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(71) Applicant: **Electronics and Telecommunications Research Institute**
Daejeon 305-700 (KR)

(72) Inventors:
• **Kim, Geon**
Daejeon (KR)

- **Park, So Ra**
Daejeon (KR)
- **Lee, Yong Hoon**
Daejeon (KR)
- **Lee, Yong Tae**
Daejeon (KR)
- **Kim, Jin Min**
Seoul (KR)
- **Baek, Myung Sun**
Seoul (KR)

(74) Representative: **Betten & Resch**
Theatinerstrasse 8
80333 München (DE)

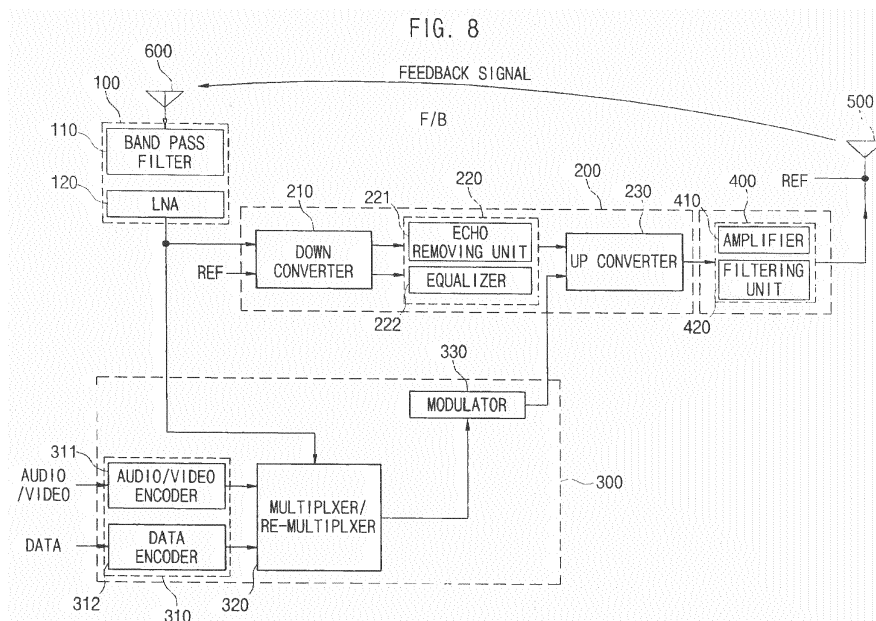
Remarks:

This application was filed on 27-02-2012 as a divisional application to the application mentioned under INID code 62.

(54) **Apparatus and method for transmitting service contents and emergency broadcasting apparatus**

(57) An emergency broadcasting apparatus comprises a co-channel repeater that removes multi-path signals or a Doppler effect from received broadcasting signals

or a Doppler effect from received broadcasting signals; and an emergency broadcasting unit performing at least one of decoding, multiplexing, and modulating input audio, video, and data emergency broadcasting signals according to a broadcasting standard.



Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Korean Patent Application No. 10-2009-0127733, filed on December 21, 2009 and Korean Patent Application No. 10-2009-0127734, filed on December 21, 2009, in the Korean Intellectual Property Office, the disclosures of which are incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present invention relates to a apparatus and method for transmitting service contents and emergency broadcasting apparatus, and more particularly, to a method and apparatus enabling a receiver to receive switching signals without performing additional operations, and an apparatus for performing emergency broadcasting to broadcasting specifications in emergency situations.

BACKGROUND

[0003] In the related art, when the transmitter does not transmit already transmitted signals but transmits switched signals, an additional operation is needed in order to receive the switched signals. In other words, the receiving side cannot receive the switching signals until the additional operation is performed. For example, when mutual synchronization between the already transmitted signals and the switched signals is not achieved, the receiving side cannot receive the switched signals until it performs the additional operations, such as synchronization.

[0004] In the tunnel or underground, the receiving antenna of the repeater may be mainly positioned near the ground or in downtown, not in a high mountain. In this case, deterioration in quality of the repeating signals occurs in the tunnel or underground due to the multi-path signals received in the receiving antenna.

SUMMARY

[0005] An exemplary embodiment of the present invention provides a method for transmitting service contents by switching connection between at least two contents providing units and a transmitter, comprising: connecting the transmitter connected to any one contents providing unit to another contents providing unit when switching signals are generated.; and transmitting service contents transmitted from another contents providing unit.

[0006] Another exemplary embodiment of the present invention provides an apparatus for transmitting service contents, including: at least two contents providing unit; a transmitter that transmits service contents output from each contents providing unit; and a switching unit that

switches a connection between each contents providing unit and the transmitter, wherein the switching unit connects the transmitter connected to any one contents providing unit to another contents providing unit when switching signals are generated.; and outputs service contents transmitted from another contents providing unit to the transmitter.

[0007] Still another exemplary embodiment of the present invention provides an emergency broadcasting apparatus, including: a co-channel repeater that removes multi-path signals or a Doppler effect due to vehicles in downtown from received broadcasting signals; and an emergency broadcasting unit performing at least one of decoding, multiplexing, and modulating input audio, video, and data emergency broadcasting signals according to a broadcasting standard.

[0008] Other features and aspects will be apparent from the following detailed description, the drawings, and the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 is a conceptual diagram of a transmitter according to an exemplary embodiment of the present invention;

[0010] FIGS. 2 and 3 are block diagrams of the transmitter according to an exemplary embodiment of the present invention;

[0011] FIG. 4 is an exemplified diagram explaining in detail the transmitter of FIG. 3;

[0012] FIGS. 5 to 7 are flowcharts explaining a connection switching method between two contents providing units; and

[0013] FIG. 8 is a block diagram for explaining the emergency broadcasting apparatus according to another exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS

[0014] Hereinafter, exemplary embodiments will be described in detail with reference to the accompanying drawings. Throughout the drawings and the detailed description, unless otherwise described, the same drawing reference numerals will be understood to refer to the same elements, features, and structures. The relative size and depiction of these elements may be exaggerated for clarity, illustration, and convenience. The following detailed description is provided to assist the reader in gaining a comprehensive understanding of the methods, apparatuses, and/or systems described herein. Accordingly, various changes, modifications, and equivalents of the methods, apparatuses, and/or systems described herein will be suggested to those of ordinary skill in the art. Also, descriptions of well-known functions and constructions may be omitted for increased clarity and conciseness.

