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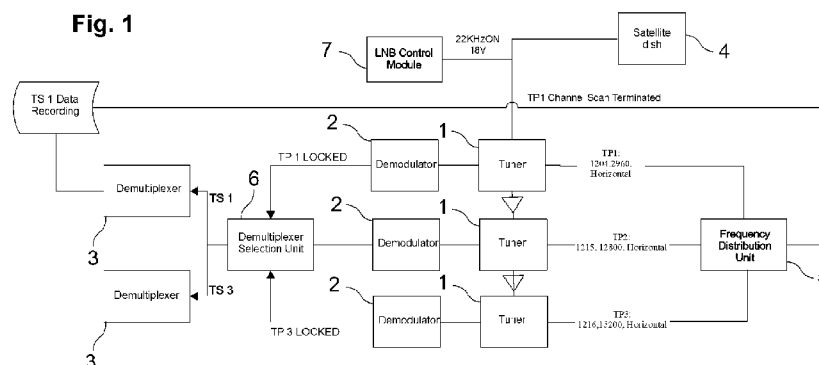
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(54) Title: SYSTEM FOR ACCELERATED SCANNING OF SEPARATE ACCESS CONTENTS IN AN IMAGE DISPLAY
DEVICE

Fig. 1



(57) Abstract: The present invention relates to a signal processing device having channel list update function, the update function, when called, effecting updating of the channel list in a substantially reduced amount of time. More particularly, the present invention relates to a signal processing device receiving a plurality of broadcasting services and comprising a digital TV processor, at least two couples of tuner (1) and demodulators (2) and at least one demultiplexer (3) module which supplies transport streams.

Description**SYSTEM FOR ACCELERATED SCANNING OF SEPARATE ACCESS
CONTENTS IN AN IMAGE DISPLAY DEVICE**

- [0001] The present invention relates to a signal processing device having channel list update function, said update function, when called, effecting updating of the channel 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] Considering the fact that a large number of television and multimedia services are being made available to consumers today, methods for enabling the host, i.e. an image display device such as a TV set with a digital receiver-decoder to satisfactorily process the received services are required. An image display device may receive programs via cable or satellite broadcasting in the form of separate subscription formats.
- [0004] 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.
- [0005] Assuming that a TV service may have hundreds of channels, configuring channel 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 channel information is preloaded for a plurality of channels, in which case, the image display device will be ready for the first use.
- [0006] Alternatively, users can initiate auto-scan function to automatically retrieve channel-specific information, generally based on a preloaded frequency range or transponder information.
- [0007] If the auto-scan function is performed such that both the preloaded frequency ranges are scanned, transponder list is checked and an

additional blind scan is performed, without inputting any parameters by the user, a substantially longer amount of time is needed for completing this network scan.

- [0008] Accordingly, configuration of channel information can be better managed and users can be offered a less troublesome viewing experience without having to manually delete and/or update information 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 channel information.
- [0009] 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.
- [0010] The present invention provides a system and method by which a signal processing device is operable so as to automatically manage configuration of channel 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.
- [0011] Primary object of the present invention is to provide a system and method by which management of channel information in an image display device is carried out automatically in a substantially reduced amount of time by which inaccurate or outdated settings are also clearable.
- [0012] The present invention proposes a signal processing device in the form of a receiver or image display device. The signal processing device receives a plurality of broadcasting services while a first tuner and a second tuner, supply transport streams to a digital TV processor.
- [0013] The digital TV processor performs a channel information retrieving

operation having simultaneously initiated stages. The search entails simultaneous updating of transponders in association with a satellite. The signal processing device categorically classifies the preloaded transponder list to divide it into four frequency band sub-groups based on polarization data and local oscillator frequency band (HiLOF, LoLOF).

