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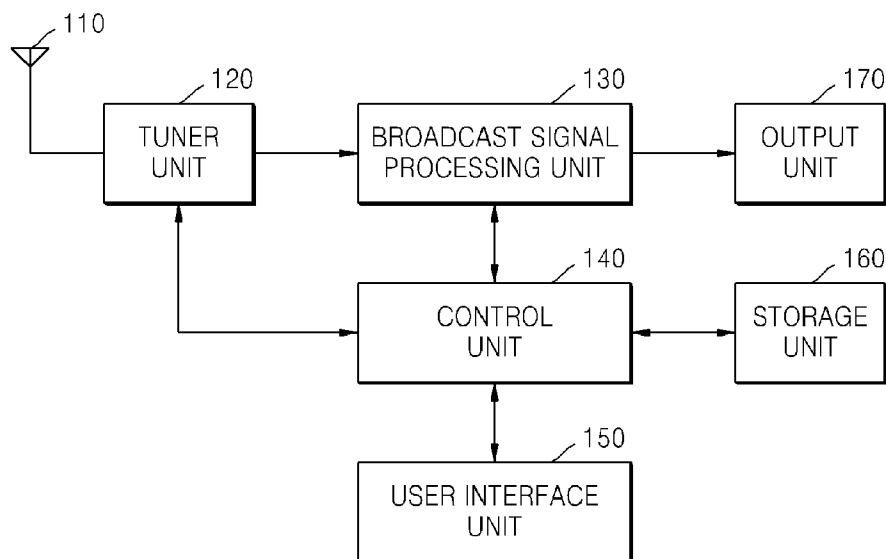
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(54) Title: BROADCAST RECEIVER FOR AND METHOD OF PROVIDING BROADCAST CHANNEL INFORMATION



(57) Abstract: Provided are a broadcast receiver for and a method of providing broadcast channel information in which a broadcast search list is dynamically created and provided to a user. The broadcast receiver includes a tuner unit which tunes one of a plurality of channels and outputs one of a plurality of digital broadcast signals; a broadcast signal processing unit which interprets service information included in the broadcast signal output by the tuner unit; a storage unit which stores the service information interpreted by the broadcast signal processing unit; and a control unit which dynamically creates a broadcast search list based on the service information and generates a screen providing the broadcast search list. Accordingly, it is possible to dynamically change a broadcast search list that provides search information regarding broadcast channels and to provide a user with the dynamically changed broadcast search list.

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Description

BROADCAST RECEIVER FOR AND METHOD OF PROVIDING BROADCAST CHANNEL INFORMATION

Technical Field

- [1] The present invention relates to an apparatus and method for receiving and providing a digital broadcast, and more particularly, to a broadcast receiver for and a method of providing broadcast channel information.

Background Art

- [2] Digital audio broadcasting (DAB) provides a variety of additional data services such as weather, traffic, entertainment, and images, as well as a high-quality audio service with a Compact Disc (CD) level sound quality by using sound coding methods that provide a high compression ratio. EUREKA-147 DAB, which is used in Europe, provides audio services with a CD level sound quality and a variety of additional data services by using a high-quality audio compression technology based on Moving Picture Experts Group (MPEG) audio layer II. Digital multimedia broadcasting (DMB) is a digital broadcasting standard which is more developed than DAB. DMB provides audio, video, and data broadcasting. DMB is classified into terrestrial DMB and satellite DMB, depending upon the transmission method. The DAB standard, such as EUREKA-147, is used for the audio broadcasting of DMB.

- [3] In the case of terrestrial DMB, a broadcast receiver scans broadcast channels when a user inputs an input signal requesting the scanning of broadcast channels. Thereafter, the user searches for a broadcast channel of interest with reference to broadcast channel information regarding the scanned broadcast channels. The broadcast channel information, however, may not be able to reflect changes in service information that are made between the time when the broadcast channels are scanned and the time when the user searches through the broadcast channels. Therefore, the user may choose broadcast services that are not being provided any longer or may not be able to choose broadcast services that are newly added after the scanning of the broadcast channels. In addition, service information is displayed to the user only after the scanning of broadcast channels is terminated. Therefore, the user may have to wait a long time for service information to be displayed when the scanning of broadcast channels is complete.

Disclosure of Invention

Technical Solution

- [4] The present invention provides a broadcast receiver for and a method of providing broadcast channel information in which a broadcast search list is dynamically created

and search information regarding broadcast channels is provided using the broadcast search list.

- [5] The present invention also provides a broadcast receiver for and a method of providing broadcast channel information in which ensemble information and service information can be provided to a user by countries and/or regions in a broadcast search list which an ensemble-service tree structure is extended.

Advantageous Effects

- [6] The present invention provides a broadcast receiver for and a method of providing broadcast channel information in which a broadcast search list is dynamically changed and the resulting broadcast search list is provided to a user.
- [7] In addition, the present invention provides a broadcast receiver for and a method of providing broadcast channel information which can provide a user with various ensemble information and various service information according to a country and/or a region chosen by the user by expanding an ensemble-service tree structure including broadcast service information.

Description of Drawings

- [8] The above and other features and advantages of the present invention will become more apparent by describing in detail exemplary embodiments thereof with reference to the attached drawings in which:
- [9] FIG. 1 is a block diagram of a broadcast receiver for providing broadcast channel information according to an exemplary embodiment of the present invention;
- [10] FIG. 2 is a block diagram of a broadcast signal processing unit of FIG. 1;
- [11] FIG. 3 is a diagram illustrating the format of a DMB transport frame according to an exemplary embodiment of the present invention;
- [12] FIG. 4 is a diagram illustrating a multiplex structure of a DMB service according to an exemplary embodiment of the present invention;
- [13] FIG. 5 is a flowchart illustrating a method of providing broadcast channel information according to an exemplary embodiment of the present invention;
- [14] FIG. 6 is a flowchart illustrating a method of providing broadcast channel information according to another exemplary embodiment of the present invention; and
- [15] FIG. 7 is a diagram illustrating a screen providing broadcast channel information using a method of providing broadcast channel information according to an exemplary embodiment of the present invention.

Best Mode

- [16] According to an aspect of the present invention, there is provided a broadcast receiver including: a tuner unit which tunes one of a plurality of channels and outputs one of a plurality of digital broadcast signals; a broadcast signal processing unit which

interprets service information included in the broadcast signal output by the tuner unit; a storage unit which stores the service information interpreted by the broadcast signal processing unit; and a control unit which dynamically creates a broadcast search list based on the service information and generates a screen providing the broadcast search list.