[0015] Hereinafter, a transmitting method capable of receiving switching signals without performing separate

operations at a receiving side according to an exemplary embodiment of the present invention will be described with reference to FIGS. 1 to 3. FIG. 1 is a conceptual diagram of a transmitting apparatus according to an exemplary embodiment of the present invention and FIGS. 2 and 3 are block diagrams of a transmitting apparatus according to an exemplary embodiment of the present invention.

[0016] As shown in FIG. 1, the transmitting apparatus is configured to include at least two contents providing units 100, a switching unit 200 that is connected to the contents providing unit 100, and a transmitter 300.

[0017] At least two contents providing units 100 transmit signals to the switching unit 200.

[0018] The switching unit 200 switches the connection between each of the contents providing units 100. For example, the switching unit 200 is connected to an A contents providing unit 100a to receive signals and switches the connection to the B contents providing unit 100b at a specific timing to receive signals therefrom and then, output them to the transmitter 300. The transmitter 300 transmits the signals.

[0019] Hereinafter, the transmitting method according to the exemplary embodiment of the present invention will be described in more detail with reference to FIGS. 2 and 3.

[0020] FIGS. 2 and 3 describes, by way of example, the case where two contents providing units transmitting signals are used for convenience of explanation, but the number of contents providing units is not limited thereto.

[0021] As shown in FIG. 2, the transmitting apparatus to enable the receiving side to receive the switching signals without performing separate operations include two contents providing units 400a and 400b, a switching unit 500a, a modem, and a transmitter 600.

[0022] The two contents providing units 400a and 400b transmit service contents to the switching unit 500.

[0023] When each contents providing unit 400a and 400b provides a plurality of service contents, they each include multiplexers 410a and 410b. In this configuration, the multiplexers 410a and 410b multiplex two or more service contents and transmit them to the switching unit 500.

[0024] The switching unit 500 switches the connection between each of the contents providing units 400a and 400b. For example, the switching unit 500 connects an A contents providing unit 400a to a modem and a transmitter 600 to transmit the service contents of the A contents providing unit 400a and then switches the connection with the A contents providing unit 400a to the B contents providing unit 400b at a specific timing to output the service contents from the B contents providing unit 400b to the modem and the transmitter 600.

[0025] Describing in more detail, the A contents providing unit 400a transmits service configuration information to the B contents providing unit 400b and the B contents providing unit 400b configures the service contents based on the service configuration information transmit-

ted from the A contents providing unit 400a. The switching unit 500 receives the service contents from the connected A contents providing unit 400a and when the switching signal is generated, switches the connection with the A contents providing unit 400a to the B contents providing unit 400b at a specific timing and receives the service contents therefrom and then outputs them to the modem and the transmitter 600.

[0026] The modem and transmitter 600 includes a modem 610 and a transmitter 620 and the modem 610 modulates the service contents output from the switching unit 500 according to the transmission standard and the transmitter 620 transmits the modulated service contents.

[0027] As described above, the transmitting method according to an exemplary embodiment of the present invention performs the switching operation during the process of configuring the signals and then, performs the modulation according to the transmission standard at the transmitting end. In this case, the transmission standard of the signals for all the contents is the same. Therefore, the above-mentioned method may be used when building a system enabling one transmitting end to transmit specific services to all receivers for a predetermined time or continuously.

[0028] The method of performing the switching at the signal configuring process and performing the modulation according to the transmission standard at the transmitting end is described with reference to FIG. 2. A method of performing the switching after the modulation will now be described with reference to FIG. 3.

[0029] As shown in FIG. 3, in order for the transmitting apparatus to enable the receiving side to receive the switching signals without performing separate operations, two contents providing units 700a and 700b, a switching unit 800, and a transmitter 900 are included.

[0030] The two contents providing units 700a and 700b transmit service contents to the switching unit 800.

[0031] Each contents providing unit 700a and 700b includes multiplexers 710a and 710b and modem units 720a and 720b.

[0032] Each multiplexer 710a and 710b multiplex two or more service contents and transmits them to modem units 720a and 720b therein when the service contents are two or more.

[0033] The modem units 720a and 720b modulate the multiplexed services according to at least one of the transmission standard and the transmission information and transmits them to the switching unit 800.

[0034] The switching unit 800 switches the connection between each contents providing unit 700a and 700b. For example, the switching unit 800 connects the A contents providing unit 700a to a transmitter 900 to transmit the modulated service contents and switches the connection with the transmitter 900 to the B contents providing unit 700b at a specific timing and receives the multiplexed service contents therefrom and outputs them to the transmitter 900.

[0035] In more detail, the A contents providing unit 700a providing the current service contents transmits the service configuration information, the transmission standard, and the transmission information to the contents providing unit 700b and the contents providing unit 700b configures the service contents based on the service configuration information transmitted from the A contents providing unit 700a and multiplexes and modulates the service contents based on the transmission standard and the transmission information. The switching unit 800 receives the modulated service contents from the connected A contents providing unit 700a and when the switching signal is generated, switches the connection with A contents providing unit 700a to the B contents providing unit 700b and receives the modulated service contents therefrom and then outputs them to the transmitter 900

[0036] The transmitter 900 transmits the modulated service output from the switching unit 800.

[0037] As described above, the transmitting method capable of receiving the switched signals at the receiving side without performing the separate operations is switched after the modulation. The two contents providing units 700a and 700b matches the transmission structure such as the frame synchronization or the symbol synchronization, etc., and when the switching signal is generated, the switchig unit 800 receives the modulated service contents at a specific timing and transmits them through the transmitter 900. The method according to the exemplary embodiment can be applied when it is difficult for the contents providing system to connect to baseband signals but can serve different services to receivers for a predetermined time or continuously.

[0038] Application examples will now be described in detail with reference to FIG. 4.

[0039] As shown in FIG. 4, the transmitting apparatus includes a repeater 10 and an emergency signal generator 20. The repeater 10 is used to retransmit received signals in an area where signals are weak at normal times and when the emergency situations occur, switches the transmission to the emergency signal generator 20 according to the emergency situation information and transmits emergency situation information. In this case, in order to enable the receiving side receiving the repeating signals to receive the emergency situation information without performing separate operations, the emergency signal generator 20 receives the existing signal, that is, the repeating signals to read the configuration information of the repeating signals and generate emergency situation information according to the configuration information. The emergency signal generator 20 has the same signal configuration as the repeater 10 and has the same transmission standard as the repeater. The signals transmitted from the repeater 10 are configured and transmitted according to the transmission standard at normal times. When the transmitting device is switched to transmit the signals output from the emergency signal generator 20, the emergency signal generator 20 should

have the same transmission standard as the repeater 10 to enable the receiving side to receive the signals without performing separate operations.

