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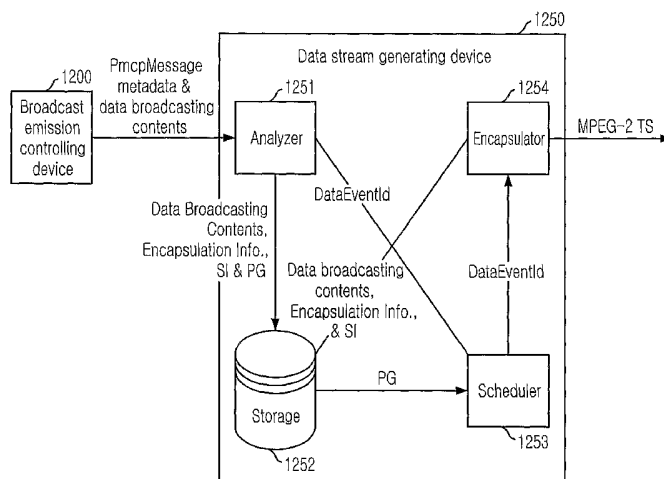
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(54) Title: PMCP EXTENSION METADATA, DATA STREAM GENERATING DEVICE, DIGITAL DATA BROADCASTING EMISSION SYSTEM AND DIGITAL DATA BROADCASTING EMISSION METHOD THEREOF



(57) Abstract: Provided are a data server, which is added to a digital broadcast emitting system to emit data broadcasting based on the Programming Metadata Communication Protocol (PMCP), a conventional international specification defined to secure inter-operability between devices of a digital broadcast emitting system; a metadata structure for securing inter-operability between devices of the conventional digital broadcast emitting system; a data stream generating device using the metadata structure; and a digital data broadcast emitting system and method thereof. The PMCP extended metadata of the present invention are formed to include channel type metadata which provide system information of a data event constituting a data broadcast program; and Program and System Information Protocol (PSIP) data event metadata which provide identification information, program guide, and encapsulation information of a data event.



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

PMCP EXTENSION METADATA, DATA STREAM GENERATING DEVICE,
DIGITAL DATA BROADCASTING EMISSION SYSTEM AND DIGITAL DATA
BROADCASTING EMISSION METHOD THEREOF

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DescriptionTechnical Field

The present invention relates to metadata for securing
inter-operability among devices composing a digital data
10 broadcast emitting system, a data stream generating device
using the metadata, a digital data broadcast emitting
system and method thereof.

In particular, the present invention relates to a
metadata structure for securing inter-operability between a
15 data server, a device which is added to a digital broadcast
emitting system to emit a data broadcast, and conventional
devices of the digital broadcast emitting system based on a
Programming Metadata Communication Protocol (PMCP), which
is a conventional international specification defined to
20 secure the inter-operability between components of the
digital broadcast emitting system; a data stream generating
device using the metadata structure; a digital data
broadcast emitting system using the data stream generating
device; and a digital data broadcast emitting method
25 thereof.

Background Art

As the type of broadcasting changes from analog to
30 digital, there is an increasing demand for transmitting
System Information (SI) and Program Guide (PG) of a
broadcast program to a receiver through a broadcasting
channel in a digital broadcast emitting system.

For this, the Advanced Television Systems Committee
35 (ATSC) defines the Program and System Information Protocol

(PSIP), a standard specification for transmitting system information and program guide of a broadcast program in a form of transport stream (TS) based on the Moving Picture Experts Group (MPEG)-2 System specifications.

5 The ATSC names a broadcast emitting device transmitting the system information and program guide of a broadcast program in the form of transport stream based on the PSIP as a PSIP server or a PSIP generator. The PSIP information is primarily authored by a program manager of a
10 broadcasting station through a program management system and transmitted to the PSIP server. The primarily authored PSIP information can be updated, deleted or have additional information upon a change in a broadcasting schedule before final broadcasting.

15 The change in the broadcasting schedule occurs in a broadcast emission controlling device such as a traffic system, an automation system, and an MPEG controller. The broadcast emission controlling device should inform the PSIP server of changed program guide so that the PSIP
20 server can update the PSIP information.

 However, interface independently defined by each operator to exchange changed broadcast program guide cannot secure inter-operability between digital broadcast emitting systems developed by various companies, i.e., broadcast
25 emission controlling devices, and the PSIP server. This calls for more efforts and costs for realizing an interface between broadcasting devices on the parts of an operator of a digital broadcast emitting system and hardware developers when a broadcast emitting system is built up.

30 In order to resolve the problems, the ATSC defines a metadata structure and a metadata transmitting method in an ATSC A/76 Standard called Programming Metadata Communication Protocol (PMCP) to exchange standardized PSIP information between constitutional devices of the digital
35 broadcast emitting system.

Fig. 1 is a structure of metadata defined in the PMCP specification. As shown in Fig. 1, a PmcpMessage metadata 100 includes message state metadata 110, i.e., PmcpReply metadata; transport stream (TS) metadata 120, i.e., TransportStream metadata; channel metadata 130; show metadata 140; PSIP event metadata 150, i.e., PsipEvent metadata; time parameters metadata 160, i.e., TimeParameters metadata; rating metadata 170, i.e., Ratings metadata; and user definition metadata 180, i.e., PrivatePmcpInformation metadata. The PmcpReply metadata 110 describes validity and process status of transport stream. The TransportStream metadata 120 described information of transport stream. The Channel metadata 130 describes virtual channel information and channel tuning information. The Show metadata 140 describes a play list of a show used for broadcast program guide. The PsipEvent metadata 150 describes the broadcast program guide. The TimeParameters metadata 160 describes system time information. The Ratings metadata 170 describes a rating of a broadcast program. The PrivatePmcpInformation metadata 180 describes PMCP user definition information of a system level.

The PmcpMessage metadata 100 describes information needed for the PSIP server to generate PSIP/program specific information (PSI) in a form of transport stream. That is, the PMCP specification only considers the providing of metadata needed for the broadcast emitting system to transmit the PSIP and PSI, which are system information and program guide of an audio/video broadcast program, i.e., a broadcast program formed of audio, video or both audio and video, in a digital broadcasting environment.

However, the broadcasting environment takes its own course from a conventional digital broadcasting environment where viewers simply watch audio/video only to a digital

data broadcasting environment where the viewers can receiver diverse services by receiving broadcast programs along with data.

5 In order to provide data broadcasting, a broadcast emitting device for encapsulating data broadcasting contents based on a data broadcasting specification and outputting the encapsulated data broadcasting contents in the form of MPEG-2 transport stream should be added to a conventional digital broadcast emitting system. The
10 broadcast emitting device is generally called a data server or a data stream generator.

A data server should be able to receive program guide and encapsulation information to generate data stream just as a PSIP server for a digital service and change the
15 program guide and encapsulation information in a broadcast emitting controlling device such as a traffic system, an automation system, an MPEG controller.

However, since the conventional PMCP does not describe encapsulation information and program guide for data
20 broadcasting, it is not appropriate as an interface of a broadcast emitting system with secure inter-operability for data broadcast emission. Therefore, a technological solution which is added to a broadcast emitting system and securing the inter-operability between broadcasting devices
25 is required to transmit digital data broadcasting.

Disclosure

Technical Problem

30 It is, therefore, an object of the present invention to provide a Programming Metadata Communication Protocol (PMCP) extended metadata structure, a structure obtained by extending conventional PMCP metadata, to secure inter-operability between devices of a conventional digital
35 broadcast emitting system and a data server, which is an

additional device to the digital broadcast emitting system,
to transmit data broadcasting; a data stream generating
device using the PMCP extended metadata structure; a
digital data broadcast emitting system; and a digital data
5 broadcast emitting method thereof.

Technical Solution

In accordance with one aspect of the present
10 invention, there is provided a data stream generating
device, which includes: an analyzer for analyzing
Programming Metadata Communication Protocol (PMCP) extended
metadata transmitted from a broadcast emission controlling
device and storing system information, program guide, and
15 encapsulation information of a data event along with a data
broadcasting content in a storage; a scheduler for
acquiring the program guide of the data event from the
storage and checking time when a data broadcasting content
of the data event is supposed to be outputted based on the
20 acquired program guide; and an encapsulator for acquiring
and outputting the data broadcasting content to be
outputted from the storage, the encapsulation information,
and the system information to a user terminal in a form of
transport stream.

25 The PMCP extended metadata, which is suggested in the
present invention, are formed to include channel type
metadata which provide system information of a data event
constituting a data broadcast program, and Program and
System Information Protocol (PSIP) data event metadata
30 which provide identification (ID) information, program
guide and encapsulation information of a data event, and
descriptor information of a Data Event Table (DET). The
PSIP data event ID metadata include data event ID metadata
which provide ID information of the data event, DET
35 descriptor metadata which describe descriptor information

of a DET, and data stream metadata which provide the PSIP data event metadata, and the PSIP data event metadata have the program guide as an attribute. The PSIP data event metadata further include content ID metadata which describe
5 ID information of a content constituting a data event, show data metadata which describe show information constituting a data event, DET private metadata for individually defining and using what needs to be registered other than predetermined schema in connection with the DET, and
10 private metadata which describe information defined by a user with respect to the data event.

Herein, the analyzer acquires the program guide based on the attribute of the PSIP data event metadata, the encapsulation information based on the data stream metadata,
15 and the system information from the channel data based on the data event ID information. Also, the scheduler acquires program guide of a data event from the storage based on the data event ID information transmitted from the analyzer. Also, the encapsulator acquires a data broadcast
20 content to be outputted from the storage, the encapsulation information, and the system information based on the data event ID information transmitted from the scheduler.

In accordance with another aspect of the present invention, there is provided PMCP extended metadata which
25 include: channel type metadata which provide system information of a data event constituting a data broadcast program; and PSIP event metadata which provide ID information of an audio/video (AV) event constituting an AV broadcast program, and program guide and encapsulation
30 information of a data event. Herein, the program guide of the data event and a program guide of the AV event are the same. Herein, the PSIP event metadata include: event ID metadata which provide ID information of the AV event; and data stream metadata which provide the encapsulation
35 information of the data event, and the PSIP event metadata

have program guide of the data event as an attribute.

Herein, the analyzer acquires the program guide based on the attribute of the PSIP event metadata, the encapsulation information based on the data stream metadata, and the system information from the channel data based on the AV event ID information. Also, the scheduler acquires program guide of a data event from the storage based on the AV event ID information transmitted from the analyzer. The encapsulator acquires a data broadcast content to be outputted from the storage, the encapsulation information, and the system information based on the AV event ID information transmitted from the scheduler.

In accordance with another aspect of the present invention, there is provided a channel type metadata which provide system information of a data event constituting a data broadcast program; PSIP data event metadata which provide descriptor information of a DET; and data stream metadata which provide ID information, program guide and encapsulation information of a data event. The data stream metadata includes data event ID metadata for providing ID information of the data event, and the program guide as an attribute.

Herein, the analyzer acquires the program guide based on the attribute of the data stream metadata, the encapsulation information based on the data stream metadata, and the system information from the channel data based on the data event ID information. Also, the scheduler acquires program guide of a data event from the storage based on the data event ID information transmitted from the analyzer. Also, the encapsulator acquires a data broadcast content to be outputted from the storage, the encapsulation information, and the system information based on the data event ID information transmitted from the scheduler.

