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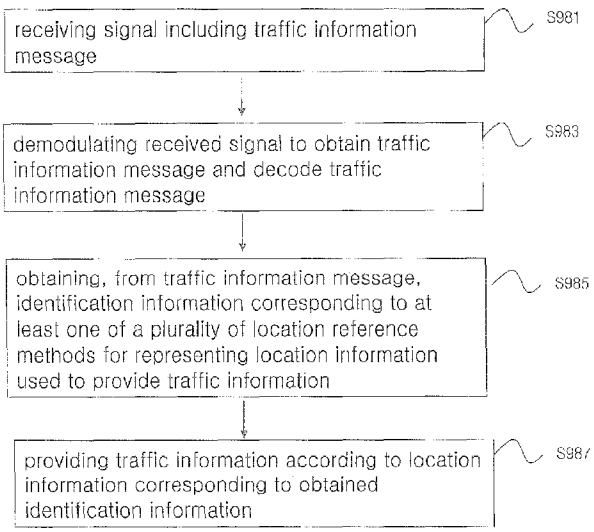
(54) **Title:** METHOD FOR TRANSMITTING AND RECEIVING TRAFFIC INFORMATION AND APPARATUS FOR TRANSMITTING AND RECEIVING TRAFFIC INFORMATION



(57) **Abstract:** In transmission of signals, a traffic information message including an identifier of at least one of a plurality of location reference methods for representing location information, location information identified by the identifier, and traffic information is encoded. And the encoded traffic information message is transmitted. The system of transmitting and receiving the traffic information may be DVB-H/T system. In reception of the signals, the transmitted signals are modulated and the traffic information message in the modulated signals is decoded. And then, an identifier of at least one of a plurality of location reference methods for representing location information is obtained. The traffic information is provided by the location information according to the identifier.

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Description

METHOD FOR TRANSMITTING AND RECEIVING TRAFFIC INFORMATION AND APPARATUS FOR TRANSMITTING AND RECEIVING TRAFFIC INFORMATION

Technical Field

[1] The present invention relates to a method for transmitting and receiving traffic information and an apparatus for receiving traffic information.

Background Art

[2] Radio and TV broadcasting has evolved from analog to digital along with development and integration of digital signal processing and communication technologies. Data broadcasting which broadcasts program information or daily life information has also been developed along with the digital broadcasting. An increase in the number of cars in cities due to the spread of private cars and an increase in the number of cars in areas outside cities due to an increase in the number of holidays have increased the need to provide traffic information of roads.

Disclosure of Invention

Technical Problem

[3] While broadcasts carrying traffic information are provided by the radio to meet the need, they are provided only at specified times. Thus, there is a need to transmit traffic information in real time. The traffic information is location-based information. A number of location reference methods are used to transmit and receive such location-based information. It is difficult to provide universal location information with a specific location reference method since there are various types of location reference methods and many countries use different national standards.Thus, there is a need to previously indicate or provide information of a specific method that has been used to provide location information when the location information can be provided according to various methods.An object of the present invention is to provide a method for transmitting traffic information including information for identification of a location reference method applied to location information. Another object of the present invention is to provide a method and apparatus for and transmitting and receiving traffic information including information for identification of a location reference method applied to location information.

Technical Solution

[4] When signals is trasmitted, a traffic information message including an identifier of at least one of a plurality of location reference methods for representing location in-

formation, location information identified by the identifier, and tracfic information is encoded. The plurality of location reference methods may include at least one of a Transport Protocol Expert Group - Location (TPEG-LOC) method, a pre-coded Korean node-link ID method, an Agora-C method, and a VICS link method. The encoded traffic information message, video signals and audio signals are multiplexed and the multiplexed sinals are operated by error correction coding against errors and interleaved. Scatter pilot signals varied depending on time and continuation pilot signals fixed depending on time within one frame of the interleaved signals are mapped respectively, and modulated by an orthogonal frequency division multiplexing (OFDM) scheme. And the modulated signals are converted to radio frequency (RF) signals and transmitted.

[5] In reception of the traffic information message including an identifier of at least one of a plurality of location reference methods, broadcasting signals including the traffic information message including an identifier of at least one of a plurality of location reference methods for representing location information, location information identified by the identifier and traffic information, are received.

[6] The broadcasting signals are demodulated by using scatter pilot signals varied depending on time and continuation pilot signals fixed depending on time within a frame of the received broadcasting signals. And the demodulated signals are decoded to obtain braodcasting stream. The traffic information message in broadcasting signals is demulitplexed and parsed to obtain the location information according to the identifier from the traffic information message. The traffic information service is output and display by using the location information.

Advantageous Effects

[7] This invention has an advantage effect that one of various location reference methods can be used without change of the structure of the prior traffic information like TPEG messages, and each of location reference methods can be applied to the traffic information without change of its structure.

[8] And in case that the location reference methods vary upon nations and local areas, it has an advantage effect that all the location reference methods can be applied to the traffic information by selecting one of location reference methods in accordance with location reference information in the received location reference methods.

[9] Also because various location reference methods and the respective identifiers of these methods can be provided, it is helpful that proper location information can be used by identifying one of the location reference methods.

Brief Description of the Drawings

[10] FIG. 1 schematically shows a digital multimedia broadcast system that provides

traffic information;

[11] FIG. 2 shows a format of wirelessly communicated traffic information;

[12] FIG. 3 shows the structure of a Transport Protocol Expert Group (TPEG) - location container;

[13] FIG. 4 shows an example representing the type of location information and the position of an identifier (ID);

[14] FIG. 5 shows another example representing the type of location information and the position of an ID;

[15] FIG. 6 shows location information written in service guide information of a traffic information message;

[16] FIG. 7 shows an example of identification information illustrated in FIG. 6;

[17] FIG. 8 shows an example of a message management container of a traffic information message;

[18] FIGs. 9 to 11 show an example of inclusion of location information according to a location reference method ID in a Road Traffic Message (RTM) component;

[19] FIG. 12 shows an example of the location reference method ID of FIGs. 9 to 11;

[20] FIG. 13 illustrates an apparatus for transmitting and receiving traffic information;

[21] FIG. 14 illustrates signal arrangement according to the frames which the frame generator generates in FIG. 13;

[22] FIG. 15 illustrates another example of an apparatus for transmitting traffic i nformation;

[23] FIG. 16 illustrates an example of services transmitted on a channel;

[24] FIG. 17 illustrates location of a descriptor of traffic information that can be transmitted along with stream parsing information;

[25] FIGs. 18 and 19 respectively illustrate the PAT and the PMT as stream parsing information;

[26] FIG. 20 illustrates a descriptor that can parse traffic information;

[27] FIG. 21 illustrates an example of an apparatus for receiving traffic information according to the present invention;

[28] FIG. 22 is a flow chart of a method for receiving traffic information;

[29] FIG. 23 is a flow chart showing an example of a method for obtaining location information included in the method for receiving traffic information; and

[30] FIG. 24 illustrates a flow chart of a method for transmitting traffic information.

Best Mode for Carrying Out the Invention

[31] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

[32] Traffic information used in the present implementation can be applied to a variety

of digital broadcast standards. Examples of the digital broadcast standards include European Digital Audio Broadcasting (DAB) based on Eureka-147 (ETSI EN 300 401), Digital Video Broadcasting-Terrestrial (DVB-T), Digital Video Broadcasting-Handheld (DVB-H), American Media Forward Link Only (MediaFLO), and Korean Digital Multimedia Broadcasting (DMB).The Korean DMB is classified into Terrestrial-DMB (T-DMB) based on Eureka-147 and Satellite-DMB (S-DMB) using satellite communication.

[33] The term "traffic information" used in the following descriptionrefers to information regarding public transportation, congestion and travel time, road traffic, emergencies, and the like. In the case where a method of providing such traffic information complies with the Transport Protocol Expert Group (TPEG) standard, a term "TPEG" will be used to indicate it for ease of explanation. The traffic information is dependent on location and each message includes information regarding location.

[34] The term "location reference method or type" used in the following description refers to a method or type of constructing location information used for traffic inf ormation that is location-based information. In the following description, TPEG-LOC, Agora-C , pre-coded Korean node-link ID, and VICS link methods will be used as examples of the location reference method. "VICS" means information which is Advanced Travel Information System in Japan. Also Agora-C and pre-coded Korean node-link ID are referred as examples regarding location information in order to represent traffic information.

[35] The term "application service information" used in the following description refers to information included in a container which provides information associated with a variety of services in a message structure that provides a specific service in TPEG technologies. In the following description, Congestion and Travel Time (CTT) information, a Road Traffic Message (RTM), and Public Transport Information (PTI) will be used as examples of the application service information.

[36] Terms other than those described above may also be used if they indicate the same functions. FIG. 1 schematically shows a digital multimedia broadcast system that provides traffic information. A method for providing traffic information through a wireless signal will now be described with reference to FIG. 1.

[37] The digital multimedia broadcast system includes a network 110 through which traffic information-related content is collected, a traffic information server 120 that provides collected content, a broadcast center 130, and a terminal 140. The traffic information server 120 in a broadcaster reconstructs various traffic information, for example input by the operator or collected from other servers through the network 110, and transmits the traffic information through a transmitter in the broadcast center 130 so that it can be received by a receiver provided in any of a variety of terminals, for

example a mobile phone, a vehicle, a Personal Digital Assistant (PDA), or any other portable terminal. The terminal 140 may also include, but not is limited to, a navigator or a computer such as a notebook computer. The traffic informationserver 120 can use not only a digital broadcast data channel as a path to transmit traffic informationbut also the wired/wireless Internet, for example, a broadband wireless medium such as the Wi-Fi or Wireless Broadband Internet (Wibro) or the Internet using wired cables. Especially, a Multimedia Object Transport (MOT) protocol or a Transparent Data Channel (TDC) protocol for digital broadcast media may be used in the case where a Digital Multimedia Broadcasting (DMB) data service is used to transmit traffic information.

[38] FIG. 2 shows a format of wirelessly communicated traffic information.

[39] As illustrated in FIG. 2, a traffic information message structure includes a message management container 212, an application event (status) container 214, and a TPEG-location container 216.

[40] Information used for traffic information message management such as version information, message identification information, or date and time information is created and included in the message management container 212. The application event (status) container 214 includes different information for each service and information of each service is constructed in a different format.

[41] The TPEG-location container 216 includes information regarding location associated with a corresponding service. Particularly, the TPEG-location container 216 provides location information used to provide traffic information to a receiving end according to its structure illustrated in FIG. 3.

[42] However, each country uses a different standard to provide location information. For example, Europe uses an Agora-C location reference type (or method), Korea uses a Pre-coded Korean Node-Link ID type which has been defined as a location information standard, and Japan uses a VICS link type.

[43] In the case where location information is provided using thecontainer as illustrated in FIG. 3, it is difficult to provide location information of various location reference types although it is possible to provide location information of the single type. In addition, if location information is provided using the structure illustrated in FIG. 3, data may be carried in unnecessary fields depending on the standard. Thus, a method for providing location information using standards of various location reference types will be disclosed in the following description.

[44] One example is to change the TPEG location container to location information defined for a different standard. As illustrated in FIG. 4, without changing structures of a TPEGmessage which constitute a data stream of the TPEG message, its TPEG location container may be changed to location information that is configured using

location information according to the variety of location reference types (or methods). For example, a TPEG location container 402 can be changed to a Pre-coded Korean Node-Link ID location reference type 404 that is mainly used in Korea. The TPEG location container 402 can also be changed to an Agora-C location reference type 406 that is mainly used in Europe. The TPEG location container 402 can also be changed to a VICS link location reference type 408 that is mainly used in Japan. In this case, different language can be applied to provide location information according to the changed location reference type.

[45] Another example is to change location coordinates included in a TPEG location containerto location information according to the variety of location reference types.As illustrated in FIG. 5, without changing the structure of a TPEG location container, location coordinates included in the container may be changed to location information that is configured using a standard used in each country. For example, location coordinates 502 can be changed to a Pre-coded Korean Node-Link ID location reference type 504 that is mainly used in Korea. The location coordinates 502 can also be changed to an Agora-C location reference type 506 that is mainly used in Europe. The location coordinates 502 can also be changed to a VICS link location reference type 508 that is mainly used in Japan. In this case, different language can be applied according to the changed location reference type.

[46] Here, each of the Pre-coded Korean Node-Link ID location reference type and the VICS link location reference type is a pre-coded type and the Agora-C location reference type is a dynamic type. The pre-coded type is based on a method using a master database (DB) in which the terminal system analyzes location informationusing a mediation DB such as a mapping table between a DB of the terminal system and the master DB. The dynamic type uses a method in which a transmitting end transmits location information by encoding it according to a specified coding scheme and a receiving end receives and decodes the encoded information to analyze the location of its map.

[47] In the case where location information has been encoded according to the variety of location reference types (or methods) as described above, there may be a variety of corresponding methods to analyze the location information.

[48] In the case where location information has been transmitted according to a variety of location referencetypes, a receiving end that receives traffic information can appropriately decode location information only when it knows which standard has been used to construct the location information. Thus, the examples herewith provides a method for distinguishing between location information constructed using a variety of methods.

[49] In a first embodiment, information for identification of the location reference

method (or type) of location information used in overall services can be provided by incorporating it in TPEG Service and Network Information (TPEG-SNI) which includes service network information containing overall service guide information of TPEG services.

[50] In a second embodiment, the information for identification of the location reference method of location information can be provided using a field in a message management container that includes message management information used to manage TPEG messages.

[51] In a third embodiment, the information for identification of the location reference method of location information can be provided using a field at the header of a location container including location information.