[0040] In other words, the transmitting device matches the following standards, etc., to enable the receiving side to receive the signals without performing separate operations.

[0041] 1. This can be performed by matching the transmitting frequency between the repeater 10 and the emergency signal generator 20 by synchronizing the frequency of the emergency signal generator 20 with the transmitting frequency of the repeater 10.

[0042] 2. Match the frame start timing.

[0043] (When the transmitting device is included in a DAB-based system, it matches the start position of a null and when it is a DVB-T, it matches transmission parameter (TPS) signaling positions, etc.)

[0044] 3. It synchronizes the symbols of the emergency signal generator 20 with the symbols of the repeater 10 so that the symbol start timings are the same as each other.

[0045] For example, in order to synchronize the frequencies, it may synchronize the frequency of the modulator 21 in the emergency signal generator 20 with the frequency of the repeater 10. In order to synchronize the frames or the symbols, the emergency signal generator 20 may receive the information on the start timings of the frame synchronization or the symbol synchronization, etc., from the repeater 10. The emergency signal generator 20 may synchronize the frames or the symbols at the switching timing by the following method.

[0046] 1. The modulator 21 adjusts the timing outputting the emergency situation information according to the start timing of the repeater 10 by using the multiplexed signals received from an MUX/ReMUX 22.

[0047] 2. When the MUX/ReMUX 22 generates data for modulation, data received from a service encoder 23 generate the multiplexed signals according to the modulating timing.

[0048] The connection switching method between at least two contents providing units 100, that is, N contents providing units will now be described with reference to FIGS. 5 to 7. For convenience of explanation, FIGS. 5 to 7 describe the connection switching method between two contents providing units with reference to the device of FIG. 3 but the number of contents providing units is not limited thereto. FIGS. 5 to 7 are flow charts for explaining the connection switching method between two contents providing unit.

[0049] The switching method shown in FIG. 5 is a method for switching a system as soon as the switching signals are generated. The switching method is advantageous in immediately switching the signals without the time delay.

[0050] First, the switching unit 800 connects to any one of the two contents providing units, for example, the A contents providing unit 700a to the transmitter 900 (S510).

[0051] It determines whether or not to switch the connection according to the generation or not of the switching signals (S520).

[0052] As the determination result, if it is determined that the connection is not switched, the connection between the A contents providing unit 700 and the transmitter 900 is maintained.

[0053] As the determination result, however, when the switching signals are generated, it is determined that the connection is switched and then, the transmitter 900 connected to the A contents providing unit 700a is connected to the B contents providing unit 700b (S530).

[0054] Thereafter, it is determined whether or not to release the switching (S540).

[0055] As the determination result, if it is determined that the switching is released, the transmitter 900 connected to the B contents providing unit 700b is again connected to the A contents providing unit 700a (S510).

[0056] As the determination result, however, if it is determined that the switching is released, the connection between the B contents providing unit 700b and the transmitter 900 is maintained.

[0057] In the case of the exemplary embodiment of FIG. 5, the transmitting side can transmit the signals by switching the connection without delay, but the receiving side delay as if services are temporarily stopped may occur in the receiving side receiving the signals.

[0058] A method for searching and switching synchronization signal interval as a switching method for the synchronization signal interval in the DAB-based system will now be described with reference to FIG. 6. In addition, the exemplary embodiment shown in FIG. 6 may be applied to a switching method for a protective interval in the OFDM system.

[0059] As shown in FIG. 6, the switching unit 800 connects any one of the two contents providing units, for example, the A contents providing unit 700a to the transmitter 900.

[0060] It is determined whether or not to switch the connection according to the generation or not of the switching signals (S620).

[0061] As the determination result, if it is determined that the connection is not switched, the connection between the A contents providing unit 700a and the transmitter 900 is maintained.

[0062] As the determination result, however, if it is determined that the connection is switched when the switching signals are generated, the position of the synchronization signals is detected (S630). As described above, the transmitter should have the information on the synchronization signal interval in order to detect the position of the synchronization signal.

[0063] When the position of the synchronization signal is not detected, the position of the synchronization signal is continuously detected until the position of the synchronization signal is detected.

[0064] When the position of the synchronization signal is detected, the transmitter 900 connected to the A con-

tents providing unit 700a is connected to the B contents providing unit 700b (S640).

[0065] Thereafter, it is determined whether or not to release the switching (S650).

[0066] As the determination result, if it is determined that the switching is released, the transmitter 900 connected to the B contents providing unit 700b is again connected to the A contents providing unit 700a.

[0067] As the determination result, however, if it is determined that the switching is not released, the connection between the B contents providing unit 700b and the transmitter 900 is maintained.

[0068] Meanwhile, when the transmitter is included in the OFDM system, the transmitter 900 connected to the A contents providing unit 700a may be connected to the B contents providing unit 700b for the protective interval.

[0069] The switching method at the timing when the encoded signal is multiplexed to be transmitted will now be described with reference to FIG. 7.

[0070] As shown in FIG. 7, the switching unit 800 connects any one of the two contents providing units, for example, the A contents providing unit 700a to the transmitter 900 (S710).

[0071] It is determined whether or not to switch the connection according to the generation or not of the switching signals (S720).

[0072] As the determination result, if it is determined that the connection is not switched, the connection between the A contents providing unit 700a and the transmitter 900 is maintained.

[0073] As the determination result, however, it is determined that the connection is switched when the switching signals are generated and it is determined whether the generation of the multiplexing signal is completed (S730). For example, it is determined whether the multiplexing for the encoded signals is completed.

[0074] As the determination result, when the multiplexing is not completed, it waits until the multiplexing is completed.

[0075] As the determination result, however, if the multiplexing is completed, the position of the synchronization signal is determined (S740).

[0076] When the position of the synchronization signal is not detected, the position of the synchronization signal is continuously detected until the position of the synchronization signal is detected.

[0077] When the position of the synchronization signal is detected, the transmitter 900 connected to the A contents providing unit 700a is connected to the B contents providing unit 700b (S750).

[0078] Thereafter, it is determined whether or not to release the switching (S760).