- [0014] A frequency distribution unit then assigns a dedicated frequency belonging to the same frequency band sub-group to each tuner and demodulator couple. An LNB control module programs the LNB such that the frequency distribution unit simultaneously assigns consecutive frequencies of a single frequency band sub-group to a respective tuner and demodulator couple at a given time.
- [0015] 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.
- [0016] 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 the claims without recourse to the technical disclosure in the description of the present invention.
- [0017] Fig. 1 demonstrates a general schematic view of the main components of the signal processing device according to the present invention.
- [0018] Fig. 2 demonstrates a general flow diagram according to which the signal processing device of the invention executes the method according to the present invention.
- [0019] The following numerals are being referred to in the detailed description of the present invention.
1. Tuner
 2. Demodulator
 3. Demultiplexer
 4. Satellite dish
 5. Frequency distribution unit
 6. Demultiplexer selection unit
 7. LNB control module

- [0020] The present invention proposes a signal processing device in the form of an image display device or a set-top box receiving programs via satellite broadcasting for instance in the form of separate subscription formats. A set-top box typically contains at least one tuner input, operating in connection with an image display device. Alternatively, the image display device itself can receive programs using built-in satellite tuners.
- [0021] Digital and interactive TV systems provide a comprehensive amount of TV channels and programs. A conventional structure receiving program contents receives a transport stream via a tuner. In order for viewing a first program content and processing a second program content, the receiver-decoder should have two tuners, which also enables various types of services including interactive functions such as picture-in-picture.
- [0022] The signal processing device in the form of an image display device in accordance with the invention can be connected to a set-top box, the latter having a plurality of tuners (1). The image display device itself or the receiver (set-top box) can therefore have multiple tuners as well as a plurality of demodulators (2) suitable for receiving broadcast multimedia content. In this regard, receivers capable of receiving and tuning to signals of different generations (e.g. DVB-S, DVB-S2) can be in use. Satellite broadcasting involves a frequency band of 10.7 – 12.75 GHz while the Low Noise Block (LNB) converts the signal into a 950 – 2200 MHz frequency band as supported by the receiver.
- [0023] The tuners (1) are typically connected to a satellite dish (4). Conventionally, signal received from a satellite dish (4) is converted to IF signal (Intermediate frequency), which can then be processed by the demodulators (2). The demodulators (2) then typically output transport streams to a digital TV processor having an audio/video processing unit, which accordingly processes said transport streams and retrieves service data for all the channels.
- [0024] By way of processing the signal received from a satellite dish (4), specific transponder information of each channel is retrievable. A transponder typically receives a television signal from the satellite uplink stations on the ground, encoding, amplifying and rebroadcasting the same. Transponder

parameters typically involve satellite name, transponder frequency in MHz, polarization, symbol rate in Ksym/s etc.

- [0025] The image display device can be factory-configured to have a satellite's transponder list. However, as the actual transponder list of a satellite can expand in time so as to accommodate new entries along with old ones, a channel whose transponder information is not updated will typically be viewed as a blank screen during channel surfing.
- [0026] The present invention proposes a system and a method for operating an image display device, having an accelerated channel information retrieving operation as delineated below. The automatic channel information retrieving operation of the invention can be automatically called on a periodical basis by setting a time interval such that transponder information in association with a given channel is processed and channels that exhibit signal error are automatically cleared.
- [0027] To this end, the signal processing device of the present invention executes the method of retrieving channel information to be implemented in the following manner: The signal processing device initiates the automatic channel information retrieving operation based on the preloaded transponder list. Television broadcasting signals are searched and parameters such as frequency, symbol rate and polarization of a transponder are fed to the demodulators to verify whether signal lock is achievable.
- [0028] According to the invention, satellite channels are simultaneously searched by a plurality of tuners (1). Referring to Fig. 1, at least two couples of tuner (1) and demodulators (2) and at least one demultiplexer (3) module are demonstrated. The transport stream data at the demodulator (2) output is conveyed to a respective demultiplexer (3) module in an order based on signal lock verification status of different transponders.
- [0029] The present invention provides grouping of transponders so as to allow common LNB programming as will be delineated below in detail. The invention enables simultaneous parallel scanning by a plurality of tuner (1) and demodulator (2) lines in communication with a single coaxial cable.
- [0030] According to the invention, the transponder list is categorically classified

based on polarization (vertical, horizontal) and high and low local oscillator frequency (HiLOF, LoLOF), allowing simultaneously tuning to different transponders by using common LNB programming. For instance, this approach allows programming by a single DiSEqC message depending on the satellite equipment. The search operation is performed by passing the same RF signal through different tuner (1) and demodulator (2) lines. The open standard Digital Satellite Equipment Control (DiSEqC) relies on DiSEqC messages carried on a modulated 22 kHz tone in the form of sequences of short bursts communicated to the low noise block downconverter (LNB) by the receiver.