[52] These embodiments will now be described in detail with reference to the drawings.

[53] FIG. 6 shows a service guide table according to the first embodiment. FIG. 7 shows a table describing ID information of location information among a variety of information shown in FIG. 6. The first embodiment will now be described with reference to FIGs. 6 and 7.

[54] To analyze a number of TPEG messages transmitted in the form of a data stream, first, TPEG Service and Network Information (TPEG-SNI) is analyzed. The TPEG-SNI carries information regarding a communication network and a variety of services communicated according to the TPEGmethod. According to information (or content) transmitted in the TPEG-SIN, it is possible to analyze and use all other services included in the TPEG message. Generally, the TPEG-SNI includes high-speed tuning information for analysis of a variety of services such as Service Component Identification (SCID), Contents Identification (COID), and Application Identification (AID). The TPEG-SNI also includes a table of time schedule information, content details information, broadcast region information, initialization-related information, reception restriction and authentication information, component connection information, and the like.

[55] For example, using the SCID, the terminal can identify whether a component transmitted is Congestion and Travel Time (CTT) information, a Road Traffic Message (RTM), or Public Transport Information (PTI). In this case, the TPEG-SNI includes information regarding which component each SCID indicates in a TPEG message.

[56] In this case, in the TPEG-SNI according to the first embodiment, the information for identification of the location reference method of location informationcan be transmitted after being coded into a value as illustrated in FIG. 7.

[57] In FIG. 6, a Service Component Identification (SCID) field 602 is used to distinguish between a number of service components transmitted within a data frame. The location method field 604 includes information for identification of the location

reference method of location information. It is possible to describe various location reference methods of location information by setting such identification information in the location method field 604.

[58] An example of the information that can be included in the location method field 604 is shown in FIG. 7. For example, when the location method field 604 is "00", it can represent a location method (TPEG-LOC) defined in the TPEG.

[59] For example, an ID value "01" 612 can represent "Pre-coded Korean Node-Link ID reference" whichis a standard used in Korea, an ID value "02" 614 can represent "Agora-C location reference" whichis a standard used in Europe, and an ID value "03" 616 can represent "VICS link reference" which is a standard used in Japan. In addition, an ID value "04" 618 can represent "traffic message channel (TMC) location reference".

[60] If the location reference specification method uses TPEG-SNI as described above, it is possible to specify a location reference method without changing the structure of the TPEG message.

[61] FIG. 8 illustrates a message management container of a TPEG message according to the second embodiment.The second embodiment will now be described in detail with reference to FIG. 8.

[62] Message management information included in a message management container includes information items used to manage each TPEG message. As illustrated in FIG. 8, the message management information may include fields such as a message identifier (ID) 702, a version number 704, a data length indicator 706, and a selector 708.

[63] The message ID 702 is identification information used to distinguish between TPEG messages, the version number 704 is version information required to keep each message updated, and the length indicator 706 provides a total message length to indicate a valid area of data. The selector 708 is used to carry information required for each message in a variable manner.Up to 8 fields may be added according to bits set to "1" in the selector 708.For example, a message generation time, a start time, a stop time, a message expiry time, etc., are added. Different fields may be added according to the type of each TPEG message.

[64] The message management information described above is used to manage information received by a decoder. The message management information according to the embodiment of the present invention may include identification information indicating the location reference method of location information. For example, information regarding a location reference type may be set in a field 710 whose selector value of the message management information is "xx1xxxx". The values illustrated in FIG. 7 may be used as ID values indicating the location reference types.

[65] FIGs. 9 to 12 show examples of location reference type information of location information set in a component of a TPEG message according to the third embodiment. Location information may be included in one of the components of a TPEG message. In the examples of FIGs. 9 to 11, location information is included in a Road Traffic Message (RTM) component.

[66] A component ID 802 indicating a location container including location information for the RTM component is "90 hex" as illustrated in FIG. 9. Each component ID has a value specified to identify a corresponding component. This value can be used to represent location reference type information.

[67] For example, when the component ID is set to "90" (802) as illustrated in FIG. 9, a component corresponding to this component ID may include a length of the component which indicates location information and location information (TPEG-location container) whichuses the TPEG-LOC that is a standard defined in the TPEG.

[68] When the component ID is set to "91" (812) as illustrated in FIG. 10, it indicates location information (Pre-coded Korean Node-Link ID Reference type location container) according to the Pre-coded Korean Node-Link ID reference type which is a standard used in Korea.

[69] When the component ID is set to "92" (822) as illustrated in FIG. 11, it indicates location information (Agora-C Location Reference type location container) according to the Agora-C location reference type which is a standard used in Europe.

[70] FIG. 12 shows a table illustrating an example where location information according to each location reference method is classified by thecomponent ID. As described above, a component ID set to "90" indicates location informationaccording to the TPEG-LOC, a component ID set to "91" indicates location information according to the Pre-coded Korean Node-Link ID reference type, and a component ID set to "92" indicates location information according to the Agora-C location reference type. In addition, a component ID set to "93" (832) indicates the VICS link reference type which is used in Japan and a component ID set to "94" (834) indicates the TMC location reference type. The component ID values illustrated in FIG. 12 can be applied when the application service is a Road Traffic Message (RTM) or a Congestion and Travel Time (CTT) information and different component ID values may be defined depending on the application service.

[71] A traffic information message can be encoded by incorporating the ID of the location reference type indicating location information into the traffic information message in the above manner and the encoded traffic information message can then be transmitted and received through the communication system as illustrated in FIG. 1.

[72] Hereinafter, systems for transmitting and receiving traffic information illustrated in the above is disclosed. Particularly, the disclosed systems is digital video broadcasting

terrestrial/handheld (DVB-T/H) systems for transmitting and receiving traffic information.

[73] FIG. 13 illustrates an apparatus for transmitting and receiving traffic information. One example of the apparatus for transmitting traffic information will be described below

[74] Broadcasting signals, for example, audio/video signals are multiplexed by a multiplexer 10 in the format of MPEG-2 transport stream (TS) and then output. The above-mentioned traffic information including location information of one of location reference methods may be multiplexed in the format of MPEG-2 TS along with the audio/video signals.

[75] For energy dispersal, the multiplexer 10 multiplexes MPEG-2 TS type signals including traffic information. An outer coder 21 and an outer interleaver 22 can respectively encode and interleave the multiplexed data to improve transmission performance of the multiplexed signals. For example, a Reed-Solomon code method may be used as an outer coding method while a convolution interleaving method may be used as an interleaving method.

[76] An inner coder 31 and inner interleaver 32 encode transport signals and interleave the coded signals considering that any error may occur in the transport signals. The inner coder may code the transport signals in accordance with a punctured convolution code, and the inner interleaver may use a native or in-depth interleaving method in accordance with use of a memory in transmission modes of 2k, 4k and 8k.

[77] A mapper 35 can map the transport signals with symbols in accordance with modes such as 16QAM (quadrature amplitude modulation), 64QAM, and QPSK (quadrature phase shift keying), considering pilot of the transmission modes and transmission parameter signaling (TPS). A frame generator 40 modulates the mapped signals in an orthogonal frequency division multiplex (OFDM) scheme, and generates frames inserted with a guard interval in a data interval including the modulated signals. Each frame includes 68 OFDM symbols, wherein each symbol includes 6817 carriers in case of the mode of 8k while it includes 1705 carriers in case of the mode of 2k. The guard interval is a cyclic continuation copied from data in the data interval, and its length depends on the transmission modes. Each of the OFDM frames includes scatter pilot signals, continuation pilot signals, and TPS carriers. The structure of the frames generated from the frame generator of FIG. 13 will be described with reference to FIG. 14.

[78] A digital-to-analog converter 41 converts digital type broadcasting signals having a guard interval and a data link into analog signals, and a transmission unit 42 can transmit the converted analog signals to RF signals. The digital-to-analog converter 41 and a transmission unit 42 may be in a united transmitter. The traffic information in the

format of MPEG-2 TS can be transmitted in the form of DVB-T. In this case, the format of MPEG-2 TS may be transmitted in the form of packetized elementary stream (PES) or section.

[79] FIG. 14 illustrates signal arrangement according to the frames which the frame generator generates in FIG. 13. In FIG. 14 Tu represents the number of available sub-carriers, Dt represents the distance between scatter pilots on a time axis, and Df represents the distance between scatter pilots on a frequency axis. The distance Df between the scatter pilots on the frequency area determines a delay range of a ghost signal, which can be predicted on a channel. Referring to FIG. 14, the location of pilots to be interpolated during reception of the signals generated by the frame generator, is shown.

[80] When signals is received, symbols are arranged to represent a uniform pilot pattern per four symbols, such that time interpolation can be executed in the location of the pilots during reception of the signals. In other words, a first input symbol (t=1) is arranged to represent the same scatter pilot signal as that of the fifth input symbol (t=5). Time interpolation of the symbols input at t=2, t=3 and t=4 can be executed in the location of the scatter pilot signals during reception of the signals.

[81] Furthermore, the symbol input at t=6 has the same scatter pilot pattern as that of the symbol input at t=2, and time interpolation of the signals at t=3, t=4 and t=5 can be executed in the location of the scatter pilot signals of the symbols input at t=6 and t=2.

[82] In this way, time interpolation is executed as above during reception of the signals after the symbol is input at t=7. In this case, since the scatter pilots are located for the symbol input at t=4 per four sub-carriers, the distance between the scatter pilot signals in the frequency area of the symbol input at t=4 is reduced in the range of 1/4 of the distance between the original scatter pilot signals, and the symbol input at t=4 has a pattern where the scatter pilot signals are located per four sub-carriers. Therefore, it is possible to obtain an advantage that more pilot signals are located in the symbol during reception of the signals. As a result, if a signal is transmitted using the continuation pilot signals and the scatter pilot signals, channel compensation can be made adaptively depending on the status of the channel received during the reception of the signal.

[83] FIG. 15 illustrates another example of an apparatus for transmitting traffic information. Another example of the apparatus for transmitting traffic information will be described below with reference to FIG. 15.

[84] As another example for transmitting the above-mentioned traffic information, a DVB-H mode can be used. The DVB-H mode enlarges a broadcasting area to a mobile terminal area, and can transmit transmission information using IP datagram. The IP datagram refers to a signal processing mode that allows a signal to be transmitted using

a packet according to Internet protocol. The IP datagram includes a header including IP address, and a data container transmitting information. Video signals, audio signals, and traffic information signals can be transmitted to the data container of the IP datagram in packet units. In other words, the DVB-H mode uses internet protocol datacasting (IP datacasting) that allows the audio signals, the video signals, and the traffic information signals to be transmitted after being divided and compressed by packet units.

[85] A signal converter 8 can convert the traffic information into data including IP by compressing the traffic information either along with the audio and video signals or separately in packet units. At this time, IP data is embedded in the MPEG-2 TS after being encapsulated by multi-protocol encapsulation (MPE). The MPE may be multi-protocol encapsulation-forward error correction (MPE-FEC) section data to which FEC is added. If a transmission signal is arranged by a form of MPE-FEC, a carrier-to-noise (CN) ratio of the transmission signal can be improved. Therefore, either MPE-FEC data having FEC or MPE data having no FEC can include transmission data in the format of IP data.

[86] The IP datagram encapsulated by the signal converter 8 using MPE may be multiplexed by a time slicing mode to reduce power consumption, and is converted into a transport stream to multiplex with MPEG-2 TS equipped with the video or audio signals. A modulating and encoding unit 50 can include configuration blocks corresponding to reference numerals 21 to 42 of FIG. 29. The traffic information multiplexed by MPEG-2 TS can be transmitted as the broadcasting signals after undergoing modulating and encoding steps of the DVB-T broadcasting signals described with reference to FIG. 13.

[87] FIG. 16 illustrates an example of services transmitted on a channel, wherein the one service has a type slicing mode and is transmitted to DVB-H and the other service is transmitted to a common channel of DVB-T and DVB-H. A program can be transmitted in accordance with a channel of each of DVB-H and DVB-T, and each service can be multiplexed by time division through time slicing in case of DVB-H. The traffic information is included in the IP datagram by DVB-H and then converted to MPE or MPE-FEC, wherein the converted MPE or MPE-FEC can be transmitted to the embedded MPEG-2 TS.

[88] FIG. 17 illustrates location of a descriptor of traffic information that can be transmitted along with stream parsing information (i. e.; DVB-SI (DVB - service information or MPEG-2 TS program specific information) if the traffic information is transmitted through the encoding and modulating steps described with reference to FIG. 13 to FIG. 15. Hereinafter, stream parsing information means table information for parsing sections in broadcasting streams, for example, NIT and SDT in DVB-SI,

PMT and PAT in MPEG-2 TS program specific information and so on. And, the descriptor of traffic information of traffic information in streams is called as descriptor table information .

[89] The location of the descriptor table information of the traffic information according to an embodiment of the present invention will be described with reference to FIG. 17. Referring to FIG. 17, to facilitate description, descriptor table information of traffic information to be transmitted will be referred to as "TPEG service descriptor."

[90] In a case that the traffic information transmitted by an embodiment of the present invention is transmitted through the broadcasting signals, stream parsing information for parsing the descriptor table information of traffic information is exemplarily shown in FIG. 17. The descriptor table information included in the broadcasting signals may be included in NIT (Network Information Table), BAT (Bouquet Association Table), SDT(Service Description Table), and EIT (Event Information Table), as shown in FIG. 17. The table of FIG. 17 represents that the descriptor for parsing the signal included in the broadcasting signal is included in which table of the transmission signals, wherein * represents that the descriptor is included in the table. For example, network_name_descriptor can be transmitted along with NIT. Therefore, if NIT of the broadcasting signals is parsed, it is possible to obtain a broadcasting signal transmitted depending on description of network_name_descriptor.