[17] The control unit may control the storage unit such that, if service information other than the service information stored in the storage unit is received, the received service information is additionally stored in the storage unit and, if service information stored in the storage unit has not been received for a predetermined amount of time, the service information is deleted from the storage unit.

[18] The storage unit may store channel information which is classified by broadcast service provider and by region, and the channel information may include: country information which identifies a country; region information which is information belonging to a lower directory than the country information and identifies a region in the country; and ensemble information which is information belonging to a lower directory than the region information and comprises an ensemble which can be provided in the region and channel information regarding channels via which the ensemble can be received.

[19] The broadcast receiver may also include a user interface unit which receives a country information and/or region information selection signal, wherein the control unit reads the ensemble information corresponding to the country information and/or region information selection signal from the storage unit and controls the output of the ensemble information.

[20] The control unit may control the tuner unit to scan a channel via which an ensemble corresponding to an ensemble information user selection signal received via the user interface unit can be received, control the broadcast signal processing unit to interpret service information transmitted via the channel scanned by the tuner unit, and dynamically create the broadcast search list based on the service information interpreted by the broadcast signal processing unit.

[21] The broadcast receiver may also include an output unit which displays a screen providing the broadcast search list, wherein the control unit generates a screen providing a broadcast search list which is created based on country information and/or region information associated with the country information and/or region information selection signal, ensemble information corresponding to the country information and/or region information, and the service information interpreted by the broadcast signal processing unit, and outputs the screen to the output unit.

[22] The control unit may add predetermined information and thus generate a screen providing the broadcast search list to indicate whether the service information stored in

the storage unit has been scanned, wherein the predetermined information indicates whether the service information stored in the storage unit has been scanned.

[23] The control unit may calculate the signal-to-noise ratio (SNR) of an ensemble bitstream generated by the broadcast signal processing unit, determine whether the reception of the ensemble bitstream is good or bad based on the calculation result, add reception state information and thus generates a screen providing the broadcast search list, wherein the reception state information indicates whether the reception of the ensemble bitstream is good or bad.

[24] According to another aspect of the present invention, there is provided a method of providing broadcast channel information comprising: storing service information transmitted via a predetermined digital broadcast channel; dynamically creating a broadcast search list based on the service information; and generating a screen providing the broadcast search list.

Mode for Invention

[25] The present invention will now be described more fully with reference to the accompanying drawings in which exemplary embodiments of the invention are shown.

[26] FIG. 1 is a block diagram of a broadcast receiver for providing broadcast channel information according to an exemplary embodiment of the present invention. Referring to FIG. 1, the broadcast receiver includes an antenna 110, a tuner unit 120, a broadcast signal processing unit 130, a control unit 140, a user interface unit 150, a storage unit 160, and an output unit 170.

[27] The tuner unit 120 tunes one of a plurality of broadcast channels and thus outputs one of a plurality of digital broadcast signals received by the antenna 110.

[28] The broadcast signal processing unit 130 receives the digital broadcast signal output by the tuner unit 120, demodulates and/or decodes the received digital broadcast signal, and outputs the demodulated and/or decoded digital broadcast signal to the output unit 170. Also, the broadcast signal processing unit 130 can interpret service information included in a broadcast signal.

[29] The user interface unit 150 comprises a touch screen or buttons. The user interface unit 150 receives a country/region information selection signal or an ensemble selection signal from a user and transmits the received signal to the control unit 140.

[30] The storage unit 160 stores service information interpreted by the broadcast signal processing unit 130. Also, the storage unit 160 stores broadcast channel information which is classified by broadcast service provider and by region. The broadcast channel information classified by broadcast service provider may include country information, region information, and ensemble information. The country information is information identifying a country, and the region information is information belonging to a lower directory than the country information and identifies a region in the country. Ensemble

information is information belonging to a lower directory than the region information and comprises information identifying an ensemble which can be provided in the region; and broadcast channel information specifying broadcast channels through which the ensemble can be received. The country information, the region information, and the ensemble information stored in the storage unit 160 may be modified. In addition, country information, region information, and ensemble information other than those already stored in the storage unit 160 may be additionally stored in the storage unit 160 using signals input via the user interface unit 150 or via a communication line connected between the broadcast receiver and an external device (not shown).

[31] The output unit 170 includes a speaker or a liquid crystal display (LCD) device and displays a broadcast search list which is dynamically created by the control unit 140.

[32] The control unit 140 controls the tuner unit 120, the broadcast signal processing unit 130, the user interface unit 150, the storage unit 160, and the output unit 170 and dynamically creates a broadcast search list. When service information other than the service information stored in the storage unit 160 is received, the control unit 140 may control the storage unit 160 to additionally store the received service information. Also, if the service information stored in the storage unit 160 has not been received for a predetermined amount of time, even when the current data reception state is good, the control unit 140 may control the storage unit 160 to delete the service information. In this manner, the control unit 140 can dynamically create a broadcast search list based on service information additionally stored in or deleted from the storage unit 160.

[33] The control unit 140 receives a country information and/or region information selection signal from the user interface unit 150 and controls the reading of the ensemble information corresponding to country information and/or region information associated with the country information and/or region information selection signal from the storage unit 160. Thereafter, the control unit 140 controls the output of the read ensemble information to the output unit 170. Thereafter, if an ensemble information user selection signal is received via the user interface unit 150, the control unit 140 controls the tuner unit 120 to scan a predetermined channel from which an ensemble corresponding to the predetermined ensemble information user selection signal can be received. Then, the broadcast signal processing unit 130 interprets service information transmitted via the predetermined channel, and the control unit 140 dynamically creates a broadcast search list based on the interpreted service information. Therefore, the control unit 140 can generate a screen providing a broadcast search list which is created based on country information and region information associated with a user selection signal, and ensemble information and service in-

formation stored in the storage unit 160 corresponding to the country information and the region information.

[34] Also, the control unit 140 may generate a screen displaying information which indicates whether the service information stored in the storage unit 160 has been scanned. Also, the control unit 140 may calculate the signal-to-noise ratio (SNR) of an ensemble bitstream generated while the broadcast signal processing unit 130 processes a broadcast signal, and then determine whether the current data reception state is good or bad. Therefore, the control unit 140 may add current data reception state information to a screen providing a broadcast search list.