[0079] As the determination result, if it is determined that the switching is released, the transmitter 900 connected to the B contents providing unit 700b is again connected to the A contents providing unit 700a.

[0080] As the determination result, however, if it is determined that the switching is not released, the connec-

tion between the contents providing unit 700b and the transmitter 900 is maintained.

[0081] Meanwhile, step S740 may be omitted.

[0082] As described above, the transmitting method and the transmitting apparatus of the present invention connects any one of at least two contents providing unit to the transmitter to transmit the service contents and enables the receiving side to receive the service contents without performing the separate operations.

[0083] An emergency broadcasting apparatus according to an exemplary embodiment of the present invention will now be described with reference to FIG. 8. FIG. 8 is a block diagram for explaining the emergency broadcasting apparatus according to another exemplary embodiment of the present invention.

[0084] As shown in FIG. 8, the emergency broadcasting apparatus includes a receiver 100, a co-channel repeater 200, an emergency broadcasting unit 300, and a transmitter 400 and can repeat broadcasting channels, for example, three terrestrial DMB channels and simultaneously broadcast the emergency broadcasting to three channel.

[0085] The receiver 100 includes a band pass filter (BPF) 110 and a low noise amplifier (LNA) 120.

[0086] The band pass filter 110 passes through a bandwidth having three terrestrial DMB channels.

[0087] The LAN 120 performs the low-noise amplification on the signals passing through the band pass filter 110 and transmits them to the co-channel repeater 200 and the emergency broadcasting unit 300.

[0088] The co-channel repeater 200 includes a down converter 210, a signal processor 220, and an up converter 230.

[0089] The down converter 210 down-converts the signals transmitted from the LAN 120, that is, the terrestrial DMB signal into an IF frequency and down-converts coupled reference signals into an IF frequency in the transmitting antenna 500.

[0090] The signal processor 220 includes an echo removing unit 221 and an equalizer 222.

[0091] The echo removing unit (ICS) 221 receives the signals down-converted from the down converter 210 and removes a feedback signal (F/B) received to the receiving antenna 600 into which the signal transmitted from the transmitting antenna 500 is received.

[0092] The equalizer 222 removes the multi-path signals received in the receiving antenna 600 or the Doppler effect due to vehicles downtown from the down-converted terrestrial DMB signals.

[0093] The up converter 230 includes a switch to switch the removed terrestrial DMB signals and the signals processed in the emergency broadcasting unit 300 and up-converts the switched signals into the terrestrial DMB RF frequency.

[0094] The emergency broadcasting unit 300 includes an encoder 310, a multiplexer/re-multiplexer 320, and a modulator 330.

[0095] The encoder 310 includes an audio/video en-

coder 311 and a data encoder 312 and transmits the encoded signals to the multiplexer/re-multiplexer 320.

[0096] The audio/video encoder 311 encodes the input audio or video emergency broadcasting signals.

[0097] The data encoder 312 encodes the input data emergency broadcasting signals.

[0098] At least one of audio, video, and data emergency broadcasting signals may be input by an operator. For example, when the emergency situations occur, the emergency message may be input to the emergency broadcasting unit 300 through input terminals such as a mike or a keyboard.

[0099] The multiplexer/re-multiplexer 320, which is a 3-channel terrestrial DMB ensemble multiplexer, analyzes the fast information channel (FIC) of the terrestrial DMB signals transmitted from the LAN 120 to obtain bit rate for at least one of audio, video, and data in the existing terrestrial DMB or service information such as a protection level, for example, and processes at least one of the encoded audio, video, and data emergency broadcasting signals according to the service information to re-multiplex it as an ensemble transport interface (ETI) protocol.

[0100] The modulator 330 modulates at least one of the re-multiplexed audio, video, and data emergency broadcasting signals by using a coded-orthogonal frequency division multiplexing (COFDM) transmission method.

[0101] The transmitter 400 includes an amplifier 410 and a filter 420.

[0102] The amplifier 410 amplifies the signals transmitted from the up-converter 230.

[0103] The filtering unit 420 band passes the transmitted signals according to a terrestrial DMB spectrum mask standard.

[0104] As described above, the emergency broadcasting apparatus according to the present invention can prevent the deterioration in the quality of the repeating signals. In particular, high-quality repeating services may be provided in the tunnel or underground. In other words, in the case where the emergency broadcasting and the repeating broadcasting are provided to one system in the tunnel or underground, the deterioration in the quality of the received signals can be prevented when the height of the receiving antenna for repeating broadcasting is low or there are obstacles such as adjacent buildings or trees, etc., and when high quality repeating services may be provided to the tunnel or underground by adopting the equalizer that can remove the Doppler effect of the received signals due to vehicles when the receiving antenna is positioned at the roadside.

[0105] Further, the emergency broadcasting apparatus of the present invention performs the switching to the emergency broadcasting service from the co-channel repeating service in the RF band and the emergency broadcasting unit 300 generates and provides the RF signal according to each channel to degrade the efficiency. In other words, the emergency broadcasting apparatus of

the present invention uses a specific IF frequency in the co-channel repeating services and switches the emergency broadcasting service in the IF band, thereby making it possible to easily provide the emergency broadcasting service in the entire terrestrial DMB frequency band.

[0106] The above-mentioned exemplary embodiment describes, for example, the case where the broadcasting apparatus is the terrestrial DMB broadcasting apparatus but the present invention is not limited thereto. Therefore, the broadcasting apparatus may be a broadcasting apparatus having various broadcasting standards. For example, the broadcasting apparatus may be a broadcasting apparatus for providing a digital audio broadcasting service or a digital video broadcasting service.

[0107] According to the exemplary embodiments of the present invention, it can transmit different service signals so that the service signals can be received without performing separate operations at the receiving side.

[0108] Further, the present invention can prevent deterioration in quality of the repeating signal.

[0109] In particular, the present invention can provide the high quality repeating services in underground.

[0110] A number of exemplary embodiments have been described above. Nevertheless, it will be understood that various modifications may be made. For example, suitable results may be achieved if the described techniques are performed in a different order and/or if components in a described system, architecture, device, or circuit are combined in a different manner and/or replaced or supplemented by other components or their equivalents. Accordingly, other implementations are within the scope of the following claims.

Further examples:

Example 1. A method for transmitting service contents by switching connection between at least two contents providing units and a transmitter, comprising:

connecting the transmitter connected to any one contents providing unit to another contents providing unit when switching signals are generated.; and
transmitting service contents transmitted from another contents providing unit.

