carried out during standby mode in a less intrusive manner, without requiring additional actions on the part of the user.
- [0015] Further, according to the invention, transponders that exhibit signal error are automatically deleted from the further updated transponder list during the second step of verification. However, removed channels and respective transponder information is copied to a temporary channel list to be rechecked in terms of functionality in a certain time interval.
- [0016] Accompanying drawings are given solely for the purpose of exemplifying a system and method by which an image display device is operable, whose

advantages over prior art were outlined above and will be explained in brief hereinafter.

- [0017] The drawings are not meant to delimit the scope of protection as identified in the claims nor should they be referred to alone in an effort to interpret the scope identified in said claims without recourse to the technical disclosure in the description of the present invention.
- [0018] Fig. 1 demonstrates a general diagram according to which the image display device of the invention executes the method according to the present invention.
- [0019] Fig. 2 demonstrates a general diagram according to which the image display device of the invention executes transponder list update step of the method according to another embodiment of the present invention.
- [0020] Fig. 3 demonstrates a general diagram according to which the image display device of the invention executes the second step of verification of the method according to the present invention.
- [0021] It is known that digital and interactive TV systems provide a comprehensive amount of TV channels and programs and each channel has specific transponder information, a transponder typically receiving a television signal from the satellite uplink stations on the ground and encoding, amplifying and rebroadcasting the same. Transponder parameters can typically involve satellite name, transponder frequency in MHz, polarization, symbol rate in Ksym/s etc.
- [0022] An image display device can be factory-configured such that transponder information is preloaded for a plurality of channels. However, a satellite's actual transponder list can change in time and it can expand to accommodate new entries along with old ones, a channel whose transponder information is not updated being typically viewed as a blank screen when channel surfing. In this case, the user can rearrange the transponder list by selecting a respective menu in the interface environment, which is not easily directly accessible in certain cases. The user must repeat the same action each time an outdated entry is encountered.
- [0023] The present invention proposes a method for operating an image display

device, having an automatic transponder list updating function as delineated below. The automatic transponder list updating function of the invention can alternatively be automatically called, upon setting a time interval by the user such that the image display device periodically performs automatic transponder list updating action such that transponder information in association with a respective satellite is processed and channels that exhibit signal error are automatically cleared.

[0024] To this end, the image display device of the present invention executes the method of updating the transponder list being implemented in the following manner: The image display device is first configured by the user to initiate automatic transponder list updating action. The image display device initiates the operation based on the preloaded transponder list in association with a satellite such that the respective parameters such as frequency, symbol rate and polarization of a transponder are fed to the demodulator to verify whether signal lock is achieved. If so, presence of network information tables (DVB-NIT or NIT) at the tuned frequency is checked. Network information tables may contain additional transponder information obtainable from the broadcast service provider. And again, if additional transponder information is retrieved from the network information tables, new transponder parameters are compared to existing preloaded transponder parameters and new transponders with new parameters are included in the transponder list in association with a given satellite. In this manner, each transponder in the preloaded list will be verified successively and new transponder information retrieved from the network information tables provided by the broadcast service will be included in the transponder list.

[0025] At this stage, the transponder list will therefore contain preloaded transponders that are already verified and transponders that are entered in the list for the first time and being not yet verified. When the automatic transponder list updating function is called by the user, the image display device therefore terminates the first stage of the automatic transponder list updating action by trying to verify the final transponder in the preloaded list and retrieving additional transponder information from the broadcast

service in association with this final transponder.

[0026] The first stage of the automatic transponder list updating operation is the only stage during which the user will have to wait for the completion of the process before taking control of the image display device. The duration of the automatic transponder list updating operation directly noticeable by the user is therefore substantially shorter than the total duration thereof.

Likewise, the present invention provides that the process is also substantially shorter compared to a network scan operation during which all the available frequencies are scanned.

[0027] The second stage of the automatic transponder list updating operation according to the present invention is a passive stage during which that the user can regularly enjoy TV viewing. During this stage, the image display device checks presence of network information tables each time a new channel is selected. Again, if new transponder information is retrievable, they are included in the transponder list. Therefore, the transponder list is updated during channel surfing. The second stage of the automatic transponder list updating operation is carried out without intervention of the user so that the operation is not noticeable unless its passive nature of operation is disabled by the user by selecting a respective menu in the interface environment.