[91] The TPEG service descriptor which describes descriptor table information of the traffic information according to an embodiment of the present invention can be located in at least one of NIT, SDT, and a program map table (PMT). The NIT corresponds to stream parsing information providing tuning information and transport stream group such as channel frequency. The SDT is used to transmit parameter and service name in the transport stream. The PMT transmits packet identifier (PID) information of video, audio, data, and program clock reference (PCR). If the TPEG service descriptor is trans mitted along with the PMT, the PMT can be obtained by parsing a program association table (PAT) from the MPEG-2 TS. In FIG. 17, 0x80 is exemplarily shown as an identifier tag value of the TPEG service descriptor.

[92] FIG. 18 and FIG. 19 respectively illustrate the PAT and the PMT as stream parsing information (herein, it is also called as program table information) transmitted along with the MPEG-2 TS type signal. The PAT serves to assign a transport packet to each program using a packet having PID of 0. The PID of a packet transmitting the PMT can be obtained from the PAT, and the PID of the packet can be obtained from the PMT to identify information which the packet in the stream transmits.

[93] Therefore, if the packet having the PID obtained from the PMT is searched, video, audio and traffic information included in the packet can be obtained.

[94] FIG. 20 illustrates a descriptor that can parse traffic information. Referring to FIG.

20, TPEG service descriptor that can be included in the PMT (i.e. can be parsed from the PMT) can parse the broadcasting signal including the traffic information as shown in FIG. 20.

[95] First, the TPEG service descriptor includes a descriptor tag (Descriptor_tag) field, a descriptor length (Descritpor_length) field, a field of the number of service components (Number_of_TPEG-_Service_Components) indicating the number of service components included in the traffic information descriptor, and a plurality of traffic information sets corresponding to a value of the Number_of_TPEG_Service-_Components field. Each traffic information set may include a service component identifier (Service_Component_ID) field, an application identifier (Application_ID) field, and an additional service information field.

[96] The Descriptor_tag field is assigned with 8 bits and a value for identifying the descriptor of traffic information from another descriptor.

[97] The Descriptor_tag field is assigned with 8 bits, and a length from the Descriptor_length field to the end of the descriptor is represented by byte units. The Service_component_ID (SCID) field is assigned with 8 bits, and indicates a value for identifying service component in one service. The SCID field value can be defined by a service provider.

[98] The Application_ID field is assigned with 16 bits and a value for identifying each application. In other words, each traffic information application is assigned with an application identifier (AID). Whenever a new application is defined, a new AID is assigned to the traffic information application.

[99] The additional service information field may include a service name (Service_name) field, a service description (Service_description) field, a service logo (Service_logo) field, a subscriber information (Subscriber_information) field, a free text information (Free_text_-information) field, and a help information (Help_information) field. The length of each field in the additional service information field is variable, and is indicated by at least one format of text row, number, and graphic.

[100] The Service_name field indicates service name of the traffic information, and allows a user to identify the service. For example, the Service_name field may transmit the traffic information including service name called "traffic information service of 'A' broadcasting station."

[101] The Service_description field indicates detailed description of corresponding service, and is to describe service contents in more detail. For example, the Service_description field may transmit the traffic information including service description called "contour public traffic information of the metropolitan southern area."

[102] The Service_logo field indicates service logo, and allows the user to identify service

or the service provider. The service logo can be transmitted in the format of bitmap or other image.

[103] The Subscriber_information field indicates subscriber information. For example, the Subscriber_information field may transmit the traffic information including billing and payment information for a restricted service component.

[104] The Free_text_information field indicates additional information to be transmitted to the user. For example, the Free_text_information field may transmit the traffic information including interruption of service and cancellation of information. The Help_information field indicates help information to be referred to by the user. For example, the Help_information field may transmit the traffic information including Internet address and phone number.

[105] FIG. 21 illustrates an example of an apparatus for receiving traffic information according to the present invention. The apparatus for receiving traffic information according to an embodiment of the present invention will be described with reference to FIG. 21. The apparatus for receiving traffic information, as shown in FIG. 21, may include a tuner 901, a demodulator 902, a demultiplexer 903, an audio decoder 904, a video decoder 905, a first application manager 906, a channel manager 907, a storage 909, a data decoder 910, a traffic information memory 911 and a system manager 912.

[106] The tuner 901 tunes a frequency of a specific channel through any one of antenna, cable and satellite, and outputs a signal down-converted into an immediate frequency (IF) signal to the demodulator 902. Examples of signals received at the frequency of the specific channel include audio signals, video signals, traffic information signals, and program table information of traffic information transmiited according to DVB-T/H. A channel manager 907 requests stream parsing information of traffic information by referring to channel information stored in a channel map 908, and receives the result from the data decoder 910. The channel manager 907 can control channel tuning of the tuner 701, and may be embodied by a software module.

[107] The system manager 912 controls the respective blocks in the apparatus, but only a part of control functions of the system manager 912 is represented in FIG.21, which is for the first application manager 906, a storage 909 and traffic information memory 911.

[108] The demodulator 902 demodulates a signal output from the tuner 901. For example the demodulator 902 demodulates the signals according to DVB-T/H system by using orthogonal frequency division multiplexing (OFDM) sheme. The demultiplexer 903 divides the signals including the video signals, audio signals and the traffic information and outputs the divided signals in TS packet units.

[109] The demultiplexer 903 outputs TS packets of the traffic information including a lof a plurality of location reference methods for representing location information to the

data decoder 910. The examle of FIG. 21, the traffic information including an idetifier of the location reference methods is transmitted in the form of digital storage media-command and control (DSM-CC) section of DVB-T systems or internet protocol (IP) datagrams in the DSM-CC section.

[110] When the traffic information is transmitted in the form of the MPEG-TS of the DVB-T/H system, the data decoder 910 may parse the descriptor illustrated in FIG.20, which is located in the PMT of the program table information. The data decoder 910 can decode traffic informations including the location information according to the identifier of one of a plurality of location reference methods, and the output the decoded traffic information to the traffic information memory 911.

[111] According to the first embodiment illustrated above, the data decoder 910 performs SCID value decoding to decode TPEG-SNI including service guide information whose SCID value is "00". The data decoder 910 can decode identification information indicating a location reference method in the TPEG-SNI.

[112] According to the second embodiment, the data decoder 910 can decode identification information of a location reference method that is included in a message management container of the traffic information message.

[113] According to the third embodiment, the data decoder 910 can decode location information of a location container in the TPEG message according to a location container ID including location information.

[114] The traffic information memory 911 stores traffic information including the location information according to one of a plurality of location reference methods, and also stores geographic information including respective road links and nodes in order to display the traffic information.

[115] A first application manager 906 shown in FIG. 21 drives a native application program stored in a storage 909 to execute a general function such as channel conversion. In this case, the native application program means built-in type software built in the apparatus for receiving traffic information at the time when the apparatus is manufactured. If there is a user request to the apparatus for receiving traffic information through a user interface (UI), the first application manager 906 responds to the user request by displaying the native application program using a graphic user interface (GUI) on a screen. The user interface receives the user request through an input device such as a remote controller, a jog dial, and a touch screen on the screen, and outputs the user request to the first application manager 906, a data broadcasting application manager 913 and the like. The first application manager 906 manages channel related operation, for example the first application manager 906 manages the channel map 908 by controlling the channel manager 907, and controls the data decoder 910. Also, the first application manager 906 stores and restores the status of

the receiving system, the user request and the GUI control of the overall receiving system in the storage 909.

[116] If the data service is requested from the user interface, the data broadcasting application manager 913 drives the corresponding application program stored in the storage 909 to process the requested data and provides the data service to the user. For the data service, the data broadcasting application manager 913 supports the GUI. In this case, the data service is provided in the form of text, voice, graphic, still images, and moving images.

[117] The data broadcasting application manager 913 may be software or hardware platform for executing the application program stored in the storage 909. In this case, the platform may be, for example, a Java virtual machine for executing Java program. The data broadcasting application manager 913 executes the traffic information application program stored in the storage 909 to process the traffic information message stored in the traffic information memory 911 and provides the traffic information service.

[118] In the embodiment of the present invention, the traffic information service can be provided to the users through at least one of text, voice, graphic, still images and moving images. The GPS module 914 receives satellite signals transmitted from a plurality of low orbit satellites and extracts current location information (e.g., latitude, longitude, and altitude) so as to output current location information to the data broadcasting application manager 913. The data broadcasting application manager 913 can provide the traffic information service requested by the user based on the current location obtained through the GPS module 914 and the traffic information message stored in the traffic information memory 911 by executing the traffic information application program.

[119] The traffic information message stored in the traffic information memory 911 is read out and input to the data broadcasting application manager 913 in accordance with the request of the data broadcasting application manager 913. The data broadcasting application manager 913 can make traffic information, for example congestion information, to be displayed in a screen, by using the location information according to the identifer of one of location reference methods.

[120] And, the data broadcasting application manager 913 extracts an electric map from the traffic information memory 911, and controls the electric map to be displayed in the screen, the electric map which is coordinated as the current location received from the GPS module 914. In this case the current location is indicated by a specfic graphic symbol. The information extracted from the traffic information may be temporarily stored in a volatile memory, for example a random access memory (RAM) which is able to be written, and then used by the data broadcasting application manager 913.

[121] The data broadcasting application manager 913 can control the traffic information decoded by the data decoder 910 to be presented using current position information of a traffic information receiver received from the GPS module 914 and geographical information and graphic information stored in the traffic informaiton memory 911.

[122] For example, if identification information of a location reference method is included in a message management container even when identification information of another location reference method is included in TPEG-SNI, the data broadcasting application manager 913 can cause a traffic information service to be provided using only the location reference method according to the identification information included in the message management information.

[123] Similarly, if identification information (component ID) of a location reference method is included in a location container even when identification information of another location reference method is included in TPEG-SNI, the data broadcasting application manager 913 can cause a traffic information service to be provided using the location reference method indicated by the identification information included in the message management information.

[124] If IDs which can identify different location reference methods are included in TPEG-SNI, a message management container, and a location container, the data broadcasting application manager 913 can analyze location information using a location reference method indicated by the ID included in the location container. For example, in some case, an ID included in a location container may indicate a Pre-coded Korean Node-Link ID reference method while an ID included in TPEG-SNI indicates a VICS link reference method and an ID included in a message management container indicates an Agora-C location reference method. In this case, the data broadcasting application manager 913 can cause a traffic information service to be provided using location information corresponding to a Pre-coded Korean Node-Link ID according to the location reference method of the location container.

[125] FIG. 22 is a flow chart of a method for receiving traffic information using identification information of the location reference methods.

[126] In order to receiving and displaying the traffic information, the broadcasting signals including traffic information message are received(S981). The traffic information message includes an identifier of at least one of a plurality of location reference methods for representing location information.

[127] And the received broadcasting signals are demodulated according to an orthogonal frequency division multiplexing (OFDM) scheme by considering scatter pilot signals varied depending on time and continuation pilot signals fixed depending on time within a frame of the received broadcasting signals. The demodulated signals are decoded and then the traffic information is obtained(S983).

[128] When the signals are demodulated in S983, the traffic information message in the demodulated signals may be included in Moving Picture Experts Group - transmport stream (MPEG-TS) or internet protocol (IP) datagram of the MPEG-TS. Where the the traffic information message are decoded, streams including the traffic information messages including an identifier of at least one of a plurality of location reference methods, may be obtained from one of program table informaiton (for example, program mapping table (PMT)). In the course of the demodulation, the demoduation method may depend on a transmisson and reception system of broadcasting signal. For example the transmisson and reception system of broadcasting signal may be DVB-T/H system.

[129] The identifier of at least one of a plurality of location reference methods for representing location information, is obtained from the decoded traffic information message(S985).

[130] And then, the traffic information by decoding the location information by the location reference method corresponding to the identifer is provided (S987). A detail example of decoding the location information by the location reference method corresponding to the identifer, may be refered from FIG. 21.

[131]

[132] FIG. 23 is a flow chart showing an example of a method for obtaining location information included in the method for receiving traffic information.

[133] First, a TPEG message is received (S1002). Here, the TPEG message is received in the form of a data stream.

[134] TPEG-SNI included in the TPEG message is decoded (S1004). Since TPEG-SNI is included in a TPEG message whose SCID value is "00" as illustrated above, the TPEG-SNI of the TPEG message can be obtained by performing SCID value decoding and extracting information whose SCID value is "00". The obtained TPEG-SNI is then decoded.

[135] It is then determined whether or not identification information of a location reference method is included in the decoded TPEG-SNI (S1006). Location reference method identification information may also be included in TPEG-SNI depending on the table format as illustrated in FIG. 6.

[136] If it is determined at step S1006 that location reference method identification information is included in the TPEG-SNI, it is possible to obtain a location reference method indicated by the identification information included in the TPEG-SNI (S1008).

[137] Location information included in the TPEG message is decoded using the obtained location reference method (S1010).

[138] On the other hand, if it is determined at step S1006 that location reference method identification information is not included in the TPEG-SNI, TPEG-application service

information is decoded (S1012). Here, the TPEG-application service information may include Congestion and Travel Time (CTT) information, a Road Traffic Message (RTM), or Public Transport Information (PTI).

[139] A message management container included in the TPEG-application service information is then decoded (S1014). The message management container includes information elements used to manage a message. For example, the message management container may include a message ID, version information, message generation information, etc. The message management container may also include identification information indicating a location reference method as illustrated in the second embodiment.