- [0031] As is known to the skilled reader, the intermediate frequency is typically created by mixing the carrier signal with a local oscillator signal by heterodyning, which allows the signals in microwave frequencies to be sent over a length of cable.
- [0032] The invention also enables simultaneous parallel filtering of transport stream data processed by different tuner (1) and demodulator (2) couples by a plurality of demultiplexer (3) modules.
- [0033] According to the invention, in a more specific manner, each tuner is assigned a specific frequency belonging to one of the four frequency groups classified based on polarization and high and low local oscillator frequencies. Depending on the satellite equipment in use, the 22kHz tone and/or DiSEqC messages are sent starting from the first frequency group. Subsequently, all tuner (1) and demodulator (2) couples are assigned by a frequency distribution unit (5) a separate dedicated frequency to be tuned. Each time a signal lock verification is received or signal lock is failed, the next frequency in the transponder table is assigned to the available tuner (1) and demodulator (2) couple. If signal lock is verified, a demultiplexer (3) module processes the respective transport stream to extract various streams.
- [0034] As an example two frequency groups of the complete transponder table of the satellite Turksat 42°E are shown below:
- [0035] Table 1: Low local oscillator frequency and horizontal polarization transponder list

[0036]

Table 1

Frequency	Symbol Rate	Polarization	IF Frequency	LoLOF / HiLOF
10954	2960	H	1204	0
10965	12800	H	1215	0
10966	15200	H	1216	0
10982	9600	H	1232	0
11054	30000	H	1304	0
11096	30000	H	1346	0
11111	30000	H	1361	0
11194	7200	H	1444	0
11472	23450	H	1722	0
11509	30000	H	1759	0
11574	1800	H	1824	0
11628	6666	H	1878	0
11640	3700	H	1890	0
11644	2960	H	1894	0
11644	2222	H	1894	0

[0037] Table 2: Low local oscillator frequency and vertical polarization transponder list

[0038]

Table 2

Frequency	Symbol Rate	Polarization	IF Frequency	LoLOF / HiLOF
10970	30000	V	1220	0
11012	30000	V	1262	0

11041	8400	V	1291	0
11049	2400	V	1299	0
11064	13000	V	1314	0
11096	30000	V	1346	0
11556	27500	V	1806	0
11593	27500	V	1843	0
11607	2962	V	1857	0
11676	24444	V	1926	0
11715	6000	V	1965	0

- [0039] Intermediate frequency data also determines local oscillator frequency band. Frequency band information (Low local oscillator frequency or high local oscillator frequency) and transponder polarization data is conventionally communicated to the LNB by an LNB control module (7) on a modulated 22 kHz tone and by 13V/18V voltage switching. The transponder list being divided into four sub-groups comprises transponders with vertical/horizontal and low/high local oscillator frequencies in combination.
- [0040] The first transponder in the first group of transponders is processed by the first tuner (1) and demodulator (2) couple while the second and third transponders in the group are processed by the respective second and third tuner (1) and demodulator (2) couples. Different tuner (1) and demodulator (2) lines are used depending on the signal lock or timeout statuses. A demultiplexer selection unit (6) orderly effectuates selection of an available demultiplexer (3) module based on signal lock verification status in relation to different transponders. When all the transponders in the first group are processed and all the tuner (1) and demodulator (2) couples become available, transponders in the second group list are processed in a simultaneous manner by assigning each transponder one by one to any available tuner (1) and demodulator (2) couple.
- [0041] According to the invention, timing of the processing operation is demonstrated in Fig. 1. In the case of low band (LoLOF) and horizontal polarization, the LNB control module (7) accordingly provides the required power supply and tone signaling. In the case of Fig. 1, the three tuner (1)

and demodulator (2) couples process the first three transponders and signal lock is achieved for the first and third transponders. In an exemplary configuration, a multiple LNB switching unit can be connected to a plurality of satellite dishes (4).