In accordance with another aspect of the present invention, there is provided a digital data broadcast

emitting system, which includes: a broadcast emission
controlling device for generating and updating PMCP
extended metadata having system information, program guide
and encapsulation information of a data broadcast program,
5 and controlling the output of transport stream of the data
broadcast program based on the program guide; and a data
stream generating device for generating and transmitting
data stream based on the system information, the program
guide and the encapsulation information of the data event
10 which is described in the PMCP extended metadata
transmitted from the broadcast emission controlling device.

In accordance with another aspect of the present
invention, there is provided a digital data broadcast
emitting method, which includes the steps of: a) analyzing
15 PMCP extended metadata transmitted from a broadcast
emission controlling device and storing system information,
program guide and encapsulation information of a data event
in a database along with a data broadcasting content; b)
checking time when the data broadcasting content
20 corresponding to the data event are supposed to be
outputted based on the program guide of the data event
acquired from the database; and c) acquiring and outputting
the data broadcasting content to be outputted, the
encapsulation information, and the system information from
25 the database to a user terminal in a form of transport
stream.

Advantageous Effects

30 The present invention secures inter-operability
between a broadcast emission controlling device and a data
server by adding metadata needed to emit data broadcasting
to a conventional Programming Metadata Communication
Protocol (PMCP) structure and extending the PMCP metadata
35 structure.

Also, the present invention provides an efficient control interface between the broadcast emission controlling device and the data server such as update, addition and deletion of a data event.

5

Description of Drawings

Fig. 1 is a diagram illustrating a structure of metadata defined in the Programming Metadata Communication Protocol (PMCP) specification;

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Fig. 2 is a diagram showing PmcpMessage metadata in accordance with a first embodiment of the present invention;

Fig. 3 is a diagram describing a structure of PSIP data event metadata of Fig. 2;

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Fig. 4 is a diagram illustrating DataStreamType metadata of Fig. 3;

Fig. 5 is a diagram showing AIT (AIT) metadata of Fig. 4;

Fig. 6 is a diagram describing ObjectCarouselType metadata of Fig. 4;

20

Fig. 7 is a diagram illustrating channel metadata of Fig. 2;

Fig. 8 is a diagram showing PSIP event metadata of PmcpMessage metadata in accordance with a second embodiment of the present invention;

25

Fig. 9 is a diagram describing PmcpMessage metadata in accordance with a third embodiment of the present invention;

Fig. 10 is a diagram showing DataStreamType metadata of Fig. 9;

30

Fig. 11 is an exemplary schema of a PMCP extended message realized by using PmcpMessage metadata in accordance with a first embodiment of the present invention;

35

Fig. 12 is a block diagram showing a digital data broadcast emitting system using PmcPMessage metadata in accordance with an embodiment of the present invention; and

Fig. 13 is a flowchart describing a data broadcast emitting method using PmcPMessage metadata in accordance with an embodiment of the present invention.

Best Mode for the Invention

Other objects and aspects of the invention will become apparent from the following description of the embodiments with reference to the accompanying drawings, which is set forth hereinafter. If it is considered that detailed description on prior art related to the present invention may blur the point of the present invention, the description will not be provided. Hereinafter, a preferred embodiment of the present invention will be described with reference to the accompanying drawings.

Fig. 2 is a diagram showing PMCP extended metadata in accordance with a first embodiment of the present invention. As shown in Fig. 2, the structure of the PMCP extended metadata 200, i.e., PmcPMessage metadata, which is suggested in the present invention, is obtained by adding PSIP data event metadata 300 to a convention PMCP metadata 100.

PmcPReply metadata 110, which are message state metadata, describe validity and process status of a transmitted message. TransportStream metadata 120, which are transport stream (TS) metadata, describe information of transport stream. Channel metadata 130 describe not only virtual channel and channel tuning information but also program map table (PMT) descriptor information. The PMT is used to signalize an application by providing information on elementary stream of a program and it is defined in an Advanced Common Application Platform (ACAP) in detail.

Show metadata 140 describes a play list of a show, which is used for audio/video (AV) broadcast program guide information. PsipEvent metadata 150, which are PSIP event metadata, describe AV broadcast program guide information.
5 TimeParameters metadata 160, which are time metadata, describe system time information.

Ratings metadata 170 describes the rating of an AV broadcast program. PrivatePmcpInformation metadata 180, which are user definition metadata, describe PMCP user
10 definition information of a system level.

PsipDataEvent metadata 300, which are PSIP data event metadata, include description information on identification (ID) of a data event, a contents ID, show, a data event table (DET) and data encapsulation, which form a data
15 broadcasting. The DET includes information on a data service of a particular virtual channel and it is described in the data broadcasting standard A/90 of the ATSC (ATSC) in detail.

The PsipDataEvent metadata 300 include program guide
20 information of a data event, such as start time and lasting time, as attributes.

Fig. 3 is a diagram describing a structure of PsipDataEvent metadata of Fig. 2.

As shown in Fig. 3, the PsipDataEvent metadata 300
25 describe a data event that constitutes a data broadcasting. The PsipDataEvent metadata 300 include DataEventId metadata 310, ContentId metadata 320, ShowData metadata 330, DetPrivateInformation metadata 340, DetDescriptor metadata 350, DataStream metadata 400, and PrivatePmcpInformation
30 metadata 360.

The DataEventId metadata 310, which describe ID information of a data event, include a transport stream identifier (TSID) additionally along with a channel number corresponding to the data event, and the DataEventId
35 metadata 310 further include any one selected from a group

of initial start time, data ID, which is a table ID included in a Data Event Table (DET), and ID information arbitrarily allocated by a producer.

5 The ContentId metadata 320 describe ID information of a content constituting a data event and include an International Standard Audiovisual Number (ISAN) and inherent ID information allocated by a broadcasting station to a content.

10 The ShowData metadata 330 describe show information constituting a data event and include such information as the title of a show, an overview of the show, and the rating of the show.

15 The DetPrivateInformation metadata 340 are used to define what needs to be registered other than predetermined schema individually in connection with a DET constituting a data broadcast program.

 The DetDescriptor metadata 350 describe descriptor information of the DET and include a descriptor tag number and contents of the descriptor.

20 The DataStream metadata 400 describe encapsulation information of a data event and include transmission protocol information and signaling information of a data service.

25 The PrivatePmcpInformation metadata 360 describe what is defined by a user with respect to a data event.

 Fig. 4 is a diagram illustrating DataStreamType metadata of Fig. 3. The DataStream metadata 400 provide encapsulation information needed for typical data broadcasting.

30 As shown in Fig. 4, the DataStream metadata 400 can be formed to include ApplicationInformationTable metadata 500 describing signaling information of an application defined in an ACAP Application Information Table (AIT), ObjectCarouselType metadata 600 describing object carousel
35 which is a protocol for transmitting an ACAP application,

StreamDescriptor metadata 410 describing Digital Storage Media Command and Control (DSM-CC) stream descriptor information, and PrivatePmcpInformation 420 describing information defined by a user with respect to a data stream.

5 Fig. 5 is a diagram showing AIT (AIT) metadata of Fig. 4. The AIT is a table describing an application and related information, and the AIT is described in the ACAP in detail. The ApplicationInformationTable metadata 500 describe the AIT information. The
10 ApplicationInformationTable metadata 500 describe an application common descriptor, which is applied in common to all ACAP data broadcasting applications described in the AIT, and an application specific descriptor, which can be applied to a specific ACAP data broadcasting application.

15 As shown in Fig. 5, the ApplicationInformationTable metadata 500 describing signaling information can be formed to include TransportProtocol metadata 510, DiiLocation metadata 520, Application metadata 530, PrivateDescriptor metadata 550.

20 The TransportProtocol metadata 510 describes an application transport protocol descriptor, which is one of application common descriptors.

 The DiiLocation metadata 520 describing a Download Information Indication (DII) location descriptor, which is
25 one of application common descriptors, describe a list of DII messages related to object carousel, which is a transport protocol of a data broadcasting application.

 The Application metadata 530 describe detailed information of an application transmitted through an object
30 carousel, which is a transport protocol of an ACAP application.

 The Application metadata 530 include such attributes as an organization ID and an application ID in order to identify an application. Also, the Application metadata
35 530 have an attribute of a control code for controlling

whether to autostart the application immediately upon arrival of the application in a receiver, whether to hold on the execution of the application and temporarily prefetch it in a cache memory, or whether to kill or
5 terminate the application which is held back from execution and prefetched into the cache memory.

The Application metadata 530 describing an application specific descriptor can be formed to include TransportProtocol metadata 531 describing transport
10 protocol information of a corresponding application, DiiLocation metadata 532 describing a list of DII messages related to an object carousel, ApplicationInfo metadata 533 describing general information on an application, ApplicationName 534 describing the name of an application,
15 ApplicationIcon 535 describing information on an icon related to application, and Prefetch metadata 536 describing information on a prefetched application stored in a cache memory.

Also, the Application metadata 530 can be formed to
20 further include AcapJApplication metadata 537 describing information on parameters needed to start an ACAP-J-based application, AcapJApplicationLocation metadata 538 describing information for describing the location of an ACAP-J-based application, AcapXApplication metadata 539
25 describing information on parameters needed to start an ACAP-X-based application, AcapXApplicationLocation 541 describing information for describing the location of an ACAP-X-based application, AcapXApplicationBoundary 542 describing information for describing data elements of an
30 ACAP-X-based application, and PrivateDescriptor 543.

Fig. 6 is a diagram describing ObjectCarouselType metadata. The ObjectCarouselType metadata describe encapsulation information defined in the ACAP.

As illustrated in Fig. 6, the ObjectCarouselType
35 metadata 600 can be formed to include DataCarousel metadata

610 describing information on a data carousel transmitting an ACAP object message and ServiceGateway metadata 620 describing a service gateway of an object carousel transmitting an ACAP application.

5 The DataCarousel metadata 610 include DsiMessage metadata 611 describing information on a Download Server Initiate (DSI), which is one of messages of a data carousel, DiiMessage metadata 612 describing information on a Download Information Indication (DII) message, and PidInfo
10 metadata 613 describing information on a Packet Identifier (PID) of a packet to which a data carousel message is transmitted.

 The ServiceGateway metadata 620 can be formed to include Directory metadata 621 describing a directory
15 object message among messages of an object carousel, File metadata 622 describing a file object message, Stream metadata 623 describing a stream object message, StreamEvent metadata 624 describing a stream event object message, and RemoteObject metadata 625 describing
20 information in an object message which is transmitted not to a corresponding object carousel but to another object carousel.

 Fig. 7 is a diagram illustrating ChannelType metadata of Fig. 2. The ChannelType metadata 700 further include
25 metadata describing Program Map Table (PMT) descriptor, compared to the conventional channel metadata 130. A PMT provides information on elementary stream of a program and it is used to signalize an application together with an AIT, which is defined in the ACAP.

30 As shown in Fig. 7, the ChannelType metadata 700 further include DeferredAssociationTag metadata 720 describing a PMT descriptor 'deferred_association_tag descriptor.' Also, the ChannelType metadata 700 additionally include CarouselId metadata 711,
35 ApplicationSignaling metadata 712, StreamIdentifier

metadata 713, AssociationTag metadata 714, and
DataBroadcastId metadata 715, in an ElementaryStream
metadata 710. The metadata 711, 712, 713, 714 and 715
describe information on PMT descriptors
5 'carousel_identifier descriptor,' 'application_signalling
descriptor,' 'stream_identifier descriptor,'
'association_tag descriptor,' and 'data_broadcast_id
descriptor,' respectively.