Example 2. The method of example 1, wherein the transmitting includes:

modulating the service contents according to the same transmission standard; and
transmitting the modulated service contents.

Example 3. An apparatus for transmitting service contents, comprising:

at least two contents providing units;

a transmitter that transmits service contents output from each contents providing unit; and

a switching unit that switches connection between each contents providing unit and the transmitter, wherein the switching unit connects the transmitter connected to any one contents providing unit to another contents providing unit when switching signals are generated; and outputs service contents transmitted from another contents providing unit to the transmitter.

Example 4. The apparatus of example 3, wherein the transmitter modulates the service contents according to the same transmission standard and transmits the modulated service contents.

Example 5. The apparatus of example 3 or 4, wherein the contents providing unit modulate the service contents based on at least one of the predetermined transmission standard and the transmission information, and the transmitter transmits the modulated and transmitted service contents.

Example 6. The apparatus of one of examples 3 to 5, wherein first contents providing unit transmits the configuration information of the service contents to second contents providing unit, and the second contents providing unit generates contents services based on the configuration information of the transmitted service contents.

Example 7. The apparatus of example 6, wherein the second contents providing unit modulates the service contents according to the transmission standard used by the first contents providing unit that is already being transmitted, and the transmitter transmits the modulated service contents.

Example 8. The apparatus of example 7, wherein the second contents providing unit synchronizes the frame and symbol of the generated service contents with the frame and symbol of the service contents of the first contents providing unit.

Example 9. The apparatus of one of examples 3 to 8, wherein the switching unit connects at least two contents providing units for the synchronization signal interval when at least two contents providing units are included in a digital audio broadcasting (DBA)-based system, connects them to each other for a protective interval when at least two contents providing units are included in an orthogonal frequency division multiplexing (OFDM) system, and connects the transmitter connected to the contents

providing unit to another contents providing unit by any one manner when service contents completes preparation to output the contents another contents providing unit.

Claims

1. An emergency broadcasting apparatus, comprising:

a co-channel repeater that removes multi-path signals or a Doppler effect from received broadcasting signals; and
an emergency broadcasting unit performing at least one of decoding, multiplexing, and modulating input audio, video, and data emergency broadcasting signals according to a broadcasting standard.

2. The apparatus of claim 1, wherein the co-channel repeater includes:

a down-converter that down-converts the received broadcasting signals and a frequency of a coupled reference signal from the transmitting antenna into an intermediate frequency; and
a signal processor that removes the multi-path signals or the Doppler effect from the down-converted broadcasting signals.

3. The apparatus of claim 2, wherein the signal processor includes:

an echo removing unit that removes the received feedback signals that is again receives the transmitted signals; and
an equalizer that removes the multi-path signals or the Doppler effect.

4. The apparatus of one of claims 1 to 3, wherein the emergency broadcasting unit includes:

an encoder that encodes at least one of the audio, video, and data emergency broadcasting signals;
a multiplexer/re-multiplexer that analyzes a fast information channel (FIC) of the received broadcasting signal to obtain at least one bit rate of audio, video, and data or service information including a protection level and processes at least one of the encoded audio, video, and data emergency broadcasting signals to re-multiplex it as an ensemble transport interface (ETI) protocol; and
a modulator that modulates at least one of the re-multiplexed audio, video, and data emergency broadcasting signals by a coded-orthogonal frequency division multiplexing (COFDM) trans-

mission manner.

5. The apparatus of one of claims 1 to 4, further comprising an up converter that up-converts the frequency of the removed broadcasting signals and up-converts at least one of the up-converted audio, video, and the data emergency broadcasting signals.

6. The apparatus of claim 5, wherein the up-converter further includes a switching unit that switches at least one of the audio, video, and data emergency broadcasting signals and the removed broadcasting signals.