[35] FIG. 2 is a block diagram of the broadcast signal processing unit 130 of FIG. 2 when the broadcast receiver illustrated in FIG. 1 is a DMB receiver and digital broadcast signals received by the broadcast receiver are DMB signals. Referring to FIG. 2, the broadcast signal processing unit 130 includes a channel decoder 131, a demultiplexer 132, a decoder 133, and a fast information channel (FIC) parser 134. The channel decoder 131 performs a channel decoding operation using a predetermined method. The demultiplexer 132 demultiplexes a channel-decoded signal provided by the channel decoder 131 and outputs a DMB transport frame 300 illustrated in FIG. 3 to the decoder 133. The demultiplexer 132 extracts a FIC 330 from the DMB transport frame 300 and outputs the FIC 330 to the FIC parser 134.

[36] The FIC parser 134 parses the FIC 330 and provides fast information group (FIG) information to the control unit 140. For example, the Extension 2 of FIG type 0 (FIG 0/2) contains basic service organization information. Therefore, the control unit 140 can obtain service information from the FIG information provided by the FIC parser 134, e.g., FIG 0/2 information. The FIG information will be described later in detail with reference to FIG. 3.

[37] The decoder 133 decodes the DAB transport frame 300 and provides the decoded DAB transport frame 300 to the output unit 170 such as an LCD or a speaker. The decoder 133 may include a plurality of decoding devices, including a plurality of audio decoding devices and a plurality of video decoding devices.

[38] FIG. 3 is a diagram illustrating the format of a DMB transport frame 300 according to an exemplary embodiment of the present invention. Referring to FIG. 3, the DMB transport frame 300 includes a synchronization channel 310, a FIC 330, and a main service channel (MSC) 350.

[39] The synchronization channel 310 comprises null symbols which are used for determining a transport mode, and reference symbols which are needed in OFDM symbol synchronization or for carrier wave frequency synchronization.

[40] The FIC 330 is a channel for transmitting information that is needed by a broadcast receiver to process data, such as service organization information or multiplex format

information, or for transmitting data that needs to be quickly transmitted. The FIC 330 includes multiplex configuration information (MCI) containing information regarding the structure of sub-channels and service information which is additional information regarding services. Therefore, it can be seen from this channel service data is transmitted via the MSC 350 and what application is to use the service data. The FIC 330 includes a fast information data channel (FIDC) containing data to be transmitted within a given time. The FIDC includes, for example, simple messages for emergencies.

[41] The FIC 330 comprises a plurality of fast information blocks (FIBs). Each of the FIBs comprises a FIB data field and a cyclical redundancy check (CRC) field. The FIB data field comprises a plurality of fast information groups (FIGs). A FIG type field specifying the type of predetermined data contained in the FIG data field and a length field specifying the length of the FIG data field are inserted into a header portion of the FIGs, and the actual data is contained in the FIG data field.

[42] The MSC 350 transmits actual content data provided from a service provider. When the space of the FIC 330 is insufficient, a part of FIC data can be contained in the MSC 350. However, since the MSC 350 employs time interleaving, which may result in more or less delay time required for decoding, the MSC 350 cannot contain FIC data to be quickly transmitted. Data transmission modes are classified into a stream mode and a packet mode. The MSC 350 comprises a plurality of frames referred to as common interleaved frames (CIFs).

[43] FIG. 4 is a diagram illustrating a multiplex structure of a DMB service according to an exemplary embodiment of the present invention. Referring to FIG. 4, the DMB service has ensembles, services, and service components.

[44] A plurality of encoded audio streams and a plurality of data are subjected to the channel coding and then are multiplexed into one bit stream along with system data, which is called an ensemble. Generally, one broadcasting station provides one ensemble. The service refers to the output broadcasting station provides one ensemble. The service refers to the output that is selected by a user, such as a program service and a data service, and the service components refers to elements constituting a service. The service components of a given service are connected to each other by the multiplex configuration information. The service components are transmitted with the sub channels or the FIDC.

[45] In an embodiment of the present invention, the DMB service comprises at least 2 ensembles including ensemble #0 (410) and ensemble #1 (415). Ensemble #0 (410) provides at least 2 services including service #0 (430) and service #1 (435). Service #0 (430) comprises at least 2 service components including service component #0 (450) and service component #1 (455).

- [46] A method of providing broadcast channel information, which is performed by a broadcast receiver according to an exemplary embodiment of the present invention, will now be described in detail with reference to FIGS. 1, 5, and 6.
- [47] FIG. 5 is a flowchart illustrating a method of providing broadcast channel information according to an exemplary embodiment of the present invention. Referring to FIG. 5, the tuner unit 120 outputs a digital broadcast signal via a predetermined channel, and the broadcast signal processing unit 130 interprets service information included in the broadcast signal and transmits the interpreted service information to the control unit 140. For example, the service information may be obtained from FIG 0/2, which is obtained in a parsing operation performed by the FIC parser 134 of the broadcast signal processing unit 130. In operation S510, the control unit 140 stores the service information transmitted by the broadcast signal processing unit 130 via the predetermined channel in the storage unit 160.
- [48] In operation S520, the control unit 140 dynamically creates a broadcast search list based on the service information stored in the storage unit 160. In operation S530, the control unit 140 generates a screen providing the broadcast search list.
- [49] If service information other than the service information stored in the storage unit 160 is received, the control unit 140 may additionally store the received service information in the storage unit 160. If the service information stored in the storage unit 160 has not been searched for for a predetermined amount of time, for example, for 1 minute, even when the data reception state is good, the control unit 140 may delete the corresponding service information from the storage unit 160.
- [50] Also, in order to indicate whether service information has been scanned, the control unit 140 may add to the service information scanned state information indicating whether the service information has been scanned, generate a screen providing the scanned state information together with the service information, and provide the generated screen to the output unit 170. For example, for service information which has been previously scanned and stored in the storage unit 160 but has not been scanned recently, the control unit 140 may add to the service information scanned state information in which the service information is marked as 'unscanned'. Alternatively, for service information which has recently been scanned and has already been stored in the storage unit 160, the control unit 140 may add to the service information scanned state information in which the service information is marked as 'scanned'.
- [51] FIG. 6 is a flowchart illustrating a method of providing broadcast channel information according to an exemplary embodiment of the present invention. Referring to FIG. 6, in operation S610, a country information and/or region information selection signal is received via the user interface unit 150. In operation S620, the control unit 140 reads the ensemble information based on the country information and/or region in-

formation selection signal from the storage unit 160 and provides the read ensemble information to the output unit 170. The control unit 140 may create an ensemble list including one or more pieces of ensemble information and provide the ensemble list to the output unit 170.