- [0042] According to the invention, grouping of transponders so as to allow common LNB programming substantially shortens the processing operation during which the user will have to wait for the completion of the scanning process before taking control of the image display device.
- [0043] In summary, the present invention proposes a signal processing device receiving a plurality of broadcasting services and comprising a digital TV processor, at least two couples of tuner (1) and demodulators (2) and at least one demultiplexer (3) module which supplies transport streams.
- [0044] According to one embodiment of the present invention, the signal processing device effects categorical classification of a transponder list in association with a satellite in the form of four frequency band sub-groups, the categorical classification of each transponder being performed based on polarization data and local oscillator frequency band (HiLOF, LoLOF) thereof.
- [0045] According to one embodiment of the present invention, the signal processing device comprises a frequency distribution unit (5) assigning a dedicated frequency to each tuner (1) and demodulator (2) couple, the dedicated frequency belonging to a single one of the four frequency band sub-groups classified based on polarization and high and low local oscillator frequencies.
- [0046] According to one embodiment of the present invention, the signal processing device comprises an LNB control module (7) programming an LNB in the manner that the frequency distribution unit (5) simultaneously assigns consecutive frequencies of a single one of four frequency band sub-groups to a respective tuner (1) and demodulator (2) couple such that each of four frequency band sub-group is processed in a successive manner.
- [0047] According to a further embodiment of the present invention, the local oscillator frequency band of a transponder is determined according to

intermediate frequency thereof.

- [0048] According to a further embodiment of the present invention, the signal processing device comprises at least three tuner (1) and demodulator (2) couples and the first transponder in the first sub-group of transponders belonging to the first frequency band sub-group is processed by the first tuner (1) and demodulator (2) couple while the second and third transponders in the same group are processed by the respective second and third tuner (1) and demodulator (2) couples.
- [0049] According to a further embodiment of the present invention, the frequency band (HiLOF, LoLOF) information and transponder polarization data is communicated to the LNB by the LNB control module (7) on a modulated 22 kHz tone and by 13V/18V voltage switching.
- [0050] According to a further embodiment of the present invention, the signal processing device comprises a plurality of demultiplexer (Demux) (3) modules effecting simultaneous parallel filtering of transport stream data processed by different tuner (1) and demodulator (2) couples.
- [0051] According to a further embodiment of the present invention, transport stream data at a demodulator (2) module output is conveyed to a respective demultiplexer (3) module by a demultiplexer selection unit (6) effecting selection of an available demultiplexer (3) module based on signal lock verification status of different transponders.
- [0052] According to a further embodiment of the present invention, each time a signal lock verification is received or signal lock is failed, the next frequency in a transponder table of a respective frequency band sub-group is assigned to an available tuner (1) and demodulator (2) couple.
- [0053] According to a further embodiment of the present invention, if signal lock is verified, a respective demultiplexer (3) module processes the respective transport stream to extract various streams.
- [0054] According to a further embodiment of the present invention, when all the transponders in the first sub-group of transponders are processed and all the tuner (1) and demodulator (2) couples become available, transponders in the second sub-group of transponders are processed in a simultaneous manner by successively assigning each transponder to any available tuner

(1) and demodulator (2) couple.

[0055] According to a further embodiment of the present invention, the first and second tuners (1) are DVB-S or DVB-S2 tuners.

[0056] According to a further embodiment of the present invention, the signal processing device is an image display device or a set-top box.

[0057] Therefore, the present invention enables simultaneous parallel scanning by a plurality of tuner (1) and demodulator (2) lines in communication with a single coaxial cable, which ensures that the time duration of the channel information retrieving operation directly noticeable to the user during which he will have to wait for the completion of the scanning process before taking control of the image display device is substantially shortened.

[0058] In this regard, the present invention ensures that configuration of channel information 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 wait for a substantial amount of time for the completion of the network scan task. The present invention therefore substantially accelerates maintenance of the channel information without requiring user intervention.

Claims

1. A signal processing device receiving a plurality of broadcasting services and comprising a digital TV processor, at least two couples of tuner (1) and demodulators (2) and at least one demultiplexer (3) module which supplies transport streams, **characterized in that**
 - the signal processing device effects categorical classification of a transponder list in association with a satellite in the form of four frequency band sub-groups, the categorical classification of each transponder being performed based on polarization data and local oscillator frequency band (HiLOF, LoLOF) thereof,
 - the signal processing device comprises a frequency distribution unit (5) assigning a dedicated frequency to each tuner (1) and demodulator (2) couple, the dedicated frequency belonging to a single one of the four frequency band sub-groups classified based on polarization and high and low local oscillator frequencies and,
 - the signal processing device comprises an LNB control module (7) programming an LNB in the manner that the frequency distribution unit (5) simultaneously assigns consecutive frequencies of a single one of four frequency band sub-groups to a respective tuner (1) and demodulator (2) couple such that each of four frequency band sub-group is processed in a successive manner.
2. A signal processing device as in Claim 1, **characterized in that** the local oscillator frequency band of a transponder is determined according to intermediate frequency thereof.
3. A signal processing device as in Claim 1, **characterized in that** the signal processing device comprises at least three tuner (1) and demodulator (2) couples and the first transponder in the first sub-group of transponders belonging to the first frequency band sub-group is processed by the first tuner (1) and demodulator (2) couple while the second and third transponders in the same group are processed by the respective second and third tuner (1) and demodulator (2) couples.
4. A signal processing device as in Claim 3, **characterized in that** the frequency band (HiLOF, LoLOF) information and transponder polarization data is