[140] It is then determined whether or not identification information indicating a location reference method is included in the message management container (S1016). The identification information may be recorded in one of the fields included in the message management container as illustrated in FIG. 8.

[141] If it is determined at step S1016 that the identification information is included in the message management container, a location reference method indicated by the identification information is obtained (S1008) and location information is decoded according to the obtained location reference method (S1010).

[142] On the other hand, if it is determined at step S1016 that no identification information indicating a location reference method is included in the message management container, a component ID including a location reference method is extracted from a location container (S1018).

[143] A location reference method is obtained according to the extracted component ID (S1020) and location information included in a container according to the ID included in the location container is then decoded (S1022).

[144] FIG. 24 illustrates a flow chart of a method for transmitting traffic information.

[145] The traffic information message including an identifier of at least one of a plurality of location reference methods for representing location information, location information identified by the identifier and traffic information is encoded (S1101). Tthe location reference methods may include a Transport Protocol Expert Group - Location (TPEG-LOC) method, a pre-coded Korean node-link ID method, an Agora-C method, and a VICS link method.

[146] The identifier may be included in one of service network information (SNI) which is guide information of a service provided by the the traffic information message, a message management container of the traffic information message and a component identifier of a location container in the traffic information message.

[147] The encoded traffic information message is multiplexed with video signals and audio signals, and the mulitiplexed signals are coded by a error correction mode

against error and interleaved (S1103). An example of the error correction mode and interleaving method are described in FIG. 13.

[148] In the interleaved signals, scatter pilot signals varied depending on time and continuation pilot signals fixed depending on time within one frame of the interleaved signals are mapped and the mapped signals are modulated by an orthogonal frequency division multiplexing (OFDM) scheme(S1105).

[149] And the modulated signals are transmitted to a radio frequency (RF) signal(S1107).

Mode for the Invention

[150] The mode for invention is described in the above best mode for invention .

Industrial Applicability

[151] According to this invention, location information by one of a variety of location reference methods are transmitted and received by the DVB-T/H system. And, when the location informatoin by the DVB-T/H system is tranmitted and received, a receiver can analyze any location information, though a variety of location reference methods may be used in the DVB-T/H system.

Claims

[1] A method for transmitting traffic information, the method comprising:
encoding a traffic information message including an identifier of at least one of a plurality of location reference methods for representing location information, location information identified by the identifier, and tracfic information;
multiplexing the encoded traffic information message, video signals and audio signals, error-coding the the multiplexed sinals against errors and interleaving the error-coded sinals;
mapping respectively, scatter pilot signals varied depending on time and continuation pilot signals fixed depending on time within one frame of the interlea ved signals and modulating the mapped signals by an orthogonal frequency division multiplexing (OFDM) scheme ; and
converting the modulated signals to radio frequency (RF) signals and transmitting the converted signals.

[2] The method of claim 1, wherein the traffic information message in the encoding step is included in the internet protocol (IP) datagram.

[3] The method of claim 1, wherein the identifier in the encoding step is included in service network information (SNI), which is guide information of a service provided by the the traffic information message.

[4] The method of claim 1, wherein the identifier in the encoding step is included in a message management container of the traffic information message.

[5] The method of claim 1, wherein the identifier in the encoding step is included in a component identifier of a location container in the traffic information message.

[6] The method of claim 1, wherein the plurality of location reference methods include at least one of a Transport Protocol Expert Group - Location (TPEG-LOC) method, a pre-coded Korean node-link ID method, an Agora-C method, and a VICS link method.

[7] An apparatus for transmitting traffic information, the apparatus comprising:
a multiplexer multiplexing audio signals, video signals, and a traffic information message including an identifier of at least one of a plurality of location reference methods for representing location information, location information identified by the identifier and tracfic informatoin;
a encoder encoding the multiplexed signals against error and interleaving the encoded signals;
a mapper mapping scatter pilot signals varied depending on time and continuation pilot signals fixed depending on time within one frame of the signals encoded by the coder;

a frame generator modulating the signals mapped by the mapper by an orthogonal frequency division multiplexing (OFDM) scheme and inserting a guard interval to the frame to which the modulated signals, the guard interval which is a part of the modulated signals; and

a transmitter converting the signals to which the guard interval is inserted, to radio frequency (RF) signals and transmitting the converted RF signals.

[8] The method of claim 7, wherein the location reference method is a pre-coded method or a dynamic method.

[9] The method of claim 7, wherein traffic information message includes a message management container, an application container, and a location container.

[10] An apparatus for transmitting traffic information, the apparatus comprising:

a signal converter converting a traffic information message including an identifier of at least one of a plurality of location reference methods for representing location information, location information identified by the identifier and tracfic informatoin, into internet protocol (IP) datagram and generating broadcasting transport streams including the converted IP datagram;

a multiplexer multiplexing the broadcasting transport streams generated by the signal converter, broadcasting transport streams including video signals and audio signals, and stream parsing information of the traffic information;

a encoder coding the multiplexed signals against error and interleaving the encoded signals;

a mapper mapping scatter pilot signals varied depending on time and continuation pilot signals fixed depending on time within a frame of the signals encoded by the encoder;

a frame generator modulating the mapped signals within the frame by an orthogonal frequency division multiplexing (OFDM) scheme and inserting a guard interval to a frame to which the modulated signals belong by adding a part of the modulated signals to the converted signals; and

a transmitter converting the signals to which the guard interval is inserted, to RF signals and transmitting the RF signals.

[11] An apparatus for receiving traffic information, the apparatus comprising:

a tuner receiving broadcasting signals including a traffic information message including an identifier of at least one of a plurality of location reference methods for representing location information, location information identified by the identifier and tracfic informatoin;

a demodulator demodulating the broadcasting signals using pilot signals varied depending on time and pilot signals fixed depending on time within a frame of the broadcasting signals received by the tuner;

a demultiplexer demultiplexing the traffic information message from the demodulated by the demodulator;

a data decoder outputting the location information identified by the identifier and the traffic information by parsing the traffic information message demultiplexed by the demultiplexer;

a traffic information memory storing the traffic information output from the data decoder; and

a data broadcasting application manager operationg traffic broadcasting application using the stored traffic information.

[12] The method of claim 11, wherein the location reference method is a pre-coded method or a dynamic method.

[13] The method of claim 11, wherein traffic information message includes a message management container, an application container, and a location container.

[14] A method for receiving traffic information, the method comprising:

receiving broadcasting signals including a traffic information message including an identifier of at least one of a plurality of location reference methods for representing location information, location information identified by the identifier, and tracfic informatoin;

demodulating the broadcasting signals considering scatter pilot signals varied depending on time and continuation pilot signals fixed depending on time within a frame of the received broadcasting signals;

demultiplexing the demodulated signals to obtain traffic information message, parsing the traffic information message using program table information and obtaining the location information according to the identifier from the traffic information message; and

outputting traffic information service using the traffic information.

[15] The method of claim 14, wherein the identifier is included in service network information (SNI), which is guide information of a service provided by the the traffic information message.

[16] The method of claim 14, wherein the identifier is included in a message management container of the traffic information message.

[17] The method of claim 14, wherein the identifier is included in a component identifier of a location container in the traffic information message.

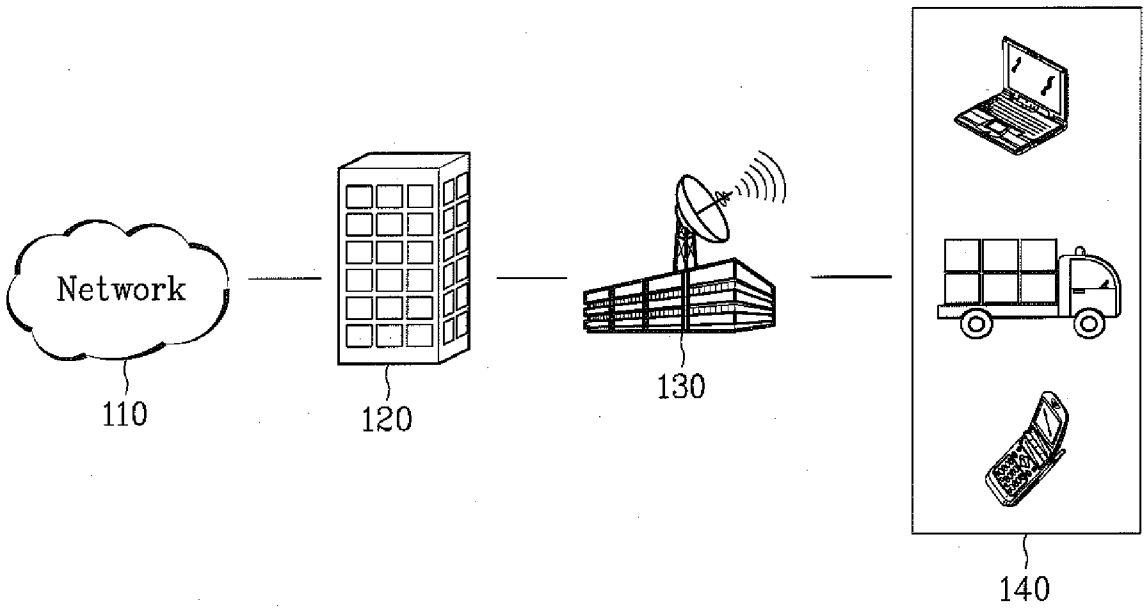
[18] The method of claim 14, wherein the plurality of location reference methods include at least one of a Transport Protocol Expert Group - Location (TPEG-LOC) method, a pre-coded Korean node-link ID method, an Agora-C method, and a VICS link method.

[19] The method of claim 14, wherein the location reference method is a pre-coded

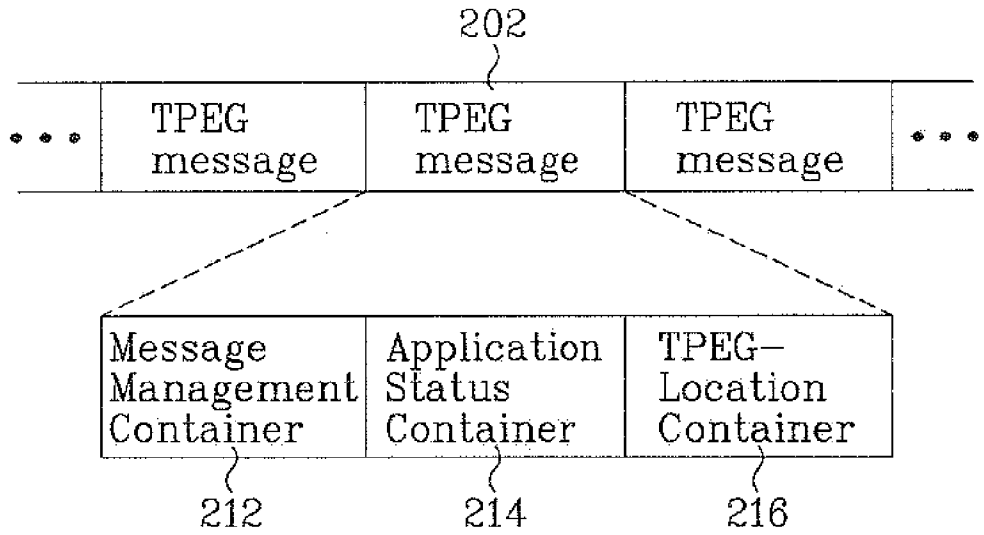
method or a dynamic method.

[20] The method of claim 14, wherein traffic information message includes a message management container, an application container, and a location container.