[52] In operation S630, the control unit 140 controls the tuner unit 120 to scan a predetermined broadcast channel via which a chosen ensemble corresponding to an ensemble information user selection signal received via the user interface unit 150 can be received. Then, a broadcast signal is received via the scanned broadcast channel and is transmitted to the broadcast signal processing unit 130. In operation S640, the broadcast signal processing unit 130 interprets service information included in the broadcast signal by appropriately processing the broadcast signal. Thereafter, the broadcast signal processing unit 130 transmits the interpreted service information to the control unit 140.

[53] In operation S650, the control unit 140 creates a broadcast search list based on the country information and/or the region information associated with the country information and/or region information selection signal, and ensemble information and service information stored in the storage unit 160 corresponding to the country information and/or the region information, and provides the broadcast search list to the output unit 170. The control unit 140 may generate a screen displaying the broadcast search list comprising the country information, the region information, the ensemble information, and the service information as a tree as illustrated in FIG. 7.

[54] In the method of providing broadcast channel information according to an exemplary embodiment of the present invention, a user can search for an ensemble using different frequencies according to country information and region information. For example, when moving from region A to region B within a country, the user may change the region information of his or her broadcast receiver. Then, the broadcast receiver may scan a channel according to region information corresponding to region A or region information corresponding to region B in order to receive a desired ensemble. In this manner, the user can receive a broadcast service even when moving between regions within a country by scanning a channel which can ensure high-quality ensemble reception by appropriately changing the region information of his or her broadcast receiver.

[55] In addition, the user can receive a broadcast service even when moving from country C to country D by scanning a channel which can ensure high-quality ensemble reception by appropriately changing the country information and region information of his or her broadcast receiver. In short, the user can receive a broadcast service from a channel which can ensure high quality ensemble reception by appropriately changing country information and/or region information. Therefore, there is no need for a GPS

device or a CDMA communication module to be additionally installed in the broadcast receiver.

[56] FIG. 7 is a diagram of a screen providing broadcast channel information using a method of providing broadcast channel information according to an exemplary embodiment of the present invention. Referring to FIG. 7, in an embodiment of the present invention, it is possible to provide a user with country information that identifies a country, region information which belongs to a lower directory than the country information and identifies a region in the country, ensemble information which comprises information regarding ensembles which can be serviced within the region and belongs to a lower directory than the region information, and service information which comprises information regarding services included in a predetermined ensemble channel and belongs to a lower directory than the ensemble information. A list of regions in a country may be displayed in such a manner that information regarding regions closer to a predetermined region chosen by the user are displayed closer to the region information chosen by the user, thereby enabling the user to easily switch to regions near the chosen region from the list.

[57] For example, referring to FIG. 1, if the user chooses South Korea and either Seoul or Kyonggi province, a broadcast receiver provides the user with ensemble information regarding ensembles which can be received in Seoul, Kyonggi province of Republic of Korea, i.e., a list including Korea Broadcasting Station (KBS), Munhwa Broadcasting Corporation (MBC), and Seoul Broadcasting Station (SBS). If the user chooses KBS from the list, the broadcast receiver scans channels through which broadcast programs broadcast by KBS can be received, and provides service information comprising a list of channels DMB1, KBS Music, and KBS Economy as a broadcast search list. Accordingly, it is possible to dynamically create service information by scanning broadcast signals in the aforementioned manner.

[58] Even when moving from Seoul or Kyonggi province to Kangwon province, the user can watch digital broadcasts from broadcast channels with high quality reception by enabling the broadcast receiver to scan channels via which broadcast programs broadcast by KBS can be received properly in Kangwon province.

[59] The method of providing broadcast channel information according to the present invention can be realized as computer-readable code written on a computer-readable recording medium. The computer-readable recording medium may be any type of recording device in which data is stored in a computer-readable manner. Examples of the computer-readable recording medium include a ROM, a RAM, a CD-ROM, a magnetic tape, a floppy disc, an optical data storage, and a carrier wave (e.g., data transmission through the Internet). The computer-readable recording medium can be distributed over a plurality of computer systems connected to a network so that

computer-readable code is written thereto and executed therefrom in a decentralized manner. Functional programs, code, and code segments needed for realizing the present invention can be easily construed by one of ordinary skill in the art.

[60] As described above, the present invention provides a broadcast receiver for and a method of providing broadcast channel information in which a broadcast search list is dynamically changed and the resulting broadcast search list is provided to a user.

[61] In addition, the present invention provides a broadcast receiver for and a method of providing broadcast channel information which can provide a user with various ensemble information and various service information according to a country and/or a region chosen by the user by expanding an ensemble-service tree structure including broadcast service information.

[62] Moreover, according to the present invention, since a user can search through a variety of ensemble channels by changing country information and/or region information, it is possible for the user to receive broadcast services by choosing broadcast channels which can ensure high-quality reception even when the user is moving between countries or between regions within a country.

[63] While the present invention has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the following claims.

Claims

- [1] 1. A broadcast receiver comprising:
a tuner unit which tunes one of a plurality of channels and outputs one of a plurality of digital broadcast signals;
a broadcast signal processing unit which interprets service information included in the broadcast signal output by the tuner unit;
a storage unit which stores the service information interpreted by the broadcast signal processing unit; and
a control unit which dynamically creates a broadcast search list based on the service information and generates a screen providing the broadcast search list.
- [2] 2. The broadcast receiver of claim 1, wherein the control unit controls the storage unit such that, if service information other than the service information stored in the storage unit is received, the received service information is additionally stored in the storage unit and, if service information stored in the storage unit has not been received for a predetermined amount of time, the service information is deleted from the storage unit.
- [3] 3. The broadcast receiver of claim 1, wherein the storage unit stores channel information which is classified by broadcast service provider and by region, and the channel information comprises:
country information which identifies a country;
region information which is information belonging to a lower directory than the country information and identifies a region in the country; and
ensemble information which is information belonging to a lower directory than the region information and comprises an ensemble which can be provided in the region and channel information regarding channels via which the ensemble can be received.
- [4] 4. The broadcast receiver of claim 3 further comprising a user interface unit which receives a country information and/or region information selection signal, wherein the control unit reads the ensemble information corresponding to the country information and/or region information selection signal from the storage unit and controls the output of the ensemble information.
- [5] 5. The broadcast receiver of claim 4, wherein the control unit controls the tuner unit to scan a channel via which an ensemble corresponding to an ensemble information user selection signal received via the user interface unit can be received, controls the broadcast signal processing unit to interpret service information transmitted via the channel scanned by the tuner unit, and dynamically creates the broadcast search list based on the service information interpreted by