FIG. 1

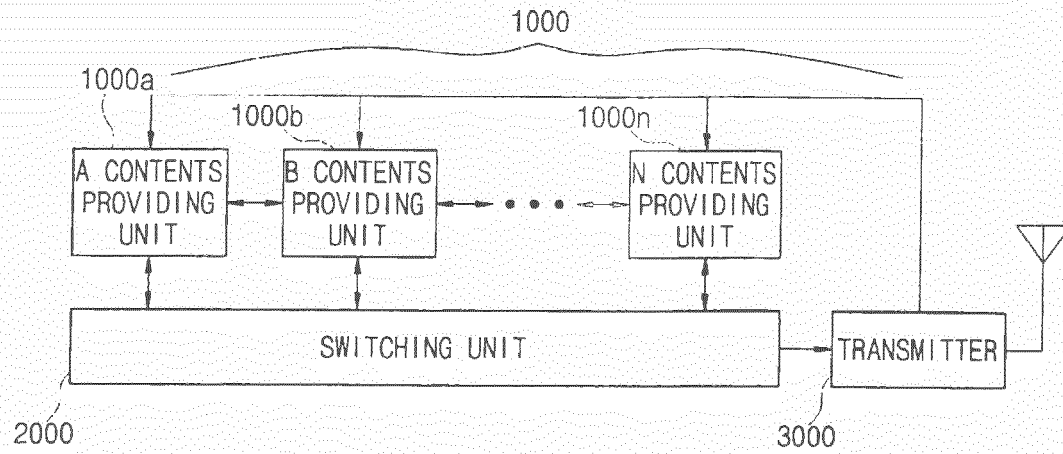


FIG. 2

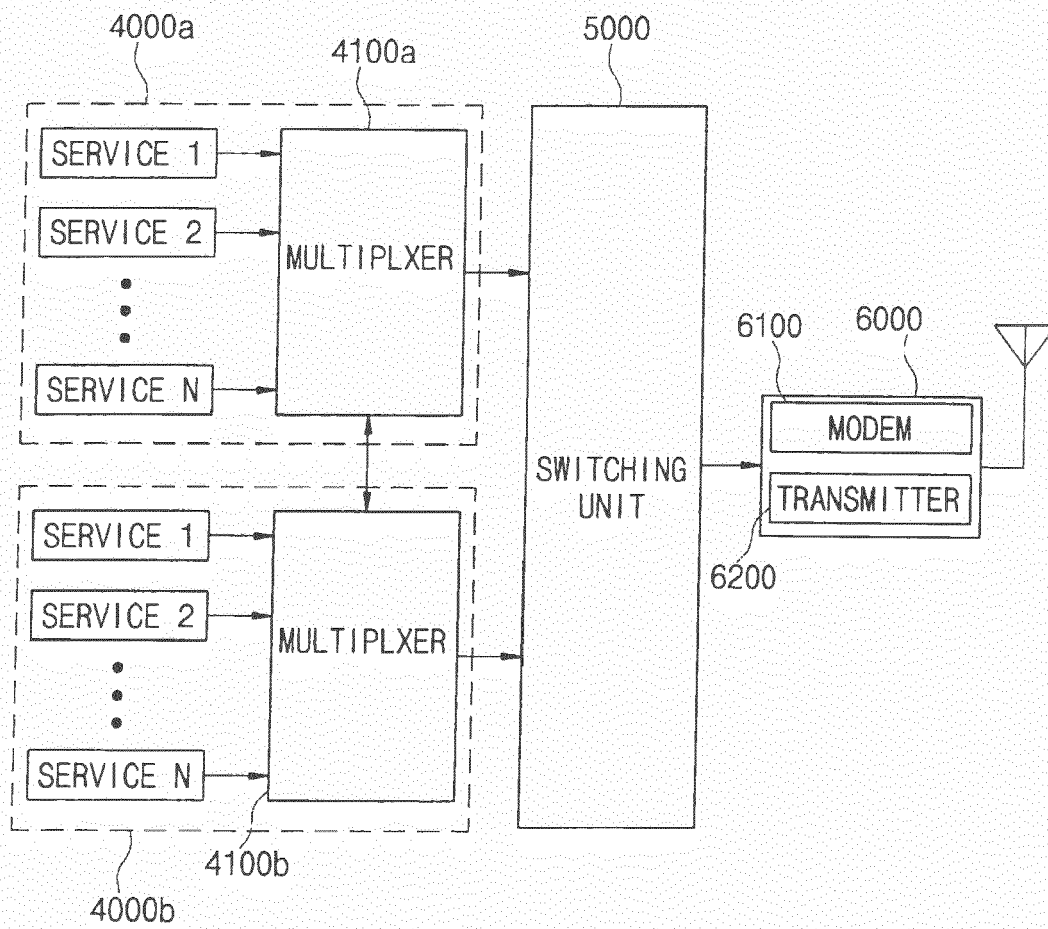


FIG. 3

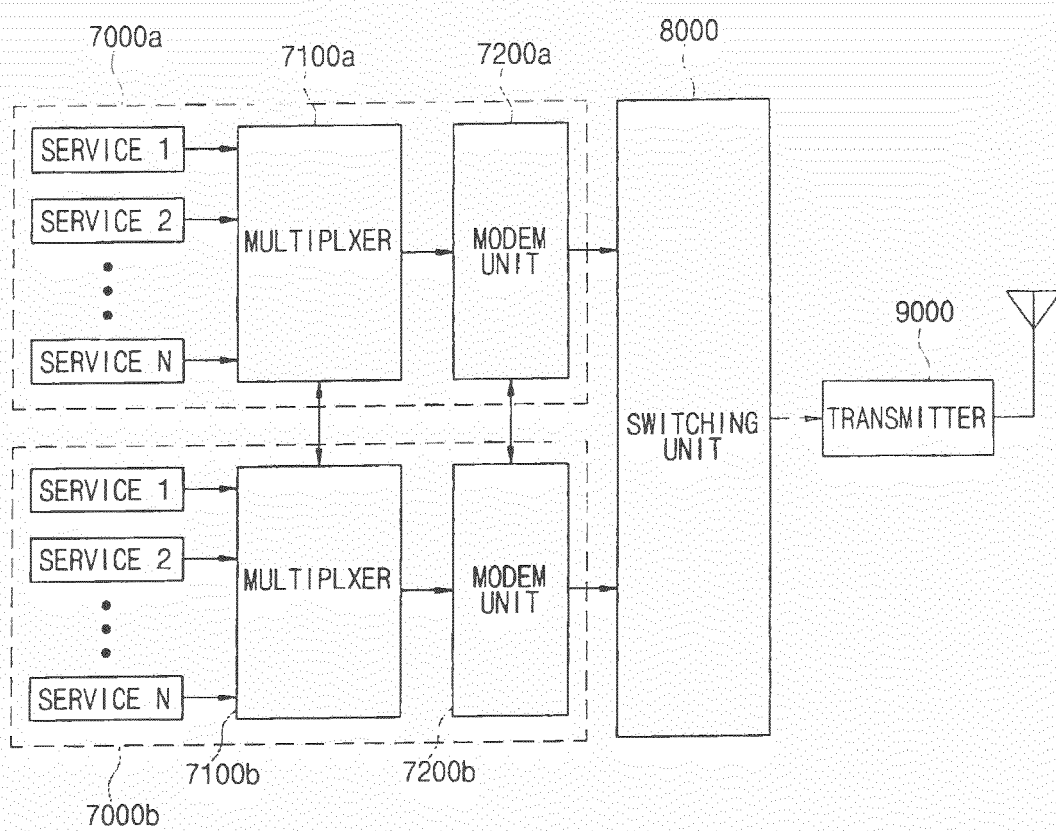


FIG. 4