communicated to the LNB by the LNB control module (7) on a modulated 22 KHZ tone and by 13V/18V voltage switching.

5. A signal processing device as in Claim 4, **characterized in that** the signal processing device comprises a plurality of demultiplexer (3) modules effecting simultaneous parallel filtering of transport stream data processed by different tuner (1) and demodulator (2) couples.
6. A signal processing device as in Claim 5, **characterized in that** transport stream data at a demodulator (2) module output is conveyed to a respective demultiplexer (3) module by a demultiplexer selection unit (6) effecting selection of an available demultiplexer (3) module based on signal lock verification status of different transponders.
7. A signal processing device as in any one of the claims 1, 3, 4, 5, 6, **characterized in that** each time a signal lock verification is received or signal lock is failed, the next frequency in a transponder table of a respective frequency band sub-group is assigned to an available tuner (1) and demodulator (2) couple.
8. A signal processing device as in Claim 6, **characterized in that** if signal lock is verified, a respective demultiplexer (3) module processes the respective transport stream to extract various streams.
9. A signal processing device as in Claim 3, **characterized in that** when all the transponders in the first sub-group of transponders are processed and all the tuner (1) and demodulator (2) couples become available, transponders in the second sub-group of transponders are processed in a simultaneous manner by successively assigning each transponder to any available tuner (1) and demodulator (2) couple.
10. A signal processing device as in Claim 1, **characterized in that** the first and second tuners (1) are DVB-S or DVB-S2 tuners.
11. A signal processing device as in Claim 1, **characterized in that** the signal processing device is an image display device or a set-top box.