Meanwhile, as PmcpMessage metadata in accordance with
10 a second embodiment of the present invention, the
DataStreamType metadata 400 having the structure of Fig. 4
metadata can be defined through extension of conventional
PsipEvent metadata 150. Fig. 8 is a diagram showing PSIP
event metadata having a DataStreamType metadata in
15 accordance with a second embodiment of the present
invention.

The DataStreamType metadata 400 can be formed to be
included in a PsipEventType metadata 800, when a data event
and broadcast program guide of an AV event are the same.
20 In this case, the PsipEventType metadata 300 as shown in
Fig.2 is not needed.

The PsipEventType metadata 800 include EventId
metadata 810, ContentId metadata 820, ShowData metadata 830,
EitPrivateInformation 840, EitDescriptor metadata 850,
25 DataStreamType metadata 400, and PrivatePmcpInformation
metadata 860.

The EventId metadata 810 describe identification
information of an AV event constituting an AV broadcast
program, include a Transport Stream Identifier (TSID) in
30 addition to a channel number corresponding to the AV event,
and further include any one selected among an event ID,
initial start time, ID information arbitrary assigned by a
producer.

The ContentId metadata 820 describe identification
35 information constituting an AV event and include an

International Standard Audiovisual Number (ISAN) identification information inherently assigned by a broadcasting station to a content.

5 The ShowData metadata 830 describe show information constituting an AV event and include the title of a show, an overview of a show, and the rating of a show.

The EitPrivateInformation 840 is used to individually define what needs to be registered other than a predetermined schema in connection with an Event
10 Information Table (EIT).

The EitDescriptor metadata 850 describe descriptor information of an EIT and include a descriptor tag number and contents of a descriptor.

15 The DataStreamType metadata 400 describe encapsulation information of a data event constituting a data broadcast program and include signaling information of a data service and transport protocol information.

The PrivatePmcpInformation metadata 860 describe private information defined by a user with respect to an
20 event constituting an AV broadcast program.

As PmcpMessage metadata in accordance with a third embodiment of the present invention, the DataStreamType metadata can be formed not to be included in PsipDataEvent metadata but to be included in PmcpMessage metadata along
25 with PsipDataEvent metadata on equal terms.

Fig. 9 is a diagram describing PmcpMessage metadata in accordance with a third embodiment of the present invention. The PmcpMessage 900 of Fig. 9, which are PmcpMessage metadata, take the DataStreamType metadata out of the
30 PsipDataEvent metadata 300 and include PsipDataEvent metadata 910 and DataStreamType metadata 920 in the PmcpMessage metadata 900, compared to the PmcpMessage metadata 200 of Fig. 2. In this case, the DataStreamType metadata 920 include program guide as attributes and
35 include DataEventId metadata 921 to identify a data event

therein.

Fig. 11 is an exemplary schema of a PMCP extended message realized by using PmcpMessage metadata in accordance with a first embodiment of the present invention. As known from the attributes of the PmcpMessage metadata, a system transmitting a present message is a traffic system and a system receiving the present message is an ACAP data server.

As known from a 'Channel' element, the channel number is 11-1 and TSID is 101. Also, the PID of ACAP data elementary stream is 210, and the PID of AIT elementary stream is 220, while the PID of video elementary stream is 48 and the PID of audio elementary stream is 49.

According to the attributes of a PsipDataEvent element, start time, which is program guide information of a data broadcasting, is defined to be 2004-12-14T04:30:00+09:00 and broadcasting duration is defined to be PT50M.

Fig. 12 is a block diagram showing a digital data broadcast emitting system using PmcpMessage metadata in accordance with an embodiment of the present invention. The broadcast emitting system using PmcpMessage metadata is formed of a broadcast emission controlling device 1200 and a data stream generating device 1250.

The broadcast emission controlling device 1200 generates encapsulation information and program guide of a data broadcast program by using the PmcpMessage metadata structure, which is suggested in the present invention, and controls the output of transport stream of the data broadcast program according to the program guide.

The broadcast emission controlling device 1200 includes a program management system, a traffic system, an automation system, a metadata extractor, a data encapsulation information editor, an MPEG controller, a file server for storing and managing data broadcasting contents, and a data agent transmitting updated data to a

database.

The broadcast emission controlling device 1200 can update the program guide and/or the data broadcasting contents by using the PmcpMessage metadata before
5 transmission of transport stream. In this case, the broadcast emission controlling device 1200 updates data and informs the data stream generating device 1250 of the update information by using the PmcpMessage metadata.

The data stream generating device 1250, i.e., a data
10 server, generates and transmits data stream according to the program guide, system information and encapsulation information which are described in the PmcpMessage metadata.

The data server can generate not only data stream including AIT, object carousel and stream descriptor but
15 also a PSIP table in the form of transport stream. The data server generates the AIT based on AIT metadata 500 describing signaling information, encapsulates data based on ObjectCarouselType metadata 600 describing information on object carousel which is a protocol for transmitting an
20 ACAP application, and generates a stream descriptor based on StreamDescriptor metadata 410 describing information on a DSM-CC stream descriptor.

The data stream generating device 1250 includes an analyzer 1251, a storage 1252, a scheduler 1253, and an
25 encapsulator 1254.

The analyzer 1251 receives the PmcpMessage metadata and data broadcasting contents from the broadcast emission controlling device 1200. The analyzer 1251 analyzes the received PmcpMessage metadata and registers system
30 information, program guide and encapsulation information in the storage 1252 together with the data broadcasting contents.

In the first embodiment shown in Fig. 2, the analyzer 1251 can acquire program guide from the attributes of
35 PsipDataEvent metadata 300. Also, in the second embodiment

shown in Fig. 8, the analyzer 1251 can acquire program guide from the attributes of PsipEventType metadata 800. Also, in the third embodiment shown in Fig. 9, the analyzer 1251 can acquire program guide from the attributes of
5 DataStreamType metadata 920.

In the first and third embodiments shown in Figs. 2 and 9, the analyzer 1251 can acquire system information from corresponding ChannelType metadata 700. In the second embodiment shown in Fig. 8, the analyzer 1251 can acquire
10 system information from corresponding ChannelType metadata by using the AV event ID of EventId metadata 810.

In the first to third embodiments shown in Figs. 2, 8 and 9, the analyzer 1251 can acquire encapsulation information from the DataStreamType metadata 400 and 920.

The analyzer 1251 transmits program guide retrieval information to the scheduler 1253. As for the program guide retrieval information, a data event ID for identifying PmcPMessage metadata is used. As shown in Fig. 8, when a data event and broadcast program guide of an AV
15 event are the same, an event ID is used as program guide because there is no data event ID. The analyzer 1251 can provide data event IDs for more than one data events to be broadcasted during a predetermined time duration to the scheduler 1253.
20

The scheduler 1253 acquire program guide for data events from the storage 1252 upon receipt of the data event ID transmitted from the analyzer 1251.
25

The scheduler 1253 checks out time when a data broadcasting content corresponding to a data event is supposed to be outputted in the form of transport stream
30 based on the acquired program guide.

When a certain data event reaches its time to be outputted, the scheduler 1253 transmits data broadcasting content retrieval information, i.e., a data event ID, to
35 the encapsulator 1254 in order to examine the data

broadcasting content corresponding to the data event. When the data event and broadcast program guide of an AV event are the same as shown in Fig. 8, the event ID is used as the data broadcasting content retrieval information because
5 there is no data event ID.

The encapsulator 1254 acquires corresponding data broadcasting contents, encapsulation information, and system information from the storage 1252 by using the data event ID or event ID transmitted from the scheduler 1253.
10 The encapsulator 1254 generates transport stream for the acquired data broadcasting contents, encapsulation information and system information and outputs the transport stream to a user terminal.

Fig. 13 is a flowchart describing a data broadcast emitting method using PmcPMessage metadata in accordance
15 with an embodiment of the present invention.

At step S1301, the broadcast emission controlling device 1200 generates PmcPMessage metadata by generating encapsulation information and schedule information for a
20 data event for data broadcasting and adding the encapsulation information and schedule information to conventional PmcPMessage metadata 100. At step S1303, it transmits the generated PmcPMessage metadata and data broadcasting contents to an analyzer 1251 of a data stream
25 generating device 1250.

Also, when data broadcast program guide or a data broadcasting content is added, deleted or updated, at the step S1301, the broadcast emission controlling device 1200 updates the generated PmcPMessage metadata and, at the step
30 S1303, transmits the updated PmcPMessage metadata to the analyzer 1251 of the broadcast emission controlling device 1200.

At step S1305, the analyzer 1251 analyzes the PmcPMessage metadata and, at step S1307, registers program
35 guide, system information, encapsulation information and

data broadcasting content in a storage 1252.

At step S1309, the analyzer 1251 transmits program guide retrieval information, which is a data event ID or an event ID, to a scheduler 1253.

5 At steps S1311 and S1313, the scheduler 1253 retrieves and acquires program guide for the data event among data registered in the storage 1252 based on the program guide retrieval information.

10 The scheduler 1253 controls a data encapsulator 1254 to transmit a data broadcasting content corresponding to the data event based on the data event program guide transmitted from the storage 1252. To be more specific, at step S1315, when the scheduler 1253 examines schedule and figure out that it is time to transmit a specific data
15 event, at step S1317, transmits data broadcasting content retrieval information, i.e., a data event ID corresponding to the data event.

20 At steps S1319 and S1321, the encapsulator 1254 retrieves and acquires a corresponding data broadcasting content, system information and encapsulation information based on the transmitted data event ID. At step S1323, the encapsulator 1254 generates transport stream for the acquired data broadcasting content, system information and encapsulation information and outputs them to the user
25 terminal. When it is time to terminate the data event, the scheduler 1253 controls the encapsulator 1254 to stop transmitting the transport stream.

30 The method of the present invention, which is described above, can be stored in a computer-readable recording medium, such as CD-ROM, RAM, ROM, floppy disks, hard disks, magneto-optical disks and the like.

35 While the present invention has been described with respect to certain preferred embodiments, it will be apparent to those skilled in the art that various changes and modifications may be made without departing from the

scope of the invention as defined in the following claims.

Industrial Applicability

- 5 The technology of the present invention can be applied to digital data broadcast emitting systems.

What is claimed is:

1. A Programming Metadata Communication Protocol (PMCP) extended metadata obtained by extending PMCP
5 metadata, comprising:

channel type metadata which provide system information of a data event constituting a data broadcast program; and

Program and System Information Protocol (PSIP) data
10 event metadata which provide identification information, program guide, and encapsulation information of a data event.

2. The PMCP extended metadata as recited in claim 1,
15 wherein the PSIP data event metadata include:

data event identification (ID) metadata which provide ID information of the data event; and

data stream metadata which provide the encapsulation information, and

20 the PSIP data event metadata have program guide as an attribute.

3. The PMCP extended metadata as recited in claim 2, wherein the PSIP data event metadata further include:

25 content ID metadata which describe ID information of a content constituting the data event;

show data metadata which describe show information constituting the data event;

30 Data Event Table (DET) descriptor metadata which describe descriptor information of a DET;

DET private metadata for individually defining and using what needs to be recorded other than predetermined schema in connection with the DET; and

35 private metadata which describe information defined by a user with respect to the data event.