[0028] The third and final stage of the automatic transponder list updating operation is the functionality verification of the added transponders in the transponder list. The verification process being previously carried out for the preloaded transponders is now carried out for the new transponders retrieved from the network information tables during the first and second stages of the operation. During this stage, new transponders are verified so as to determine whether signal lock is achieved. The third stage of the automatic transponder list updating operation is performed in standby mode during which the user shows no interest in TV viewing and his/her viewing experience is accordingly not interrupted. This third stage in accordance with the invention is therefore an inherently passive stage which causes no disturbance to the user.

[0029] Alternatively, the user can himself/herself initiate the third stage by

selecting a respective menu in the interface environment so that only the newly added transponders' functionality is checked, which will therefore be terminated in a substantially shorter period of time compared to a network scan during which the preloaded transponder list is checked and all the available frequencies are scanned.

- [0030] According to the invention, transponders that exhibit 'no signal' error can automatically be deleted so that outdated transponder entries in the transponder list are cleared. In this way, no blank screen with the 'no signal' error message will be encountered. This automatic clearing function of the image display device is performed such that, while providing that outdated transponder entries in the transponder list in association with a respective satellite are cleared on confirmation and the respective channels are removed from the channel list, according to a further step of operation, the removed channels and associated transponder information are automatically copied to a temporary channel list and the transponder information for each channel in the list is rechecked at the end of a certain time interval. In this regard, the invention also ensures that the channels with no 'no signal' error can automatically be relocated back.
- [0031] In a nutshell, the present invention proposes a method for operating an image display device, said method for operating the image display device comprises an automatic transponder list updating action.
- [0032] According to one embodiment of the present invention, the method comprises: a) a first step of verification during which each transponder in a preloaded transponder list in association with a satellite is successively verified such that a respective transponder's parameters are fed to a demodulator to verify whether signal lock is achievable, b) if signal lock is achieved, a first step of transponder information retrieval during which presence of network information tables (NIT) at the tuned frequency is checked, c) if transponder information is retrieved from the network information tables, a first step of transponder list update during which at least one transponder's parameters are compared to existing preloaded transponder parameters and said at least one new transponder with new parameters is included in the transponder list in association with the given

satellite and, d) a second step of verification during which transponders in the transponder list updated during the first step of transponder list update are verified in the manner to determine whether signal lock is achievable.

[0033] According to a further embodiment of the present invention, the method comprises a second step of transponder information retrieval during which the image display device checks presence of network information tables each time a new channel is selected during channel changing.

[0034] According to a further embodiment of the present invention, the method comprises a second step of transponder list update during which at least one transponder's parameters included in the network information tables are compared to existing transponder parameters in the transponder list being updated during the first step of transponder list update and said at least one new transponder with new parameters is included in the transponder list.

[0035] According to a further embodiment of the present invention, the second step of verification is carried out during standby mode.

[0036] According to another embodiment of the present invention, the method further comprises the step of deleting transponders that exhibit signal error during the second step of verification from the transponder list.

[0037] According to another embodiment of the present invention, the method further comprises the step of automatically copying removed channels and respective transponder information to a temporary channel list.

[0038] According to another embodiment of the present invention, the method further comprises the step of verifying functionality of a transponder for each channel in the temporary channel list at the end of a certain time interval.

[0039] According to another embodiment of the present invention, the method further comprises the step of carrying over the transponder information in respect of a channel which previously exhibited signal error and currently functional into said transponder list.

[0040] According to another embodiment of the present invention, the method further comprises the step of deleting transponder information in respect of channels which previously exhibited and currently exhibit signal error at

the end of a certain time interval.

[0041] In this regard, the present invention ensures that configuration of transponder settings can be better managed in a less intrusive and substantially shorter manner such that users are offered a less troublesome viewing experience without having to manually delete and/or update unused transponder data on a continual basis or wait for a substantial amount of time for completion of the automatic network scan task. The present invention therefore substantially accelerates maintenance of the transponder list without requiring user intervention.