- the broadcast signal processing unit.
- [6] 6. The broadcast receiver of claim 5 further comprising an output unit which displays a screen providing the broadcast search list, wherein the control unit generates a screen providing a broadcast search list which is created based on country information and/or region information associated with the country information and/or region information selection signal, ensemble information corresponding to the country information and/or region information, and the service information interpreted by the broadcast signal processing unit, and outputs the screen to the output unit.
- [7] 7. The broadcast receiver of claim 1, wherein the control unit adds predetermined information and thus generates a screen providing the broadcast search list to indicate whether the service information stored in the storage unit has been scanned, wherein the predetermined information indicates whether the service information stored in the storage unit has been scanned.
- [8] 8. The broadcast receiver of claim 1, wherein the control unit calculates the signal-to-noise ratio (SNR) of an ensemble bitstream generated by the broadcast signal processing unit, determines whether the reception of the ensemble bitstream is good or bad based on the calculation result, adds reception state information and thus generates a screen providing the broadcast search list, wherein the reception state information indicates whether the reception of the ensemble bitstream is good or bad.
- [9] 9. A method of providing broadcast channel information comprising:
storing service information transmitted via a predetermined digital broadcast channel;
dynamically creating a broadcast search list based on the service information;
and
generating a screen providing the broadcast search list.
- [10] 10. The method of claim 9, wherein the dynamically creating comprises:
if service information other than the service information stored in the storage unit is received, additionally storing the received service information; and
if the service information stored in the storage unit has not been updated for a predetermined amount of time, deleting the service information.
- [11] 11. The method of claim 9 further comprising:
receiving a country information and/or region information selection signal via a user interface;
providing ensemble information corresponding to country information and/or region information associated with the country information and/or region information selection signal, the ensemble information identifying an ensemble

which can be received in a country and/or a region identified by the country information and/or the region information;
scanning a channel for receiving chosen ensemble information with reference to an ensemble information selection signal; and
interpreting service information received through the scanning.

- [12] 12. The method of claim 11, wherein the dynamically creating comprises dynamically creating a broadcast search list using the country information and/or the region information associated with the country information and/or region information selection signal, the ensemble information corresponding to the country information and/or region information, and the service information.
- [13] 13. The method of claim 9, wherein the generating of the screen comprises: generating a screen providing the broadcast search list to which scanned state information indicating whether the service information has been scanned is added.
- [14] 14. The method of claim 9, wherein the generating of the screen comprises: generating a screen providing the broadcast search list to which current data reception state information specifying a current broadcast signal reception state is added.
- [15] 15. A computer-readable recording medium storing a computer program for executing the method of any of claims 9 through 14.