4. The PMCP extended metadata as recited in claim 2, wherein the data stream metadata include:

5 Application Information Table (AIT) metadata which describe signaling information of an application that is defined in an AIT; and

 object carousel metadata which describe information on object carousel, which is a protocol for transmitting an application.

10

5. The PMCP extended metadata as recited in claim 1, wherein the channel type metadata further provide Program Map Table (PMT) descriptor information.

15 6. A Programming Metadata Communication Protocol (PMCP) extended metadata obtained by extending PMCP metadata, comprising:

 channel type metadata which provide system information of a data event constituting a data broadcast program; and

20

 Program and System Information Protocol (PSIP) event metadata which provide identification information of an audio/video (AV) event constituting an AV broadcast program, and program guide and encapsulation information of a data event.

25

7. The PMCP extended metadata as recited in claim 6, wherein the program guide of the data event and a program guide of the AV event are the same.

30

8. The PMCP extended metadata as recited in claim 7, wherein the PSIP event metadata include:

 event identification (ID) metadata which provide ID information of the AV event; and

35 data stream metadata which provide the encapsulation

information of the data event, and

the PSIP event metadata have program guide of the data event as an attribute.

5 9. The PMCP extended metadata as recited in claim 8, wherein the PSIP event metadata further include:

content ID metadata which describe ID information of a content constituting the AV event;

10 show data metadata which describe show information constituting the AV event;

Event Information Table (EIT) descriptor metadata which describe descriptor information of an EIT;

15 EIT private metadata for individually defining and using what needs to be recorded other than predetermined schema in connection with the EIT; and

Private metadata which describe information defined by a user with respect to the AV event.

20 10. Programming Metadata Communication Protocol (PMCP) extended metadata obtained by extending PMCP metadata, comprising:

channel type metadata which provide system information of a data event constituting a data broadcast program;

25 Program and System Information Protocol (PSIP) data event metadata which provide descriptor information of a Data Event Table (DET); and

30 data stream metadata which provide identification (ID) information, program guide and encapsulation information of a data event.

11. The PMCP extended metadata as recited in claim 10, wherein the data stream metadata include:

35 data event ID metadata which provide ID information of the data event;

Application Information Table (AIT) metadata which is defined in an AIT and describe signaling information of an application; and

5 object carousel metadata which describe information on object carousel, which is a protocol for transmitting an application.

12. The PMCP extended metadata as recited in claim 10, wherein the data stream metadata have the program guide as an attribute.

13. A data stream generating device, comprising:
 an analyzer for analyzing Programming Metadata Communication Protocol (PMCP) extended metadata transmitted
15 from a broadcast emission controlling device and storing system information, program guide, and encapsulation information of a data event along with a data broadcasting content in a storage;

 a scheduler for acquiring the program guide of the
20 data event from the storage and checking time when a data broadcasting content of the data event is supposed to be outputted based on the acquired program guide; and

 an encapsulator for acquiring and outputting the data broadcasting content to be outputted from the storage, the
25 encapsulation information, and the system information to a user terminal in a form of transport stream.

14. The data stream generating device as recited in claim 13, wherein the PMCP extended metadata include:
30 channel type metadata which provide system information of a data event constituting a data broadcast program; and

 Program and System Information Protocol (PSIP) data event metadata which provide identification (ID)
35 information, program guide and encapsulation information of

a data event.

15. The data stream generating device as recited in claim 14, wherein the PSIP data event metadata include:

5 data event ID metadata which provide ID information of the data event; and

data stream metadata which provide the encapsulation information, and

10 the PSIP data event metadata have the program guide as an attribute.

16. The data stream generating device as recited in claim 15, wherein the analyzer acquires the program guide based on the attribute of the PSIP data event metadata, the
15 encapsulation information based on the data stream metadata, and the system information from the channel data based on the data event ID information.

17. The data stream generating device as recited in
20 claim 16, wherein the scheduler acquires program guide of a data event from the storage based on the data event ID information transmitted from the analyzer.

18. The data stream generating device as recited in
25 claim 17, wherein the encapsulator acquires a data broadcast content to be outputted from the storage, the encapsulation information, and the system information based on the data event ID information transmitted from the scheduler.

30

19. The data stream generating device as recited in claim 15, wherein the PSIP data event metadata further include:

35 content ID metadata which describe ID information of a content constituting the data event;

show data metadata which describe show information constituting the data event;

Data Event Table (DET) descriptor metadata which describe descriptor information of a DET;

5 DET private metadata for individually defining and using what needs to be recorded other than predetermined schema in connection with the DET; and

private metadata which describe information defined by a user with respect to the data event.

10

20. The data stream generating device as recited in claim 13, wherein the PMCP extended metadata include:

channel type metadata which provide system information of a data event constituting a data broadcast program; and

15 PSIP event metadata which provide ID information of an audio/video (AV) event constituting an AV broadcast program, and program guide and encapsulation information of a data event, and

20 the program guide of the data event and the program guide of the AV event are the same.

21. The data stream generating device as recited in claim 20, wherein the

25 event ID metadata which provide ID information of the AV event; and

data stream metadata which provide the encapsulation information of the data event, and

30 the PSIP event metadata have the program guide of the data event as an attribute.

22. The data stream generating device as recited in claim 21, wherein the analyzer acquires the program guide based on the attribute of the PSIP event metadata, the
35 encapsulation information based on the data stream metadata,

and the system information from the channel data based on the AV event ID information.

23. The data stream generating device as recited in
5 claim 22, wherein the scheduler acquires program guide of a data event from the storage based on the AV event ID information transmitted from the analyzer.

24. The data stream generating device as recited in
10 claim 23, wherein the encapsulator acquires a data broadcast content to be outputted from the storage, the encapsulation information, and the system information based on the AV event ID information transmitted from the scheduler.

15

25. The data stream generating device as recited in claim 13, wherein the PMCP extended metadata include:

channel type metadata which provide system
information of a data event constituting a data broadcast
20 program;

PSIP data event metadata which provide descriptor
information of a Data Event Table (DET); and

data stream metadata which provide ID information,
program guide and encapsulation information of a data event.

25

26. The data stream generating device as recited in claim 25, wherein the data stream metadata include:

data event ID metadata which provide ID information
of the data event, and

30 the data stream metadata have the program guide as an attribute.

27. The data stream generating device as recited in
claim 26, wherein the analyzer acquires the program guide
35 based on the attribute of the data stream metadata, the

encapsulation information based on the data stream metadata, and the system information from the channel data based on the data event ID information.

5 28. The data stream generating device as recited in claim 27, wherein the scheduler acquires program guide of a data event from the storage based on the data event ID information transmitted from the analyzer.

10 29. The data stream generating device as recited in claim 28, wherein the encapsulator acquires a data broadcast content to be outputted from the storage, the encapsulation information, and the system information based on the data event ID information transmitted from the
15 scheduler.

30. A digital data broadcast emitting system, comprising:

20 a broadcast emission controlling device for generating and updating Programming Metadata Communication Protocol (PMCP) extended metadata having system information, program guide and encapsulation information of a data broadcast program, and controlling the output of transport stream of the data broadcast program based on the program
25 guide; and

 a data stream generating device for generating and transmitting data stream based on the system information, the program guide and the encapsulation information of the data event which is described in the PMCP extended metadata
30 transmitted from the broadcast emission controlling device.

31. The digital data broadcast emitting system as recited in claim 30, wherein the data stream generating device includes:

35 an analyzer for analyzing the PMCP extended metadata

transmitted from the broadcast emission controlling device and storing system information, program guide, and encapsulation information of a data event in a storage along with a data broadcasting content;

5 a scheduler for acquiring the program guide of the data event from the storage and checking time when the data broadcasting content corresponding to the data event is supposed to be outputted based on the acquired program guide; and

10 an encapsulator for acquiring and outputting the data broadcasting content to be outputted from the storage, the encapsulation information, and the system information to a user terminal in a form of transport stream.

15 32. The digital data broadcast emitting system as recited in claim 30, wherein the PMCP extended metadata include:

 channel type metadata which provide system information of a data event constituting a data
20 broadcasting program; and

 Program and System Information Protocol (PSIP) data event metadata which provide identification (ID) information, program guide and encapsulation information of a data event.

25

 33. The digital data broadcast emitting system as recited in claim 32, wherein the PSIP data event metadata include:

 data event ID metadata which provide ID information
30 of the data event; and

 data stream metadata which provide the encapsulation information, and

 the PSIP data event metadata have the program guide as an attribute.

35

34. The digital data broadcast emitting system as recited in claim 30, wherein the PMCP extended metadata include:

channel type metadata which provide system
5 information of a data event constituting a data broadcast program; and

PSIP event metadata which provide ID information of an audio/video (AV) event constituting an AV broadcast program, and program guide and encapsulation information of
10 a data event, and

The program guide of the data event and the program guide of the AV event are the same.

35. The digital data broadcast emitting system as
15 recited in claim 34, wherein the PSIP event metadata include:

event ID metadata which provide ID information of the AV event; and

data stream metadata which provide the encapsulation
20 information of the data event, and

the PSIP event metadata have program guide of the data event as an attribute.

36. The digital data broadcast emitting system as
25 recited in claim 30, wherein the PMCP extended metadata include:

channel type metadata which provide system information of a data event constituting a data broadcast program;

30 PSIP data event metadata which provide descriptor information of a Data Event Table (DET); and

data stream metadata which provide ID information, program guide and encapsulation information of a data event.

35 37. The digital data broadcast emitting system as

recited in claim 36, wherein the data stream metadata include:

data event ID metadata which provide ID information of the data event, and

5 the data stream metadata have the program guide as an attribute.

38. A digital data broadcast emitting method, comprising the steps of:

10 a) analyzing Programming Metadata Communication Protocol (PMCP) extended metadata transmitted from a broadcast emission controlling device and storing system information, program guide and encapsulation information of a data event in a database along with a data broadcasting
15 content;

b) checking time when the data broadcasting content corresponding to the data event are supposed to be outputted based on the program guide of the data event acquired from the database; and

20 c) acquiring and outputting the data broadcasting content to be outputted, the encapsulation information, and the system information from the database to a user terminal in a form of transport stream.

25 39. The digital data broadcast emitting method as recited in claim 38, wherein the PMCP extended metadata include:

channel type metadata which provide system information of a data event constituting a data
30 broadcasting program; and

Program and System Information Protocol (PSIP) data event metadata which provide identification (ID) information, program guide and encapsulation information of a data event.

35

40. The digital data broadcast emitting method as recited in claim 39, wherein the PSIP data event metadata include:

5 data event ID metadata which provide ID information of the data event; and

data stream metadata which provide the encapsulation information, and

the PSIP data event metadata have the program guide as an attribute.

10

41. The digital data broadcast emitting method as recited in claim 40, wherein the program information is acquired based on the attribute of the PSIP data event metadata and the encapsulation information is acquired
15 based on the data stream metadata, while the system information is acquired from the channel data based on the data event ID information.

42. The digital data broadcast emitting method as
20 recited in claim 38, wherein the PMCP extended metadata include:

channel type metadata which provide system information of a data event constituting a data broadcast program; and

25 PSIP event metadata which provide ID information of an audio/video (AV) event constituting an AV broadcast program, and program guide and encapsulation information of a data event, and

the program guide of the data event and the program
30 guide of the AV event are the same.

43. The digital data broadcast emitting method as recited in claim 42, wherein the PSIP event metadata include:

35 event ID metadata which provide ID information of the

AV event; and

data stream metadata which provide the encapsulation information of the data event, and

the PSIP event metadata have program guide of the data event as an attribute.