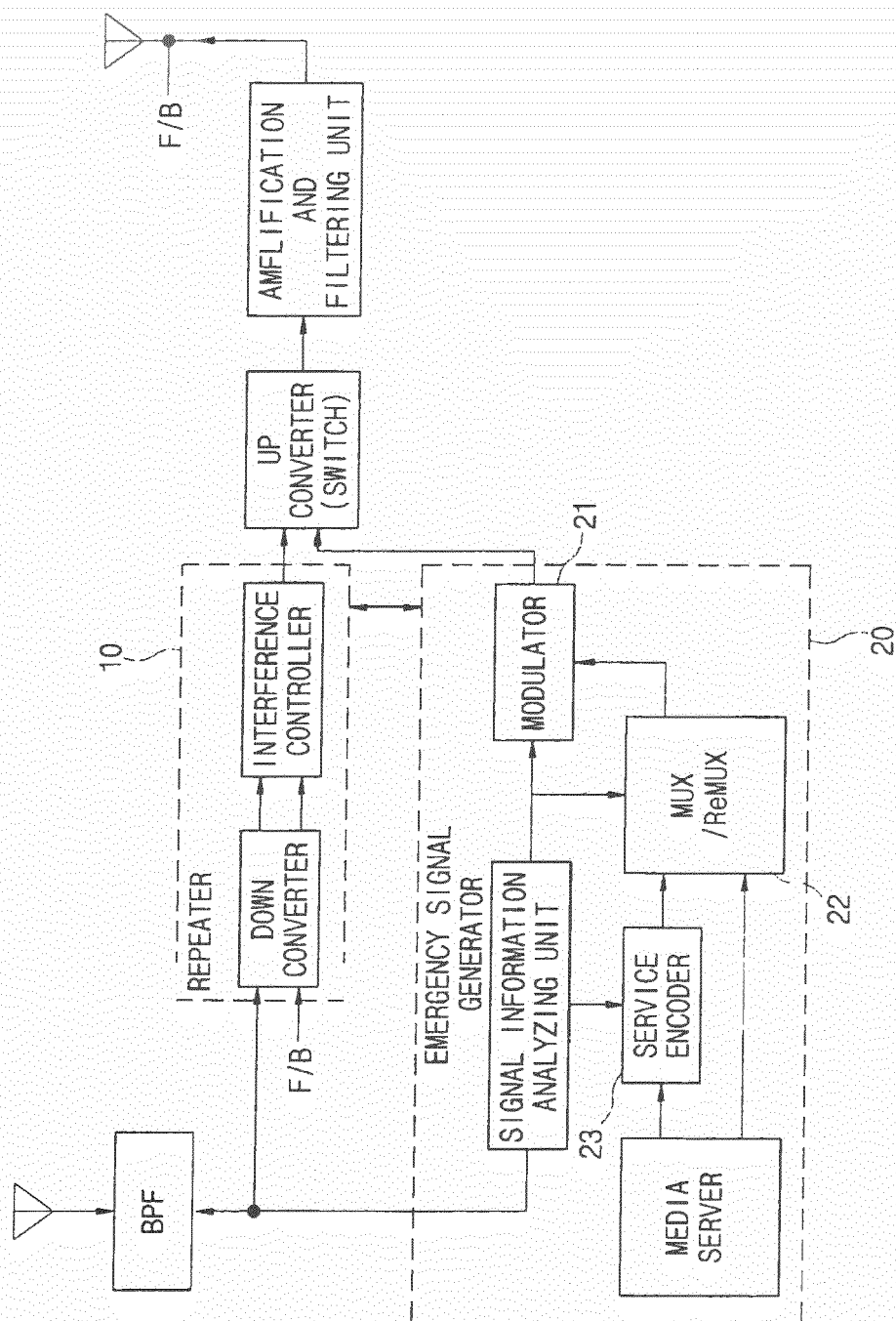


FIG. 5

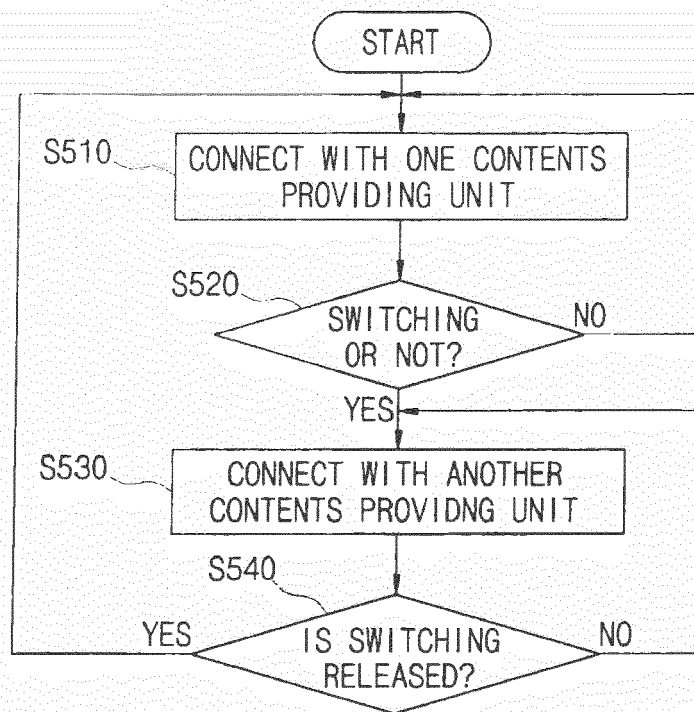


FIG. 6

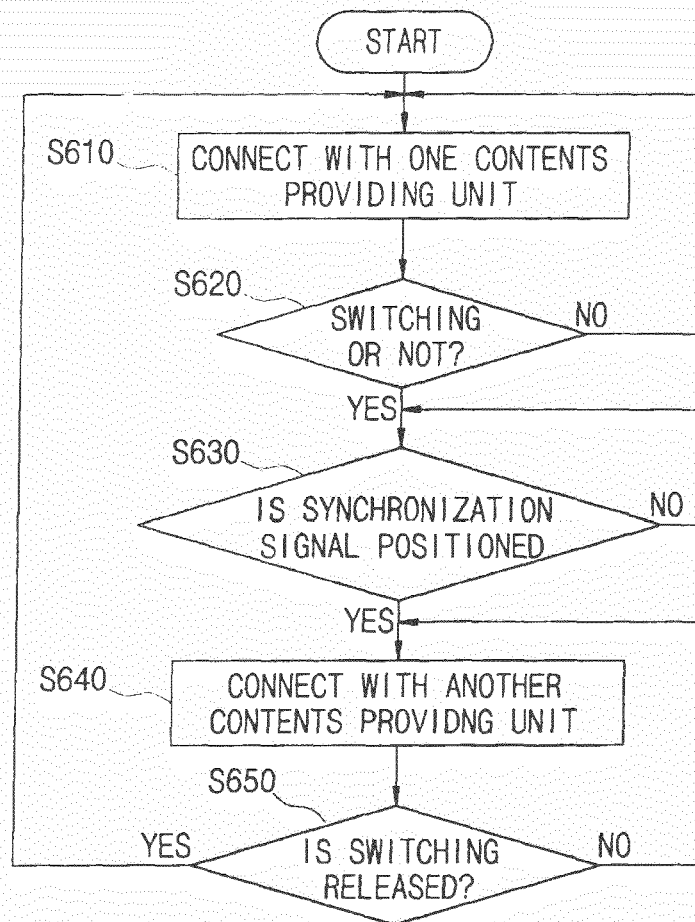


FIG. 7

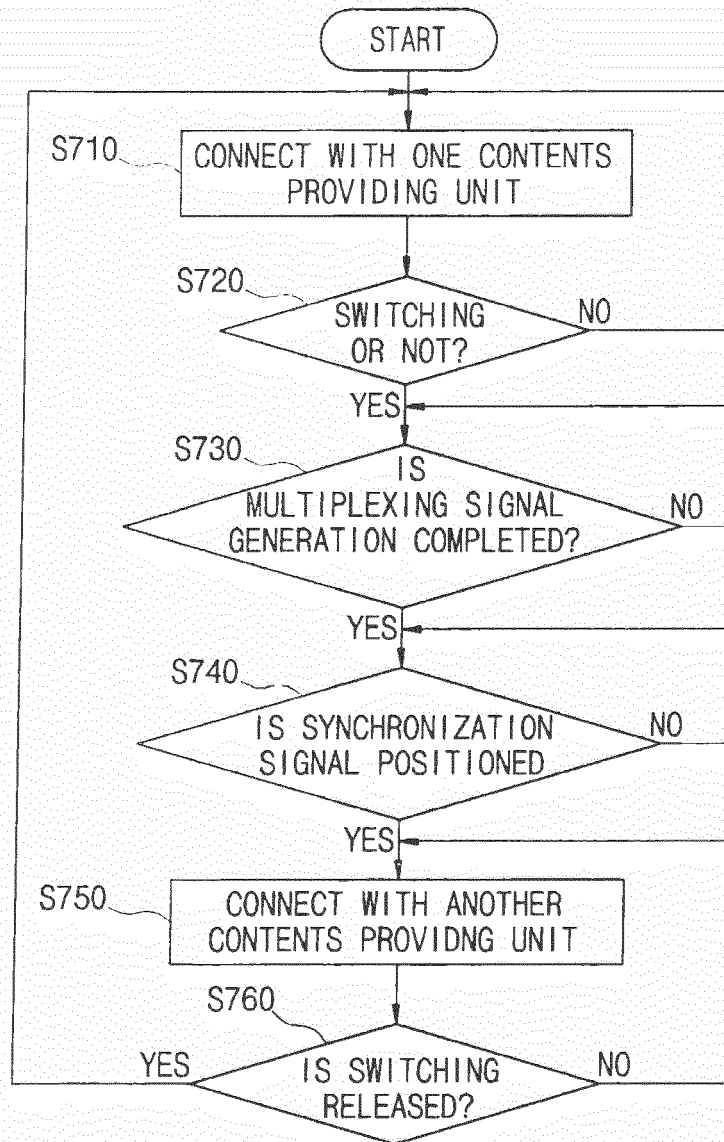