FIG. 1

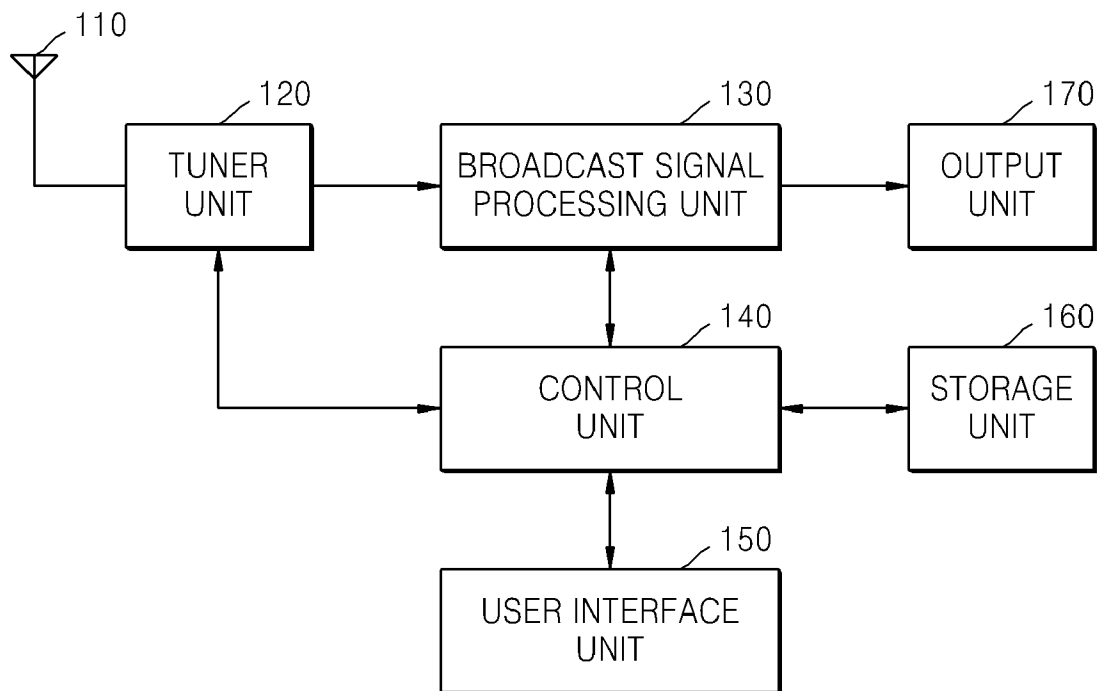


FIG. 2

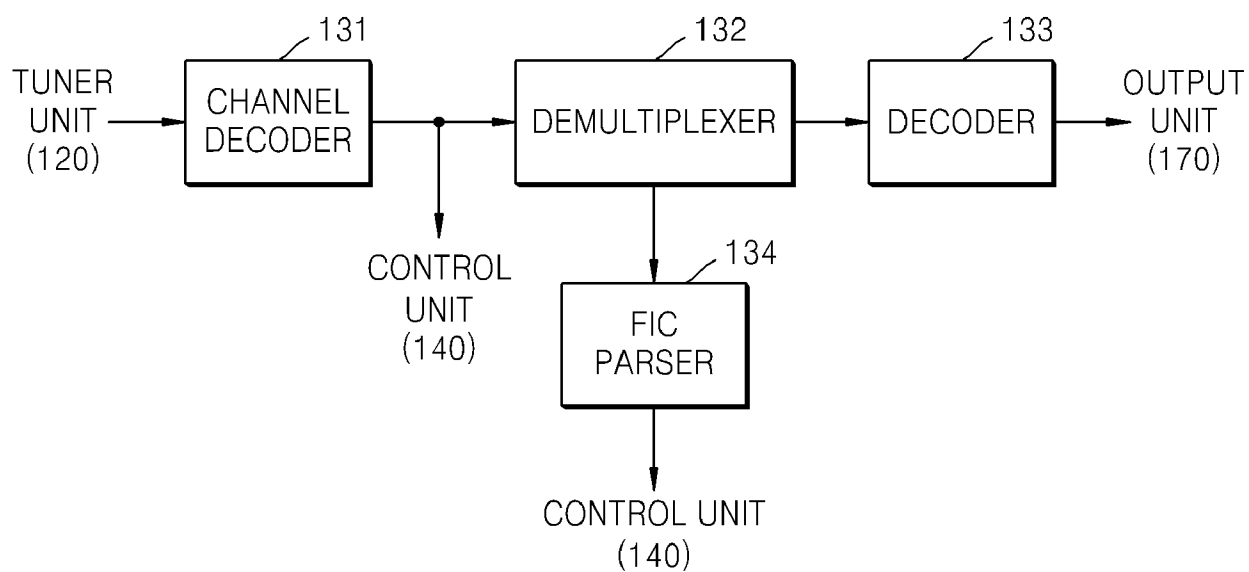


FIG. 3

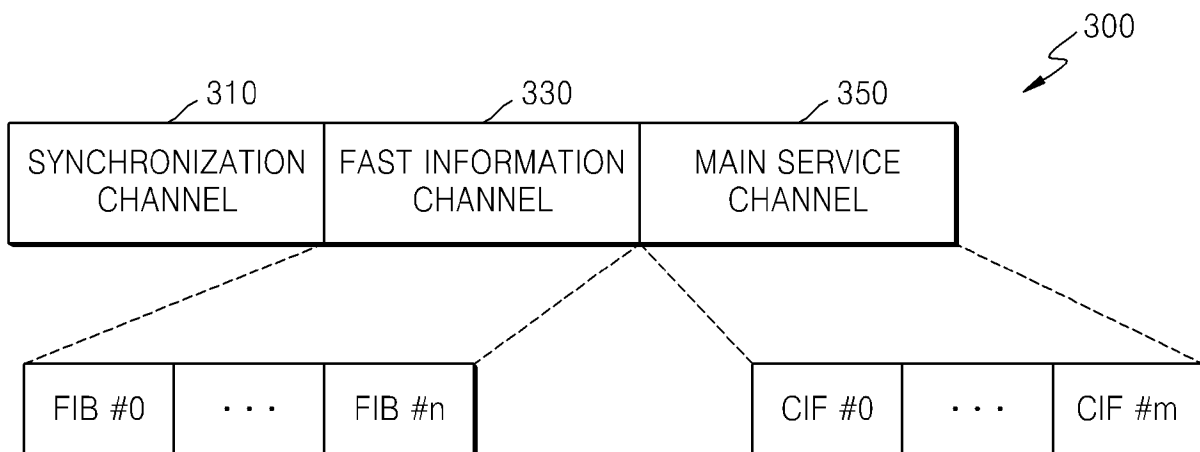


FIG. 4

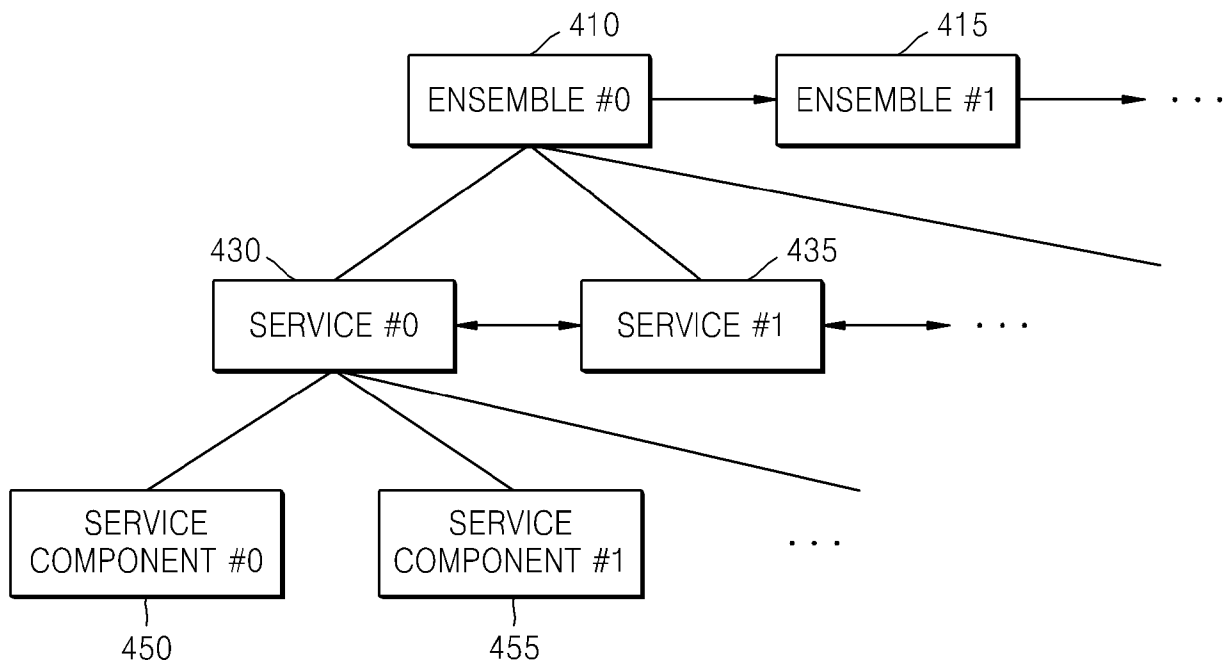


FIG. 5

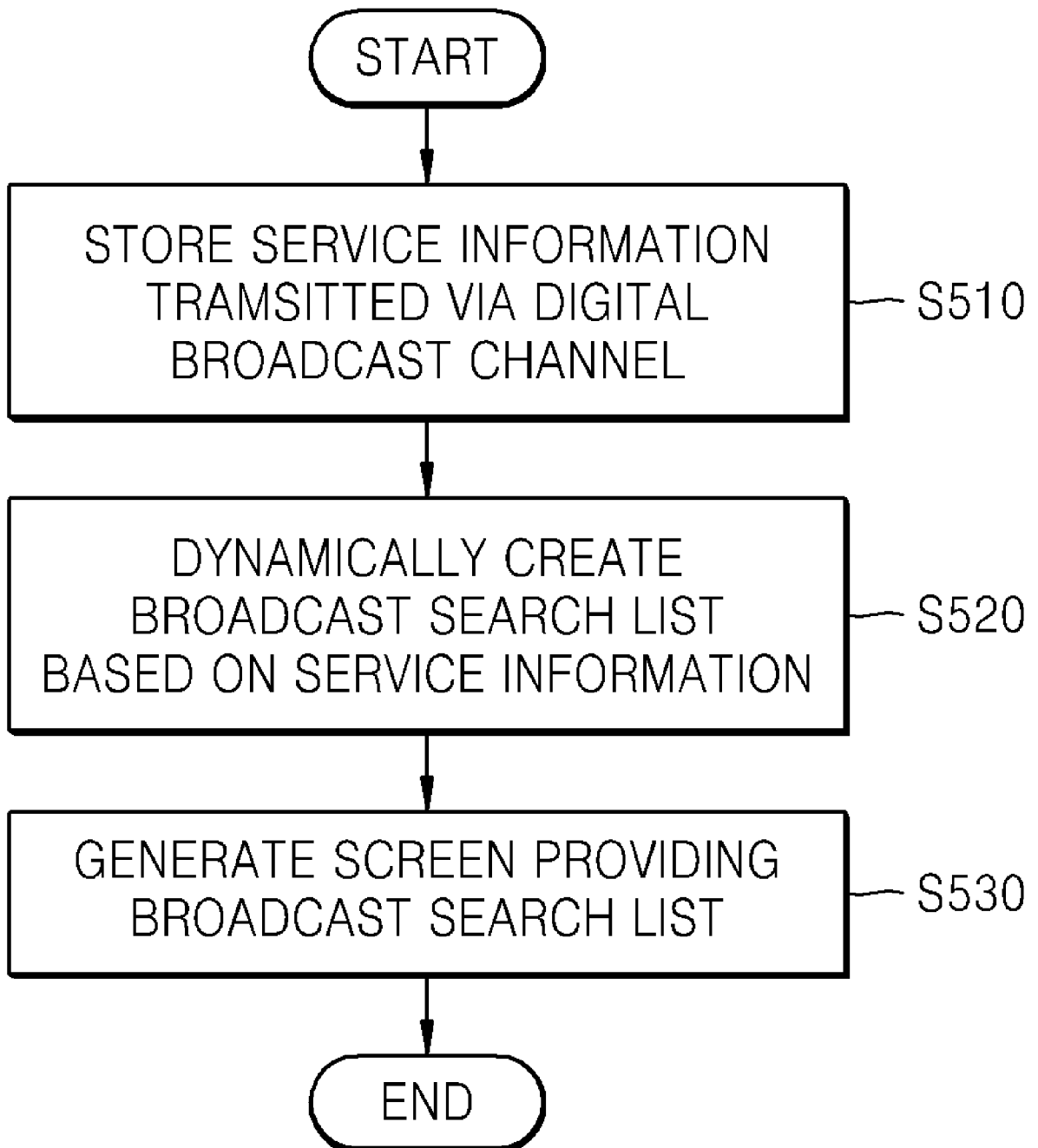


FIG. 6

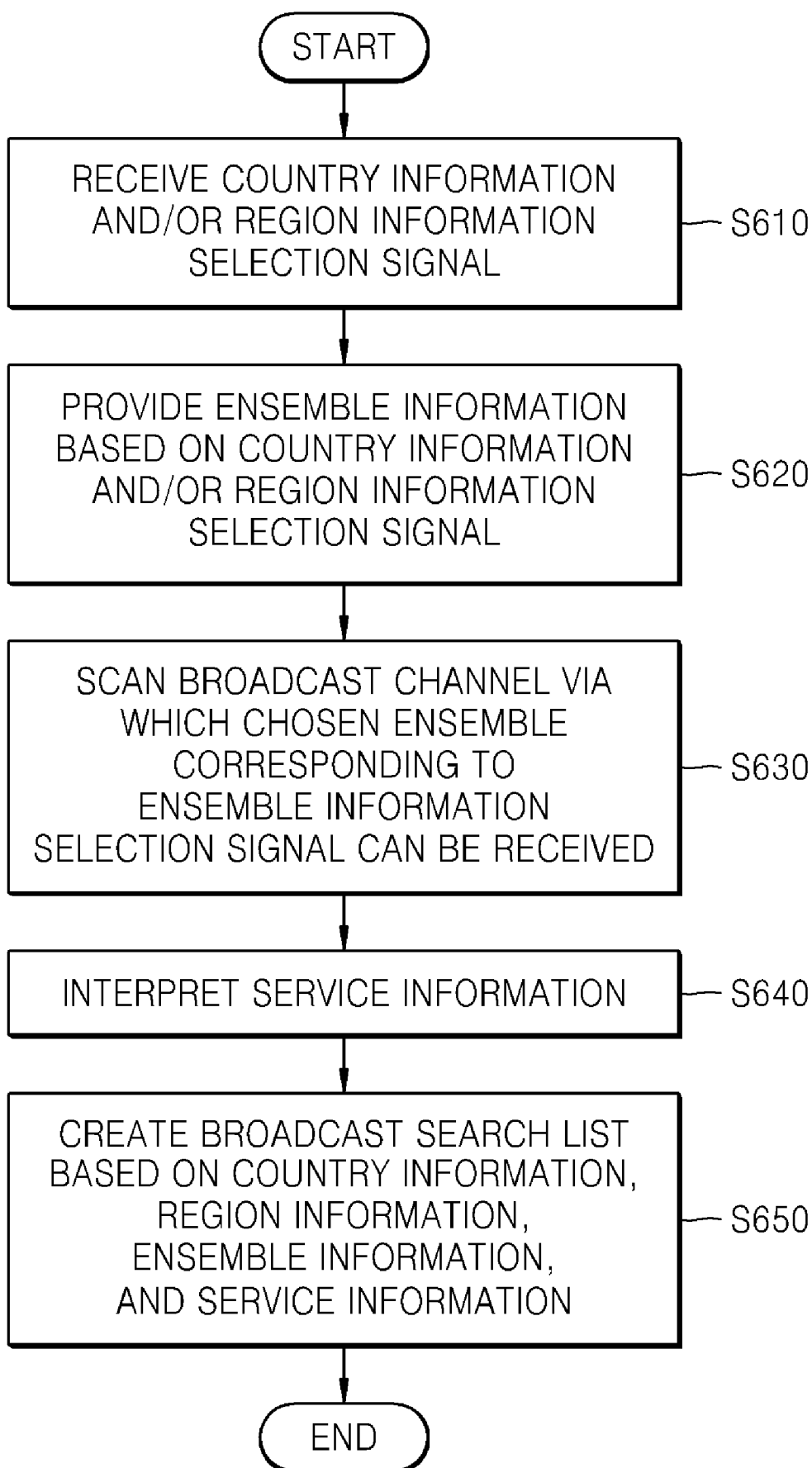
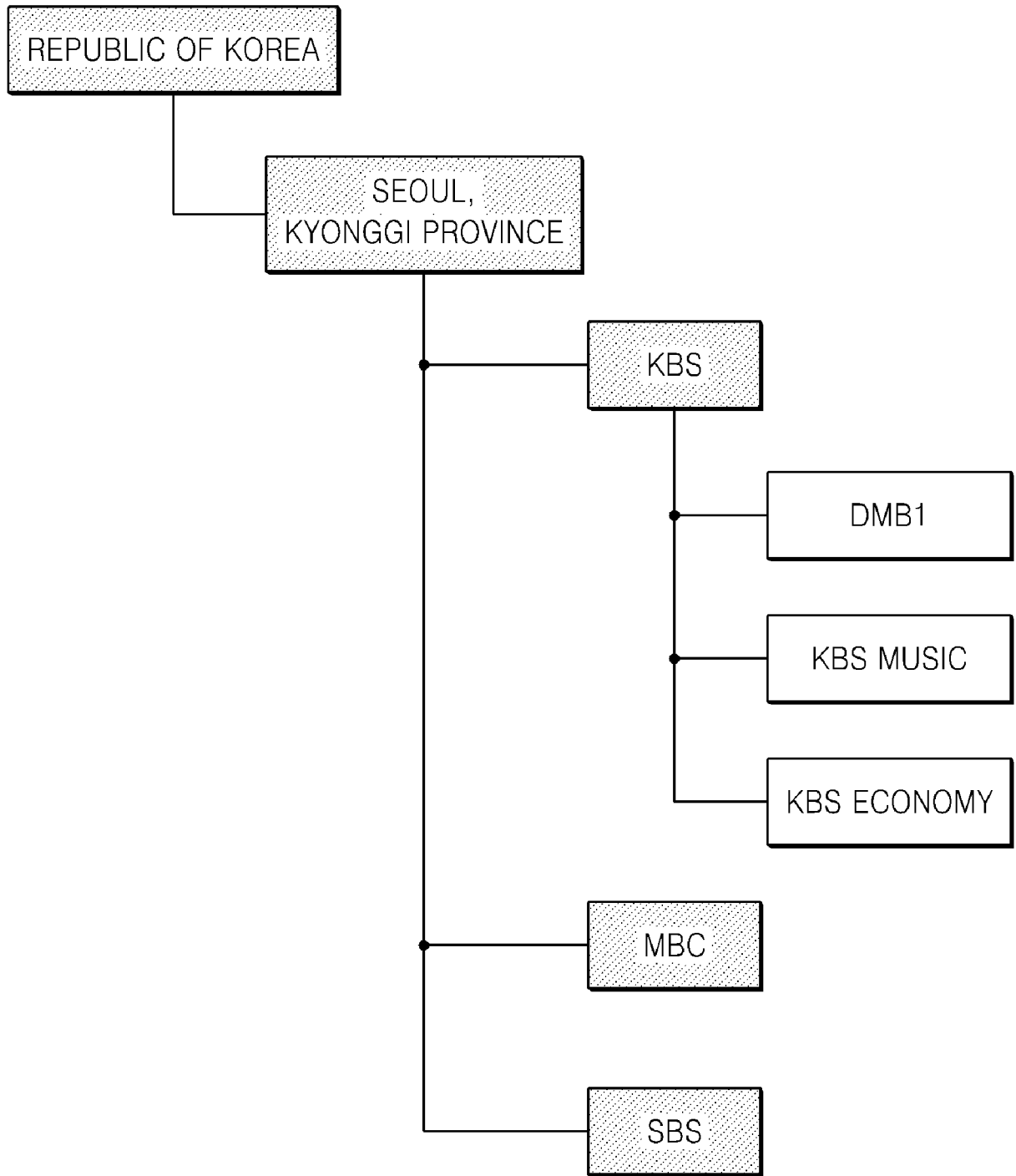


FIG. 7



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2006/005320**A. CLASSIFICATION OF SUBJECT MATTER*****H04N 5/50(2006.01)i***

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

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

Korean Patents and applications for inventions since 1975

Korean Utility models and applications for Utility models since 1975

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

eKIPASS Search Terms: tuner, area, channel, information

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 20050034174 A(SHINICHI HATANAKA) 10 February 2005 See abstract and page 1, [0001]-page 3, [0049].	1-15
A	JP 2004222028 A(MATSUSHITA ELECTRIC IND CO. LTD) 5 August 2004 See abstract and page 2, [0001]-page 2, [0007].	1-15
A	JP 10294903 A(SANYO ELECTRIC CO. LTD) 4 November 1998 See abstract and page 2, [0001]-page 4, [0016].	1-15

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

* Special categories of cited documents:

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&" document member of the same patent family

Date of the actual completion of the international search

16 MARCH 2007 (16.03.2007)

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2006/005320

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US20050034174A1	10.02.2005	JP17064719	10.03.2005
		JP2005064719A2	10.03.2005
		US2005034174A1	10.02.2005
		US2005034174AA	10.02.2005
JP16222028	05.08.2004	JP16222028	05.08.2004
		JP2004222028A2	05.08.2004
JP10294903	04.11.1998	JP10294903A2	04.11.1998
		JP10294903	04.11.1998
		JP3448455B2	22.09.2003