44. The digital data broadcast emitting method as recited in claim 43, wherein the program guide is acquired based on the attribute of the PSIP event metadata, and the encapsulation information is acquired based on the data stream metadata, while the system information is acquired from the channel data based on the AV event ID information.

45. The digital data broadcast emitting method as recited in claim 38, wherein the PMCP extended metadata include:

channel type metadata which provide system information of a data event constituting a data broadcast program;

PSIP data event metadata which provide descriptor information of a Data Event Table (DET); and

data stream metadata which provide ID information, program guide and encapsulation information of a data event.

46. The digital data broadcast emitting method as recited in claim 45, wherein the data stream metadata include:

data event ID metadata which provide ID information of the data event, and

the data stream metadata have the program guide as an attribute.

47. The digital data broadcast emitting method as recited in claim 46, wherein the program guide is acquired based on the attribute of the data stream metadata, and the

encapsulation information is acquired based on the data stream metadata, while the system information from the channel data based on the data event ID information.

5 48. A computer-readable recording medium for recording a program, comprising the steps of:

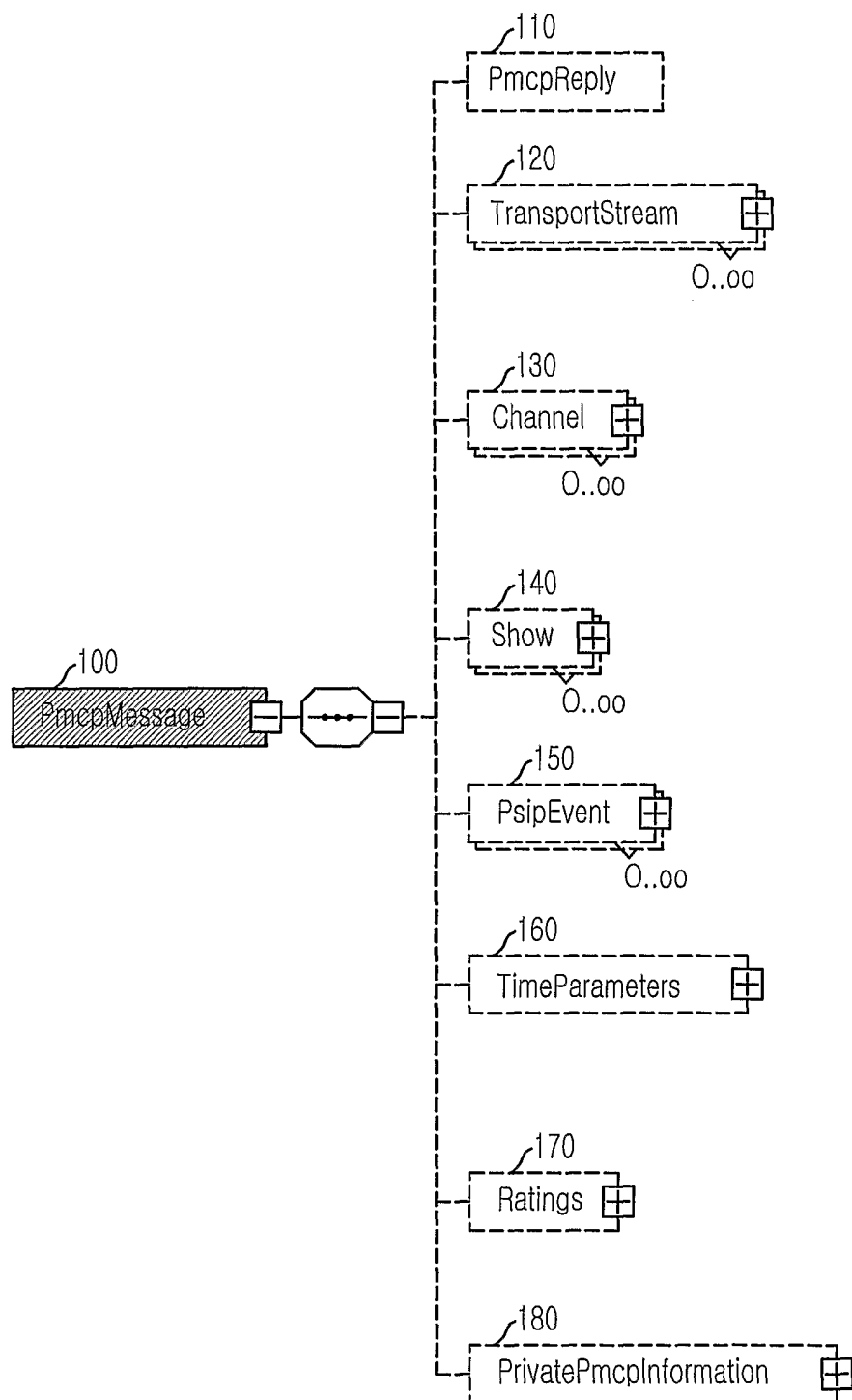
 a) analyzing Programming Metadata Communication Protocol (PMCP) extended metadata transmitted from a broadcast emission controlling device and storing system
10 information, program guide and encapsulation information of a data event in a database along with a data broadcasting content;

 b) checking time when the data broadcasting content corresponding to the data event are supposed to be
15 outputted based on the program guide of the data event acquired from the database; and

 c) acquiring and outputting the data broadcasting content to be outputted, the encapsulation information, and the system information from the database to a user terminal
20 in a form of transport stream.

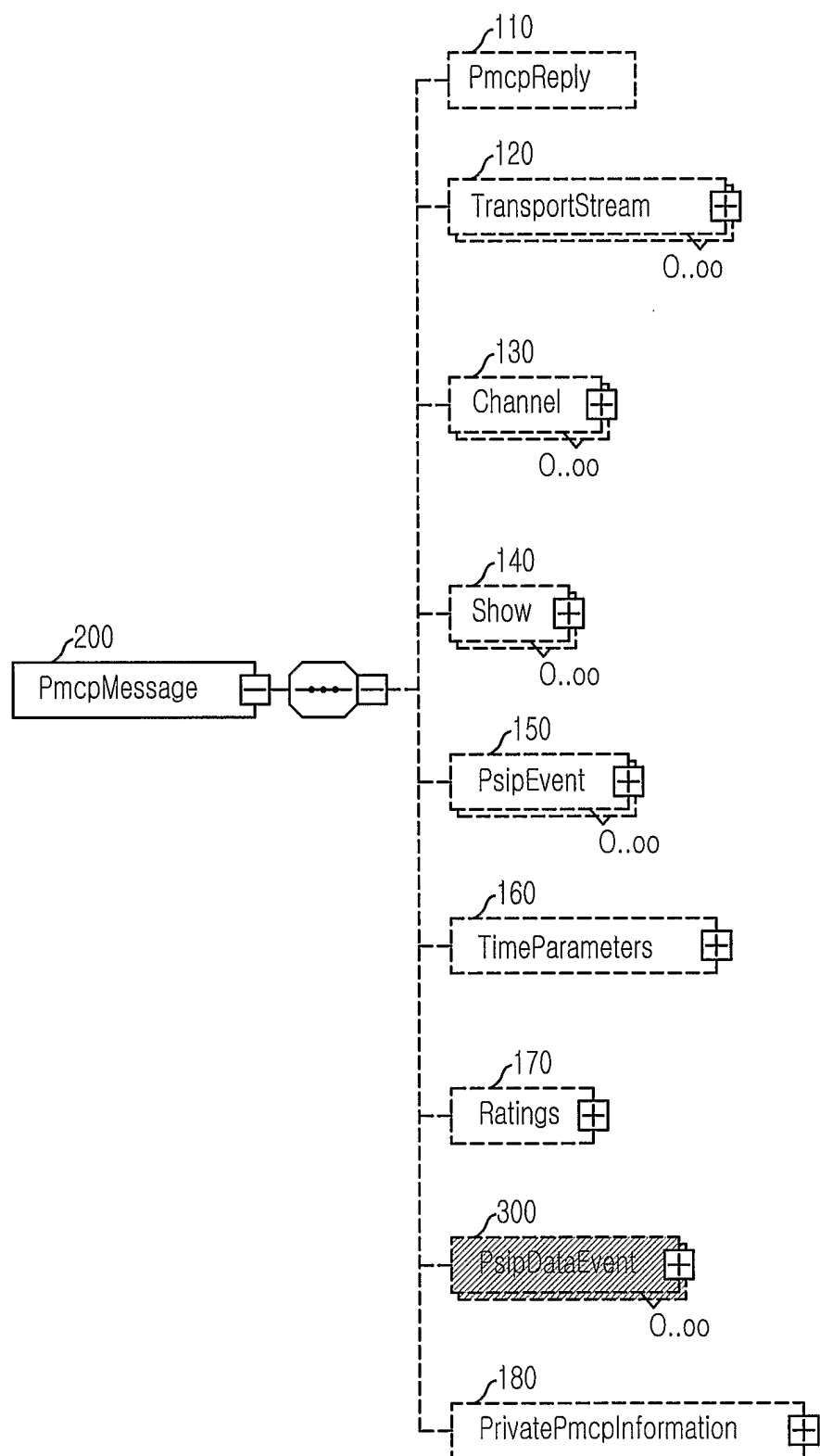
1/13

FIG. 1



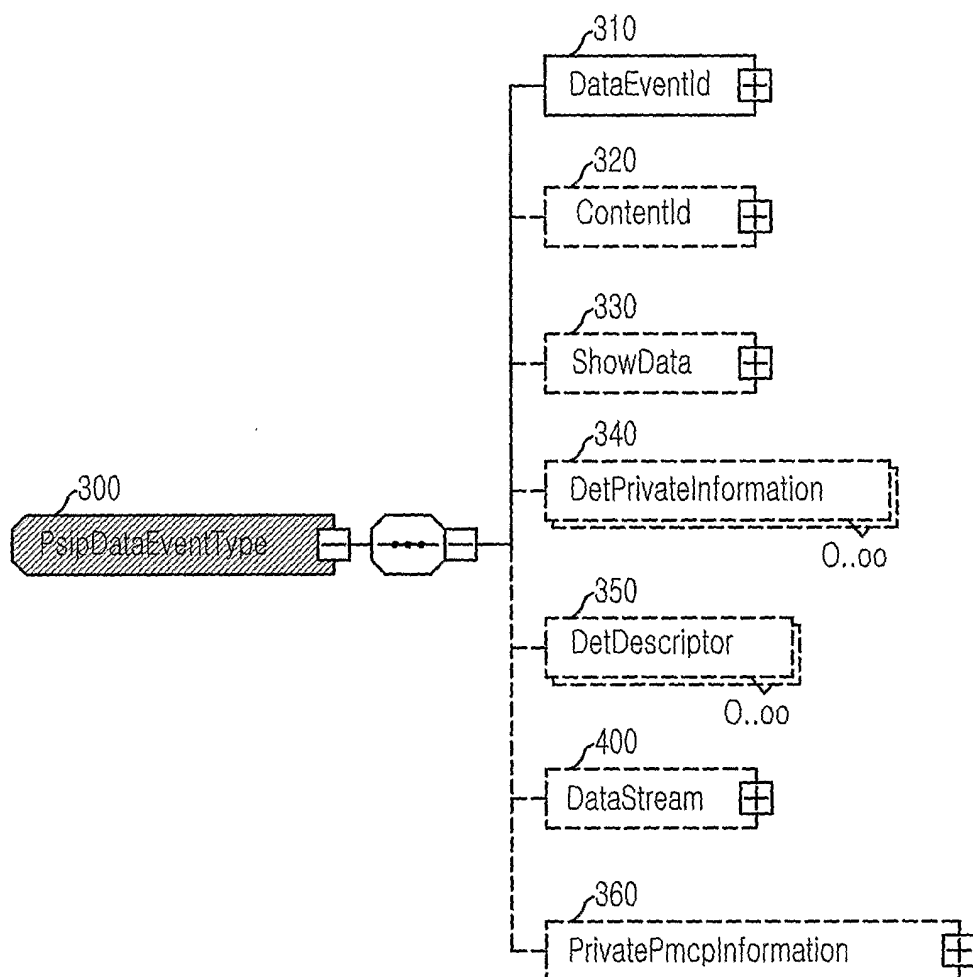
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FIG. 2