Claims

1. A method for operating an image display device, said method for operating the image display device comprises an automatic transponder list updating action **characterized in that** the method comprises:
 - a first step of verification during which each transponder in a preloaded transponder list in association with a satellite is successively verified such that a respective transponder's parameters are fed to a demodulator to verify whether signal lock is achievable,
 - if signal lock is achieved, a first step of transponder information retrieval during which presence of network information tables (NIT) at the tuned frequency is checked,
 - if transponder information is retrievable from said network information tables, a first step of transponder list update during which at least one transponder's parameters are compared to existing preloaded transponder parameters and said at least one new transponder with new parameters is included in the transponder list in association with the given satellite and
 - a second step of verification during which transponders in the transponder list updated during the first step of transponder list update are verified in the manner to determine whether signal lock is achievable.
2. A method for operating an image display device as in Claim 1, **characterized in that** the method comprises a second step of transponder information retrieval during which the image display device checks presence of network information tables each time a new channel is selected during channel changing.
3. A method for operating an image display device as in Claim 2, **characterized in that** the method comprises a second step of transponder list update during which at least one transponder's parameters included in the network information tables are compared to existing transponder parameters in the transponder list being updated during the first step of transponder list update and at least one new transponder with new parameters is included in the transponder list.
4. A method for operating an image display device as in Claim 1, 2 or 3 **characterized in that** the second step of verification is carried out during standby mode.

5. A method for operating an image display device as in any preceding Claims, **characterized in that** the method further comprises the step of deleting transponders that exhibit signal error during the second step of verification from the transponder list.
6. A method for operating an image display device as Claim 5, **characterized in that** the method further comprises the step of automatically copying removed channels and respective transponder information to a temporary channel list.
7. A method for operating an image display device as Claim 6, **characterized in that** the method further comprises the step of verifying functionality of a transponder for each channel in the temporary channel list at the end of a certain time interval.
8. A method for operating an image display device as in Claim 7, **characterized in that** the method further comprises the step of carrying over the transponder information in respect of a channel which previously exhibited signal error and currently functional into the transponder list.
9. A method for operating an image display device as in Claim 8, **characterized in that** the method further comprises the step of deleting transponder information in respect of channels which previously exhibited and currently exhibit signal error at the end of a certain time interval.