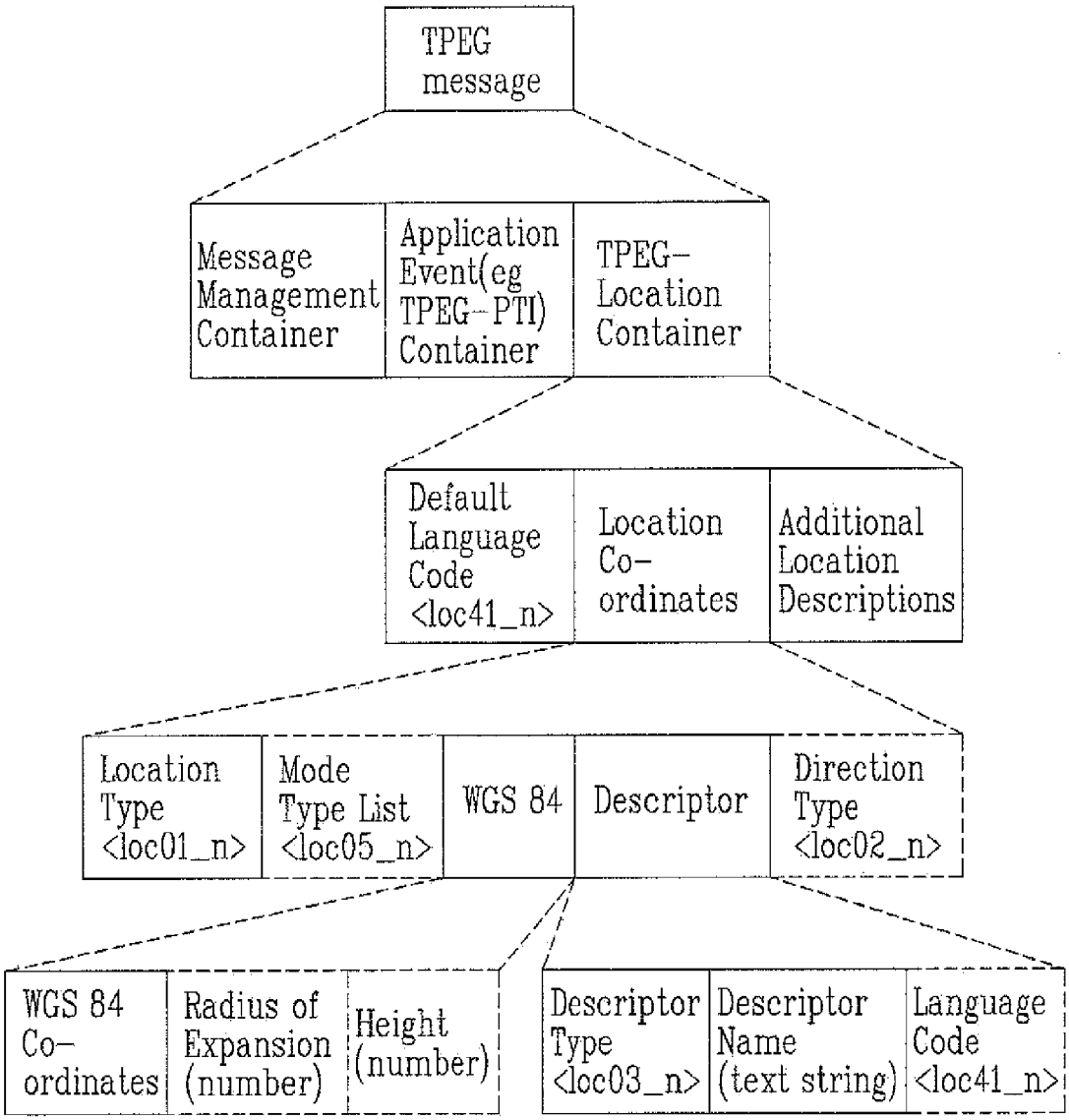
[Fig. 1]


Network
110
120
130
140

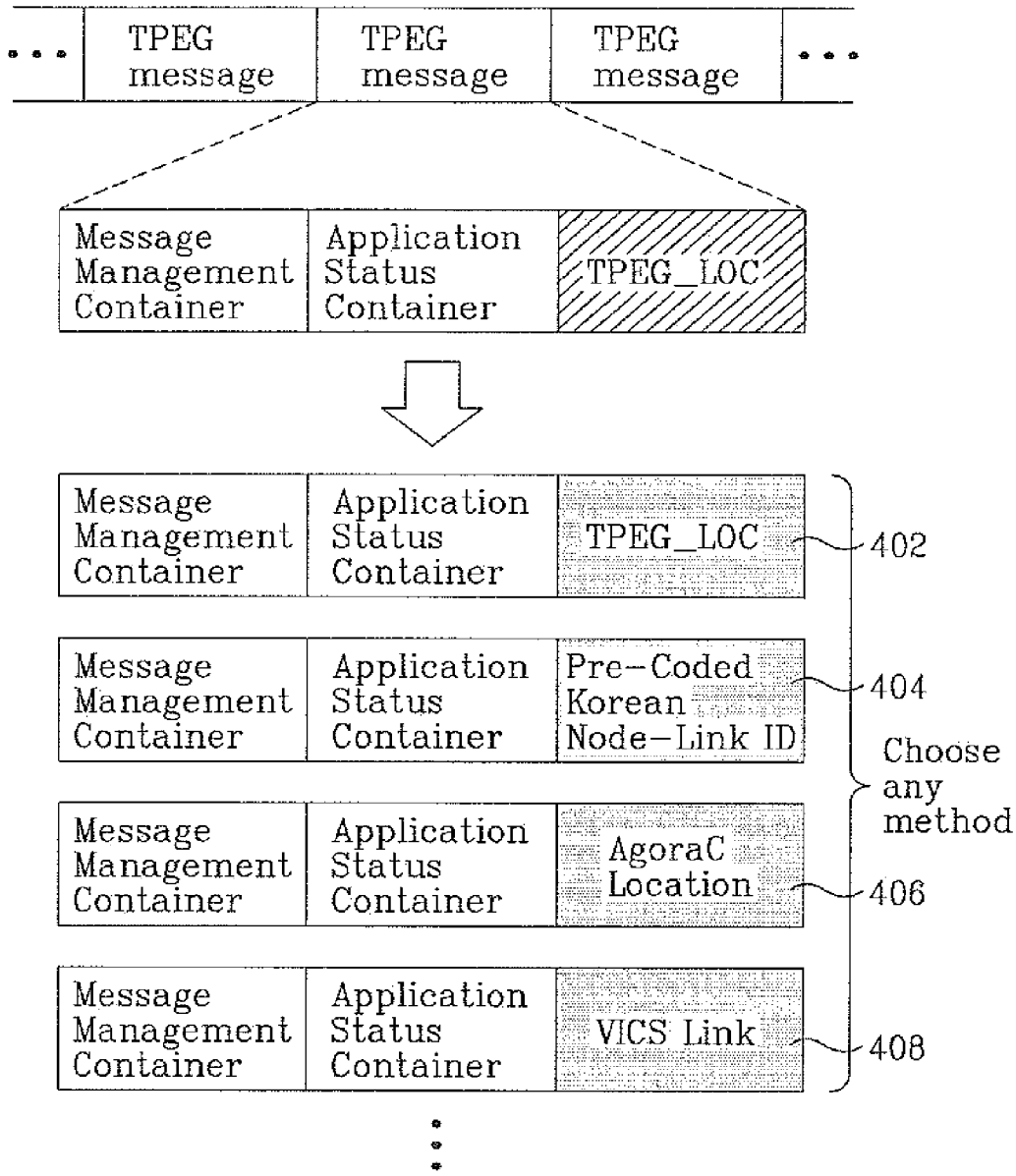
[Fig. 2]


202
TPEG message
TPEG message
TPEG message
Message Management Container
Application Status Container
TPEG-Location Container
212
214
216

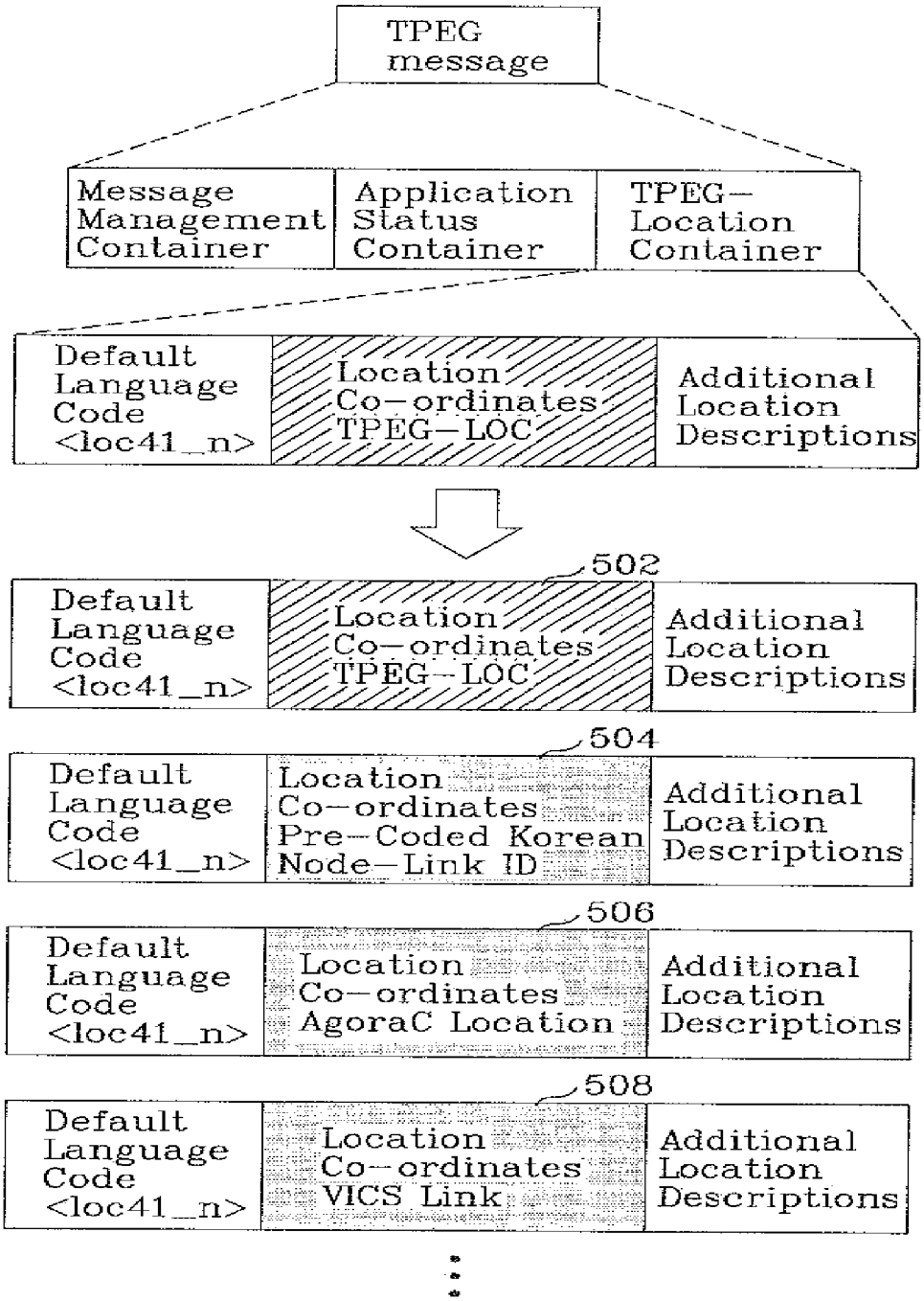
[Fig. 3]


TPEG message
Message Management Container
Application Event(eg TPEG-PTI) Container
TPEG-Location Container
Default Language Code <loc41_n>
Location Co-ordinates
Additional Location Descriptions
Location Type <loc01_n>
Mode Type List <loc05_n>
WGS 84
Descriptor
Direction Type <loc02_n>
WGS 84 Co-ordinates
Radius of Expansion (number)
Height (number)
Descriptor Type <loc03_n>
Descriptor Name (text string)
Language Code <loc41_n>

[Fig. 4]


TPEG message
TPEG message
TPEG message
Message Management Container
Application Status Container
TPEG_LOC
Message Management Container
Application Status Container
TPEG_LOC
402
Message Management Container
Application Status Container
Pre-Coded Korean Node-Link ID
404
Message Management Container
Application Status Container
AgoraC Location
406
Message Management Container
Application Status Container
VICS Link
408
Choose any method

[Fig. 5]


TPEG message
Message Management Container
Application Status Container
TPEG-Location Container
Default Language Code <loc41_n>
Location Co-ordinates TPEG-LOC
Additional Location Descriptions
502
Location Co-ordinates TPEG-LOC
504
Location Co-ordinates Pre-Coded Korean Node-Link ID
506
Location Co-ordinates AgoraC Location
508
Location Co-ordinates VICS Link

[Fig. 6]

Table	Information about the location reference method Version Number: Range:0..255, Incremented, if any of the entries is changed Type: <intunti>	
	1	2
602 / Name:	Service Component Identification (SCID):	604 / Location Method:
Transmission:	Mandatory	Mandatory
Default:		00: Default (TPEG-LOC)
Element Structure:	<intunti> 1 Byte	<intunti> 1 Byte

[Fig. 7]

	ID	Location Method	Description
	00	TPEG-LOC	TPEG default location reference (Deafult)
612	01	Pre-Coded Korean Node-Link ID Reference	Korean standard
614	02	AgoraC Location Reference	European standard
616	03	VICS Link Reference	Japanese standard
618	04	TMC Location	

[Fig. 8]

<intunli>(mid),	: Message ID ~702
<intunti>(ver),	: Version number ~704
<intunli>	: Number of bytes following the length indicator
<bitswitch>(selector),	: Message elements supplied ~708
If (selector=xxxxxxx1) <time_t>,	: Message generation time
If (selector=xxxxxx1x) <time_t>,	: Start time
If (selector=xxxxx1xx) <time_t>,	: Stop time
If (selector=xxxx1xxx) <time_t>,	: Message expiry time
If (selector=xxx1xxxx) <rtm31>,	: Severity factor, see TPEG table rtm31
If (selector=xx1xxxxx) <intunti>,	**: Location Reference Type ~710**
If (selector=x1xxxxxx) <rtm46>,	: Unverified information, see TPEG table rtm46
If (selector=1xxxxxxx) <rtm_components>;	: Road taraffic message components

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[Fig. 9]

<rtm_component(90)>:=	: Location Referencing (see TPEG-Loc)
<intunli>(id),	: Identifier, id=90 hex ~802
<intunti>(n),	: Length, n, of component data in bytes
<tpeg_loc_container>	: TPEG-Location Container

[Fig. 10]

<rtm_component(91)>:=	: Location Referencing (Pre-Coded Korean Node-Link ID Reference)
<intunli>(id),	: Identifier, id=91 hex ~812
<intunti>(n),	: Length, n, of component data in bytes
<kor_node-linkId_container>;	: Pre-Coded Korean Node-Link ID Reference type location container