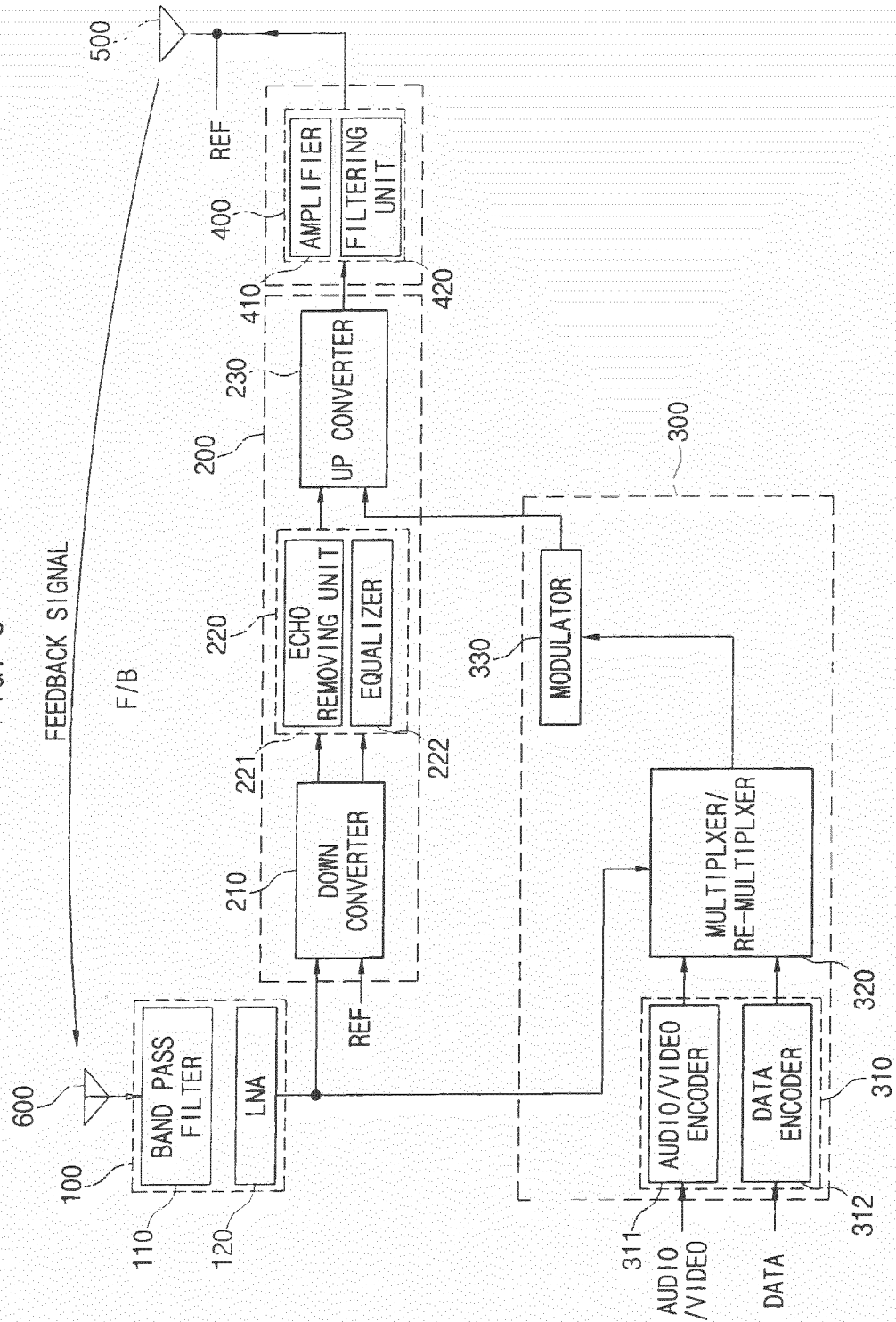


FIG. 8



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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