Fig. 1

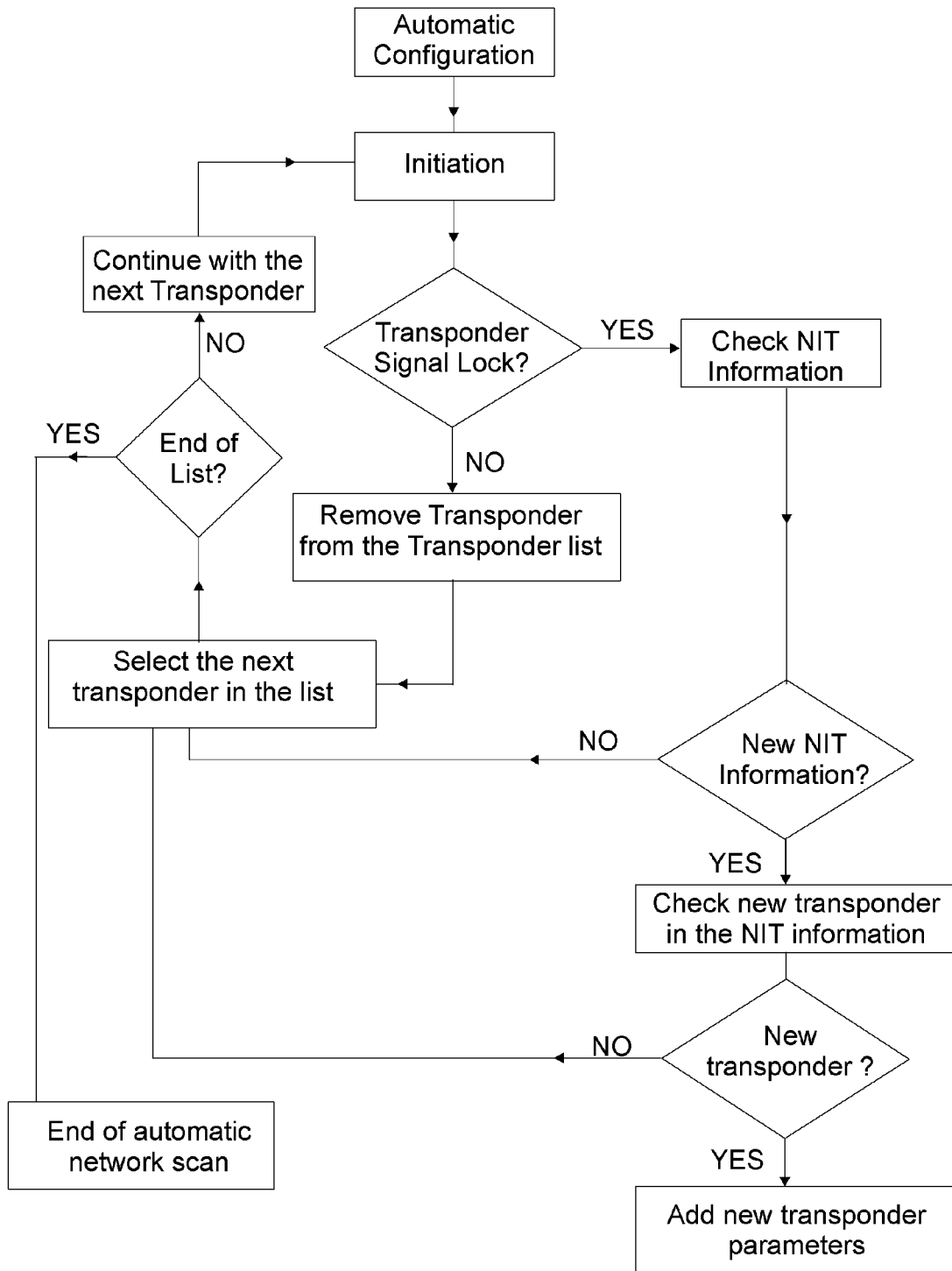


Fig. 2

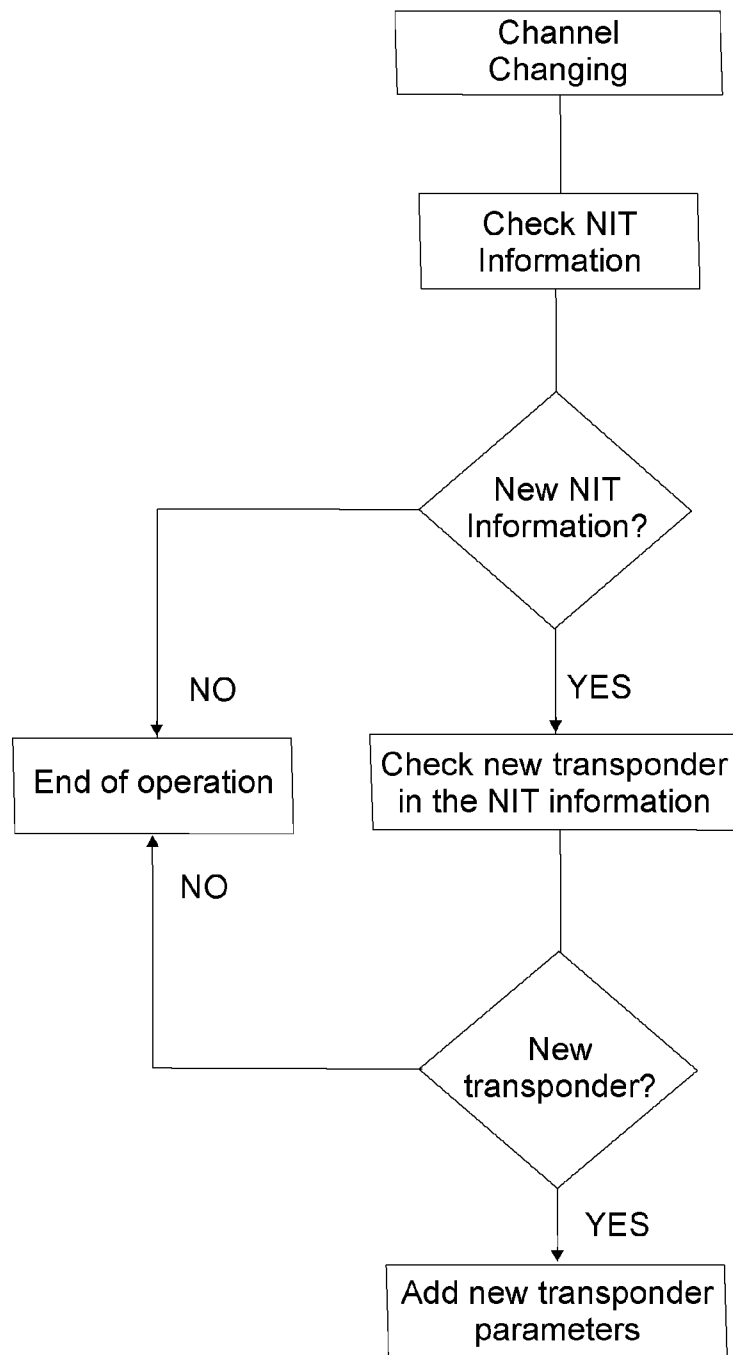
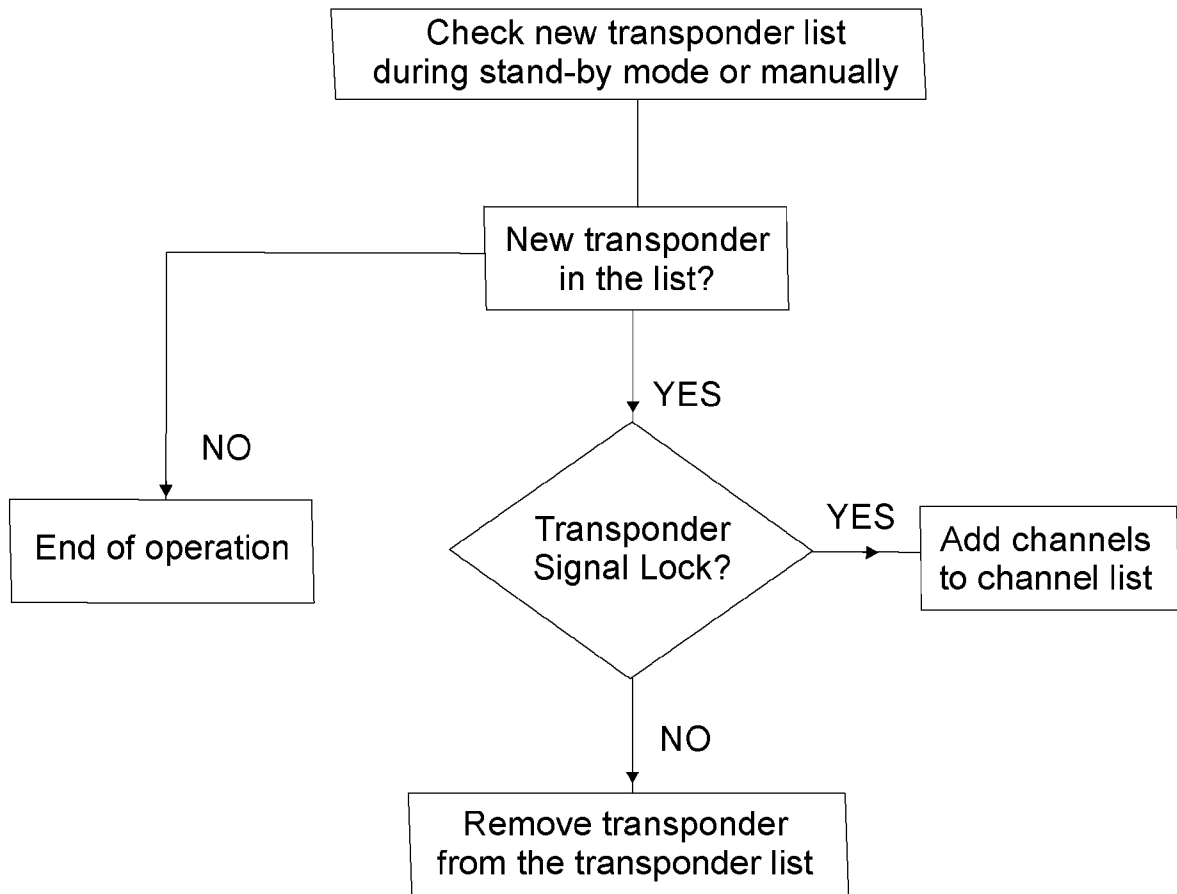


Fig. 3



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2014/066901

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04H40/90 H04H60/41
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)
H04H

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 practicable, search terms used)

EPO-Internal, 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	JP 2002 344906 A (SONY CORP) 29 November 2002 (2002-11-29) paragraphs [0060] - [63.68] -----	1-9
A	EP 1 722 569 A1 (CYBERLINK CORP [TW]) 15 November 2006 (2006-11-15) paragraphs [0013], [0016] -----	5
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A	KR 2014 0003968 A (DANDINET CO LTD [KR]) 10 January 2014 (2014-01-10) the whole document -----	1-9



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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2014/066901

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