Fig. 1

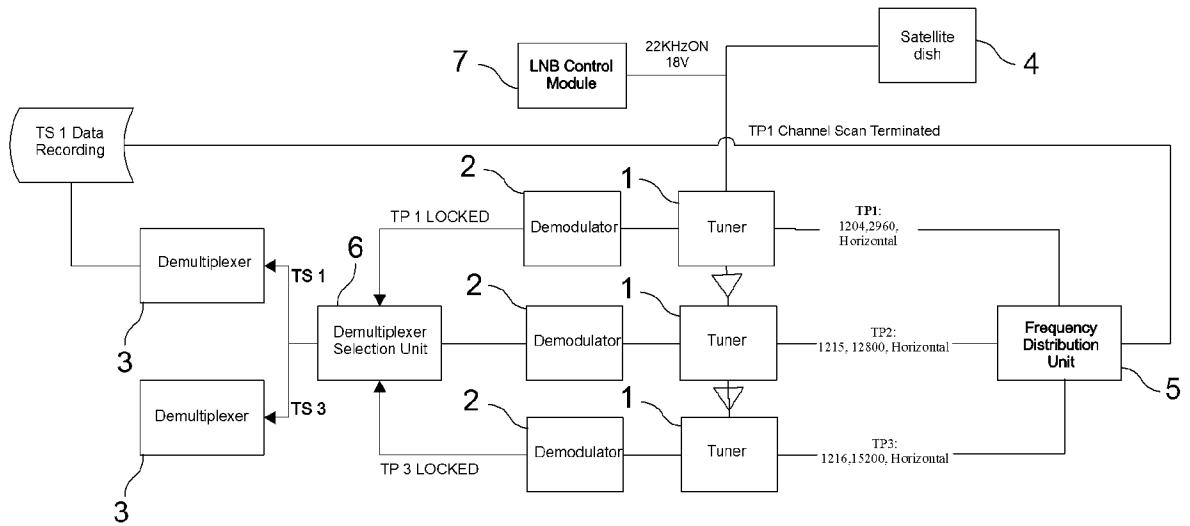
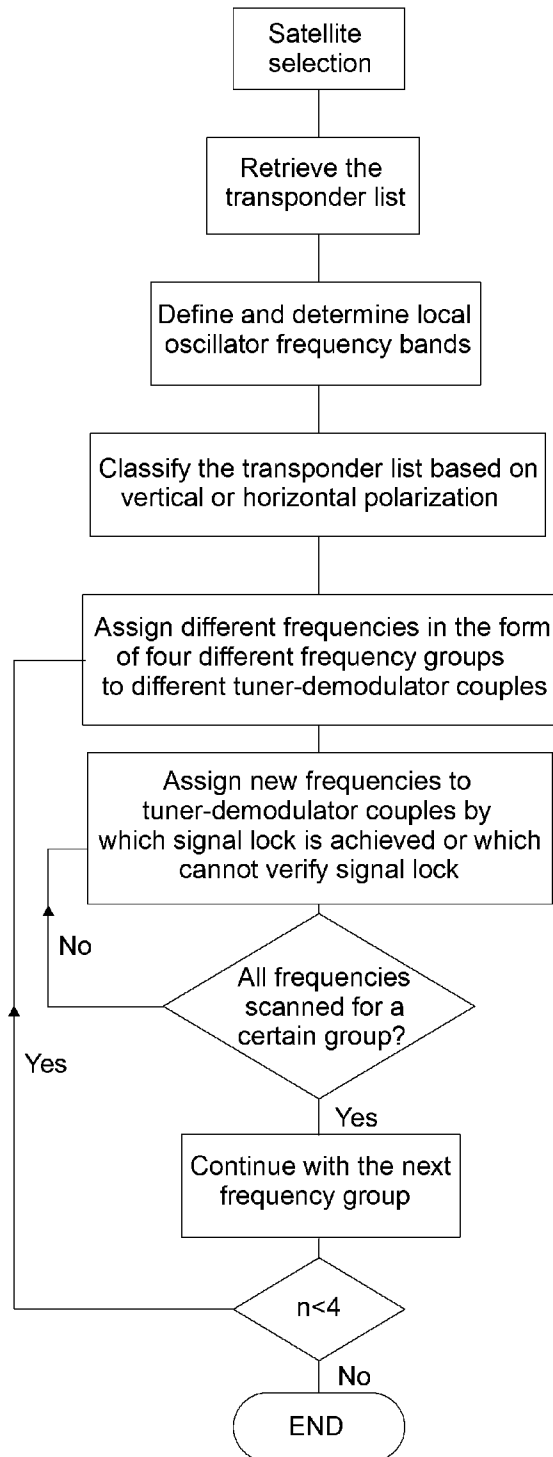


Fig. 2



INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

INV. H04N21/426 H04N21/438 H04N21/61 H04H60/43 H03J7/18
H04H40/90 H04N21/442
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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)

H04N H04H H03J H03L

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.
Y	EP 2 296 273 A1 (NXP BV [NL]) 16 March 2011 (2011-03-16) paragraphs [0012], [0015], [0031] - [0056]	1-11
Y	----- EP 2 007 031 A2 (THOMSON LICENSING [FR]) 24 December 2008 (2008-12-24) paragraphs [0016] - [0024]	1-11
A	----- US 2006/061694 A1 (OH KEUM-YONG [KR]) 23 March 2006 (2006-03-23) paragraphs [0013], [0018], [0064] - [0107]	1-11



Further documents are listed in the continuation of Box C.



See patent family annex.

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Patent document cited in search report		Publication date		Patent family member(s)		Publication date
EP 2296273	A1	16-03-2011	EP	2296273 A1		16-03-2011
			US	2011109811 A1		12-05-2011

EP 2007031	A2	24-12-2008	CN	101330335 A		24-12-2008
			EP	2007031 A2		24-12-2008
			FR	2917932 A1		26-12-2008
			JP	5235522 B2		10-07-2013
			JP	2009005352 A		08-01-2009
			KR	20080112128 A		24-12-2008
			US	2008320529 A1		25-12-2008

US 2006061694	A1	23-03-2006	KR	20060027636 A		28-03-2006
			US	2006061694 A1		23-03-2006