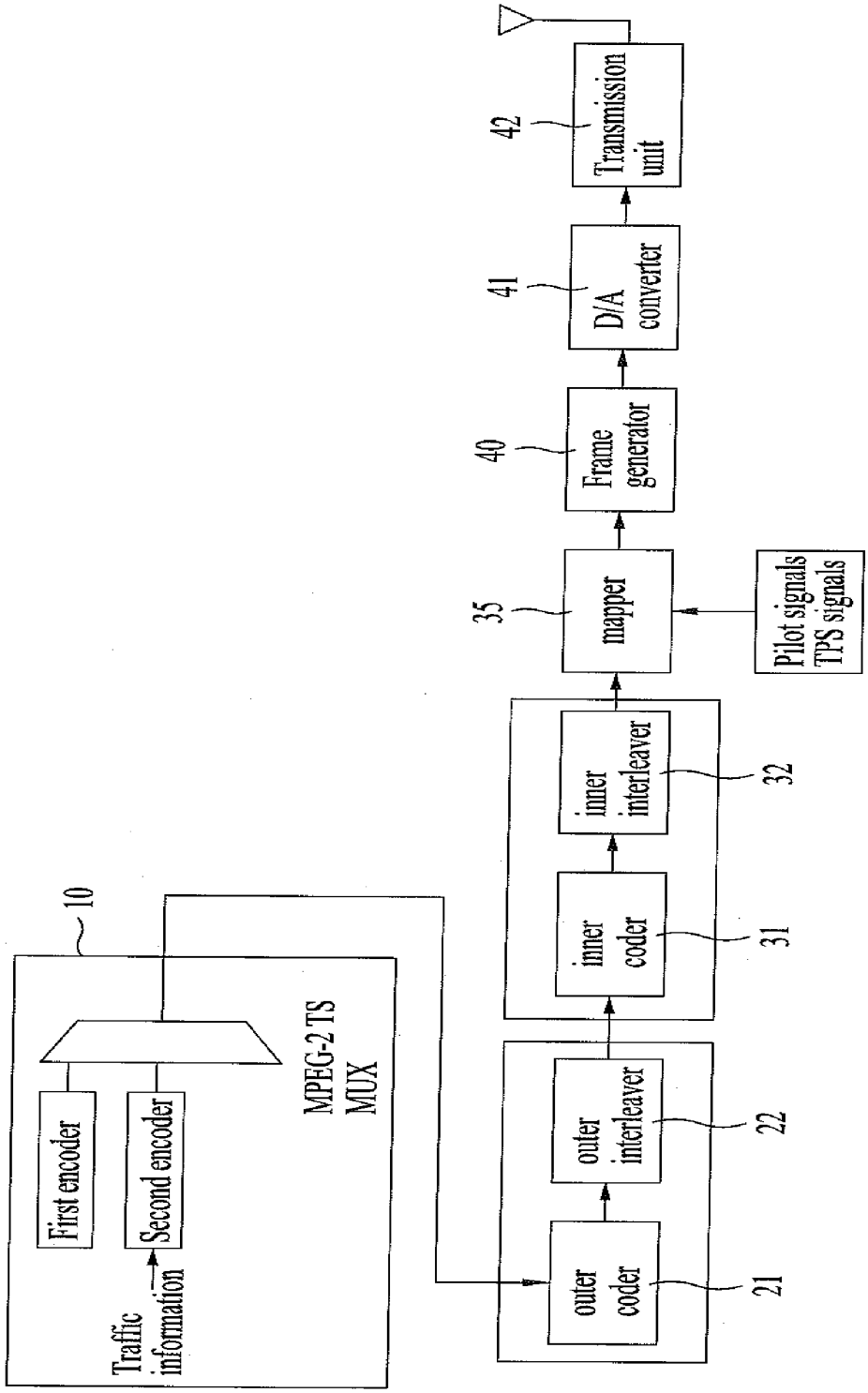
[Fig. 11]

<rtm_component(92)>:=	: Location Referencing (AgoraC Location Reference type)
<intunli>(id),	: Identifier, id=92 hex ~822
<intunti>(n),	: Length, n, of component data in bytes
<agorac_location_reference>;	: AgoraC Location Reference type location container

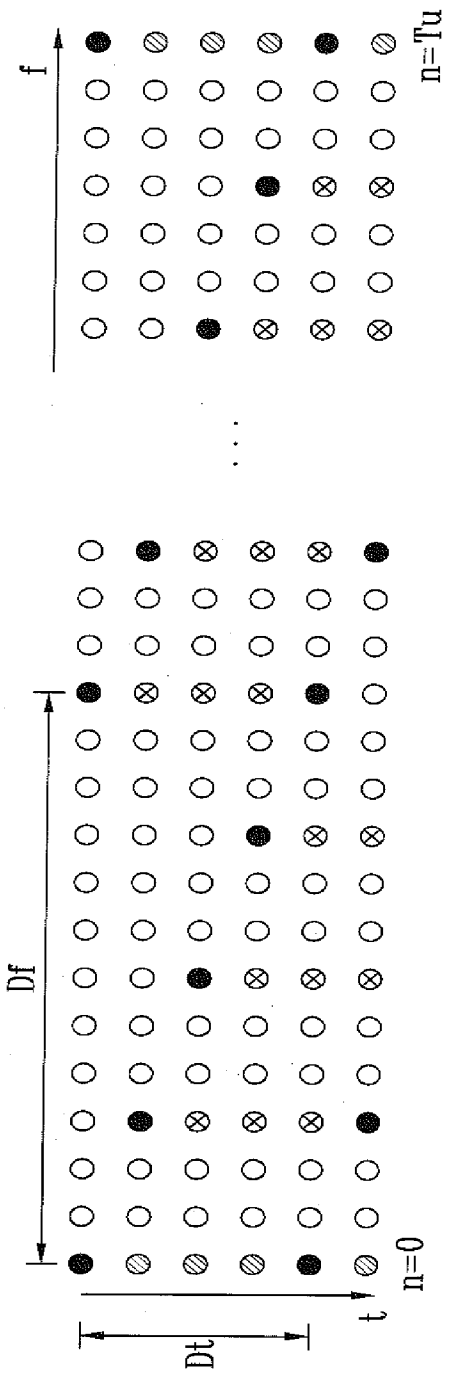
[Fig. 12]

	ID	Location Method	Description
	90	TPEG-LOC	TPEG default location reference (Deafult)
	91	Pre-Coded Korean Node-Link ID Reference	Korean standard
	92	AgoraC Location Reference	European standard
832~	93	VICS Link Reference	Japanese standard
834~	94	TMC Location	

[Fig. 13]

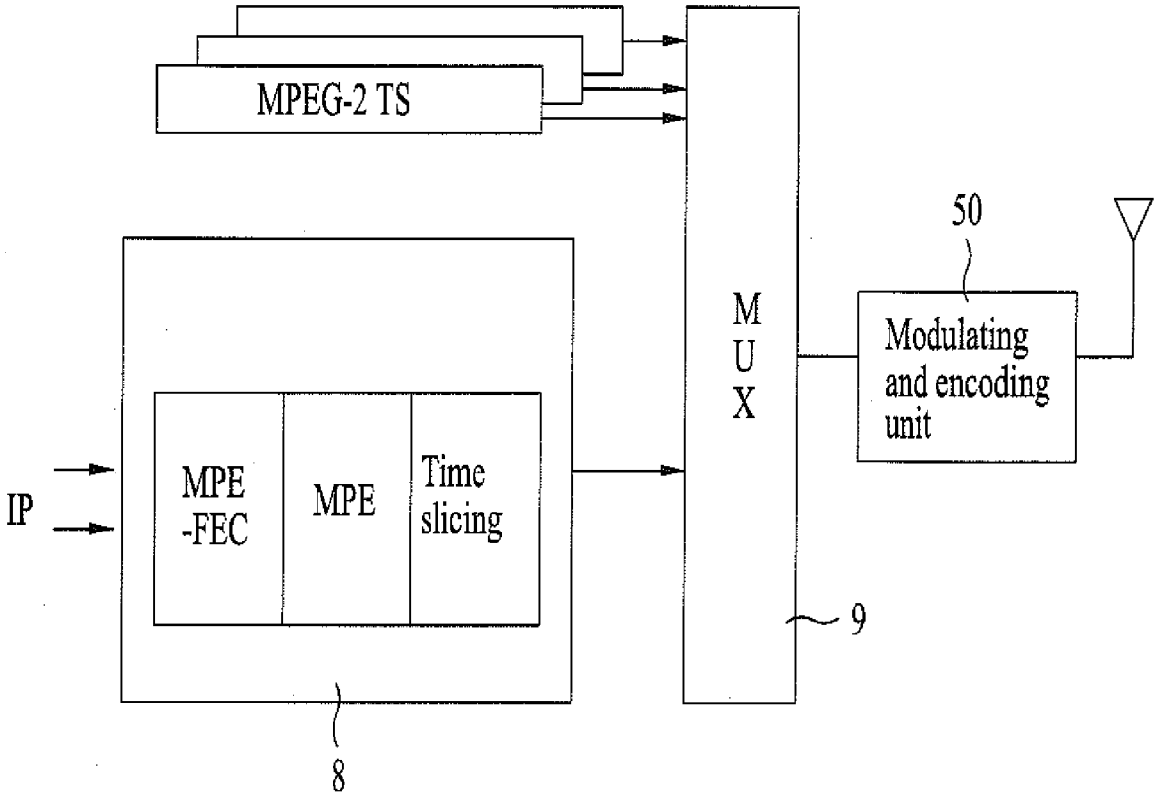

10
First encoder
Second encoder
MPEG-2 TS MUX
Traffic information
outer coder
21
outer interleaver
22
inner coder
31
inner interleaver
32
mapper
35
Pilot signals TPS signals
Frame generator
40
D/A converter
41
Transmission unit
42

[Fig. 14]

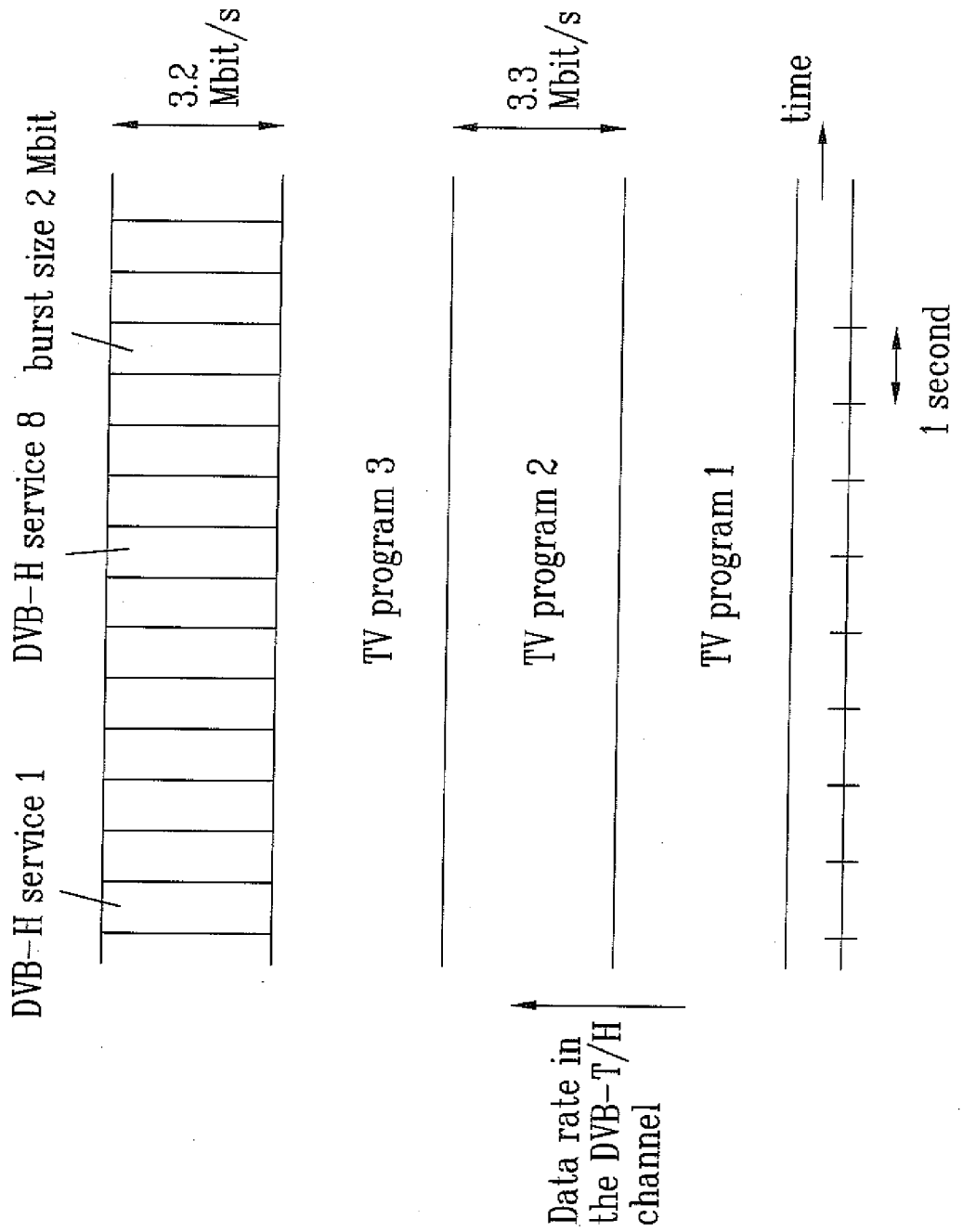


● : Scattered pilot
⊘ : Continual pilot
Tf : Scattered pilot distance in frequency direction
Dt : Scattered pilot distance in time direction
Tu : Number of effective useful carrier
⊗ : Interpolated pilot