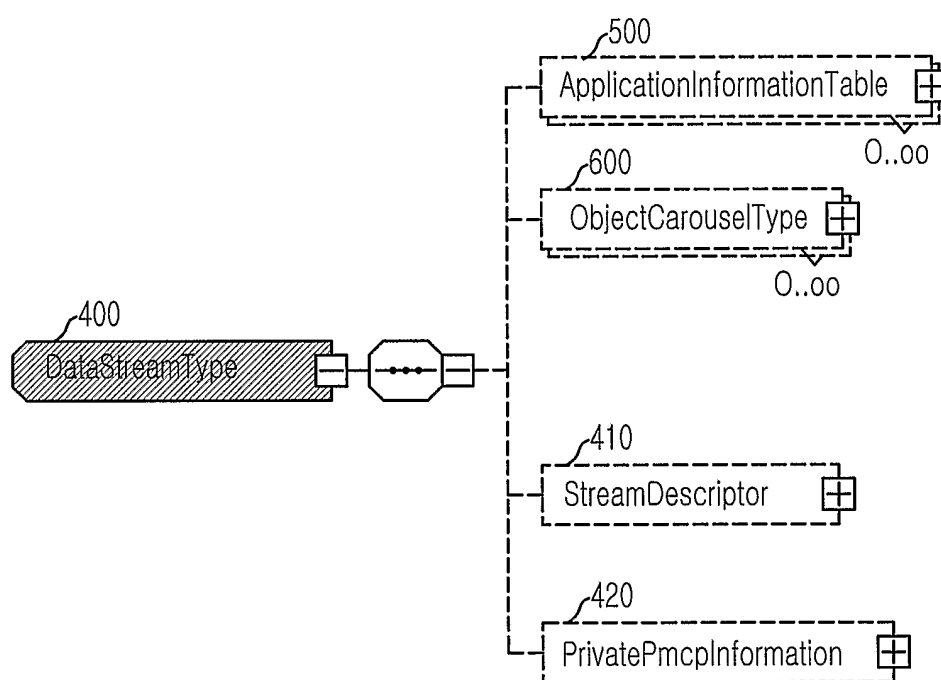
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FIG. 3



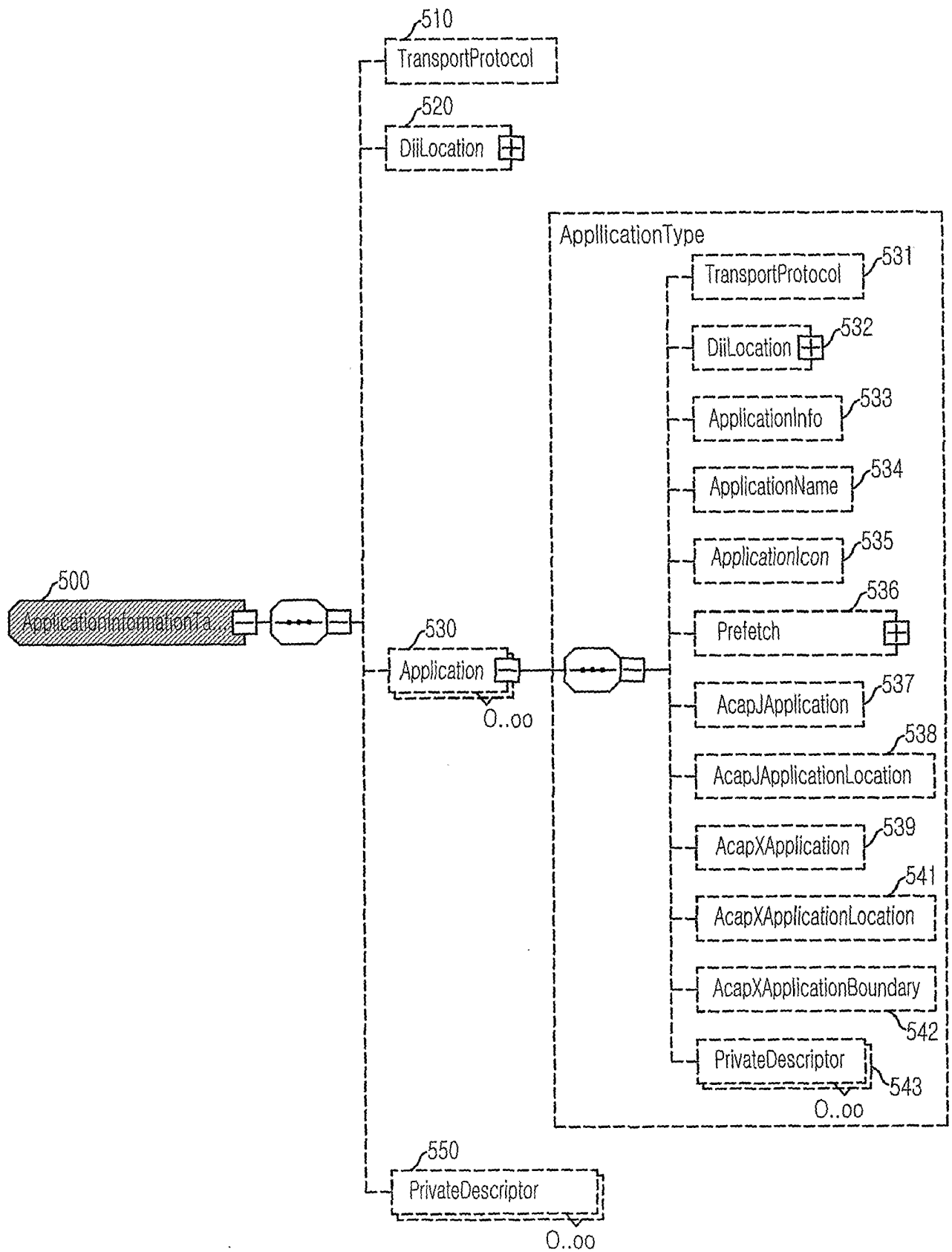
4/13

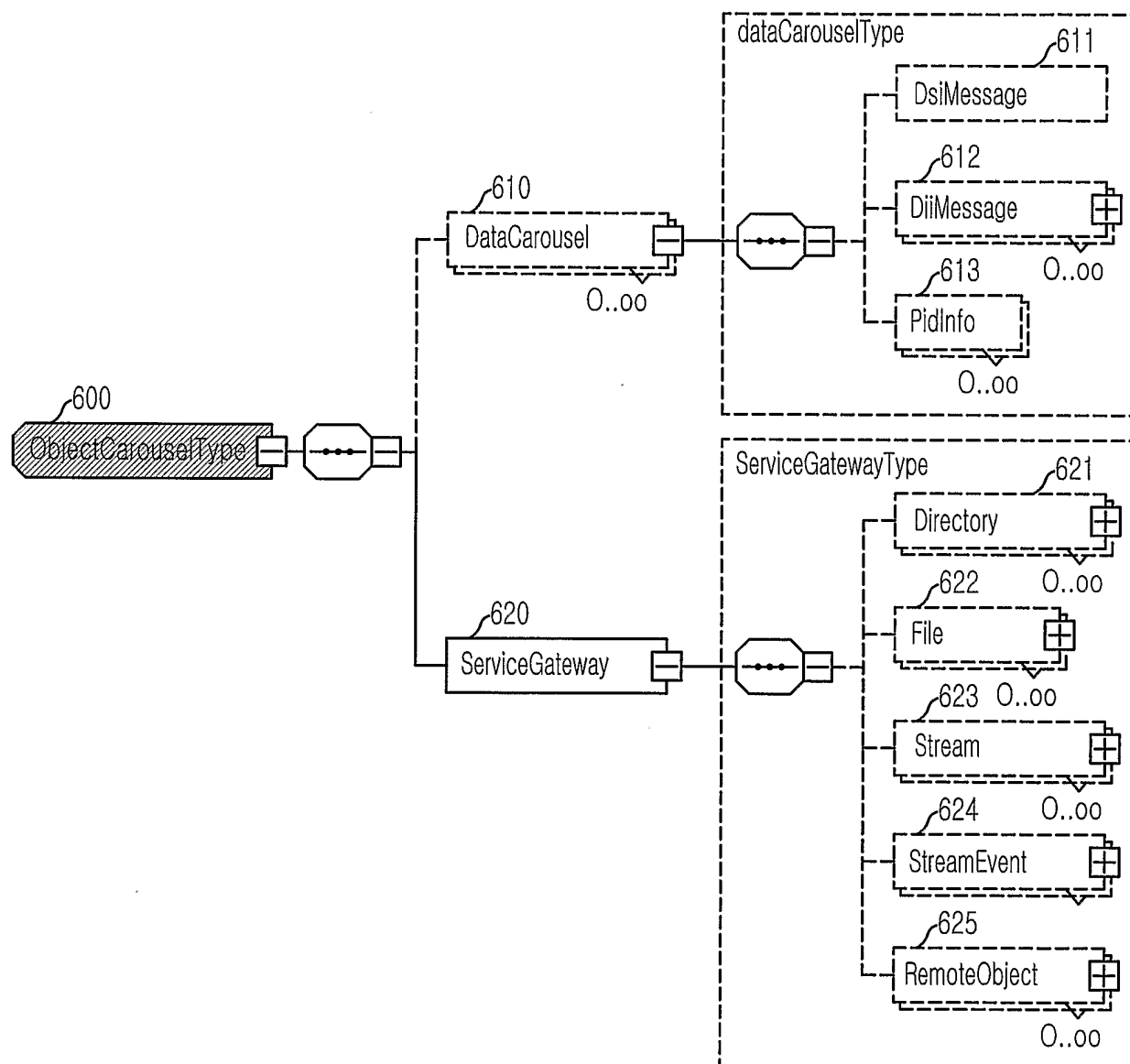
FIG. 4



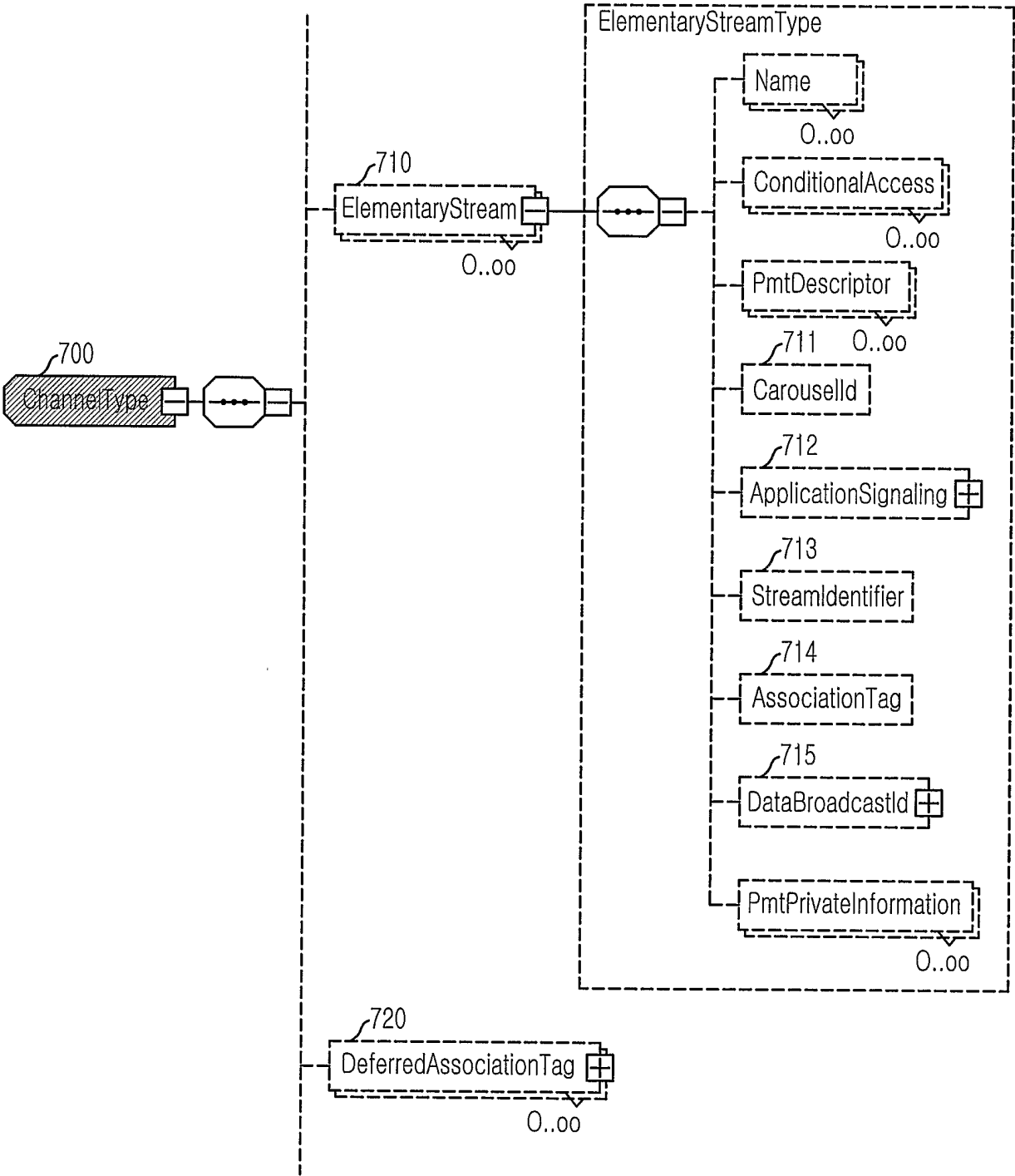
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FIG. 5



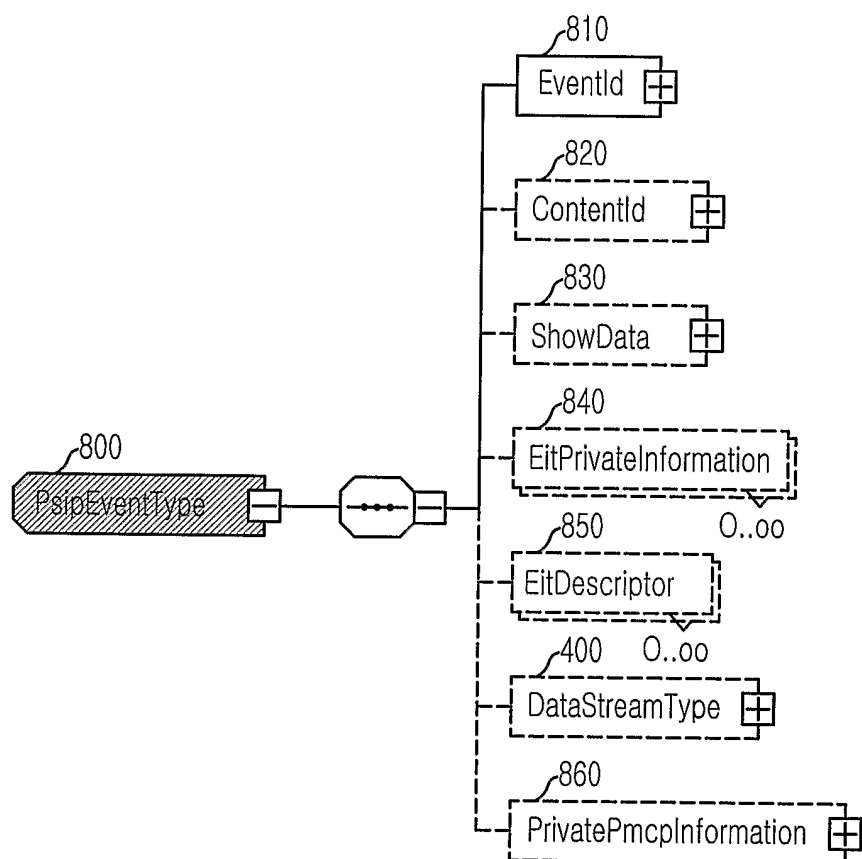
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FIG. 6

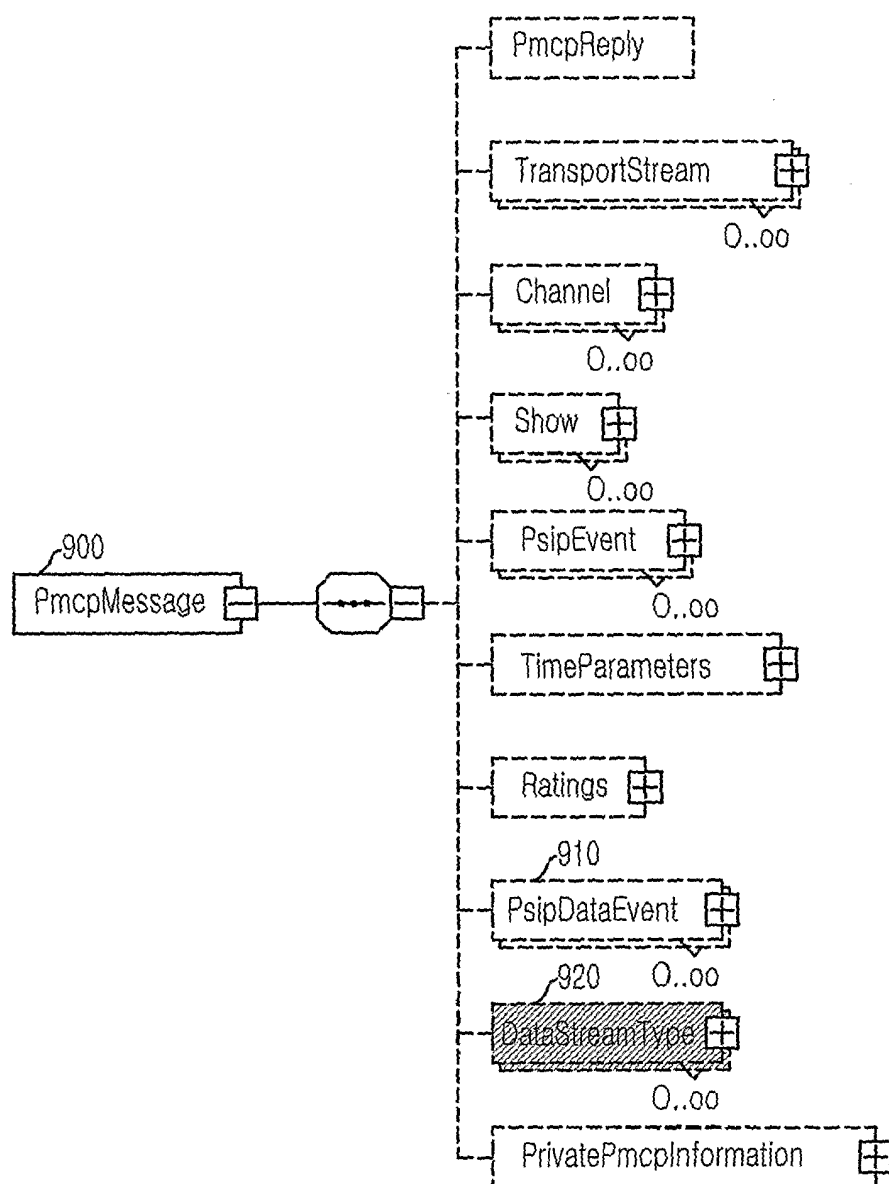
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FIG. 7



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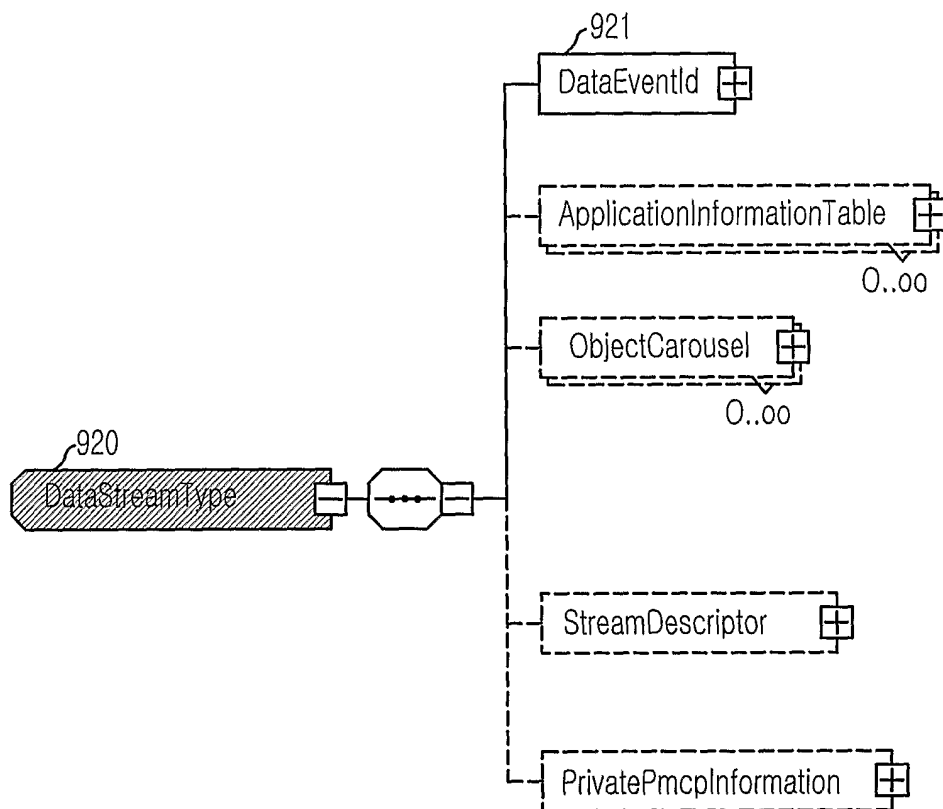
FIG. 8