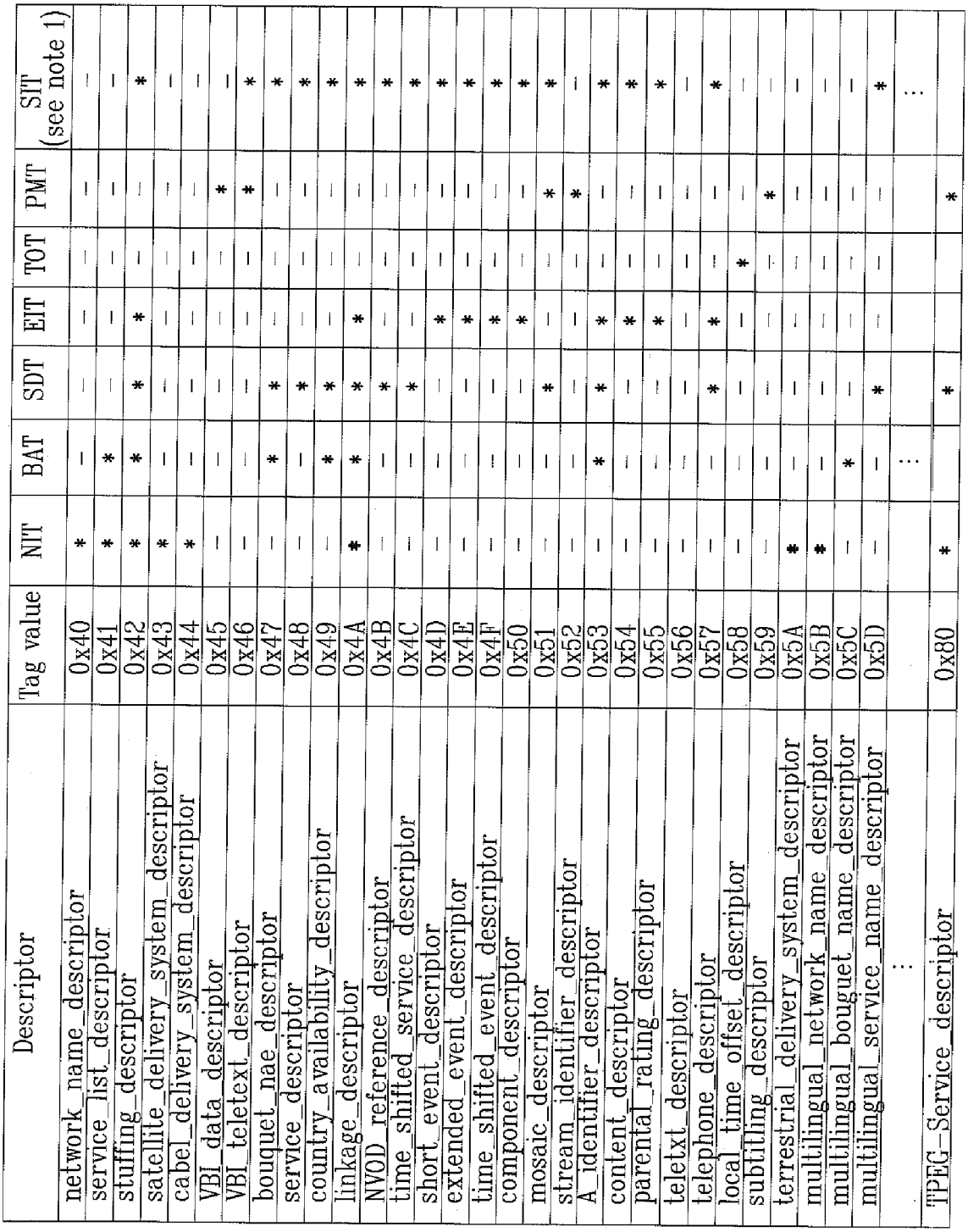
[Fig. 15]


MPEG-2 TS
50
M
U
X
Modulating and encoding unit
IP
MPE -FEC
MPE
Time slicing
9
8

[Fig. 16]


DVB-H service 1
DVB-H service 8
burst size 2 Mbit
3.2 Mbit/s
TV program 3
TV program 2
TV program 1
3.3 Mbit/s
time
1 second
Data rate in the DVB-T/H channel

[Fig. 17]



Descriptor	Tag value	NIT	BAT	SDT	EIT	TOT	PMT	SIT (see note 1)
network_name_descriptor	0x40	*	—	—	—	—	—	—
service_list_descriptor	0x41	*	*	—	—	—	—	—
stuffing_descriptor	0x42	*	*	*	*	—	—	*
satellite_delivery_system_descriptor	0x43	*	—	—	—	—	—	—
cabel_delivery_system_descriptor	0x44	*	—	—	—	—	—	—
VBI_data_descriptor	0x45	—	—	—	—	—	*	—
VBI_teletext_descriptor	0x46	—	—	—	—	—	*	*
bouquet_nae_descriptor	0x47	—	*	*	—	—	—	*
service_descriptor	0x48	—	—	*	—	—	—	*
country_availability_descriptor	0x49	—	*	*	—	—	—	*
linkage_descriptor	0x4A	*	*	*	*	—	—	*
NVOD_reference_descriptor	0x4B	—	—	*	—	—	—	*
time_shifted_service_descriptor	0x4C	—	—	*	—	—	—	*
short_event_descriptor	0x4D	—	—	—	*	—	—	*
extended_event_descriptor	0x4E	—	—	—	*	—	—	*
time_shifted_event_descriptor	0x4F	—	—	—	*	—	—	*
component_descriptor	0x50	—	—	—	*	—	—	*
mosaic_descriptor	0x51	—	—	*	—	—	*	*
stream_identifier_descriptor	0x52	—	—	—	—	—	*	—
A_identifier_descriptor	0x53	—	*	*	*	—	—	*
content_descriptor	0x54	—	—	—	*	—	—	*
parental_rating_descriptor	0x55	—	—	—	*	—	—	*
teletxt_descriptor	0x56	—	—	—	—	—	—	—
telephone_descriptor	0x57	—	—	*	*	—	—	*
local_time_offset_descriptor	0x58	—	—	—	—	*	—	—
subtilling_descriptor	0x59	—	—	—	—	—	*	—
terrestrial_delivery_system_descriptor	0x5A	*	—	—	—	—	—	—
multilingual_network_name_descriptor	0x5B	*	—	—	—	—	—	—
multilingual_bouguet_name_descriptor	0x5C	—	*	—	—	—	—	—
multilingual_service_name_descriptor	0x5D	—	—	*	—	—	—	*
⋮			⋮					⋮
TPEG-Service_descriptor	0x80	*		*			*	

[Fig. 18]

Syndax	No. of bit	Mnemonic
Program_association_section() {		
table_id	8	uimsbf
section_system_indicator	1	bslbf
'0'	1	bslbf
reserved	2	bslbf
section_length	12	uimsbf
transport_stream_id	16	uimsbf
reserved	2	bslbf
version_number	5	uimsbf
current_next_indicator	1	bslbf
section_number	8	uimsbf
last_section_number	8	uimsbf
for(i=0: i<N; i++)		
program_number	16	uimsbf
reserved	3	bslbf
if(program_number=='0'){		
network_PID	13	uimsbf
}		
else{		
program_map_PID	13	uimsbf
}		
}		
CRC_32	32	rpchof
}		

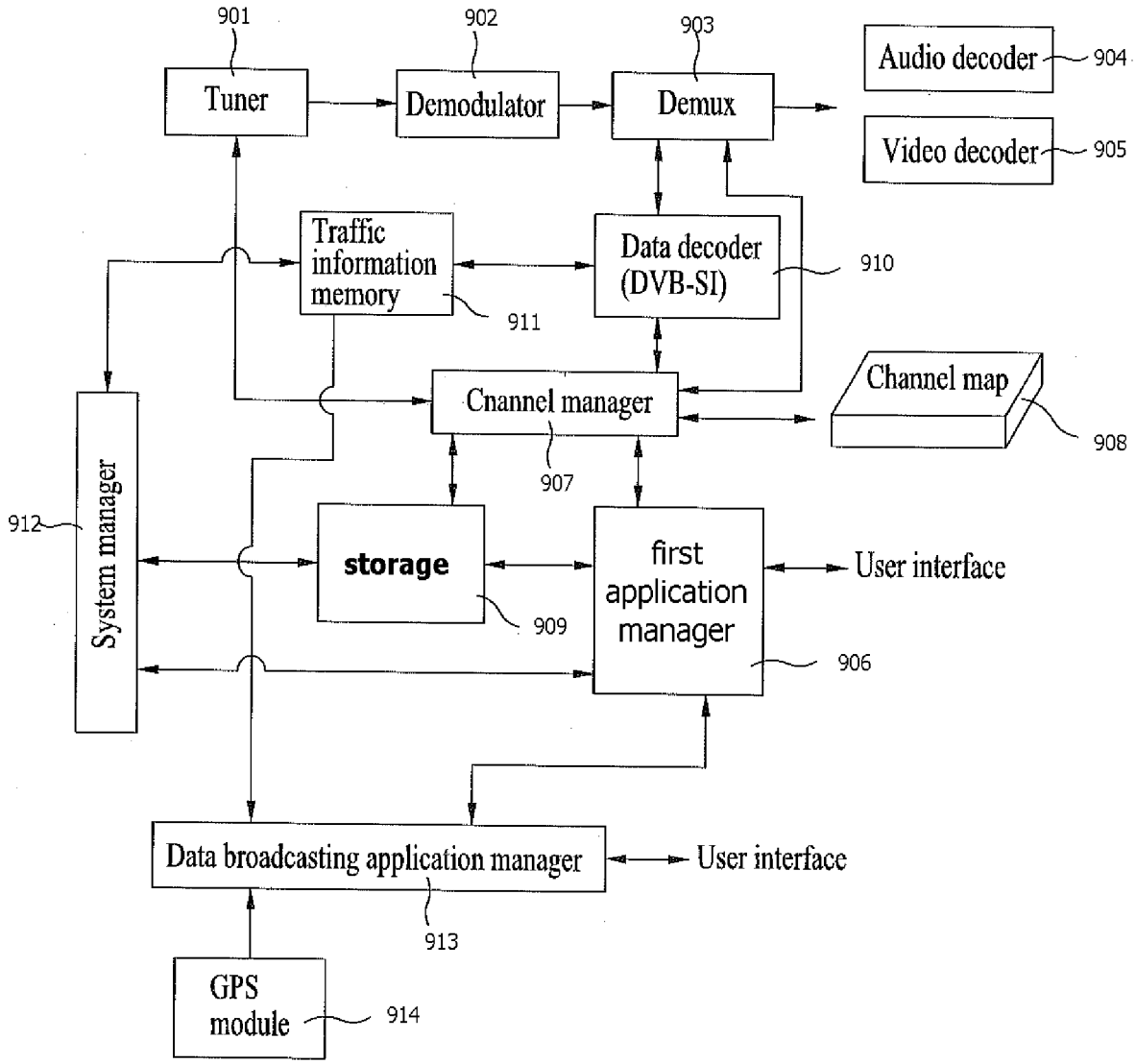
[Fig. 19]

Syndax	No. of bit	Mnemonic
TS_program_map_section() {		
table_id	8	uimsbf
section_system_indicator	1	bslbf
'0'	1	bslbf
reserved	2	bslbf
section_length	12	uimsbf
program_number	16	uimsbf
reserved	2	bslbf
version_number	5	uimsbf
current_next_indicator	1	bslbf
section_number	8	uimsbf
last_section_number	8	uimsbf
reserved	3	bslbf
PCR_PID	13	uimsbf
reserved	4	bslbf
for(i=0: i<N; i++)	12	uimsbf
descriptor()		
}		
for(i=0: i<N1; i++)		
stream_type	8	uimsbf
reserved	3	bslbf
elementary_PID	13	uimsbf
reserved	4	bslbf
for(i=0: i<N2; i++)	12	uimsbf
descriptor()		
}		
}		
CRC_32	32	rpchof
}		