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FIG. 9

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FIG. 10



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FIG. 11

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<?xml version="1.0" encoding="UTF-8"?>
<!--Sample PMCP file for Demo, Two Directory -->
- <PmcpMessage id="100004" origin="Streaming_Controller" originType="Traffic" dateTime="2004-12-14T04:28:00+09:00" destination="ACAP_Data_Server" type="information">
- <Channel channelNumber="11-1" tsid="101" programNumber="1" sourceId="1" pmlPID="72" pcrPid="48" cation="add">
- <ElementaryStream pid="210" type="11">
  <CarouselId carouselId="1" moduleVersion="0" moduleId="0" blockSize="4508" objectKey="0"/>
  <AssociationTag associationTag="1" use="0" transactionId="2147483648" timeout="10000000"/>
</ElementaryStream>
- <ElementaryStream pid="220" type="5">
  <ApplicationSignaling>
    <VersionInfo applicationType="6" attVersionNumber="1"/>
  </ApplicationSignaling>
</ElementaryStream>
  <ElementaryStream pid="48" type="2"/>
  <ElementaryStream pid="49" type="129" audioId="1"/>
</Channel>
- <PspDataEvent startTime="2004-12-14T04:30:00+09:00" duration="PT50M" action="add">
- <DataEventId channelNumber="11-1">
  <PspDataId dataId="101"/>
  <DataEventId>
- <DataStream>
  - <ApplicationInformationTable applicationType="6" pid="220">
    <!-- applicationType="6" for ACAP-J -->
    <TransportProtocol transportProtocolLabel="1" protocolId="6" sourceId="1" componentTag="1"/>
    <!-- protocolId="6" for ACAP ObjectCarousel -->
  - <DiiLocation transportProtocolLabel="1">
    <DiiModule diiIdentification="1" associationTag="1"/>
  </DiiLocation>
  - <Application organizationId="1" applicationId="1" controlCode="1">
    <ApplicationInfo applicationProfile="1" versionMajor="1" versionMinor="0" versionMicro="0" serviceBoundFlag="1" visibility="1" applicationPriority="1" transportProtocolLabel="1"/>
    <ApplicationName lang="kor" applicationName="quiz"/>
    <Application parameter="quiz"/>
    <ApplicationLocation baseDirectory="/" classPathExtension="" initialClass="XletMain"/>
  </Application>
</ApplicationInformationTable>
- <ObjectCarousel>
  - <DataCarousel carouselId="1" blockSize="4058" periodMs="1000">
    <DsiMessage associationTag="1" transactionId="2147483648" periodMs="500"/>
    ⊞ <DiiMessage associationTag="1" transactionId="2147483650" periodMs="500">
      <PidInfo associationTag="1" pid="210"/>
    </DiiMessage>
  </DataCarousel>
  + <ServiceGateway carouselId="1" sourceId="1" moduleId="0" objectKey="0">
</ObjectCarousel>
</DataStream>
</PspDataEvent>
</PmcpMessage>

```

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FIG. 12

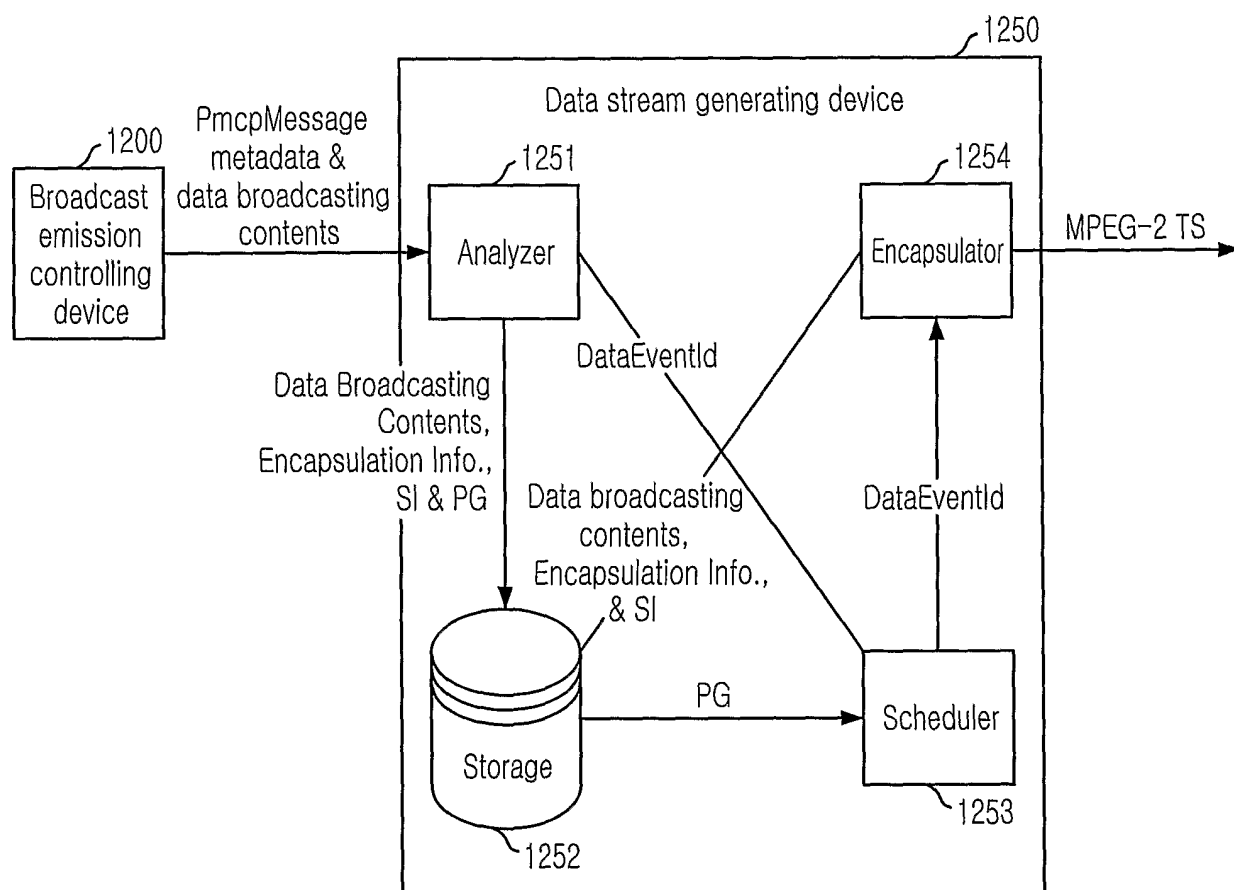
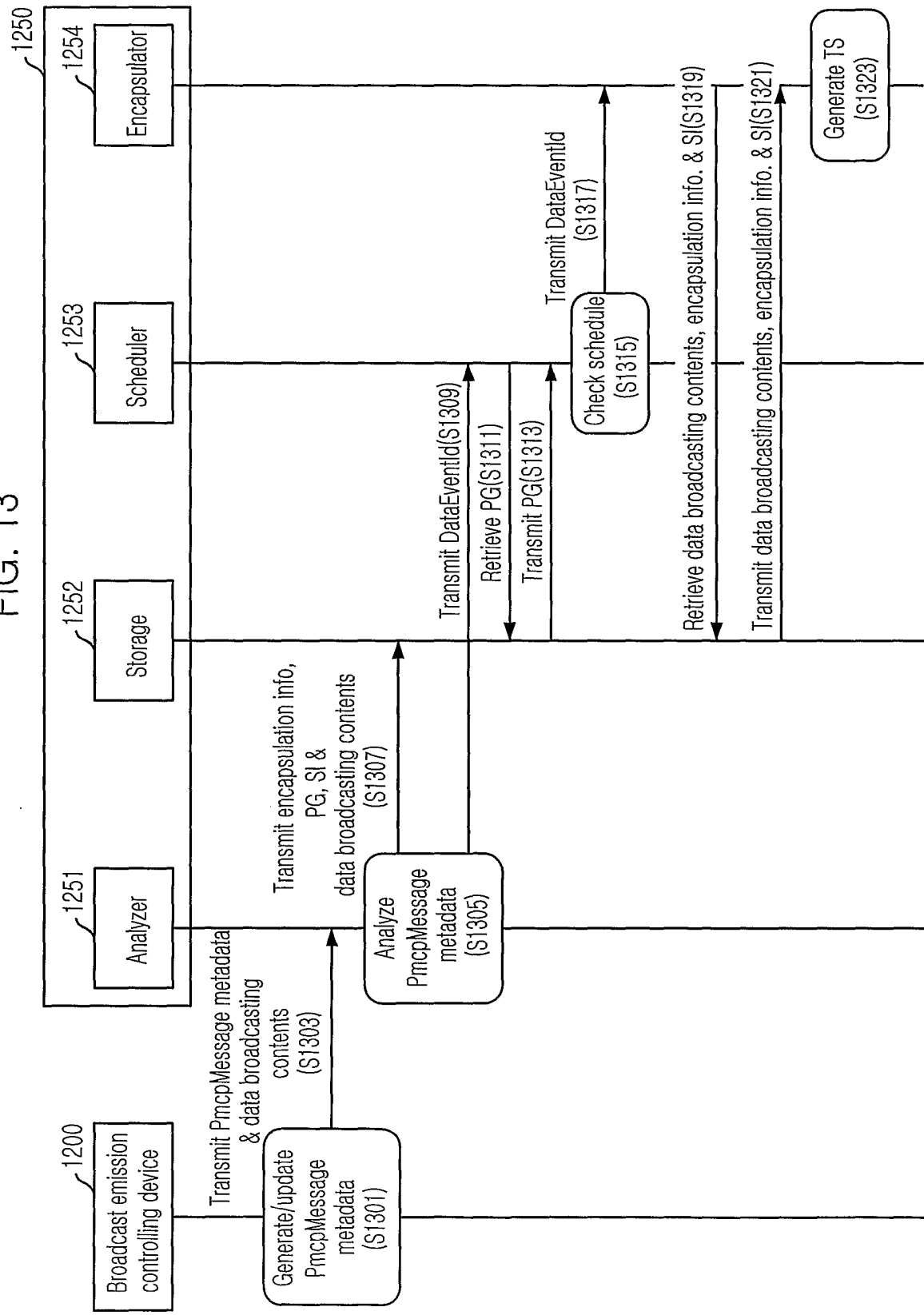


FIG. 13



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2005/001606

A. CLASSIFICATION OF SUBJECT MATTER**IPC7 H04N 7/08**

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)

IPC7 H04N 7/08

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

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

IEEE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	"Design of PSIP converter for data broadcasting service in the interoperable network of terrestrial and cable" ; Ji Hoon Choi, et al., Intelligent Signal Processing and Communication Systems, 2004. ISPACS 2004, Publication Date: 18-19 Nov. 2004, On page(s): 604 - 608	1-48
P,A	"Implementation of PSIP generating system for data broadcasting based on PMCP"; Young Kyung Park, et al., Advanced Communication Technology, 2005, ICACT 2005. The 7th International Conference on, Publication Date: 21-23 Feb. 2005, Volume: 2, On page(s): 1175 - 1179 Vol. 2	1-48
A	ATSC STANDARD A/76	1-48

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

* Special categories of cited documents:

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"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

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"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

07 OCTOBER 2005 (07.10.2005)

Date of mailing of the international search report

10 OCTOBER 2005 (10.10.2005)

Name and mailing address of the ISA/KR

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