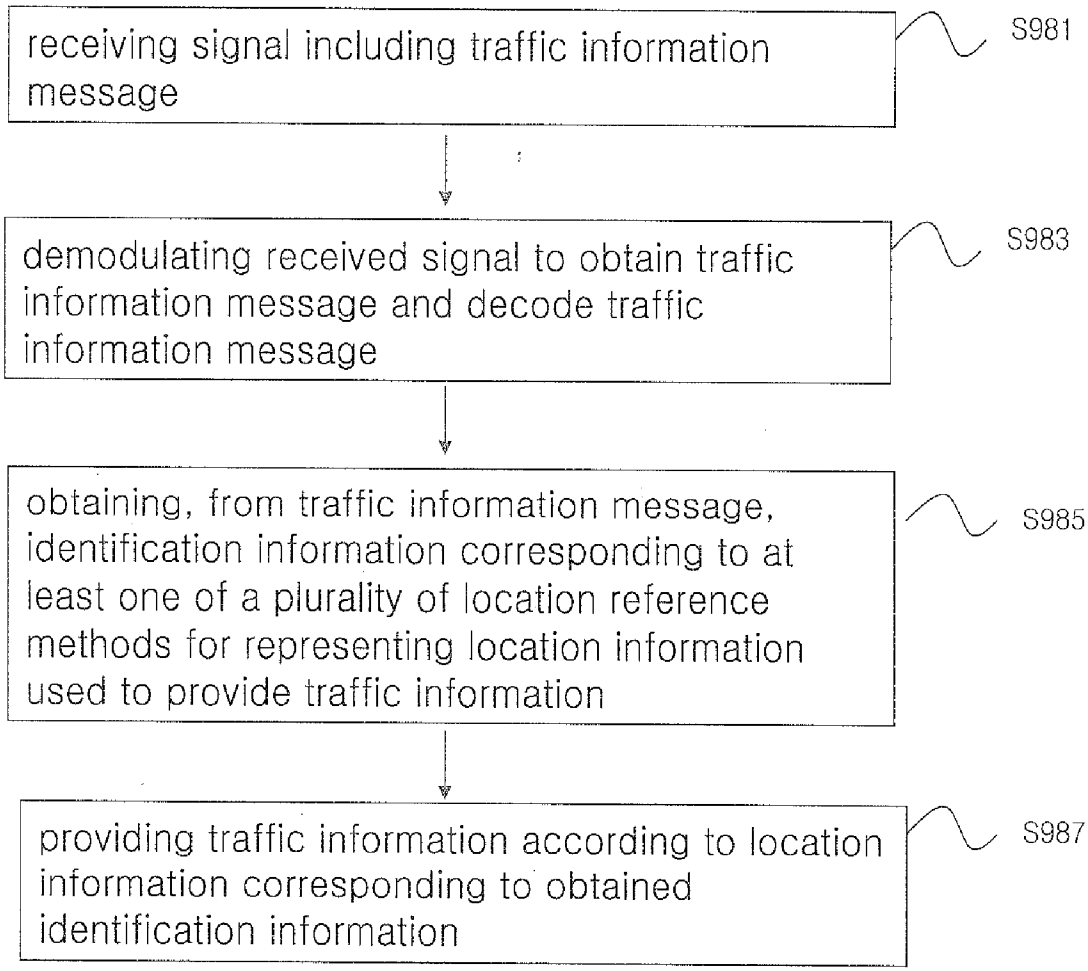
[Fig. 20]

Syntax	No. of Bits	Format
TPEG_service_descriptor(){		
descriptor_tag	8	uimsbf
descriptor_length	8	uimsbf
Number_of_TPEG_service_components	8	uimsbf
for(i=0;i<Number_of_TPEG_service_components;i++){		
Service_component_ID	8	uimsbf
Application_ID	16	uimsbf
Service_name	var	
Service_description	var	
Service_logo	var	
Subscriber_information	var	
Free_text_information	var	
Help_information	var	
}		
}		

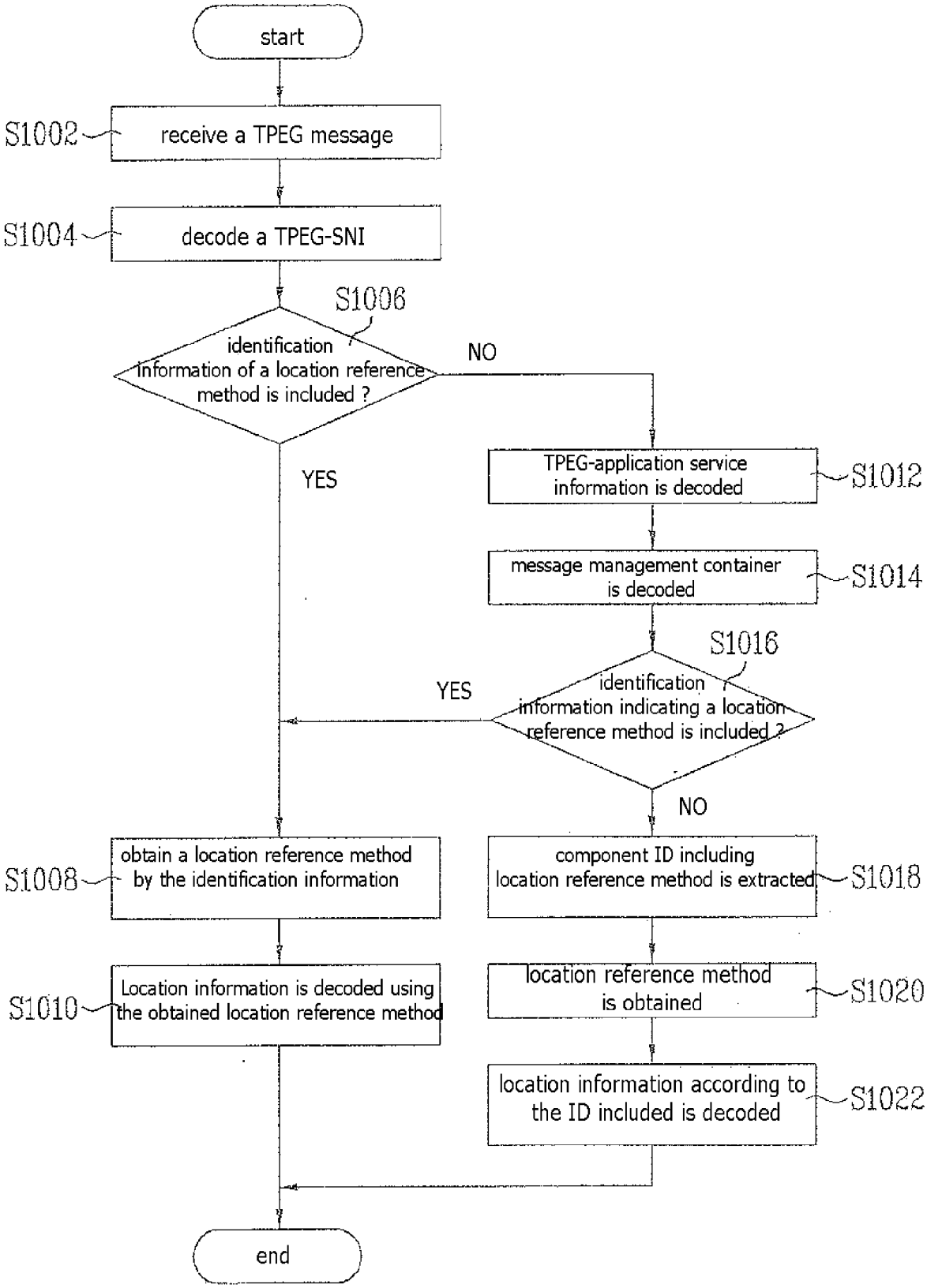
[Fig. 21]


901
902
903
Tuner
Demodulator
Demux
Audio decoder
904
Video decoder
905
Traffic information memory
911
Data decoder (DVB-SI)
910
Channel map
908
Cnannel manager
907
912
System manager
storage
909
first application manager
906
User interface
Data broadcasting application manager
913
User interface
GPS module
914

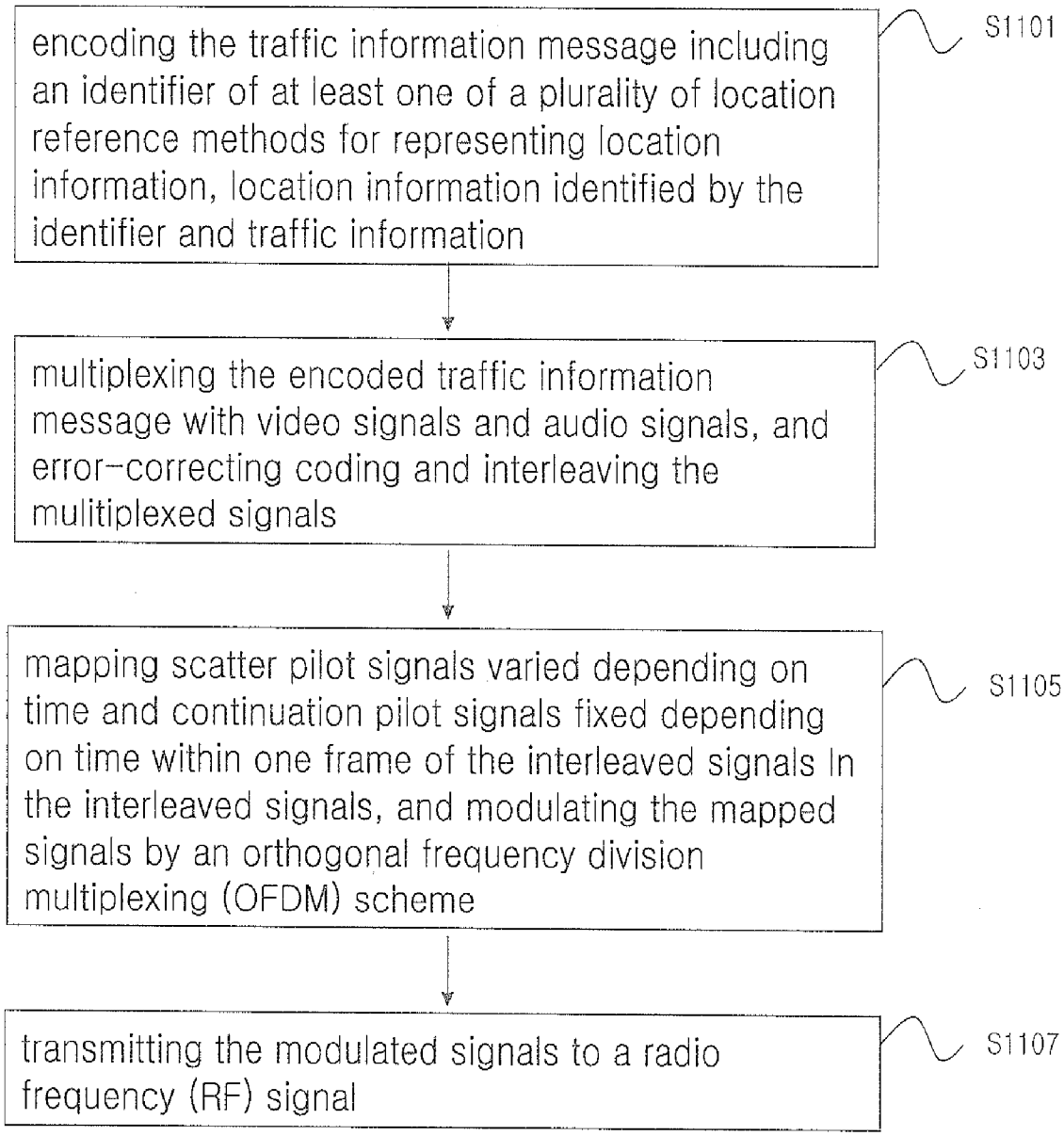
[Fig. 22]


receiving signal including traffic information message
S981
demodulating received signal to obtain traffic information message and decode traffic information message
S983
obtaining, from traffic information message, identification information corresponding to at least one of a plurality of location reference methods for representing location information used to provide traffic information
S985
providing traffic information according to location information corresponding to obtained identification information
S987

[Fig. 23]


start
S1002
receive a TPEG message
S1004
decode a TPEG-SNI
S1006
identification information of a location reference method is included ?
NO
YES
TPEG-application service information is decoded
S1012
message management container is decoded
S1014
S1016
identification information indicating a location reference method is included ?
YES
NO
S1008
obtain a location reference method by the identification information
component ID including location reference method is extracted
S1018
S1010
Location information is decoded using the obtained location reference method
location reference method is obtained
S1020
location information according to the ID included is decoded
S1022
end

[Fig. 24]


encoding the traffic information message including an identifier of at least one of a plurality of location reference methods for representing location information, location information identified by the identifier and traffic information
S1101
multiplexing the encoded traffic information message with video signals and audio signals, and error-correcting coding and interleaving the mulitiplexed signals
S1103
mapping scatter pilot signals varied depending on time and continuation pilot signals fixed depending on time within one frame of the interleaved signals In the interleaved signals, and modulating the mapped signals by an orthogonal frequency division multiplexing (OFDM) scheme
S1105
transmitting the modulated signals to a radio frequency (RF) signal
S1107

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2007/004742

A. CLASSIFICATION OF SUBJECT MATTER

H04N 7/08(2006.01)i, G08G 1/0968(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)
IPC 8 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models since 1975
Japanese 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 (KIPO internal): "TPEG, TPEG-LOC, VICS link, AgoraC, traffic, location, broadcasting"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2006/062324 A1 (ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE) 15 June 2006 See abstract; page 1, line 22 - page 6, line 26.	1-20
A	KR 2006063563 A (ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE) 12 June 2006 See abstract; claims 1 - 19.	1-20
A	US 2006/105787 A1 (SEO JU-HEE) 18 May 2006 See abstract; paragraphs [0009] - [0014]; figure 5.	1-20
A	KR 2006002468 A (SAMSUNG ELECTRONICS CO., LTD.) 09 January 2006 See abstract; claims 1-9; figures 2-5.	1-20
A	EP 1357529 A2 (Vehicle Information and Communication System Center) 29 October 2003 See abstract; paragraphs [0009] - [0024] and [0051] - [0064]; figure 1.	1-20

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"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
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26 DECEMBER 2007 (26.12.2007)	**26 DECEMBER 2007 (26.12.2007)**

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
920 Dunsan-dong, Seo-gu, Daejeon 302-701,
Republic of Korea
Facsimile No. 82-42-472-7140

Authorized officer
KIM, Heung Soo
Telephone No. 82-42-481-5764

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2007/004742

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO2006062324A1	15.06.2006	EP1836630A1	26.09.2007
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KR2006063563A	12.06.2006	None	
US2006105787A1	18.05.2006	CN1776769A	24.05.2006
		EP1659713A1	24.05.2006
		KR2006053494A	22.05.2006
KR2006002468A	09.01.2006	None	
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		DE60301292T2	06.07.2006
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		EP1357529B1	17.08.2005
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		TW276014B	11.03.2007
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		US6873904BB	29.03.2005